Living Resources Committee **ICES CM 2001/G:01**

REPORT OF THE

Workshop on Identification and Staging of Mackerel and Horse Mackerel Eggs

Lowestoft, United Kingdom
4–13 December 2000

International Council for the Exploration of the Sea

Conseil International pour l’Exploration de la Mer

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Terms of Reference

Address identification and staging problems encountered during the 1998 surveys.

Summary

In preparation of the 2001 international ICES coordinated mackerel and horse mackerel egg survey a workshop was conducted to investigate causes for individual divergences in egg staging of mackerel and horse mackerel and to eventually harmonise these. For the calculation of the number of spawning females it is essential to correctly identify the number freshly spawned eggs, *i.e.*, the eggs of the stages Ia and Ib, and to distinguish these from eggs of the stage II. Previous to the workshop an egg exchange was initiated in 1999 to test the precision in egg staging of the individual laboratories. Even though this exercise was not fully completed when the workshops started, it showed sufficiently that the numbers of eggs retrieved from the plankton sample and identified correctly, varied greatly and intolerably. This strongly underpinned the importance and the need of conducting the workshop.

At the beginning of the workshop the possible causes of the divergences of the results from the exchange were discussed. It became clear that the treatments of the samples differed considerably between the nations. Also, the individual perception of the developmental stages fluctuated greatly for some particular embryonic stages.

However, from the statistical analysis of the first staging during the workshop it became apparent that the agreement for the stages Ia and Ib together was over 90% for both species was thus surprisingly high. In the second staging both figures were even improved and reached 96% for mackerel and 94% for horse mackerel. The overall agreement for all stages together improved for horse mackerel from 74% in the first reading to 85% in the second, and from 71% to 82% in mackerel. For both species the improvement was thus about 10% as an average for all stages (learning effect during the workshop).

The initial overall mis-estimation of the stages Ia+b combined was –2.5% for mackerel and +1.5% for horse mackerel. In retrospective this implies that during the analysis of the results of earlier surveys it is likely that the number of mackerel eggs was on average slightly underestimated and the number of horse mackerel eggs was slightly overestimated. The individual over- or underestimation was however large and varied between the participating persons from -16% to +15% for horse mackerel and between –16% to +10% for mackerel. However, even though the individual deviations from seem to be high, the exercise has clearly shown that on average the estimate of eggs at stage I was reasonably good, if taken yearly differences in the egg production of the fish of 20-30% into account. In summary, the workshop has sufficiently shown that the overall reading error in the analysis of previous surveys was probably not too high.

In addition, a histology workshop was held subsequent to the egg staging workshop to teach the histological methods to determine the fecundity of mackerel and horse mackerel. On analogy of egg staging comparison, the performance of the individual reader was tested again. The results show a great discrepancy between the experienced and the inexperienced readers. It is therefore recommended for the immediate future to initiate histological slide exchanges to ensure little deviation in the histological interpretation of the fecundity of mackerel and horse mackerel.

It is intended to initiate such an exchange already in the context of the 2001 mackerel and horse mackerel egg survey with the slides obtained from the fish caught during the survey.

Acknowledgements

All participants wish to express their thanks and gratitude for the great hospitality they met and excellent facilities they were allowed to use at the CEFAS laboratories. They also wish to acknowledge the generous financial support which was granted by the European Commission in the frame of an Accompanying Measure. Without this it would have been impossible to conduct this workshop.

Introduction

The annual analytical assessments of the northeast Atlantic mackerel and horse mackerel stocks rely on commercial catch data which usually are insufficient for a fully qualified analytical assessment. For mackerel and horse mackerel the only available fishery independent biomass indices are derived from the international triennial egg survey. Since over 20 years this survey is conducted during the spawning season. At present 9 European contributors conduct the survey, *i.e.* Portugal, Spain mainland and Spain Basque Country, England, Ireland, Scotland, Norway, The Netherlands and Germany. Each nation contributes with at least one survey, some nations even with two or more. France additionally contributes with data analysis. Due to the great effort invested into the survey programme and the tremendous costs involved, it can only be conducted every third year, the next being conducted in 2001. During such a survey programme sampling starts in the spawning area in the Portuguese waters in January. The coverage increases in space and duration and shifts slowly northwards with progressing time and warming of the water masses. In late summer the areas north of Ireland are reached.

The plankton samples taken during the surveys are sorted and the eggs classified according to their individual stages in as many laboratories as there are participants in the survey. The data are combined and result in the overall biomass indices. Initial results of a recent exchange of samples have however indicated unexpected high divergences of the staging of the fish eggs, pointing at partially different interpretation of the embryonic structures. This problem of high variability in determination of embryonic developmental stages cannot be solved by circulating instructions or samples from lab to lab. For this reason the respective ICES working group (Mackerel and Horse Mackerel Egg Survey Working Group, WGMEGS) decided to organise a workshop which was conducted in December 2000 in Lowestoft, England.

Moreover, the estimate of the total number of parental animals in the stock, which contribute to the spawning, depends on the accurate evaluation of the histological sections of the gonads for fecundity and atresia determination.

It was not yet assessed how divergent the individual readings of the participating laboratories were. In addition to the plankton staging workshop, a second workshop was organized in conjunction with the plankton staging workshop to train the sectioning techniques, to teach the analysis and to train and assess the interpretation of the slides of the gonads.

Timetable

- December 03. 2000 - Travel of participants to Lowestoft, England
- December 04. 2000 - Start of workshop part I, introduction, presentation of the results of the 1999-2000 egg exchange, starting 1. round of egg staging. Delivering the results to the statistical coordinator.
- December 05. 2000 - Continuation of the analysis of the samples. A total of 800 eggs were read in the first round by each reading participant with 16 different microscopes.
- December 06. 2000 - Presentation of the statistical analysis of the first analysis. Discussion of the results. Discussion of developmental stages with low agreement in the first analysis by means of transparencies and of filmed images on the screen.
- December 07. 2000 - Second analysis of 400 eggs at 16 microscopes.
- December 08. 2000 - Discussion and analysis of the results of the second reading
- December 09. 2000 - Final discussion and analysis, drafting of the report.
- December 10. 2000 - Free
- December 11. 2000 - Introduction to preparing histological slides for fecundity and atresia.
- December 12. 2000 - Exercises in production of histological slides.
- December 13. 2000 - Exercises in fecundity and atresia estimation from slides, drafting manual and report and “shopping list”.
- December 14. 2000 - Travel home.

1 MACKEREL AND HORSE MACKEREL EGG STAGING WORKSHOP

1.1 List of Participants

Inger -Marie Beck	IMR, Norway
Ingeborg de Boois	RIVO, Netherlands
Carol Bye, CEFAS	England
Guus Eltink, RIVO	Netherlands
Anabela Farina, IPIMAR	Portugal
Sofia Figueiredo	IPIMAR, Portugal
Concha Franco	IEO, Spain
Iain Gibb	FRS, Scotland
Cornelius Hammer	BFA, Germany
Selene Hoey, MI	Ireland
Ana Lago De Lanzós	IEO, Spain
Jan de Lange, IMR	Norway
Deirdre Lynch, MI	Ireland
Inma Martin, AZTI	Spain
Steve Milligan, (**Chair)**	CEFAS, England
Kerstin Mölter	BFA, Germany
Beatriz Roel	CEFAS, England
Mike Shaw	CEFAS, England
Maria Santos	AZTI, Spain

1.2 Workshop Agenda

1. Introduction and welcome. S. Milligan (CEFAS)
2. Brief introduction to the histology workshop. P. Witthames (CEFAS)
3. Presentation of the results of the sample exchange experiment 1999-2000. S. Milligan (CEFAS), discussion and evaluation.
4. Presentation of working documents.
5. Discussion on the egg staging to be used during the workshop.
6. Staging of prepared samples of mackerel and horse mackerel eggs.
7. Statistical analysis of the results from the comparative egg staging exercise.
8. Discussion and evaluation of results including group analysis of those eggs which are highlighted as causing the greatest difficulties.
9. Repeat of egg staging exercise.
10. Statistical analysis and interpretation of the second set of results.
11. Repeat the egg staging exercise if necessary and appropriate time is available.
12. Statistical analysis and interpretation of the third set of results.
13. Discussion and evaluation of the performance of individual participants.
14. Production of the report on the statistical evaluation of individual participants.
15. Discussion on the interpretation of egg stages and production of a plankton sampling manual for the use of all participants in the WGMEGS 2001 surveys.
16. Any other business.

1.3 Results of the plankton sample (egg staging) exchange (1999-2000)

Note*: Detailed information is given in the Appendices (Annex 1-7). The numbering of the figures and tables start for each Annex with 1. Therefore, identical figure and table number occur in the chapters, referring to different Appendices.*

As a result of a recommendation of the WGMEGS (ICES, 1999), three plankton samples were prepared and passed around each institute in turn. Each sample contained both mackerel and horse mackerel eggs in all stages of development. Each participant was asked to sort, count, identify and stage the mackerel and horse mackerel eggs found in each sample. If sub-sampling was required (because of large numbers of eggs) each institute was to use their standard sub-sampling procedure. Once the eggs had been sorted from the samples, they were identified, staged and returned to the rest of the plankton before being sent to the next participant.

The samples were prepared and sent to Germany during December 1999. To date, only five participating institutes have produced results (Tables 1 (a-c) and 2 (a - c)), with the Netherlands only having time to complete sample 1. The results are given for each country in the order of analysis.

Table 1. The number of mackerel eggs allocated to each development stage by country.

a)

Country	**Mackerel egg stages. Sample 1 (stn 40)**								
	Ia	Ib	Total I	II	III	IV	V	Raising factor	Total
England	24	12	36	16	11	5	1	1	69
Germany			39	22	20	6	0	1	87
Norway	33	6	39	9	19	4	3	1	74
Scotland 1			18	4	7	3	0	1	32
Scotland 2			20	3	7	4	0	1	34
Netherlands			38	11	11	4	2	1	66

b)

Country	**Mackerel egg stages. Sample 2 (stn 99)**								
	Ia	Ib	Total I	II	III	IV	V	Raising factor	Total
England	3	1	4	2	9	6	0	1	21
Germany	9	2	11	2	7	9	0	1	29
Norway	3	0	3	0	16	4	0	1	23
Scotland 1			3	2	13	4	0	1	22
Scotland 2			3	2	11	7	0	1	23

c)

Country	**Mackerel egg stages. Sample 3 (stn 157)**								
	Ia	Ib	Total I	II	III	IV	V	Raising factor	Total
England	39	8	47	20	5	4	7	1	83
Germany			39 (160)	9 (37)	8 (33)	1 (4)	0 (0)	4.09	234
Norway	44	4	48	3	16	1	8	1	76
Scotland 1			46	3	10	2	8	1	69
Scotland 2			45	3	12	2	8	1	70

Table 2. The number of horse mackerel eggs allocated to each development stage by country.

a)

Country	**Horse mackerel egg stages. Sample 1 (stn 40)**							
	Ia	Ib	Total I	II	III	IV	Raising factor	Total
England	5 (8)	0 (0)	5 (8)	41 (62)	42 (64)	12 (18)	1.52	152
Germany			31	38	88	12	1	169
Norway	4	0	4	4	92	32	1	132
Scotland 1			9	5	18	38	1	70
Scotland 2			8	4	32	31	1	75
Netherlands			10	22	32	9	1	73

b)

Country	**Horse mackerel egg stages. Sample 2 (stn 99)**							
	Ia	Ib	Total I	II	III	IV	Raising factor	Total
England	16 (22)	9 (12)	25 (34)	13 (18)	39 (53)	23 (32)	1.37	137
Germany	35	17	52	32	79	41	1	204
Norway	20	3	23	9	27	3	1	62
Scotland 1			25	17	38	25	1	105
Scotland 2			32	17	40	33	1	122

c)

Country	**Horse mackerel egg stages. Sample 3 (stn 157)**							
	Ia	Ib	Total I	II	III	IV	Raising factor	Total
England	47 (342)	0 (0)	47 (342)	32 (233)	14 (102)	7 (51)	7.28	728
Germany			68 (278)	34 (139)	31 (127)	11 (45)	4.09	589
Norway	147 (415)	0 (0)	147 (415)	53 (150)	17 (48)	13 (37)	2.826	650
Scotland 1			356	94	80	63	1	593
Scotland 2			351	94	83	60	1	588

The 'Raising factor' in the above tables is the multiplication factor applied to the number of staged eggs, to obtain the total numbers of eggs of each species in each station. The 'Raised' egg numbers are given in brackets.

Different countries used different sub-sampling techniques. In England, all horse mackerel eggs were removed and identified but only one hundred were staged from each sample. Norway employed the same procedure in sample 3, staging 230 horse mackerel eggs from a total of 650.

A different procedure was used in Germany where all eggs were removed but only 201 were identified and staged. The raising factor for sample 3 is therefore the same for both mackerel and horse mackerel. This procedure assumes that both the stage distribution and the proportion of mackerel to horse mackerel eggs are the same in the sub-sample and the total sample.

The results show some alarming differences not only in the allocation of eggs to stages but also in the overall numbers of each species of egg identified. These results clearly indicate the very urgent need for this egg staging workshop.

1.4 Egg staging exercise

1.4.1 Material and Methods, explanation of the document

The following text explains the results of the egg staging exercise. The respective tables and figures referred to are found in Annex 1 and 2. Annex 1 gives and overview of the results in form of one table and Annex 2 provides all details.

Tables 1a-c in Annex 1 summarise the results of all readings of all participants. Table 1c shows the overall *average* underestimation of –2% and of +2% for horse mackerel. The latter figure improves to 0% in the second reading and changes to +2% for the former. However, this is only an average and individual deviations range from 16% to +17%. In addition, the tables show a high degree of the modal egg stage.

The utilized egg material was taken from samples from the previous 1998 mackerel and horse mackerel egg survey. The eggs have for this reason been preserved in formalin for three years and have on top of this been sorted and handled a couple of times. As a result, many eggs were difficult to determine and were partly in a poor condition. Some of the eggs have become very murky and dark in the meantime and were very difficult to determine. However, the discussion of exactly these eggs proved to be very valuable because all features to determine the eggs were thoroughly evaluated and weighted against each other. A total of 800 eggs were prepared in 16 trays. Each tray had 50 little wells containing one egg each. Since lines and rows were marked, each individual egg could be identified and be described. Each participant had to stage these eggs in the first round at 16 different microscopes. Some of these were new and modern, others older and less sophisticated, thus reflecting the variety of microscopes available and used in the different labs involved in the analysis of the plankton samples. The egg stage readers had to shift from one microscope to the other. In this way, the results of the egg stage readers were not affected by differences in the quality of the microscopes. The mackerel eggs were staged Ia, Ib, II, III, IV, V and the horse mackerel were staged Ia, Ib, II, III, IV. Due to the fact that computers can only calculate with numeric values, stage Ia was changed in 0 and stage Ib in I in the tables.

The first set of tables presented at the workshop (Annex 2,Table 1, 6, 11, 16) contain the stages as analysed by each reader. From the results of each reader the modal stage per egg was calculated. This means that that particular stage was taken as a general or “correct” stage which most reader decided for. This does not necessarily need to be the true stage, however. In the case when two or more stages appeared at equal frequency, the stage used by the most experienced readers was used as the modal stage. The percentage of agreement represents the percentage of readers that agreed with the modal stage.

Based on the results of the staging, a table (Annex 2, Table 2(A), 7(A), 12(A), 17(A) (capital letters in parenthesis refer to particularly marked lines in the tables)) was created which represents the number of eggs per stage that should have been identified by each reader. The figures in this table are based on the modal stage. The numbers per stage will be the same for all readers that read all the eggs. The next table presented (*i.e.* Annex 2, Table 2(B), 7(B), 12(B), 17(B)) contains the real number of eggs per stage as staged by each reader.

From those tables the over- and underestimation (*i.e.* Annex 2 Table 2(C), 7(C), 12(C), 17(C)) of stage I was calculated by comparing the sum of Ia and Ib eggs of the table with the numbers per modal age and the sum of stage Ia and Ib in the egg stage composition.

Next, from all eggs the stage as identified by the reader was compared with the modal stage calculated. This resulted in a percentage of agreement per egg stage per reader (*i.e.* Annex 2, Table 2(D), 7(D), 12(D), 17(D)). Based on the weighted mean of all stages readers in this table were ranked from the highest to the lowest percentage agreement. This is the basis of the ranking of the readers in the other tables.

Annex 2, Tables 2(E), 7(E), 12(E), 17(E) show the percentage of agreement on stage Ia and Ib eggs, considered to be one stage.

Annex 2, Tables 2(F), 7(F), 12(F) and 17(F) show the bias in the different stages. When the bias is positive, it means the eggs compared to the modal stage were put in a higher stage than it had to be. As a result, all bias in stage Ia will be 0 or positive and all bias in stage V (mackerel) and stage V (horse mackerel) will be negative. For example, if a reader stages 4 eggs as stage III and two of them were modal stage II and the other two were modal stage III then the bias will be: (2-3)+(2-3)+(3-3)+(3-3))/4= -0.50.

Annex 2, Tables 3, 8, 13 and 18 show the results per microscope, which was equal to the tray number, since the trays did not circulate. The first table shows the number of eggs per modal stage, the second one the percentage agreement on the different stages by tray/microscope and the third one the bias per stage. The reason for this analysis is the different quality of microscopes and samples.

Annex 2, Tables 4, 9, 14 and 19 show the standard deviation by reader and stage. Those tables contain the data for the plots in figures 1, 3, 5 and 7. For each modal stage an average of the identified stages per reader will be calculated. This value shows if a reader is over- or underestimating the stage of the eggs at a given modal stage (accuracy). Around that value 2*standard deviation is plotted as a measure for the precision of the staging.

Annex 2, Tables 5, 10, 15 and 20 show the same results as Annex 2, Tables 2, 7, 12 and 17 but then for the situation when stage Ia and Ib are put together to one stage. Annex 2, Figures 2, 4, 6 and 8 show the same results as given in Annex 2, Figure 1, 3, 5 and 7 but then for the stages Ia and Ib put together as well.

The data were recorded, analysed and subsequently thoroughly discussed. From the analysis of the readings it became apparent which individual egg had resulted in a high or low agreement, the low agreement indicating problems of the correct identification of the developmental stage. These eggs were then brought under a microscope equipped with a digital camera and broadly displayed at a screen. The discussions then led generally accepted developmental stages in the group.

Due to the lack of time, only 400 eggs were read by the group in the second reading. However, this number was sufficient to have a solid basis for comparison and to identify problematic stages which still remained.

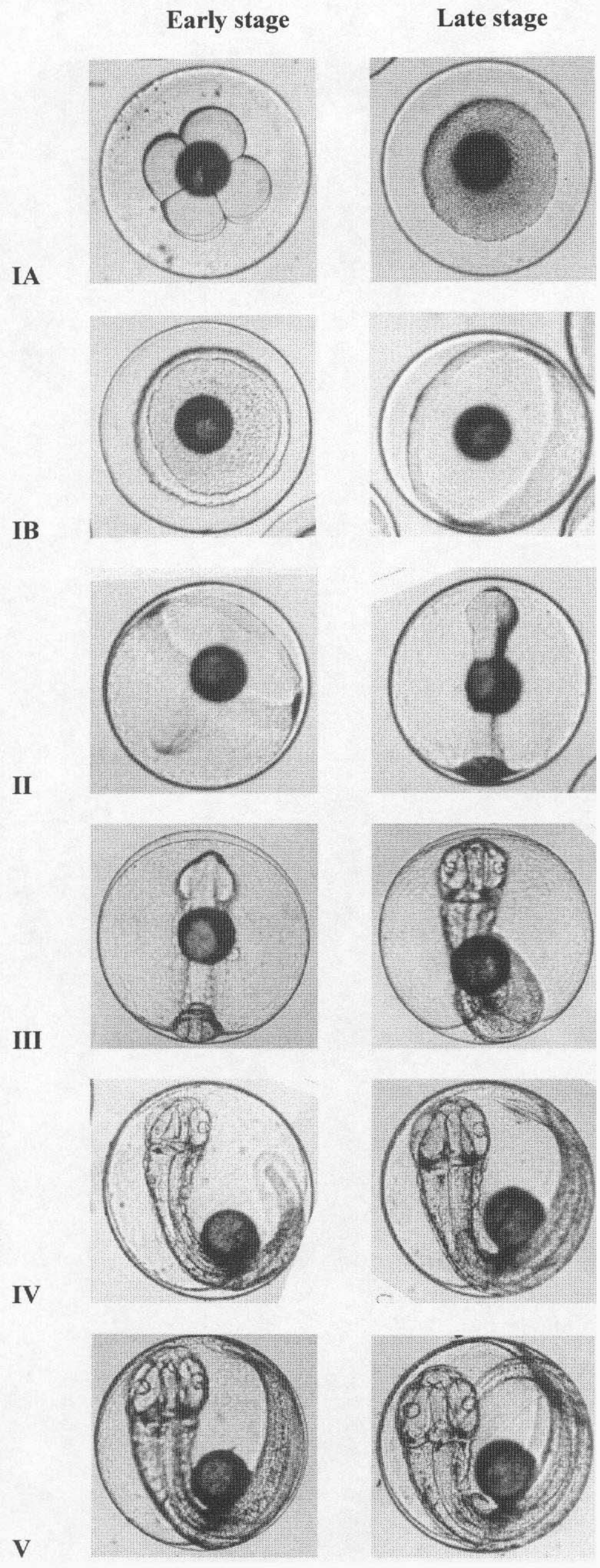

Figure 1. Developmental stages of mackerel eggs.

In the frame of the discussions of the particular stages the group decided upon the following definitions of the developmental stages for mackerel and horse mackerel. The primary characteristics are based on those presented in Lockwood *et al*. (1977).

Stage Ia

Primary characteristics: From fertilisation until cleavage produces a cell bundle in which the individual cells are not visible.

Secondary characteristics: There are no signs of a thickening of cells around the edge of the cell bundle. NB. In preserved eggs the edge of the cell bundle can sometimes fold over giving the appearance of a 'signet ring' seen in a stage Ib.

Stage Ib

Primary characteristics: Formation of the blastodisc, visible as a 'signet ring' and subsequent thickening a one pole.

Secondary characteristics: The cell bundle has thickened around the edge giving a distinct ring appearance. Cells in the centre of the ring form a progressively thinner layer and eventually disappear. NB. At the end of this stage the ring can become very indistinct as it spreads towards the circumference of the egg.

Stage II

Primary characteristics: From the first sign of the primitive streak until closure of the blastopore. By the end of this stage the embryo is half way round the circumference of the egg.

Secondary characteristics: Early in this stage the primitive streak can be difficult to see, only appearing as a faint line in the surface of the yolk. Late in this stage the head is still narrow and the eyes are not well formed. The tail tapers to end flattened against the yolk.

Stage III

Primary characteristics: Growth of the embryo from half way to three-quarters of the way around the circumference of the egg.

Secondary characteristics: The tail thickens becoming bulbous in appearance. Widening of the head and development of the eyes. Pigment spots develop on the embryo, usually close to the posterior end.

Stage IV

Primary characteristics: Growth of the embryo from three-quarters to the full circumference of the egg.

Secondary characteristics: Eyes continue to develop and the lenses become visible. Development of the marginal fin and the tail begins to separate from the yolk. Pigmentation of the body increases.

Stage V

Primary characteristics: Growth of the embryo until the tail has reached the nose.

Secondary characteristics: Pigmentation develops in the eye.

The preservation of eggs can cause shrinkage and distortion of the embryo. In these cases the embryo does not grow around the circumference of the yolk and this must be allowed for when determining egg stage.

A manual providing instructions for egg staging is provided in Annex 3.

1.5 Results of the comparative egg staging exercise

The analysis of the results makes it possible to identify each reading of each single participant (Annex 2, Tables 1, 6). These tables list the first egg stage readings of mackerel and horse mackerel, when egg stages Ia, Ib, II, III, IV and V were used. It is apparent from these tables that each single egg was staged by each participant, providing thus a modal age and a %-agreement, i.e. the relative number of participants agreeing upon the mode. The agreement reached from less than 50% for difficult eggs to 100% for eggs of very obvious developmental stage. Based on this list it is possible to identify critical eggs which have a low % agreement and to attribute difficulties in correct identification to single persons. These persons than have the opportunity to go back to that specific egg an compare their individual judgement with that of the majority.

Annex 2, Tables 11 and 16 present the second egg stage readings of mackerel and horse mackerel eggs, while egg stages I, II, III, IV and V were used. The modal egg stage and the percentage agreement achieved by the readers is given for each egg separately.

Annex 2, Tables 2 and 7 give the results by reader of the first egg stage readings of mackerel and horse mackerel eggs, while egg stages Ia, Ib, II, III, IV and V were used. In these tables each individual reader is informed about his personal performance for each single stage. It becomes obvious from column “D” for which stages the reader is more or less qualified to identify correctly. In column “B” the individual over- or under-estimations of stage I are summarised. It is obvious from this compilation that the individual mis-estimations were great and varied in the first reading between -16% and +10% for mackerel and between –16% and +17% for horse mackerel. However, the average was -2% for mackerel and +2% for horse mackerel, thus indicating only a small underestimation of the number of mackerel eggs of stage I, and an equal over-estimation of the horse mackerel eggs.

Annex 2, Tables 12 and 17 present the results by reader of the second egg stage readings of mackerel and horse mackerel eggs, with egg stages Ia, Ib, separated. From these tables it is obvious that overall over- and under-estimation of mackerel was still –2%, whereas for horse mackerel it had decreased to 0% on average. However, the individual divergences were still great and ranged from –13% to +8% in the extremes for mackerel and from –12% to +12% for horse mackerel.

Annex 2, Tables 5 and 10 give the results by reader of the first egg stage readings of mackerel and horse mackerel eggs, when the egg stages I, II, III, IV and V were used. These stages show clearly that the average agreement for both species is over 90%.

Annex 2, Tables 15 and 20 present the results by reader of the second egg stage readings of mackerel and horse mackerel eggs, while egg stages I, II, III, IV and V were used.

Annex 2, Tables 3 and 8 outline the results by tray/microscope of the first egg stage readings of mackerel and horse mackerel eggs, while egg stages Ia, Ib, II, III, IV and V were used. These tables detail the modal agreement of all readers with regard to the particular binocular microscope under which the particular tray was mounted. Annex 2, Table 3 shows that for microscope No. 5 the mean modal agreement was only 65%. This was an older microscope with insufficient illumination. However, on average the agreement was 71% for those binoculars with mackerel eggs, and 74% for those binoculars with horse mackerel eggs. As a result, it may be concluded from these data that the effect of the microscope quality was less important that initially assumed. During the second reading the microscope effect was even lower. From the Annex 2, Tables 13 and 18 it becomes apparent that in the second reading the microscope agreement improved to 82% for microscopes with mackerel eggs and to 85% for microscopes with horse mackerel eggs.

Annex 2, Figures 1, 2, 3, 4, 5, 6, 7 and 8 show the egg stage bias plots in which the mean egg stage +/- 2 standard deviations of each stage reader and all stage readers combined are plotted against the modal egg stage.

Annex 2, Figures 1 and 3 show the egg stage bias plots for the first egg stage readings of mackerel and horse mackerel, when egg stage Ia, Ib, II, III, IV and V were used.

Annex 2, Figures 2 and 4 show the egg stage bias plots for the first egg stage readings of mackerel and horse mackerel, when egg stage I, II, III, IV and V were used.

Annex 2, Figures 5 and 7 show the egg stage bias plots for the second egg stage readings of mackerel and horse mackerel, when egg stage Ia, Ib, II, III, IV and V were used.

Annex 2, Figures 6 and 8 show the egg stage bias plots for the second egg stage readings of mackerel and horse mackerel, when egg stage I, II, III, IV and V were used.

Annex 2, Tables 4, 9, 14, 19 contain the data necessary for plotting the Annex 2, Figures 1, 3, 5 and 7 respectively.

1.6 Discussion of egg staging exercise

Weakness of the method: the modal stage is not necessarily the true stage. In the discussions after the staging exercises it became clear in some difficult cases with a low percentage of agreement that the majority of the group was incorrect in its judgement and only a minority of the group was right. However, in the statistical analysis of the results the individual's performances is always put into relation to the modal stage which is thus assumed to represent always the "truth". It should therefore be borne in mind that as long as validated egg samples are not available this is an in borne feature of the method and is unavoidable for the time being.

One of the particular problems encountered during the workshop was the distinction between the stages Ia and Ib. Some of the eggs were in a very poor condition and due to this a number of eggs of the stage Ia had developed ring-like structures at the periphery, making them difficult to distinguish from the stages Ib. From the statistical analysis it is apparent that the % agreement for the stages Ia and Ib together is for both species over 90% and thus quite high however (Annex 2, Table 5, 10). The overall agreement for all stages together improved for horse mackerel from 74% in the first round to 85% in the second, and from 71% to 82% in mackerel. For both species the improvement was thus about 10%.

The overall mis-estimation of the stages Ia+b combined for mackerel was initially –2.5% for mackerel and +1.5% for horse mackerel (Annex 2, Table 2, 7, Row C), rounded to 2% for both species. *This implies that, in retrospective, it is likely that the number of mackerel eggs on average was slightly underestimated and the number of horse mackerel eggs was slightly overestimated*. The individual over- or underestimation was however large and varied between the participating persons from -16% to +15% for horse mackerel and between –16% to +10% for mackerel. *As a result, even though the individual deviations from 0% seem to be high, the exercise has clearly shown that on average the estimate of eggs at stage 1 was reasonably good, if taken yearly differences in the egg production of the fish of 20-30% into account.*

After the first round of analysis and due to the extensive discussion of the embryonic features, the staging criteria for eggs in stages Ia and Ib had apparently changed. This lead to an increased ratio of Ia to Ib during the second round of analysis but had no significant effect on total stage I (Ia and Ib) numbers.

It appears that during the first round of analysis damaged stage Ia eggs where mis-interpreted as early stage Ib. The lack of easily observed differences between the two stages (Ia and Ib) leads to increased analysis time and combination of these stages would make processing of the samples more efficient. While the recognition of the change from Ia to Ib was identified as a problem, there was less difficulty to distinguish between Ib and II, as there are more obvious morphological differences between these stages. For these reasons it is recommended by the workshop to combine stages Ia and Ib in the future and to determine these stages only as stage I. This will have no impact on previous assessments as the combined egg stage I has always been used to produce a SSB estimate.

1.7 Recommendations based on the discussions during the workshop

Based on the discussions during the workshop it is recommended to be endorsed by the Working Group for Mackerel and Horse Mackerel Egg Surveys that

- After the mackerel and horse mackerel egg surveys a small exchange of egg shall be initiated. This should be done with the eggs collected during the survey. From a larger sample eggs shall be selected into a number of subsamples. These shall be sent to the individual participants simultaneously. The purpose of this exercise is to prove that the quality of the egg staging has not decreased and that the current identification is valid. The exchange for the upcoming survey will be organised and finally be evaluated by CEFAS.

- Based on the experiences of the 1999-2000 egg exchange it is recommended that those laboratories who select the mackerel and horse mackerel eggs out of the whole plankton sample by means of a magnifying glass check the sorted plankton samples regularly by means of a binocular microscope, to make sure that all eggs have been sorted out.

- Based on the experiences at the workshop it is recommended that during the staging of the eggs those of stage I will in the future not separated in Ia and Ib since both stages will eventually be combined for the final estimate of egg densities. However, the correct identification of Ib-stages and their distinction from stage II eggs is essential for the correct estimate of egg abundance. Only a correct identification of Ib eggs will make a distinction between eggs of stage I and stage II possible and will provide a correct estimate. For this reason it is of great advantage for the individual reader to be able to correctly identify stage Ib and to distinguish this stage from stage II.

- Based on the experiences made at the workshop a recommended binocular microscope should have the following features:

  Black and white plate for top light
  Transparent plate for bottom light
  Dark field illumination for contrast
  Adjustable brightness
  Magnification with click stops
  Eyepieces 10x and 20x
  Adjustable head and ergonomic design of the binocular
  Adjustable focus on eyepieces
  Micrometer and goniometer on the eyepieces
  Double cold light, with adjustable focus, to avoid shadows
  Mechanical stages to hold samples in place
  Filters and polarisation
  Adjustable tables and chairs for good ergonomics
  For training and discussion we recommend a Discussion Stereomicroscope. It enables two observers to simultaneously see the same laterally-correct and three-dimensional image.

2 MACKEREL AND HORSE MACKEREL HISTOLOGY WORKSHOP

2.1 List of Participants

Ingeborg de Boois	RIVO, Netherlands
Ana Maria Costa	Spain
Guus Eltink, RIVO	Netherlands
Iain Gibb	FRS, Scotland
Cornelius Hammer	BFA, Germany
Selene Hoey	MI, Ireland
Deirdre Lynch	MI, Ireland
Inma Martin	AZTI, Spain
Kerstin Mölter	BFA, Germany
Hilario Muroa	Spain
Jose Ramon Perez	Spain
Beatriz Roel, CEFAS	England
Maria Santos, AZTI	Spain
Hanz Wiegerinck, RIVO	Netherlands
Peter Witthames **(Chair)**	CEFAS, England

2.2 Specific objectives of the workshop (part 2)

1. An introduction shall be given by P. Witthames (CEFAS, Lowestoft) about the embryonic development of eggs in the ovaries and the respective techniques employed in the frame of the mackerel and horse mackerel egg surveys.
2. Training of the participants producing slides of the ovaries for atresia and fecundity estimation shall be carried out.
3. Individual performance of the interpretation of histological slides shall be examined on a non-formal basis. Results and individual deviations shall be discussed according to need.
4. A short manual for the correct estimation of atresia and fecundity from histological slides shall be produced. This shall contain a specific list of necessary equipment (including estimated costs), chemicals, the handling of the material, quality requirements and the interpretation of the slides.

2.3 Introduction

From the previous mackerel and horse mackerel egg survey the fecundity of both species had been much lower than in the previous years. At the same time the total egg production was found to have been high. As a result the SSB must have been high in order to produce these eggs. However, there were still some unresolved questions involved regarding the determination of the fecundity of firstly horse mackerel. This discussion was taken up during the histology workshop and must be seen as a prolongation of the discussion that begun at the 1999 WGMEGS meeting in Hamburg (Anon., 1999) and which commenced at the MHMSAWG in 2000 (Anon., 2000).

2.4 Results of count of vitellogenic and atretic oocytes

A total of 25 slides were displayed by means of a beamer and were analysed by 14 readers simultaneously. The results are shown in figures of Annex 4. In these figures the minimum, average and maximum number of vitellogenic/atretic oocytes scored are plotted by sample number. The figures for vitellogenic oocytes and total alpha atresia are also plotted for experienced members of the group.

The difference in counting the oocytes is high, although experienced readers show less difference compared with the average number of oocytes. It would be useful when in future, before or after the surveys some samples would be sent around to see how people interpret the different oocytes. A detailed manual for the production and the interpretation of the slides for fecundity determination is given in Annex 5.

As another result of extensive discussions of the sampling strategy, tables for mackerel and horse mackerel fecundity sampling was produced (Annex 6). These tables are amendments to the section 5.4.3 of the WGMEGS report 2000 (Anon., 2000) in which the sampling strategy has been detailed and agreed.

The recommendation from the Santander meeting of WGMEGS (Anon., 2000) to circulate slides before work commences is met by the analysis of slides during workshop only partly. The exercise during the workshop showed sufficiently that still slides (or standard images) should be circulated to those participants who are involved and responsible for the analysis of slides in the context of the mackerel and horse mackerel egg survey.

Appendices

Annex 1 - Summary of the results of the statistical evaluation of the egg staging performance of the individual participants and the entire group. (A. Eltink, RIVO-DLO, Netherlands).
Annex 2 - Report of the statistical evaluation of the egg staging performance of the individual participants and the entire group (A. Eltink, RIVO-DLO, Netherlands), including an evaluation of the improvement of the egg staging performance in view of the previous assessments and the upcoming assessment in 2001.
Annex 3 - Production of the egg staging and plankton sampling manual (S. Milligan, CEFAS, Lowestoft, England).
Annex 4 - Report of the analysis of the identification of vittelogenic oocytes, atretic oocytes, postovulatory follicles, hydrated eggs and migratory nuclei of mackerel and horse mackerel slides.
Annex 5 - Manual on the estimation of fecundity and atresia in mackerel and horse mackerel (P. Witthames, CEFAS, Lowestoft, UK).
Annex 6 - Fecundity Sampling Tables for mackerel and horse mackerel.
Annex 7 - Sorting procedure of mackerel and horse mackerel eggs by nation.

References

Anon. (1999) Report of the Working Group on Mackerel and Horse Mackerel Egg Surveys. ICES CM 1999/G:5.

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Lockwood, S.J., Nichols, J.H. & Coombs S.H. (1977) The development rates of mackerel (*Scomber scombrus* L.) eggs over a range of temperature. ICES CM 1977/J:13.

Eltink, G., De Boois, I., Wiegerinck, H. (2000) Preliminary estimates of horse mackerel fecundity in 2000 and the planning of the fecundity sampling in 2001. WD presented at the Mackerel, Horse Mackerel Staging and Histology Workshop, Lowestoft, 2000, 14pp.

Annex 1

Summary tables of the results of the mackerel and horse mackerel egg staging exercises

Table 1a

Evaluation of the egg stageing workshop.

The total egg productions of stage 1 (1a and 1b combined) eggs are used for the calculation of spawning stock biomass. Therefore the percentages of over- and underestimation of stage 1 eggs are presented by egg stage reader and for all readers combined both for the first and the second egg stageing excercise. It should be noted that this includes the decrease by misstageings from stage 1 towards higher stages and the increase by misstageings of higher stages towards stage 1).

OVERESTIMATION AND UNDERESTIMATION OF STAGE 1 (= 1A and 1B combined)

MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	-6%	-3%	2%	-2%	-7%	2%	-16%	10%	-5%	1%	6%	-3%	-11%	-6%	-	-	-3%	-	-	1%	-2%
2nd reading	-1%	-2%	1%	-12%	1%	-3%	-1%	-4%	-5%	0%	4%	-4%	8%	-	-4%	-13%	-	-1%	4%	-	-2%

HORSE MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	-6%	1%	0%	-2%	-1%	1%	-16%	17%	1%	1%	13%	2%	-7%	15%	-	-	-4%	-	-	10%	2%
2nd reading	-11%	-2%	1%	-12%	1%	0%	2%	-1%	-6%	-5%	12%	5%	-1%	-	0%	0%	-	7%	2%	-	0%

Table 1b

Evaluation of the egg stageing workshop.

The percentage agreement for modal egg stage 1 (1a and 1b combined) for each stage reader and for all stage readers combined both for the first and the second egg stageing excercise.

AGREEMENT TO MODAL EGG STAGE 1 (= 1A and 1B combined)

MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	90%	92%	96%	93%	87%	95%	81%	100%	89%	93%	96%	91%	82%	82%	-	-	89%	-	-	94%	91%
2nd reading	99%	94%	99%	88%	97%	96%	99%	94%	93%	97%	99%	95%	97%	-	95%	87%	-	95%	99%	-	96%

HORSE MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	90%	95%	95%	94%	92%	96%	80%	99%	96%	94%	97%	89%	86%	88%	-	-	89%	-	-	95%	92%
2nd reading	86%	94%	98%	84%	94%	97%	97%	91%	91%	92%	100%	94%	94%	-	93%	93%	-	98%	96%	-	94%

Table 1c

Evaluation of the egg stageing workshop.

The weighted mean percentage agreement over all modal egg stages for each stage reader and for all stage readers combined both for the first and the second egg stageing excercise.

AGREEMENT TO ALL MODAL EGG STAGES (WEIGHTED)

MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	84.3%	82.7%	81.0%	78.8%	77.1%	75.0%	74.0%	69.3%	68.8%	68.3%	65.0%	61.9%	61.6%	51.5%	-	-	67.3%	-	-	72.0%	71.1%
2nd reading	81.1%	90.5%	87.4%	70.4%	80.4%	84.4%	95.5%	83.2%	74.7%	89.9%	86.9%	81.2%	86.9%	-	71.6%	72.4%	-	77.4%	80.0%	-	82.1%

HORSE MACKEREL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Port AF	Nor JdL	Eng MS	Neth IdB	Germ NH	Spain AL	Norw IMB	Germ KM	Eng BR	KM+BR	Irel SH	Irel DL	SH+DL	ALL
1st reading	83.1%	79.8%	83.9%	85.1%	81.1%	67.8%	71.5%	73.0%	76.3%	77.9%	63.4%	72.0%	73.1%	48.0%	-	-	76.4%	-	-	75.1%	74.1%
2nd reading	84.3%	91.3%	94.5%	74.5%	80.0%	91.5%	93.0%	83.8%	74.0%	89.5%	89.0%	82.7%	88.6%	-	83.4%	61.9%	-	83.0%	86.9%	-	84.8%

Annex 2

Tables with details of the results of the mackerel and horse mackerel egg staging exercises

Table 1 MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1ab-5

RANGE r. 1-16

Sample no	no	Tray	Well no	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	MODAL stage	Percent agreement
1A	1	1	A1	0	0	0	0	1	0	0	-	0	0	0	-	1	0	0	1	**0**	79%
1A	2	1	A2	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1A	3	1	A3	1	1	0	0	0	0	0	-	0	0	0	-	0	1	1	0	**0**	71%
1A	4	1	A4	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1A	5	1	A5	2	2	3	2	3	3	3	-	2	3	2	-	3	3	3	3	**3**	64%
1A	6	1	A6	0	0	1	0	0	0	0	-	0	0	0	-	1	1	0	0	**0**	79%
1A	7	1	A7	0	0	0	0	0	0	0	-	0	0	0	-	0	0	-	0	**0**	100%
1A	8	1	A8	1	1	0	1	1	0	1	-	0	1	1	-	1	0	1	0	**1**	64%
1A	9	1	A9	4	4	4	4	4	4	4	-	4	4	4	-	4	4	4	4	**4**	100%
1A	10	1	A10	0	0	0	0	0	0	0	-	0	0	0	-	0	0	0	0	**0**	100%
1A	11	1	B1	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	4	**3**	93%
1A	12	1	B2	1	1	0	0	0	0	1	-	0	0	0	-	1	0	1	1	**0**	57%
1A	13	1	B3	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	4	**5**	71%
1A	14	1	B4	0	0	0	0	0	0	0	-	0	0	0	-	1	0	0	0	**0**	93%
1A	15	1	B5	2	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	93%
1A	16	1	B6	0	0	0	0	0	0	0	-	0	1	0	-	1	0	-	0	**0**	85%
1A	17	1	B7	4	4	3	3	4	4	4	-	3	4	3	-	3	4	4	3	**4**	57%
1A	18	1	B8	2	2	3	2	2	3	3	-	2	3	2	-	2	4	2	3	**2**	57%
1A	19	1	B9	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1A	20	1	B10	3	3	3	3	3	4	4	-	3	3	3	-	4	3	4	2	**3**	64%
1A	21	1	C1	3	3	3	3	3	3	3	-	3	3	3	-	4	4	3	3	**3**	86%
1A	22	1	C2	1	1	0	0	1	0	1	-	0	0	0	-	1	1	1	1	**1**	57%
1A	23	1	C3	1	1	0	0	1	0	0	-	0	0	0	-	1	0	1	1	**0**	57%
1A	24	1	C4	0	0	0	0	0	0	0	-	0	0	0	-	0	0	0	0	**0**	100%
1A	25	1	C5	0	0	0	0	0	0	0	-	0	0	0	-	1	1	0	0	**0**	86%
1B	26	1	C6	1	0	0	0	0	0	0	-	0	0	0	-	1	1	0	0	**0**	79%
1B	27	1	C7	1	0	0	0	0	0	0	-	0	0	0	-	1	0	1	2	**0**	71%
1B	28	1	C8	5	5	4	4	4	4	5	-	4	5	3	-	5	3	4	2	**4**	43%
1B	29	1	C9	5	5	5	4	4	5	5	-	5	5	4	-	5	4	4	3	**5**	57%
1B	30	1	C10	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	4	**5**	71%
1B	31	1	D1	2	2	1	0	2	2	2	-	0	3	0	-	1	1	2	0	**2**	43%
1B	32	1	D2	0	0	0	0	0	0	0	-	0	1	0	-	1	0	1	0	**0**	79%
1B	33	1	D3	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	2	**5**	71%
1B	34	1	D4	4	4	4	4	4	4	4	-	4	4	3	-	5	4	4	3	**4**	79%
1B	35	1	D5	3	3	3	2	3	3	3	-	2	3	2	-	3	3	3	2	**3**	71%
1B	36	1	D6	5	5	5	4	5	5	5	-	4	5	3	-	5	4	4	3	**5**	57%
1B	37	1	D7	4	4	4	4	4	4	5	-	4	4	3	-	5	4	4	4	**4**	79%
1B	38	1	D8	0	0	0	0	0	0	0	-	0	0	0	-	1	1	0	0	**0**	86%
1B	39	1	D9	0	0	0	0	0	0	0	-	0	1	0	-	1	1	3	0	**0**	71%
1B	40	1	D10	3	3	3	3	4	4	3	-	3	4	3	-	3	3	3	0	**3**	71%
1B	41	1	E1	3	3	3	3	3	3	3	-	3	4	3	-	3	3	3	2	**3**	86%
1B	42	1	E2	0	0	0	0	0	0	0	-	0	0	0	-	1	0	1	0	**0**	86%
1B	43	1	E3	3	3	2	2	3	3	3	-	2	3	2	-	2	2	3	2	**3**	50%
1B	44	1	E4	0	0	0	0	4	0	0	-	0	1	0	-	1	1	1	0	**0**	64%
1B	45	1	E5	3	3	3	3	3	4	4	-	3	3	3	-	3	3	4	2	**3**	71%
1B	46	1	E6	5	5	5	4	4	5	5	-	4	5	3	-	4	4	4	3	**5**	43%
1B	47	1	E7	0	0	0	0	0	0	0	-	0	1	0	-	1	2	-	0	**0**	77%
1B	48	1	E8	2	2	0	2	0	0	2	-	0	2	2	-	2	2	2	1	**2**	64%
1B	49	1	E9	2	2	2	2	3	3	3	-	2	3	2	-	2	3	3	2	**2**	57%
1B	50	1	E10	3	3	3	2	3	3	3	-	3	3	3	-	2	3	3	2	**3**	79%
2A	1	2	A1	1	2	1	1	2	1	2	2	1	1	2	-	1	1	1	0	**1**	60%
2A	2	2	A2	2	2	2	2	2	3	3	3	2	2	2	-	2	2	3	2	**2**	73%
2A	3	2	A3	0	0	1	0	-	0	0	2	0	0	0	-	1	0	1	0	**0**	71%
2A	4	2	A4	3	2	2	2	3	3	3	4	2	3	2	-	3	2	3	2	**3**	47%
2A	5	2	A5	2	2	2	2	2	3	2	2	2	2	2	-	2	2	2	2	**2**	93%
2A	6	2	A6	1	1	0	1	1	1	1	2	0	1	1	-	2	1	2	1	**1**	67%
2A	7	2	A7	1	2	1	1	1	0	2	1	1	1	0	-	1	0	2	0	**1**	53%
2A	8	2	A8	3	4	4	3	3	4	4	3	3	4	3	-	3	3	3	2	**3**	60%
2A	9	2	A9	2	2	2	2	2	3	2	2	2	3	2	-	2	3	2	2	**2**	80%
2A	10	2	A10	1	1	1	1	2	1	2	2	0	1	1	-	1	1	2	0	**1**	60%
2A	11	2	B1	3	2	3	2	3	3	3	4	2	3	2	-	3	3	3	2	**3**	60%
2A	12	2	B2	4	3	3	3	4	4	3	3	3	4	3	-	2	3	3	2	**3**	60%
2A	13	2	B3	0	0	0	0	1	0	0	1	0	0	0	-	1	0	0	0	**0**	80%
2A	14	2	B4	3	3	3	3	3	3	3	2	3	3	3	-	3	3	3	2	**3**	87%
2A	15	2	B5	3	3	3	3	4	4	3	3	3	3	3	-	3	3	3	3	**3**	87%
2A	16	2	B6	0	0	0	0	0	0	1	0	0	1	0	-	1	0	1	2	**0**	67%
2A	17	2	B7	2	2	2	2	2	3	3	2	2	3	2	-	3	2	3	2	**2**	67%
2A	18	2	B8	5	5	5	5	5	5	5	5	5	5	5	-	5	4	5	3	**5**	87%
2A	19	2	B9	0	1	0	1	1	0	1	1	0	1	1	-	1	0	1	0	**1**	60%
2A	20	2	B10	1	1	0	1	1	0	1	1	0	0	0	-	0	0	1	0	**0**	53%
2A	21	2	C1	2	2	2	2	2	2	2	0	2	2	2	-	1	3	2	0	**2**	73%
2A	22	2	C2	0	0	0	0	0	0	0	0	0	0	0	-	1	0	1	0	**0**	87%
2A	23	2	C3	2	3	2	2	3	3	3	2	2	3	2	-	2	3	3	2	**2**	53%
2A	24	2	C4	3	3	3	2	3	3	3	2	2	3	2	-	2	3	3	2	**3**	60%
2A	25	2	C5	2	3	3	2	3	3	3	2	2	3	2	-	3	3	3	2	**3**	60%
2B	26	2	C6	0	1	0	0	0	0	0	1	0	0	0	-	0	1	1	0	**0**	73%
2B	27	2	C7	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	0	**0**	93%
2B	28	2	C8	0	0	0	0	0	0	0	0	0	0	0	-	1	0	1	0	**0**	87%
2B	29	2	C9	0	0	0	0	0	0	0	1	0	0	0	-	0	0	1	0	**0**	87%
2B	30	2	C10	1	1	0	1	1	0	1	2	0	0	1	-	1	1	1	2	**1**	60%
2B	31	2	D1	0	0	0	0	1	0	0	0	0	0	0	-	1	0	0	0	**0**	87%
2B	32	2	D2	0	0	0	0	1	0	0	0	0	0	0	-	1	0	0	0	**0**	87%
2B	33	2	D3	0	0	0	0	1	0	0	0	0	0	0	-	1	0	0	0	**0**	87%
2B	34	2	D4	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	**0**	80%
2B	35	2	D5	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	**0**	87%
2B	36	2	D6	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	1	**0**	80%
2B	37	2	D7	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	0	**0**	93%
2B	38	2	D8	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	0	**0**	93%
2B	39	2	D9	1	1	0	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	93%
2B	40	2	D10	0	1	0	0	1	0	0	0	0	0	0	-	1	1	0	0	**0**	73%
2B	41	2	E1	0	0	0	1	1	0	0	0	0	0	0	-	0	0	0	0	**0**	87%
2B	42	2	E2	1	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	93%
2B	43	2	E3	0	0	0	0	1	0	0	0	0	0	0	-	0	0	1	0	**0**	87%
2B	44	2	E4	1	1	1	1	1	0	1	1	1	1	1	-	1	0	1	1	**1**	87%
2B	45	2	E5	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	1	**0**	93%
2B	46	2	E6	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	0	**0**	93%
2B	47	2	E7	0	0	0	0	0	0	0	0	0	0	0	-	1	0	0	0	**0**	93%
2B	48	2	E8	0	0	0	0	0	0	0	0	0	2	0	-	1	0	0	0	**0**	87%
2B	49	2	E9	1	1	1	1	0	1	1	0	0	1	1	-	0	0	1	0	**1**	60%
2B	50	2	E10	0	0	0	0	0	0	0	0	0	0	0	-	1	0	0	0	**0**	93%
3A	1	3	A1	2	2	2	2	2	2	2	2	2	0	2	-	2	2	2	3	**2**	87%
3A	2	3	A2	0	0	1	0	1	0	0	1	0	1	0	-	1	1	1	3	**0**	47%
3A	3	3	A3	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	5	**0**	87%
3A	4	3	A4	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	3	**4**	80%
3A	5	3	A5	4	3	4	4	4	4	4	2	3	4	2	-	4	3	4	2	**4**	60%
3A	6	3	A6	5	5	5	4	4	5	5	4	4	5	3	-	5	4	5	4	**5**	53%
3A	7	3	A7	0	0	1	0	0	0	1	2	0	0	2	-	1	2	4	3	**0**	47%
3A	8	3	A8	5	5	5	4	4	5	5	4	4	5	3	-	5	4	5	3	**5**	53%
3A	9	3	A9	4	3	4	4	4	4	4	3	3	4	2	-	4	3	4	3	**4**	60%
3A	10	3	A10	2	2	2	2	3	3	3	2	2	3	2	-	3	2	3	4	**2**	53%
3A	11	3	B1	1	0	1	0	0	0	0	1	1	0	0	-	1	0	2	0	**0**	60%
3A	12	3	B2	3	3	3	3	3	3	3	3	3	3	3	-	2	3	3	3	**3**	93%
3A	13	3	B3	0	0	0	0	0	0	2	0	0	2	0	-	1	1	1	0	**0**	67%
3A	14	3	B4	3	3	3	3	3	3	3	2	3	3	2	-	3	2	3	3	**3**	80%
3A	15	3	B5	1	0	1	1	0	0	0	0	1	2	0	-	1	0	0	1	**0**	53%
3A	16	3	B6	3	3	3	3	3	3	3	2	2	3	2	-	3	2	3	4	**3**	67%
3A	17	3	B7	4	4	4	4	4	4	4	3	3	4	3	-	4	3	4	4	**4**	73%
3A	18	3	B8	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	4	**4**	87%
3A	19	3	B9	4	4	5	4	4	5	5	4	4	5	4	-	5	4	5	4	**4**	60%
3A	20	3	B10	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3A	21	3	C1	1	1	1	0	1	0	1	1	1	1	1	-	1	0	2	1	**1**	73%
3A	22	3	C2	4	4	4	4	4	4	4	4	4	4	3	-	5	4	4	4	**4**	87%
3A	23	3	C3	2	2	2	2	2	2	2	2	2	2	2	-	2	2	1	0	**2**	87%
3A	24	3	C4	1	0	2	1	0	0	2	1	1	0	0	-	1	0	0	1	**0**	47%
3A	25	3	C5	2	3	2	2	3	3	3	2	2	3	2	-	2	3	3	2	**2**	53%
3B	26	3	C6	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3B	27	3	C7	2	0	2	1	1	0	2	1	0	0	0	-	1	0	1	0	**0**	47%
3B	28	3	C8	2	2	2	2	1	2	2	1	0	2	2	-	1	2	1	2	**2**	67%
3B	29	3	C9	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	4	**4**	87%
3B	30	3	C10	1	1	1	1	1	0	1	1	1	1	1	-	1	2	1	1	**1**	87%
3B	31	3	D1	5	5	5	5	5	5	5	5	4	5	4	-	5	5	5	5	**5**	87%
3B	32	3	D2	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3B	33	3	D3	2	1	2	1	1	0	2	1	0	0	0	-	1	1	1	0	**1**	47%
3B	34	3	D4	3	3	3	3	3	3	3	3	3	3	3	-	3	3	3	4	**3**	93%
3B	35	3	D5	5	5	5	4	4	5	5	5	5	5	4	-	5	4	5	4	**5**	67%
3B	36	3	D6	1	1	1	1	1	0	1	1	0	1	1	-	1	1	1	0	**1**	80%
3B	37	3	D7	5	5	5	5	4	5	5	5	4	5	4	-	5	5	5	4	**5**	73%

3B	38	3	D8	4	4	4	4	4	4	4	4	4	4	3	-	4	4	4	4	**4**	93%
3B	39	3	D9	5	5	5	5	4	5	5	5	5	5	4	-	5	5	5	4	**5**	80%
3B	40	3	D10	4	4	4	4	4	3	4	4	3	4	3	-	4	4	4	4	**4**	80%
3B	41	3	E1	2	2	2	2	2	0	2	1	0	2	2	-	1	2	1	3	**2**	60%
3B	42	3	E2	4	4	4	4	4	4	4	4	4	4	3	-	4	4	4	4	**4**	93%
3B	43	3	E3	2	2	2	2	2	2	2	2	0	2	0	-	1	2	1	2	**2**	73%
3B	44	3	E4	5	5	4	4	5	5	5	4	4	5	4	-	5	4	5	4	**5**	53%
3B	45	3	E5	2	1	2	1	1	0	2	0	0	0	0	-	1	2	1	1	**1**	40%
3B	46	3	E6	2	2	2	1	1	2	2	1	0	2	2	-	1	2	2	1	**2**	60%
3B	47	3	E7	2	2	1	1	1	0	2	0	0	0	0	-	1	2	1	0	**0**	40%
3B	48	3	E8	1	1	1	1	1	1	1	1	1	1	0	-	1	2	1	1	**1**	87%
3B	49	3	E9	1	0	0	0	0	0	0	0	1	0	0	-	0	0	0	1	**0**	80%
3B	50	3	E10	1	1	0	0	0	0	0	0	0	0	0	-	0	0	1	1	**0**	73%
4A	1	4	A1	3	-	5	5	4	4	5	5	4	4	4	4	4	4	5	4	**4**	60%
4A	2	4	A2	5	-	4	4	3	4	4	4	3	4	3	3	4	5	4	4	**4**	60%
4A	3	4	A3	4	-	3	4	5	5	3	3	5	4	4	5	5	5	3	2	**5**	40%
4A	4	4	A4	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4A	5	4	A5	2	-	2	2	2	3	2	2	2	3	2	2	2	3	2	2	**2**	80%
4A	6	4	A6	4	-	3	3	4	4	3	3	4	4	4	4	4	4	3	3	**4**	60%
4A	7	4	A7	3	-	3	3	3	3	3	3	3	4	3	3	4	4	3	3	**3**	80%
4A	8	4	A8	3	-	4	4	3	3	4	4	3	3	3	4	3	4	4	3	**3**	53%
4A	9	4	A9	3	-	4	4	3	3	4	4	3	3	3	3	3	4	4	4	**3**	53%
4A	10	4	A10	4	-	3	3	4	4	3	3	4	4	4	4	4	4	3	3	**4**	60%
4A	11	4	B1	3	-	3	3	4	4	4	3	3	3	3	4	3	4	3	3	**3**	67%
4A	12	4	B2	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4A	13	4	B3	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4A	14	4	B4	4	-	4	4	4	4	4	3	4	4	4	4	4	4	4	3	**4**	87%
4A	15	4	B5	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4A	16	4	B6	3	-	4	4	3	4	4	3	3	3	3	3	3	4	4	3	**3**	60%
4A	17	4	B7	4	-	5	4	4	5	5	4	4	5	4	5	4	4	4	4	**4**	67%
4A	18	4	B8	4	-	3	3	4	4	3	3	4	4	4	3	4	4	3	3	**4**	53%
4A	19	4	B9	4	-	4	4	4	4	5	4	4	4	4	4	4	5	4	4	**4**	87%
4A	20	4	B10	3	-	3	3	3	4	3	3	3	3	3	3	4	4	3	3	**3**	80%
4A	21	4	C1	4	-	4	4	4	4	4	4	3	4	4	4	4	4	4	3	**4**	87%
4A	22	4	C2	5	-	5	5	5	5	5	5	5	5	5	5	5	5	5	3	**5**	93%
4A	23	4	C3	3	-	3	3	3	3	3	3	3	3	3	3	4	3	3	3	**3**	93%
4A	24	4	C4	5	-	5	5	4	5	5	4	5	5	4	5	5	4	5	3	**5**	67%
4A	25	4	C5	4	-	4	4	4	4	4	4	4	4	3	4	4	4	5	3	**4**	80%
4B	26	4	C6	1	-	1	1	2	0	1	1	0	0	1	0	1	1	2	3	**1**	53%
4B	27	4	C7	3	-	3	3	3	3	3	3	3	3	3	2	2	4	3	4	**3**	73%
4B	28	4	C8	2	-	1	1	2	1	1	2	0	0	0	1	1	4	3	3	**1**	40%
4B	29	4	C9	3	-	3	2	2	2	1	1	0	3	3	0	1	1	3	4	**3**	33%
4B	30	4	C10	1	-	1	1	2	1	1	1	1	0	1	1	1	1	1	3	**1**	80%
4B	31	4	D1	2	-	2	2	2	3	2	2	2	3	2	2	2	3	2	3	**2**	73%
4B	32	4	D2	2	-	1	1	2	1	2	1	0	0	0	1	2	1	1	3	**1**	47%
4B	33	4	D3	1	-	1	1	1	1	1	1	0	0	1	0	1	1	2	3	**1**	67%
4B	34	4	D4	2	-	3	2	3	3	3	3	2	3	2	2	2	4	3	4	**3**	47%
4B	35	4	D5	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4B	36	4	D6	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	0	**3**	87%
4B	37	4	D7	3	-	3	3	3	3	3	3	2	3	3	2	2	3	3	3	**3**	80%
4B	38	4	D8	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	0	**3**	87%
4B	39	4	D9	2	-	3	3	3	3	3	3	2	0	3	2	2	3	3	1	**3**	60%
4B	40	4	D10	2	-	2	2	2	0	2	1	1	2	2	1	1	0	2	1	**2**	53%
4B	41	4	E1	2	-	1	1	2	1	2	1	0	2	1	0	1	0	2	0	**1**	40%
4B	42	4	E2	2	-	1	2	2	1	2	1	0	2	0	1	1	0	2	0	**2**	40%
4B	43	4	E3	1	-	1	1	2	1	0	1	0	2	1	0	2	1	1	1	**1**	60%
4B	44	4	E4	1	-	0	1	-	0	0	1	0	0	1	1	1	1	1	0	**1**	57%
4B	45	4	E5	2	-	1	0	1	1	1	1	1	0	0	1	1	1	2	0	**1**	60%
4B	46	4	E6	3	-	2	3	4	3	3	3	3	3	3	3	3	4	3	3	**3**	80%
4B	47	4	E7	2	-	2	2	3	3	2	2	2	3	2	2	2	3	3	3	**2**	60%
4B	48	4	E8	3	-	2	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	93%
4B	49	4	E9	4	-	4	4	4	4	4	4	4	5	2	4	5	4	4	3	**4**	73%
4B	50	4	E10	3	-	3	3	3	4	3	3	3	4	3	4	3	4	3	3	**3**	73%
5A	1	5	A1	1	-	1	1	1	0	2	1	1	0	1	-	1	1	0	0	**1**	64%
5A	2	5	A2	0	-	1	2	2	1	1	2	1	1	0	-	1	1	0	0	**1**	50%
5A	3	5	A3	1	-	1	1	0	0	1	0	0	1	1	-	2	0	0	0	**0**	50%
5A	4	5	A4	3	-	3	2	2	1	2	2	1	3	0	-	4	2	0	0	**2**	36%
5A	5	5	A5	1	-	1	1	1	0	2	0	1	1	0	-	1	2	0	0	**1**	50%
5A	6	5	A6	2	-	2	2	2	2	2	2	2	2	0	-	1	3	0	0	**2**	64%
5A	7	5	A7	3	-	4	3	3	4	4	3	3	4	3	-	3	4	4	4	**3**	50%
5A	8	5	A8	5	-	5	5	5	5	5	5	5	5	4	-	5	4	5	5	**5**	86%
5A	9	5	A9	0	-	1	0	1	0	2	0	1	1	0	-	0	2	0	3	**0**	50%
5A	10	5	A10	5	-	5	5	5	5	5	5	5	5	4	-	5	4	5	4	**5**	79%
5A	11	5	B1	2	-	1	0	3	2	2	2	1	1	2	-	1	2	0	2	**2**	50%
5A	12	5	B2	0	-	1	0	0	0	2	0	1	1	0	-	0	-	0	0	**0**	69%
5A	13	5	B3	4	-	4	4	4	4	4	3	3	4	3	-	4	4	4	3	**4**	71%
5A	14	5	B4	5	-	5	4	4	5	5	4	5	5	4	-	4	5	5	4	**5**	57%
5A	15	5	B5	1	-	1	1	1	1	1	1	1	1	1	-	0	1	0	2	**1**	79%
5A	16	5	B6	2	-	1	1	1	0	1	1	0	1	2	-	0	1	0	0	**1**	50%
5A	17	5	B7	5	-	4	4	4	4	5	4	4	5	4	-	5	4	4	4	**4**	71%
5A	18	5	B8	1	-	1	2	1	1	2	2	1	1	2	-	1	1	0	3	**1**	57%
5A	19	5	B9	4	-	3	3	3	4	3	4	3	4	3	-	4	4	3	4	**4**	50%
5A	20	5	B10	1	-	1	1	1	0	2	1	1	1	1	-	1	1	0	0	**1**	71%
5A	21	5	C1	5	-	4	4	4	4	5	4	4	5	4	-	4	4	5	4	**4**	71%
5A	22	5	C2	2	-	0	2	2	2	1	1	0	0	1	-	0	1	-	0	**0**	38%
5A	23	5	C3	5	-	5	5	5	5	5	5	5	5	5	-	5	4	5	3	**5**	86%
5A	24	5	C4	4	-	4	4	4	4	4	4	4	4	4	-	4	4	4	3	**4**	93%
5A	25	5	C5	0	-	0	1	1	1	1	0	0	1	0	-	0	2	0	0	**0**	57%
5B	26	5	C6	1	-	1	1	1	1	1	0	0	2	1	-	1	1	0	3	**1**	64%
5B	27	5	C7	1	-	1	1	1	1	1	1	0	2	1	-	1	1	3	3	**1**	71%
5B	28	5	C8	4	-	4	4	4	4	4	4	3	4	3	-	4	4	4	5	**4**	79%
5B	29	5	C9	1	-	1	1	1	1	1	1	1	0	1	-	1	1	0	3	**1**	79%
5B	30	5	C10	3	-	3	2	3	3	3	2	2	3	3	-	3	3	3	0	**3**	71%
5B	31	5	D1	1	-	1	1	1	1	1	1	1	0	1	-	1	1	0	3	**1**	79%
5B	32	5	D2	1	-	1	1	1	1	1	1	0	0	1	-	1	1	0	0	**1**	71%
5B	33	5	D3	1	-	1	1	1	1	1	1	1	1	1	-	1	2	0	3	**1**	79%
5B	34	5	D4	4	-	3	4	4	4	4	4	3	4	3	-	4	3	4	3	**4**	64%
5B	35	5	D5	1	-	1	1	1	0	1	1	0	0	0	-	1	1	0	3	**1**	57%
5B	36	5	D6	1	-	1	1	1	1	1	0	0	1	1	-	1	0	0	0	**1**	64%
5B	37	5	D7	1	-	1	1	1	1	2	1	0	1	1	-	1	2	0	0	**1**	64%
5B	38	5	D8	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	3	**3**	71%
5B	39	5	D9	1	-	1	1	1	1	1	1	0	1	1	-	1	1	0	3	**1**	79%
5B	40	5	D10	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	3	**3**	71%
5B	41	5	E1	2	-	3	2	2	3	3	2	2	3	2	-	2	3	2	3	**2**	57%
5B	42	5	E2	1	-	1	1	1	1	2	0	0	0	1	-	1	1	1	0	**1**	64%
5B	43	5	E3	2	-	3	2	2	3	3	2	2	3	2	-	3	2	3	3	**2**	50%
5B	44	5	E4	3	-	3	3	3	3	3	3	3	3	3	-	3	3	3	3	**3**	100%
5B	45	5	E5	1	-	1	1	1	1	1	1	0	0	1	-	1	1	0	2	**1**	71%
5B	46	5	E6	0	-	1	0	0	0	2	1	0	1	0	-	1	0	0	0	**0**	64%
5B	47	5	E7	1	-	1	1	1	0	2	1	0	0	1	-	0	1	0	2	**1**	50%
5B	48	5	E8	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	4	**3**	64%
5B	49	5	E9	1	-	1	1	1	1	2	1	1	2	1	-	0	1	0	2	**1**	64%
5B	50	5	E10	1	-	1	1	1	0	2	0	1	0	1	-	0	1	2	3	**1**	50%
6A	1	6	A1	2	2	2	2	2	2	2	2	2	3	2	2	2	3	2	3	**2**	81%
6A	2	6	A2	1	0	1	0	1	1	1	1	0	0	1	0	0	1	2	0	**1**	50%
6A	3	6	A3	4	5	4	4	4	5	5	4	4	5	4	5	4	4	4	3	**4**	63%
6A	4	6	A4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**0**	94%
6A	5	6	A5	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	4	**0**	75%
6A	6	6	A6	2	1	1	2	1	1	1	1	0	0	2	0	1	1	2	0	**1**	50%
6A	7	6	A7	5	5	5	4	4	5	5	5	5	5	4	5	5	4	4	5	**5**	69%
6A	8	6	A8	0	1	1	1	0	0	1	1	1	0	1	1	2	0	0	0	**1**	50%
6A	9	6	A9	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	**4**	94%
6A	10	6	A10	3	3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	**3**	88%
6A	11	6	B1	2	2	2	2	2	3	2	2	2	3	2	2	2	3	2	2	**2**	81%
6A	12	6	B2	1	1	1	1	1	0	0	1	1	0	1	1	3	1	2	1	**1**	69%
6A	13	6	B3	1	1	1	1	1	1	1	1	1	3	1	1	1	2	1	1	**1**	88%
6A	14	6	B4	5	5	5	5	4	5	5	5	5	5	4	5	5	4	4	4	**5**	69%
6A	15	6	B5	5	5	4	4	4	4	5	4	4	5	3	4	4	4	4	4	**4**	69%
6A	16	6	B6	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	1	**0**	63%
6A	17	6	B7	5	5	4	4	4	4	5	4	5	5	3	5	5	4	4	4	**4**	50%
6A	18	6	B8	4	5	5	4	5	5	5	4	5	4	4	5	5	4	4	5	**5**	56%
6A	19	6	B9	1	1	0	1	1	0	0	1	0	0	1	1	0	0	1	1	**1**	56%
6A	20	6	B10	3	3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	**3**	88%
6A	21	6	C1	1	1	1	1	0	0	0	1	0	0	1	1	1	0	0	1	**1**	56%
6A	22	6	C2	3	3	3	3	3	4	3	3	3	3	3	3	4	4	3	3	**3**	81%
6A	23	6	C3	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	**4**	94%
6A	24	6	C4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**0**	94%
6A	25	6	C5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	4	5	**5**	81%
6B	26	6	C6	0	1	0	1	1	0	0	1	0	0	1	1	0	1	0	0	**0**	56%
6B	27	6	C7	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	**1**	88%
6B	28	6	C8	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	88%
6B	29	6	C9	1	1	2	1	1	1	1	1	0	1	1	1	1	1	0	0	**1**	75%

6B	30	6	C10	2	2	3	3	3	3	2	3	3	3	3	3	2	3	3	3	**3**	75%
6B	31	6	D1	0	1	0	1	1	0	1	1	0	0	1	1	0	0	0	0	**0**	56%
6B	32	6	D2	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	**1**	88%
6B	33	6	D3	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	**1**	88%
6B	34	6	D4	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	**1**	88%
6B	35	6	D5	0	0	1	1	1	0	1	1	0	0	1	1	1	0	0	1	**1**	56%
6B	36	6	D6	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	1	**1**	50%
6B	37	6	D7	1	1	1	2	1	1	1	1	0	0	0	1	1	1	0	1	**1**	69%
6B	38	6	D8	0	1	1	1	0	0	0	1	0	0	0	0	1	0	1	1	**0**	56%
6B	39	6	D9	1	1	1	1	1	1	1	1	1	3	1	1	2	0	0	1	**1**	75%
6B	40	6	D10	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	**3**	94%
6B	41	6	E1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	**0**	81%
6B	42	6	E2	4	5	4	4	4	5	4	4	4	4	3	5	4	4	4	3	**4**	69%
6B	43	6	E3	1	1	1	1	2	1	1	1	1	0	1	1	1	1	2	0	**1**	75%
6B	44	6	E4	1	1	1	2	1	1	1	1	1	2	0	2	0	1	1	0	**1**	63%
6B	45	6	E5	1	1	1	1	1	1	1	1	0	0	1	1	1	1	2	0	**1**	75%
6B	46	6	E6	1	1	2	1	1	0	2	1	1	1	0	1	1	1	1	3	**1**	69%
6B	47	6	E7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	**0**	88%
6B	48	6	E8	1	3	1	1	1	0	1	1	0	0	1	1	1	0	1	0	**1**	63%
6B	49	6	E9	3	3	3	3	4	3	3	3	2	3	3	3	3	4	3	3	**3**	81%
6B	50	6	E10	1	1	1	1	1	1	2	1	0	0	2	1	0	1	0	0	**1**	56%
7A	1	7	A1	2	2	2	2	2	3	3	2	2	0	2	-	2	3	2	2	**2**	73%
7A	2	7	A2	2	2	3	2	3	3	3	2	2	4	2	-	3	3	3	3	**3**	53%
7A	3	7	A3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
7A	4	7	A4	1	1	1	1	1	1	1	1	0	0	1	-	0	1	2	1	**1**	73%
7A	5	7	A5	3	3	3	0	2	2	3	2	1	0	2	-	2	3	2	3	**3**	40%
7A	6	7	A6	2	2	3	2	2	3	3	2	2	3	2	-	3	3	3	2	**2**	53%
7A	7	7	A7	1	1	1	1	1	0	1	1	1	1	1	-	1	1	2	1	**1**	87%
7A	8	7	A8	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	100%
7A	9	7	A9	1	1	1	0	1	0	1	0	0	0	0	-	1	0	1	0	**0**	53%
7A	10	7	A10	2	2	2	0	2	2	2	0	2	2	0	-	1	2	2	2	**2**	73%
7A	11	7	B1	4	4	4	4	4	4	4	2	4	4	3	-	4	3	4	3	**4**	73%
7A	12	7	B2	4	4	4	4	4	4	4	2	3	4	3	-	3	3	4	4	**4**	67%
7A	13	7	B3	4	4	4	4	3	4	4	3	4	4	4	-	4	4	4	4	**4**	87%
7A	14	7	B4	3	3	3	2	3	3	3	2	2	4	2	-	2	3	3	3	**3**	60%
7A	15	7	B5	1	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	93%
7A	16	7	B6	0	0	0	0	0	0	0	0	0	0	0	-	1	0	0	0	**0**	93%
7A	17	7	B7	3	3	3	2	3	3	3	2	2	3	3	-	3	3	3	3	**3**	80%
7A	18	7	B8	2	2	1	0	2	2	2	2	0	0	2	-	0	0	1	1	**2**	47%
7A	19	7	B9	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	100%
7A	20	7	B10	0	0	1	1	1	1	1	0	0	2	0	-	2	2	2	1	**1**	40%
7A	21	7	C1	3	3	3	2	2	2	3	2	3	4	2	-	3	3	2	3	**3**	53%
7A	22	7	C2	2	2	1	1	1	1	2	1	1	2	1	-	1	0	2	1	**1**	60%
7A	23	7	C3	3	3	3	2	2	3	3	2	3	3	3	-	2	3	3	3	**3**	73%
7A	24	7	C4	2	2	2	2	2	3	2	2	2	2	2	-	2	2	2	2	**2**	93%
7A	25	7	C5	3	3	4	4	3	4	4	2	3	4	3	-	4	4	3	4	**4**	53%
7B	26	7	C6	1	2	1	1	1	0	2	1	1	1	1	-	1	2	2	1	**1**	67%
7B	27	7	C7	3	3	3	3	3	3	3	2	3	3	3	-	3	4	3	3	**3**	87%
7B	28	7	C8	2	2	3	2	2	2	3	2	3	3	2	-	3	3	3	3	**3**	53%
7B	29	7	C9	3	3	3	3	3	3	3	2	3	3	3	-	3	4	3	3	**3**	87%
7B	30	7	C10	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	100%
7B	31	7	D1	1	1	1	1	1	0	1	1	1	1	1	-	1	1	1	1	**1**	93%
7B	32	7	D2	4	4	4	4	3	4	4	3	4	4	3	-	4	4	4	4	**4**	80%
7B	33	7	D3	5	5	4	4	3	4	5	3	4	5	4	-	3	4	4	4	**4**	53%
7B	34	7	D4	4	4	4	4	4	4	5	4	4	4	4	-	4	4	4	4	**4**	93%
7B	35	7	D5	3	3	1	2	2	2	2	1	1	3	2	-	0	1	2	1	**2**	40%
7B	36	7	D6	1	1	0	1	1	0	1	1	0	1	1	-	1	1	1	1	**1**	80%
7B	37	7	D7	3	3	3	3	3	3	3	3	3	4	3	-	3	4	3	3	**3**	87%
7B	38	7	D8	1	1	0	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	93%
7B	39	7	D9	3	3	0	2	2	2	3	1	0	3	1	-	0	1	2	1	**3**	27%
7B	40	7	D10	0	0	0	1	0	0	0	0	0	0	1	-	1	0	1	1	**0**	67%
7B	41	7	E1	2	2	3	2	2	2	3	2	3	3	2	-	2	3	3	3	**2**	53%
7B	42	7	E2	0	0	0	0	0	0	0	0	0	0	0	-	1	0	1	0	**0**	87%
7B	43	7	E3	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	**0**	100%
7B	44	7	E4	2	2	2	2	2	2	3	2	2	3	2	-	2	3	2	2	**2**	80%
7B	45	7	E5	1	1	0	1	1	1	3	1	0	1	2	-	0	1	4	1	**1**	60%
7B	46	7	E6	2	2	2	2	1	0	2	2	1	2	0	-	1	1	2	2	**2**	60%
7B	47	7	E7	1	1	1	1	1	0	1	1	1	1	0	-	0	1	1	1	**1**	80%
7B	48	7	E8	3	3	3	3	3	3	3	3	3	3	3	-	3	4	3	3	**3**	93%
7B	49	7	E9	1	1	0	1	1	0	1	0	0	1	1	-	1	1	2	1	**1**	67%
7B	50	7	E10	1	1	0	1	1	1	1	1	0	1	1	-	1	1	1	1	**1**	87%
8A	1	8	A1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	2	**0**	75%
8A	2	8	A2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	3	**2**	88%
8A	3	8	A3	0	0	0	0	1	0	1	0	0	0	0	1	1	0	1	0	**0**	69%
8A	4	8	A4	1	0	0	0	2	1	1	0	0	2	1	0	0	1	1	1	**1**	44%
8A	5	8	A5	0	1	0	0	1	0	1	1	0	1	0	1	1	0	1	3	**1**	50%
8A	6	8	A6	2	2	2	2	2	2	3	2	2	3	2	2	3	2	3	3	**2**	69%
8A	7	8	A7	2	1	2	2	2	3	2	2	1	2	2	2	2	2	2	3	**2**	75%
8A	8	8	A8	0	0	0	0	0	0	1	0	0	1	0	2	1	1	1	1	**0**	56%
8A	9	8	A9	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	**0**	75%
8A	10	8	A10	2	2	2	2	2	3	3	2	2	3	2	2	3	2	3	1	**2**	63%
8A	11	8	B1	3	2	3	2	3	3	3	2	2	3	2	2	3	3	3	3	**3**	63%
8A	12	8	B2	2	2	2	2	3	3	2	2	2	3	2	2	2	2	3	3	**2**	69%
8A	13	8	B3	3	2	3	2	3	3	3	2	2	3	2	2	4	2	3	3	**3**	50%
8A	14	8	B4	2	2	3	2	2	2	3	2	2	3	2	2	3	2	3	2	**2**	69%
8A	15	8	B5	0	0	0	0	-	0	1	0	0	0	0	0	1	0	1	2	**0**	73%
8A	16	8	B6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**0**	94%
8A	17	8	B7	2	2	2	2	2	3	3	2	2	3	2	2	2	2	3	3	**2**	69%
8A	18	8	B8	2	2	0	2	2	0	3	2	1	1	2	2	1	2	3	2	**2**	56%
8A	19	8	B9	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	3	**2**	88%
8A	20	8	B10	2	2	3	2	3	3	3	2	2	3	2	2	3	3	3	3	**3**	56%
8A	21	8	C1	1	1	0	2	0	0	1	1	0	2	0	0	1	1	1	0	**1**	44%
8A	22	8	C2	0	0	0	0	2	0	0	0	0	0	2	2	0	2	0	2	**0**	69%
8A	23	8	C3	2	2	3	2	3	3	3	2	3	3	2	2	2	2	3	2	**2**	56%
8A	24	8	C4	2	2	0	2	2	2	2	0	2	2	2	2	2	2	2	2	**2**	88%
8A	25	8	C5	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	**2**	94%
8B	26	8	C6	3	3	3	3	3	3	3	2	3	3	3	2	1	3	3	3	**3**	81%
8B	27	8	C7	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	**0**	81%
8B	28	8	C8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	**0**	88%
8B	29	8	C9	0	1	0	0	2	0	1	1	0	0	1	1	0	1	1	1	**1**	50%
8B	30	8	C10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	**0**	88%
8B	31	8	D1	3	2	2	2	0	2	3	1	1	2	0	0	1	0	3	0	**2**	31%
8B	32	8	D2	2	1	2	2	0	2	2	2	2	2	0	1	2	0	2	0	**2**	63%
8B	33	8	D3	1	2	1	2	0	2	3	2	0	1	0	0	0	1	2	1	**1**	31%
8B	34	8	D4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	**0**	88%
8B	35	8	D5	2	2	2	3	2	2	2	2	2	2	2	2	2	3	2	3	**2**	81%
8B	36	8	D6	1	1	1	2	2	2	2	1	1	2	1	2	1	1	2	2	**1**	50%
8B	37	8	D7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	**0**	88%
8B	38	8	D8	4	5	4	4	4	4	5	4	4	4	4	4	4	5	4	2	**4**	75%
8B	39	8	D9	1	2	1	2	2	2	2	2	2	2	1	2	2	1	2	1	**2**	69%
8B	40	8	D10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	88%
8B	41	8	E1	1	0	0	0	2	0	2	0	0	0	1	2	1	1	0	1	**0**	50%
8B	42	8	E2	0	0	0	0	2	0	1	0	0	0	2	2	1	1	0	2	**0**	56%
8B	43	8	E3	1	0	0	1	2	1	1	1	0	0	2	2	0	2	0	2	**0**	38%
8B	44	8	E4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	**0**	81%
8B	45	8	E5	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	**0**	69%
8B	46	8	E6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	94%
8B	47	8	E7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	94%
8B	48	8	E8	1	1	0	1	1	0	0	1	0	0	1	0	0	1	0	1	**1**	50%
8B	49	8	E9	0	0	0	0	2	0	0	0	0	0	2	2	1	2	0	1	**0**	63%
8B	50	8	E10	3	2	3	2	1	2	3	2	3	3	0	0	3	0	3	1	**3**	44%
			Total staged	400	300	400	400	397	400	400	350	400	400	400	150	400	399	396	400		**71.1%**
			Total NOT staged	0	100	0	0	3	0	0	50	0	0	0	250	0	1	4	0		

Table 2 The number of egg staging by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

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NUMBER OF EGG STAGE READINGS BY MODAL EGG STAGE

	MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	TOTAL
Stage 1a ==>	0	101	95	101	101	99	101	101	82	101	101	101	30	101	100	97	101	1513
Stage 1b ==>	1	90	59	90	90	89	90	90	88	90	90	90	38	90	90	90	90	1354
	2	55	45	55	55	55	55	55	51	55	55	55	23	55	55	55	55	834
	3	78	50	78	78	78	78	78	64	78	78	78	34	78	78	78	78	1162
	4	48	30	48	48	48	48	48	43	48	48	48	18	48	48	48	48	715
	5	28	21	28	28	28	28	28	22	28	28	28	7	28	28	28	28	414
Total	**0-5**	**400**	**300**	**400**	**400**	**397**	**400**	**400**	**350**	**400**	**400**	**400**	**150**	**400**	**399**	**396**	**400**	**5992**

B

EGG STAGE COMPOSITION

	Stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	TOTAL
Stage 1a ==>	0	87	84	107	97	78	140	83	77	157	130	119	29	69	94	85	106	1542
Stage 1b ==>	1	93	65	88	91	97	55	78	95	53	52	73	37	133	90	81	73	1254
	2	73	57	48	85	66	32	65	77	59	38	82	35	51	50	56	54	928
	3	72	45	83	53	79	86	95	47	69	93	83	23	66	73	96	109	1172
	4	42	21	45	56	60	56	38	38	40	51	40	15	47	79	57	51	736
	5	33	28	29	18	17	31	41	16	22	36	3	11	34	13	21	7	360
Total	**0-5**	**400**	**300**	**400**	**400**	**397**	**400**	**400**	**350**	**400**	**400**	**400**	**150**	**400**	**399**	**396**	**400**	**5992**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
1a+1b	**-6%**	**-3%**	**2%**	**-2%**	**-7%**	**2%**	**-16%**	**1%**	**10%**	**-5%**	**1%**	**-3%**	**6%**	**-3%**	**-11%**	**-6%**	**-2%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
Stage 1a ==>	0	79%	84%	84%	84%	71%	96%	75%	78%	94%	84%	88%	53%	48%	68%	56%	63%	**76%**
Stage 1b ==>	1	82%	83%	76%	83%	80%	56%	67%	80%	42%	41%	71%	68%	72%	67%	40%	42%	**65%**
	2	93%	89%	69%	89%	75%	42%	64%	78%	67%	44%	82%	83%	55%	51%	53%	42%	**66%**
	3	86%	76%	87%	60%	83%	77%	87%	55%	68%	83%	68%	62%	69%	59%	88%	63%	**74%**
	4	81%	67%	81%	88%	88%	90%	63%	65%	69%	79%	40%	67%	77%	73%	81%	56%	**73%**
	5	93%	100%	93%	61%	61%	96%	96%	68%	75%	93%	11%	100%	93%	36%	61%	18%	**70%**
Weighted mean	**0-5**	**84.3%**	**82.7%**	**81.0%**	**78.8%**	**77.1%**	**75.0%**	**74.0%**	**72.0%**	**69.3%**	**68.8%**	**68.3%**	**67.3%**	**65.0%**	**61.9%**	**61.6%**	**51.5%**	71.1%
	RANKING	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	

E

PERCENTAGE AGREEMENT STAGE 1A and 1B combined

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
1a+1b	**90%**	**92%**	**96%**	**93%**	**87%**	**95%**	**81%**	**94%**	**100%**	**89%**	**93%**	**89%**	**96%**	**91%**	**82%**	**82%**	**91%**
RANKING	**10**	**8**	**2**	**6**	**13**	**4**	**16**	**5**	**1**	**11**	**6**	**12**	**2**	**9**	**15**	**14**	

F

BIAS

	MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
Stage 1a ==>	0	0.24	0.17	0.18	0.17	0.38	0.05	0.33	0.24	0.06	0.19	0.17	0.67	0.53	0.40	0.51	0.56	**0.29**
Stage 1b ==>	1	0.02	0.05	-0.16	0.01	0.09	-0.40	0.20	-0.02	-0.58	-0.28	-0.16	-0.21	-0.11	-0.09	0.02	0.09	**-0.09**
	2	0.04	0.02	-0.07	-0.15	-0.02	0.24	0.36	-0.24	-0.40	0.33	-0.35	-0.22	-0.15	0.09	0.13	-0.09	**-0.02**
	3	-0.12	-0.20	-0.03	-0.35	-0.03	0.08	0.06	-0.36	-0.38	0.06	-0.36	-0.32	-0.18	0.15	0.04	-0.28	**-0.13**
	4	0.10	0.13	-0.06	-0.08	-0.13	0.06	0.21	-0.40	-0.27	0.21	-0.67	0.11	0.10	-0.15	-0.02	-0.46	**-0.09**
	5	-0.07	0.00	-0.11	-0.39	-0.39	-0.04	-0.07	-0.36	-0.25	-0.07	-1.04	0.00	-0.07	-0.64	-0.43	-1.25	**-0.35**

MACKEREL first stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Table 3   Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL stage	SAMPLING STRATA												Nr of eggs
	1	2	3	4	5	6	7	8	x	x	x	x	
0	19	26	11	-	6	9	9	21	-	-	-	-	**101**
1	2	9	6	9	22	22	13	7	-	-	-	-	**90**
2	4	6	8	5	5	2	9	16	-	-	-	-	**55**
3	14	8	4	22	6	7	12	5	-	-	-	-	**78**
4	5	-	11	11	7	6	7	1	-	-	-	-	**48**
5	6	1	10	3	4	4	-	-	-	-	-	-	**28**
TOTAL	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**0**	**0**	**0**	**0**	**400**

PERCENTAGE AGREEMENT

MODAL stage	SAMPLING STRATA												Agree-ment
	1	2	3	4	5	6	7	8	x	x	x	x	
0	80%	84%	59%	-	55%	74%	88%	75%	-	-	-	-	**76.4%**
1	61%	67%	69%	56%	65%	68%	75%	46%	-	-	-	-	**65.1%**
2	55%	73%	68%	61%	51%	81%	64%	70%	-	-	-	-	**66.2%**
3	81%	65%	83%	76%	71%	85%	66%	59%	-	-	-	-	**73.8%**
4	71%	-	78%	70%	71%	73%	72%	75%	-	-	-	-	**73.1%**
5	62%	87%	73%	67%	77%	69%	-	-	-	-	-	-	**70.3%**
Mean CV	**74.3%**	**76.8%**	**70.4%**	**69.1%**	**65.0%**	**72.5%**	**72.9%**	**67.7%**	**-**	**-**	**-**	**-**	**71.1%**

Weighted

BIAS

MODAL stage	SAMPLING STRATA												Mean bias
	1	2	3	4	5	6	7	8	x	x	x	x	
0	0.23	0.16	0.58	-	0.60	0.28	0.12	0.32	-	-	-	-	**0.29**
1	-0.39	-0.08	-0.09	0.04	-0.07	-0.16	-0.03	-0.17	-	-	-	-	**-0.09**
2	-0.11	0.18	-0.12	-0.12	-0.04	0.19	-0.10	0.02	-	-	-	-	**-0.02**
3	-0.06	-0.13	-0.10	0.01	-0.12	-0.06	-0.33	-0.50	-	-	-	-	**-0.13**
4	-0.07	-	-0.16	-0.10	-0.10	0.13	-0.21	0.06	-	-	-	-	**-0.09**
5	-0.46	-0.20	-0.29	-0.51	-0.25	-0.31	-	-	-	-	-	-	**-0.35**
Mean	**-0.02**	**0.07**	**-0.00**	**-0.05**	**-0.01**	**-0.03**	**-0.11**	**0.07**	**-**	**-**	**-**	**-**	**-0.01**

Weighted

Table 4 TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Irel SH+DL	Port AF	Nor JdL	Eng MS	KM+BR	Neth IdB	Germ NH	Spain AL	Norw IMB	**2STDEV**
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	0.986	0.807	0.867	0.803	1.391	0.520	1.236	0.972	0.475	0.926	0.983	1.605	1.042	1.271	1.358	1.885	**1.149**
1	0.847	0.941	0.944	0.821	0.886	1.073	1.207	0.909	0.993	1.530	1.035	1.056	1.099	1.295	1.748	2.112	**1.274**
2	0.539	0.673	1.380	1.117	1.305	1.804	0.971	1.172	1.568	1.590	1.502	1.037	1.560	1.816	1.590	2.082	**1.489**
3	0.719	0.904	0.966	1.241	0.910	0.955	0.812	1.303	1.299	1.221	1.161	1.756	1.358	1.514	0.679	1.820	**1.237**
4	0.849	1.143	0.866	0.694	0.668	0.640	1.164	1.390	0.988	0.821	1.191	1.166	0.944	1.010	0.874	1.302	**1.100**
5	0.525	0.000	0.833	0.995	0.995	0.378	0.756	1.162	0.882	0.525	1.016	0.000	0.525	0.976	1.145	1.689	**1.154**

MEAN STAGE

MODAL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Irel SH+DL	Port AF	Nor JdL	Eng MS	KM+BR	Neth IdB	Germ NH	Spain AL	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	0.24	0.17	0.18	0.17	0.38	0.05	0.33	0.24	0.06	0.19	0.17	0.67	0.53	0.40	0.51	0.56	**0.29**
1	1.02	1.05	0.84	1.01	1.09	0.60	1.20	0.98	0.42	0.72	0.84	0.79	0.89	0.91	1.02	1.09	**0.91**
2	2.04	2.02	1.93	1.85	1.98	2.24	2.36	1.76	1.60	2.33	1.65	1.78	1.85	2.09	2.13	1.91	**1.98**
3	2.88	2.80	2.97	2.65	2.97	3.08	3.06	2.64	2.62	3.06	2.64	2.68	2.82	3.15	3.04	2.72	**2.87**
4	4.10	4.13	3.94	3.92	3.88	4.06	4.21	3.60	3.73	4.21	3.33	4.11	4.10	3.85	3.98	3.54	**3.91**
5	4.93	5.00	4.89	4.61	4.61	4.96	4.93	4.64	4.75	4.93	3.96	5.00	4.93	4.36	4.57	3.75	**4.65**

MEAN STAGE +2STDEV

MODAL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Irel SH+DL	Port AF	Nor JdL	Eng MS	KM+BR	Neth IdB	Germ NH	Spain AL	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	1.223	0.975	1.045	0.972	1.775	0.569	1.563	1.216	0.535	1.114	1.151	2.271	1.576	1.671	1.863	2.449	**1.44**
1	1.869	1.992	1.788	1.832	1.976	1.673	2.407	1.886	1.416	2.252	1.879	1.846	1.988	2.206	2.770	3.201	**2.18**
2	2.576	2.695	3.307	2.971	3.287	4.040	3.335	2.937	3.168	3.917	3.156	2.819	3.414	3.907	3.717	3.992	**3.47**
3	3.604	3.704	3.940	3.895	3.885	4.031	3.876	3.943	3.914	4.285	3.802	4.433	4.178	4.668	3.718	4.538	**4.11**
4	4.954	5.276	4.804	4.611	4.543	4.702	5.372	4.994	4.718	5.029	4.524	5.277	5.049	4.864	4.853	4.844	**5.01**
5	5.453	5.000	5.725	5.602	5.602	5.342	5.685	5.799	5.632	5.453	4.980	5.000	5.453	5.333	5.717	5.439	**5.81**

MEAN STAGE -2STDEV

MODAL	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Irel SH+DL	Port AF	Nor JdL	Eng MS	KM+BR	Neth IdB	Germ NH	Spain AL	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	-0.748	-0.639	-0.689	-0.635	-1.007	-0.470	-0.910	-0.728	-0.416	-0.738	-0.814	-0.938	-0.507	-0.871	-0.853	-1.321	**-0.863**
1	0.175	0.110	-0.099	0.190	0.204	-0.473	-0.007	0.069	-0.571	-0.807	-0.190	-0.267	-0.210	-0.383	-0.725	-1.024	**-0.368**
2	1.497	1.350	0.547	0.738	0.677	0.433	1.393	0.592	0.032	0.738	0.153	0.746	0.295	0.274	0.538	-0.173	**0.490**
3	2.165	1.896	2.009	1.413	2.064	2.122	2.253	1.338	1.317	1.844	1.480	0.920	1.463	1.639	2.359	0.898	**1.636**
4	3.255	2.991	3.071	3.222	3.207	3.423	3.044	2.215	2.741	3.388	2.142	2.945	3.160	2.844	3.105	2.240	**2.808**
5	4.404	5.000	4.060	3.612	3.612	4.586	4.173	3.474	3.868	4.404	2.949	5.000	4.404	3.381	3.426	2.061	**3.500**

MACKEREL first stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 1

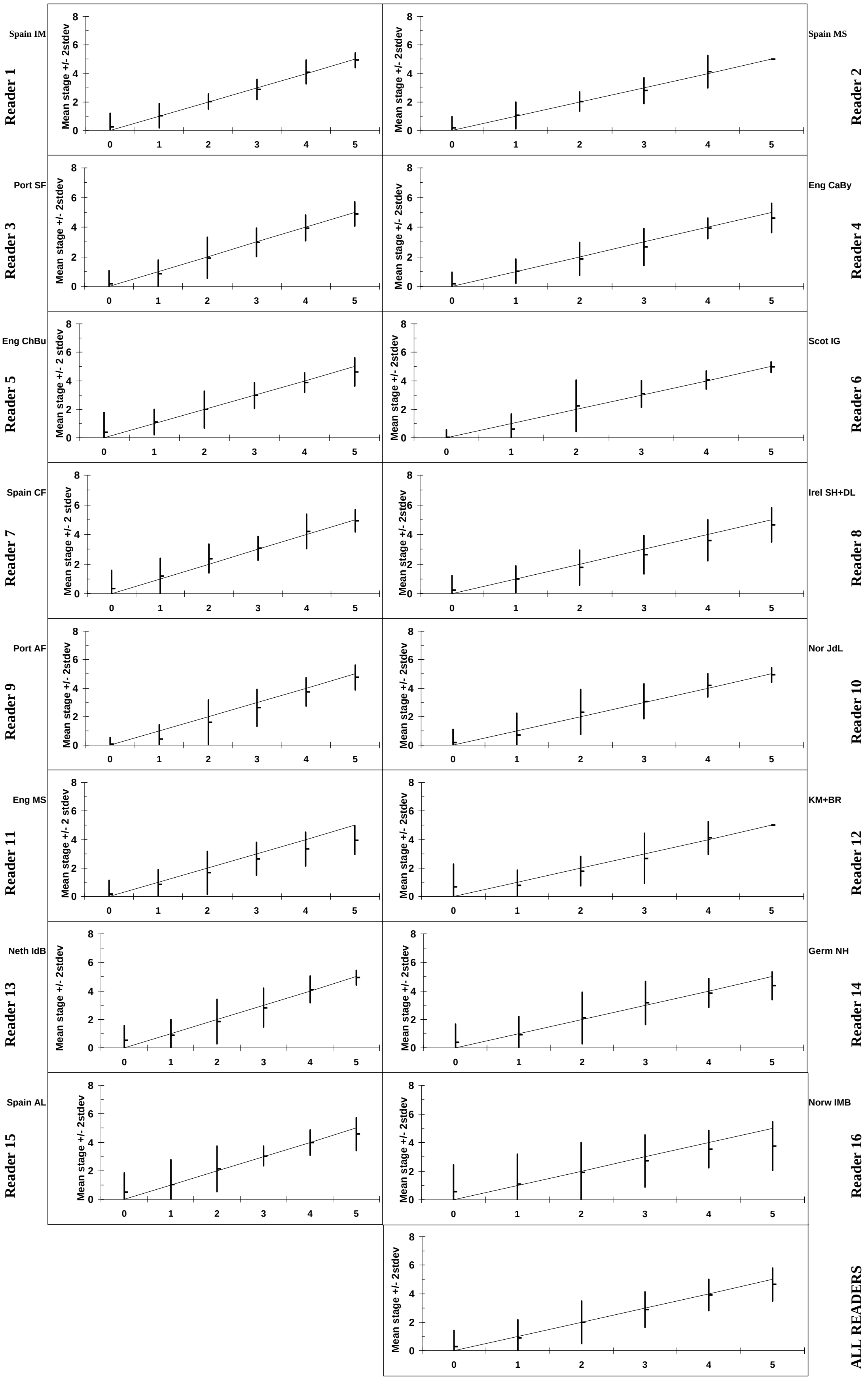

Table 5 The number of egg staging by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	TOTAL
	1	198	159	198	198	195	198	198	176	198	198	198	71	198	197	194	198	**2972**
	2	50	41	50	50	50	50	50	47	50	50	50	21	50	50	50	50	**759**
	3	76	49	76	76	76	76	76	62	76	76	76	33	76	76	76	76	**1132**
	4	48	30	48	48	48	48	48	43	48	48	48	18	48	48	48	48	**715**
	5	28	21	28	28	28	28	28	22	28	28	28	7	28	28	28	28	**414**
Total	**0-5**	**400**	**300**	**400**	**400**	**397**	**400**	**400**	**350**	**400**	**400**	**400**	**150**	**400**	**399**	**396**	**400**	**5992**

B

EGG STAGE COMPOSITION

	Stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	TOTAL
	1	180	149	195	188	175	195	161	172	210	182	192	66	202	184	166	179	**2796**
	2	73	57	48	85	66	32	65	77	59	38	82	35	51	50	56	54	**928**
	3	72	45	83	53	79	86	95	47	69	93	83	23	66	73	96	109	**1172**
	4	42	21	45	56	60	56	38	38	40	51	40	15	47	79	57	51	**736**
	5	33	28	29	18	17	31	41	16	22	36	3	11	34	13	21	7	**360**
Total	**0-5**	**400**	**300**	**400**	**400**	**397**	**400**	**400**	**350**	**400**	**400**	**400**	**150**	**400**	**399**	**396**	**400**	**5992**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
1a+1b	**-9%**	**-6%**	**-2%**	**-5%**	**-10%**	**-2%**	**-19%**	**-2%**	**6%**	**-8%**	**-3%**	**-7%**	**2%**	**-7%**	**-14%**	**-10%**	**-6%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
	1	90%	92%	96%	93%	87%	95%	81%	94%	100%	89%	93%	89%	96%	91%	82%	82%	**91%**
	2	96%	90%	74%	92%	74%	38%	62%	83%	74%	44%	86%	90%	60%	56%	52%	46%	**69%**
	3	86%	76%	88%	62%	86%	79%	88%	56%	70%	83%	68%	64%	71%	61%	89%	64%	**75%**
	4	81%	67%	81%	88%	88%	90%	63%	65%	69%	79%	40%	67%	77%	73%	81%	56%	**73%**
	5	93%	100%	93%	61%	61%	96%	96%	68%	75%	93%	11%	100%	93%	36%	61%	18%	**70%**
Weighted mean	**0-5**	**89.3%**	**87.3%**	**89.8%**	**84.0%**	**83.1%**	**84.5%**	**79.0%**	**80.6%**	**85.5%**	**81.3%**	**75.3%**	**81.3%**	**84.3%**	**74.7%**	**78.0%**	**66.8%**	81.5%
	RANKING	**2**	**3**	**1**	**7**	**8**	**5**	**12**	**11**	**4**	**10**	**14**	**9**	**6**	**15**	**13**	**16**	

E

PERCENTAGE AGREEMENT STAGE 1 (stage 1A and 1B combined)

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
1a+1b	**90%**	**92%**	**96%**	**93%**	**87%**	**95%**	**81%**	**94%**	**100%**	**89%**	**93%**	**89%**	**96%**	**91%**	**82%**	**82%**	91%
RANKING	**10**	**8**	**2**	**6**	**13**	**4**	**16**	**5**	**1**	**11**	**6**	**12**	**2**	**9**	**15**	**14**	

F

BIAS

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	ALL
1	0.12	0.09	0.05	0.07	0.14	0.05	0.21	0.06	0.00	0.14	0.08	0.11	0.05	0.10	0.23	0.31	**0.11**
2	0.00	0.00	0.06	-0.04	0.06	0.38	0.38	-0.13	-0.18	0.40	-0.14	-0.10	-0.02	0.30	0.20	0.16	**0.09**
3	-0.12	-0.20	0.01	-0.32	0.00	0.11	0.09	-0.31	-0.32	0.09	-0.33	-0.21	-0.12	0.22	0.05	-0.22	**-0.09**
4	0.10	0.13	-0.06	-0.08	-0.13	0.06	0.21	-0.40	-0.27	0.21	-0.67	0.11	0.10	-0.15	-0.02	-0.46	**-0.09**
5	-0.07	0.00	-0.11	-0.39	-0.39	-0.04	-0.07	-0.36	-0.25	-0.07	-1.04	0.00	-0.07	-0.64	-0.43	-1.25	**-0.35**

Table 5a MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1-5

RANGE
r. 1-16

	Sample			Well	Spain IM	Spain MS	Port SF	Eng CaBy	Eng ChBu	Scot IG	Spain CF	Irel SH+DL	Port AF	Nor JdL	Eng MS	KM+BR	Neth IdB	Germ NH	Spain AL	Norw IMB	**MODAL**	**Percent**
Stratum	no	no	Tray	no	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**stage**	**agreement**
1	1A	1	1	A1	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	2	1	A2	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1	1A	3	1	A3	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	4	1	A4	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1	1A	5	1	A5	2	2	3	2	3	3	3	-	2	3	2	-	3	3	3	3	**3**	64%
1	1A	6	1	A6	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	7	1	A7	1	1	1	1	1	1	1	-	1	1	1	-	1	1	-	1	**1**	100%
1	1A	8	1	A8	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	9	1	A9	4	4	4	4	4	4	4	-	4	4	4	-	4	4	4	4	**4**	100%
1	1A	10	1	A10	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	11	1	B1	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	4	**3**	93%
1	1A	12	1	B2	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	13	1	B3	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	4	**5**	71%
1	1A	14	1	B4	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	15	1	B5	2	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	93%
1	1A	16	1	B6	1	1	1	1	1	1	1	-	1	1	1	-	1	1	-	1	**1**	100%
1	1A	17	1	B7	4	4	3	3	4	4	4	-	3	4	3	-	3	4	4	3	**4**	57%
1	1A	18	1	B8	2	2	3	2	2	3	3	-	2	3	2	-	2	4	2	3	**2**	57%
1	1A	19	1	B9	3	3	3	3	3	3	3	-	3	3	3	-	3	3	3	3	**3**	100%
1	1A	20	1	B10	3	3	3	3	3	4	4	-	3	3	3	-	4	3	4	2	**3**	64%
1	1A	21	1	C1	3	3	3	3	3	3	3	-	3	3	3	-	4	4	3	3	**3**	86%
1	1A	22	1	C2	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	23	1	C3	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	24	1	C4	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1A	25	1	C5	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1B	26	1	C6	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1B	27	1	C7	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	2	**1**	93%
1	1B	28	1	C8	5	5	4	4	4	4	5	-	4	5	3	-	5	3	4	2	**4**	43%
1	1B	29	1	C9	5	5	5	4	4	5	5	-	5	5	4	-	5	4	4	3	**5**	57%
1	1B	30	1	C10	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	4	**5**	71%
1	1B	31	1	D1	2	2	1	1	2	2	2	-	1	3	1	-	1	1	2	1	**1**	50%
1	1B	32	1	D2	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1B	33	1	D3	5	5	5	5	5	5	5	-	5	5	4	-	5	4	4	2	**5**	71%
1	1B	34	1	D4	4	4	4	4	4	4	4	-	4	4	3	-	5	4	4	3	**4**	79%
1	1B	35	1	D5	3	3	3	2	3	3	3	-	2	3	2	-	3	3	3	2	**3**	71%
1	1B	36	1	D6	5	5	5	4	5	5	5	-	4	5	3	-	5	4	4	3	**5**	57%
1	1B	37	1	D7	4	4	4	4	4	4	5	-	4	4	3	-	5	4	4	4	**4**	79%
1	1B	38	1	D8	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1B	39	1	D9	1	1	1	1	1	1	1	-	1	1	1	-	1	1	3	1	**1**	93%
1	1B	40	1	D10	3	3	3	3	4	4	3	-	3	4	3	-	3	3	3	1	**3**	71%
1	1B	41	1	E1	3	3	3	3	3	3	3	-	3	4	3	-	3	3	3	2	**3**	86%
1	1B	42	1	E2	1	1	1	1	1	1	1	-	1	1	1	-	1	1	1	1	**1**	100%
1	1B	43	1	E3	3	3	2	2	3	3	3	-	2	3	2	-	2	2	3	2	**3**	50%
1	1B	44	1	E4	1	1	1	1	4	1	1	-	1	1	1	-	1	1	1	1	**1**	93%
1	1B	45	1	E5	3	3	3	3	3	4	4	-	3	3	3	-	3	3	4	2	**3**	71%
1	1B	46	1	E6	5	5	5	4	4	5	5	-	4	5	3	-	4	4	4	3	**5**	43%
1	1B	47	1	E7	1	1	1	1	1	1	1	-	1	1	1	-	1	2	-	1	**1**	92%
1	1B	48	1	E8	2	2	1	2	1	1	2	-	1	2	2	-	2	2	2	1	**2**	64%
1	1B	49	1	E9	2	2	2	2	3	3	3	-	2	3	2	-	2	3	3	2	**2**	57%
1	1B	50	1	E10	3	3	3	2	3	3	3	-	3	3	3	-	2	3	3	2	**3**	79%
2	2A	1	2	A1	1	2	1	1	2	1	2	2	1	1	2	-	1	1	1	1	**1**	67%
2	2A	2	2	A2	2	2	2	2	2	3	3	3	2	2	2	-	2	2	3	2	**2**	73%
2	2A	3	2	A3	1	1	1	1	-	1	1	2	1	1	1	-	1	1	1	1	**1**	93%
2	2A	4	2	A4	3	2	2	2	3	3	3	4	2	3	2	-	3	2	3	2	**3**	47%
2	2A	5	2	A5	2	2	2	2	2	3	2	2	2	2	2	-	2	2	2	2	**2**	93%
2	2A	6	2	A6	1	1	1	1	1	1	1	2	1	1	1	-	2	1	2	1	**1**	80%
2	2A	7	2	A7	1	2	1	1	1	1	2	1	1	1	1	-	1	1	2	1	**1**	80%
2	2A	8	2	A8	3	4	4	3	3	4	4	3	3	4	3	-	3	3	3	2	**3**	60%
2	2A	9	2	A9	2	2	2	2	2	3	2	2	2	3	2	-	2	3	2	2	**2**	80%
2	2A	10	2	A10	1	1	1	1	2	1	2	2	1	1	1	-	1	1	2	1	**1**	73%
2	2A	11	2	B1	3	2	3	2	3	3	3	4	2	3	2	-	3	3	3	2	**3**	60%
2	2A	12	2	B2	4	3	3	3	4	4	3	3	3	4	3	-	2	3	3	2	**3**	60%
2	2A	13	2	B3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2A	14	2	B4	3	3	3	3	3	3	3	2	3	3	3	-	3	3	3	2	**3**	87%
2	2A	15	2	B5	3	3	3	3	4	4	3	3	3	3	3	-	3	3	3	3	**3**	87%
2	2A	16	2	B6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	2	**1**	93%
2	2A	17	2	B7	2	2	2	2	2	3	3	2	2	3	2	-	3	2	3	2	**2**	67%
2	2A	18	2	B8	5	5	5	5	5	5	5	5	5	5	5	-	5	4	5	3	**5**	87%
2	2A	19	2	B9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2A	20	2	B10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2A	21	2	C1	2	2	2	2	2	2	2	1	2	2	2	-	1	3	2	1	**2**	73%
2	2A	22	2	C2	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2A	23	2	C3	2	3	2	2	3	3	3	2	2	3	2	-	2	3	3	2	**2**	53%
2	2A	24	2	C4	3	3	3	2	3	3	3	2	2	3	2	-	2	3	3	2	**3**	60%
2	2A	25	2	C5	2	3	3	2	3	3	3	2	2	3	2	-	3	3	3	2	**3**	60%
2	2B	26	2	C6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	27	2	C7	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	28	2	C8	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	29	2	C9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	30	2	C10	1	1	1	1	1	1	1	2	1	1	1	-	1	1	1	2	**1**	87%
2	2B	31	2	D1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	32	2	D2	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	33	2	D3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	34	2	D4	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	35	2	D5	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	36	2	D6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	37	2	D7	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	38	2	D8	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	39	2	D9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	40	2	D10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	41	2	E1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	42	2	E2	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	43	2	E3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	44	2	E4	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	45	2	E5	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	46	2	E6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	47	2	E7	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	48	2	E8	1	1	1	1	1	1	1	1	1	2	1	-	1	1	1	1	**1**	93%
2	2B	49	2	E9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
2	2B	50	2	E10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
3	3A	1	3	A1	2	2	2	2	2	2	2	2	2	1	2	-	2	2	2	3	**2**	87%
3	3A	2	3	A2	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	3	**1**	93%
3	3A	3	3	A3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	5	**1**	93%
3	3A	4	3	A4	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	3	**4**	80%
3	3A	5	3	A5	4	3	4	4	4	4	4	2	3	4	2	-	4	3	4	2	**4**	60%
3	3A	6	3	A6	5	5	5	4	4	5	5	4	4	5	3	-	5	4	5	4	**5**	53%
3	3A	7	3	A7	1	1	1	1	1	1	1	2	1	1	2	-	1	2	4	3	**1**	67%
3	3A	8	3	A8	5	5	5	4	4	5	5	4	4	5	3	-	5	4	5	3	**5**	53%
3	3A	9	3	A9	4	3	4	4	4	4	4	3	3	4	2	-	4	3	4	3	**4**	60%
3	3A	10	3	A10	2	2	2	2	3	3	3	2	2	3	2	-	3	2	3	4	**2**	53%
3	3A	11	3	B1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
3	3A	12	3	B2	3	3	3	3	3	3	3	3	3	3	3	-	2	3	3	3	**3**	93%
3	3A	13	3	B3	1	1	1	1	1	1	2	1	1	2	1	-	1	1	1	1	**1**	87%
3	3A	14	3	B4	3	3	3	3	3	3	3	2	3	3	2	-	3	2	3	3	**3**	80%
3	3A	15	3	B5	1	1	1	1	1	1	1	1	1	2	1	-	1	1	1	1	**1**	93%
3	3A	16	3	B6	3	3	3	3	3	3	3	2	2	3	2	-	3	2	3	4	**3**	67%
3	3A	17	3	B7	4	4	4	4	4	4	4	3	3	4	3	-	4	3	4	4	**4**	73%
3	3A	18	3	B8	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	4	**4**	87%
3	3A	19	3	B9	4	4	5	4	4	5	5	4	4	5	4	-	5	4	5	4	**4**	60%
3	3A	20	3	B10	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3	3A	21	3	C1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
3	3A	22	3	C2	4	4	4	4	4	4	4	4	4	4	3	-	5	4	4	4	**4**	87%
3	3A	23	3	C3	2	2	2	2	2	2	2	2	2	2	2	-	2	2	1	1	**2**	87%
3	3A	24	3	C4	1	1	2	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	87%
3	3A	25	3	C5	2	3	2	2	3	3	3	2	2	3	2	-	2	3	3	2	**2**	53%
3	3B	26	3	C6	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3	3B	27	3	C7	2	1	2	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	80%
3	3B	28	3	C8	2	2	2	2	1	2	2	1	1	2	2	-	1	2	1	2	**2**	67%
3	3B	29	3	C9	4	4	4	4	4	4	4	4	4	4	3	-	4	3	4	4	**4**	87%
3	3B	30	3	C10	1	1	1	1	1	1	1	1	1	1	1	-	1	2	1	1	**1**	93%
3	3B	31	3	D1	5	5	5	5	5	5	5	5	4	5	4	-	5	5	5	5	**5**	87%
3	3B	32	3	D2	5	5	5	5	5	5	5	5	5	5	4	-	5	5	5	4	**5**	87%
3	3B	33	3	D3	2	1	2	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	80%
3	3B	34	3	D4	3	3	3	3	3	3	3	3	3	3	3	-	3	3	3	4	**3**	93%
3	3B	35	3	D5	5	5	5	4	4	5	5	5	5	5	4	-	5	4	5	4	**5**	67%
3	3B	36	3	D6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%

3	3B	37	3	D7	5	5	5	5	4	5	5	5	4	5	4	-	5	5	5	4	**5**	73%
3	3B	38	3	D8	4	4	4	4	4	4	4	4	4	4	3	-	4	4	4	4	**4**	93%
3	3B	39	3	D9	5	5	5	5	4	5	5	5	5	5	4	-	5	5	5	4	**5**	80%
3	3B	40	3	D10	4	4	4	4	4	3	4	4	3	4	3	-	4	4	4	4	**4**	80%
3	3B	41	3	E1	2	2	2	2	2	1	2	1	1	2	2	-	1	2	1	3	**2**	60%
3	3B	42	3	E2	4	4	4	4	4	4	4	4	4	4	3	-	4	4	4	4	**4**	93%
3	3B	43	3	E3	2	2	2	2	2	2	2	2	1	2	1	-	1	2	1	2	**2**	73%
3	3B	44	3	E4	5	5	4	4	5	5	5	4	4	5	4	-	5	4	5	4	**5**	53%
3	3B	45	3	E5	2	1	2	1	1	1	2	1	1	1	1	-	1	2	1	1	**1**	73%
3	3B	46	3	E6	2	2	2	1	1	2	2	1	1	2	2	-	1	2	2	1	**2**	60%
3	3B	47	3	E7	2	2	1	1	1	1	2	1	1	1	1	-	1	2	1	1	**1**	73%
3	3B	48	3	E8	1	1	1	1	1	1	1	1	1	1	1	-	1	2	1	1	**1**	93%
3	3B	49	3	E9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
3	3B	50	3	E10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
4	4A	1	4	A1	3	-	5	5	4	4	5	5	4	4	4	4	4	4	5	4	**4**	60%
4	4A	2	4	A2	5	-	4	4	3	4	4	4	3	4	3	3	4	5	4	4	**4**	60%
4	4A	3	4	A3	4	-	3	4	5	5	3	3	5	4	4	5	5	5	3	2	**5**	40%
4	4A	4	4	A4	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4	4A	5	4	A5	2	-	2	2	2	3	2	2	2	3	2	2	2	3	2	2	**2**	80%
4	4A	6	4	A6	4	-	3	3	4	4	3	3	4	4	4	4	4	4	3	3	**4**	60%
4	4A	7	4	A7	3	-	3	3	3	3	3	3	3	4	3	3	4	4	3	3	**3**	80%
4	4A	8	4	A8	3	-	4	4	3	3	4	4	3	3	3	4	3	4	4	3	**3**	53%
4	4A	9	4	A9	3	-	4	4	3	3	4	4	3	3	3	3	3	4	4	4	**3**	53%
4	4A	10	4	A10	4	-	3	3	4	4	3	3	4	4	4	4	4	4	3	3	**4**	60%
4	4A	11	4	B1	3	-	3	3	4	4	4	3	3	3	3	4	3	4	3	3	**3**	67%
4	4A	12	4	B2	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	13	4	B3	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4	4A	14	4	B4	4	-	4	4	4	4	4	3	4	4	4	4	4	4	4	3	**4**	87%
4	4A	15	4	B5	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4	4A	16	4	B6	3	-	4	4	3	4	4	3	3	3	3	3	3	4	4	3	**3**	60%
4	4A	17	4	B7	4	-	5	4	4	5	5	4	4	5	4	5	4	4	4	4	**4**	67%
4	4A	18	4	B8	4	-	3	3	4	4	3	3	4	4	4	3	4	4	3	3	**4**	53%
4	4A	19	4	B9	4	-	4	4	4	4	5	4	4	4	4	4	4	5	4	4	**4**	87%
4	4A	20	4	B10	3	-	3	3	3	4	3	3	3	3	3	3	4	4	3	3	**3**	80%
4	4A	21	4	C1	4	-	4	4	4	4	4	4	3	4	4	4	4	4	4	3	**4**	87%
4	4A	22	4	C2	5	-	5	5	5	5	5	5	5	5	5	5	5	5	5	3	**5**	93%
4	4A	23	4	C3	3	-	3	3	3	3	3	3	3	3	3	3	4	3	3	3	**3**	93%
4	4A	24	4	C4	5	-	5	5	4	5	5	4	5	5	4	5	5	4	5	3	**5**	67%
4	4A	25	4	C5	4	-	4	4	4	4	4	4	4	4	3	4	4	4	5	3	**4**	80%
4	4B	26	4	C6	1	-	1	1	2	1	1	1	1	1	1	1	1	1	2	3	**1**	80%
4	4B	27	4	C7	3	-	3	3	3	3	3	3	3	3	3	2	2	4	3	4	**3**	73%
4	4B	28	4	C8	2	-	1	1	2	1	1	2	1	1	1	1	1	4	3	3	**1**	60%
4	4B	29	4	C9	3	-	3	2	2	2	1	1	1	3	3	1	1	1	3	4	**1**	40%
4	4B	30	4	C10	1	-	1	1	2	1	1	1	1	1	1	1	1	1	1	3	**1**	87%
4	4B	31	4	D1	2	-	2	2	2	3	2	2	2	3	2	2	2	3	2	3	**2**	73%
4	4B	32	4	D2	2	-	1	1	2	1	2	1	1	1	1	1	2	1	1	3	**1**	67%
4	4B	33	4	D3	1	-	1	1	1	1	1	1	1	1	1	1	1	1	2	3	**1**	87%
4	4B	34	4	D4	2	-	3	2	3	3	3	3	2	3	2	2	2	4	3	4	**3**	47%
4	4B	35	4	D5	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	93%
4	4B	36	4	D6	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	1	**3**	87%
4	4B	37	4	D7	3	-	3	3	3	3	3	3	2	3	3	2	2	3	3	3	**3**	80%
4	4B	38	4	D8	3	-	3	3	3	3	3	3	3	3	3	3	3	4	3	1	**3**	87%
4	4B	39	4	D9	2	-	3	3	3	3	3	3	2	1	3	2	2	3	3	1	**3**	60%
4	4B	40	4	D10	2	-	2	2	2	1	2	1	1	2	2	1	1	1	2	1	**2**	53%
4	4B	41	4	E1	2	-	1	1	2	1	2	1	1	2	1	1	1	1	2	1	**1**	67%
4	4B	42	4	E2	2	-	1	2	2	1	2	1	1	2	1	1	1	1	2	1	**1**	60%
4	4B	43	4	E3	1	-	1	1	2	1	1	1	1	2	1	1	2	1	1	1	**1**	80%
4	4B	44	4	E4	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
4	4B	45	4	E5	2	-	1	1	1	1	1	1	1	1	1	1	1	1	2	1	**1**	87%
4	4B	46	4	E6	3	-	2	3	4	3	3	3	3	3	3	3	3	4	3	3	**3**	80%
4	4B	47	4	E7	2	-	2	2	3	3	2	2	2	3	2	2	2	3	3	3	**2**	60%
4	4B	48	4	E8	3	-	2	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	93%
4	4B	49	4	E9	4	-	4	4	4	4	4	4	4	5	2	4	5	4	4	3	**4**	73%
4	4B	50	4	E10	3	-	3	3	3	4	3	3	3	4	3	4	3	4	3	3	**3**	73%
5	5A	1	5	A1	1	-	1	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	93%
5	5A	2	5	A2	1	-	1	2	2	1	1	2	1	1	1	-	1	1	1	1	**1**	79%
5	5A	3	5	A3	1	-	1	1	1	1	1	1	1	1	1	-	2	1	1	1	**1**	93%
5	5A	4	5	A4	3	-	3	2	2	1	2	2	1	3	1	-	4	2	1	1	**2**	36%
5	5A	5	5	A5	1	-	1	1	1	1	2	1	1	1	1	-	1	2	1	1	**1**	86%
5	5A	6	5	A6	2	-	2	2	2	2	2	2	2	2	1	-	1	3	1	1	**2**	64%
5	5A	7	5	A7	3	-	4	3	3	4	4	3	3	4	3	-	3	4	4	4	**3**	50%
5	5A	8	5	A8	5	-	5	5	5	5	5	5	5	5	4	-	5	4	5	5	**5**	86%
5	5A	9	5	A9	1	-	1	1	1	1	2	1	1	1	1	-	1	2	1	3	**1**	79%
5	5A	10	5	A10	5	-	5	5	5	5	5	5	5	5	4	-	5	4	5	4	**5**	79%
5	5A	11	5	B1	2	-	1	1	3	2	2	2	1	1	2	-	1	2	1	2	**2**	50%
5	5A	12	5	B2	1	-	1	1	1	1	2	1	1	1	1	-	1	-	1	1	**1**	92%
5	5A	13	5	B3	4	-	4	4	4	4	4	3	3	4	3	-	4	4	4	3	**4**	71%
5	5A	14	5	B4	5	-	5	4	4	5	5	4	5	5	4	-	4	5	5	4	**5**	57%
5	5A	15	5	B5	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	2	**1**	93%
5	5A	16	5	B6	2	-	1	1	1	1	1	1	1	1	2	-	1	1	1	1	**1**	86%
5	5A	17	5	B7	5	-	4	4	4	4	5	4	4	5	4	-	5	4	4	4	**4**	71%
5	5A	18	5	B8	1	-	1	2	1	1	2	2	1	1	2	-	1	1	1	3	**1**	64%
5	5A	19	5	B9	4	-	3	3	3	4	3	4	3	4	3	-	4	4	3	4	**4**	50%
5	5A	20	5	B10	1	-	1	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	93%
5	5A	21	5	C1	5	-	4	4	4	4	5	4	4	5	4	-	4	4	5	4	**4**	71%
5	5A	22	5	C2	2	-	1	2	2	2	1	1	1	1	1	-	1	1	-	1	**1**	69%
5	5A	23	5	C3	5	-	5	5	5	5	5	5	5	5	5	-	5	4	5	3	**5**	86%
5	5A	24	5	C4	4	-	4	4	4	4	4	4	4	4	4	-	4	4	4	3	**4**	93%
5	5A	25	5	C5	1	-	1	1	1	1	1	1	1	1	1	-	1	2	1	1	**1**	93%
5	5B	26	5	C6	1	-	1	1	1	1	1	1	1	2	1	-	1	1	1	3	**1**	86%
5	5B	27	5	C7	1	-	1	1	1	1	1	1	1	2	1	-	1	1	3	3	**1**	79%
5	5B	28	5	C8	4	-	4	4	4	4	4	4	3	4	3	-	4	4	4	5	**4**	79%
5	5B	29	5	C9	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	3	**1**	93%
5	5B	30	5	C10	3	-	3	2	3	3	3	2	2	3	3	-	3	3	3	1	**3**	71%
5	5B	31	5	D1	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	3	**1**	93%
5	5B	32	5	D2	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
5	5B	33	5	D3	1	-	1	1	1	1	1	1	1	1	1	-	1	2	1	3	**1**	86%
5	5B	34	5	D4	4	-	3	4	4	4	4	4	3	4	3	-	4	3	4	3	**4**	64%
5	5B	35	5	D5	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	3	**1**	93%
5	5B	36	5	D6	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
5	5B	37	5	D7	1	-	1	1	1	1	2	1	1	1	1	-	1	2	1	1	**1**	86%
5	5B	38	5	D8	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	3	**3**	71%
5	5B	39	5	D9	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	3	**1**	93%
5	5B	40	5	D10	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	3	**3**	71%
5	5B	41	5	E1	2	-	3	2	2	3	3	2	2	3	2	-	2	3	2	3	**2**	57%
5	5B	42	5	E2	1	-	1	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	93%
5	5B	43	5	E3	2	-	3	2	2	3	3	2	2	3	2	-	3	2	3	3	**2**	50%
5	5B	44	5	E4	3	-	3	3	3	3	3	3	3	3	3	-	3	3	3	3	**3**	100%
5	5B	45	5	E5	1	-	1	1	1	1	1	1	1	1	1	-	1	1	1	2	**1**	93%
5	5B	46	5	E6	1	-	1	1	1	1	2	1	1	1	1	-	1	1	1	1	**1**	93%
5	5B	47	5	E7	1	-	1	1	1	1	2	1	1	1	1	-	1	1	1	2	**1**	86%
5	5B	48	5	E8	3	-	3	2	3	3	3	2	2	3	2	-	3	3	3	4	**3**	64%
5	5B	49	5	E9	1	-	1	1	1	1	2	1	1	2	1	-	1	1	1	2	**1**	79%
5	5B	50	5	E10	1	-	1	1	1	1	2	1	1	1	1	-	1	1	2	3	**1**	79%
6	6A	1	6	A1	2	2	2	2	2	2	2	2	2	3	2	2	2	3	2	3	**2**	81%
6	6A	2	6	A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	**1**	94%
6	6A	3	6	A3	4	5	4	4	4	5	5	4	4	5	4	5	4	4	4	3	**4**	63%
6	6A	4	6	A4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	5	6	A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	**1**	94%
6	6A	6	6	A6	2	1	1	2	1	1	1	1	1	1	2	1	1	1	2	1	**1**	75%
6	6A	7	6	A7	5	5	5	4	4	5	5	5	5	5	4	5	5	4	4	5	**5**	69%
6	6A	8	6	A8	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	**1**	94%
6	6A	9	6	A9	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	**4**	94%
6	6A	10	6	A10	3	3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	**3**	88%
6	6A	11	6	B1	2	2	2	2	2	3	2	2	2	3	2	2	2	3	2	2	**2**	81%
6	6A	12	6	B2	1	1	1	1	1	1	1	1	1	1	1	1	3	1	2	1	**1**	88%
6	6A	13	6	B3	1	1	1	1	1	1	1	1	1	3	1	1	1	2	1	1	**1**	88%
6	6A	14	6	B4	5	5	5	5	4	5	5	5	5	5	4	5	5	4	4	4	**5**	69%
6	6A	15	6	B5	5	5	4	4	4	4	5	4	4	5	3	4	4	4	4	4	**4**	69%
6	6A	16	6	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	17	6	B7	5	5	4	4	4	4	5	4	5	5	3	5	5	4	4	4	**4**	50%
6	6A	18	6	B8	4	5	5	4	5	5	5	4	5	4	4	5	5	4	4	5	**5**	56%
6	6A	19	6	B9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	20	6	B10	3	3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	**3**	88%
6	6A	21	6	C1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	22	6	C2	3	3	3	3	3	4	3	3	3	3	3	3	4	4	3	3	**3**	81%
6	6A	23	6	C3	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	**4**	94%
6	6A	24	6	C4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	25	6	C5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	4	5	**5**	81%
6	6B	26	6	C6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	27	6	C7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	28	6	C8	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	88%

6	6B	29	6	C9	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	94%
6	6B	30	6	C10	2	2	3	3	3	3	2	3	3	3	3	3	2	3	3	3	**3**	75%
6	6B	31	6	D1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	32	6	D2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	33	6	D3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	34	6	D4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	35	6	D5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	36	6	D6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	37	6	D7	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	**1**	94%
6	6B	38	6	D8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	39	6	D9	1	1	1	1	1	1	1	1	1	3	1	1	2	1	1	1	**1**	88%
6	6B	40	6	D10	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	**3**	94%
6	6B	41	6	E1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	42	6	E2	4	5	4	4	4	5	4	4	4	4	3	5	4	4	4	3	**4**	69%
6	6B	43	6	E3	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	**1**	88%
6	6B	44	6	E4	1	1	1	2	1	1	1	1	1	2	1	2	1	1	1	1	**1**	81%
6	6B	45	6	E5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	**1**	94%
6	6B	46	6	E6	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	3	**1**	81%
6	6B	47	6	E7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6B	48	6	E8	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	94%
6	6B	49	6	E9	3	3	3	3	4	3	3	3	2	3	3	3	3	4	3	3	**3**	81%
6	6B	50	6	E10	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	**1**	88%
7	7A	1	7	A1	2	2	2	2	2	3	3	2	2	1	2	-	2	3	2	2	**2**	73%
7	7A	2	7	A2	2	2	3	2	3	3	3	2	2	4	2	-	3	3	3	3	**3**	53%
7	7A	3	7	A3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
7	7A	4	7	A4	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
7	7A	5	7	A5	3	3	3	1	2	2	3	2	1	1	2	-	2	3	2	3	**3**	40%
7	7A	6	7	A6	2	2	3	2	2	3	3	2	2	3	2	-	3	3	3	2	**2**	53%
7	7A	7	7	A7	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
7	7A	8	7	A8	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7A	9	7	A9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7A	10	7	A10	2	2	2	1	2	2	2	1	2	2	1	-	1	2	2	2	**2**	73%
7	7A	11	7	B1	4	4	4	4	4	4	4	2	4	4	3	-	4	3	4	3	**4**	73%
7	7A	12	7	B2	4	4	4	4	4	4	4	2	3	4	3	-	3	3	4	4	**4**	67%
7	7A	13	7	B3	4	4	4	4	3	4	4	3	4	4	4	-	4	4	4	4	**4**	87%
7	7A	14	7	B4	3	3	3	2	3	3	3	2	2	4	2	-	2	3	3	3	**3**	60%
7	7A	15	7	B5	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7A	16	7	B6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7A	17	7	B7	3	3	3	2	3	3	3	2	2	3	3	-	3	3	3	3	**3**	80%
7	7A	18	7	B8	2	2	1	1	2	2	2	2	1	1	2	-	1	1	1	1	**1**	53%
7	7A	19	7	B9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7A	20	7	B10	1	1	1	1	1	1	1	1	1	2	1	-	2	2	2	1	**1**	73%
7	7A	21	7	C1	3	3	3	2	2	2	3	2	3	4	2	-	3	3	2	3	**3**	53%
7	7A	22	7	C2	2	2	1	1	1	1	2	1	1	2	1	-	1	1	2	1	**1**	67%
7	7A	23	7	C3	3	3	3	2	2	3	3	2	3	3	3	-	2	3	3	3	**3**	73%
7	7A	24	7	C4	2	2	2	2	2	3	2	2	2	2	2	-	2	2	2	2	**2**	93%
7	7A	25	7	C5	3	3	4	4	3	4	4	2	3	4	3	-	4	4	3	4	**4**	53%
7	7B	26	7	C6	1	2	1	1	1	1	2	1	1	1	1	-	1	2	2	1	**1**	73%
7	7B	27	7	C7	3	3	3	3	3	3	3	2	3	3	3	-	3	4	3	3	**3**	87%
7	7B	28	7	C8	2	2	3	2	2	2	3	2	3	3	2	-	3	3	3	3	**3**	53%
7	7B	29	7	C9	3	3	3	3	3	3	3	2	3	3	3	-	3	4	3	3	**3**	87%
7	7B	30	7	C10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	31	7	D1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	32	7	D2	4	4	4	4	3	4	4	3	4	4	3	-	4	4	4	4	**4**	80%
7	7B	33	7	D3	5	5	4	4	3	4	5	3	4	5	4	-	3	4	4	4	**4**	53%
7	7B	34	7	D4	4	4	4	4	4	4	5	4	4	4	4	-	4	4	4	4	**4**	93%
7	7B	35	7	D5	3	3	1	2	2	2	2	1	1	3	2	-	1	1	2	1	**1**	40%
7	7B	36	7	D6	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	37	7	D7	3	3	3	3	3	3	3	3	3	4	3	-	3	4	3	3	**3**	87%
7	7B	38	7	D8	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	39	7	D9	3	3	1	2	2	2	3	1	1	3	1	-	1	1	2	1	**1**	47%
7	7B	40	7	D10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	41	7	E1	2	2	3	2	2	2	3	2	3	3	2	-	2	3	3	3	**2**	53%
7	7B	42	7	E2	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	43	7	E3	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	44	7	E4	2	2	2	2	2	2	3	2	2	3	2	-	2	3	2	2	**2**	80%
7	7B	45	7	E5	1	1	1	1	1	1	3	1	1	1	2	-	1	1	4	1	**1**	80%
7	7B	46	7	E6	2	2	2	2	1	1	2	2	1	2	1	-	1	1	2	2	**2**	60%
7	7B	47	7	E7	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
7	7B	48	7	E8	3	3	3	3	3	3	3	3	3	3	3	-	3	4	3	3	**3**	93%
7	7B	49	7	E9	1	1	1	1	1	1	1	1	1	1	1	-	1	1	2	1	**1**	93%
7	7B	50	7	E10	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	**1**	100%
8	8A	1	8	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	**1**	94%
8	8A	2	8	A2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	3	**2**	88%
8	8A	3	8	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	4	8	A4	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	**1**	88%
8	8A	5	8	A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	**1**	94%
8	8A	6	8	A6	2	2	2	2	2	2	3	2	2	3	2	2	3	2	3	3	**2**	69%
8	8A	7	8	A7	2	1	2	2	2	3	2	2	1	2	2	2	2	2	2	3	**2**	75%
8	8A	8	8	A8	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	**1**	94%
8	8A	9	8	A9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	10	8	A10	2	2	2	2	2	3	3	2	2	3	2	2	3	2	3	1	**2**	63%
8	8A	11	8	B1	3	2	3	2	3	3	3	2	2	3	2	2	3	3	3	3	**3**	63%
8	8A	12	8	B2	2	2	2	2	3	3	2	2	2	3	2	2	2	2	3	3	**2**	69%
8	8A	13	8	B3	3	2	3	2	3	3	3	2	2	3	2	2	4	2	3	3	**3**	50%
8	8A	14	8	B4	2	2	3	2	2	2	3	2	2	3	2	2	3	2	3	2	**2**	69%
8	8A	15	8	B5	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	2	**1**	93%
8	8A	16	8	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	17	8	B7	2	2	2	2	2	3	3	2	2	3	2	2	2	2	3	3	**2**	69%
8	8A	18	8	B8	2	2	1	2	2	1	3	2	1	1	2	2	1	2	3	2	**2**	56%
8	8A	19	8	B9	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	3	**2**	88%
8	8A	20	8	B10	2	2	3	2	3	3	3	2	2	3	2	2	3	3	3	3	**3**	56%
8	8A	21	8	C1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	**1**	88%
8	8A	22	8	C2	1	1	1	1	2	1	1	1	1	1	2	2	1	2	1	2	**1**	69%
8	8A	23	8	C3	2	2	3	2	3	3	3	2	3	3	2	2	2	2	3	2	**2**	56%
8	8A	24	8	C4	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	**2**	88%
8	8A	25	8	C5	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	**2**	94%
8	8B	26	8	C6	3	3	3	3	3	3	3	2	3	3	3	2	1	3	3	3	**3**	81%
8	8B	27	8	C7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	28	8	C8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	29	8	C9	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	**1**	94%
8	8B	30	8	C10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	31	8	D1	3	2	2	2	1	2	3	1	1	2	1	1	1	1	3	1	**1**	50%
8	8B	32	8	D2	2	1	2	2	1	2	2	2	2	2	1	1	2	1	2	1	**2**	63%
8	8B	33	8	D3	1	2	1	2	1	2	3	2	1	1	1	1	1	1	2	1	**1**	63%
8	8B	34	8	D4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	35	8	D5	2	2	2	3	2	2	2	2	2	2	2	2	2	3	2	3	**2**	81%
8	8B	36	8	D6	1	1	1	2	2	2	2	1	1	2	1	2	1	1	2	2	**1**	50%
8	8B	37	8	D7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	38	8	D8	4	5	4	4	4	4	5	4	4	4	4	4	4	5	4	2	**4**	75%
8	8B	39	8	D9	1	2	1	2	2	2	2	2	2	2	1	2	2	1	2	1	**2**	69%
8	8B	40	8	D10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	41	8	E1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	1	1	**1**	81%
8	8B	42	8	E2	1	1	1	1	2	1	1	1	1	1	2	2	1	1	1	2	**1**	75%
8	8B	43	8	E3	1	1	1	1	2	1	1	1	1	1	2	2	1	2	1	2	**1**	69%
8	8B	44	8	E4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	45	8	E5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	46	8	E6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	47	8	E7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	48	8	E8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8B	49	8	E9	1	1	1	1	2	1	1	1	1	1	2	2	1	2	1	1	**1**	75%
8	8B	50	8	E10	3	2	3	2	1	2	3	2	3	3	1	1	3	1	3	1	**3**	44%
				Total staged	400	300	400	400	397	400	400	350	400	400	400	150	400	399	396	400		**81.4%**
				Total NOT staged	0	100	0	0	3	0	0	50	0	0	0	250	0	1	4	0		

Table 5b TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	**2STDEV ALL**
1	0.758	0.704	0.464	0.514	0.786	0.418	0.907	0.486	0.000	0.855	0.568	0.637	0.464	0.699	1.078	1.455	**0.764**
2	0.404	0.632	1.023	0.566	1.023	1.393	0.981	0.793	0.964	1.278	0.701	0.602	1.370	1.294	1.340	1.531	**1.124**
3	0.728	0.911	0.692	1.141	0.864	0.899	0.668	1.178	0.991	0.989	1.001	1.300	1.130	1.248	0.645	1.482	**1.062**
4	0.849	1.143	0.866	0.694	0.668	0.640	1.164	1.390	0.988	0.821	1.191	1.166	0.944	1.010	0.874	1.302	**1.100**
5	0.525	0.000	0.833	0.995	0.995	0.378	0.756	1.162	0.882	0.525	1.016	0.000	0.525	0.976	1.145	1.689	**1.154**

MEAN STAGE

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	**ALL**
1	1.12	1.09	1.05	1.07	1.14	1.05	1.21	1.06	1.00	1.14	1.08	1.11	1.05	1.10	1.23	1.31	**1.11**
2	2.00	2.00	2.06	1.96	2.06	2.38	2.38	1.87	1.82	2.40	1.86	1.90	1.98	2.30	2.20	2.16	**2.09**
3	2.88	2.80	3.01	2.68	3.00	3.11	3.09	2.69	2.68	3.09	2.67	2.79	2.88	3.22	3.05	2.78	**2.91**
4	4.10	4.13	3.94	3.92	3.88	4.06	4.21	3.60	3.73	4.21	3.33	4.11	4.10	3.85	3.98	3.54	**3.91**
5	4.93	5.00	4.89	4.61	4.61	4.96	4.93	4.64	4.75	4.93	3.96	5.00	4.93	4.36	4.57	3.75	**4.65**

MEAN STAGE +2STDEV

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	**ALL**
1	1.875	1.798	1.509	1.585	1.930	1.463	2.114	1.548	1.000	1.997	1.643	1.750	1.509	1.801	2.304	2.763	**1.88**
2	2.404	2.632	3.083	2.526	3.083	3.773	3.361	2.665	2.784	3.678	2.561	2.506	3.350	3.594	3.540	3.691	**3.22**
3	3.609	3.707	3.705	3.825	3.864	4.004	3.760	3.872	3.675	4.082	3.672	4.088	4.011	4.472	3.697	4.259	**3.97**
4	4.954	5.276	4.804	4.611	4.543	4.702	5.372	4.994	4.718	5.029	4.524	5.277	5.049	4.864	4.853	4.844	**5.01**
5	5.453	5.000	5.725	5.602	5.602	5.342	5.685	5.799	5.632	5.453	4.980	5.000	5.453	5.333	5.717	5.439	**5.81**

MEAN STAGE -2STDEV

MODAL stage	Spain IM Reader 1	Spain MS Reader 2	Port SF Reader 3	Eng CaBy Reader 4	Eng ChBu Reader 5	Scot IG Reader 6	Spain CF Reader 7	Irel SH+DL Reader 8	Port AF Reader 9	Nor JdL Reader 10	Eng MS Reader 11	KM+BR Reader 12	Neth IdB Reader 13	Germ NH Reader 14	Spain AL Reader 15	Norw IMB Reader 16	**ALL**
1	0.358	0.390	0.582	0.557	0.357	0.628	0.300	0.577	1.000	0.286	0.508	0.476	0.582	0.402	0.149	-0.147	**0.349**
2	1.596	1.368	1.037	1.394	1.037	0.987	1.399	1.079	0.856	1.122	1.159	1.303	0.610	1.006	0.860	0.629	**0.968**
3	2.154	1.885	2.321	1.543	2.136	2.206	2.425	1.515	1.693	2.103	1.670	1.488	1.752	1.976	2.408	1.294	**1.849**
4	3.255	2.991	3.071	3.222	3.207	3.423	3.044	2.215	2.741	3.388	2.142	2.945	3.160	2.844	3.105	2.240	**2.808**
5	4.404	5.000	4.060	3.612	3.612	4.586	4.173	3.474	3.868	4.404	2.949	5.000	4.404	3.381	3.426	2.061	**3.500**

MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Table 5c Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL stage	SAMPLING STRATA												Nr of eggs
	1	2	3	4	5	6	7	8	x	x	x	x	
1	22	35	17	11	28	31	25	29	-	-	-	-	**198**
2	3	6	8	4	5	2	7	15	-	-	-	-	**50**
3	14	8	4	21	6	7	11	5	-	-	-	-	**76**
4	5	-	11	11	7	6	7	1	-	-	-	-	**48**
5	6	1	10	3	4	4	-	-	-	-	-	-	**28**
TOTAL	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**0**	**0**	**0**	**0**	**400**

PERCENTAGE AGREEMENT

MODAL stage	SAMPLING STRATA												Agree-ment
	1	2	3	4	5	6	7	8	x	x	x	x	
1	96%	96%	88%	74%	87%	95%	88%	89%	-	-	-	-	**90.7%**
2	60%	73%	68%	67%	51%	81%	70%	73%	-	-	-	-	**68.8%**
3	81%	65%	83%	78%	71%	85%	70%	59%	-	-	-	-	**75.0%**
4	71%	-	78%	70%	71%	73%	72%	75%	-	-	-	-	**73.1%**
5	62%	87%	73%	67%	77%	69%	-	-	-	-	-	-	**70.3%**
Mean CV	**83.1%**	**88.3%**	**79.2%**	**73.8%**	**78.8%**	**88.0%**	**79.3%**	**80.7%**	**-**	**-**	**-**	**-**	**81.4%**

Weighted

BIAS

MODAL stage	SAMPLING STRATA												Mean bias
	1	2	3	4	5	6	7	8	x	x	x	x	
1	0.05	0.04	0.15	0.35	0.15	0.07	0.14	0.12	-	-	-	-	**0.11**
2	0.19	0.20	-0.05	0.10	0.07	0.19	0.10	0.10	-	-	-	-	**0.09**
3	-0.06	-0.13	-0.10	0.07	-0.11	-0.06	-0.22	-0.46	-	-	-	-	**-0.09**
4	-0.07	-	-0.16	-0.10	-0.10	0.13	-0.21	0.06	-	-	-	-	**-0.09**
5	-0.46	-0.20	-0.29	-0.51	-0.25	-0.31	-	-	-	-	-	-	**-0.35**
Mean	**-0.05**	**0.03**	**-0.06**	**0.06**	**0.05**	**0.03**	**0.01**	**0.06**	**-**	**-**	**-**	**-**	**0.02**

Weighted

MACKEREL first stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 2 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.

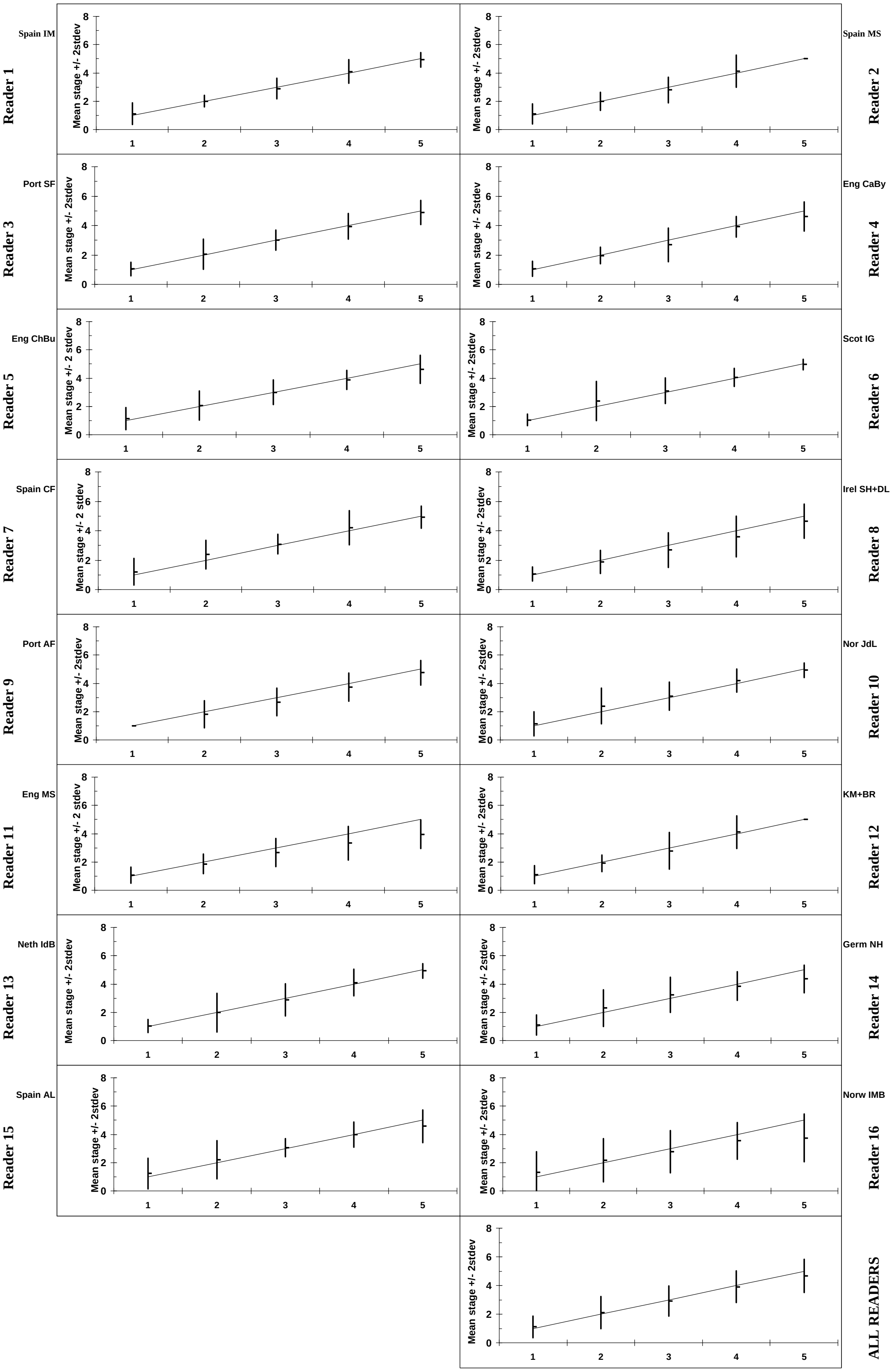

Table 6 HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1ab-5

RANGE r. 1-16

Stratum	Sample no	no	Tray	Well no	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	MODAL stage	Percent agreement
9	9A	1	9	A1	4	4	4	4	4	3	4	4	3	4	4	4	4	4	5	3	**4**	75%
9	9A	2	9	A2	2	2	2	1	2	2	2	3	1	2	1	0	2	2	1	1	**2**	56%
9	9A	3	9	A3	4	4	3	4	3	3	3	4	3	4	3	4	3	4	4	4	**4**	56%
9	9A	4	9	A4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	5	2	**4**	81%
9	9A	5	9	A5	1	2	1	1	1	0	1	1	0	1	1	2	2	0	0	1	**1**	56%
9	9A	6	9	A6	1	1	1	1	1	1	1	0	1	-	0	2	1	1	0	0	**1**	67%
9	9A	7	9	A7	3	2	2	2	2	3	3	3	3	2	3	3	3	3	3	2	**3**	63%
9	9A	8	9	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
9	9A	9	9	A9	2	2	2	2	-	2	1	2	2	2	1	3	2	2	1	2	**2**	73%
9	9A	10	9	A10	1	1	1	1	2	2	2	0	1	2	0	4	1	1	1	2	**1**	50%
9	9A	11	9	B1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	0	**2**	88%
9	9A	12	9	B2	2	1	1	1	2	1	1	2	1	1	0	1	1	1	1	1	**1**	75%
9	9A	13	9	B3	2	3	2	2	3	2	2	3	2	3	2	3	3	3	2	1	**2**	50%
9	9A	14	9	B4	3	3	3	3	3	3	3	3	3	4	3	4	3	3	4	2	**3**	75%
9	9A	15	9	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
9	9A	16	9	B6	2	3	3	2	2	2	2	3	2	3	3	2	3	3	2	1	**2**	50%
9	9A	17	9	B7	4	4	4	4	3	3	3	3	3	4	4	4	4	4	4	1	**4**	63%
9	9A	18	9	B8	3	2	3	3	3	2	3	3	3	3	3	3	3	2	3	3	**3**	81%
9	9A	19	9	B9	4	4	4	4	4	3	4	4	3	4	3	4	4	3	5	2	**4**	63%
9	9A	20	9	B10	4	4	4	4	4	3	4	4	3	4	4	4	4	4	5	3	**4**	75%
9	9A	21	9	C1	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	**4**	88%
9	9A	22	9	C2	2	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	**3**	81%
9	9A	23	9	C3	2	2	2	2	2	1	2	2	1	2	0	0	2	1	1	3	**2**	56%
9	9A	24	9	C4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	93%
9	9A	25	9	C5	-	2	2	1	2	2	2	2	1	2	0	0	2	2	1	0	**2**	60%
9	9B	26	9	C6	0	2	2	2	2	2	2	2	2	2	2	2	3	0	0	1	**2**	69%
9	9B	27	9	C7	0	0	-	0	0	0	0	1	0	0	0	0	-	0	0	2	**0**	86%
9	9B	28	9	C8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**0**	94%
9	9B	29	9	C9	2	2	3	3	2	2	3	2	2	2	0	2	4	3	1	0	**2**	50%
9	9B	30	9	C10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**0**	94%
9	9B	31	9	D1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	**0**	88%
9	9B	32	9	D2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
9	9B	33	9	D3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**0**	94%
9	9B	34	9	D4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**0**	94%
9	9B	35	9	D5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**0**	94%
9	9B	36	9	D6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	**0**	88%
9	9B	37	9	D7	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	**0**	94%
9	9B	38	9	D8	2	2	2	2	2	2	2	3	2	2	2	0	3	3	2	0	**2**	69%
9	9B	39	9	D9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**0**	88%
9	9B	40	9	D10	2	2	3	2	2	2	3	3	2	2	2	2	3	3	2	2	**2**	69%
9	9B	41	9	E1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	**0**	88%
9	9B	42	9	E2	2	1	2	0	0	1	1	1	1	2	0	1	1	1	0	0	**1**	50%
9	9B	43	9	E3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**0**	94%
9	9B	44	9	E4	2	2	3	2	2	2	2	3	2	2	0	2	3	2	2	1	**2**	69%
9	9B	45	9	E5	0	1	1	2	0	2	2	1	0	0	0	0	2	0	1	0	**0**	50%
9	9B	46	9	E6	0	1	1	2	0	2	2	0	0	2	0	2	1	0	1	0	**0**	44%
9	9B	47	9	E7	2	2	2	2	2	2	3	2	2	2	2	3	3	3	2	2	**2**	75%
9	9B	48	9	E8	2	2	3	3	2	2	2	3	2	2	2	2	3	3	2	0	**2**	63%
9	9B	49	9	E9	2	2	3	2	2	2	2	2	2	2	2	0	3	3	2	0	**2**	69%
9	9B	50	9	E10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	**0**	88%
10	10A	1	10	A1	2	0	2	1	1	2	-	2	-	1	0	2	2	2	1	1	**2**	50%
10	10A	2	10	A2	1	1	3	2	3	2	-	1	-	2	0	1	3	2	0	0	**1**	29%
10	10A	3	10	A3	4	4	4	4	4	3	-	4	-	4	3	4	4	4	4	2	**4**	79%
10	10A	4	10	A4	0	0	-	0	0	0	-	1	-	0	0	1	0	0	1	0	**0**	77%
10	10A	5	10	A5	2	2	2	2	2	2	-	2	-	2	2	2	2	2	2	1	**2**	93%
10	10A	6	10	A6	0	0	0	0	0	0	-	0	-	0	0	0	1	0	0	0	**0**	93%
10	10A	7	10	A7	1	1	1	1	1	1	-	1	-	1	0	1	1	0	1	1	**1**	86%
10	10A	8	10	A8	2	2	2	2	2	2	-	2	-	2	2	2	2	2	2	1	**2**	93%
10	10A	9	10	A9	0	0	-	0	0	0	-	0	-	0	0	0	1	0	0	0	**0**	92%
10	10A	10	10	A10	3	3	3	3	3	3	-	3	-	3	3	3	4	3	3	2	**3**	86%
10	10A	11	10	B1	1	0	2	1	0	2	-	1	-	1	0	1	1	1	0	1	**1**	57%
10	10A	12	10	B2	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	**0**	100%
10	10A	13	10	B3	0	0	0	0	0	0	-	0	-	1	0	0	0	0	0	0	**0**	93%
10	10A	14	10	B4	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	**0**	100%
10	10A	15	10	B5	1	1	1	1	1	1	-	2	-	2	1	1	2	2	2	1	**1**	64%
10	10A	16	10	B6	0	0	1	0	0	0	-	0	-	0	0	0	0	0	0	0	**0**	93%
10	10A	17	10	B7	1	1	-	1	1	1	-	1	-	2	0	1	1	1	1	1	**1**	85%
10	10A	18	10	B8	2	3	1	2	2	2	-	2	-	2	0	2	2	2	2	2	**2**	79%
10	10A	19	10	B9	0	1	2	2	1	2	-	1	-	2	0	1	1	1	1	1	**1**	57%
10	10A	20	10	B10	0	0	0	0	0	0	-	0	-	0	0	0	-	0	0	0	**0**	100%
10	10A	21	10	C1	4	3	4	4	3	3	-	4	-	4	3	4	4	4	3	2	**4**	57%
10	10A	22	10	C2	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	**0**	100%
10	10A	23	10	C3	1	1	1	1	1	1	-	1	-	0	0	0	0	0	1	1	**1**	64%
10	10A	24	10	C4	2	3	3	2	3	2	-	2	-	2	0	1	3	2	2	1	**2**	50%
10	10A	25	10	C5	2	3	-	2	3	2	-	2	-	3	1	1	3	2	2	1	**2**	46%
10	10B	26	10	C6	2	2	2	2	2	2	-	2	-	0	0	1	2	2	2	2	**2**	79%
10	10B	27	10	C7	2	2	2	2	2	2	-	2	-	2	2	2	2	3	2	2	**2**	93%
10	10B	28	10	C8	3	3	3	3	2	3	-	3	-	3	3	3	3	3	3	3	**3**	93%
10	10B	29	10	C9	0	0	0	0	0	0	-	0	-	1	0	0	0	0	1	0	**0**	86%
10	10B	30	10	C10	3	3	3	3	2	3	-	3	-	3	3	3	3	3	3	2	**3**	86%
10	10B	31	10	D1	0	0	0	1	0	1	-	1	-	1	0	1	0	1	1	0	**0**	50%
10	10B	32	10	D2	3	3	3	3	3	3	-	3	-	3	2	3	3	4	4	2	**3**	71%
10	10B	33	10	D3	4	4	4	4	4	3	-	4	-	4	3	4	4	4	4	4	**4**	86%
10	10B	34	10	D4	4	4	4	3	4	3	-	4	-	4	4	4	4	4	4	3	**4**	79%
10	10B	35	10	D5	3	3	3	3	3	3	-	3	-	3	3	3	3	3	4	3	**3**	93%
10	10B	36	10	D6	4	4	4	3	4	3	-	4	-	4	4	3	4	4	3	2	**4**	64%
10	10B	37	10	D7	0	0	0	0	2	0	-	0	-	0	0	0	2	0	1	0	**0**	79%
10	10B	38	10	D8	3	3	3	3	3	3	-	3	-	3	3	4	3	3	4	2	**3**	79%
10	10B	39	10	D9	3	3	3	3	3	3	-	3	-	3	3	3	3	3	3	2	**3**	93%
10	10B	40	10	D10	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	**0**	100%
10	10B	41	10	E1	2	2	2	2	2	2	-	2	-	2	2	3	2	2	2	2	**2**	93%
10	10B	42	10	E2	3	3	3	3	3	3	-	3	-	3	3	4	3	3	4	3	**3**	86%
10	10B	43	10	E3	0	0	0	1	1	0	-	0	-	1	0	1	1	0	1	0	**0**	57%
10	10B	44	10	E4	3	4	4	4	4	3	-	4	-	3	3	4	3	4	4	4	**4**	64%
10	10B	45	10	E5	2	2	1	2	0	2	-	2	-	0	0	1	2	2	1	0	**2**	50%
10	10B	46	10	E6	4	3	3	3	4	3	-	3	-	3	4	3	3	4	3	3	**3**	71%
10	10B	47	10	E7	2	2	2	2	3	2	-	2	-	3	2	2	3	2	2	1	**2**	71%
10	10B	48	10	E8	3	3	3	3	3	3	-	4	-	3	3	3	3	3	3	2	**3**	86%
10	10B	49	10	E9	3	3	4	3	4	2	-	3	-	3	4	3	2	3	4	2	**3**	50%
10	10B	50	10	E10	1	1	1	1	1	1	-	0	-	0	0	1	2	1	1	2	**1**	64%
11	11A	1	11	A1	2	3	3	2	2	2	-	2	2	3	2	3	3	3	2	2	**2**	60%
11	11A	2	11	A2	2	2	3	2	2	2	-	2	2	3	2	3	3	3	1	2	**2**	60%
11	11A	3	11	A3	4	3	3	3	3	2	-	4	2	3	3	3	3	4	3	3	**3**	67%
11	11A	4	11	A4	2	3	2	2	2	2	-	2	2	2	2	3	3	3	2	3	**2**	67%
11	11A	5	11	A5	3	3	3	4	3	3	-	3	3	3	3	3	3	3	2	2	**3**	80%
11	11A	6	11	A6	4	3	3	3	3	3	-	3	2	3	2	4	3	4	3	3	**3**	67%
11	11A	7	11	A7	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	3	**2**	80%
11	11A	8	11	A8	4	4	5	4	4	4	-	5	4	4	4	4	5	4	5	4	**4**	73%
11	11A	9	11	A9	0	0	0	0	0	0	-	0	0	0	0	0	0	0	1	1	**0**	87%
11	11A	10	11	A10	4	3	3	4	3	2	-	3	2	3	2	3	3	3	3	3	**3**	67%
11	11A	11	11	B1	2	2	2	2	2	2	-	3	2	2	2	0	2	3	2	2	**2**	80%
11	11A	12	11	B2	2	3	3	3	3	3	-	3	3	3	3	3	3	3	1	0	**3**	80%
11	11A	13	11	B3	3	3	3	4	3	3	-	3	3	4	3	4	3	4	3	4	**3**	67%
11	11A	14	11	B4	2	2	2	2	2	2	-	3	2	2	2	2	2	3	1	3	**2**	73%
11	11A	15	11	B5	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	16	11	B6	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	17	11	B7	4	3	3	3	3	3	-	3	3	3	3	3	3	4	2	4	**3**	73%
11	11A	18	11	B8	3	3	3	4	4	3	-	3	3	3	3	3	4	4	3	4	**3**	67%
11	11A	19	11	B9	3	3	3	3	3	3	-	3	3	4	3	3	3	3	3	4	**3**	87%
11	11A	20	11	B10	4	3	3	4	3	3	-	3	3	3	3	3	3	4	3	5	**3**	73%
11	11A	21	11	C1	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	22	11	C2	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	23	11	C3	3	3	3	4	4	3	-	4	3	3	3	3	4	4	3	4	**3**	60%
11	11A	24	11	C4	4	3	3	4	4	3	-	3	3	3	3	3	4	4	3	4	**3**	60%
11	11A	25	11	C5	4	3	3	4	3	3	-	3	3	3	3	3	4	4	3	4	**3**	67%
11	11B	26	11	C6	4	4	4	3	4	3	-	4	3	4	4	3	4	4	3	4	**4**	67%
11	11B	27	11	C7	0	0	1	0	1	2	-	0	0	-	0	0	2	0	1	4	**0**	57%
11	11B	28	11	C8	0	1	1	0	0	0	-	0	0	1	0	0	0	0	1	1	**0**	67%
11	11B	29	11	C9	4	3	3	4	3	3	-	3	3	4	3	3	3	4	4	4	**3**	60%
11	11B	30	11	C10	0	1	1	0	0	0	-	0	0	1	0	2	2	0	1	1	**0**	53%
11	11B	31	11	D1	2	2	2	0	1	0	-	0	0	2	2	0	2	0	-	-	**2**	46%
11	11B	32	11	D2	2	2	2	2	2	0	-	2	2	2	0	2	3	3	1	0	**2**	60%
11	11B	33	11	D3	0	0	-	0	0	0	-	0	0	1	0	0	0	0	1	0	**0**	86%
11	11B	34	11	D4	4	3	4	4	4	3	-	3	3	3	3	3	4	4	2	2	**3**	47%
11	11B	35	11	D5	1	1	1	1	0	1	-	1	0	1	1	2	1	0	1	2	**1**	67%
11	11B	36	11	D6	0	0	0	0	0	0	-	0	0	1	0	0	0	0	1	1	**0**	80%

11	11B	37	11	D7	2	2	2	0	2	0	-	2	3	2	1	2	2	2	1	1	**2**	60%
11	11B	38	11	D8	1	1	1	2	0	1	-	1	1	1	1	1	1	0	1	1	**1**	80%
11	11B	39	11	D9	0	0	3	0	0	0	-	0	0	1	0	1	3	0	2	1	**0**	60%
11	11B	40	11	D10	4	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	87%
11	11B	41	11	E1	2	2	2	2	2	2	-	2	2	2	2	2	3	3	1	2	**2**	80%
11	11B	42	11	E2	2	2	3	2	2	2	-	2	2	2	2	3	3	3	2	2	**2**	73%
11	11B	43	11	E3	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	1	**2**	80%
11	11B	44	11	E4	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	0	**2**	80%
11	11B	45	11	E5	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	1	**2**	80%
11	11B	46	11	E6	2	2	3	2	2	2	-	3	2	3	2	3	3	3	2	2	**2**	60%
11	11B	47	11	E7	2	0	2	2	0	0	-	3	1	-	0	1	2	1	1	2	**2**	36%
11	11B	48	11	E8	2	2	3	2	0	2	-	3	1	2	0	3	3	2	2	1	**2**	47%
11	11B	49	11	E9	4	3	-	3	3	3	-	3	3	0	3	0	0	3	1	1	**3**	57%
11	11B	50	11	E10	4	4	5	3	4	3	-	5	4	4	4	4	5	4	4	4	**4**	67%
12	12A	1	12	A1	1	1	0	1	-	1	-	1	-	-	0	1	1	0	1	1	**1**	75%
12	12A	2	12	A2	3	3	3	3	-	2	-	4	-	-	3	3	3	4	3	3	**3**	75%
12	12A	3	12	A3	4	4	4	4	-	2	-	5	-	-	4	4	4	4	2	2	**4**	67%
12	12A	4	12	A4	2	2	2	3	-	2	-	2	-	-	2	2	3	3	2	2	**2**	75%
12	12A	5	12	A5	4	3	2	4	-	2	-	4	-	-	3	3	4	4	3	3	**4**	42%
12	12A	6	12	A6	0	1	0	1	-	0	-	0	-	-	0	0	1	0	1	1	**0**	58%
12	12A	7	12	A7	1	0	0	1	-	0	-	1	-	-	0	0	0	0	0	1	**0**	67%
12	12A	8	12	A8	2	2	2	2	-	2	-	3	-	-	2	3	3	3	2	2	**2**	67%
12	12A	9	12	A9	3	3	3	3	-	2	-	3	-	-	3	3	3	4	3	2	**3**	75%
12	12A	10	12	A10	0	1	1	1	-	0	-	2	-	-	1	0	2	0	1	2	**1**	42%
12	12A	11	12	B1	0	0	0	0	-	0	-	1	-	-	0	0	2	1	1	1	**0**	58%
12	12A	12	12	B2	0	0	0	0	-	0	-	0	-	-	0	0	0	0	0	0	**0**	100%
12	12A	13	12	B3	0	0	0	0	-	0	-	0	-	-	0	0	0	0	0	0	**0**	100%
12	12A	14	12	B4	0	1	0	0	-	0	-	0	-	-	0	0	0	0	1	0	**0**	83%
12	12A	15	12	B5	1	0	1	0	-	0	-	0	-	-	0	0	0	0	2	1	**0**	67%
12	12A	16	12	B6	2	1	1	1	-	2	-	0	-	-	0	1	2	2	1	1	**1**	50%
12	12A	17	12	B7	2	1	3	1	-	2	-	1	-	-	1	2	3	2	0	1	**1**	42%
12	12A	18	12	B8	0	0	0	0	-	0	-	0	-	-	0	0	0	0	0	1	**0**	92%
12	12A	19	12	B9	2	1	2	0	-	0	-	0	-	-	1	2	2	0	1	1	**2**	33%
12	12A	20	12	B10	0	0	0	0	-	0	-	0	-	-	0	1	0	0	0	0	**0**	92%
12	12A	21	12	C1	1	1	2	1	-	1	-	0	-	-	0	1	1	0	0	0	**1**	50%
12	12A	22	12	C2	1	0	0	0	-	0	-	1	-	-	0	0	0	0	0	0	**0**	83%
12	12A	23	12	C3	1	0	0	0	-	0	-	0	-	-	0	0	0	0	0	0	**0**	92%
12	12A	24	12	C4	1	0	2	0	-	0	-	0	-	-	0	1	2	0	1	1	**0**	50%
12	12A	25	12	C5	1	0	0	0	-	0	-	0	-	-	0	0	0	0	1	2	**0**	75%
12	12B	26	12	C6	4	3	3	3	-	3	-	4	-	-	3	3	4	3	4	2	**3**	58%
12	12B	27	12	C7	0	0	0	0	-	0	-	0	-	-	0	0	0	0	0	0	**0**	100%
12	12B	28	12	C8	2	2	2	2	-	2	-	3	-	-	2	3	3	3	2	2	**2**	67%
12	12B	29	12	C9	1	0	1	2	-	0	-	0	-	-	0	1	1	0	1	0	**0**	50%
12	12B	30	12	C10	0	0	0	3	-	0	-	0	-	-	0	0	0	0	1	1	**0**	75%
12	12B	31	12	D1	2	1	2	1	-	2	-	2	-	-	0	2	2	2	2	1	**2**	67%
12	12B	32	12	D2	1	1	1	1	-	1	-	0	-	-	0	1	2	1	0	0	**1**	58%
12	12B	33	12	D3	0	0	0	0	-	0	-	0	-	-	0	0	0	0	0	0	**0**	100%
12	12B	34	12	D4	1	1	1	1	-	1	-	0	-	-	0	2	1	1	0	0	**1**	58%
12	12B	35	12	D5	2	3	2	3	-	2	-	3	-	-	2	3	3	3	2	2	**2**	50%
12	12B	36	12	D6	0	0	0	0	-	0	-	0	-	-	0	0	1	0	1	2	**0**	75%
12	12B	37	12	D7	2	3	3	3	-	2	-	3	-	-	3	3	3	3	2	2	**3**	67%
12	12B	38	12	D8	1	1	1	1	-	1	-	1	-	-	1	2	1	0	1	1	**1**	83%
12	12B	39	12	D9	2	0	3	2	-	0	-	0	-	-	0	1	3	0	0	0	**0**	58%
12	12B	40	12	D10	1	0	1	1	-	1	-	0	-	-	0	1	1	1	1	0	**1**	67%
12	12B	41	12	E1	1	1	1	1	-	1	-	1	-	-	1	0	2	1	1	0	**1**	75%
12	12B	42	12	E2	0	0	0	0	-	0	-	0	-	-	0	1	0	0	1	1	**0**	75%
12	12B	43	12	E3	0	1	1	1	-	0	-	1	-	-	0	0	2	0	1	1	**1**	50%
12	12B	44	12	E4	1	1	1	1	-	1	-	1	-	-	1	0	1	1	1	1	**1**	92%
12	12B	45	12	E5	0	0	0	0	-	0	-	0	-	-	0	0	0	0	1	1	**0**	83%
12	12B	46	12	E6	1	0	1	1	-	1	-	1	-	-	0	3	1	1	0	2	**1**	58%
12	12B	47	12	E7	2	2	2	2	-	2	-	3	-	-	3	0	3	3	2	2	**2**	58%
12	12B	48	12	E8	0	2	0	0	-	2	-	2	-	-	2	4	0	0	2	0	**0**	50%
12	12B	49	12	E9	2	0	2	2	-	0	-	0	-	-	0	3	2	3	1	0	**0**	42%
12	12B	50	12	E10	1	1	1	0	-	1	-	1	-	-	0	1	0	1	1	1	**1**	75%
13	13A	1	13	A1	0	0	0	0	1	0	1	-	-	1	0	0	0	1	0	1	**0**	64%
13	13A	2	13	A2	1	1	1	1	1	1	1	3	-	1	1	1	1	1	1	3	**1**	87%
13	13A	3	13	A3	0	0	0	0	1	0	0	0	-	1	0	0	0	0	0	3	**0**	80%
13	13A	4	13	A4	1	1	1	1	1	1	1	1	-	1	0	1	2	1	1	1	**1**	87%
13	13A	5	13	A5	0	0	0	-	0	0	1	-	-	1	0	0	0	0	1	-	**0**	75%
13	13A	6	13	A6	4	4	4	4	4	4	4	5	-	4	4	4	4	4	4	3	**4**	87%
13	13A	7	13	A7	0	0	0	0	1	0	0	1	-	1	0	0	0	0	0	0	**0**	80%
13	13A	8	13	A8	1	1	2	1	1	1	1	1	-	1	0	1	2	2	1	1	**1**	73%
13	13A	9	13	A9	3	3	3	4	3	3	3	4	-	3	3	3	3	4	2	3	**3**	73%
13	13A	10	13	A10	0	0	0	0	0	0	0	0	-	1	0	1	0	0	0	1	**0**	80%
13	13A	11	13	B1	0	0	0	0	1	0	1	0	-	1	0	1	1	0	0	0	**0**	67%
13	13A	12	13	B2	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13A	13	13	B3	4	3	3	3	3	3	3	3	-	3	3	3	3	4	4	3	**3**	80%
13	13A	14	13	B4	0	0	0	0	1	0	0	-	-	1	0	0	1	0	1	0	**0**	71%
13	13A	15	13	B5	2	2	2	2	2	0	2	-	-	2	2	2	3	3	1	0	**2**	64%
13	13A	16	13	B6	1	1	1	1	1	1	1	1	-	2	1	1	2	1	1	3	**1**	80%
13	13A	17	13	B7	0	0	0	0	0	0	0	-	-	1	1	0	0	0	0	0	**0**	86%
13	13A	18	13	B8	0	0	1	0	1	0	0	0	-	1	0	0	0	0	0	0	**0**	80%
13	13A	19	13	B9	0	0	0	1	1	0	1	0	-	1	0	0	1	0	1	0	**0**	60%
13	13A	20	13	B10	0	0	2	2	0	0	2	-	-	1	0	0	2	1	1	0	**0**	50%
13	13A	21	13	C1	4	3	3	3	3	3	3	3	-	3	2	3	3	4	3	3	**3**	80%
13	13A	22	13	C2	1	1	1	1	1	1	1	1	-	2	1	1	3	1	1	3	**1**	80%
13	13A	23	13	C3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13	13A	24	13	C4	2	2	2	0	2	0	2	-	-	2	0	0	2	0	0	0	**2**	50%
13	13A	25	13	C5	0	1	1	1	1	0	0	-	-	1	0	0	1	1	1	0	**1**	57%
13	13B	26	13	C6	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	27	13	C7	1	0	1	1	1	1	0	0	-	0	1	1	1	1	0	0	**1**	60%
13	13B	28	13	C8	1	1	1	1	1	1	1	1	-	1	0	1	1	0	1	0	**1**	80%
13	13B	29	13	C9	2	3	3	3	3	2	3	3	-	3	2	3	3	3	2	0	**3**	67%
13	13B	30	13	C10	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	31	13	D1	2	3	2	3	2	2	3	3	-	2	2	3	3	3	3	3	**3**	60%
13	13B	32	13	D2	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	33	13	D3	2	3	3	3	3	2	3	3	-	3	2	3	3	3	2	3	**3**	73%
13	13B	34	13	D4	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	35	13	D5	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	36	13	D6	0	0	0	1	1	0	1	0	-	1	0	0	1	0	0	0	**0**	67%
13	13B	37	13	D7	2	1	3	2	2	2	1	2	-	2	1	1	3	2	2	0	**2**	53%
13	13B	38	13	D8	0	0	0	0	1	1	0	0	-	0	0	1	0	0	0	0	**0**	80%
13	13B	39	13	D9	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	40	13	D10	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	41	13	E1	2	2	2	2	2	2	2	2	-	2	2	2	2	2	2	3	**2**	93%
13	13B	42	13	E2	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	43	13	E3	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	44	13	E4	0	0	0	0	1	0	0	1	-	1	0	1	0	0	1	0	**0**	67%
13	13B	45	13	E5	1	0	0	1	1	0	1	0	-	0	0	0	0	0	0	1	**0**	67%
13	13B	46	13	E6	0	0	0	0	1	0	0	0	-	1	0	0	0	0	0	0	**0**	87%
13	13B	47	13	E7	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	48	13	E8	2	3	2	3	3	2	2	2	-	3	2	3	3	3	2	3	**3**	53%
13	13B	49	13	E9	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	**0**	100%
13	13B	50	13	E10	0	0	0	0	0	0	0	1	-	0	0	0	0	0	0	0	**0**	93%
14	14A	1	14	A1	2	2	2	-	2	1	-	3	1	2	0	2	2	1	2	2	**2**	64%
14	14A	2	14	A2	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	1	**0**	87%
14	14A	3	14	A3	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	4	14	A4	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	5	14	A5	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	0	**0**	93%
14	14A	6	14	A6	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
14	14A	7	14	A7	3	3	3	3	3	3	-	3	3	3	3	3	0	3	2	2	**3**	80%
14	14A	8	14	A8	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	**3**	100%
14	14A	9	14	A9	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	10	14	A10	2	2	2	3	2	2	-	3	2	3	3	3	3	3	2	3	**3**	53%
14	14A	11	14	B1	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	**3**	100%
14	14A	12	14	B2	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	93%
14	14A	13	14	B3	2	2	2	3	2	2	-	3	2	3	2	3	2	3	2	2	**2**	67%
14	14A	14	14	B4	2	2	2	2	2	2	-	3	2	3	2	3	2	3	2	2	**2**	73%
14	14A	15	14	B5	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	16	14	B6	3	2	2	2	2	2	-	3	3	3	3	3	3	2	2	3	**3**	53%
14	14A	17	14	B7	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
14	14A	18	14	B8	0	0	0	0	0	0	-	0	2	0	0	0	0	0	0	0	**0**	93%
14	14A	19	14	B9	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
14	14A	20	14	B10	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	21	14	C1	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
14	14A	22	14	C2	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	23	14	C3	2	2	2	2	2	2	-	3	2	2	2	2	2	2	1	2	**2**	87%
14	14A	24	14	C4	1	1	1	1	1	0	-	0	0	1	0	1	1	0	2	1	**1**	60%
14	14A	25	14	C5	2	2	2	1	2	2	-	3	1	3	2	2	2	2	1	3	**2**	60%
14	14B	26	14	C6	1	1	1	1	1	0	-	-	1	1	0	2	1	0	1	0	**1**	64%
14	14B	27	14	C7	1	1	1	1	1	1	-	1	1	2	0	2	1	0	1	2	**1**	67%
14	14B	28	14	C8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

14	14B	29	14	C9	1	0	1	1	1	1	-	0	1	1	0	0	1	0	1	1	**1**	67%
14	14B	30	14	C10	1	0	1	0	1	1	-	1	1	1	0	1	1	1	1	0	**1**	73%
14	14B	31	14	D1	1	0	1	2	1	0	-	1	1	1	1	1	1	0	1	2	**1**	67%
14	14B	32	14	D2	1	0	1	0	1	1	-	1	1	1	0	0	1	0	0	0	**1**	53%
14	14B	33	14	D3	2	2	2	2	1	2	-	1	2	4	1	0	3	2	2	1	**2**	53%
14	14B	34	14	D4	1	0	1	0	1	1	-	1	1	1	0	0	1	0	1	1	**1**	67%
14	14B	35	14	D5	1	0	0	1	1	1	-	1	1	1	0	1	1	0	0	0	**1**	60%
14	14B	36	14	D6	1	0	0	0	1	1	-	1	1	1	0	1	1	0	0	0	**1**	53%
14	14B	37	14	D7	0	0	0	0	1	0	-	0	1	1	0	1	1	0	0	0	**0**	67%
14	14B	38	14	D8	1	1	1	1	1	1	-	1	1	1	1	0	1	0	1	1	**1**	87%
14	14B	39	14	D9	1	1	0	1	1	0	-	1	0	0	1	1	1	0	1	1	**1**	67%
14	14B	40	14	D10	1	0	1	1	1	1	-	1	0	1	0	2	2	0	1	0	**1**	53%
14	14B	41	14	E1	1	0	1	1	1	1	-	1	2	1	1	0	1	1	1	0	**1**	73%
14	14B	42	14	E2	0	0	0	1	1	0	-	1	1	1	0	1	1	0	1	0	**1**	53%
14	14B	43	14	E3	1	0	1	1	1	1	-	1	1	1	0	1	1	0	1	1	**1**	80%
14	14B	44	14	E4	1	0	1	1	1	1	-	1	0	1	0	1	1	0	-	0	**1**	64%
14	14B	45	14	E5	1	0	1	0	1	0	-	1	1	1	0	1	1	0	1	0	**1**	60%
14	14B	46	14	E6	3	3	3	3	3	3	-	-	2	3	3	3	3	3	2	0	**3**	79%
14	14B	47	14	E7	0	0	0	0	1	1	-	1	0	1	1	0	1	0	1	0	**0**	53%
14	14B	48	14	E8	1	0	1	1	1	0	-	0	2	2	1	2	2	0	0	0	**0**	40%
14	14B	49	14	E9	2	2	2	2	2	2	-	3	2	2	2	3	3	3	2	0	**2**	67%
14	14B	50	14	E10	1	0	1	1	0	1	-	1	0	1	0	2	1	0	1	1	**1**	60%
15	15A	1	15	A1	4	3	3	3	-	3	3	4	3	4	3	3	3	3	3	4	**3**	73%
15	15A	2	15	A2	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	1	**0**	93%
15	15A	3	15	A3	4	3	3	4	-	3	3	4	3	4	3	4	4	4	4	3	**4**	53%
15	15A	4	15	A4	2	2	2	3	-	3	2	3	2	3	2	2	2	3	2	3	**2**	60%
15	15A	5	15	A5	2	2	2	3	-	2	2	4	2	3	2	1	2	2	2	4	**2**	67%
15	15A	6	15	A6	3	3	3	3	-	3	3	3	3	3	3	3	3	3	2	4	**3**	87%
15	15A	7	15	A7	2	2	2	2	-	2	2	3	2	2	2	3	2	3	2	4	**2**	73%
15	15A	8	15	A8	3	3	3	3	-	3	3	3	3	3	3	3	3	3	2	4	**3**	87%
15	15A	9	15	A9	3	3	3	3	-	3	3	4	3	3	3	3	3	4	3	4	**3**	80%
15	15A	10	15	A10	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	1	**0**	87%
15	15A	11	15	B1	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
15	15A	12	15	B2	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
15	15A	13	15	B3	4	3	4	3	-	3	0	4	3	4	4	4	4	4	3	5	**4**	53%
15	15A	14	15	B4	2	2	2	2	-	2	4	3	2	2	2	2	3	3	2	0	**2**	67%
15	15A	15	15	B5	0	0	0	1	-	0	1	1	1	1	0	0	0	0	1	0	**0**	60%
15	15A	16	15	B6	0	0	0	1	-	0	0	0	0	1	0	0	0	0	1	0	**0**	80%
15	15A	17	15	B7	4	3	3	3	-	3	4	3	3	3	3	4	3	3	3	5	**3**	73%
15	15A	18	15	B8	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	5	**3**	93%
15	15A	19	15	B9	3	3	3	4	-	3	3	4	3	4	3	3	4	4	3	4	**3**	60%
15	15A	20	15	B10	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	21	15	C1	3	3	3	3	-	3	3	3	3	3	2	3	3	3	3	3	**3**	93%
15	15A	22	15	C2	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	23	15	C3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	24	15	C4	4	3	4	3	-	3	3	3	2	3	3	3	4	3	2	4	**3**	60%
15	15A	25	15	C5	4	3	3	3	-	3	3	4	3	4	3	3	3	3	3	4	**3**	73%
15	15B	26	15	C6	3	4	3	3	-	3	4	4	2	4	4	3	3	4	4	4	**4**	53%
15	15B	27	15	C7	4	4	4	4	-	4	4	5	3	1	4	4	4	4	4	4	**4**	80%
15	15B	28	15	C8	1	1	1	1	-	1	2	1	1	1	1	1	2	0	1	0	**1**	73%
15	15B	29	15	C9	0	0	1	0	-	0	2	0	0	2	1	1	1	0	1	-	**0**	50%
15	15B	30	15	C10	1	1	1	0	-	1	1	1	1	3	1	1	1	1	1	-	**1**	86%
15	15B	31	15	D1	3	3	3	3	-	3	4	3	3	3	3	3	3	3	3	3	**3**	93%
15	15B	32	15	D2	3	3	3	3	-	3	3	4	3	3	3	3	3	3	3	3	**3**	93%
15	15B	33	15	D3	2	3	2	3	-	2	3	2	2	2	2	2	3	3	2	4	**2**	60%
15	15B	34	15	D4	0	1	1	1	-	1	2	1	2	1	-	-	1	0	1	-	**1**	67%
15	15B	35	15	D5	2	3	3	3	-	2	3	2	2	1	1	3	3	2	1	0	**3**	40%
15	15B	36	15	D6	2	2	2	2	-	2	2	2	2	2	2	3	2	3	2	1	**2**	80%
15	15B	37	15	D7	3	4	3	4	-	3	3	3	3	3	3	3	4	4	4	3	**3**	67%
15	15B	38	15	D8	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
15	15B	39	15	D9	4	4	4	4	-	3	4	4	2	4	4	4	4	4	4	3	**4**	80%
15	15B	40	15	D10	1	1	1	1	-	0	2	1	2	1	1	0	2	0	1	-	**1**	57%
15	15B	41	15	E1	4	4	3	3	-	3	0	4	3	3	3	3	3	3	3	0	**3**	67%
15	15B	42	15	E2	0	0	0	0	-	0	0	0	0	0	0	0	1	0	1	-	**0**	86%
15	15B	43	15	E3	2	3	3	2	-	1	0	3	1	3	1	1	3	2	1	4	**3**	33%
15	15B	44	15	E4	2	3	3	2	-	0	2	3	2	2	2	3	3	3	2	-	**2**	50%
15	15B	45	15	E5	3	3	3	3	-	3	3	4	3	3	4	3	3	3	4	4	**3**	73%
15	15B	46	15	E6	0	2	1	0	-	0	0	0	0	-	1	0	1	0	1	0	**0**	64%
15	15B	47	15	E7	3	3	3	3	-	3	3	3	3	4	3	3	3	4	3	4	**3**	80%
15	15B	48	15	E8	0	0	0	0	-	0	0	0	0	-	0	0	2	0	1	-	**0**	85%
15	15B	49	15	E9	3	3	3	3	-	2	3	3	2	3	3	4	3	2	2	3	**3**	67%
15	15B	50	15	E10	0	2	0	0	-	0	1	0	0	-	0	0	0	0	1	0	**0**	79%
16	16A	1	16	A1	2	2	2	2	2	2	-	2	2	2	1	2	2	2	1	0	**2**	80%
16	16A	2	16	A2	3	3	3	3	3	2	-	3	3	3	2	3	3	3	3	1	**3**	80%
16	16A	3	16	A3	2	3	2	2	2	2	-	3	2	3	2	2	3	3	2	3	**2**	60%
16	16A	4	16	A4	2	2	2	2	2	0	-	2	1	2	2	2	2	2	2	1	**2**	80%
16	16A	5	16	A5	2	2	2	2	2	2	-	2	2	2	1	0	2	2	2	3	**2**	80%
16	16A	6	16	A6	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	-	**4**	93%
16	16A	7	16	A7	3	3	3	3	3	3	-	3	3	3	3	4	4	3	4	-	**3**	79%
16	16A	8	16	A8	4	3	3	3	3	3	-	3	3	3	3	3	3	3	3	5	**3**	87%
16	16A	9	16	A9	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	1	**2**	93%
16	16A	10	16	A10	4	4	4	4	4	3	-	4	3	4	4	3	3	4	4	4	**4**	73%
16	16A	11	16	B1	1	2	1	2	1	0	-	1	0	1	1	1	2	0	1	1	**1**	60%
16	16A	12	16	B2	4	4	3	4	3	3	-	0	3	4	3	3	3	4	4	3	**3**	53%
16	16A	13	16	B3	1	1	1	1	1	1	-	0	1	1	1	1	1	1	1	-	**1**	93%
16	16A	14	16	B4	0	0	0	0	0	0	-	0	0	2	0	1	0	0	0	5	**0**	80%
16	16A	15	16	B5	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	3	**2**	93%
16	16A	16	16	B6	1	2	1	2	1	0	-	1	0	2	1	1	1	0	0	1	**1**	53%
16	16A	17	16	B7	2	2	2	2	2	2	-	2	2	2	1	2	2	2	2	1	**2**	87%
16	16A	18	16	B8	0	1	0	0	0	0	-	0	0	1	0	1	0	0	1	-	**0**	71%
16	16A	19	16	B9	4	4	3	3	3	3	-	4	3	4	3	4	4	4	4	-	**4**	57%
16	16A	20	16	B10	1	2	1	1	0	0	-	1	0	1	1	1	2	0	1	3	**1**	53%
16	16A	21	16	C1	1	1	1	1	1	1	-	1	1	1	1	2	1	1	1	4	**1**	87%
16	16A	22	16	C2	0	0	0	0	0	0	-	0	0	0	0	1	0	0	0	-	**0**	93%
16	16A	23	16	C3	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	24	16	C4	2	2	2	2	2	2	-	2	1	2	1	1	2	2	2	-	**2**	79%
16	16A	25	16	C5	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	-	**4**	93%
16	16B	26	16	C6	2	2	2	2	2	2	-	2	2	2	2	2	2	2	1	3	**2**	87%
16	16B	27	16	C7	2	3	2	2	2	2	-	2	2	2	2	3	3	3	3	3	**2**	60%
16	16B	28	16	C8	3	3	3	3	3	3	-	4	3	4	3	4	3	3	3	-	**3**	79%
16	16B	29	16	C9	1	1	1	1	1	1	-	0	1	0	0	0	1	0	1	-	**1**	64%
16	16B	30	16	C10	3	3	3	3	3	3	-	3	3	4	3	4	4	4	4	-	**3**	64%
16	16B	31	16	D1	2	3	3	3	3	2	-	2	2	3	2	-	3	3	3	4	**3**	57%
16	16B	32	16	D2	3	4	3	4	3	3	-	4	3	4	3	4	4	4	4	3	**4**	53%
16	16B	33	16	D3	1	1	1	1	1	1	-	0	1	1	0	1	1	0	1	1	**1**	80%
16	16B	34	16	D4	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	3	**2**	80%
16	16B	35	16	D5	2	2	2	2	2	2	-	2	2	2	2	3	3	3	2	4	**2**	73%
16	16B	36	16	D6	2	2	2	2	2	2	-	2	2	2	2	3	2	3	2	4	**2**	80%
16	16B	37	16	D7	1	1	2	0	2	2	-	1	0	2	1	2	2	0	1	-	**2**	43%
16	16B	38	16	D8	1	1	2	1	2	1	-	0	1	2	1	1	2	1	1	-	**1**	64%
16	16B	39	16	D9	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
16	16B	40	16	D10	1	1	1	1	1	1	-	0	1	1	0	1	1	0	1	2	**1**	73%
16	16B	41	16	E1	2	2	2	1	2	2	-	2	0	2	1	1	2	2	1	3	**2**	60%
16	16B	42	16	E2	4	4	4	4	4	3	-	4	3	4	4	4	4	4	4	3	**4**	80%
16	16B	43	16	E3	3	3	3	3	3	3	-	3	3	4	3	3	3	3	4	4	**3**	80%
16	16B	44	16	E4	2	2	2	2	2	2	-	1	2	2	1	2	2	2	2	3	**2**	80%
16	16B	45	16	E5	4	4	3	4	3	3	-	4	3	4	3	3	4	4	4	5	**4**	53%
16	16B	46	16	E6	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	5	**4**	87%
16	16B	47	16	E7	3	3	2	2	2	3	-	3	3	2	3	3	3	2	3	4	**3**	60%
16	16B	48	16	E8	4	4	4	4	4	3	-	4	3	4	4	4	4	4	4	4	**4**	87%
16	16B	49	16	E9	4	4	4	4	4	3	-	4	3	3	4	4	4	4	4	4	**4**	80%
16	16B	50	16	E10	2	0	3	2	3	2	-	0	1	3	0	1	3	2	0	-	**2**	29%
				Total staged	397	398	391	396	297	398	148	388	249	342	397	396	396	398	396	373		**73.9%**
				Total NOT staged	1	0	7	2	101	0	250	10	149	56	1	2	2	0	2	25		

Table 7 The number of egg staging by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

A

NUMBER OF EGG STAGE READINGS BY MODAL EGG STAGE

	MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	TOTAL
Stage 1a ==>	0	116	116	112	115	81	116	57	111	50	89	116	116	114	116	116	109	**1650**
Stage 1b ==>	1	69	69	68	69	51	69	17	67	39	54	68	68	69	69	68	63	**977**
	2	86	87	86	86	72	87	27	85	65	79	87	87	87	87	86	81	**1275**
	3	92	92	91	92	66	92	34	91	70	88	92	91	92	92	92	89	**1356**
	4	34	34	34	34	27	34	13	34	25	32	34	34	34	34	34	31	**502**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**397**	**398**	**391**	**396**	**297**	**398**	**148**	**388**	**249**	**342**	**397**	**396**	**396**	**398**	**396**	**373**	**5760**

B

EGG STAGE COMPOSITION

	Stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	TOTAL
Stage 1a ==>	0	112	125	99	111	70	132	50	117	58	60	168	117	90	153	84	125	**1671**
Stage 1b ==>	1	69	60	70	71	63	55	21	63	40	73	47	71	63	34	123	73	**996**
	2	101	79	85	83	72	105	28	58	68	79	67	59	73	48	90	55	**1150**
	3	62	101	107	90	65	102	37	102	77	88	89	109	127	106	56	65	**1383**
	4	53	33	28	41	27	4	12	43	6	42	26	40	41	57	38	47	**538**
	5	-	-	2	-	-	-	-	5	-	-	-	-	2	-	5	8	**22**
Total	**0-5**	**397**	**398**	**391**	**396**	**297**	**398**	**148**	**388**	**249**	**342**	**397**	**396**	**396**	**398**	**396**	**373**	**5760**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
1a+1b	**-2%**	**0%**	**-6%**	**-1%**	**1%**	**1%**	**-4%**	**1%**	**10%**	**-7%**	**17%**	**2%**	**-16%**	**1%**	**13%**	**15%**	**2%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
Stage 1a ==>	0	91%	90%	84%	85%	75%	94%	79%	87%	90%	58%	95%	79%	75%	96%	57%	76%	**82%**
Stage 1b ==>	1	86%	68%	81%	80%	80%	71%	65%	70%	67%	69%	38%	62%	68%	39%	75%	44%	**66%**
	2	98%	78%	80%	78%	85%	86%	70%	60%	78%	77%	63%	51%	52%	43%	71%	28%	**68%**
	3	64%	92%	90%	80%	80%	79%	85%	80%	84%	81%	83%	87%	84%	67%	54%	38%	**76%**
	4	91%	88%	74%	79%	78%	12%	69%	82%	24%	91%	68%	82%	82%	97%	68%	35%	**71%**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Weighted mean	**0-5**	**85.1%**	**83.9%**	**83.1%**	**81.1%**	**79.8%**	**77.9%**	**76.4%**	**76.3%**	**75.1%**	**73.1%**	**73.0%**	**72.0%**	**71.5%**	**67.8%**	**63.4%**	**48.0%**	74.1%
RANKING		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	

E

PERCENTAGE AGREEMENT STAGE 1A and 1B combined

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
1a+1b	**94%**	**95%**	**90%**	**92%**	**95%**	**94%**	**89%**	**96%**	**95%**	**86%**	**99%**	**89%**	**80%**	**96%**	**97%**	**88%**	92%
RANKING	**8**	**5**	**11**	**10**	**6**	**9**	**12**	**3**	**7**	**15**	**1**	**13**	**16**	**4**	**2**	**14**	

F

BIAS

	MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
Stage 1a ==>	0	0.11	0.13	0.22	0.22	0.26	0.09	0.28	0.14	0.14	0.46	0.06	0.28	0.37	0.06	0.46	0.35	**0.22**
Stage 1b ==>	1	-0.03	-0.20	0.07	-0.03	-0.02	-0.12	0.12	-0.16	-0.18	0.15	-0.62	0.04	0.30	-0.46	-0.19	-0.05	**-0.10**
	2	-0.03	0.02	0.15	-0.09	-0.06	-0.22	0.19	0.24	-0.23	0.14	-0.51	-0.11	0.49	0.33	-0.30	-0.32	**-0.03**
	3	0.12	-0.01	-0.03	0.11	-0.02	-0.22	-0.15	0.09	-0.17	0.05	-0.13	0.05	0.05	0.20	-0.17	0.03	**-0.00**
	4	-0.09	-0.12	-0.18	-0.21	-0.22	-0.94	-0.54	0.12	-0.84	-0.16	-0.32	-0.18	-0.06	-0.03	-0.06	-0.71	**-0.26**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Table 8 Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL	SAMPLING STRATA												Nr of
stage	9	10	11	12	13	14	15	16	x	x	x	x	eggs
0	17	14	7	23	29	11	12	3	-	-	-	-	**116**
1	5	8	2	14	8	19	4	9	-	-	-	-	**69**
2	16	11	17	7	4	7	7	18	-	-	-	-	**87**
3	5	11	21	4	7	12	22	10	-	-	-	-	**92**
4	7	6	3	2	1	-	5	10	-	-	-	-	**34**
5	-	-	-	-	-	-	-	-	-	-	-	-	**0**
TOTAL	**50**	**50**	**50**	**50**	**49**	**49**	**50**	**50**	**0**	**0**	**0**	**0**	**398**

PERCENTAGE AGREEMENT

MODAL	SAMPLING STRATA												Agree-
stage	9	10	11	12	13	14	15	16	x	x	x	x	ment
0	86%	87%	70%	75%	85%	84%	82%	81%	-	-	-	-	**82.3%**
1	59%	63%	73%	63%	76%	65%	71%	70%	-	-	-	-	**66.3%**
2	66%	73%	66%	60%	66%	67%	65%	75%	-	-	-	-	**68.3%**
3	80%	81%	73%	69%	70%	85%	76%	73%	-	-	-	-	**76.4%**
4	71%	71%	69%	54%	87%	-	64%	76%	-	-	-	-	**70.9%**
5	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Mean CV	**74.4%**	**76.9%**	**70.1%**	**68.0%**	**79.6%**	**74.5%**	**74.4%**	**74.1%**	**-**	**-**	**-**	**-**	**74.1%**

Weighted

BIAS

MODAL	SAMPLING STRATA												Mean
stage	9	10	11	12	13	14	15	16	x	x	x	x	bias
0	0.18	0.14	0.42	0.36	0.17	0.19	0.21	0.30	-	-	-	-	**0.22**
1	0.03	0.04	-0.07	-0.11	0.00	-0.28	0.02	-0.04	-	-	-	-	**-0.10**
2	-0.03	-0.16	-0.02	0.02	-0.34	0.04	0.30	-0.05	-	-	-	-	**-0.03**
3	-0.13	0.03	0.10	-0.02	-0.17	-0.17	0.02	0.06	-	-	-	-	**-0.00**
4	-0.25	-0.32	0.00	-0.58	0.00	-	-0.40	-0.22	-	-	-	-	**-0.26**
5	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Mean	**0.01**	**-0.02**	**0.09**	**0.12**	**0.05**	**-0.10**	**0.06**	**-0.04**	**-**	**-**	**-**	**-**	**0.02**

Weighted

Table 9 TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL	Eng CaBy	Port SF	Spain IM	Eng ChBu	Spain MS	Eng MS	KM+BR	Nor JdL	Irel SH+DL	Spain AL	Port AF	Germ NH	Spain CF	Scot IG	Neth IdB	Norw IMB	**2STDEV**
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	0.735	0.814	1.161	1.148	0.937	0.790	1.180	0.738	0.904	1.170	0.546	1.314	1.439	0.661	1.100	1.596	**1.080**
1	0.765	1.062	1.055	0.906	1.019	1.059	1.200	1.133	1.112	1.192	0.979	1.484	1.203	1.264	0.931	1.881	**1.239**
2	0.480	1.140	0.841	1.251	1.056	1.273	1.245	1.402	1.105	1.143	1.639	1.866	1.051	1.604	1.109	2.342	**1.447**
3	1.180	0.554	0.629	0.862	0.894	0.881	1.567	1.060	0.832	1.131	0.948	1.005	1.162	1.079	1.500	2.265	**1.170**
4	0.576	0.654	1.152	0.821	0.847	0.844	2.253	0.819	1.108	1.148	0.950	0.774	0.844	0.343	1.297	2.013	**1.195**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE

MODAL	Eng CaBy	Port SF	Spain IM	Eng ChBu	Spain MS	Eng MS	KM+BR	Nor JdL	Irel SH+DL	Spain AL	Port AF	Germ NH	Spain CF	Scot IG	Neth IdB	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	0.11	0.13	0.22	0.22	0.26	0.09	0.28	0.14	0.14	0.46	0.06	0.28	0.37	0.06	0.46	0.35	**0.22**
1	0.97	0.80	1.07	0.97	0.98	0.88	1.12	0.84	0.82	1.15	0.38	1.04	1.30	0.54	0.81	0.95	**0.90**
2	1.97	2.02	2.15	1.91	1.94	1.78	2.19	2.24	1.77	2.14	1.49	1.89	2.49	2.33	1.70	1.68	**1.97**
3	3.12	2.99	2.97	3.11	2.98	2.78	2.85	3.09	2.83	3.05	2.87	3.05	3.05	3.20	2.83	3.03	**3.00**
4	3.91	3.88	3.82	3.79	3.78	3.06	3.46	4.12	3.16	3.84	3.68	3.82	3.94	3.97	3.94	3.29	**3.74**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE +2STDEV

MODAL	Eng CaBy	Port SF	Spain IM	Eng ChBu	Spain MS	Eng MS	KM+BR	Nor JdL	Irel SH+DL	Spain AL	Port AF	Germ NH	Spain CF	Scot IG	Neth IdB	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	0.847	0.944	1.384	1.365	1.196	0.885	1.461	0.873	1.044	1.631	0.607	1.598	1.808	0.722	1.557	1.944	**1.30**
1	1.736	1.859	2.128	1.877	1.999	1.943	2.318	1.969	1.932	2.340	1.362	2.528	2.507	1.800	1.740	2.834	**2.14**
2	2.445	3.163	2.992	3.158	3.000	3.055	3.430	3.638	2.874	3.282	3.133	3.751	3.545	3.938	2.807	4.021	**3.42**
3	4.300	3.543	3.596	3.971	3.879	3.663	4.420	4.148	3.661	4.176	3.817	4.060	4.217	4.274	4.327	5.299	**4.17**
4	4.488	4.536	4.975	4.615	4.625	3.903	5.715	4.936	4.268	4.992	4.626	4.597	4.786	4.314	5.238	5.303	**4.93**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE -2STDEV

MODAL	Eng CaBy	Port SF	Spain IM	Eng ChBu	Spain MS	Eng MS	KM+BR	Nor JdL	Irel SH+DL	Spain AL	Port AF	Germ NH	Spain CF	Scot IG	Neth IdB	Norw IMB	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**ALL**
0	-0.623	-0.685	-0.938	-0.931	-0.678	-0.695	-0.900	-0.603	-0.764	-0.709	-0.486	-1.029	-1.071	-0.601	-0.643	-1.247	**-0.856**
1	0.206	-0.265	0.019	0.065	-0.039	-0.175	-0.083	-0.298	-0.291	-0.043	-0.597	-0.439	0.101	-0.728	-0.122	-0.929	**-0.337**
2	1.485	0.883	1.310	0.656	0.889	0.508	0.940	0.833	0.664	0.996	-0.145	0.019	1.443	0.729	0.589	-0.663	**0.528**
3	1.939	2.435	2.338	2.246	2.091	1.902	1.286	2.028	1.997	1.915	1.922	2.050	1.892	2.117	1.326	0.768	**1.825**
4	3.336	3.228	2.672	2.973	2.930	2.214	1.208	3.299	2.052	2.695	2.727	3.050	3.097	3.628	2.644	1.277	**2.544**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 3 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the MODAL egg stage. The estimated mean egg stage corresponds to MODAL egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the egg stage difference between estimated mean egg stage and MODAL egg stage.

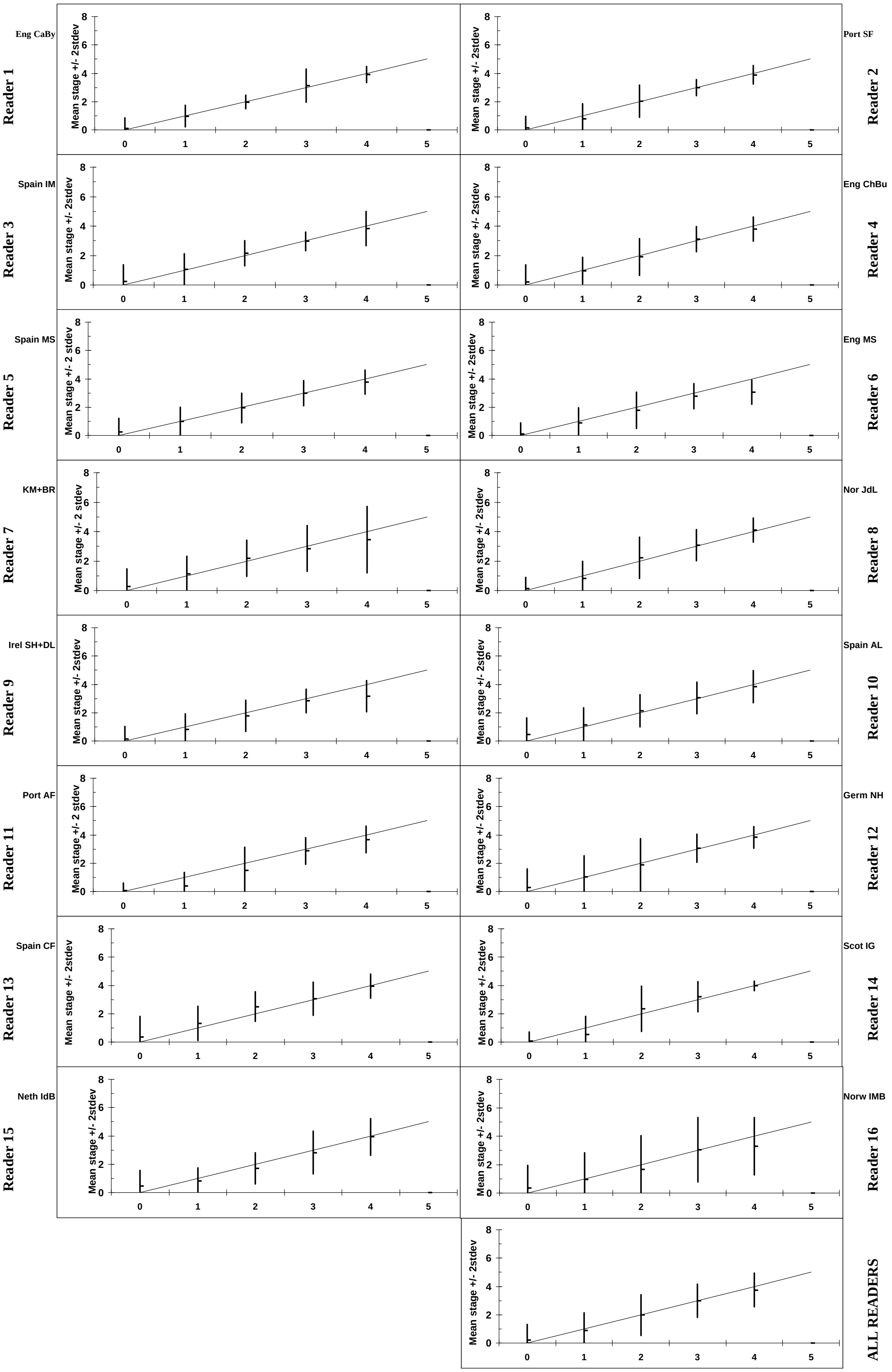

Table 10 The number of egg staging by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	TOTAL
	1	191	191	186	190	136	191	75	184	94	147	190	190	189	191	189	175	**2709**
	2	81	82	81	81	68	82	27	80	61	76	82	82	82	82	82	79	**1208**
	3	91	91	90	91	66	91	33	90	69	87	91	90	91	91	91	88	**1341**
	4	34	34	34	34	27	34	13	34	25	32	34	34	34	34	34	31	**502**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**397**	**398**	**391**	**396**	**297**	**398**	**148**	**388**	**249**	**342**	**397**	**396**	**396**	**398**	**396**	**373**	**5760**

B

EGG STAGE COMPOSITION

	Stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	TOTAL
	1	181	185	169	182	133	187	71	180	98	133	215	188	153	187	207	198	**2667**
	2	101	79	85	83	72	105	28	58	68	79	67	59	73	48	90	55	**1150**
	3	62	101	107	90	65	102	37	102	77	88	89	109	127	106	56	65	**1383**
	4	53	33	28	41	27	4	12	43	6	42	26	40	41	57	38	47	**538**
	5	-	-	2	-	-	-	-	5	-	-	-	-	2	-	5	8	**22**
Total	**0-5**	**397**	**398**	**391**	**396**	**297**	**398**	**148**	**388**	**249**	**342**	**397**	**396**	**396**	**398**	**396**	**373**	**5760**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
1a+1b	**-5%**	**-3%**	**-9%**	**-4%**	**-2%**	**-2%**	**-5%**	**-2%**	**4%**	**-10%**	**13%**	**-1%**	**-19%**	**-2%**	**10%**	**13%**	**-2%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	Modal stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
	1	94%	95%	90%	92%	95%	94%	89%	96%	95%	86%	99%	89%	80%	96%	97%	88%	**92%**
	2	99%	82%	80%	80%	88%	89%	70%	64%	84%	78%	66%	51%	50%	44%	74%	28%	**70%**
	3	65%	92%	90%	81%	80%	80%	88%	80%	86%	80%	84%	88%	84%	68%	55%	39%	**77%**
	4	91%	88%	74%	79%	78%	12%	69%	82%	24%	91%	68%	82%	82%	97%	68%	35%	**71%**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Weighted mean	**0-5**	**88.2%**	**91.2%**	**86.4%**	**85.9%**	**88.6%**	**82.7%**	**83.8%**	**84.5%**	**82.3%**	**83.3%**	**85.9%**	**80.3%**	**74.7%**	**78.9%**	**80.3%**	**59.2%**	**82.2%**
	RANKING	**3**	**1**	**4**	**6**	**2**	**10**	**8**	**7**	**11**	**9**	**5**	**12**	**15**	**14**	**12**	**16**	

E

PERCENTAGE AGREEMENT STAGE 1 (stage 1A and 1B combined)

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
1a+1b	**94%**	**95%**	**90%**	**92%**	**95%**	**94%**	**89%**	**96%**	**95%**	**86%**	**99%**	**89%**	**80%**	**96%**	**97%**	**88%**	**92%**
RANKING	**8**	**5**	**11**	**10**	**6**	**9**	**12**	**3**	**7**	**15**	**1**	**13**	**16**	**4**	**2**	**14**	

F

BIAS

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	ALL
1	0.06	0.05	0.13	0.09	0.07	0.06	0.11	0.05	0.05	0.16	0.01	0.14	0.24	0.05	0.03	0.20	**0.09**
2	-0.01	0.11	0.15	0.00	0.00	-0.09	0.19	0.33	-0.13	0.16	-0.29	0.05	0.51	0.46	-0.23	-0.13	**0.07**
3	0.13	-0.01	-0.03	0.12	-0.02	-0.20	-0.03	0.10	-0.14	0.06	-0.11	0.09	0.08	0.21	-0.15	0.08	**0.01**
4	-0.09	-0.12	-0.18	-0.21	-0.22	-0.94	-0.46	0.12	-0.84	-0.16	-0.32	-0.18	-0.06	-0.03	-0.06	-0.71	**-0.26**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

Table 10a HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1-5

																					RANGE r. 1-16	
	Sample			Well	Eng CaBy	Port SF	Spain IM	Eng ChBu	Spain MS	Eng MS	KM+BR	Nor JdL	Irel SH+DL	Spain AL	Port AF	Germ NH	Spain CF	Scot IG	Neth IdB	Norw IMB	**MODAL**	**Percent**
Stratum	no	no	Tray	no	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	**stage**	**agreement**
9	9A	1	9	A1	4	4	4	4	4	3	4	4	3	4	4	4	4	4	5	3	**4**	75%
9	9A	2	9	A2	2	2	2	1	2	2	2	3	1	2	1	1	2	2	1	1	**2**	56%
9	9A	3	9	A3	4	4	3	4	3	3	3	4	3	4	3	4	3	4	4	4	**4**	56%
9	9A	4	9	A4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	5	2	**4**	81%
9	9A	5	9	A5	1	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	**1**	81%
9	9A	6	9	A6	1	1	1	1	1	1	1	1	1	-	1	2	1	1	1	1	**1**	93%
9	9A	7	9	A7	3	2	2	2	2	3	3	3	3	2	3	3	3	3	3	2	**3**	63%
9	9A	8	9	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
9	9A	9	9	A9	2	2	2	2	-	2	1	2	2	2	1	3	2	2	1	2	**2**	73%
9	9A	10	9	A10	1	1	1	1	2	2	2	1	1	2	1	4	1	1	1	2	**1**	63%
9	9A	11	9	B1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	1	**2**	88%
9	9A	12	9	B2	2	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	**1**	81%
9	9A	13	9	B3	2	3	2	2	3	2	2	3	2	3	2	3	3	3	2	1	**2**	50%
9	9A	14	9	B4	3	3	3	3	3	3	3	3	3	4	3	4	3	3	4	2	**3**	75%
9	9A	15	9	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
9	9A	16	9	B6	2	3	3	2	2	2	2	3	2	3	3	2	3	3	2	1	**2**	50%
9	9A	17	9	B7	4	4	4	4	3	3	3	3	3	4	4	4	4	4	4	1	**4**	63%
9	9A	18	9	B8	3	2	3	3	3	2	3	3	3	3	3	3	3	2	3	3	**3**	81%
9	9A	19	9	B9	4	4	4	4	4	3	4	4	3	4	3	4	4	3	5	2	**4**	63%
9	9A	20	9	B10	4	4	4	4	4	3	4	4	3	4	4	4	4	4	5	3	**4**	75%
9	9A	21	9	C1	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	**4**	88%
9	9A	22	9	C2	2	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	**3**	81%
9	9A	23	9	C3	2	2	2	2	2	1	2	2	1	2	1	1	2	1	1	3	**2**	56%
9	9A	24	9	C4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
9	9A	25	9	C5	-	2	2	1	2	2	2	2	1	2	1	1	2	2	1	1	**2**	60%
9	9B	26	9	C6	1	2	2	2	2	2	2	2	2	2	2	2	3	1	1	1	**2**	69%
9	9B	27	9	C7	1	1	-	1	1	1	1	1	1	1	1	1	-	1	1	2	**1**	93%
9	9B	28	9	C8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	29	9	C9	2	2	3	3	2	2	3	2	2	2	1	2	4	3	1	1	**2**	50%
9	9B	30	9	C10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	31	9	D1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	32	9	D2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	33	9	D3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	34	9	D4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	35	9	D5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	36	9	D6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	37	9	D7	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	**1**	94%
9	9B	38	9	D8	2	2	2	2	2	2	2	3	2	2	2	1	3	3	2	1	**2**	69%
9	9B	39	9	D9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	40	9	D10	2	2	3	2	2	2	3	3	2	2	2	2	3	3	2	2	**2**	69%
9	9B	41	9	E1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	42	9	E2	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	**1**	81%
9	9B	43	9	E3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9B	44	9	E4	2	2	3	2	2	2	2	3	2	2	1	2	3	2	2	1	**2**	69%
9	9B	45	9	E5	1	1	1	2	1	2	2	1	1	1	1	1	2	1	1	1	**1**	75%
9	9B	46	9	E6	1	1	1	2	1	2	2	1	1	2	1	2	1	1	1	1	**1**	69%
9	9B	47	9	E7	2	2	2	2	2	2	3	2	2	2	2	3	3	3	2	2	**2**	75%
9	9B	48	9	E8	2	2	3	3	2	2	2	3	2	2	2	2	3	3	2	1	**2**	63%
9	9B	49	9	E9	2	2	3	2	2	2	2	2	2	2	2	1	3	3	2	1	**2**	69%
9	9B	50	9	E10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	1	10	A1	2	1	2	1	1	2	-	2	-	1	1	2	2	2	1	1	**2**	50%
10	10A	2	10	A2	1	1	3	2	3	2	-	1	-	2	1	1	3	2	1	1	**1**	50%
10	10A	3	10	A3	4	4	4	4	4	3	-	4	-	4	3	4	4	4	4	2	**4**	79%
10	10A	4	10	A4	1	1	-	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	5	10	A5	2	2	2	2	2	2	-	2	-	2	2	2	2	2	2	1	**2**	93%
10	10A	6	10	A6	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	7	10	A7	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	8	10	A8	2	2	2	2	2	2	-	2	-	2	2	2	2	2	2	1	**2**	93%
10	10A	9	10	A9	1	1	-	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	10	10	A10	3	3	3	3	3	3	-	3	-	3	3	3	4	3	3	2	**3**	86%
10	10A	11	10	B1	1	1	2	1	1	2	-	1	-	1	1	1	1	1	1	1	**1**	86%
10	10A	12	10	B2	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	13	10	B3	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	14	10	B4	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	15	10	B5	1	1	1	1	1	1	-	2	-	2	1	1	2	2	2	1	**1**	64%
10	10A	16	10	B6	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	17	10	B7	1	1	-	1	1	1	-	1	-	2	1	1	1	1	1	1	**1**	92%
10	10A	18	10	B8	2	3	1	2	2	2	-	2	-	2	1	2	2	2	2	2	**2**	79%
10	10A	19	10	B9	1	1	2	2	1	2	-	1	-	2	1	1	1	1	1	1	**1**	71%
10	10A	20	10	B10	1	1	1	1	1	1	-	1	-	1	1	1	-	1	1	1	**1**	100%
10	10A	21	10	C1	4	3	4	4	3	3	-	4	-	4	3	4	4	4	3	2	**4**	57%
10	10A	22	10	C2	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	23	10	C3	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10A	24	10	C4	2	3	3	2	3	2	-	2	-	2	1	1	3	2	2	1	**2**	50%
10	10A	25	10	C5	2	3	-	2	3	2	-	2	-	3	1	1	3	2	2	1	**2**	46%
10	10B	26	10	C6	2	2	2	2	2	2	-	2	-	1	1	1	2	2	2	2	**2**	79%
10	10B	27	10	C7	2	2	2	2	2	2	-	2	-	2	2	2	2	3	2	2	**2**	93%
10	10B	28	10	C8	3	3	3	3	2	3	-	3	-	3	3	3	3	3	3	3	**3**	93%
10	10B	29	10	C9	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10B	30	10	C10	3	3	3	3	2	3	-	3	-	3	3	3	3	3	3	2	**3**	86%
10	10B	31	10	D1	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10B	32	10	D2	3	3	3	3	3	3	-	3	-	3	2	3	3	4	4	2	**3**	71%
10	10B	33	10	D3	4	4	4	4	4	3	-	4	-	4	3	4	4	4	4	4	**4**	86%
10	10B	34	10	D4	4	4	4	3	4	3	-	4	-	4	4	4	4	4	4	3	**4**	79%
10	10B	35	10	D5	3	3	3	3	3	3	-	3	-	3	3	3	3	3	4	3	**3**	93%
10	10B	36	10	D6	4	4	4	3	4	3	-	4	-	4	4	3	4	4	3	2	**4**	64%
10	10B	37	10	D7	1	1	1	1	2	1	-	1	-	1	1	1	2	1	1	1	**1**	86%
10	10B	38	10	D8	3	3	3	3	3	3	-	3	-	3	3	4	3	3	4	2	**3**	79%
10	10B	39	10	D9	3	3	3	3	3	3	-	3	-	3	3	3	3	3	3	2	**3**	93%
10	10B	40	10	D10	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10B	41	10	E1	2	2	2	2	2	2	-	2	-	2	2	3	2	2	2	2	**2**	93%
10	10B	42	10	E2	3	3	3	3	3	3	-	3	-	3	3	4	3	3	4	3	**3**	86%
10	10B	43	10	E3	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	**1**	100%
10	10B	44	10	E4	3	4	4	4	4	3	-	4	-	3	3	4	3	4	4	4	**4**	64%
10	10B	45	10	E5	2	2	1	2	1	2	-	2	-	1	1	1	2	2	1	1	**2**	50%
10	10B	46	10	E6	4	3	3	3	4	3	-	3	-	3	4	3	3	4	3	3	**3**	71%
10	10B	47	10	E7	2	2	2	2	3	2	-	2	-	3	2	2	3	2	2	1	**2**	71%
10	10B	48	10	E8	3	3	3	3	3	3	-	4	-	3	3	3	3	3	3	2	**3**	86%
10	10B	49	10	E9	3	3	4	3	4	2	-	3	-	3	4	3	2	3	4	2	**3**	50%
10	10B	50	10	E10	1	1	1	1	1	1	-	1	-	1	1	1	2	1	1	2	**1**	86%
11	11A	1	11	A1	2	3	3	2	2	2	-	2	2	3	2	3	3	3	2	2	**2**	60%
11	11A	2	11	A2	2	2	3	2	2	2	-	2	2	3	2	3	3	3	1	2	**2**	60%
11	11A	3	11	A3	4	3	3	3	3	2	-	4	2	3	3	3	3	4	3	3	**3**	67%
11	11A	4	11	A4	2	3	2	2	2	2	-	2	2	2	2	3	3	3	2	3	**2**	67%
11	11A	5	11	A5	3	3	3	4	3	3	-	3	3	3	3	3	3	3	2	2	**3**	80%
11	11A	6	11	A6	4	3	3	3	3	3	-	3	2	3	2	4	3	4	3	3	**3**	67%
11	11A	7	11	A7	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	3	**2**	80%
11	11A	8	11	A8	4	4	5	4	4	4	-	5	4	4	4	4	5	4	5	4	**4**	73%
11	11A	9	11	A9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
11	11A	10	11	A10	4	3	3	4	3	2	-	3	2	3	2	3	3	3	3	3	**3**	67%
11	11A	11	11	B1	2	2	2	2	2	2	-	3	2	2	2	1	2	3	2	2	**2**	80%
11	11A	12	11	B2	2	3	3	3	3	3	-	3	3	3	3	3	3	3	1	1	**3**	80%
11	11A	13	11	B3	3	3	3	4	3	3	-	3	3	4	3	4	3	4	3	4	**3**	67%
11	11A	14	11	B4	2	2	2	2	2	2	-	3	2	2	2	2	2	3	1	3	**2**	73%
11	11A	15	11	B5	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	16	11	B6	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	17	11	B7	4	3	3	3	3	3	-	3	3	3	3	3	3	4	2	4	**3**	73%
11	11A	18	11	B8	3	3	3	4	4	3	-	3	3	3	3	3	4	4	3	4	**3**	67%
11	11A	19	11	B9	3	3	3	3	3	3	-	3	3	4	3	3	3	3	3	4	**3**	87%
11	11A	20	11	B10	4	3	3	4	3	3	-	3	3	3	3	3	3	4	3	5	**3**	73%
11	11A	21	11	C1	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	22	11	C2	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
11	11A	23	11	C3	3	3	3	4	4	3	-	4	3	3	3	3	4	4	3	4	**3**	60%
11	11A	24	11	C4	4	3	3	4	4	3	-	3	3	3	3	3	4	4	3	4	**3**	60%
11	11A	25	11	C5	4	3	3	4	3	3	-	3	3	3	3	3	4	4	3	4	**3**	67%
11	11B	26	11	C6	4	4	4	3	4	3	-	4	3	4	4	3	4	4	3	4	**4**	67%
11	11B	27	11	C7	1	1	1	1	1	2	-	1	1	-	1	1	2	1	1	4	**1**	79%
11	11B	28	11	C8	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
11	11B	29	11	C9	4	3	3	4	3	3	-	3	3	4	3	3	3	4	4	4	**3**	60%
11	11B	30	11	C10	1	1	1	1	1	1	-	1	1	1	1	2	2	1	1	1	**1**	87%
11	11B	31	11	D1	2	2	2	1	1	1	-	1	1	2	2	1	2	1	-	-	**1**	54%
11	11B	32	11	D2	2	2	2	2	2	1	-	2	2	2	1	2	3	3	1	1	**2**	60%
11	11B	33	11	D3	1	1	-	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
11	11B	34	11	D4	4	3	4	4	4	3	-	3	3	3	3	3	4	4	2	2	**3**	47%
11	11B	35	11	D5	1	1	1	1	1	1	-	1	1	1	1	2	1	1	1	2	**1**	87%
11	11B	36	11	D6	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%

11	11B	37	11	D7	2	2	2	1	2	1	-	2	3	2	1	2	2	2	1	1	**2**	60%
11	11B	38	11	D8	1	1	1	2	1	1	-	1	1	1	1	1	1	1	1	1	**1**	93%
11	11B	39	11	D9	1	1	3	1	1	1	-	1	1	1	1	1	3	1	2	1	**1**	80%
11	11B	40	11	D10	4	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	87%
11	11B	41	11	E1	2	2	2	2	2	2	-	2	2	2	2	2	3	3	1	2	**2**	80%
11	11B	42	11	E2	2	2	3	2	2	2	-	2	2	2	2	3	3	3	2	2	**2**	73%
11	11B	43	11	E3	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	1	**2**	80%
11	11B	44	11	E4	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	1	**2**	80%
11	11B	45	11	E5	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	1	**2**	80%
11	11B	46	11	E6	2	2	3	2	2	2	-	3	2	3	2	3	3	3	2	2	**2**	60%
11	11B	47	11	E7	2	1	2	2	1	1	-	3	1	-	1	1	2	1	1	2	**1**	57%
11	11B	48	11	E8	2	2	3	2	1	2	-	3	1	2	1	3	3	2	2	1	**2**	47%
11	11B	49	11	E9	4	3	-	3	3	3	-	3	3	1	3	1	1	3	1	1	**3**	57%
11	11B	50	11	E10	4	4	5	3	4	3	-	5	4	4	4	4	5	4	4	4	**4**	67%
12	12A	1	12	A1	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	2	12	A2	3	3	3	3	-	2	-	4	-	-	3	3	3	4	3	3	**3**	75%
12	12A	3	12	A3	4	4	4	4	-	2	-	5	-	-	4	4	4	4	2	2	**4**	67%
12	12A	4	12	A4	2	2	2	3	-	2	-	2	-	-	2	2	3	3	2	2	**2**	75%
12	12A	5	12	A5	4	3	2	4	-	2	-	4	-	-	3	3	4	4	3	3	**4**	42%
12	12A	6	12	A6	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	7	12	A7	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	8	12	A8	2	2	2	2	-	2	-	3	-	-	2	3	3	3	2	2	**2**	67%
12	12A	9	12	A9	3	3	3	3	-	2	-	3	-	-	3	3	3	4	3	2	**3**	75%
12	12A	10	12	A10	1	1	1	1	-	1	-	2	-	-	1	1	2	1	1	2	**1**	75%
12	12A	11	12	B1	1	1	1	1	-	1	-	1	-	-	1	1	2	1	1	1	**1**	92%
12	12A	12	12	B2	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	13	12	B3	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	14	12	B4	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	15	12	B5	1	1	1	1	-	1	-	1	-	-	1	1	1	1	2	1	**1**	92%
12	12A	16	12	B6	2	1	1	1	-	2	-	1	-	-	1	1	2	2	1	1	**1**	67%
12	12A	17	12	B7	2	1	3	1	-	2	-	1	-	-	1	2	3	2	1	1	**1**	50%
12	12A	18	12	B8	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	19	12	B9	2	1	2	1	-	1	-	1	-	-	1	2	2	1	1	1	**1**	67%
12	12A	20	12	B10	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	21	12	C1	1	1	2	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	92%
12	12A	22	12	C2	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	23	12	C3	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12A	24	12	C4	1	1	2	1	-	1	-	1	-	-	1	1	2	1	1	1	**1**	83%
12	12A	25	12	C5	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	2	**1**	92%
12	12B	26	12	C6	4	3	3	3	-	3	-	4	-	-	3	3	4	3	4	2	**3**	58%
12	12B	27	12	C7	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	28	12	C8	2	2	2	2	-	2	-	3	-	-	2	3	3	3	2	2	**2**	67%
12	12B	29	12	C9	1	1	1	2	-	1	-	1	-	-	1	1	1	1	1	1	**1**	92%
12	12B	30	12	C10	1	1	1	3	-	1	-	1	-	-	1	1	1	1	1	1	**1**	92%
12	12B	31	12	D1	2	1	2	1	-	2	-	2	-	-	1	2	2	2	2	1	**2**	67%
12	12B	32	12	D2	1	1	1	1	-	1	-	1	-	-	1	1	2	1	1	1	**1**	92%
12	12B	33	12	D3	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	34	12	D4	1	1	1	1	-	1	-	1	-	-	1	2	1	1	1	1	**1**	92%
12	12B	35	12	D5	2	3	2	3	-	2	-	3	-	-	2	3	3	3	2	2	**2**	50%
12	12B	36	12	D6	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	2	**1**	92%
12	12B	37	12	D7	2	3	3	3	-	2	-	3	-	-	3	3	3	3	2	2	**3**	67%
12	12B	38	12	D8	1	1	1	1	-	1	-	1	-	-	1	2	1	1	1	1	**1**	92%
12	12B	39	12	D9	2	1	3	2	-	1	-	1	-	-	1	1	3	1	1	1	**1**	67%
12	12B	40	12	D10	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	41	12	E1	1	1	1	1	-	1	-	1	-	-	1	1	2	1	1	1	**1**	92%
12	12B	42	12	E2	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	43	12	E3	1	1	1	1	-	1	-	1	-	-	1	1	2	1	1	1	**1**	92%
12	12B	44	12	E4	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	45	12	E5	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
12	12B	46	12	E6	1	1	1	1	-	1	-	1	-	-	1	3	1	1	1	2	**1**	83%
12	12B	47	12	E7	2	2	2	2	-	2	-	3	-	-	3	1	3	3	2	2	**2**	58%
12	12B	48	12	E8	1	2	1	1	-	2	-	2	-	-	2	4	1	1	2	1	**1**	50%
12	12B	49	12	E9	2	1	2	2	-	1	-	1	-	-	1	3	2	3	1	1	**1**	50%
12	12B	50	12	E10	1	1	1	1	-	1	-	1	-	-	1	1	1	1	1	1	**1**	100%
13	13A	1	13	A1	1	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	**1**	100%
13	13A	2	13	A2	1	1	1	1	1	1	1	3	-	1	1	1	1	1	1	3	**1**	87%
13	13A	3	13	A3	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	3	**1**	93%
13	13A	4	13	A4	1	1	1	1	1	1	1	1	-	1	1	1	2	1	1	1	**1**	93%
13	13A	5	13	A5	1	1	1	-	1	1	1	-	-	1	1	1	1	1	1	-	**1**	100%
13	13A	6	13	A6	4	4	4	4	4	4	4	5	-	4	4	4	4	4	4	3	**4**	87%
13	13A	7	13	A7	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	8	13	A8	1	1	2	1	1	1	1	1	-	1	1	1	2	2	1	1	**1**	80%
13	13A	9	13	A9	3	3	3	4	3	3	3	4	-	3	3	3	3	4	2	3	**3**	73%
13	13A	10	13	A10	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	11	13	B1	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	12	13	B2	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	13	13	B3	4	3	3	3	3	3	3	3	-	3	3	3	3	4	4	3	**3**	80%
13	13A	14	13	B4	1	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	**1**	100%
13	13A	15	13	B5	2	2	2	2	2	1	2	-	-	2	2	2	3	3	1	1	**2**	64%
13	13A	16	13	B6	1	1	1	1	1	1	1	1	-	2	1	1	2	1	1	3	**1**	80%
13	13A	17	13	B7	1	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	**1**	100%
13	13A	18	13	B8	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	19	13	B9	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13A	20	13	B10	1	1	2	2	1	1	2	-	-	1	1	1	2	1	1	1	**1**	71%
13	13A	21	13	C1	4	3	3	3	3	3	3	3	-	3	2	3	3	4	3	3	**3**	80%
13	13A	22	13	C2	1	1	1	1	1	1	1	1	-	2	1	1	3	1	1	3	**1**	80%
13	13A	23	13	C3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13	13A	24	13	C4	2	2	2	1	2	1	2	-	-	2	1	1	2	1	1	1	**2**	50%
13	13A	25	13	C5	1	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	**1**	100%
13	13B	26	13	C6	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	27	13	C7	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	28	13	C8	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	29	13	C9	2	3	3	3	3	2	3	3	-	3	2	3	3	3	2	1	**3**	67%
13	13B	30	13	C10	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	31	13	D1	2	3	2	3	2	2	3	3	-	2	2	3	3	3	3	3	**3**	60%
13	13B	32	13	D2	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	33	13	D3	2	3	3	3	3	2	3	3	-	3	2	3	3	3	2	3	**3**	73%
13	13B	34	13	D4	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	35	13	D5	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	36	13	D6	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	37	13	D7	2	1	3	2	2	2	1	2	-	2	1	1	3	2	2	1	**2**	53%
13	13B	38	13	D8	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	39	13	D9	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	40	13	D10	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	41	13	E1	2	2	2	2	2	2	2	2	-	2	2	2	2	2	2	3	**2**	93%
13	13B	42	13	E2	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	43	13	E3	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	44	13	E4	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	45	13	E5	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	46	13	E6	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	47	13	E7	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	48	13	E8	2	3	2	3	3	2	2	2	-	3	2	3	3	3	2	3	**3**	53%
13	13B	49	13	E9	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
13	13B	50	13	E10	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	**1**	100%
14	14A	1	14	A1	2	2	2	-	2	1	-	3	1	2	1	2	2	1	2	2	**2**	64%
14	14A	2	14	A2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	3	14	A3	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	4	14	A4	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	5	14	A5	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	6	14	A6	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	7	14	A7	3	3	3	3	3	3	-	3	3	3	3	3	1	3	2	2	**3**	80%
14	14A	8	14	A8	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	**3**	100%
14	14A	9	14	A9	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	10	14	A10	2	2	2	3	2	2	-	3	2	3	3	3	3	3	2	3	**3**	53%
14	14A	11	14	B1	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	**3**	100%
14	14A	12	14	B2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	13	14	B3	2	2	2	3	2	2	-	3	2	3	2	3	2	3	2	2	**2**	67%
14	14A	14	14	B4	2	2	2	2	2	2	-	3	2	3	2	3	2	3	2	2	**2**	73%
14	14A	15	14	B5	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	16	14	B6	3	2	2	2	2	2	-	3	3	3	3	3	3	2	2	3	**3**	53%
14	14A	17	14	B7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	18	14	B8	1	1	1	1	1	1	-	1	2	1	1	1	1	1	1	1	**1**	93%
14	14A	19	14	B9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	20	14	B10	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	21	14	C1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14A	22	14	C2	3	3	3	3	3	3	-	3	3	3	3	3	3	3	2	3	**3**	93%
14	14A	23	14	C3	2	2	2	2	2	2	-	3	2	2	2	2	2	2	1	2	**2**	87%
14	14A	24	14	C4	1	1	1	1	1	1	-	1	1	1	1	1	1	1	2	1	**1**	93%
14	14A	25	14	C5	2	2	2	1	2	2	-	3	1	3	2	2	2	2	1	3	**2**	60%
14	14B	26	14	C6	1	1	1	1	1	1	-	-	1	1	1	2	1	1	1	1	**1**	93%
14	14B	27	14	C7	1	1	1	1	1	1	-	1	1	2	1	2	1	1	1	2	**1**	80%
14	14B	28	14	C8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

14	14B	29	14	C9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	30	14	C10	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	31	14	D1	1	1	1	2	1	1	-	1	1	1	1	1	1	1	1	2	**1**	87%
14	14B	32	14	D2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	33	14	D3	2	2	2	2	1	2	-	1	2	4	1	1	3	2	2	1	**2**	53%
14	14B	34	14	D4	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	35	14	D5	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	36	14	D6	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	37	14	D7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	38	14	D8	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	39	14	D9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	40	14	D10	1	1	1	1	1	1	-	1	1	1	1	2	2	1	1	1	**1**	87%
14	14B	41	14	E1	1	1	1	1	1	1	-	1	2	1	1	1	1	1	1	1	**1**	93%
14	14B	42	14	E2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	43	14	E3	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	44	14	E4	1	1	1	1	1	1	-	1	1	1	1	1	1	1	-	1	**1**	100%
14	14B	45	14	E5	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	46	14	E6	3	3	3	3	3	3	-	-	2	3	3	3	3	3	2	1	**3**	79%
14	14B	47	14	E7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
14	14B	48	14	E8	1	1	1	1	1	1	-	1	2	2	1	2	2	1	1	1	**1**	73%
14	14B	49	14	E9	2	2	2	2	2	2	-	3	2	2	2	3	3	3	2	1	**2**	67%
14	14B	50	14	E10	1	1	1	1	1	1	-	1	1	1	1	2	1	1	1	1	**1**	93%
15	15A	1	15	A1	4	3	3	3	-	3	3	4	3	4	3	3	3	3	3	4	**3**	73%
15	15A	2	15	A2	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	3	15	A3	4	3	3	4	-	3	3	4	3	4	3	4	4	4	4	3	**4**	53%
15	15A	4	15	A4	2	2	2	3	-	3	2	3	2	3	2	2	2	3	2	3	**2**	60%
15	15A	5	15	A5	2	2	2	3	-	2	2	4	2	3	2	1	2	2	2	4	**2**	67%
15	15A	6	15	A6	3	3	3	3	-	3	3	3	3	3	3	3	3	3	2	4	**3**	87%
15	15A	7	15	A7	2	2	2	2	-	2	2	3	2	2	2	3	2	3	2	4	**2**	73%
15	15A	8	15	A8	3	3	3	3	-	3	3	3	3	3	3	3	3	3	2	4	**3**	87%
15	15A	9	15	A9	3	3	3	3	-	3	3	4	3	3	3	3	3	4	3	4	**3**	80%
15	15A	10	15	A10	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	11	15	B1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	12	15	B2	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	13	15	B3	4	3	4	3	-	3	1	4	3	4	4	4	4	4	3	5	**4**	53%
15	15A	14	15	B4	2	2	2	2	-	2	4	3	2	2	2	2	3	3	2	1	**2**	67%
15	15A	15	15	B5	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	16	15	B6	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15A	17	15	B7	4	3	3	3	-	3	4	3	3	3	3	4	3	3	3	5	**3**	73%
15	15A	18	15	B8	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	5	**3**	93%
15	15A	19	15	B9	3	3	3	4	-	3	3	4	3	4	3	3	4	4	3	4	**3**	60%
15	15A	20	15	B10	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	21	15	C1	3	3	3	3	-	3	3	3	3	3	2	3	3	3	3	3	**3**	93%
15	15A	22	15	C2	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	23	15	C3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	4	**3**	93%
15	15A	24	15	C4	4	3	4	3	-	3	3	3	2	3	3	3	4	3	2	4	**3**	60%
15	15A	25	15	C5	4	3	3	3	-	3	3	4	3	4	3	3	3	3	3	4	**3**	73%
15	15B	26	15	C6	3	4	3	3	-	3	4	4	2	4	4	3	3	4	4	4	**4**	53%
15	15B	27	15	C7	4	4	4	4	-	4	4	5	3	1	4	4	4	4	4	4	**4**	80%
15	15B	28	15	C8	1	1	1	1	-	1	2	1	1	1	1	1	2	1	1	1	**1**	87%
15	15B	29	15	C9	1	1	1	1	-	1	2	1	1	2	1	1	1	1	1	-	**1**	86%
15	15B	30	15	C10	1	1	1	1	-	1	1	1	1	3	1	1	1	1	1	-	**1**	93%
15	15B	31	15	D1	3	3	3	3	-	3	4	3	3	3	3	3	3	3	3	3	**3**	93%
15	15B	32	15	D2	3	3	3	3	-	3	3	4	3	3	3	3	3	3	3	3	**3**	93%
15	15B	33	15	D3	2	3	2	3	-	2	3	2	2	2	2	2	3	3	2	4	**2**	60%
15	15B	34	15	D4	1	1	1	1	-	1	2	1	2	1	-	-	1	1	1	-	**1**	83%
15	15B	35	15	D5	2	3	3	3	-	2	3	2	2	1	1	3	3	2	1	1	**3**	40%
15	15B	36	15	D6	2	2	2	2	-	2	2	2	2	2	2	3	2	3	2	1	**2**	80%
15	15B	37	15	D7	3	4	3	4	-	3	3	3	3	3	3	3	4	4	4	3	**3**	67%
15	15B	38	15	D8	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
15	15B	39	15	D9	4	4	4	4	-	3	4	4	2	4	4	4	4	4	4	3	**4**	80%
15	15B	40	15	D10	1	1	1	1	-	1	2	1	2	1	1	1	2	1	1	-	**1**	79%
15	15B	41	15	E1	4	4	3	3	-	3	1	4	3	3	3	3	3	3	3	1	**3**	67%
15	15B	42	15	E2	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15B	43	15	E3	2	3	3	2	-	1	1	3	1	3	1	1	3	2	1	4	**1**	40%
15	15B	44	15	E4	2	3	3	2	-	1	2	3	2	2	2	3	3	3	2	-	**2**	50%
15	15B	45	15	E5	3	3	3	3	-	3	3	4	3	3	4	3	3	3	4	4	**3**	73%
15	15B	46	15	E6	1	2	1	1	-	1	1	1	1	-	1	1	1	1	1	1	**1**	93%
15	15B	47	15	E7	3	3	3	3	-	3	3	3	3	4	3	3	3	4	3	4	**3**	80%
15	15B	48	15	E8	1	1	1	1	-	1	1	1	1	-	1	1	2	1	1	-	**1**	92%
15	15B	49	15	E9	3	3	3	3	-	2	3	3	2	3	3	4	3	2	2	3	**3**	67%
15	15B	50	15	E10	1	2	1	1	-	1	1	1	1	-	1	1	1	1	1	1	**1**	93%
16	16A	1	16	A1	2	2	2	2	2	2	-	2	2	2	1	2	2	2	1	1	**2**	80%
16	16A	2	16	A2	3	3	3	3	3	2	-	3	3	3	2	3	3	3	3	1	**3**	80%
16	16A	3	16	A3	2	3	2	2	2	2	-	3	2	3	2	2	3	3	2	3	**2**	60%
16	16A	4	16	A4	2	2	2	2	2	1	-	2	1	2	2	2	2	2	2	1	**2**	80%
16	16A	5	16	A5	2	2	2	2	2	2	-	2	2	2	1	1	2	2	2	3	**2**	80%
16	16A	6	16	A6	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	-	**4**	93%
16	16A	7	16	A7	3	3	3	3	3	3	-	3	3	3	3	4	4	3	4	-	**3**	79%
16	16A	8	16	A8	4	3	3	3	3	3	-	3	3	3	3	3	3	3	3	5	**3**	87%
16	16A	9	16	A9	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	1	**2**	93%
16	16A	10	16	A10	4	4	4	4	4	3	-	4	3	4	4	3	3	4	4	4	**4**	73%
16	16A	11	16	B1	1	2	1	2	1	1	-	1	1	1	1	1	2	1	1	1	**1**	80%
16	16A	12	16	B2	4	4	3	4	3	3	-	1	3	4	3	3	3	4	4	3	**3**	53%
16	16A	13	16	B3	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	-	**1**	100%
16	16A	14	16	B4	1	1	1	1	1	1	-	1	1	2	1	1	1	1	1	5	**1**	87%
16	16A	15	16	B5	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	3	**2**	93%
16	16A	16	16	B6	1	2	1	2	1	1	-	1	1	2	1	1	1	1	1	1	**1**	80%
16	16A	17	16	B7	2	2	2	2	2	2	-	2	2	2	1	2	2	2	2	1	**2**	87%
16	16A	18	16	B8	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	-	**1**	100%
16	16A	19	16	B9	4	4	3	3	3	3	-	4	3	4	3	4	4	4	4	-	**4**	57%
16	16A	20	16	B10	1	2	1	1	1	1	-	1	1	1	1	1	2	1	1	3	**1**	80%
16	16A	21	16	C1	1	1	1	1	1	1	-	1	1	1	1	2	1	1	1	4	**1**	87%
16	16A	22	16	C2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	-	**1**	100%
16	16A	23	16	C3	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	24	16	C4	2	2	2	2	2	2	-	2	1	2	1	1	2	2	2	-	**2**	79%
16	16A	25	16	C5	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	-	**4**	93%
16	16B	26	16	C6	2	2	2	2	2	2	-	2	2	2	2	2	2	2	1	3	**2**	87%
16	16B	27	16	C7	2	3	2	2	2	2	-	2	2	2	2	3	3	3	3	3	**2**	60%
16	16B	28	16	C8	3	3	3	3	3	3	-	4	3	4	3	4	3	3	3	-	**3**	79%
16	16B	29	16	C9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	-	**1**	100%
16	16B	30	16	C10	3	3	3	3	3	3	-	3	3	4	3	4	4	4	4	-	**3**	64%
16	16B	31	16	D1	2	3	3	3	3	2	-	2	2	3	2	-	3	3	3	4	**3**	57%
16	16B	32	16	D2	3	4	3	4	3	3	-	4	3	4	3	4	4	4	4	3	**4**	53%
16	16B	33	16	D3	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
16	16B	34	16	D4	2	2	2	2	2	2	-	2	2	2	2	2	3	3	2	3	**2**	80%
16	16B	35	16	D5	2	2	2	2	2	2	-	2	2	2	2	3	3	3	2	4	**2**	73%
16	16B	36	16	D6	2	2	2	2	2	2	-	2	2	2	2	3	2	3	2	4	**2**	80%
16	16B	37	16	D7	1	1	2	1	2	2	-	1	1	2	1	2	2	1	1	-	**1**	57%
16	16B	38	16	D8	1	1	2	1	2	1	-	1	1	2	1	1	2	1	1	-	**1**	71%
16	16B	39	16	D9	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	4	**3**	93%
16	16B	40	16	D10	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	2	**1**	93%
16	16B	41	16	E1	2	2	2	1	2	2	-	2	1	2	1	1	2	2	1	3	**2**	60%
16	16B	42	16	E2	4	4	4	4	4	3	-	4	3	4	4	4	4	4	4	3	**4**	80%
16	16B	43	16	E3	3	3	3	3	3	3	-	3	3	4	3	3	3	3	4	4	**3**	80%
16	16B	44	16	E4	2	2	2	2	2	2	-	1	2	2	1	2	2	2	2	3	**2**	80%
16	16B	45	16	E5	4	4	3	4	3	3	-	4	3	4	3	3	4	4	4	5	**4**	53%
16	16B	46	16	E6	4	4	4	4	4	3	-	4	4	4	4	4	4	4	4	5	**4**	87%
16	16B	47	16	E7	3	3	2	2	2	3	-	3	3	2	3	3	3	2	3	4	**3**	60%
16	16B	48	16	E8	4	4	4	4	4	3	-	4	3	4	4	4	4	4	4	4	**4**	87%
16	16B	49	16	E9	4	4	4	4	4	3	-	4	3	3	4	4	4	4	4	4	**4**	80%
16	16B	50	16	E10	2	1	3	2	3	2	-	1	1	3	1	1	3	2	1	-	**1**	43%
				Total staged	397	398	391	396	297	398	148	388	249	342	397	396	396	398	396	373		**82.2%**
				Total NOT staged	1	0	7	2	101	0	250	10	149	56	1	2	2	0	2	25		

Table 10b TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

HORSE MACKEREL first stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	**2STDEV ALL**
1	0.467	0.492	0.853	0.608	0.606	0.487	0.622	0.581	0.451	0.834	0.205	0.910	1.014	0.472	0.322	1.250	**0.702**
2	0.222	0.832	0.843	0.894	0.691	0.644	1.245	1.092	0.772	0.983	1.018	1.402	1.054	1.184	0.905	1.905	**1.128**
3	1.163	0.557	0.632	0.835	0.894	0.801	0.933	0.950	0.709	1.028	0.867	0.773	0.954	1.055	1.458	1.994	**1.059**
4	0.576	0.654	1.152	0.821	0.847	0.844	1.754	0.819	1.108	1.148	0.950	0.774	0.844	0.343	1.297	2.013	**1.173**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	**ALL**
1	1.06	1.05	1.13	1.09	1.07	1.06	1.11	1.05	1.05	1.16	1.01	1.14	1.24	1.05	1.03	1.20	**1.09**
2	1.99	2.11	2.15	2.00	2.00	1.91	2.19	2.33	1.87	2.16	1.71	2.05	2.51	2.46	1.77	1.87	**2.07**
3	3.13	2.99	2.97	3.12	2.98	2.80	2.97	3.10	2.86	3.06	2.89	3.09	3.08	3.21	2.85	3.08	**3.01**
4	3.91	3.88	3.82	3.79	3.78	3.06	3.54	4.12	3.16	3.84	3.68	3.82	3.94	3.97	3.94	3.29	**3.74**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE +2STDEV

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	**ALL**
1	1.525	1.544	1.987	1.698	1.672	1.549	1.728	1.636	1.504	1.991	1.215	2.053	2.252	1.519	1.348	2.450	**1.80**
2	2.210	2.942	2.991	2.894	2.691	2.559	3.430	3.417	2.641	3.141	2.725	3.451	3.566	3.647	2.674	3.778	**3.19**
3	4.295	3.546	3.599	3.955	3.879	3.603	3.903	4.050	3.564	4.085	3.757	3.862	4.031	4.264	4.304	5.073	**4.07**
4	4.488	4.536	4.975	4.615	4.625	3.903	5.293	4.936	4.268	4.992	4.626	4.597	4.786	4.314	5.238	5.303	**4.91**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE -2STDEV

MODAL stage	Eng CaBy Reader 1	Port SF Reader 2	Spain IM Reader 3	Eng ChBu Reader 4	Spain MS Reader 5	Eng MS Reader 6	KM+BR Reader 7	Nor JdL Reader 8	Irel SH+DL Reader 9	Spain AL Reader 10	Port AF Reader 11	Germ NH Reader 12	Spain CF Reader 13	Scot IG Reader 14	Neth IdB Reader 15	Norw IMB Reader 16	**ALL**
1	0.590	0.561	0.282	0.481	0.460	0.576	0.485	0.473	0.602	0.322	0.806	0.232	0.225	0.575	0.705	-0.050	**0.392**
2	1.765	1.278	1.305	1.106	1.309	1.270	0.940	1.233	1.096	1.175	0.690	0.647	1.458	1.279	0.863	-0.031	**0.938**
3	1.969	2.432	2.334	2.286	2.091	2.001	2.036	2.150	2.146	2.030	2.023	2.316	2.123	2.154	1.388	1.086	**1.956**
4	3.336	3.228	2.672	2.973	2.930	2.214	1.784	3.299	2.052	2.695	2.727	3.050	3.097	3.628	2.644	1.277	**2.568**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

HORSE MACKEREL first stageing. **Egg Stageing Workshop, Lowestoft, 4-9 December 2000**

Table 10c Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL	SAMPLING STRATA												Nr of
stage	9	10	11	12	13	14	15	16	x	x	x	x	eggs
1	22	22	11	38	37	30	17	14	-	-	-	-	**191**
2	16	11	15	6	4	7	7	16	-	-	-	-	**82**
3	5	11	21	4	7	12	21	10	-	-	-	-	**91**
4	7	6	3	2	1	-	5	10	-	-	-	-	**34**
5	-	-	-	-	-	-	-	-	-	-	-	-	**0**
TOTAL	**50**	**50**	**50**	**50**	**49**	**49**	**50**	**50**	**0**	**0**	**0**	**0**	**398**

PERCENTAGE AGREEMENT

MODAL	SAMPLING STRATA												Agree-
stage	9	10	11	12	13	14	15	16	x	x	x	x	ment
1	92%	92%	86%	89%	97%	96%	91%	84%	-	-	-	-	**92.3%**
2	66%	73%	69%	64%	66%	67%	65%	79%	-	-	-	-	**70.0%**
3	80%	81%	73%	69%	70%	85%	78%	73%	-	-	-	-	**76.9%**
4	71%	71%	69%	54%	87%	-	64%	76%	-	-	-	-	**70.9%**
5	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Mean CV	**79.8%**	**83.1%**	**74.5%**	**83.2%**	**90.2%**	**89.6%**	**79.3%**	**78.8%**	**-**	**-**	**-**	**-**	**82.4%**

Weighted

BIAS

MODAL	SAMPLING STRATA												Mean
stage	9	10	11	12	13	14	15	16	x	x	x	x	bias
1	0.08	0.09	0.18	0.13	0.04	0.04	0.12	0.21	-	-	-	-	**0.09**
2	0.04	-0.09	0.13	0.22	-0.17	0.07	0.32	0.03	-	-	-	-	**0.07**
3	-0.13	0.03	0.11	-0.02	-0.16	-0.16	0.08	0.07	-	-	-	-	**0.01**
4	-0.25	-0.32	0.00	-0.58	0.00	-	-0.39	-0.22	-	-	-	-	**-0.26**
5	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Mean	**0.00**	**-0.01**	**0.13**	**0.10**	**-0.01**	**-0.01**	**0.08**	**0.04**	**-**	**-**	**-**	**-**	**0.04**

Weighted

HORSE MACKEREL first stageing.   **Egg Stageing Workshop, Lowestoft, 4-9 December 2000**

Figure 4 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.

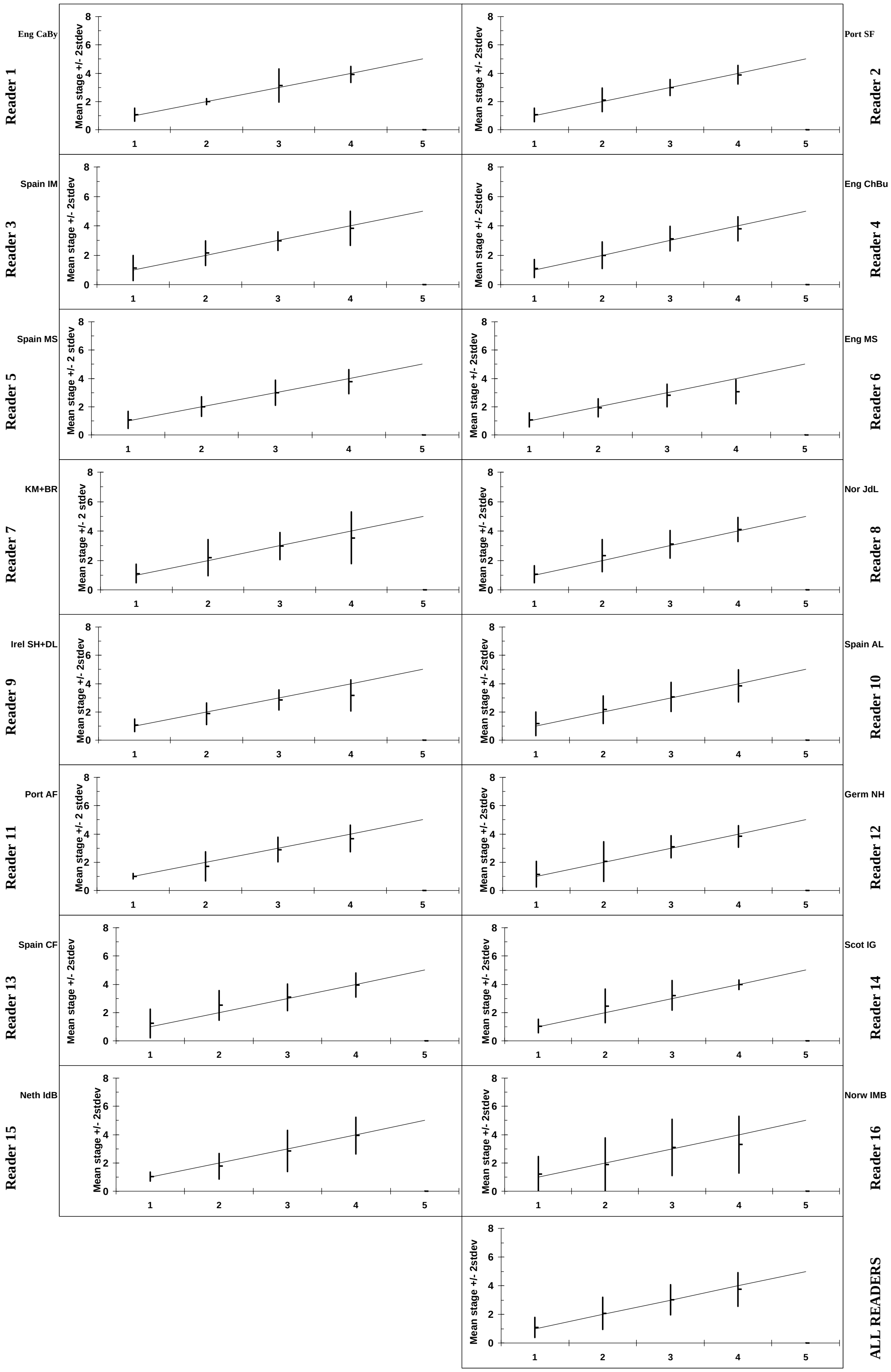

Table 11 MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1ab-5

RANGE r. 1-17

Stratum	Sample no	no	Tray	Well no	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**MODAL stage**	**Percent agreement**
1	1A	1	1	A1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**0**	94%
1	1A	2	1	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
1	1A	3	1	A3	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	**0**	82%
1	1A	4	1	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	5	1	A5	3	2	2	3	3	2	3	2	3	2	2	2	2	3	3	3	2	**2**	53%
1	1A	6	1	A6	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	**0**	82%
1	1A	7	1	A7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	8	1	A8	1	0	1	0	0	2	0	0	1	1	1	0	0	1	0	1	1	**1**	47%
1	1A	9	1	A9	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
1	1A	10	1	A10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	11	1	B1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	12	1	B2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	13	1	B3	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	**5**	94%
1	1A	14	1	B4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	**0**	94%
1	1A	15	1	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	16	1	B6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	17	1	B7	3	4	4	4	3	3	3	4	4	4	3	3	3	3	4	4	3	**3**	53%
1	1A	18	1	B8	2	2	2	3	2	2	2	2	2	2	2	2	2	3	3	3	2	**2**	76%
1	1A	19	1	B9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
1	1A	20	1	B10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	**0**	94%
1	1A	21	1	C1	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
1	1A	22	1	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	**0**	94%
1	1A	23	1	C3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	24	1	C4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
1	1A	25	1	C5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
2	2A	1	2	A1	2	2	0	0	1	0	0	1	2	1	0	0	1	2	-	2	1	**0**	38%
2	2A	2	2	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
2	2A	3	2	A3	0	0	0	0	0	0	0	1	0	0	0	1	0	1	-	0	0	**0**	81%
2	2A	4	2	A4	3	3	3	3	3	2	3	2	3	3	3	3	2	3	-	2	2	**3**	69%
2	2A	5	2	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
2	2A	6	2	A6	0	0	0	0	1	0	2	2	0	1	1	0	0	1	-	1	1	**0**	50%
2	2A	7	2	A7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	-	0	1	**0**	88%
2	2A	8	2	A8	3	3	3	3	3	3	4	3	4	3	4	3	3	3	-	3	4	**3**	75%
2	2A	9	2	A9	2	2	2	2	2	3	2	2	2	2	2	2	2	2	-	2	2	**2**	94%
2	2A	10	2	A10	0	0	0	0	0	0	0	-	0	-	1	0	0	1	-	1	1	**0**	71%
2	2A	11	2	B1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	2	2	**3**	81%
2	2A	12	2	B2	3	3	4	3	3	3	4	3	3	3	4	4	3	3	-	3	3	**3**	75%
2	2A	13	2	B3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	0	0	**0**	94%
2	2A	14	2	B4	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	3	3	**3**	94%
2	2A	15	2	B5	3	3	4	3	3	3	3	3	4	3	4	3	3	3	-	3	4	**3**	75%
2	2A	16	2	B6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	0	0	**0**	94%
2	2A	17	2	B7	2	2	2	2	2	2	2	2	3	2	2	2	2	2	-	2	2	**2**	94%
2	2A	18	2	B8	5	5	5	5	5	5	5	4	5	5	4	4	4	5	-	4	5	**5**	69%
2	2A	19	2	B9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	1	1	**0**	81%
2	2A	20	2	B10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	1	0	**0**	94%
2	2A	21	2	C1	2	0	0	2	0	0	2	2	2	2	2	2	2	2	-	1	2	**2**	69%
2	2A	22	2	C2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	-	0	0	**0**	94%
2	2A	23	2	C3	2	2	2	2	3	2	3	2	3	2	2	2	2	3	-	2	2	**2**	75%
2	2A	24	2	C4	2	2	2	2	2	2	3	3	3	2	3	3	2	3	-	2	2	**2**	63%
2	2A	25	2	C5	3	3	2	3	0	2	3	2	3	2	2	2	2	3	-	3	2	**2**	50%
3	3A	1	3	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
3	3A	2	3	A2	0	0	0	1	0	0	0	0	0	0	1	0	0	1	-	0	1	**0**	75%
3	3A	3	3	A3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	**0**	100%
3	3A	4	3	A4	4	4	4	4	4	3	4	4	4	4	4	3	4	4	-	4	4	**4**	88%
3	3A	5	3	A5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	94%
3	3A	6	3	A6	4	4	4	4	4	4	5	4	4	4	4	4	4	5	-	5	4	**4**	81%
3	3A	7	3	A7	0	0	0	0	0	0	0	0	0	0	0	0	2	1	-	0	1	**0**	81%
3	3A	8	3	A8	4	4	5	4	4	4	4	4	4	5	4	5	4	4	-	3	4	**4**	75%
3	3A	9	3	A9	4	4	4	4	4	3	4	4	4	4	4	2	4	4	-	4	2	**4**	81%
3	3A	10	3	A10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
3	3A	11	3	B1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	**0**	94%
3	3A	12	3	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
3	3A	13	3	B3	0	2	0	0	0	0	0	0	0	0	0	-	0	0	-	0	0	**0**	93%
3	3A	14	3	B4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
3	3A	15	3	B5	1	0	0	1	1	1	0	0	0	1	0	0	0	0	-	0	1	**0**	63%
3	3A	16	3	B6	3	3	3	3	3	3	3	3	3	3	3	3	2	3	-	2	2	**3**	81%
3	3A	17	3	B7	4	4	4	4	4	3	4	4	4	4	4	4	4	4	-	4	4	**4**	94%
3	3A	18	3	B8	4	-	4	4	4	4	4	4	-	4	5	-	4	4	-	-	3	**4**	83%
3	3A	19	3	B9	4	-	4	4	4	4	4	4	-	4	4	-	4	4	-	-	4	**4**	100%
3	3A	20	3	B10	5	5	5	5	5	4	5	4	5	5	5	5	4	5	-	5	5	**5**	81%
3	3A	21	3	C1	0	0	1	0	0	0	0	1	0	1	1	1	0	1	-	1	1	**0**	50%
3	3A	22	3	C2	4	3	4	4	4	4	4	4	4	4	4	4	4	4	-	4	4	**4**	94%
3	3A	23	3	C3	2	2	2	2	0	2	2	2	2	2	2	2	2	2	-	2	2	**2**	94%
3	3A	24	3	C4	1	2	0	1	1	0	0	0	0	1	0	0	0	0	-	0	0	**0**	69%
3	3A	25	3	C5	2	3	2	3	2	2	3	0	3	2	2	3	2	3	-	2	2	**2**	56%
4	4A	1	4	A1	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	4	5	**5**	82%
4	4A	2	4	A2	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	**4**	94%
4	4A	3	4	A3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	88%
4	4A	4	4	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	5	4	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
4	4A	6	4	A6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
4	4A	7	4	A7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	8	4	A8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
4	4A	9	4	A9	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	3	4	**4**	88%
4	4A	10	4	A10	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	11	4	B1	3	3	3	3	4	3	4	3	4	3	4	3	3	3	3	4	4	**3**	65%
4	4A	12	4	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	13	4	B3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	14	4	B4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
4	4A	15	4	B5	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	16	4	B6	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	**4**	88%
4	4A	17	4	B7	4	4	4	5	4	4	5	5	5	4	4	4	4	4	4	4	5	**4**	71%
4	4A	18	4	B8	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	19	4	B9	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	3	4	**4**	88%
4	4A	20	4	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	21	4	C1	3	4	4	4	4	4	4	3	4	4	4	3	3	4	4	3	4	**4**	71%
4	4A	22	4	C2	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	**5**	94%
4	4A	23	4	C3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	24	4	C4	4	5	5	4	4	4	5	4	5	5	4	4	4	5	5	4	5	**4**	53%
4	4A	25	4	C5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
5	5A	1	5	A1	0	-	0	0	0	0	0	1	0	1	0	0	0	0	-	3	1	**0**	73%
5	5A	2	5	A2	0	-	2	0	0	0	0	-	0	1	2	3	0	0	-	2	2	**0**	57%
5	5A	3	5	A3	0	-	0	0	0	0	0	1	1	1	0	0	0	1	-	0	1	**0**	67%
5	5A	4	5	A4	3	-	2	2	3	3	2	3	3	2	2	3	2	3	-	3	2	**3**	53%
5	5A	5	5	A5	0	-	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	**0**	100%
5	5A	6	5	A6	2	-	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
5	5A	7	5	A7	3	-	3	4	3	3	4	3	3	3	3	3	3	3	-	3	3	**3**	87%
5	5A	8	5	A8	5	-	5	5	5	5	5	4	5	5	4	5	4	5	-	5	5	**5**	80%
5	5A	9	5	A9	0	-	0	0	0	0	0	2	0	-	0	0	0	0	-	0	0	**0**	93%
5	5A	10	5	A10	5	-	5	5	5	5	4	5	5	5	5	4	4	5	-	5	5	**5**	80%
5	5A	11	5	B1	2	-	2	1	2	0	1	2	2	2	0	2	2	1	-	2	2	**2**	67%
5	5A	12	5	B2	0	-	0	0	0	0	0	-	0	0	0	0	2	0	-	0	0	**0**	93%
5	5A	13	5	B3	4	-	4	4	4	4	4	4	3	4	3	4	3	4	-	3	4	**4**	73%
5	5A	14	5	B4	5	-	5	5	5	4	5	4	5	4	4	4	4	3	-	3	5	**5**	47%
5	5A	15	5	B5	0	-	0	0	0	0	1	-	0	-	0	0	0	2	-	0	1	**0**	77%
5	5A	16	5	B6	0	-	0	0	0	0	1	1	2	1	1	0	2	1	-	1	2	**0**	40%
5	5A	17	5	B7	4	-	5	4	4	4	4	4	5	4	4	4	4	3	-	5	4	**4**	73%
5	5A	18	5	B8	0	-	0	0	0	0	0	-	0	0	0	0	0	1	-	0	2	**0**	86%
5	5A	19	5	B9	3	-	3	4	4	3	3	3	4	4	4	3	3	4	-	3	4	**3**	53%
5	5A	20	5	B10	0	-	0	0	0	1	0	0	0	1	0	1	1	1	-	0	1	**0**	60%
5	5A	21	5	C1	4	-	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	93%
5	5A	22	5	C2	0	-	0	0	0	0	2	0	0	1	0	0	1	1	-	0	2	**0**	67%
5	5A	23	5	C3	5	-	5	5	5	4	5	5	5	5	5	5	4	5	-	5	5	**5**	87%
5	5A	24	5	C4	4	-	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	93%
5	5A	25	5	C5	0	-	0	0	0	0	0	0	0	1	0	0	0	0	-	0	1	**0**	87%
6	6A	1	6	A1	2	-	2	2	2	2	2	2	2	2	2	3	3	3	4	3	2	**2**	69%
6	6A	2	6	A2	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
6	6A	3	6	A3	4	-	4	4	0	4	4	4	4	4	4	4	4	4	5	4	5	**4**	81%
6	6A	4	6	A4	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
6	6A	5	6	A5	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
6	6A	6	6	A6	0	-	1	0	0	0	0	0	0	1	1	0	0	1	0	1	2	**0**	63%
6	6A	7	6	A7	5	-	5	4	5	4	5	4	5	5	4	4	4	5	5	4	5	**5**	56%
6	6A	8	6	A8	0	-	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	**0**	69%

6	6A	9	6	A9	4	-	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	**4**	94%
6	6A	10	6	A10	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
6	6A	11	6	B1	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	**2**	88%
6	6A	12	6	B2	1	-	1	1	2	0	0	1	0	2	1	0	1	1	0	0	1	**1**	50%
6	6A	13	6	B3	0	-	0	1	0	0	0	0	1	1	1	0	0	1	0	0	1	**0**	63%
6	6A	14	6	B4	5	-	5	5	5	4	5	4	5	5	4	4	4	5	5	4	5	**5**	63%
6	6A	15	6	B5	4	-	5	4	4	4	3	4	5	5	4	4	4	3	5	4	4	**4**	63%
6	6A	16	6	B6	0	-	0	0	0	0	0	0	0	1	1	0	0	3	0	1	1	**0**	69%
6	6A	17	6	B7	4	-	4	4	4	4	4	4	4	4	4	4	4	4	5	4	5	**4**	88%
6	6A	18	6	B8	5	-	5	5	5	5	5	4	5	5	4	4	4	5	5	4	4	**5**	63%
6	6A	19	6	B9	0	-	0	0	0	1	0	0	0	1	1	0	0	1	0	1	1	**0**	63%
6	6A	20	6	B10	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
6	6A	21	6	C1	0	-	1	0	0	1	0	0	0	1	1	0	0	1	0	1	0	**0**	63%
6	6A	22	6	C2	3	-	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
6	6A	23	6	C3	4	-	4	4	4	3	4	4	4	4	4	3	3	4	4	4	4	**4**	81%
6	6A	24	6	C4	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
6	6A	25	6	C5	5	-	5	5	5	5	5	4	5	5	4	4	4	5	5	5	5	**5**	75%
7	7A	1	7	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
7	7A	2	7	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
7	7A	3	7	A3	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	**0**	76%
7	7A	4	7	A4	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	**0**	59%
7	7A	5	7	A5	3	3	3	3	4	3	3	3	3	3	2	3	2	3	4	3	2	**3**	71%
7	7A	6	7	A6	2	2	2	3	3	3	3	2	2	2	2	2	2	3	3	2	2	**2**	65%
7	7A	7	7	A7	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	**0**	65%
7	7A	8	7	A8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
7	7A	9	7	A9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	**0**	82%
7	7A	10	7	A10	2	2	2	2	2	2	2	2	2	2	2	0	0	2	2	2	2	**2**	88%
7	7A	11	7	B1	4	4	4	4	4	4	4	3	4	4	4	4	3	4	4	3	4	**4**	82%
7	7A	12	7	B2	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	**4**	88%
7	7A	13	7	B3	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	**4**	94%
7	7A	14	7	B4	3	3	2	3	3	2	3	2	2	3	2	2	2	3	3	2	2	**2**	53%
7	7A	15	7	B5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	**0**	82%
7	7A	16	7	B6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**0**	94%
7	7A	17	7	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
7	7A	18	7	B8	0	0	2	2	0	0	2	2	2	0	0	0	0	2	2	0	2	**0**	53%
7	7A	19	7	B9	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	**0**	88%
7	7A	20	7	B10	0	0	-	0	-	0	0	-	0	0	0	-	1	0	0	1	2	**0**	77%
7	7A	21	7	C1	2	2	2	2	3	3	3	3	3	3	2	2	3	3	3	3	2	**3**	59%
7	7A	22	7	C2	0	0	0	0	1	0	0	1	0	1	2	0	2	1	0	0	2	**0**	59%
7	7A	23	7	C3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3	**3**	94%
7	7A	24	7	C4	2	2	2	2	0	0	2	2	2	2	2	2	3	2	2	2	2	**2**	82%
7	7A	25	7	C5	3	3	3	3	4	3	4	3	4	3	3	4	2	3	4	3	4	**3**	59%
8	8A	1	8	A1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
8	8A	2	8	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	**2**	94%
8	8A	3	8	A3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	**0**	88%
8	8A	4	8	A4	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	2	2	**0**	71%
8	8A	5	8	A5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	**0**	94%
8	8A	6	8	A6	2	2	2	2	2	2	3	2	2	2	2	3	2	3	3	2	2	**2**	76%
8	8A	7	8	A7	2	0	2	2	0	2	2	2	2	2	2	0	2	2	3	2	2	**2**	76%
8	8A	8	8	A8	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
8	8A	9	8	A9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**0**	94%
8	8A	10	8	A10	2	2	2	3	2	2	3	2	3	2	2	3	2	2	3	2	2	**2**	71%
8	8A	11	8	B1	0	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0	1	**0**	65%
8	8A	12	8	B2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	3	**2**	88%
8	8A	13	8	B3	2	2	2	3	2	3	3	2	3	2	2	3	2	3	4	3	2	**2**	53%
8	8A	14	8	B4	2	2	3	3	2	3	3	2	3	2	2	2	2	3	3	3	3	**3**	53%
8	8A	15	8	B5	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	**0**	100%
8	8A	16	8	B6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
8	8A	17	8	B7	2	2	3	2	2	2	2	2	3	2	2	2	2	2	3	2	2	**2**	82%
8	8A	18	8	B8	2	2	0	2	0	0	2	2	2	3	0	0	1	-	3	3	2	**2**	44%
8	8A	19	8	B9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
8	8A	20	8	B10	2	2	2	3	2	2	3	2	3	2	2	2	2	3	3	3	2	**2**	65%
8	8A	21	8	C1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8	8A	22	8	C2	3	3	3	3	2	3	3	2	3	3	3	3	2	3	3	3	3	**3**	82%
8	8A	23	8	C3	2	2	3	3	2	3	2	2	3	2	2	2	2	3	3	3	2	**2**	59%
8	8A	24	8	C4	2	2	2	0	0	2	2	2	0	2	0	0	2	2	2	2	2	**2**	71%
8	8A	25	8	C5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
				Total staged	199	147	198	199	198	198	199	191	197	196	199	195	199	198	123	197	199		**82.0%**
				Total NOT staged	0	52	1	0	1	1	0	8	2	3	0	4	0	1	76	2	0		

Table 12 The number of egg stageings by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	TOTAL
Stage 1a ==>	0	73	51	72	73	72	72	73	65	73	70	73	71	73	73	43	73	73	1173
Stage 1b ==>	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	33
	2	37	33	37	37	37	37	37	37	37	37	37	37	37	36	23	37	37	610
	3	42	36	42	42	42	42	42	42	42	42	42	42	42	42	29	42	42	695
	4	32	21	32	32	32	32	32	32	30	32	32	30	32	32	19	30	32	514
	5	13	5	13	13	13	13	13	13	13	13	13	13	13	13	7	13	13	207
Total	0-5	199	147	198	199	198	198	199	191	197	196	199	195	199	198	123	197	199	3232

B

EGG STAGE COMPOSITION

	Stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	TOTAL
Stage 1a ==>	0	70	51	68	70	75	73	70	55	68	44	60	69	63	44	34	53	39	1006
Stage 1b ==>	1	4	-	6	6	5	4	3	9	4	27	16	7	11	27	5	19	27	180
	2	37	33	37	28	30	30	29	44	28	38	39	30	44	25	14	33	55	574
	3	44	37	38	47	40	51	48	39	42	40	35	50	43	59	39	59	27	738
	4	31	20	32	35	35	32	33	38	38	32	43	33	37	29	20	24	35	547
	5	13	6	17	13	13	8	16	6	17	15	6	6	1	14	11	9	16	187
Total	0-5	199	147	198	199	198	198	199	191	197	196	199	195	199	198	123	197	199	3232

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
1a+1b	-1%	-2%	0%	1%	8%	4%	-3%	-4%	-4%	-1%	1%	4%	-1%	-5%	-13%	-4%	-12%	-2%

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
Stage 1a ==>	0	96%	94%	92%	93%	92%	94%	93%	82%	90%	63%	78%	89%	82%	60%	74%	71%	53%	82%
Stage 1b ==>	1	100%	0%	100%	50%	0%	0%	0%	50%	50%	50%	100%	0%	50%	100%	0%	50%	100%	48%
	2	92%	85%	89%	68%	70%	76%	68%	95%	68%	95%	89%	73%	89%	58%	39%	73%	97%	79%
	3	95%	92%	86%	88%	86%	98%	86%	86%	71%	90%	79%	90%	81%	98%	90%	88%	60%	86%
	4	97%	90%	88%	97%	97%	84%	84%	91%	83%	91%	94%	77%	78%	88%	79%	57%	81%	86%
	5	100%	100%	100%	92%	100%	62%	92%	38%	100%	92%	38%	38%	8%	92%	100%	54%	92%	75%
Weighted mean	0-5	95.5%	90.5%	89.9%	87.4%	86.9%	86.9%	84.4%	83.2%	81.2%	81.1%	80.4%	80.0%	77.4%	74.7%	72.4%	71.6%	70.4%	82.1%
	RANKING	1	2	3	4	5	5	7	8	9	10	11	12	13	14	15	16	17	

E

PERCENTAGE AGREEMENT STAGE 1A and 1B combined

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
1a+1b	99%	94%	97%	99%	97%	99%	96%	94%	95%	99%	97%	99%	95%	93%	87%	95%	88%	96%
RANKING	1	13	7	1	7	3	9	14	10	5	6	4	10	15	17	10	16	

F

BIAS

	MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
Stage 1a ==>	0	0.05	0.12	0.11	0.08	0.10	0.06	0.11	0.25	0.18	0.37	0.25	0.14	0.23	0.48	0.42	0.36	0.59	0.23
Stage 1b ==>	1	0.00	-1.00	0.00	-0.50	0.00	0.00	-1.00	-0.50	-0.50	0.50	0.00	-1.00	-0.50	0.00	-1.00	-0.50	0.00	-0.33
	2	0.08	-0.03	-0.05	0.19	-0.27	-0.08	0.27	-0.03	0.24	0.05	-0.14	-0.05	-0.03	0.36	0.70	0.22	0.03	0.07
	3	-0.05	-0.03	0.05	0.02	0.05	-0.02	0.10	-0.10	0.29	0.00	0.02	0.00	-0.24	0.02	0.10	-0.02	-0.02	0.01
	4	-0.03	0.00	0.13	0.03	-0.13	-0.16	0.09	-0.03	0.10	0.09	0.00	-0.20	-0.22	0.00	0.21	-0.30	0.03	-0.03
	5	0.00	0.00	0.00	-0.08	0.00	-0.38	-0.08	-0.62	0.00	-0.08	-0.62	-0.62	-0.92	-0.15	0.00	-0.54	-0.08	-0.26

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Table 13   Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL	SAMPLING STRATA												Nr of
stage	1	2	3	4	5	6	7	8	x	x	x	x	eggs
0	13	10	8	-	12	10	11	9	-	-	-	-	73
1	1	-	-	-	-	1	-	-	-	-	-	-	2
2	2	8	4	1	2	2	5	13	-	-	-	-	37
3	7	6	3	12	3	3	6	2	-	-	-	-	42
4	1	-	9	10	4	5	3	-	-	-	-	-	32
5	1	1	1	2	4	4	-	-	-	-	-	-	13
TOTAL	25	25	25	25	25	25	25	24	0	0	0	0	199

PERCENTAGE AGREEMENT

MODAL	SAMPLING STRATA												Agree-
stage	1	2	3	4	5	6	7	8	x	x	x	x	ment
0	95%	78%	78%	-	75%	79%	76%	90%	-	-	-	-	82.2%
1	47%	-	-	-	-	50%	-	-	-	-	-	-	48.5%
2	65%	80%	88%	100%	83%	78%	78%	75%	-	-	-	-	78.7%
3	92%	78%	94%	94%	64%	94%	79%	68%	-	-	-	-	85.9%
4	100%	-	88%	85%	83%	81%	88%	-	-	-	-	-	85.8%
5	94%	69%	81%	88%	73%	64%	-	-	-	-	-	-	74.9%
Mean CV	90.1%	78.6%	84.9%	90.1%	75.3%	77.5%	78.6%	80.3%	-	-	-	-	82.1%

Weighted

BIAS

MODAL	SAMPLING STRATA												Mean
stage	1	2	3	4	5	6	7	8	x	x	x	x	bias
0	0.07	0.27	0.24	-	0.35	0.23	0.31	0.15	-	-	-	-	0.23
1	-0.41	-	-	-	-	-0.25	-	-	-	-	-	-	-0.33
2	0.35	0.06	0.03	0.00	-0.23	0.25	0.08	0.06	-	-	-	-	0.07
3	0.08	0.03	-0.06	0.06	0.04	-0.02	-0.07	-0.32	-	-	-	-	0.01
4	0.00	-	-0.04	0.02	-0.07	-0.02	-0.12	-	-	-	-	-	-0.03
5	-0.06	-0.31	-0.19	-0.12	-0.30	-0.36	-	-	-	-	-	-	-0.26
Mean	0.07	0.12	0.05	0.03	0.10	0.04	0.12	0.06	-	-	-	-	0.07

Weighted

Table 14 TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**2STDEV ALL**
0	0.567	0.951	0.791	0.646	0.685	0.461	0.854	1.120	1.262	0.973	0.988	0.913	1.081	1.338	1.588	1.264	1.408	**1.063**
1	0.000	-	0.000	1.414	2.828	2.828	0.000	1.414	1.414	1.414	0.000	0.000	1.414	0.000	0.000	1.414	0.000	**1.291**
2	0.553	1.171	1.048	1.233	1.804	1.519	1.016	0.743	1.193	0.458	1.170	1.560	0.880	1.085	1.270	0.959	0.329	**1.177**
3	0.431	0.583	0.759	0.697	0.759	0.309	0.740	0.740	0.914	0.625	0.936	0.625	1.153	0.309	0.620	0.697	1.287	**0.781**
4	0.354	0.632	0.672	0.354	1.414	0.738	0.780	0.619	0.805	0.592	0.508	1.102	0.840	0.718	0.838	1.192	1.076	**0.854**
5	0.000	0.000	0.000	0.555	0.000	1.013	0.555	1.013	0.000	0.555	1.013	1.013	0.555	1.109	0.000	1.320	0.555	**0.923**

MEAN STAGE

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**ALL**
0	0.05	0.12	0.11	0.08	0.10	0.06	0.11	0.25	0.18	0.37	0.25	0.14	0.23	0.48	0.42	0.36	0.59	**0.23**
1	1.00	0.00	1.00	0.50	1.00	1.00	0.00	0.50	0.50	1.50	1.00	0.00	0.50	1.00	0.00	0.50	1.00	**0.67**
2	2.08	1.97	1.95	2.19	1.73	1.92	2.27	1.97	2.24	2.05	1.86	1.95	1.97	2.36	2.70	2.22	2.03	**2.07**
3	2.95	2.97	3.05	3.02	3.05	2.98	3.10	2.90	3.29	3.00	3.02	3.00	2.76	3.02	3.10	2.98	2.98	**3.01**
4	3.97	4.00	4.13	4.03	3.88	3.84	4.09	3.97	4.10	4.09	4.00	3.80	3.78	4.00	4.21	3.70	4.03	**3.97**
5	5.00	5.00	5.00	4.92	5.00	4.62	4.92	4.38	5.00	4.92	4.38	4.38	4.08	4.85	5.00	4.46	4.92	**4.74**

MEAN STAGE +2STDEV

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**ALL**
0	0.622	1.068	0.902	0.728	0.782	0.517	0.963	1.366	1.440	1.345	1.234	1.054	1.314	1.817	2.006	1.620	1.997	**1.29**
1	1.000	-	1.000	1.914	3.828	3.828	0.000	1.914	1.914	2.914	1.000	0.000	1.914	1.000	0.000	1.914	1.000	**1.96**
2	2.635	3.141	2.994	3.422	3.534	3.438	3.287	2.716	3.436	2.513	3.035	3.506	2.853	3.446	3.966	3.175	2.356	**3.25**
3	3.383	3.555	3.807	3.721	3.807	3.285	3.836	3.645	4.200	3.625	3.960	3.625	3.915	3.332	3.723	3.673	4.263	**3.79**
4	4.322	4.632	4.797	4.385	5.289	4.582	4.874	4.588	4.905	4.686	4.508	4.902	4.621	4.718	5.048	4.892	5.107	**4.83**
5	5.000	5.000	5.000	5.478	5.000	5.628	5.478	5.397	5.000	5.478	5.397	5.397	4.632	5.956	5.000	5.782	5.478	**5.66**

MEAN STAGE -2STDEV

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**ALL**
0	-0.512	-0.833	-0.680	-0.564	-0.587	-0.406	-0.744	-0.874	-1.084	-0.602	-0.741	-0.772	-0.848	-0.858	-1.169	-0.907	-0.819	**-0.837**
1	1.000	-	1.000	-0.914	-1.828	-1.828	0.000	-0.914	-0.914	0.086	1.000	0.000	-0.914	1.000	0.000	-0.914	1.000	**-0.624**
2	1.528	0.799	0.898	0.957	-0.075	0.400	1.254	1.230	1.050	1.596	0.695	0.386	1.093	1.276	1.426	1.258	1.698	**0.895**
3	2.521	2.389	2.289	2.327	2.289	2.668	2.355	2.164	2.371	2.375	2.088	2.375	1.609	2.715	2.484	2.279	1.689	**2.227**
4	3.615	3.368	3.453	3.678	2.461	3.106	3.313	3.350	3.295	3.501	3.492	2.698	2.941	3.282	3.373	2.508	2.955	**3.118**
5	5.000	5.000	5.000	4.368	5.000	3.603	4.368	3.372	5.000	4.368	3.372	3.372	3.522	3.737	5.000	3.141	4.368	**3.816**

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Figure 5 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.

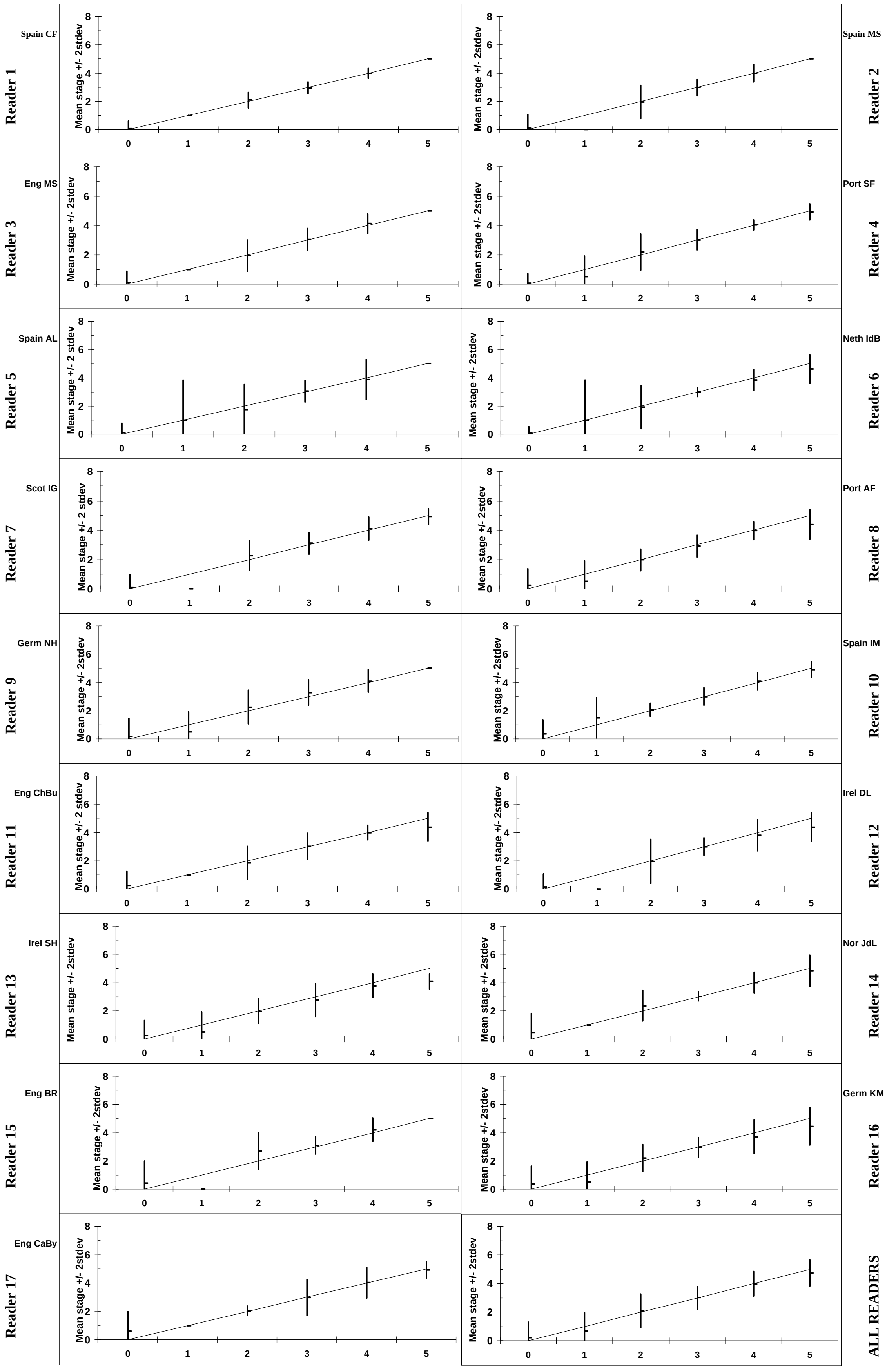

Table 15 The number of egg staging by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	TOTAL
	1	75	52	74	75	74	74	75	67	75	72	75	73	75	75	45	75	75	**1206**
	2	37	33	37	37	37	37	37	37	37	37	37	37	37	36	23	37	37	**610**
	3	42	36	42	42	42	42	42	42	42	42	42	42	42	42	29	42	42	**695**
	4	32	21	32	32	32	32	32	32	30	32	32	30	32	32	19	30	32	**514**
	5	13	5	13	13	13	13	13	13	13	13	13	13	13	13	7	13	13	**207**
Total	**0-5**	**199**	**147**	**198**	**199**	**198**	**198**	**199**	**191**	**197**	**196**	**199**	**195**	**199**	**198**	**123**	**197**	**199**	**3232**

B

EGG STAGE COMPOSITION

	Stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	TOTAL
	1	74	51	74	76	80	77	73	64	72	71	76	76	74	71	39	72	66	**1186**
	2	37	33	37	28	30	30	29	44	28	38	39	30	44	25	14	33	55	**574**
	3	44	37	38	47	40	51	48	39	42	40	35	50	43	59	39	59	27	**738**
	4	31	20	32	35	35	32	33	38	38	32	43	33	37	29	20	24	35	**547**
	5	13	6	17	13	13	8	16	6	17	15	6	6	1	14	11	9	16	**187**
Total	**0-5**	**199**	**147**	**198**	**199**	**198**	**198**	**199**	**191**	**197**	**196**	**199**	**195**	**199**	**198**	**123**	**197**	**199**	**3232**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
1a+1b	**-1%**	**-2%**	**0%**	**1%**	**8%**	**4%**	**-3%**	**-4%**	**-4%**	**-1%**	**1%**	**4%**	**-1%**	**-5%**	**-13%**	**-4%**	**-12%**	**-2%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
	1	99%	94%	97%	99%	97%	99%	96%	94%	95%	99%	97%	99%	95%	93%	87%	95%	88%	**96%**
	2	92%	85%	89%	68%	70%	76%	68%	95%	68%	95%	89%	73%	89%	58%	39%	73%	97%	**79%**
	3	95%	92%	86%	88%	86%	98%	86%	86%	71%	90%	79%	90%	81%	98%	90%	88%	60%	**86%**
	4	97%	90%	88%	97%	97%	84%	84%	91%	83%	91%	94%	77%	78%	88%	79%	57%	81%	**86%**
	5	100%	100%	100%	92%	100%	62%	92%	38%	100%	92%	38%	38%	8%	92%	100%	54%	92%	**75%**
Weighted mean	**0-5**	**96.5%**	**91.2%**	**91.9%**	**89.9%**	**89.9%**	**89.4%**	**86.4%**	**88.0%**	**83.2%**	**94.4%**	**87.4%**	**84.6%**	**82.4%**	**86.9%**	**78.0%**	**80.7%**	**82.9%**	**87.4%**
	RANKING	**1**	**4**	**3**	**5**	**6**	**7**	**11**	**8**	**13**	**2**	**9**	**12**	**15**	**10**	**17**	**16**	**14**	

E

PERCENTAGE AGREEMENT STAGE 1 (stage 1A and 1B combined)

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
1a+1b	**99%**	**94%**	**97%**	**99%**	**97%**	**99%**	**96%**	**94%**	**95%**	**99%**	**97%**	**99%**	**95%**	**93%**	**87%**	**95%**	**88%**	96%
RANKING	**1**	**13**	**7**	**1**	**7**	**3**	**9**	**14**	**10**	**5**	**6**	**4**	**10**	**15**	**17**	**10**	**16**	

F

BIAS

MODAL stage	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	ALL
1	0.01	0.06	0.03	0.01	0.03	0.01	0.04	0.06	0.08	0.01	0.03	0.03	0.05	0.08	0.16	0.07	0.12	**0.05**
2	0.08	0.03	0.00	0.22	-0.08	0.03	0.27	0.00	0.27	0.05	-0.05	0.05	0.00	0.36	0.70	0.22	0.03	**0.11**
3	-0.05	-0.03	0.05	0.02	0.05	-0.02	0.10	-0.10	0.29	0.00	0.02	0.00	-0.21	0.02	0.10	-0.02	-0.02	**0.01**
4	-0.03	0.00	0.13	0.03	-0.09	-0.16	0.09	-0.03	0.10	0.09	0.00	-0.20	-0.22	0.00	0.21	-0.30	0.03	**-0.03**
5	0.00	0.00	0.00	-0.08	0.00	-0.38	-0.08	-0.62	0.00	-0.08	-0.62	-0.62	-0.92	-0.15	0.00	-0.54	-0.08	**-0.26**

Table 15a MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1-5

RANGE r. 1-17

Stratum	Sample no	no	Tray	Well no	Spain CF Reader 1	Spain MS Reader 2	Eng MS Reader 3	Port SF Reader 4	Spain AL Reader 5	Neth IdB Reader 6	Scot IG Reader 7	Port AF Reader 8	Germ NH Reader 9	Spain IM Reader 10	Eng ChBu Reader 11	Irel DL Reader 12	Irel SH Reader 13	Nor JdL Reader 14	Eng BR Reader 15	Germ KM Reader 16	Eng CaBy Reader 17	**MODAL stage**	**Percent agreement**
1	1A	1	1	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	2	1	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
1	1A	3	1	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	4	1	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	5	1	A5	3	2	2	3	3	2	3	2	3	2	2	2	2	3	3	3	2	**2**	53%
1	1A	6	1	A6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	7	1	A7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	8	1	A8	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	**1**	94%
1	1A	9	1	A9	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
1	1A	10	1	A10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	11	1	B1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	12	1	B2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	13	1	B3	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	**5**	94%
1	1A	14	1	B4	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	**1**	94%
1	1A	15	1	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
1	1A	16	1	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	17	1	B7	3	4	4	4	3	3	3	4	4	4	3	3	3	3	4	4	3	**3**	53%
1	1A	18	1	B8	2	2	2	3	2	2	2	2	2	2	2	2	2	3	3	3	2	**2**	76%
1	1A	19	1	B9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
1	1A	20	1	B10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	**1**	94%
1	1A	21	1	C1	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
1	1A	22	1	C2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	**1**	94%
1	1A	23	1	C3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	24	1	C4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
1	1A	25	1	C5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
2	2A	1	2	A1	2	2	1	1	1	1	1	1	2	1	1	1	1	2	-	2	1	**1**	69%
2	2A	2	2	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
2	2A	3	2	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	4	2	A4	3	3	3	3	3	2	3	2	3	3	3	3	2	3	-	2	2	**3**	69%
2	2A	5	2	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
2	2A	6	2	A6	1	1	1	1	1	1	2	2	1	1	1	1	1	1	-	1	1	**1**	88%
2	2A	7	2	A7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	8	2	A8	3	3	3	3	3	3	4	3	4	3	4	3	3	3	-	3	4	**3**	75%
2	2A	9	2	A9	2	2	2	2	2	3	2	2	2	2	2	2	2	2	-	2	2	**2**	94%
2	2A	10	2	A10	1	1	1	1	1	1	1	-	1	-	1	1	1	1	-	1	1	**1**	100%
2	2A	11	2	B1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	2	2	**3**	81%
2	2A	12	2	B2	3	3	4	3	3	3	4	3	3	3	4	4	3	3	-	3	3	**3**	75%
2	2A	13	2	B3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	14	2	B4	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	3	3	**3**	94%
2	2A	15	2	B5	3	3	4	3	3	3	3	3	4	3	4	3	3	3	-	3	4	**3**	75%
2	2A	16	2	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	17	2	B7	2	2	2	2	2	2	2	2	3	2	2	2	2	2	-	2	2	**2**	94%
2	2A	18	2	B8	5	5	5	5	5	5	5	4	5	5	4	4	4	5	-	4	5	**5**	69%
2	2A	19	2	B9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	20	2	B10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
2	2A	21	2	C1	2	1	1	2	1	1	2	2	2	2	2	2	2	2	-	1	2	**2**	69%
2	2A	22	2	C2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	-	1	1	**1**	94%
2	2A	23	2	C3	2	2	2	2	3	2	3	2	3	2	2	2	2	3	-	2	2	**2**	75%
2	2A	24	2	C4	2	2	2	2	2	2	3	3	3	2	3	3	2	3	-	2	2	**2**	63%
2	2A	25	2	C5	3	3	2	3	1	2	3	2	3	2	2	2	2	3	-	3	2	**2**	50%
3	3A	1	3	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
3	3A	2	3	A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
3	3A	3	3	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
3	3A	4	3	A4	4	4	4	4	4	3	4	4	4	4	4	3	4	4	-	4	4	**4**	88%
3	3A	5	3	A5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	94%
3	3A	6	3	A6	4	4	4	4	4	4	5	4	4	4	4	4	4	5	-	5	4	**4**	81%
3	3A	7	3	A7	1	1	1	1	1	1	1	1	1	1	1	1	2	1	-	1	1	**1**	94%
3	3A	8	3	A8	4	4	5	4	4	4	4	4	4	5	4	5	4	4	-	3	4	**4**	75%
3	3A	9	3	A9	4	4	4	4	4	3	4	4	4	4	4	2	4	4	-	4	2	**4**	81%
3	3A	10	3	A10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
3	3A	11	3	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
3	3A	12	3	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
3	3A	13	3	B3	1	2	1	1	1	1	1	1	1	1	1	-	1	1	-	1	1	**1**	93%
3	3A	14	3	B4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3	**3**	100%
3	3A	15	3	B5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
3	3A	16	3	B6	3	3	3	3	3	3	3	3	3	3	3	3	2	3	-	2	2	**3**	81%
3	3A	17	3	B7	4	4	4	4	4	3	4	4	4	4	4	4	4	4	-	4	4	**4**	94%
3	3A	18	3	B8	4	-	4	4	4	4	4	4	-	4	5	-	4	4	-	-	3	**4**	83%
3	3A	19	3	B9	4	-	4	4	4	4	4	4	-	4	4	-	4	4	-	-	4	**4**	100%
3	3A	20	3	B10	5	5	5	5	5	4	5	4	5	5	5	5	4	5	-	5	5	**5**	81%
3	3A	21	3	C1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
3	3A	22	3	C2	4	3	4	4	4	4	4	4	4	4	4	4	4	4	-	4	4	**4**	94%
3	3A	23	3	C3	2	2	2	2	1	2	2	2	2	2	2	2	2	2	-	2	2	**2**	94%
3	3A	24	3	C4	1	2	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	94%
3	3A	25	3	C5	2	3	2	3	2	2	3	1	3	2	2	3	2	3	-	2	2	**2**	56%
4	4A	1	4	A1	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	4	5	**5**	82%
4	4A	2	4	A2	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	**4**	94%
4	4A	3	4	A3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	88%
4	4A	4	4	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	5	4	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
4	4A	6	4	A6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
4	4A	7	4	A7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	8	4	A8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
4	4A	9	4	A9	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	3	4	**4**	88%
4	4A	10	4	A10	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	11	4	B1	3	3	3	3	4	3	4	3	4	3	4	3	3	3	3	4	4	**3**	65%
4	4A	12	4	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	13	4	B3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	14	4	B4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
4	4A	15	4	B5	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	16	4	B6	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	**4**	88%
4	4A	17	4	B7	4	4	4	5	4	4	5	5	5	4	4	4	4	4	4	4	5	**4**	71%
4	4A	18	4	B8	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	19	4	B9	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	3	4	**4**	88%
4	4A	20	4	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
4	4A	21	4	C1	3	4	4	4	4	4	4	3	4	4	4	3	3	4	4	3	4	**4**	71%
4	4A	22	4	C2	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	**5**	94%
4	4A	23	4	C3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
4	4A	24	4	C4	4	5	5	4	4	4	5	4	5	5	4	4	4	5	5	4	5	**4**	53%
4	4A	25	4	C5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**4**	100%
5	5A	1	5	A1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	3	1	**1**	93%
5	5A	2	5	A2	1	-	2	1	1	1	1	-	1	1	2	3	1	1	-	2	2	**1**	64%
5	5A	3	5	A3	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
5	5A	4	5	A4	3	-	2	2	3	3	2	3	3	2	2	3	2	3	-	3	2	**3**	53%
5	5A	5	5	A5	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
5	5A	6	5	A6	2	-	2	2	2	2	2	2	2	2	2	2	2	2	-	2	2	**2**	100%
5	5A	7	5	A7	3	-	3	4	3	3	4	3	3	3	3	3	3	3	-	3	3	**3**	87%
5	5A	8	5	A8	5	-	5	5	5	5	5	4	5	5	4	5	4	5	-	5	5	**5**	80%
5	5A	9	5	A9	1	-	1	1	1	1	1	2	1	-	1	1	1	1	-	1	1	**1**	93%
5	5A	10	5	A10	5	-	5	5	5	5	4	5	5	5	5	4	4	5	-	5	5	**5**	80%
5	5A	11	5	B1	2	-	2	1	2	1	1	2	2	2	1	2	2	1	-	2	2	**2**	67%
5	5A	12	5	B2	1	-	1	1	1	1	1	-	1	1	1	1	2	1	-	1	1	**1**	93%
5	5A	13	5	B3	4	-	4	4	4	4	4	4	3	4	3	4	3	4	-	3	4	**4**	73%
5	5A	14	5	B4	5	-	5	5	5	4	5	4	5	4	4	4	4	3	-	3	5	**5**	47%
5	5A	15	5	B5	1	-	1	1	1	1	1	-	1	-	1	1	1	2	-	1	1	**1**	92%
5	5A	16	5	B6	1	-	1	1	1	1	1	1	2	1	1	1	2	1	-	1	2	**1**	80%
5	5A	17	5	B7	4	-	5	4	4	4	4	4	5	4	4	4	4	3	-	5	4	**4**	73%
5	5A	18	5	B8	1	-	1	1	1	1	1	-	1	1	1	1	1	1	-	1	2	**1**	93%
5	5A	19	5	B9	3	-	3	4	4	3	3	3	4	4	4	3	3	4	-	3	4	**3**	53%
5	5A	20	5	B10	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
5	5A	21	5	C1	4	-	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	93%
5	5A	22	5	C2	1	-	1	1	1	1	2	1	1	1	1	1	1	1	-	1	2	**1**	87%
5	5A	23	5	C3	5	-	5	5	5	4	5	5	5	5	5	5	4	5	-	5	5	**5**	87%
5	5A	24	5	C4	4	-	4	4	4	4	4	4	4	4	4	4	4	4	-	3	4	**4**	93%
5	5A	25	5	C5	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	**1**	100%
6	6A	1	6	A1	2	-	2	2	2	2	2	2	2	2	2	3	3	3	4	3	2	**2**	69%
6	6A	2	6	A2	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	3	6	A3	4	-	4	4	1	4	4	4	4	4	4	4	4	4	5	4	5	**4**	81%
6	6A	4	6	A4	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	5	6	A5	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	6	6	A6	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	**1**	94%
6	6A	7	6	A7	5	-	5	4	5	4	5	4	5	5	4	4	4	5	5	4	5	**5**	56%
6	6A	8	6	A8	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	9	6	A9	4	-	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	**4**	94%
6	6A	10	6	A10	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
6	6A	11	6	B1	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	**2**	88%

6	6A	12	6	B2	1	-	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	**1**	88%
6	6A	13	6	B3	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	14	6	B4	5	-	5	5	5	4	5	4	5	5	4	4	4	5	5	4	5	**5**	63%
6	6A	15	6	B5	4	-	5	4	4	4	3	4	5	5	4	4	4	3	5	4	4	**4**	63%
6	6A	16	6	B6	1	-	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	**1**	94%
6	6A	17	6	B7	4	-	4	4	4	4	4	4	4	4	4	4	4	4	5	4	5	**4**	88%
6	6A	18	6	B8	5	-	5	5	5	5	5	4	5	5	4	4	4	5	5	4	4	**5**	63%
6	6A	19	6	B9	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	20	6	B10	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
6	6A	21	6	C1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	22	6	C2	3	-	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	**3**	94%
6	6A	23	6	C3	4	-	4	4	4	3	4	4	4	4	4	3	3	4	4	4	4	**4**	81%
6	6A	24	6	C4	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
6	6A	25	6	C5	5	-	5	5	5	5	5	4	5	5	4	4	4	5	5	5	5	**5**	75%
7	7A	1	7	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
7	7A	2	7	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
7	7A	3	7	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	4	7	A4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	5	7	A5	3	3	3	3	4	3	3	3	3	3	2	3	2	3	4	3	2	**3**	71%
7	7A	6	7	A6	2	2	2	3	3	3	3	2	2	2	2	2	2	3	3	2	2	**2**	65%
7	7A	7	7	A7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	8	7	A8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	9	7	A9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	**1**	94%
7	7A	10	7	A10	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	**2**	88%
7	7A	11	7	B1	4	4	4	4	4	4	4	3	4	4	4	4	3	4	4	3	4	**4**	82%
7	7A	12	7	B2	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	**4**	88%
7	7A	13	7	B3	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	**4**	94%
7	7A	14	7	B4	3	3	2	3	3	2	3	2	2	3	2	2	2	3	3	2	2	**2**	53%
7	7A	15	7	B5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	16	7	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	17	7	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	**3**	94%
7	7A	18	7	B8	1	1	2	2	1	1	2	2	2	1	1	1	1	2	2	1	2	**1**	53%
7	7A	19	7	B9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
7	7A	20	7	B10	1	1	-	1	-	1	1	-	1	1	1	-	1	1	1	1	2	**1**	92%
7	7A	21	7	C1	2	2	2	2	3	3	3	3	3	3	2	2	3	3	3	3	2	**3**	59%
7	7A	22	7	C2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	**1**	82%
7	7A	23	7	C3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3	3	**3**	94%
7	7A	24	7	C4	2	2	2	2	1	1	2	2	2	2	2	2	3	2	2	2	2	**2**	82%
7	7A	25	7	C5	3	3	3	3	4	3	4	3	4	3	3	4	2	3	4	3	4	**3**	59%
8	8A	1	8	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	2	8	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	**2**	94%
8	8A	3	8	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	**1**	88%
8	8A	4	8	A4	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	**1**	82%
8	8A	5	8	A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	**1**	94%
8	8A	6	8	A6	2	2	2	2	2	2	3	2	2	2	2	3	2	3	3	2	2	**2**	76%
8	8A	7	8	A7	2	1	2	2	1	2	2	2	2	2	2	1	2	2	3	2	2	**2**	76%
8	8A	8	8	A8	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	9	8	A9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	10	8	A10	2	2	2	3	2	2	3	2	3	2	2	3	2	2	3	2	2	**2**	71%
8	8A	11	8	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	12	8	B2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	3	**2**	88%
8	8A	13	8	B3	2	2	2	3	2	3	3	2	3	2	2	3	2	3	4	3	2	**2**	53%
8	8A	14	8	B4	2	2	3	3	2	3	3	2	3	2	2	2	2	3	3	3	3	**3**	53%
8	8A	15	8	B5	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	16	8	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
8	8A	17	8	B7	2	2	3	2	2	2	2	2	3	2	2	2	2	2	3	2	2	**2**	82%
8	8A	18	8	B8	2	2	1	2	1	1	2	2	2	3	1	1	1	-	3	3	2	**2**	44%
8	8A	19	8	B9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
8	8A	20	8	B10	2	2	2	3	2	2	3	2	3	2	2	2	2	3	3	3	2	**2**	65%
8	8A	21	8	C1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8	8A	22	8	C2	3	3	3	3	2	3	3	2	3	3	3	3	2	3	3	3	3	**3**	82%
8	8A	23	8	C3	2	2	3	3	2	3	2	2	3	2	2	2	2	3	3	3	2	**2**	59%
8	8A	24	8	C4	2	2	2	1	1	2	2	2	1	2	1	1	2	2	2	2	2	**2**	71%
8	8A	25	8	C5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
				Total staged	199	147	198	199	198	198	199	191	197	196	199	195	199	198	123	197	199		**87.4%**
				Total NOT staged	0	52	1	0	1	1	0	8	2	3	0	4	0	1	76	2	0		

Table 15b TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL	Spain CF	Spain MS	Eng MS	Port SF	Spain AL	Neth IdB	Scot IG	Port AF	Germ NH	Spain IM	Eng ChBu	Irel DL	Irel SH	Nor JdL	Eng BR	Germ KM	Eng CaBy	**2STDEV**
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	**ALL**
1	0.231	0.471	0.327	0.231	0.327	0.232	0.395	0.477	0.789	0.236	0.324	0.468	0.452	0.638	0.848	0.600	0.654	**0.482**
2	0.553	0.788	0.667	1.068	1.093	0.998	1.016	0.471	1.016	0.458	0.658	1.048	0.667	1.085	1.270	0.959	0.329	**0.917**
3	0.431	0.583	0.759	0.697	0.759	0.309	0.740	0.740	0.914	0.625	0.936	0.625	0.941	0.309	0.620	0.697	1.287	**0.763**
4	0.354	0.632	0.672	0.354	1.061	0.738	0.780	0.619	0.805	0.592	0.508	1.102	0.840	0.718	0.838	1.192	1.076	**0.822**
5	0.000	0.000	0.000	0.555	0.000	1.013	0.555	1.013	0.000	0.555	1.013	1.013	0.555	1.109	0.000	1.320	0.555	**0.923**

MEAN STAGE

MODAL	Spain CF	Spain MS	Eng MS	Port SF	Spain AL	Neth IdB	Scot IG	Port AF	Germ NH	Spain IM	Eng ChBu	Irel DL	Irel SH	Nor JdL	Eng BR	Germ KM	Eng CaBy	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	**ALL**
1	1.01	1.06	1.03	1.01	1.03	1.01	1.04	1.06	1.08	1.01	1.03	1.03	1.05	1.08	1.16	1.07	1.12	**1.05**
2	2.08	2.03	2.00	2.22	1.92	2.03	2.27	2.00	2.27	2.05	1.95	2.05	2.00	2.36	2.70	2.22	2.03	**2.11**
3	2.95	2.97	3.05	3.02	3.05	2.98	3.10	2.90	3.29	3.00	3.02	3.00	2.79	3.02	3.10	2.98	2.98	**3.01**
4	3.97	4.00	4.13	4.03	3.91	3.84	4.09	3.97	4.10	4.09	4.00	3.80	3.78	4.00	4.21	3.70	4.03	**3.97**
5	5.00	5.00	5.00	4.92	5.00	4.62	4.92	4.38	5.00	4.92	4.38	4.38	4.08	4.85	5.00	4.46	4.92	**4.74**

MEAN STAGE +2STDEV

MODAL	Spain CF	Spain MS	Eng MS	Port SF	Spain AL	Neth IdB	Scot IG	Port AF	Germ NH	Spain IM	Eng ChBu	Irel DL	Irel SH	Nor JdL	Eng BR	Germ KM	Eng CaBy	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	**ALL**
1	1.244	1.529	1.354	1.244	1.354	1.246	1.435	1.537	1.869	1.250	1.351	1.496	1.506	1.718	2.004	1.667	1.774	**1.53**
2	2.635	2.818	2.667	3.284	3.012	3.026	3.287	2.471	3.287	2.513	2.604	3.102	2.667	3.446	3.966	3.175	2.356	**3.03**
3	3.383	3.555	3.807	3.721	3.807	3.285	3.836	3.645	4.200	3.625	3.960	3.625	3.726	3.332	3.723	3.673	4.263	**3.77**
4	4.322	4.632	4.797	4.385	4.967	4.582	4.874	4.588	4.905	4.686	4.508	4.902	4.621	4.718	5.048	4.892	5.107	**4.80**
5	5.000	5.000	5.000	5.478	5.000	5.628	5.478	5.397	5.000	5.478	5.397	5.397	4.632	5.956	5.000	5.782	5.478	**5.66**

MEAN STAGE -2STDEV

MODAL	Spain CF	Spain MS	Eng MS	Port SF	Spain AL	Neth IdB	Scot IG	Port AF	Germ NH	Spain IM	Eng ChBu	Irel DL	Irel SH	Nor JdL	Eng BR	Germ KM	Eng CaBy	
stage	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	**ALL**
1	0.782	0.587	0.700	0.782	0.700	0.781	0.645	0.582	0.291	0.778	0.702	0.559	0.601	0.442	0.308	0.466	0.466	**0.566**
2	1.528	1.242	1.333	1.148	0.826	1.029	1.254	1.529	1.254	1.596	1.288	1.006	1.333	1.276	1.426	1.258	1.698	**1.198**
3	2.521	2.389	2.289	2.327	2.289	2.668	2.355	2.164	2.371	2.375	2.088	2.375	1.845	2.715	2.484	2.279	1.689	**2.247**
4	3.615	3.368	3.453	3.678	2.846	3.106	3.313	3.350	3.295	3.501	3.492	2.698	2.941	3.282	3.373	2.508	2.955	**3.153**
5	5.000	5.000	5.000	4.368	5.000	3.603	4.368	3.372	5.000	4.368	3.372	3.372	3.522	3.737	5.000	3.141	4.368	**3.816**

MACKEREL second stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Table 15c Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL stage	SAMPLING STRATA												Nr of eggs
	1	2	3	4	5	6	7	8	x	x	x	x	
1	14	10	8	-	12	11	11	9	-	-	-	-	**75**
2	2	8	4	1	2	2	5	13	-	-	-	-	**37**
3	7	6	3	12	3	3	6	2	-	-	-	-	**42**
4	1	-	9	10	4	5	3	-	-	-	-	-	**32**
5	1	1	1	2	4	4	-	-	-	-	-	-	**13**
TOTAL	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**24**	**0**	**0**	**0**	**0**	**199**

PERCENTAGE AGREEMENT

MODAL stage	SAMPLING STRATA												Agree-ment
	1	2	3	4	5	6	7	8	x	x	x	x	
1	98%	95%	98%	-	91%	98%	93%	96%	-	-	-	-	**95.6%**
2	65%	80%	88%	100%	83%	78%	78%	75%	-	-	-	-	**78.7%**
3	92%	78%	94%	94%	64%	94%	79%	68%	-	-	-	-	**85.9%**
4	100%	-	88%	85%	83%	81%	88%	-	-	-	-	-	**85.8%**
5	94%	69%	81%	88%	73%	64%	-	-	-	-	-	-	**74.9%**
Mean CV	**93.6%**	**85.2%**	**91.2%**	**90.1%**	**83.3%**	**87.0%**	**86.1%**	**82.5%**	**-**	**-**	**-**	**-**	**87.5%**

Weighted

BIAS

MODAL stage	SAMPLING STRATA												Mean bias
	1	2	3	4	5	6	7	8	x	x	x	x	
1	0.03	0.05	0.02	-	0.10	0.03	0.07	0.05	-	-	-	-	**0.05**
2	0.35	0.10	0.06	0.00	-0.17	0.25	0.13	0.12	-	-	-	-	**0.11**
3	0.08	0.03	-0.06	0.06	0.04	-0.02	-0.06	-0.32	-	-	-	-	**0.01**
4	0.00	-	-0.04	0.02	-0.07	-0.01	-0.12	-	-	-	-	-	**-0.03**
5	-0.06	-0.31	-0.19	-0.12	-0.30	-0.36	-	-	-	-	-	-	**-0.26**
Mean	**0.06**	**0.05**	**-0.01**	**0.03**	**-0.02**	**-0.03**	**0.03**	**0.06**	**-**	**-**	**-**	**-**	**0.02**

Weighted

MACKEREL second stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 6 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.

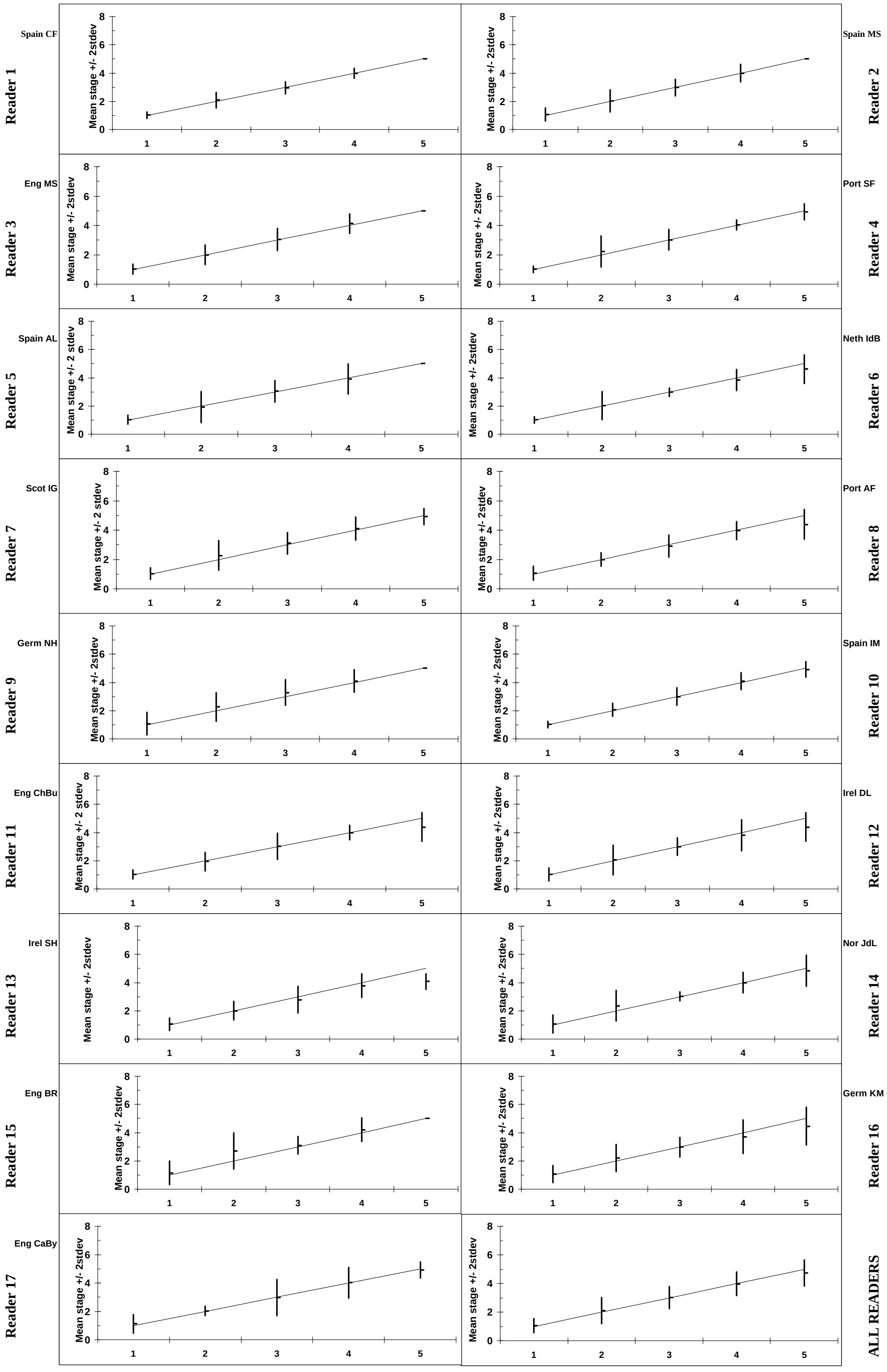

Table 16 HORSE MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1ab-5

RANGE r. 1-17

	Sample			Well	Port SF	Spain CF	Scot IG	Spain MS	Eng MS	Neth IdB	Spain AL	Irel DL	Spain IM	Port AF	Germ KM	Irel SH	Germ NH	Eng ChBu	Eng CaBy	Nor JdL	Eng BR	MODAL	Percent
Stratum	no	no	Tray	no	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	stage	agreement
9	9A	1	9	A1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
9	9A	2	9	A2	2	2	2	-	2	0	2	2	2	1	2	0	2	0	2	2	2	**2**	75%
9	9A	3	9	A3	3	3	3	-	4	3	3	3	4	3	3	3	4	3	4	4	4	**3**	63%
9	9A	4	9	A4	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	94%
9	9A	5	9	A5	0	1	0	-	0	1	1	0	1	1	0	2	1	0	1	2	1	**1**	50%
9	9A	6	9	A6	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
9	9A	7	9	A7	2	2	3	-	2	2	2	2	3	2	3	2	3	3	3	3	3	**2**	50%
9	9A	8	9	A8	3	3	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
9	9A	9	9	A9	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
9	9A	10	9	A10	0	0	0	-	0	0	0	0	2	1	0	0	2	0	1	2	0	**0**	69%
9	9A	11	9	B1	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
9	9A	12	9	B2	0	0	0	-	0	0	0	0	1	1	0	1	0	1	1	1	1	**0**	56%
9	9A	13	9	B3	3	2	2	-	2	2	2	2	2	2	3	2	3	2	2	3	3	**2**	69%
9	9A	14	9	B4	3	3	3	-	3	3	3	3	3	3	3	2	3	3	3	3	3	**3**	94%
9	9A	15	9	B5	2	0	2	-	2	2	0	0	2	0	2	0	2	2	2	2	3	**2**	63%
9	9A	16	9	B6	3	2	2	-	3	2	2	2	3	2	3	2	3	2	3	3	3	**3**	50%
9	9A	17	9	B7	3	3	3	-	3	4	3	3	4	3	3	3	4	3	4	3	4	**3**	69%
9	9A	18	9	B8	3	3	3	-	2	3	3	2	2	3	3	2	3	2	3	3	3	**3**	69%
9	9A	19	9	B9	4	4	3	-	4	3	4	3	4	3	3	4	4	4	4	4	4	**4**	69%
9	9A	20	9	B10	4	3	4	-	3	4	4	3	4	4	3	3	4	3	4	3	4	**4**	56%
9	9A	21	9	C1	4	4	4	-	3	4	4	4	4	3	3	3	4	4	4	3	4	**4**	69%
9	9A	22	9	C2	3	3	3	-	2	2	3	2	3	2	3	2	3	2	2	3	3	**3**	56%
9	9A	23	9	C3	0	0	0	-	2	0	0	0	2	-	2	0	0	1	2	2	0	**0**	60%
9	9A	24	9	C4	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
9	9A	25	9	C5	2	2	2	-	2	0	2	0	2	0	2	0	1	1	2	2	2	**2**	63%
10	10A	1	10	A1	0	0	0	-	0	0	-	0	1	2	0	0	0	1	2	1	0	**0**	67%
10	10A	2	10	A2	2	0	2	-	0	0	-	0	2	2	0	0	2	1	2	1	2	**2**	47%
10	10A	3	10	A3	3	3	4	-	3	3	-	3	4	4	3	3	4	3	4	4	4	**3**	53%
10	10A	4	10	A4	0	0	0	-	0	0	-	0	0	0	1	0	0	0	0	1	1	**0**	80%
10	10A	5	10	A5	2	2	2	-	2	2	-	2	2	2	1	2	2	2	2	2	2	**2**	93%
10	10A	6	10	A6	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	**0**	100%
10	10A	7	10	A7	0	0	0	-	0	1	-	0	1	1	1	0	0	1	1	1	1	**1**	53%
10	10A	8	10	A8	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	2	2	**2**	100%
10	10A	9	10	A9	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	**0**	100%
10	10A	10	10	A10	3	3	3	-	3	3	-	4	3	3	2	3	3	3	3	3	3	**3**	87%
10	10A	11	10	B1	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	2	2	**2**	100%
10	10A	12	10	B2	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	**0**	100%
10	10A	13	10	B3	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	**0**	100%
10	10A	14	10	B4	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	1	**0**	93%
10	10A	15	10	B5	0	0	0	-	0	0	-	0	1	2	0	0	0	0	2	1	0	**0**	73%
10	10A	16	10	B6	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	1	0	**0**	93%
10	10A	17	10	B7	0	0	0	-	0	0	-	0	1	1	1	0	0	1	1	1	1	**0**	53%
10	10A	18	10	B8	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	3	0	**2**	87%
10	10A	19	10	B9	0	0	0	-	0	0	-	0	1	0	0	0	0	1	2	0	0	**0**	80%
10	10A	20	10	B10	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	**0**	100%
10	10A	21	10	C1	3	3	3	-	3	3	-	3	3	3	3	3	4	4	4	4	4	**3**	67%
10	10A	22	10	C2	0	0	0	-	0	0	-	0	0	0	1	0	0	0	0	0	0	**0**	93%
10	10A	23	10	C3	0	0	0	-	0	0	-	0	1	0	1	0	0	1	1	1	0	**0**	67%
10	10A	24	10	C4	2	0	2	-	2	0	-	2	2	3	1	0	0	2	2	3	3	**2**	47%
10	10A	25	10	C5	2	2	2	-	2	0	-	2	3	3	2	2	2	2	2	3	4	**2**	67%
11	11A	1	11	A1	2	3	2	3	2	2	2	2	2	2	2	2	3	2	2	2	3	**2**	76%
11	11A	2	11	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
11	11A	3	11	A3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	4	4	4	**3**	76%
11	11A	4	11	A4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	5	11	A5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	6	11	A6	3	3	3	3	3	2	3	2	3	2	3	2	3	3	3	3	4	**3**	71%
11	11A	7	11	A7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	8	11	A8	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	**4**	94%
11	11A	9	11	A9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	94%
11	11A	10	11	A10	3	3	3	3	2	2	3	2	3	2	3	2	3	3	3	3	3	**3**	71%
11	11A	11	11	B1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
11	11A	12	11	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
11	11A	13	11	B3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	14	11	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	15	11	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	16	11	B6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	94%
11	11A	17	11	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	**3**	94%
11	11A	18	11	B8	2	2	2	2	2	2	2	2	2	0	2	1	2	2	0	2	2	**2**	82%
11	11A	19	11	B9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	20	11	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	21	11	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	22	11	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	23	11	C3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	82%
11	11A	24	11	C4	3	3	4	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	82%
11	11A	25	11	C5	3	3	3	3	3	3	3	3	3	2	3	3	3	4	4	4	4	**3**	71%
12	12A	1	12	A1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	-	**0**	69%
12	12A	2	12	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
12	12A	3	12	A3	4	4	4	4	4	4	4	3	4	4	3	3	4	4	4	4	-	**4**	81%
12	12A	4	12	A4	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
12	12A	5	12	A5	3	3	4	3	3	3	3	4	3	3	4	3	4	4	4	4	-	**3**	56%
12	12A	6	12	A6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	94%
12	12A	7	12	A7	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	-	**0**	75%
12	12A	8	12	A8	2	2	2	3	2	2	2	2	2	2	2	2	3	2	2	2	-	**2**	88%
12	12A	9	12	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
12	12A	10	12	A10	1	0	0	1	0	0	1	0	1	0	0	0	1	1	1	1	-	**1**	50%
12	12A	11	12	B1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	**0**	94%
12	12A	12	12	B2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	**0**	94%
12	12A	13	12	B3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
12	12A	14	12	B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	**0**	94%
12	12A	15	12	B5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	-	**0**	88%
12	12A	16	12	B6	0	0	0	0	2	0	2	0	2	2	0	0	2	0	2	2	-	**0**	56%
12	12A	17	12	B7	0	0	2	0	2	0	2	0	3	2	1	0	0	2	2	2	-	**0**	44%
12	12A	18	12	B8	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	-	**0**	94%
12	12A	19	12	B9	2	0	0	0	2	0	0	-	0	2	0	0	2	2	2	2	-	**0**	53%
12	12A	20	12	B10	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	-	**0**	81%
12	12A	21	12	C1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	1	-	**0**	75%
12	12A	22	12	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
12	12A	23	12	C3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
12	12A	24	12	C4	0	0	0	0	2	0	0	0	2	0	0	1	0	0	2	0	-	**0**	75%
12	12A	25	12	C5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
13	13A	1	13	A1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	2	13	A2	1	1	0	1	0	1	1	1	1	1	1	0	0	1	1	1	0	**1**	71%
13	13A	3	13	A3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	4	13	A4	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	1	0	**0**	76%
13	13A	5	13	A5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	**0**	94%
13	13A	6	13	A6	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	**4**	94%
13	13A	7	13	A7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	8	13	A8	0	0	0	0	0	0	0	0	1	2	3	0	0	1	1	1	0	**0**	65%
13	13A	9	13	A9	3	3	3	3	3	3	3	4	3	2	3	2	4	4	3	3	3	**3**	71%
13	13A	10	13	A10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	11	13	B1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
13	13A	12	13	B2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	13	13	B3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	3	3	**3**	88%
13	13A	14	13	B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	15	13	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
13	13A	16	13	B6	0	1	0	1	0	0	1	1	1	0	0	0	0	1	1	1	0	**0**	53%
13	13A	17	13	B7	0	0	0	0	0	0	0	-	-	-	-	0	-	0	0	0	-	**0**	100%
13	13A	18	13	B8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	19	13	B9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	**0**	94%
13	13A	20	13	B10	0	2	0	2	2	0	0	2	-	0	0	1		2	2	2	-	**0**	50%
13	13A	21	13	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
13	13A	22	13	C2	0	0	1	0	1	1	1	1	1	1	1	0	0	2	1	1	1	**1**	65%
13	13A	23	13	C3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	100%
13	13A	24	13	C4	1	2	2	2	2	0	0	0	2	2	0	1	0	1	2	2	1	**2**	47%
13	13A	25	13	C5	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	1	0	**0**	94%
14	14A	1	14	A1	0	2	1	2	0	0	2	2	2	0	2	0	0	1	2	1	-	**2**	44%
14	14A	2	14	A2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	3	14	A3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	4	14	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	-	**3**	94%
14	14A	5	14	A5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	6	14	A6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	7	14	A7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	8	14	A8	3	3	3	3	3	3	4	3	3	3	3	2	3	3	2	3	-	**3**	81%
14	14A	9	14	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	10	14	A10	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	-	**2**	94%
14	14A	11	14	B1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%

14	14A	12	14	B2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	13	14	B3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
14	14A	14	14	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
14	14A	15	14	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	16	14	B6	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	3	-	**2**	81%
14	14A	17	14	B7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	18	14	B8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	19	14	B9	3	3	3	2	3	3	4	3	3	3	3	3	3	3	3	3	-	**3**	88%
14	14A	20	14	B10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	-	**0**	81%
14	14A	21	14	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
14	14A	22	14	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	23	14	C3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	-	**2**	94%
14	14A	24	14	C4	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0	-	**0**	56%
14	14A	25	14	C5	2	2	2	2	2	2	2	2	2	2	3	2	1	1	2	2	-	**2**	81%
15	15A	1	15	A1	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	-	**3**	94%
15	15A	2	15	A2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	3	15	A3	3	3	4	3	3	3	4	3	3	3	3	4	4	3	4	3	-	**3**	69%
15	15A	4	15	A4	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	-	**2**	94%
15	15A	5	15	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
15	15A	6	15	A6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	7	15	A7	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	3	-	**2**	88%
15	15A	8	15	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	9	15	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	10	15	A10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	11	15	B1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	12	15	B2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	13	15	B3	4	3	4	4	4	4	4	3	4	4	3	4	4	3	4	3	-	**4**	69%
15	15A	14	15	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
15	15A	15	15	B5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	16	15	B6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	**0**	100%
15	15A	17	15	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	18	15	B8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	19	15	B9	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	-	**3**	94%
15	15A	20	15	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	21	15	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	22	15	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	23	15	C3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	24	15	C4	4	3	3	3	3	3	4	3	4	4	3	3	4	3	4	3	-	**3**	63%
15	15A	25	15	C5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
16	16A	1	16	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	2	16	A2	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	**3**	94%
16	16A	3	16	A3	3	2	2	2	2	3	3	3	2	2	3	2	2	2	2	3	-	**2**	63%
16	16A	4	16	A4	2	2	2	2	2	2	2	2	2	2	0	2	1	2	2	2	-	**2**	88%
16	16A	5	16	A5	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	-	**2**	94%
16	16A	6	16	A6	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	-	**4**	94%
16	16A	7	16	A7	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	-	**3**	94%
16	16A	8	16	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
16	16A	9	16	A9	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
16	16A	10	16	A10	4	4	4	3	4	3	4	4	4	4	3	3	3	4	4	3	-	**4**	63%
16	16A	11	16	B1	1	0	0	1	0	0	1	0	1	1	1	0	0	2	1	1	-	**1**	50%
16	16A	12	16	B2	3	3	4	3	3	4	4	3	3	3	3	3	4	4	4	4	-	**3**	56%
16	16A	13	16	B3	0	0	1	1	1	0	1	0	1	1	2	0	-	1	1	1	-	**1**	60%
16	16A	14	16	B4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	-	**0**	94%
16	16A	15	16	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	16	16	B6	0	0	0	0	0	0	1	0	1	0	2	0	0	1	1	1	-	**0**	63%
16	16A	17	16	B7	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
16	16A	18	16	B8	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	-	**0**	88%
16	16A	19	16	B9	3	3	3	3	3	3	4	3	3	4	3	3	4	3	4	4	-	**3**	69%
16	16A	20	16	B10	0	0	0	1	0	0	0	0	1	1	2	0	0	1	1	1	-	**0**	56%
16	16A	21	16	C1	0	1	0	0	1	1	1	1	1	1	1	0	0	1	1	1	-	**1**	69%
16	16A	22	16	C2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	-	**0**	94%
16	16A	23	16	C3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	24	16	C4	2	2	2	0	2	0	2	2	2	2	2	2	-	2	2	2	-	**2**	87%
16	16A	25	16	C5	4	4	4	3	4	4	4	4	4	4	3	4	4	4	4	4	-	**4**	88%
				Total staged	200	200	200	150	200	200	175	198	197	198	199	200	197	200	200	200	97		**84.7%**
				Total NOT staged	0	0	0	50	0	0	25	2	3	2	1	0	3	0	0	0	103		

Table 17 The number of egg stageings by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

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A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	TOTAL
Stage 1a ==>	**0**	76	76	76	56	76	76	62	74	73	74	75	76	75	76	76	76	35	**1208**
Stage 1b ==>	**1**	8	8	8	6	8	8	7	8	8	8	8	8	7	8	8	8	4	**128**
	2	46	46	46	31	46	46	39	46	46	46	46	46	45	46	46	46	24	**737**
	3	60	60	60	50	60	60	57	60	60	60	60	60	60	60	60	60	29	**976**
	4	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	5	**162**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**200**	**200**	**200**	**150**	**200**	**200**	**175**	**198**	**197**	**198**	**199**	**200**	**196**	**200**	**200**	**200**	**97**	**3210**

B

EGG STAGE COMPOSITION

	Stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	TOTAL
Stage 1a ==>	**0**	81	82	81	55	76	89	58	79	50	68	69	85	80	59	53	48	29	**1142**
Stage 1b ==>	**1**	4	4	3	6	4	5	10	5	22	13	14	5	6	26	21	31	10	**189**
	2	43	44	46	30	53	39	37	48	52	53	42	49	35	48	57	43	15	**734**
	3	61	62	55	54	59	57	53	57	59	53	71	55	54	54	36	63	20	**923**
	4	11	8	15	5	8	10	17	9	14	11	3	6	22	13	33	15	23	**223**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**200**	**200**	**200**	**150**	**200**	**200**	**175**	**198**	**197**	**198**	**199**	**200**	**197**	**200**	**200**	**200**	**97**	**3211**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1a+1b	**1%**	**2%**	**0%**	**-2%**	**-5%**	**12%**	**-1%**	**2%**	**-11%**	**-1%**	**0%**	**7%**	**5%**	**1%**	**-12%**	**-6%**	**0%**	**0%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
Stage 1a ==>	**0**	99%	97%	99%	93%	91%	100%	90%	95%	68%	85%	85%	95%	96%	75%	68%	63%	77%	**87%**
Stage 1b ==>	**1**	38%	38%	25%	67%	38%	63%	100%	38%	100%	88%	63%	0%	29%	63%	100%	88%	75%	**59%**
	2	91%	91%	96%	87%	96%	76%	85%	89%	93%	85%	80%	83%	71%	85%	96%	78%	54%	**85%**
	3	98%	98%	88%	98%	93%	90%	86%	87%	92%	82%	97%	85%	78%	85%	58%	85%	41%	**86%**
	4	100%	80%	90%	71%	70%	80%	100%	60%	100%	80%	20%	50%	90%	80%	100%	60%	100%	**78%**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Weighted mean	**0-5**	**94.5%**	**93.0%**	**91.5%**	**91.3%**	**89.5%**	**89.0%**	**88.6%**	**86.9%**	**84.3%**	**83.8%**	**83.4%**	**83.0%**	**82.7%**	**80.0%**	**74.5%**	**74.0%**	**61.9%**	84.8%
	RANKING	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	

E

PERCENTAGE AGREEMENT STAGE 1A and 1B combined

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1a+1b	**98%**	**97%**	**97%**	**94%**	**92%**	**100%**	**94%**	**96%**	**86%**	**91%**	**93%**	**98%**	**94%**	**94%**	**84%**	**91%**	**93%**	94%
RANKING	**2**	**4**	**4**	**10**	**13**	**1**	**7**	**6**	**16**	**15**	**11**	**2**	**9**	**8**	**17**	**14**	**12**	

F

BIAS

	MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
Stage 1a ==>	**0**	0.03	0.04	0.03	0.11	0.17	0.00	0.15	0.08	0.45	0.23	0.21	0.07	0.08	0.29	0.46	0.45	0.29	**0.18**
Stage 1b ==>	**1**	-0.63	-0.63	-0.75	-0.33	-0.63	-0.38	0.00	-0.63	0.00	-0.13	-0.13	-0.75	-0.71	0.13	0.00	0.13	-0.25	**-0.34**
	2	-0.02	-0.11	0.00	0.03	-0.09	-0.41	0.00	-0.15	0.07	-0.15	-0.09	-0.30	-0.09	-0.13	-0.02	0.13	0.29	**-0.07**
	3	0.02	-0.02	0.08	-0.02	-0.03	-0.03	0.11	-0.03	0.05	-0.08	0.00	-0.12	0.22	0.02	0.35	0.15	0.59	**0.06**
	4	0.00	-0.20	-0.10	-0.29	-0.30	-0.20	0.00	-0.40	0.00	-0.20	-0.80	-0.60	-0.10	-0.20	0.00	-0.40	0.00	**-0.23**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

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Table 18 Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL	SAMPLING STRATA												Nr of
stage	9	10	11	12	13	14	15	16	x	x	x	x	eggs
0	6	14	1	18	17	9	6	5	-	-	-	-	76
1	1	1	-	1	2	-	-	3	-	-	-	-	8
2	8	7	7	2	2	7	4	9	-	-	-	-	46
3	7	3	16	3	3	9	14	5	-	-	-	-	60
4	3	-	1	1	1	-	1	3	-	-	-	-	10
5	-	-	-	-	-	-	-	-	-	-	-	-	0
TOTAL	25	25	25	25	25	25	25	25	0	0	0	0	200

PERCENTAGE AGREEMENT

MODAL	SAMPLING STRATA												Agree-
stage	9	10	11	12	13	14	15	16	x	x	x	x	ment
0	80%	86%	94%	83%	90%	93%	100%	79%	-	-	-	-	87.1%
1	50%	53%	-	50%	68%	-	-	60%	-	-	-	-	58.6%
2	77%	77%	92%	91%	74%	85%	95%	91%	-	-	-	-	85.3%
3	71%	69%	86%	83%	84%	96%	92%	83%	-	-	-	-	86.1%
4	65%	-	94%	81%	94%	-	69%	81%	-	-	-	-	77.8%
5	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean CV	73.5%	80.0%	88.7%	82.0%	86.1%	91.8%	93.8%	81.9%	-	-	-	-	84.8%

Weighted

BIAS

MODAL	SAMPLING STRATA												Mean
stage	9	10	11	12	13	14	15	16	x	x	x	x	bias
0	0.28	0.17	0.06	0.29	0.15	0.07	0.00	0.26	-	-	-	-	0.18
1	-0.25	-0.47	-	-0.50	-0.26	-	-	-0.32	-	-	-	-	-0.34
2	-0.09	-0.18	0.01	0.09	-0.41	-0.10	0.05	-0.04	-	-	-	-	-0.07
3	-0.09	0.27	0.06	0.17	0.08	-0.01	0.08	0.15	-	-	-	-	0.06
4	-0.35	-	-0.06	-0.19	-0.12	-	-0.31	-0.19	-	-	-	-	-0.23
5	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	-0.04	0.06	0.04	0.21	0.05	-0.01	0.04	0.01	-	-	-	-	0.04

Weighted

Table 19 TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

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2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	**2STDEV ALL**
0	0.459	0.510	0.459	0.825	1.102	0.000	0.948	0.722	1.492	1.173	1.153	0.596	0.789	1.074	1.477	1.281	1.145	**1.012**
1	1.035	1.035	0.926	1.033	1.035	1.035	0.000	1.035	0.000	0.707	1.282	1.414	0.976	1.282	0.000	0.707	1.000	**1.102**
2	0.788	1.052	0.422	0.964	0.825	1.717	1.124	1.190	0.499	1.263	1.253	1.390	1.403	0.905	0.665	0.905	1.613	**1.125**
3	0.258	0.258	0.668	0.283	0.516	0.634	0.725	0.733	0.573	0.847	0.368	0.745	0.831	0.780	1.094	0.720	1.002	**0.738**
4	0.000	0.843	0.632	0.976	0.966	0.843	0.000	1.033	0.000	0.843	0.843	1.398	0.632	0.843	0.000	1.033	0.000	**0.871**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	**ALL**
0	0.03	0.04	0.03	0.11	0.17	0.00	0.15	0.08	0.45	0.23	0.21	0.07	0.08	0.29	0.46	0.45	0.29	**0.18**
1	0.38	0.38	0.25	0.67	0.38	0.63	1.00	0.38	1.00	0.88	0.88	0.25	0.29	1.13	1.00	1.13	0.75	**0.66**
2	1.98	1.89	2.00	2.03	1.91	1.59	2.00	1.85	2.07	1.85	1.91	1.70	1.91	1.87	1.98	2.13	2.29	**1.93**
3	3.02	2.98	3.08	2.98	2.97	2.97	3.11	2.97	3.05	2.92	3.00	2.88	3.22	3.02	3.35	3.15	3.59	**3.06**
4	4.00	3.80	3.90	3.71	3.70	3.80	4.00	3.60	4.00	3.80	3.20	3.40	3.90	3.80	4.00	3.60	4.00	**3.77**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE +2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	**ALL**
0	0.485	0.550	0.485	0.932	1.273	0.000	1.093	0.803	1.944	1.402	1.366	0.662	0.869	1.364	1.937	1.729	1.431	**1.19**
1	1.410	1.410	1.176	1.699	1.410	1.660	1.000	1.410	1.000	1.582	2.157	1.664	1.262	2.407	1.000	1.832	1.750	**1.77**
2	2.766	2.944	2.422	2.996	2.738	3.304	3.124	3.038	2.564	3.110	3.166	3.086	3.314	2.775	2.643	3.036	3.905	**3.05**
3	3.275	3.242	3.751	3.263	3.483	3.601	3.831	3.700	3.623	3.764	3.368	3.628	4.048	3.797	4.444	3.870	4.589	**3.80**
4	4.000	4.643	4.532	4.690	4.666	4.643	4.000	4.633	4.000	4.643	4.043	4.798	4.532	4.643	4.000	4.633	4.000	**4.64**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE -2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	**ALL**
0	-0.433	-0.471	-0.433	-0.718	-0.931	0.000	-0.802	-0.641	-1.040	-0.943	-0.939	-0.531	-0.709	-0.785	-1.016	-0.834	-0.859	**-0.831**
1	-0.660	-0.660	-0.676	-0.366	-0.660	-0.410	1.000	-0.660	1.000	0.168	-0.407	-1.164	-0.690	-0.157	1.000	0.418	-0.250	**-0.438**
2	1.191	0.839	1.578	1.068	1.088	-0.130	0.876	0.658	1.566	0.585	0.660	0.306	0.508	0.964	1.313	1.225	0.679	**0.800**
3	2.758	2.725	2.415	2.697	2.450	2.332	2.380	2.233	2.477	2.070	2.632	2.138	2.386	2.236	2.256	2.430	2.584	**2.319**
4	4.000	2.957	3.268	2.738	2.734	2.957	4.000	2.567	4.000	2.957	2.357	2.002	3.268	2.957	4.000	2.567	4.000	**2.900**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

HORSE MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 7 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.

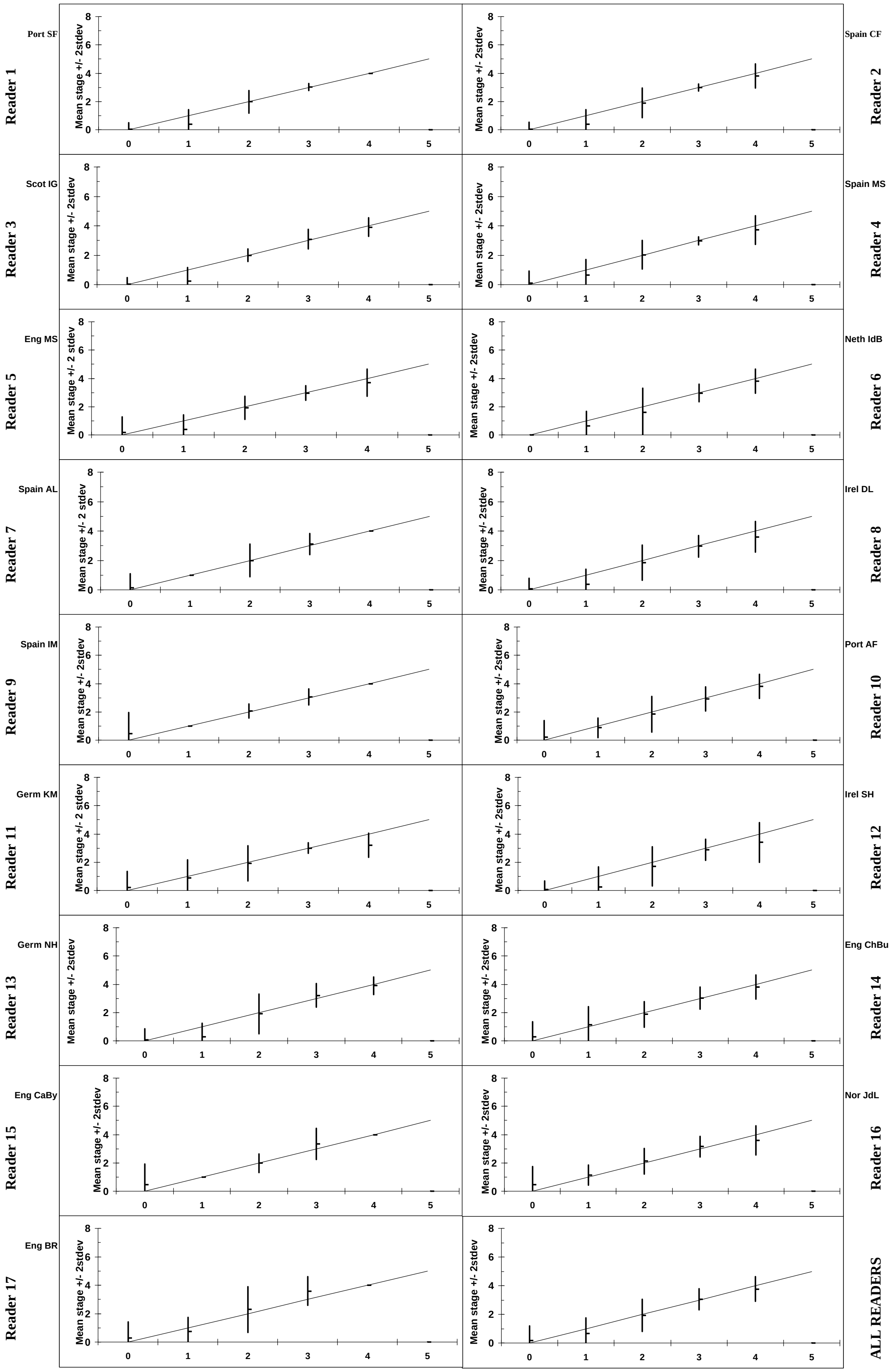

Table 20 The number of egg stageings by modal egg stage and the egg stage compositions by stage and reader are shown for all stage readers. The percentage agreement and the bias are presented also. A weighted mean percent agreement is given by stage reader and all stage readers combined. The percentage over- and underestimation of stage 1 eggs is given by stage reader and all stage readers combined.

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A

NUMBER OF EGG STAGE READINGS BY MODAL STAGE

	MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	TOTAL
	1	87	87	87	64	87	87	71	85	84	85	86	87	85	87	87	87	41	**1384**
	2	43	43	43	29	43	43	37	43	43	43	43	43	42	43	43	43	22	**689**
	3	60	60	60	50	60	60	57	60	60	60	60	60	60	60	60	60	29	**976**
	4	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	5	**162**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**200**	**200**	**200**	**150**	**200**	**200**	**175**	**198**	**197**	**198**	**199**	**200**	**196**	**200**	**200**	**200**	**97**	**3210**

B

EGG STAGE COMPOSITION

	Stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	TOTAL
	1	85	86	84	61	80	94	68	84	72	81	83	90	85	85	74	79	39	**1330**
	2	43	44	46	30	53	39	37	48	52	53	42	49	35	48	57	43	15	**734**
	3	61	62	55	54	59	57	53	57	59	53	71	55	54	54	36	63	20	**923**
	4	11	8	15	5	8	10	17	9	14	11	3	6	22	13	33	15	23	**223**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Total	**0-5**	**200**	**200**	**200**	**150**	**200**	**200**	**175**	**198**	**197**	**198**	**199**	**200**	**196**	**200**	**200**	**200**	**97**	**3210**

C

OVER- / UNDERESTIMATION OF STAGE 1 (=1A+1B)

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1a+1b	**-2%**	**-1%**	**-3%**	**-5%**	**-8%**	**8%**	**-4%**	**-1%**	**-14%**	**-5%**	**-3%**	**3%**	**0%**	**-2%**	**-15%**	**-9%**	**-5%**	**-4%**

D

PERCENTAGE AGREEMENT BY EGG STAGE

	MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
	1	98%	97%	97%	94%	92%	100%	94%	96%	86%	91%	93%	98%	94%	94%	84%	91%	93%	**94%**
	2	95%	93%	98%	86%	100%	81%	86%	93%	93%	86%	84%	88%	74%	91%	95%	81%	55%	**88%**
	3	98%	98%	88%	98%	93%	90%	86%	87%	92%	82%	97%	85%	78%	85%	58%	85%	41%	**86%**
	4	100%	80%	90%	71%	70%	80%	100%	60%	100%	80%	20%	50%	90%	80%	100%	60%	100%	**78%**
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Weighted mean	**0-5**	**97.5%**	**95.5%**	**94.0%**	**92.7%**	**93.0%**	**92.0%**	**90.3%**	**90.9%**	**89.8%**	**86.4%**	**88.4%**	**89.5%**	**85.2%**	**90.0%**	**79.5%**	**85.5%**	**69.1%**	**89.3%**
	RANKING	**1**	**2**	**3**	**5**	**4**	**6**	**8**	**7**	**10**	**13**	**12**	**11**	**15**	**9**	**16**	**14**	**17**	

E

PERCENTAGE AGREEMENT STAGE 1 (stage 1A and 1B combined)

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1a+1b	**98%**	**97%**	**97%**	**94%**	**92%**	**100%**	**94%**	**96%**	**86%**	**91%**	**93%**	**98%**	**94%**	**94%**	**84%**	**91%**	**93%**	94%
RANKING	**2**	**4**	**4**	**10**	**13**	**1**	**7**	**6**	**16**	**15**	**11**	**2**	**9**	**8**	**17**	**14**	**12**	

F

BIAS

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1	0.02	0.03	0.03	0.06	0.08	0.00	0.06	0.04	0.15	0.09	0.08	0.02	0.04	0.06	0.16	0.09	0.07	**0.06**
2	0.05	-0.02	0.02	0.07	0.00	-0.14	0.08	-0.02	0.07	-0.05	0.02	-0.12	0.02	-0.05	0.00	0.19	0.41	**0.02**
3	0.02	-0.02	0.08	-0.02	-0.03	-0.03	0.11	-0.03	0.05	-0.08	0.00	-0.12	0.22	0.02	0.35	0.15	0.59	**0.06**
4	0.00	-0.20	-0.10	-0.29	-0.30	-0.20	0.00	-0.40	0.00	-0.20	-0.80	-0.60	-0.10	-0.20	0.00	-0.40	0.00	**-0.23**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

Table 20a HORSE MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

EGG STAGES 1-5

RANGE r. 1-17

Stratum	Sample no	no	Tray	Well no	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	**MODAL stage**	**Percent agreement**
9	9A	1	9	A1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9A	2	9	A2	2	2	2	-	2	1	2	2	2	1	2	1	2	1	2	2	2	**2**	75%
9	9A	3	9	A3	3	3	3	-	4	3	3	3	4	3	3	3	4	3	4	4	4	**3**	63%
9	9A	4	9	A4	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9A	5	9	A5	1	1	1	-	1	1	1	1	1	1	1	2	1	1	1	2	1	**1**	88%
9	9A	6	9	A6	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
9	9A	7	9	A7	2	2	3	-	2	2	2	2	3	2	3	2	3	3	3	3	3	**2**	50%
9	9A	8	9	A8	3	3	3	-	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
9	9A	9	9	A9	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
9	9A	10	9	A10	1	1	1	-	1	1	1	1	2	1	1	1	2	1	1	2	1	**1**	81%
9	9A	11	9	B1	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
9	9A	12	9	B2	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9A	13	9	B3	3	2	2	-	2	2	2	2	2	2	3	2	3	2	2	3	3	**2**	69%
9	9A	14	9	B4	3	3	3	-	3	3	3	3	3	3	3	2	3	3	3	3	3	**3**	94%
9	9A	15	9	B5	2	1	2	-	2	2	1	1	2	1	2	1	2	2	2	2	3	**2**	63%
9	9A	16	9	B6	3	2	2	-	3	2	2	2	3	2	3	2	3	2	3	3	3	**3**	50%
9	9A	17	9	B7	3	3	3	-	3	4	3	3	4	3	3	3	4	3	4	3	4	**3**	69%
9	9A	18	9	B8	3	3	3	-	2	3	3	2	2	3	3	2	3	2	3	3	3	**3**	69%
9	9A	19	9	B9	4	4	3	-	4	3	4	3	4	3	3	4	4	4	4	4	4	**4**	69%
9	9A	20	9	B10	4	3	4	-	3	4	4	3	4	4	3	3	4	3	4	3	4	**4**	56%
9	9A	21	9	C1	4	4	4	-	3	4	4	4	4	3	3	3	4	4	4	3	4	**4**	69%
9	9A	22	9	C2	3	3	3	-	2	2	3	2	3	2	3	2	3	2	2	3	3	**3**	56%
9	9A	23	9	C3	1	1	1	-	2	1	1	1	2	-	2	1	1	1	2	2	1	**1**	67%
9	9A	24	9	C4	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
9	9A	25	9	C5	2	2	2	-	2	1	2	1	2	1	2	1	1	1	2	2	2	**2**	63%
10	10A	1	10	A1	1	1	1	-	1	1	-	1	1	2	1	1	1	1	2	1	1	**1**	87%
10	10A	2	10	A2	2	1	2	-	1	1	-	1	2	2	1	1	2	1	2	1	2	**1**	53%
10	10A	3	10	A3	3	3	4	-	3	3	-	3	4	4	3	3	4	3	4	4	4	**3**	53%
10	10A	4	10	A4	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	5	10	A5	2	2	2	-	2	2	-	2	2	2	1	2	2	2	2	2	2	**2**	93%
10	10A	6	10	A6	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	7	10	A7	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	8	10	A8	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	2	2	**2**	100%
10	10A	9	10	A9	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	10	10	A10	3	3	3	-	3	3	-	4	3	3	2	3	3	3	3	3	3	**3**	87%
10	10A	11	10	B1	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	2	2	**2**	100%
10	10A	12	10	B2	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	13	10	B3	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	14	10	B4	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	15	10	B5	1	1	1	-	1	1	-	1	1	2	1	1	1	1	2	1	1	**1**	87%
10	10A	16	10	B6	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	17	10	B7	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	18	10	B8	2	2	2	-	2	2	-	2	2	2	2	2	2	2	2	3	1	**2**	87%
10	10A	19	10	B9	1	1	1	-	1	1	-	1	1	1	1	1	1	1	2	1	1	**1**	93%
10	10A	20	10	B10	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	21	10	C1	3	3	3	-	3	3	-	3	3	3	3	3	4	4	4	4	4	**3**	67%
10	10A	22	10	C2	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	23	10	C3	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1	**1**	100%
10	10A	24	10	C4	2	1	2	-	2	1	-	2	2	3	1	1	1	2	2	3	3	**2**	47%
10	10A	25	10	C5	2	2	2	-	2	1	-	2	3	3	2	2	2	2	2	3	4	**2**	67%
11	11A	1	11	A1	2	3	2	3	2	2	2	2	2	2	2	2	3	2	2	2	3	**2**	76%
11	11A	2	11	A2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
11	11A	3	11	A3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	4	4	4	**3**	76%
11	11A	4	11	A4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	5	11	A5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	6	11	A6	3	3	3	3	3	2	3	2	3	2	3	2	3	3	3	3	4	**3**	71%
11	11A	7	11	A7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	8	11	A8	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	**4**	94%
11	11A	9	11	A9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
11	11A	10	11	A10	3	3	3	3	2	2	3	2	3	2	3	2	3	3	3	3	3	**3**	71%
11	11A	11	11	B1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	**2**	94%
11	11A	12	11	B2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**3**	100%
11	11A	13	11	B3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	14	11	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
11	11A	15	11	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	16	11	B6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	**3**	94%
11	11A	17	11	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	**3**	94%
11	11A	18	11	B8	2	2	2	2	2	2	2	2	2	1	2	1	2	2	1	2	2	**2**	82%
11	11A	19	11	B9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	20	11	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
11	11A	21	11	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	22	11	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	88%
11	11A	23	11	C3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	82%
11	11A	24	11	C4	3	3	4	3	3	3	3	3	3	3	3	3	3	3	4	3	4	**3**	82%
11	11A	25	11	C5	3	3	3	3	3	3	3	3	3	2	3	3	3	4	4	4	4	**3**	71%
12	12A	1	12	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	2	12	A2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
12	12A	3	12	A3	4	4	4	4	4	4	4	3	4	4	3	3	4	4	4	4	-	**4**	81%
12	12A	4	12	A4	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
12	12A	5	12	A5	3	3	4	3	3	3	3	4	3	3	4	3	4	4	4	4	-	**3**	56%
12	12A	6	12	A6	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	94%
12	12A	7	12	A7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	8	12	A8	2	2	2	3	2	2	2	2	2	2	2	2	3	2	2	2	-	**2**	88%
12	12A	9	12	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
12	12A	10	12	A10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	11	12	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	12	12	B2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	13	12	B3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	14	12	B4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	15	12	B5	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	-	**1**	94%
12	12A	16	12	B6	1	1	1	1	2	1	2	1	2	2	1	1	2	1	2	2	-	**1**	56%
12	12A	17	12	B7	1	1	2	1	2	1	2	1	3	2	1	1	1	2	2	2	-	**1**	50%
12	12A	18	12	B8	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	-	**1**	94%
12	12A	19	12	B9	2	1	1	1	2	1	1	-	1	2	1	1	2	2	2	2	-	**1**	53%
12	12A	20	12	B10	1	1	1	1	1	1	2	1	2	1	1	1	1	1	2	1	-	**1**	81%
12	12A	21	12	C1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	-	**1**	94%
12	12A	22	12	C2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	23	12	C3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
12	12A	24	12	C4	1	1	1	1	2	1	1	1	2	1	1	1	1	1	2	1	-	**1**	81%
12	12A	25	12	C5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
13	13A	1	13	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	2	13	A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	3	13	A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	4	13	A4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	**1**	94%
13	13A	5	13	A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	**1**	94%
13	13A	6	13	A6	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	**4**	94%
13	13A	7	13	A7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	8	13	A8	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1	1	**1**	88%
13	13A	9	13	A9	3	3	3	3	3	3	3	4	3	2	3	2	4	4	3	3	3	**3**	71%
13	13A	10	13	A10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	11	13	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
13	13A	12	13	B2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	13	13	B3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	3	3	**3**	88%
13	13A	14	13	B4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	15	13	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**	100%
13	13A	16	13	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	17	13	B7	1	1	1	1	1	1	1	-	-	-	-	1	-	1	1	1	-	**1**	100%
13	13A	18	13	B8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	19	13	B9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	**1**	94%
13	13A	20	13	B10	1	2	1	2	2	1	1	2	-	1	1	1		2	2	2	-	**1**	50%
13	13A	21	13	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	**3**	94%
13	13A	22	13	C2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	**1**	94%
13	13A	23	13	C3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**	100%
13	13A	24	13	C4	1	2	2	2	2	1	1	1	2	2	1	1	1	1	2	2	1	**1**	53%
13	13A	25	13	C5	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	**1**	100%
14	14A	1	14	A1	1	2	1	2	1	1	2	2	2	1	2	1	1	1	2	1	-	**1**	56%
14	14A	2	14	A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	3	14	A3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	4	14	A4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	-	**3**	94%
14	14A	5	14	A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	6	14	A6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	7	14	A7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	8	14	A8	3	3	3	3	3	3	4	3	3	3	3	2	3	3	2	3	-	**3**	81%
14	14A	9	14	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	10	14	A10	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	-	**2**	94%
14	14A	11	14	B1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%

14	14A	12	14	B2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	13	14	B3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
14	14A	14	14	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
14	14A	15	14	B5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	16	14	B6	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	3	-	**2**	81%
14	14A	17	14	B7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	18	14	B8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	19	14	B9	3	3	3	2	3	3	4	3	3	3	3	3	3	3	3	3	-	**3**	88%
14	14A	20	14	B10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	21	14	C1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	22	14	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
14	14A	23	14	C3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	-	**2**	94%
14	14A	24	14	C4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
14	14A	25	14	C5	2	2	2	2	2	2	2	2	2	2	3	2	1	1	2	2	-	**2**	81%
15	15A	1	15	A1	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	-	**3**	94%
15	15A	2	15	A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	3	15	A3	3	3	4	3	3	3	4	3	3	3	3	4	4	3	4	3	-	**3**	69%
15	15A	4	15	A4	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	-	**2**	94%
15	15A	5	15	A5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
15	15A	6	15	A6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	7	15	A7	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	3	-	**2**	88%
15	15A	8	15	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	9	15	A9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	10	15	A10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	11	15	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	12	15	B2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	13	15	B3	4	3	4	4	4	4	4	3	4	4	3	4	4	3	4	3	-	**4**	69%
15	15A	14	15	B4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
15	15A	15	15	B5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	16	15	B6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
15	15A	17	15	B7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	18	15	B8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	19	15	B9	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	-	**3**	94%
15	15A	20	15	B10	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
15	15A	21	15	C1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	22	15	C2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	23	15	C3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
15	15A	24	15	C4	4	3	3	3	3	3	4	3	4	4	3	3	4	3	4	3	-	**3**	63%
15	15A	25	15	C5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	-	**3**	94%
16	16A	1	16	A1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	2	16	A2	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-	**3**	94%
16	16A	3	16	A3	3	2	2	2	2	3	3	3	2	2	3	2	2	2	2	3	-	**2**	63%
16	16A	4	16	A4	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	-	**2**	88%
16	16A	5	16	A5	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	-	**2**	94%
16	16A	6	16	A6	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	-	**4**	94%
16	16A	7	16	A7	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	-	**3**	94%
16	16A	8	16	A8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	**3**	100%
16	16A	9	16	A9	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
16	16A	10	16	A10	4	4	4	3	4	3	4	4	4	4	3	3	3	4	4	3	-	**4**	63%
16	16A	11	16	B1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	-	**1**	94%
16	16A	12	16	B2	3	3	4	3	3	4	4	3	3	3	3	3	4	4	4	4	-	**3**	56%
16	16A	13	16	B3	1	1	1	1	1	1	1	1	1	1	2	1	-	1	1	1	-	**1**	93%
16	16A	14	16	B4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
16	16A	15	16	B5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	16	16	B6	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	-	**1**	94%
16	16A	17	16	B7	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	-	**2**	94%
16	16A	18	16	B8	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	-	**1**	94%
16	16A	19	16	B9	3	3	3	3	3	3	4	3	3	4	3	3	4	3	4	4	-	**3**	69%
16	16A	20	16	B10	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	-	**1**	94%
16	16A	21	16	C1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	**1**	100%
16	16A	22	16	C2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	-	**1**	94%
16	16A	23	16	C3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	**2**	100%
16	16A	24	16	C4	2	2	2	1	2	1	2	2	2	2	2	2	-	2	2	2	-	**2**	87%
16	16A	25	16	C5	4	4	4	3	4	4	4	4	4	4	3	4	4	4	4	4	-	**4**	88%
				Total staged	200	200	200	150	200	200	175	198	197	198	199	200	197	200	200	200	97		**89.3%**
				Total NOT staged	0	0	0	50	0	0	25	2	3	2	1	0	3	0	0	0	103		

Table 20b TABLES FOR PLOTTING THE EGG STAGE BIAS PLOT FIGURES OF FIGURE 1

HORSE MACKEREL second stageing. Egg Stageing Workshop, Lowestoft, 4-9 December 2000

2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	2STDEV ALL
1	0.301	0.367	0.367	0.488	0.547	0.000	0.464	0.371	0.791	0.587	0.630	0.301	0.483	0.468	0.739	0.581	0.527	**0.508**
2	0.426	0.532	0.305	0.743	0.000	0.826	0.727	0.532	0.516	0.750	0.815	0.649	1.035	0.610	0.436	0.787	1.332	**0.702**
3	0.258	0.258	0.668	0.283	0.516	0.634	0.725	0.733	0.573	0.847	0.368	0.745	0.831	0.780	1.094	0.720	1.002	**0.738**
4	0.000	0.843	0.632	0.976	0.966	0.843	0.000	1.033	0.000	0.843	0.843	1.398	0.632	0.843	0.000	1.033	0.000	**0.871**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1	1.02	1.03	1.03	1.06	1.08	1.00	1.06	1.04	1.15	1.09	1.08	1.02	1.04	1.06	1.16	1.09	1.07	**1.06**
2	2.05	1.98	2.02	2.07	2.00	1.86	2.08	1.98	2.07	1.95	2.02	1.88	2.02	1.95	2.00	2.19	2.41	**2.02**
3	3.02	2.98	3.08	2.98	2.97	2.97	3.11	2.97	3.05	2.92	3.00	2.88	3.22	3.02	3.35	3.15	3.59	**3.06**
4	4.00	3.80	3.90	3.71	3.70	3.80	4.00	3.60	4.00	3.80	3.20	3.40	3.90	3.80	4.00	3.60	4.00	**3.77**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE +2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1	1.324	1.402	1.402	1.550	1.628	1.000	1.521	1.407	1.946	1.682	1.711	1.324	1.518	1.526	1.900	1.673	1.600	**1.57**
2	2.473	2.509	2.328	2.812	2.000	2.686	2.808	2.509	2.585	2.704	2.838	2.532	3.059	2.563	2.436	2.974	3.741	**2.72**
3	3.275	3.242	3.751	3.263	3.483	3.601	3.831	3.700	3.623	3.764	3.368	3.628	4.048	3.797	4.444	3.870	4.589	**3.80**
4	4.000	4.643	4.532	4.690	4.666	4.643	4.000	4.633	4.000	4.643	4.043	4.798	4.532	4.643	4.000	4.633	4.000	**4.64**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

MEAN STAGE -2STDEV

MODAL stage	Port SF Reader 1	Spain CF Reader 2	Scot IG Reader 3	Spain MS Reader 4	Eng MS Reader 5	Neth IdB Reader 6	Spain AL Reader 7	Irel DL Reader 8	Spain IM Reader 9	Port AF Reader 10	Germ KM Reader 11	Irel SH Reader 12	Germ NH Reader 13	Eng ChBu Reader 14	Eng CaBy Reader 15	Nor JdL Reader 16	Eng BR Reader 17	ALL
1	0.722	0.667	0.667	0.575	0.533	1.000	0.592	0.664	0.364	0.507	0.452	0.722	0.553	0.589	0.422	0.511	0.546	**0.556**
2	1.620	1.444	1.718	1.326	2.000	1.035	1.354	1.444	1.554	1.203	1.208	1.235	0.989	1.343	1.564	1.399	1.077	**1.317**
3	2.758	2.725	2.415	2.697	2.450	2.332	2.380	2.233	2.477	2.070	2.632	2.138	2.386	2.236	2.256	2.430	2.584	**2.319**
4	4.000	2.957	3.268	2.738	2.734	2.957	4.000	2.567	4.000	2.957	2.357	2.002	3.268	2.957	4.000	2.567	4.000	**2.900**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

HORSE MACKEREL second stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Table 20c Eggs staged, percentage agreement and bias by stratum and modal egg stage.
The strata correspond to egg trays and its corresponding binoculars.

NUMBER OF EGGS STAGED

MODAL	SAMPLING STRATA												Nr of
stage	9	10	11	12	13	14	15	16	x	x	x	x	eggs
1	7	16	1	19	20	10	6	8	-	-	-	-	87
2	8	6	7	2	1	6	4	9	-	-	-	-	43
3	7	3	16	3	3	9	14	5	-	-	-	-	60
4	3	-	1	1	1	-	1	3	-	-	-	-	10
5	-	-	-	-	-	-	-	-	-	-	-	-	0
TOTAL	25	25	25	25	25	25	25	25	0	0	0	0	200

PERCENTAGE AGREEMENT

MODAL	SAMPLING STRATA												Agree-
stage	9	10	11	12	13	14	15	16	x	x	x	x	ment
1	91%	95%	100%	89%	93%	96%	100%	95%	-	-	-	-	93.6%
2	77%	82%	92%	91%	100%	92%	95%	91%	-	-	-	-	88.1%
3	71%	69%	86%	83%	84%	96%	92%	83%	-	-	-	-	86.1%
4	65%	-	94%	81%	94%	-	69%	81%	-	-	-	-	77.8%
5	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean CV	77.7%	88.8%	88.9%	88.5%	92.5%	94.8%	93.8%	89.5%	-	-	-	-	89.4%

Weighted

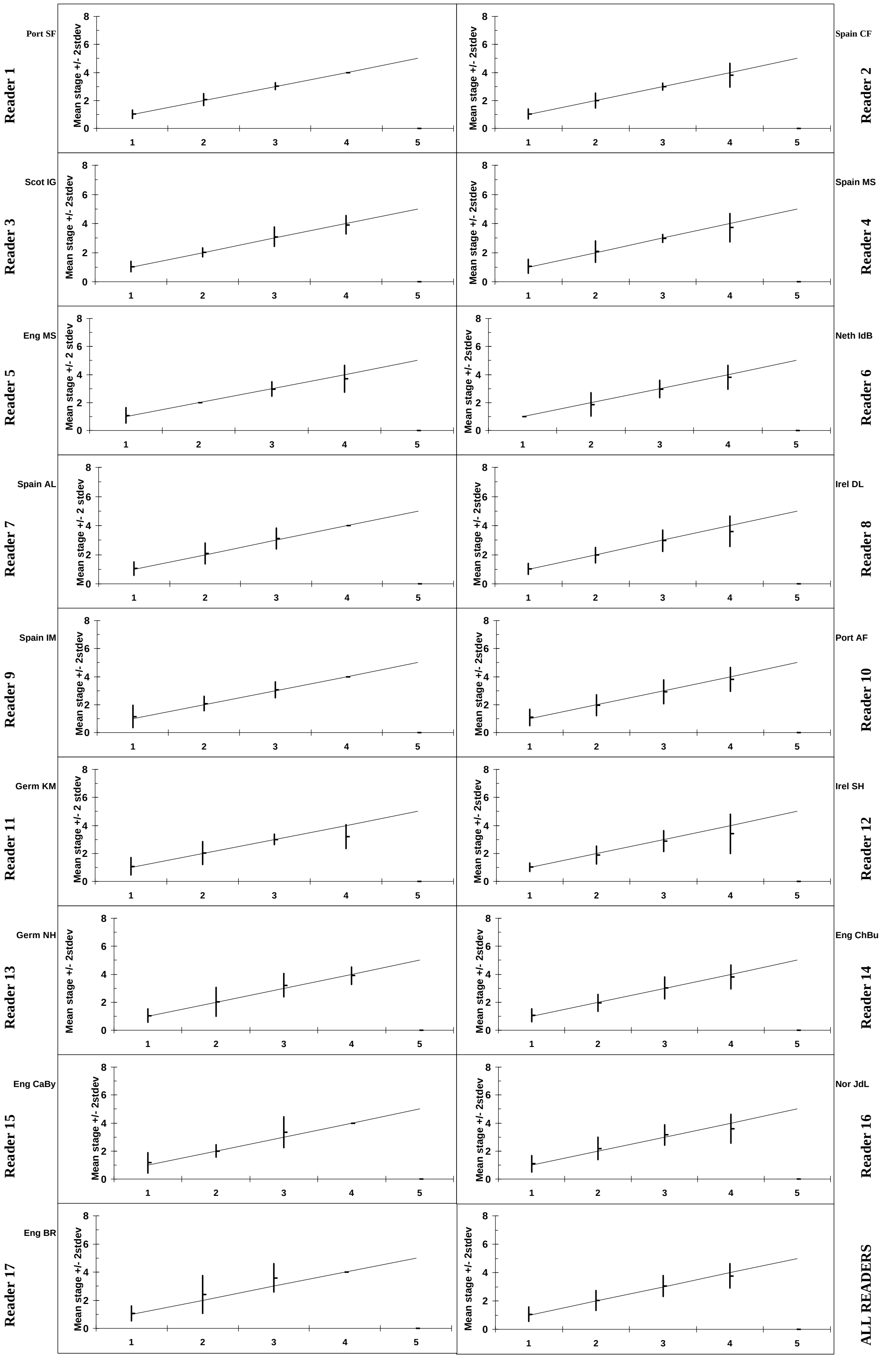
BIAS

MODAL	SAMPLING STRATA												Mean
stage	9	10	11	12	13	14	15	16	x	x	x	x	bias
1	0.09	0.05	0.00	0.11	0.06	0.04	0.00	0.05	-	-	-	-	0.06
2	0.00	0.01	0.03	0.09	0.00	0.04	0.05	-0.01	-	-	-	-	0.02
3	-0.09	0.27	0.06	0.17	0.08	-0.01	0.08	0.15	-	-	-	-	0.06
4	-0.35	-	-0.06	-0.19	-0.12	-	-0.31	-0.19	-	-	-	-	-0.23
5	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	-0.04	0.07	0.04	0.10	0.06	0.02	0.04	0.02	-	-	-	-	0.04

Weighted

HORSE MACKEREL second stageing.   Egg Stageing Workshop, Lowestoft, 4-9 December 2000

Figure 8 In the egg stage bias plots below the mean egg stage recorded +/- 2stdev of each stage reader and all stage readers combined are plotted against the modal egg stage. The estimated mean egg stage corresponds to modal egg stage, if the estimated mean egg stage is on the 1:1 equilibrium line (solid line). Bias is the difference between estimated mean egg stage and modal egg stage.



Annex 3

Egg Staging and Plankton Sampling Manual

Egg Staging and Plankton Sampling Manual

1. Sampling strategy, gear and procedures

The report of the mackerel, horse mackerel egg production workshop (WGMEGS, ICES, 1994) contains a manual for the conduct of egg surveys (section 8), targeted at the annual egg production method (AEPM). Those instructions are repeated in ICES 1997 (Sections 6.4.1 to 6.4.8) and incorporate changes, additions or clarifications, which are underlined.

This manual is designed to enhance those described above by providing a protocol on the collection and handling of plankton samples at sea and the processing of samples in the laboratory. In addition, the 1998 WGMEGS samples were used to fully describe the distribution and abundance of **all** species of fish eggs and larvae occurring throughout the sampling area at that time. The EU, in a project (97/017) designed to produce *'Ichthyoplankton-based indices of spring spawning commercial fish populations in Western European waters'* (INDICES), provided funding for this analysis. This manual encompasses the full analysis completed for the INDICES project.

1.1. Sampling areas and sampling effort

The spatial and temporal distribution of sampling is designed to ensure an adequate coverage of both mackerel (*Scomber scombrus* L.) and horse mackerel (*Trachurus trachurus* L.) spawning. Sampling effort is targeted at producing estimates of stage 1 egg production for both species.

The north-east Atlantic shelf area is sub-divided (by the WGMEGS) into 'western' and 'southern' areas for the purposes of estimating spawning stock biomass (SSB) of mackerel and horse mackerel. The 'southern' area is regarded as being from 36º N to 45º N. It includes southern Biscay, the Cantabrian Sea and from the Portuguese coast to 11º W. Sampling usually begins in January in this area and continues until June in the Cantabrian Sea.

The 'western' area is from 44º N to 58º N. It includes Biscay, the Celtic Sea and the shelf edge to the northwest of Scotland. Sampling is focussed along the shelf edge (200m contour) but also occurs from the French and Irish coasts out to 16º W. Sampling in this area usually begins in March and continues into early July.

Plankton samplers are deployed at the centre of half standard ICES rectangles which are 0.5º latitude by 0.5º longitude in the western area and to the west of Portugal. To the north of Spain (Cantabrian Sea) and to the south of Portugal the sampling rectangles are 0.25º latitude by 1º longitude because of the proximity of the shelf edge to the coast.

1.2. **Sampling gear** (An example sea-going equipment list is given at Appendix 1)

The standard samplers acceptable for use on these surveys are national variants of the Gulf III or Bongo high-speed plankton samplers. These samplers generally incorporate conductivity, temperature, and depth probes (CTD's), and either contain mechanical or electronic flowmeters to enable the volume of water filtered on each deployment to be calculated. These sensors either relay 'real time' environmental data back to a shipboard computer display or log the information ready for downloading once the station has been completed.

Although a mesh size of 500µm aperture is adequate for sampling mackerel and horse mackerel eggs, a nylon mesh with an aperture between 250µm and 280µm is recommended for these surveys. This allows the plankton samples to be more widely used for investigations on other species and taxa. If serious clogging occurs then a change to a 500µm aperture mesh can be made (this change has only rarely been made on any of the surveys).

The aperture on the Gulf III type samplers should be 20cm diameter in order to ensure that an adequate volume of water is filtered. This ensures that the eggs of other species are quantitatively sampled, in particular the eggs of hake (*Merluccius merluccius* L.), which may be present at lower densities than those of mackerel or horse mackerel.

The aperture for the Bongo samplers should be either 40cm or 60cm diameter.

1.3. Sampler deployment

The Gulf III sampler is deployed on a double oblique tow, at 4-5 knots, from the surface to within 3 metres of the bottom (or as near as bottom topography will allow) and return to the surface. The Bongo samplers are towed at 2-3 knots. Maximum sampling depth is restricted to 200m in deeper water off the shelf edge. In the presence of a thermocline greater than 2.5°C in 10m depth, sampling can be confined to a maximum depth of 20 m below the base of the thermocline.

The requirement is for an even, 'V' shaped dive profile, filtering the same volume of water per unit of depth. The aim is to shoot and haul at the same rate with the sampler spending 10 seconds in each 1 metre depth band.

At shallow stations, multiple double-oblique dives may be necessary to enable a sufficient volume of water to be filtered. A minimum sampler deployment time of 15 minutes is recommended.

1.4. Target Species

The WGMEGS tri-ennial sampling programme is targeted at mackerel and horse mackerel. An egg production estimate is calculated for both species in both the western and southern areas. In addition an egg production estimate for mackerel is calculated for the combined North East Atlantic area.

In 1998, an EU funded project (97-017) known as INDICES used the plankton samples collected to describe the distribution and abundance of all fish eggs and larvae. Seven commercially important target species (including mackerel and horse mackerel) were selected as suitable for further data analysis including geo-statistical techniques. These species (blue whiting, *Micromesistius poutassou* (Risso); hake, *Merluccius merluccius* (L.); megrim, *Lepidorhombus whiffiagonis* (Walbaum); sardine, *Sardina pilchardus* (Walbaum) and anchovy, *Engraulis encrasicolus* (L.)) were all known to spawn in the same area and at the same time as mackerel and horse mackerel.

2. Plankton sample handling and processing

2.1. Sample fixation

It is recommended that the standard plankton samples collected for the SSB estimate will be analysed onshore and should be treated carefully when being fixed at sea. The procedure will be as follows:-

a). Remove the end bag used on the station before washing down the net.
b). Attach a clean end bag and **gently** wash down the net from both ends of the sampler, taking care to wash the lower surface of the net just in front of the end bucket.
c). Always wash down from the nosecone end last.
d). Make sure the net is clean, using more than one end bag if necessary.
e). Make doubly sure that a clean end bag is left on the sampler ready for the next station.

f). Wash the plankton from the end bags into a jar with the 4% formaldehyde solution in a wash bottle.
g). Top up the jar with 4% formaldehyde, making sure that the volume of plankton does not exceed 50% of the volume of the jar.
h). Any excess sample should be fixed separately in additional jars.
i). Put labels containing station details in pencil into all jars.

The standard fixative for use on these surveys will be a 4% solution of buffered (pH 7 - 8) formaldehyde in either distilled or fresh water. (250g of sodium acetate trihydrate is dissolved in 10 litres of 30% formaldehyde to make a buffered stock solution. The stock solution is then diluted to 4% using distilled water). This solution is approximately iso-osmotic with seawater and will minimise damage and distortion of the eggs. The sample should be directly fixed with the addition of the 4% formaldehyde solution and should not come into contact with formaldehyde strength in excess of 4%.

2.2. **Sample sorting** (A laboratory equipment list is given at Appendix 2)

Prior to sorting the plankton samples it is recommended that a small quantity of red, borax carmine, stain is added to the samples (Nichols, 1976). A few drops of this stain in each sample jar will stain most of the zooplankton (including fish larvae) a pink/red colour, but fish eggs will remain virtually unaffected. This technique makes sorting of the eggs much easier, and, done lightly, does not impair subsequent identification or staging. The samples should be stained for at least a day before being analysed.

Immediately before analysis it is recommended that the 4% formalin is drained from the sample and the sample washed gently with seawater. The sample can then be placed in a sorting/observation fluid (Steedman, 1976) which also acts as a preservative. The observation fluid stock solution is made with 50ml of propylene phenoxetol mixed with 450ml of propylene glycol (propane-1,2-diol). Before use, 5ml of the stock solution is diluted with 95ml of distilled water to produce a sorting fluid which is non-toxic and pleasant to use (odourless).

Whenever practicable the whole sample should be sorted in order to remove all the eggs of species, which may be present in low densities. All sorted eggs should be kept in tubes, in, 4% buffered formaldehyde, inside the sample container for future reference and use. Usually only the eggs of mackerel and horse mackerel need be identified to species and staged. However, in 1998, all fish eggs and larvae were identified to species where possible (for the INDICES project). The eggs of six of the seven target species were staged (Blue whiting eggs are not distinguishable from those of other species). The standard lengths of larvae of all the target species were measured.

2.3. Species identification

The eggs and larvae of most of the species found in the area are well described by Russell, 1976. This book is well known and used by all the participants of the ICES tri-ennial surveys. It is generally regarded as the definitive work on the subject in this area.

Some difficulties do occur, particularly with the identification of fish eggs, which do not show great differences in their morphological features. In some instances it is even difficult to recognise differences between mackerel and horse mackerel eggs when the segmentation of the yolk is not distinct in the latter.

Some difficulties can occur with the identification of hake eggs, which are similar in size and appearance to several other species including mackerel, ling (*Molva molva* L.) and megrim. The 'surface adhesion test' (SAT) described by Porebski (1975) and Coombs (1994) does help to separate hake eggs from those of other species. However, some problems were experienced when using the SAT technique on fixed eggs during the INDICES project. The results were not always consistent and re-analysis of some samples became necessary.

Identification of fish larvae is not so much of a problem. However, some problems do occur where species are closely related e.g. Sprat (*Sprattus sprattus* L.), sardine, and anchovy, where further detailed analysis such as myotome counts may be required.

Positive identification is wholly reliant on the skills and experience of the analysts involved in processing the samples. Samples of mackerel and horse mackerel eggs are regularly passed between participants to help to standardise the identification criteria. In the INDICES project some samples were processed by at least two laboratories and in general a good level of agreement was reached.

2.4. Egg staging (ageing)

Within WGMEGS the eggs of mackerel are classified into one of five morphological stages (I, II, III, IV and V) (Lockwood *et al.*, 1981) (Figure 1), following the development criteria described for plaice (Simpson, 1959). For horse mackerel the description of stages is the same with the exception of stage V which does not exist. Horse mackerel larvae hatch at the end of egg stage IV (Pipe and Walker, 1987). In the INDICES project, hake and megrim eggs were staged using the same criteria as that for mackerel. The eggs of pilchard and anchovy were both classified to eleven development stages using the descriptions provided by Ahlstrom (1943) and Moser and Ahlstrom (1985) respectively.

To help with consistency of staging, samples of mackerel and horse mackerel eggs are routinely passed between all participants of WGMEGS. Some discrepancies in the allocation of eggs to stages are always apparent and it is hoped that the situation can be improved by the setting up of an ICES identification and staging workshop to be held in December 2000.

For the estimation of daily egg production for both mackerel and horse mackerel, only the counts of stage I eggs are used. This is recognised as a conservative estimate of the total eggs spawned because of mortality which occurs during development. However until there is consistency in the identification of the other stages, between all countries, the other stages cannot be used for the estimation of mortality rates and backtracking to total eggs spawned.

2.5. Measurement of Larvae

Within INDICES the standard lengths of larvae of the seven target species were measured. The larvae were then assigned into one of three length classes according to the following morphological characteristics:

1. Length at hatching to yolk sac absorption.
2. Length at yolk sac absorption to post-larvae with recognisable features such as fins, characteristic pigmentation, spines etc.
3. Late post-larvae with additional physical characteristics such as fin rays, enhanced pigmentation, urostyle development etc.

This size categorisation was to overcome difficulties with different growth rates between species where the measurement of standard length might not reflect the overall pattern of larval growth. The standard length group (mm) and size group characteristics for each species is given in Table 1.

2.6. Sub - sampling

Wherever practicable the whole plankton sample should be sorted. However, where large numbers of eggs and larvae occur in plankton samples it becomes impractical to sort the total sample. The recommended method for sub-sampling is by using a Folsom splitter. In this way, samples can be sub-divided repeatedly to achieve the optimum sampling level. It is recommended that 100 eggs of the target species (mackerel and horse mackerel) are present in the sub-sample. If more than 100 eggs of these species are sorted from the sample (or sub-sample) then only 100 need to be staged and the rest apportioned across the stages found in that particular sample. If 100 eggs of the target species are **NOT** found in 25% or less of the sample then the whole sample will have to be sorted.

In some samples the eggs of only one target species may be present in large numbers. These eggs can be sub-sampled using the procedure above, whilst the eggs of the other species should be sorted from at least 25% of the sample.

Where extremely large numbers of eggs of other (non-target) species occur or where the total plankton volume is large, it may be impractical and time consuming to sort through the whole sample for a few eggs of the target species. In these cases it may be practical to only sort 25% of the sample.

Fish larvae can be sub-sampled completely independently of the eggs if required. It is recommended that a minimum of 100 fish larvae of one species in a sub-sample would be required to provide a length/frequency distribution. All fish larvae sorted from a sub-sample should be identified.

3. Estimation of daily egg production

To convert abundance of eggs into daily egg production, data on the rate of development is required. For mackerel the relationship between egg development rate and temperature was described by Lockwood *et al.*, (1977, 1981a). This has been used as the basis for calculating daily production of stage I eggs on all the surveys from 1977. For horse mackerel similar egg development data are given by Pipe and Walker (1987) and have also been used for the calculation of stage I egg production since 1977.

The formula for calculating the age of **stage I mackerel eggs** from the sea temperature (T°C) is:

$$\mathrm{Log}_e \text{ time (hours)} = -1.61 \log_e (T°C) + 7.76$$

For calculating the age of **stage I horse mackerel eggs** the formula is:

$$\mathrm{Log}_e \text{ time (hours)} = -1.608 \log_e (T°C) + 7.713.$$

Temperature / depth profiles are obtained at each sampled position from the CTD's mounted on the plankton sampler bodies. When available the temperature at 20m depth should be used for the calculation of egg stage duration. If that is not available then the sub-surface temperature (ca. 3 m) should be used.

To estimate the daily egg production of the target species in the INDICES project, the rate of egg development with regard to temperature would need to be determined experimentally. This data is available for the development of hake eggs (Coombs and Mitchell, 1982), where the age of **stage I hake eggs** can be derived from the formula:

$$\mathrm{Log}_e \text{ time (hours)} = \mathrm{Log}_e 1263.9 - 1.411 \log_e (T°C)$$

Species	1. Hatching to yolk-sac absorption.	2. Yolk-sac absorption to post-larvae	3. Late post-larvae
Mackerel (*Scomber scombrus*)	**2.5 - 3.9mm** Oil globule positioned near the anus. Can count the myomeres (32). Characteristic pigmentation with a group of melanophores on the head and irregular rows of melanophores along both dorsal and ventral contours of the body.	**4.0 - 6.0mm** Teeth visable in upper and lower jaws. Characteristic pigmentation, both dorsal and ventral, starting 4 to 6 myomeres behind the anus and extending to the tail region. Some melanophores along the base on the developing anal fin, on the head and between the eyes.	**>6.0mm** The stomach has assumed a characteristic bulbous shape, with a dense scattering of pigment spots. Pigment spots on snout and along lower jaw. Urostyle may begin to bend at about 6.5 mm. Caudal, dorsal and anal fins rays visible from about 7 to 8 mm.
Horse mackerel (*Trachurus trachurus*)	**1.6 - 3.4mm** The oil globule is at the anterior of the yolk sac. The myomeres are easily visible (24). The melanophores are large and run along the dorsal and ventral contours of the body.	**3.5 - 5.4mm** The dorsal row of pigment spots extends from the head to mid way between anus and tail; the ventral row extends to the tip of urostyle. Melanophores are also present along lower jaw and ventral stomach.	**>5.4mm** Opercular spines become very visible from 6 mm. The urostyle begins to turn up at about 6 mm.
Sardine (*Sardina pilchardus*)	**3.3 - 5.0mm** An oil globule is visible in the yolk sac. Pigmentation initially confined to dorsal surface. The myomeres are difficult to count.	**5.1 - 7.0mm** Continuous double row of pigment spots along ventral surface of body to anus. Double row of pigment spots along ventral hind gut. Myomeres 41 to 42.	**>7.0mm** Dorsal fin beginning to develop. Urostyle begins to turn up at about 12 mm. Pelvic fins appear, level with pylorus, at about 18 mm.
Blue whiting (*Micromesistius poutassou*)	**2.0 - 3.4mm** A scattering of pigment spots, except on the posterior part of the body. By 3mm the dorsal and ventral bar of pigment spots may be evident. A scatter of pigment spots on the head and a row of ventral body spots above the gut. 56 to 60 myomeres.	**3.5 - 5.0mm** Melanophores becoming larger and darker, with the characteristic dorsal and ventral bars very evident. Strong melanophores on head and dorsal gut, some spots on snout.	**>5.0mm** Pigmentation has spread along lateral body but characteristic unpigmented tail region is striking. By 8 mm the urostyle is beginning to bend upwards and by 9 mm the caudal fins rays are developing.

Hake (*Merluccius merluccius*)	**3.0 - 4.0mm** Large pigmented oil globule in yolk sac. 3 large post- anal melanophores visible along lateral body and a scattering of much smaller melanophores on head and abdomen.	**4.1 - 6.0mm** 50-52 Myomeres. The characteristic 3 large post-anal abdominal melanophores very striking. Large pigment spots on head and between eyes. Row of pigment spots along lower jaw. Dark pigment on dorsal gut and a row of spots along ventral gut.	**>6.0mm** Pelvic fins beginning to appear and by 9 mm extend as far as anus. By 9 mm the urostyle begins to bend upwards and the first dorsal fin is developing.
Megrim (*Lepidorhombus whiffiagonus*)	**4.0 - 5.0mm** Pigmented oil globule at posterior end of yolk sac. Scattering of small melanophores all over body. Some v-shaped pigment visible on dorsal and ventral tips of primordial fin membranes.	**5.1 - 7.0mm** A row of melanophores present along the edge of the dorsal and ventral fin membranes, and the dorsal and ventral surface of the body. A scatter of spots is visible in the caudal region. Pigment spots on dorsal and ventral jaw line and a row of spots along ventral gut.	**>7.0mm** The characteristic 2 large otocystic spines are visible on either side of the head region. The fin membranes have a large scattering of small pigment spots. There are additional pigment spots on the head. By 9 mm the dorsal and anal fins are beginning to develop.

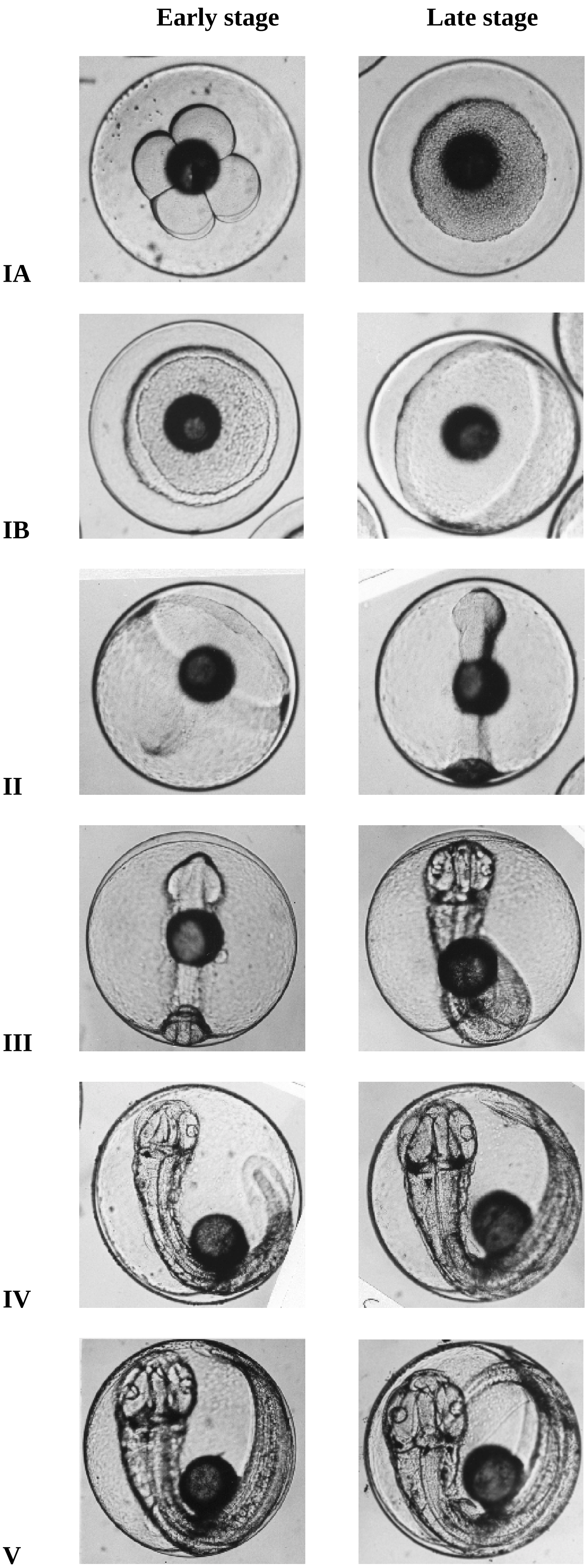


Figure 1. Mackerel eggs at the beginning and end of the six development stages

Appendix 1. Plankton Sampling Equipment list

Ships gear
2 Electrically cored cables for plankton sampling (minimum length 500m).
2 x 28" alloy blocks (Standard TTN blocks) with accumulator springs.

Plankton sampler hardware
2 x 76cm unencased plankton sampler frames.
2 x 40cm diameter aperture conical nosecones to fit frames.
2 x 30cm diameter aperture conical nosecones to fit frames.
2 x Fine mesh (Pup) sampler frames and nosecones
4 x standard Scripps depressors.
1.x twin depressor frame.
1 x Box of accessories including end buckets, drogues, lines, shackles etc.
1 x Box of accessories and spares for Pup samplers.

Plankton Nets
4 x 270µm mesh nets for TTN
20 x 270µm mesh end bags
2 x 425µm mesh nets for TTN
20 x 425µm mesh end bags
2 x 64µm mesh nets for Pup
8 x 64µm mesh end bags

CTD's and plankton sampler electronics
3 x Guildline CTD underwater units or equivalent PRO-NET system.
2 x Guildline or PRO-NET deck units.
BFM001 (12.5cm OD) Valeport flowmeters and spares.
BFM002 (5.0cm OD)Valeport flowmeters and leads for Pup.

Containers (plankton requirements only)
10 x Trays of 1 lb. jars
4 x Trays of 4 lb. jars
6 boxes of salinity bottles and plastic inserts

Fixatives (plankton requirements only)
30 litres neutralised 30% formaldehyde
2 x 25 litre formalin dispensers
175 litres distilled water for fixatives.

Laboratory Equipment
Low power stereozoom microscope
Plankton sorting equipment:- Dishes, beakers, wash bottles, forceps. pipettes etc.

Data recording
Shipboard computers, terminals and printer.
Software for plankton sampler deployment.
Clip folders for computer outputs.
Plankton station log sheets and folders.
Plankton sample labels.

Appendix 2. Plankton Laboratory Equipment List

Equipment	**Supplier**	**Comments**
Aspirator bottles with taps-25 litre	Fisher Scientific	
Beakers/Jugs - Plastic- 1 litre	Fisher Scientific	Or kitchenware retailer
Beakers/Jugs - Plastic- 2 litre	Fisher Scientific	
Deioniser	Fisher Scientific	To produce pure water
Egg trays- for holding eggs under microscope	'Home made'	Example can be supplied
Folsom splitter	Spartel	For sub-sampling
Forceps	Fisher Scientific	
Funnels	Fisher Scientific	
Hotplate/stirrer	Fisher Scientific	
Light boxes	Philip Harris Scientific	
Measuring cylinders	Fisher Scientific	
Mesh - various sizes	Spartel	
Mesh strainers- various sizes	Spartel	
Microscopes and accessories	Lieca/Olympus	We have SZH stereo-zoom
Petri dishes - glass and plastic	Fisher Scientific	Glass ones don't scratch
Pipettes - glass and plastic	Fisher Scientific	
Plankton labels	Local printers	Should be printed in waterproof ink. e.g. TYVEK
Rubber gloves	Fisher Scientific	
Safety spectacles	Fisher Scientific	
Sample jars (called bottles in catalogue)	Fisher Scientific	We use 250 ml
Sample tubes/vials	Fisher Scientific	Screw caps are best
Seekers	Fisher Scientific	
Sorting trays- for sorting plankton under mic.	'Home made'	Example can be supplied
Stirring rods	Fisher Scientific	
Tally counters	Fisher Scientific	
Wash bottles	Fisher Scientific	
Chemicals		
Borax carmine	Fisher Scientific	To stain samples in lab
Embedding wax	Fisher Scientific	To seal jars for storage
Formaldehyde	Fisher Scientific	Buy 30% and dilute it
Propane 1-2 diol	Fisher Scientific	To make observation fluid
Propylene phenoxetol	Nipa Laboratories	To make observation fluid
Sodium acetate trihydrate	Fisher Scientific	Buffer for formalin

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Annex 4

Analysis of the interpretation of histological slides of mackerel and horse mackerel

sample	number	reader	experience	mig.nucleus	hydrated	POF	beta atr	vitellogenic	early alfa atresia	late alfa atr	alfa atresia	total oocytes
HMNF085	1	IdB-Neth	e	0	0	1	0	33	0	1	1	33
HMNF085	3	IdB-Neth	e	0	0	1	0	30	0	0	0	30
HMNF088	1	IdB-Neth	e	0	0	0	0	38	0	0	0	38
HMNF088	2	IdB-Neth	e	0	0	0	0	37	0	2	2	37
HMNF088	3	IdB-Neth	e	0	0	0	0	28	1	2	3	29
HMNF098	1	IdB-Neth	e	0	0	0	0	25	0	0	0	25
HMNF098	2	IdB-Neth	e	0	0	0	0	35	0	0	0	35
HMNF098	3	IdB-Neth	e	0	0	0	0	22	0	0	0	22
HMNF118	1	IdB-Neth	e	0	1	1	0	22	0	0	0	22
HMNF118	2	IdB-Neth	e	0	0	1	0	18	0	0	0	18
HMNF147	1	IdB-Neth	e	0	0	0	0	33	0	3	3	33
HMNF147	2	IdB-Neth	e	0	0	0	0	36	0	0	0	36
HMNF147	3	IdB-Neth	e	0	0	0	0	33	0	0	0	33
hmnotsogood	0	IdB-Neth	e	0	0	0	1	9	0	0	0	9
hyaline010	1	IdB-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	IdB-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IdB-Neth	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	IdB-Neth	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IdB-Neth	e	0	0	0	0	2	1	1	2	3
MCOR976D2	C	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	F	IdB-Neth	e	0	0	1	0	4	1	1	2	5
MCOR976D9	A	IdB-Neth	e	1	0	0	0	2	1	0	1	3
MCOR976D9	B	IdB-Neth	e	0	0	0	0	2	3	0	3	5
MCOR976D9	C	IdB-Neth	e	0	0	0	0	2	4	0	4	6
HMNF085	1	IM-Sp	n	0	0	1	0	29	0	0	0	29
HMNF085	3	IM-Sp	n	0	0	1	0	31	0	0	0	31
HMNF088	1	IM-Sp	n	0	0	1	0	36	0	0	0	36
HMNF088	2	IM-Sp	n	0	0	0	1	29	1	0	1	30
HMNF088	3	IM-Sp	n	0	0	1	1	20	0	0	0	20
HMNF098	1	IM-Sp	n	0	0	1	0	22	1	0	1	23
HMNF098	2	IM-Sp	n	0	0	0	0	29	0	0	0	29
HMNF098	3	IM-Sp	n	0	1	0	0	22	0	0	0	22
HMNF118	1	IM-Sp	n	0	0	1	0	19	1	0	1	20
HMNF118	2	IM-Sp	n	0	0	1	0	15	0	0	0	15
HMNF147	1	IM-Sp	n	0	0	0	1	27	0	1	1	27
HMNF147	2	IM-Sp	n	0	0	0	0	26	0	0	0	26
HMNF147	3	IM-Sp	n	0	0	0	0	25	0	0	0	25
hmnotsogood	0	IM-Sp	n	0	0	0	1	7	0	0	0	7
hyaline010	1	IM-Sp	n	0	1	0	0	5	0	0	0	5
hyaline010	2	IM-Sp	n	0	1	0	0	7	0	0	0	7
hyaline010	3	IM-Sp	n	0	1	0	0	12	0	0	0	12
MCOR976D2	A	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	IM-Sp	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C	IM-Sp	n	0	0	0	0	5	1	1	2	6
MCOR976D2	E	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	F	IM-Sp	n	0	0	1	0	3	1	1	2	4
MCOR976D9	A	IM-Sp	n	0	0	1	0	2	0	1	1	2
MCOR976D9	B	IM-Sp	n	0	0	0	0	1	1	2	3	2
MCOR976D9	C	IM-Sp	n	0	0	0	0	3	2	0	2	5
HMNF085	1	HM-Sp	e	0	0	1	1	29	0	0	0	29
HMNF085	3	HM-Sp	e	0	0	1	0	29	0	0	0	29
HMNF088	1	HM-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	HM-Sp	e	0	0	0	0	37	0	2	2	37
HMNF088	3	HM-Sp	e	0	0	0	0	30	1	1	2	31
HMNF098	1	HM-Sp	e	0	0	1	1	27	2	0	2	29
HMNF098	2	HM-Sp	e	0	0	0	0	34	0	0	0	34
HMNF098	3	HM-Sp	e	0	0	0	0	25	0	0	0	25
HMNF118	1	HM-Sp	e	0	1	1	0	24	1	1	2	25
HMNF118	2	HM-Sp	e	0	0	1	1	17	0	0	0	17
HMNF147	1	HM-Sp	e	0	0	0	0	41	0	4	4	41
HMNF147	2	HM-Sp	e	0	0	1	1	40	0	0	0	40
HMNF147	3	HM-Sp	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	HM-Sp	e	0	0	0	1	10	0	0	0	10
hyaline010	1	HM-Sp	e	0	1	1	0	6	0	0	0	6
hyaline010	2	HM-Sp	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HM-Sp	e	0	1	0	0	14	0	0	0	14
MCOR976D2	A	HM-Sp	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	HM-Sp	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	HM-Sp	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	HM-Sp	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	HM-Sp	e	0	0	1	0	4	0	2	2	4
MCOR976D9	A	HM-Sp	e	0	0	0	0	3	2	0	2	5
MCOR976D9	B	HM-Sp	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	HM-Sp	e	0	0	0	0	3	2	0	2	5
HMNF085	1	IG-Scot	e	0	0	0	0	32	2	0	2	34
HMNF085	3	IG-Scot	e	0	0	0	0	22	3	0	3	25
HMNF088	1	IG-Scot	e	0	0	0	0	35	0	0	0	35
HMNF088	2	IG-Scot	e	0	0	0	0	34	2	0	2	36
HMNF088	3	IG-Scot	e	0	0	0	0	27	0	1	1	27
HMNF098	1	IG-Scot	e	0	0	0	0	26	0	0	0	26
HMNF098	2	IG-Scot	e	0	0	0	0	33	0	0	0	33
HMNF098	3	IG-Scot	e	0	0	0	0	24	0	0	0	24
HMNF118	1	IG-Scot	e	0	1	1	0	23	1	0	1	24
HMNF118	2	IG-Scot	e	0	0	1	0	13	0	0	0	13
HMNF147	1	IG-Scot	e	0	0	0	0	34	1	3	4	35
HMNF147	2	IG-Scot	e	0	0	0	0	44	1	0	1	45

HMNF147		3	IG-Scot	e	0	0	0	0	34	0	0	0	34
hmnotsogood		0	IG-Scot	e	0	0	0	1	7	0	0	0	7
hyaline010		1	IG-Scot	e	0	1	1	0	5	0	0	0	5
hyaline010		2	IG-Scot	e	0	1	0	0	7	0	0	0	7
hyaline010		3	IG-Scot	e	0	1	1	0	16	1	0	1	17
MCOR976D2	A		IG-Scot	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B		IG-Scot	e	1	0	0	0	2	1	1	2	3
MCOR976D2	C		IG-Scot	e	0	0	0	0	4	2	0	2	6
MCOR976D2	E		IG-Scot	e	0	0	0	0	5	0	2	2	5
MCOR976D2	F		IG-Scot	e	0	0	1	1	6	0	1	1	6
MCOR976D9	A		IG-Scot	e	1	0	1	0	3	1	0	1	4
MCOR976D9	B		IG-Scot	e	0	0	0	0	3	3	0	3	6
MCOR976D9	C		IG-Scot	e	0	0	1	0	3	3	0	3	6
HMNF085		1	SH-Irel	e	0	0	1	0	34	0	1	1	34
HMNF085		3	SH-Irel	e	0	0	1	1	31	3	0	3	34
HMNF088		1	SH-Irel	e	0	0	0	0	40	0	0	0	40
HMNF088		2	SH-Irel	e	0	0	0	1	32	0	1	1	32
HMNF088		3	SH-Irel	e	0	0	1	1	22	0	0	0	22
HMNF098		1	SH-Irel	e	1	0	0	0	23	0	0	0	23
HMNF098		2	SH-Irel	e	1	0	0	0	30	0	0	0	30
HMNF098		3	SH-Irel	e	0	0	0	0	19	0	1	1	19
HMNF118		1	SH-Irel	e	0	0	1	0	17	0	1	1	17
HMNF118		2	SH-Irel	e	0	0	1	0	11	0	0	0	11
HMNF147		1	SH-Irel	e	0	0	1	1	25	0	0	0	25
HMNF147		2	SH-Irel	e	0	1	1	0	31	0	0	0	31
HMNF147		3	SH-Irel	e	0	1	0	0	22	0	0	0	22
hmnotsogood		0	SH-Irel	e	0	0	1	0	6	0	0	0	6
hyaline010		1	SH-Irel	e	0	1	1	0	5	0	0	0	5
hyaline010		2	SH-Irel	e	0	1	1	0	7	0	0	0	7
hyaline010		3	SH-Irel	e	0	1	0	0	12	0	0	0	12
MCOR976D2	A		SH-Irel	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B		SH-Irel	e	1	0	1	1	2	0	2	2	2
MCOR976D2	C		SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	E		SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F		SH-Irel	e	0	0	0	1	4	0	3	3	4
MCOR976D9	A		SH-Irel	e	0	0	1	0	4	1	0	1	5
MCOR976D9	B		SH-Irel	e	0	0	1	0	4	3	0	3	7
MCOR976D9	C		SH-Irel	e	0	0	0	0	2	2	1	3	4
HMNF085		1	JRP-Sp	e	0	0	1	0	31	0	1	1	31
HMNF085		3	JRP-Sp	e	1	0	1	0	25	2	0	2	27
HMNF088		1	JRP-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088		2	JRP-Sp	e	0	0	0	0	32	0	2	2	32
HMNF088		3	JRP-Sp	e	0	0	0	1	37	0	0	0	37
HMNF098		1	JRP-Sp	e	1	0	0	0	26	0	0	0	26
HMNF098		2	JRP-Sp	e	1	0	0	0	27	0	0	0	27
HMNF098		3	JRP-Sp	e	1	0	0	0	17	0	0	0	17
HMNF118		1	JRP-Sp	e	0	0	0	1	19	0	0	0	19
HMNF118		2	JRP-Sp	e	0	0	0	1	15	0	0	0	15
HMNF147		1	JRP-Sp	e	0	0	0	1	30	0	1	1	30
HMNF147		2	JRP-Sp	e	0	0	0	0	38	0	0	0	38
HMNF147		3	JRP-Sp	e	0	0	0	0	42	0	0	0	42
hmnotsogood		0	JRP-Sp	e	0	0	0	0	7	0	0	0	7
hyaline010		1	JRP-Sp	e	0	1	0	0	5	0	0	0	5
hyaline010		2	JRP-Sp	e	0	1	0	0	6	0	0	0	6
hyaline010		3	JRP-Sp	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A		JRP-Sp	e	0	0	0	0	1	0	2	2	1
MCOR976D2	B		JRP-Sp	e	0	0	0	1	1	0	2	2	1
MCOR976D2	C		JRP-Sp	e	0	0	0	0	5	0	2	2	5
MCOR976D2	E		JRP-Sp	e	0	0	0	1	2	0	0	0	2
MCOR976D2	F		JRP-Sp	e	0	0	1	0	4	0	0	0	4
MCOR976D9	A		JRP-Sp	e	0	0	0	0	6	1	0	1	7
MCOR976D9	B		JRP-Sp	e	0	0	0	0	7	0	3	3	7
MCOR976D9	C		JRP-Sp	e	0	0	0	0	4	0	2	2	4
HMNF085		1	HW-Neth	e	0	0	0	0	32	0	0	0	32
HMNF085		3	HW-Neth	e	0	0	0	1	30	3	0	3	33
HMNF088		1	HW-Neth	e	0	0	0	0	33	0	0	0	33
HMNF088		2	HW-Neth	e	0	0	0	1	24	0	2	2	24
HMNF088		3	HW-Neth	e	0	0	1	1	23	0	1	1	23
HMNF098		1	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF098		2	HW-Neth	e	0	0	0	0	28	0	0	0	28
HMNF098		3	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF118		1	HW-Neth	e	0	1	0	0	15	0	0	0	15
HMNF118		2	HW-Neth	e	0	0	0	0	14	0	0	0	14
HMNF147		1	HW-Neth	e	0	0	1	1	29	0	2	2	29
HMNF147		2	HW-Neth	e	0	0	1	0	29	0	0	0	29
HMNF147		3	HW-Neth	e	0	0	0	0	26	0	0	0	26
hmnotsogood		0	HW-Neth	e	0	0	1	0	7	0	0	0	7
hyaline010		1	HW-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010		2	HW-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010		3	HW-Neth	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A		HW-Neth	e	0	0	0	1	2	0	2	2	2
MCOR976D2	B		HW-Neth	e	1	0	0	1	2	0	2	2	2
MCOR976D2	C		HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	E		HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	F		HW-Neth	e	0	0	1	1	5	0	2	2	5
MCOR976D9	A		HW-Neth	e	1	0	0	0	5	0	0	0	5
MCOR976D9	B		HW-Neth	e	0	0	0	1	4	0	3	3	4
MCOR976D9	C		HW-Neth	e	0	0	0	1	2	0	2	2	2

HMNF085		1	KM-Germ	n	0	0	0	0	23	0	0	0	23
HMNF085		3	KM-Germ	n	0	0	0	0	20	3	0	3	23
HMNF088		1	KM-Germ	n	0	0	0	0	22	2	0	2	24
HMNF088		2	KM-Germ	n	0	0	1	0	25	0	2	2	25
HMNF088		3	KM-Germ	n	0	0	0	0	16	0	3	3	16
HMNF098		1	KM-Germ	n	0	0	0	0	20	0	0	0	20
HMNF098		2	KM-Germ	n	0	0	0	0	28	2	0	2	30
HMNF098		3	KM-Germ	n	0	0	0	0	24	0	1	1	24
HMNF118		1	KM-Germ	n	0	1	1	0	9	0	2	2	9
HMNF118		2	KM-Germ	n	0	0	1	0	12	0	0	0	12
HMNF147		1	KM-Germ	n	0	0	0	0	26	0	4	4	26
HMNF147		2	KM-Germ	n	0	1	0	0	21	0	0	0	21
HMNF147		3	KM-Germ	n	0	0	0	0	28	0	1	1	28
hmnotsogood		0	KM-Germ	n	0	0	0	0	5	0	1	1	5
hyaline010		1	KM-Germ	n	0	1	0	0	4	0	0	0	4
hyaline010		2	KM-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		3	KM-Germ	n	0	1	0	0	3	0	1	1	3
MCOR976D2	A		KM-Germ	n	0	0	0	0	3	0	4	4	3
MCOR976D2	B		KM-Germ	n	0	0	0	0	4	0	3	3	4
MCOR976D2	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
MCOR976D2	E		KM-Germ	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	A		KM-Germ	n	0	0	1	0	6	0	0	0	6
MCOR976D9	B		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
HMNF085		1	DL-Irel	n	0	0	1	0	33	0	0	0	33
HMNF085		3	DL-Irel	n	0	0	1	0	32	0	0	0	32
HMNF088		1	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF088		2	DL-Irel	n	0	0	1	0	22	0	0	0	22
HMNF088		3	DL-Irel	n	1	0	1	0	13	0	0	0	13
HMNF098		1	DL-Irel	n	0	0	0	0	18	0	0	0	18
HMNF098		2	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF098		3	DL-Irel	n	0	0	1	0	14	0	0	0	14
HMNF118		1	DL-Irel	n	0	0	1	0	18	0	0	0	18
HMNF118		2	DL-Irel	n					12		0	0	12
HMNF147		1	DL-Irel	n	0	0	1	0	20	0	0	0	20
HMNF147		2	DL-Irel	n	0	1	0	0	26	0	0	0	26
HMNF147		3	DL-Irel	n	0	1	0	0	24	0	0	0	24
hmnotsogood		0	DL-Irel	n	0	0			8		0	0	8
hyaline010		1	DL-Irel	n	0	1	1	0	5	0	0	0	5
hyaline010		2	DL-Irel	n	0	1	0	0	7	0	0	0	7
hyaline010		3	DL-Irel	n	0	1	0	0	8	0	0	0	8
MCOR976D2	A		DL-Irel	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		DL-Irel	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C		DL-Irel	n	0	0	0	0	8	0	2	2	8
MCOR976D2	E		DL-Irel	n	0	0	0	0	6	0	1	1	6
MCOR976D2	F		DL-Irel	n	0	0	1	0	5	1	1	2	6
MCOR976D9	A		DL-Irel	n	0	0	0	1	2	0	1	1	2
MCOR976D9	B		DL-Irel	n	0	0	0	0	2	1	2	3	3
MCOR976D9	C		DL-Irel	n	0	0	0	0	1	0	3	3	1
HMNF085		1	GE-Neth	n	0	0	1	0	30	0	0	0	30
HMNF085		3	GE-Neth	n	0	0	1	0	31	0	0	0	31
HMNF088		1	GE-Neth	n	0	0	0	0	38	0	0	0	38
HMNF088		2	GE-Neth	n	0	0	0	0	41	2	0	2	43
HMNF088		3	GE-Neth	n	0	0	0	1	22	0	0	0	22
HMNF098		1	GE-Neth	n	0	0	0	0	25	0	0	0	25
HMNF098		2	GE-Neth	n	0	0	1	0	27	0	0	0	27
HMNF098		3	GE-Neth	n	0	0	0	1	21	0	0	0	21
HMNF118		1	GE-Neth	n	0	0	1	0	19	0	1	1	19
HMNF118		2	GE-Neth	n	0	0	1	1	12	0	0	0	12
HMNF147		1	GE-Neth	n	0	0	1	1	32	0	1	1	32
HMNF147		2	GE-Neth	n	0	0	1	0	40	0	0	0	40
HMNF147		3	GE-Neth	n	0	0	0	0	27	0	0	0	27
hmnotsogood		0	GE-Neth	n	0	0	0	1	7	0	0	0	7
hyaline010		1	GE-Neth	n	0	1	0	0	6	0	0	0	6
hyaline010		2	GE-Neth	n	0	1	0	0	8	0	0	0	8
hyaline010		3	GE-Neth	n	0	1	0	0	11	0	0	0	11
MCOR976D2	A		GE-Neth	n	0	0	0	0	2	2	0	2	4
MCOR976D2	B		GE-Neth	n	1	0	0	0	1	1	1	2	2
MCOR976D2	C		GE-Neth	n	0	0	0	0	3	0	2	2	3
MCOR976D2	E		GE-Neth	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		GE-Neth	n	0	0	1	0	6	0	2	2	6
MCOR976D9	A		GE-Neth	n	0	0	0	0	4	1	0	1	5
MCOR976D9	B		GE-Neth	n	0	0	0	0	2	2	1	3	4
MCOR976D9	C		GE-Neth	n	0	0	0	0	0	5	0	5	5
HMNF085		1	AMC-Port	e	0	0	0	0	30	1	0	1	31
HMNF085		3	AMC-Port	e	0	0	0	0	30	0	0	0	30
HMNF088		1	AMC-Port	e	0	0	0	0	40	0	0	0	40
HMNF088		2	AMC-Port	e	0	0	0	0	36	2	0	2	38
HMNF088		3	AMC-Port	e	0	0	0	0	28	3	0	3	31
HMNF098		1	AMC-Port	e	0	0	0	0	29	0	0	0	29
HMNF098		2	AMC-Port	e	0	0	0	0	32	0	0	0	32
HMNF098		3	AMC-Port	e	0	0	0	0	23	0	0	0	23
HMNF118		1	AMC-Port	e	0	1	0	0	25	0	0	0	25
HMNF118		2	AMC-Port	e	0	0	1	0	22	0	0	0	22
HMNF147		1	AMC-Port	e	0	0	1	0	32	3	0	3	35
HMNF147		2	AMC-Port	e	0	0	0	0	52	0	0	0	52
HMNF147		3	AMC-Port	e	0	0	0	0	41	0	0	0	41

hmnotsogood	0	AMC-Port	e	0	0	1	0	10	0	0	0	10
hyaline010	1	AMC-Port	e	0	1	0	0	5	0	0	0	5
hyaline010	2	AMC-Port	e	0	1	0	0	11	0	0	0	11
hyaline010	3	AMC-Port	e	0	1	0	0	15	0	0	0	15
MCOR976D2	A	AMC-Port	e	0	0	0	0	1	2	0	2	3
MCOR976D2	B	AMC-Port	e	1	0	0	0	2	2	0	2	4
MCOR976D2	C	AMC-Port	e	0	0	0	0	2	0	2	2	2
MCOR976D2	E	AMC-Port	e	0	0	0	0	4	2	0	2	6
MCOR976D2	F	AMC-Port	e	0	0	1	0	2	2	0	2	4
MCOR976D9	A	AMC-Port	e	1	0	0	0	7	2	0	2	9
MCOR976D9	B	AMC-Port	e	0	0	0	0	7	3	0	3	10
MCOR976D9	C	AMC-Port	e	0	0	0	0	2	3	0	3	5
HMNF085	1	Christie-En	n	0	0	1	0	28	0	0	0	28
HMNF085	3	Christie-En	n	0	0	0	0	26	6	0	6	32
HMNF088	1	Christie-En	n	0	0	0	0	38	3	0	3	41
HMNF088	2	Christie-En	n	0	0	1	0	28	3	0	3	31
HMNF088	3	Christie-En	n	0	0	0	0	18	0	3	3	18
HMNF098	1	Christie-En	n	0	0	0	0	26	0	0	0	26
HMNF098	2	Christie-En	n	0	0	0	0	28	2	0	2	30
HMNF098	3	Christie-En	n	0	0	0	0	24	0	1	1	24
HMNF118	1	Christie-En	n	0	0	0	0	15	6	0	6	21
HMNF118	2	Christie-En	n	0	0	0	0	16	2	0	2	18
HMNF147	1	Christie-En	n	0	0	0	1	30	3	1	4	33
HMNF147	2	Christie-En	n	0	0	0	0	18	0	0	0	18
HMNF147	3	Christie-En	n	0	0	0	0	18	2	0	2	20
hmnotsogood	0	Christie-En	n	0	0	0	0	3	2	0	2	5
hyaline010	1	Christie-En	n	0	1	0	0	5	0	0	0	5
hyaline010	2	Christie-En	n	0	1	0	0	6	0	0	0	6
hyaline010	3	Christie-En	n	0	0	0	0	9	0	0	0	9
MCOR976D2	A	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	C	Christie-En	n	0	0	0	0	4	0	1	1	4
MCOR976D2	E	Christie-En	n	0	0	0	0	4	0	2	2	4
MCOR976D2	F	Christie-En	n	0	0	0	0	5	0	2	2	5
MCOR976D9	A	Christie-En	n	0	0	0	0	2	1	0	1	3
MCOR976D9	B	Christie-En	n	0	0	0	0	1	0	3	3	1
MCOR976D9	C	Christie-En	n	0	0	0	1	2	2	0	2	4
HMNF085	1	NH-Germ	n	0	0	0	0	35	1	0	1	36
HMNF085	3	NH-Germ	n	0	0	1	0	38	1	0	1	39
HMNF088	1	NH-Germ	n	0	0	0	0	62	0	0	0	62
HMNF088	2	NH-Germ	n	0	0	0	1	42	1	1	2	43
HMNF088	3	NH-Germ	n	0	0	0	0	42	0	3	3	42
HMNF098	1	NH-Germ	n	0	0	0	0	37	0	0	0	37
HMNF098	2	NH-Germ	n	0	0	0	0	46	0	0	0	46
HMNF098	3	NH-Germ	n	0	0	0	0	31	0	0	0	31
HMNF118	1	NH-Germ	n	0	0	1	0	32	1	0	1	33
HMNF118	2	NH-Germ	n	0	0	1	0	26	0	0	0	26
HMNF147	1	NH-Germ	n	0	0	0	1	41	0	1	1	41
HMNF147	2	NH-Germ	n	0	0	0	1	62	0	0	0	62
HMNF147	3	NH-Germ	n	0	0	0	0	59	1	0	1	60
hmnotsogood	0	NH-Germ	n	0	0	0	1	10	0	0	0	10
hyaline010	1	NH-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010	2	NH-Germ	n	0	1	0	0	11	0	0	0	11
hyaline010	3	NH-Germ	n	0	1	0	0	16	0	0	0	16
MCOR976D2	A	NH-Germ	n	0	1	0	0	3	4	0	4	7
MCOR976D2	B	NH-Germ	n	1	0	0	0	3	1	2	3	4
MCOR976D2	C	NH-Germ	n	0	0	0	0	9	3	0	3	12
MCOR976D2	E	NH-Germ	n	0	1	0	0	5	2	0	2	7
MCOR976D2	F	NH-Germ	n	0	0	0	1	4	3	1	4	7
MCOR976D9	A	NH-Germ	n	0	1	0	0	2	2	0	2	4
MCOR976D9	B	NH-Germ	n	0	1	0	0	4	3	0	3	7
MCOR976D9	C	NH-Germ	n	0	0	1	0	6	3	0	3	9
HMNF085	1	PW-Eng	e	0	0	1	1	32	0	1	1	32
HMNF085	3	PW-Eng	e	0	0	0	0	29	3	0	3	32
HMNF088	1	PW-Eng	e	0	0	0	0	36	0	0	0	36
HMNF088	2	PW-Eng	e	0	0	0	1	35	0	1	1	35
HMNF088	3	PW-Eng	e	0	0	0	1	25	0	1	1	25
HMNF098	1	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF098	2	PW-Eng	e	1	0	0	0	31	0	0	0	31
HMNF098	3	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF118	1	PW-Eng	e	0	0	0	0	21	1	0	1	22
HMNF118	2	PW-Eng	e	0	0	0	0	17	0	0	0	17
HMNF147	1	PW-Eng	e	0	0	0	1	32	0	2	2	32
HMNF147	2	PW-Eng	e	0	0	0	0	30	0	0	0	30
HMNF147	3	PW-Eng	e	0	0	0	0	28	0	0	0	28
hmnotsogood	0	PW-Eng	e	0	0	0	1	9	0	0	0	9
hyaline010	1	PW-Eng	e	0	1	0	0	6	0	0	0	6
hyaline010	2	PW-Eng	e	0	1	0	0	8	0	0	0	8
hyaline010	3	PW-Eng	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	PW-Eng	e	0	0	0	0	2	0	2	2	2
MCOR976D2	B	PW-Eng	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	PW-Eng	e	0	0	0	0	2	1	2	3	3
MCOR976D2	E	PW-Eng	e	0	0	0	0	3	1	1	2	4
MCOR976D2	F	PW-Eng	e	0	0	1	0	3	1	1	2	4
MCOR976D9	A	PW-Eng	e	1	0	0	0	1	2	0	2	3
MCOR976D9	B	PW-Eng	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	PW-Eng	e	0	0	1	0	2	3	0	3	5

Average of vitellogenic oocytes		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	30	29	32	33	32	31	32	34	28	33	30	29	23	35
	3	30	29	30	30	22	25	29	31	26	32	31	31	20	38
HMNF088	1	40	40	33	38	35	40	36	40	38	27	38	36	22	62
	2	36	37	24	37	34	32	35	32	28	22	41	29	25	42
	3	28	30	23	28	27	37	25	22	18	13	22	20	16	42
HMNF098	1	29	27	23	25	26	26	26	23	26	18	25	22	20	37
	2	32	34	28	35	33	27	31	30	28	27	27	29	28	46
	3	23	25	23	22	24	17	26	19	24	14	21	22	24	31
HMNF118	1	25	24	15	22	23	19	21	17	15	18	19	19	9	32
	2	22	17	14	18	13	15	17	11	16	12	12	15	12	26
HMNF147	1	32	41	29	33	34	30	32	25	30	20	32	27	26	41
	2	52	40	29	36	44	38	30	31	18	26	40	26	21	62
	3	41	34	26	33	34	42	28	22	18	24	27	25	28	59
hmnotsogood	0	10	10	7	9	7	7	9	6	3	8	7	7	5	10
hyaline010	1	5	6	5	5	5	5	6	5	5	5	6	5	4	8
	2	11	7	7	7	7	6	8	7	6	7	8	7	8	11
	3	15	14	13	10	16	10	13	12	9	8	11	12	3	16
MCOR976D2	A	1	2	2	2	2	1	2	2	2	2	2	2	3	3
	B	2	2	2	2	2	1	2	2	2	2	1	2	4	3
	C	2	4	4	4	4	5	2	3	4	8	3	5	4	9
	E	4	3	4	4	5	2	3	3	4	6	6	2	6	5
	F	2	4	5	4	6	4	3	4	5	5	6	3	4	4
MCOR976D9	A	7	3	5	2	3	6	1	4	2	2	4	2	6	2
	B	7	2	4	2	3	7	2	4	1	2	2	1	4	4
	C	2	3	2	2	3	4	2	2	2	1	0	3	4	6

sample	minimum	round(aver	maximum
HMNF0	29	32	34
HMNF0	22	28	31
HMNF0	33	38	40
HMNF0	24	33	37
HMNF0	22	28	37
HMNF0	23	26	29
HMNF0	27	31	35
HMNF0	17	22	26
HMNF1	15	21	25
HMNF1	11	16	22
HMNF1	25	32	41
HMNF1	29	38	52
HMNF1	22	33	42
hmnots	6	8	10
hyaline	5	5	6
hyaline	6	8	11
hyaline	10	13	16
MCOR9	1	2	2
MCOR9	1	2	2
MCOR9	2	4	5
MCOR9	2	4	5
MCOR9	2	4	6
MCOR9	1	4	7
MCOR9	2	4	7
MCOR9	2	3	4

Sum of alfa atresia		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	1	0	0	1	2	1	1	1	0	0	0	0	0	1
	3	0	0	3	0	3	2	3	3	6	0	0	0	3	1
HMNF088	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0
	2	2	2	2	2	2	2	1	1	3	0	2	1	2	2
	3	3	2	1	3	1	0	1	0	3	0	0	0	3	3
HMNF098	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0
HMNF118	1	0	2	0	0	1	0	1	1	6	0	1	1	2	1
	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
HMNF147	1	3	4	2	3	4	1	2	0	4	0	1	1	4	1
	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	2	0	0	0	1	1
hmnotsogood	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	0	0	0	0	0	0	0	1	0
MCOR976D2	A	2	3	2	2	2	2	2	3	2	2	2	2	4	4
	B	2	2	2	2	2	2	2	2	2	2	2	2	3	3
	C	2	2	2	2	2	2	3	2	1	2	2	2	2	3
	E	2	2	2	2	2	0	2	2	2	1	2	2	2	2
	F	2	2	2	2	1	0	2	3	2	2	2	2	2	4
MCOR976D9	A	2	2	0	1	1	1	2	1	1	1	1	1	0	2
	B	3	3	3	3	3	3	3	3	3	3	3	3	2	3
	C	3	2	2	4	3	2	3	3	2	3	5	2	2	3

sample	minimum	round(aver	maximum
HMNF0	0	1	2
HMNF0	0	2	3
HMNF0	0	0	0
HMNF0	1	2	2
HMNF0	0	1	3
HMNF0	0	0	2
HMNF0	0	0	0
HMNF0	0	0	1
HMNF1	0	1	2
HMNF1	0	0	0
HMNF1	0	2	4
HMNF1	0	0	1
HMNF1	0	0	0
hmnots	0	0	0
hyaline	0	0	0
hyaline	0	0	0
hyaline	0	0	1
MCOR9	2	2	3
MCOR9	2	2	2
MCOR9	2	2	3
MCOR9	0	2	2
MCOR9	0	2	3
MCOR9	0	1	2
MCOR9	3	3	3
MCOR9	2	3	4

Sum of hydrated		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF098	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HMNF118	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	6
	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
hmnotsogood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyaline010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	13
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCOR976D9	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sum of POF		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	1	1	1	1	0	1	0	1	1	0	0	1	1	9
	3	0	0	1	1	1	0	1	0	1	1	0	1	0	1	8
HMNF088	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
	3	0	0	1	0	0	1	0	0	1	0	0	0	0	1	4
HMNF098	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HMNF118	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	9
	2	1	0		1	1	0	1	1	1	0	1	1	0	1	9
HMNF147	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	5
	2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	4
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hmnotsogood	0	1	0		0	0	1	0	0	0	0	0	0	0	1	3
hyaline010	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	1	0	1	1	1	1	1	1	1	1	1	0	1	0	11
MCOR976D9	A	0	0	0	0	0	0	0	1	1	0	1	0	0	1	4
	B	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
	C	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3

Average of vitellogenic oocytes		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	30	28	33	30	29	32	33	32	29	31	23	35	32	34	30.79
	3	30	26	32	31	29	30	30	22	31	25	20	38	29	31	28.86
HMNF088	1	40	38	27	38	40	33	38	35	36	40	22	62	36	40	37.5
	2	36	28	22	41	37	24	37	34	29	32	25	42	35	32	32.43
	3	28	18	13	22	30	23	28	27	20	37	16	42	25	22	25.07
HMNF098	1	29	26	18	25	27	23	25	26	22	26	20	37	26	23	25.21
	2	32	28	27	27	34	28	35	33	29	27	28	46	31	30	31.07
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	22.5
HMNF118	1	25	15	18	19	24	15	22	23	19	19	9	32	21	17	19.86
	2	22	16	12	12	17	14	18	13	15	15	12	26	17	11	15.71
HMNF147	1	32	30	20	32	41	29	33	34	27	30	26	41	32	25	30.86
	2	52	18	26	40	40	29	36	44	26	38	21	62	30	31	35.21
	3	41	18	24	27	34	26	33	34	25	42	28	59	28	22	31.5
hmnotsogood	0	10	3	8	7	10	7	9	7	7	7	5	10	9	6	7.5
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5.357
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	7.643
	3	15	9	8	11	14	13	10	16	12	10	3	16	13	12	11.57
MCOR976D2	A	1	2	2	2	2	2	2	2	2	1	3	3	2	2	2
	B	2	2	2	1	2	2	2	2	2	1	4	3	2	2	2.071
	C	2	4	8	3	4	4	4	4	5	5	4	9	2	3	4.357
	E	4	4	6	6	3	4	4	5	2	2	6	5	3	3	4.071
	F	2	5	5	6	4	5	4	6	3	4	4	4	3	4	4.214
MCOR976D9	A	7	2	2	4	3	5	2	3	2	6	6	2	1	4	3.5
	B	7	1	2	2	2	4	2	3	1	7	4	4	2	4	3.214
	C	2	2	1	0	3	2	2	3	3	4	4	6	2	2	2.571

all readers			
sample	minimum	round(average)	maximum
HMNF085-1	23	31	35
HMNF085-3	20	29	38
HMNF088-1	22	38	62
HMNF088-2	22	32	42
HMNF088-3	13	25	42
HMNF098-1	18	25	37
HMNF098-2	27	31	46
HMNF098-3	14	23	31
HMNF118-1	9	20	32
HMNF118-2	11	16	26
HMNF147-1	20	31	41
HMNF147-2	18	35	62
HMNF147-3	18	32	59
hmnotsogood-	3	8	10
hyaline010-1	4	5	8
hyaline010-2	6	8	11
hyaline010-3	3	12	16
MCOR976D2-	1	2	3
MCOR976D2-	1	2	4
MCOR976D2-	2	4	9
MCOR976D2-	2	4	6
MCOR976D2-	2	4	6
MCOR976D9-	1	4	7
MCOR976D9-	1	3	7
MCOR976D9-	0	3	6

		NH-Germ	AMC-Port	HM-Sp	JRP-Sp	IG-Scot	IdB-Neth	HW-Neth	KM-Gern	GE-Ne	PW-Eng	SH-Irel	IM-Sp	DL-Irel	Christie-Eng	
HMNF085	1	0.137	-0.026	-0.058	0.007	0.039	0.072	0.039	-0.253	-0.026	0.039	0.104	-0.058	0.072	-0.090	(score-mean)/mean
	3	0.317	0.040	0.005	-0.134	-0.238	0.040	0.040	-0.307	0.074	0.005	0.074	0.074	0.109	-0.099	
HMNF088	1	0.653	0.067	0.067	0.067	-0.067	0.013	-0.120	-0.413	0.013	-0.040	0.067	-0.040	-0.280	0.013	
	2	0.295	0.110	0.141	-0.013	0.048	0.141	-0.260	-0.229	0.264	0.079	-0.013	-0.106	-0.322	-0.137	
	3	0.675	0.117	0.197	0.476	0.077	0.117	-0.083	-0.362	-0.123	-0.003	-0.123	-0.202	-0.481	-0.282	
HMNF098	1	0.467	0.150	0.071	0.031	0.031	-0.008	-0.088	-0.207	-0.008	0.031	-0.088	-0.127	-0.286	0.031	
	2	0.480	0.030	0.094	-0.131	0.062	0.126	-0.099	-0.099	-0.131	-0.002	-0.034	-0.067	-0.131	-0.099	
	3	0.378	0.022	0.111	-0.244	0.067	-0.022	0.022	0.067	-0.067	0.156	-0.156	-0.022	-0.378	0.067	
HMNF118	1	0.612	0.259	0.209	-0.043	0.158	0.108	-0.245	-0.547	-0.043	0.058	-0.144	-0.043	-0.094	-0.245	
	2	0.655	0.400	0.082	-0.045	-0.173	0.145	-0.109	-0.236	-0.236	0.082	-0.300	-0.045	-0.236	0.018	
HMNF147	1	0.329	0.037	0.329	-0.028	0.102	0.069	-0.060	-0.157	0.037	0.037	-0.190	-0.125	-0.352	-0.028	
	2	0.761	0.477	0.136	0.079	0.249	0.022	-0.176	-0.404	0.136	-0.148	-0.120	-0.262	-0.262	-0.489	
	3	0.873	0.302	0.079	0.333	0.079	0.048	-0.175	-0.111	-0.143	-0.111	-0.302	-0.206	-0.238	-0.429	
hmnotsogood	0	0.333	0.333	0.333	-0.067	-0.067	0.200	-0.067	-0.333	-0.067	0.200	-0.200	-0.067	0.067	-0.600	
hyaline010	1	0.493	-0.067	0.120	-0.067	-0.067	-0.067	-0.067	-0.253	0.120	0.120	-0.067	-0.067	-0.067	-0.067	
	2	0.439	0.439	-0.084	-0.215	-0.084	-0.084	-0.084	0.047	0.047	0.047	-0.084	-0.084	-0.084	-0.215	
	3	0.383	0.296	0.210	-0.136	0.383	-0.136	0.123	-0.741	-0.049	0.123	0.037	0.037	-0.309	-0.222	
MCOR976D2	A	0.500	-0.500	0.000	-0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	
	B	0.448	-0.034	-0.034	-0.517	-0.034	-0.034	-0.034	0.931	-0.517	-0.034	-0.034	-0.034	-0.034	-0.034	
	C	1.066	-0.541	-0.082	0.148	-0.082	-0.082	-0.082	-0.082	-0.311	-0.541	-0.311	0.148	0.836	-0.082	
	E	0.228	-0.018	-0.263	-0.509	0.228	-0.018	-0.018	0.474	0.474	-0.263	-0.263	-0.509	0.474	-0.018	
	F	-0.051	-0.525	-0.051	-0.051	0.424	-0.051	0.186	-0.051	0.424	-0.288	-0.051	-0.288	0.186	0.186	
MCOR976D9	A	-0.429	1.000	-0.143	0.714	-0.143	-0.429	0.429	0.714	0.143	-0.714	0.143	-0.429	-0.429	-0.429	
	B	0.244	1.178	-0.378	1.178	-0.067	-0.378	0.244	0.244	-0.378	-0.378	0.244	-0.689	-0.378	-0.689	
	C	1.333	-0.222	0.167	0.556	0.167	-0.222	-0.222	0.556	-1.000	-0.222	-0.222	0.167	-0.611	-0.222	
		0.465	0.133	0.050	0.036	0.044	-0.017	-0.036	-0.050	-0.055	-0.071	-0.081	-0.122	-0.129	-0.166	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	ranking

			reader														
sample	number	Data	AMC-Port	Christie	DL-Irel	GE-Net	HM-Sp	HW-Neth	IdB-Neth	IG-Sco	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-En	SH-Irel	average
HMNF085	1	Average of	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0.286
		Average of	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0.286
	3	Average of	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.714
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	Average of	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.357
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	2	3	0	2	0	0	0	2	1	0	0	1	0	0	0.786
		Average of	0	0	0	0	2	2	2	0	0	2	2	1	1	1	0.929
	3	Average of	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0.357

sample	atresia	minimum	round(aver	maximum
HMNF085-	Average of early alfa	0	0.29	2
HMNF085-	Average of early alfa	0	0.29	1
HMNF088-	Average of early alfa	0	1.71	6
HMNF088-	Average of early alfa	0	0	0
HMNF088-	Average of early alfa	0	0.36	3
HMNF098-	Average of early alfa	0	0	0
HMNF098-	Average of early alfa	0	0.79	3
HMNF098-	Average of early alfa	0	0.93	2
HMNF118-	Average of early alfa	0	0.36	3

HMNF088	3	Average of	0	3	0	0	1	1	2	1	0	0	3	3	1	0	1.071
HMNF098	1	Average of	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.286
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.214
HMNF118	1	Average of	0	6	0	0	1	0	0	1	1	0	0	1	1	0	0.786
		Average of	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0.357
	2	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	Average of	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0.5
		Average of	0	1	0	1	4	2	3	3	1	1	4	1	2	0	1.643
	2	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hmnotsogood	0	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hyaline010	1	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
MCOR976D2	A	Average of	2	0	0	2	0	0	2	2	0	0	0	4	0	0	0.857
		Average of	0	2	2	0	3	2	0	0	2	2	4	0	2	3	1.571
	B	Average of	2	0	0	1	0	0	1	1	0	0	0	1	0	0	0.429
		Average of	0	2	2	1	2	2	1	1	2	2	3	2	2	2	1.714
	C	Average of	0	0	0	0	0	0	0	2	1	0	0	3	1	0	0.5
		Average of	2	1	2	2	2	2	2	0	1	2	2	0	2	2	1.571
	E	Average of	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0.357
		Average of	0	2	1	2	2	2	2	2	2	0	2	0	1	2	1.429
	F	Average of	2	0	1	0	0	0	1	0	1	0	0	3	1	0	0.643
		Average of	0	2	1	2	2	2	1	1	1	0	2	1	1	3	1.357
MCOR976D9	A	Average of	2	1	0	1	2	0	1	1	0	1	0	2	2	1	1
		Average of	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.143
	B	Average of	3	0	1	2	2	0	3	3	1	0	0	3	2	3	1.643
		Average of	0	3	2	1	1	3	0	0	2	3	2	0	1	0	1.286
	C	Average of	3	2	0	5	2	0	4	3	2	0	0	3	3	2	2.071
		Average of	0	0	3	0	0	2	0	0	0	2	2	0	0	1	0.714

HMNF118-	Average of early alfa	0	1.07	3
HMNF147-	Average of early alfa	0	0.21	2
HMNF147-	Average of early alfa	0	0	0
HMNF147-	Average of early alfa	0	0.29	2
hmnotsogo	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0.21	1
hyaline010	Average of early alfa	0	0.79	6
MCOR976	Average of early alfa	0	0.36	2
MCOR976	Average of early alfa	0	0.15	2
MCOR976	Average of early alfa	0	0	0
MCOR976	Average of early alfa	0	0.5	3
MCOR976	Average of early alfa	0	1.64	4
MCOR976	Average of early alfa	0	0.07	1
MCOR976	Average of early alfa	0	0	0
MCOR976	Average of early alfa	0	0.21	2
HMNF085-	Average of late alfa	0	0.07	1
HMNF085-	Average of late alfa	0	0.15	2
HMNF088-	Average of late alfa	0	0.07	1
HMNF088-	Average of late alfa	0	0	0
HMNF088-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.86	4
HMNF147-	Average of late alfa	0	1.57	4
HMNF147-	Average of late alfa	0	0.43	2
HMNF147-	Average of late alfa	0	1.71	3
hmnotsogo	Average of late alfa	0	0.5	3
hyaline010	Average of late alfa	0	1.57	2
hyaline010	Average of late alfa	0	0.36	2
hyaline010	Average of late alfa	0	1.43	2
MCOR976	Average of late alfa	0	0.64	3
MCOR976	Average of late alfa	0	1.36	3
MCOR976	Average of late alfa	0	1	2
MCOR976	Average of late alfa	0	0.14	1
MCOR976	Average of late alfa	0	1.64	3
MCOR976	Average of late alfa	0	1.29	3
MCOR976	Average of late alfa	0	2.07	5
MCOR976	Average of late alfa	0	0.71	3

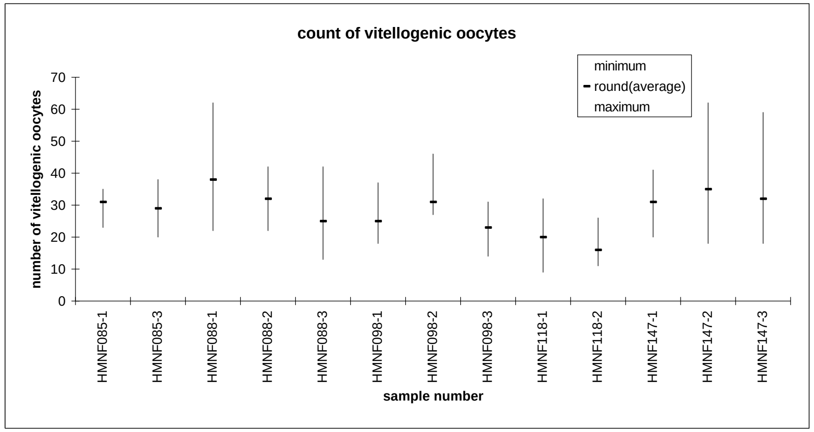
Sum of alfa atresia		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	1	0	0	0	0	0	1	2	0	1	0	1	1	1	0.57
	3	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.71
HMNF088	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.36
	2	2	3	0	2	2	2	2	2	1	2	2	2	1	1	1.71
	3	3	3	0	0	2	1	3	1	0	0	3	3	1	0	1.43
HMNF098	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.21
	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.29
	3	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.21
HMNF118	1	0	6	0	1	2	0	0	1	1	0	2	1	1	1	1.14
	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.14
HMNF147	1	3	4	0	1	4	2	3	4	1	1	4	1	2	0	2.14
	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.07
	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.29
hmnotsogood	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0.21
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.14
MCOR976D2	A	2	2	2	2	3	2	2	2	2	2	4	4	2	3	2.43
	B	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2.14
	C	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2.07
	E	2	2	1	2	2	2	2	2	2	0	2	2	2	2	1.79
	F	2	2	2	2	2	2	2	1	2	0	2	4	2	3	2.00
MCOR976D9	A	2	1	1	1	2	0	1	1	1	1	0	2	2	1	1.14
	B	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2.93

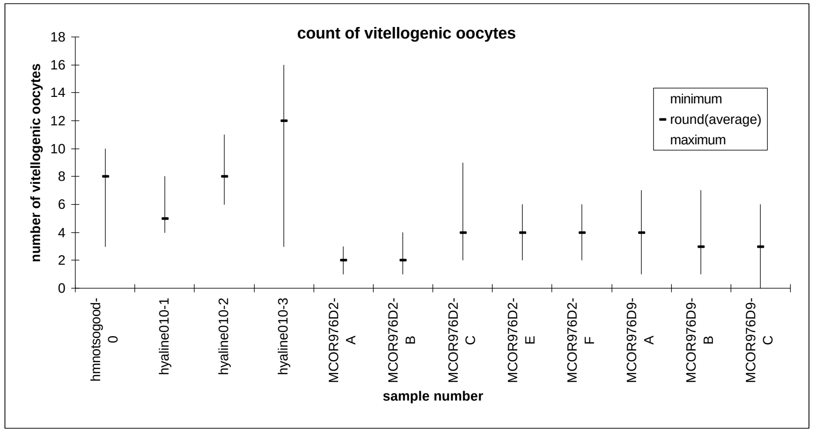
sample	minimum	round(aver	maximum
HMNF085-	0	0.571429	2
HMNF085-	0	1.714286	6
HMNF088-	0	0.357143	3
HMNF088-	0	1.714286	3
HMNF088-	0	1.428571	3
HMNF098-	0	0.214286	2
HMNF098-	0	0.285714	2
HMNF098-	0	0.214286	1
HMNF118-	0	1.142857	6
HMNF118-	0	0.142857	2
HMNF147-	0	2.142857	4
HMNF147-	0	0.071429	1
HMNF147-	0	0.285714	2
hmnotsogo	0	0.214286	2
hyaline010	0	0	0
hyaline010	0	0	0
hyaline010	0	0.142857	1
MCOR976	2	2.428571	4
MCOR976	2	2.142857	3
MCOR976	1	2.071429	3
MCOR976	0	1.785714	2
MCOR976	0	2	4
MCOR976	0	1.142857	2
MCOR976	2	2.928571	3

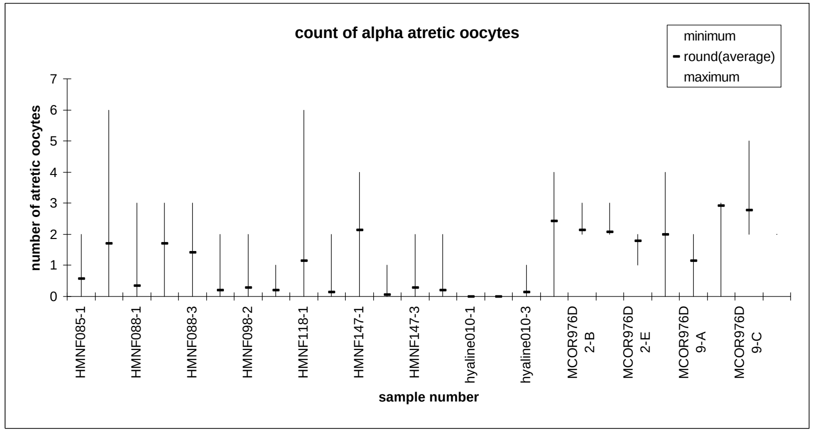
MCOR976D9	C	3	2	3	5	2	2	4	3	2	2	2	3	3	3	2.79		MCOR976I	2	2.785714	5

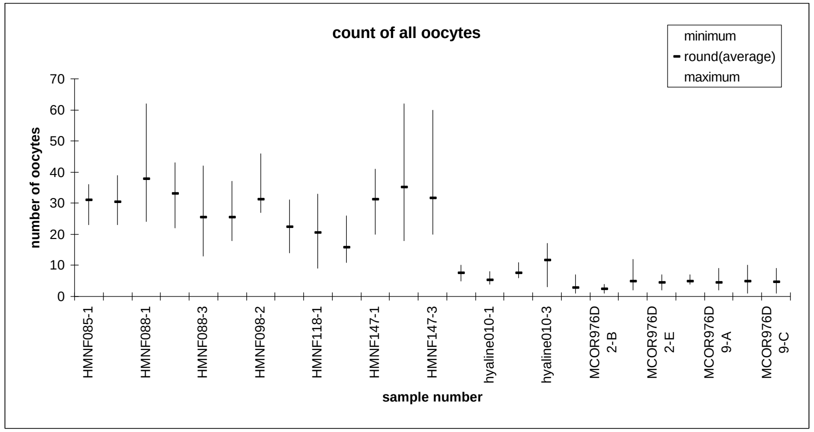
Sum of total oocytes		reader																			
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel		round(average)	sample	minimum	round(aver	maximum
HMNF085	1	31	28	33	30	29	32	33	34	29	31	23	36	32	34	31	31	HMNF085-	23	31	36
	3	30	32	32	31	29	33	30	25	31	27	23	39	32	34	31	31	HMNF085-	23	31	39
HMNF088	1	40	41	27	38	40	33	38	35	36	40	24	62	36	40	38	38	HMNF088-	24	38	62
	2	38	31	22	43	37	24	37	36	30	32	25	43	35	32	33	33	HMNF088-	22	33	43
	3	31	18	13	22	31	23	29	27	20	37	16	42	25	22	25	25	HMNF088-	13	25	42
HMNF098	1	29	26	18	25	29	23	25	26	23	26	20	37	26	23	25	25	HMNF098-	18	25	37
	2	32	30	27	27	34	28	35	33	29	27	30	46	31	30	31	31	HMNF098-	27	31	46
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	23	23	HMNF098-	14	23	31
HMNF118	1	25	21	18	19	25	15	22	24	20	19	9	33	22	17	21	21	HMNF118-	9	21	33
	2	22	18	12	12	17	14	18	13	15	15	12	26	17	11	16	16	HMNF118-	11	16	26
HMNF147	1	35	33	20	32	41	29	33	35	27	30	26	41	32	25	31	31	HMNF147-	20	31	41
	2	52	18	26	40	40	29	36	45	26	38	21	62	30	31	35	35	HMNF147-	18	35	62
	3	41	20	24	27	34	26	33	34	25	42	28	60	28	22	32	32	HMNF147-	20	32	60
hmnotsogood	0	10	5	8	7	10	7	9	7	7	7	5	10	9	6	8	8	hmnotsogo	5	8	10
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5	5	hyaline010	4	5	8
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	8	8	hyaline010	6	8	11
	3	15	9	8	11	14	13	10	17	12	10	3	16	13	12	12	12	hyaline010	3	12	17
MCOR976D2	A	3	2	2	4	2	2	4	4	2	1	3	7	2	2	3	3	MCOR976I	1	3	7
	B	4	2	2	2	2	2	3	3	2	1	4	4	2	2	3	3	MCOR976I	1	3	4
	C	2	4	8	3	4	4	4	6	6	5	4	12	3	3	5	5	MCOR976I	2	5	12
	E	6	4	6	6	3	4	4	5	2	2	6	7	4	3	4	4	MCOR976I	2	4	7
	F	4	5	6	6	4	5	5	6	4	4	4	7	4	4	5	5	MCOR976I	4	5	7
MCOR976D9	A	9	3	2	5	5	5	3	4	2	7	6	4	3	5	5	5	MCOR976I	2	5	9
	B	10	1	3	4	4	4	5	6	2	7	4	7	4	7	5	5	MCOR976I	1	5	10
	C	5	4	1	5	5	2	6	6	5	4	4	9	5	4	5	5	MCOR976I	1	5	9

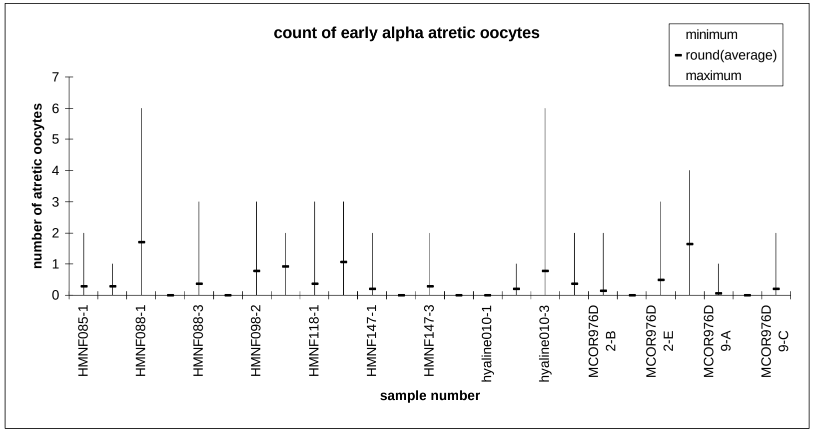
		NH-Germ	AMC-Port	IG-Scot	IdB-Neth	HM-Sp	GE-Neth	PW-Eng	JRP-Sp	SH-Irel	HW-Neth	IM-Sp	Christie-Er	KM-Germ	DL-Irel	
HMNF085	1	0.161	0.000	0.097	0.065	-0.065	-0.032	0.032	0.000	0.097	0.032	-0.065	-0.097	-0.258	0.065	
	3	0.258	-0.032	-0.194	-0.032	-0.065	0.000	0.032	-0.129	0.097	0.065	0.000	0.032	-0.258	0.032	
HMNF088	1	0.632	0.053	-0.079	0.000	0.053	0.000	-0.053	0.053	0.053	-0.132	-0.053	0.079	-0.368	-0.289	
	2	0.303	0.152	0.091	0.121	0.121	0.303	0.061	-0.030	-0.030	-0.273	-0.091	-0.061	-0.242	-0.333	
	3	0.680	0.240	0.080	0.160	0.240	-0.120	0.000	0.480	-0.120	-0.080	-0.200	-0.280	-0.360	-0.480	
HMNF098	1	0.480	0.160	0.040	0.000	0.160	0.000	0.040	0.040	-0.080	-0.080	-0.080	0.040	-0.200	-0.280	
	2	0.484	0.032	0.065	0.129	0.097	-0.129	0.000	-0.129	-0.032	-0.097	-0.065	-0.032	-0.032	-0.129	
	3	0.348	0.000	0.043	-0.043	0.087	-0.087	0.130	-0.261	-0.174	0.000	-0.043	0.043	0.043	-0.391	
HMNF118	1	0.571	0.190	0.143	0.048	0.190	-0.095	0.048	-0.095	-0.190	-0.286	-0.048	0.000	-0.571	-0.143	
	2	0.625	0.375	-0.188	0.125	0.063	-0.250	0.063	-0.063	-0.313	-0.125	-0.063	0.125	-0.250	-0.250	
HMNF147	1	0.323	0.129	0.129	0.065	0.323	0.032	0.032	-0.032	-0.194	-0.065	-0.129	0.065	-0.161	-0.355	
	2	0.771	0.486	0.286	0.029	0.143	0.143	-0.143	0.086	-0.114	-0.171	-0.257	-0.486	-0.400	-0.257	
	3	0.875	0.281	0.063	0.031	0.063	-0.156	-0.125	0.313	-0.313	-0.188	-0.219	-0.375	-0.125	-0.250	
hmnotsogood	0	0.250	0.250	-0.125	0.125	0.250	-0.125	0.125	-0.125	-0.250	-0.125	-0.125	-0.375	-0.375	0.000	
hyaline010	1	0.600	0.000	0.000	0.000	0.200	0.200	0.200	0.000	0.000	0.000	0.000	0.000	-0.200	0.000	
	2	0.375	0.375	-0.125	-0.125	-0.125	0.000	0.000	-0.250	-0.125	-0.125	-0.125	-0.250	0.000	-0.125	
	3	0.333	0.250	0.417	-0.167	0.167	-0.083	0.083	-0.167	0.000	0.083	0.000	-0.250	-0.750	-0.333	
MCOR976D2	A	1.333	0.000	0.333	0.333	-0.333	0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.000	-0.333	
	B	0.333	0.333	0.000	0.000	-0.333	-0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.333	-0.333	
	C	1.400	-0.600	0.200	-0.200	-0.200	-0.400	-0.400	0.000	-0.400	-0.200	0.200	-0.200	-0.200	0.600	
	E	0.750	0.500	0.250	0.000	-0.250	0.500	0.000	-0.500	-0.250	0.000	-0.500	0.000	0.500	0.500	
	F	0.400	-0.200	0.200	0.000	-0.200	0.200	-0.200	-0.200	-0.200	0.000	-0.200	0.000	-0.200	0.200	
MCOR976D9	A	-0.200	0.800	-0.200	-0.400	0.000	0.000	-0.400	0.400	0.000	0.000	-0.600	-0.400	0.200	-0.600	
	B	0.400	1.000	0.200	0.000	-0.200	-0.200	-0.200	0.400	0.400	-0.200	-0.600	-0.800	-0.200	-0.400	
	C	0.800	0.000	0.200	0.200	0.000	0.000	0.000	-0.200	-0.200	-0.600	0.000	-0.200	-0.200	-0.800	
		0.531	0.191	0.077	0.019	0.015	-0.012	-0.054	-0.070	-0.120	-0.129	-0.157	-0.164	-0.171	-0.187	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	rank

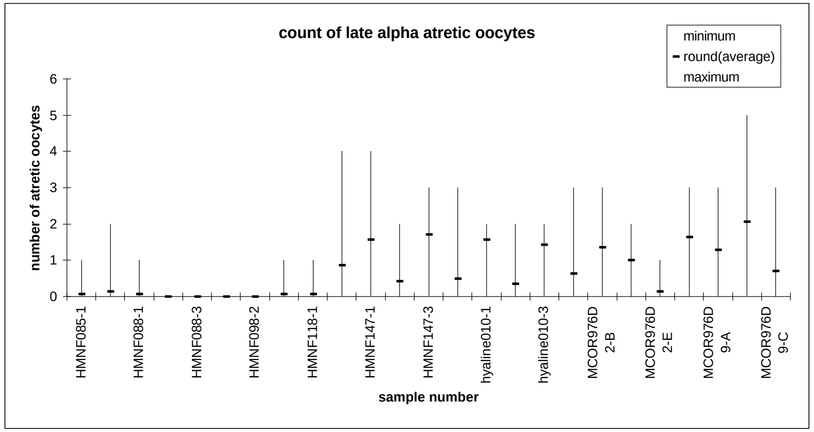

count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF085-3
HMNF088-1
HMNF088-2
HMNF088-3
HMNF098-1
HMNF098-2
HMNF098-3
HMNF118-1
HMNF118-2
HMNF147-1
HMNF147-2
HMNF147-3
sample number


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
2
4
6
8
10
12
14
16
18
hmnotsogood-0
hyaline010-1
hyaline010-2
hyaline010-3
MCOR976D2-A
MCOR976D2-B
MCOR976D2-C
MCOR976D2-E
MCOR976D2-F
MCOR976D9-A
MCOR976D9-B
MCOR976D9-C
sample number


count of alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of all oocytes
minimum
round(average)
maximum
number of oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of early alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of late alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number

Annex 4

Analysis of the interpretation of histological slides of mackerel and horse mackerel

sample	number	reader	experience	mig.nucleus	hydrated	POF	beta atr	vitellogenic	early alfa atresia	late alfa atr	alfa atresia	total oocytes
HMNF085	1	IdB-Neth	e	0	0	1	0	33	0	1	1	33
HMNF085	3	IdB-Neth	e	0	0	1	0	30	0	0	0	30
HMNF088	1	IdB-Neth	e	0	0	0	0	38	0	0	0	38
HMNF088	2	IdB-Neth	e	0	0	0	0	37	0	2	2	37
HMNF088	3	IdB-Neth	e	0	0	0	0	28	1	2	3	29
HMNF098	1	IdB-Neth	e	0	0	0	0	25	0	0	0	25
HMNF098	2	IdB-Neth	e	0	0	0	0	35	0	0	0	35
HMNF098	3	IdB-Neth	e	0	0	0	0	22	0	0	0	22
HMNF118	1	IdB-Neth	e	0	1	1	0	22	0	0	0	22
HMNF118	2	IdB-Neth	e	0	0	1	0	18	0	0	0	18
HMNF147	1	IdB-Neth	e	0	0	0	0	33	0	3	3	33
HMNF147	2	IdB-Neth	e	0	0	0	0	36	0	0	0	36
HMNF147	3	IdB-Neth	e	0	0	0	0	33	0	0	0	33
hmnotsogood	0	IdB-Neth	e	0	0	0	1	9	0	0	0	9
hyaline010	1	IdB-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	IdB-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IdB-Neth	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	IdB-Neth	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IdB-Neth	e	0	0	0	0	2	1	1	2	3
MCOR976D2	C	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	F	IdB-Neth	e	0	0	1	0	4	1	1	2	5
MCOR976D9	A	IdB-Neth	e	1	0	0	0	2	1	0	1	3
MCOR976D9	B	IdB-Neth	e	0	0	0	0	2	3	0	3	5
MCOR976D9	C	IdB-Neth	e	0	0	0	0	2	4	0	4	6
HMNF085	1	IM-Sp	n	0	0	1	0	29	0	0	0	29
HMNF085	3	IM-Sp	n	0	0	1	0	31	0	0	0	31
HMNF088	1	IM-Sp	n	0	0	1	0	36	0	0	0	36
HMNF088	2	IM-Sp	n	0	0	0	1	29	1	0	1	30
HMNF088	3	IM-Sp	n	0	0	1	1	20	0	0	0	20
HMNF098	1	IM-Sp	n	0	0	1	0	22	1	0	1	23
HMNF098	2	IM-Sp	n	0	0	0	0	29	0	0	0	29
HMNF098	3	IM-Sp	n	0	1	0	0	22	0	0	0	22
HMNF118	1	IM-Sp	n	0	0	1	0	19	1	0	1	20
HMNF118	2	IM-Sp	n	0	0	1	0	15	0	0	0	15
HMNF147	1	IM-Sp	n	0	0	0	1	27	0	1	1	27
HMNF147	2	IM-Sp	n	0	0	0	0	26	0	0	0	26
HMNF147	3	IM-Sp	n	0	0	0	0	25	0	0	0	25
hmnotsogood	0	IM-Sp	n	0	0	0	1	7	0	0	0	7
hyaline010	1	IM-Sp	n	0	1	0	0	5	0	0	0	5
hyaline010	2	IM-Sp	n	0	1	0	0	7	0	0	0	7
hyaline010	3	IM-Sp	n	0	1	0	0	12	0	0	0	12
MCOR976D2	A	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	IM-Sp	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C	IM-Sp	n	0	0	0	0	5	1	1	2	6
MCOR976D2	E	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	F	IM-Sp	n	0	0	1	0	3	1	1	2	4
MCOR976D9	A	IM-Sp	n	0	0	1	0	2	0	1	1	2
MCOR976D9	B	IM-Sp	n	0	0	0	0	1	1	2	3	2
MCOR976D9	C	IM-Sp	n	0	0	0	0	3	2	0	2	5
HMNF085	1	HM-Sp	e	0	0	1	1	29	0	0	0	29
HMNF085	3	HM-Sp	e	0	0	1	0	29	0	0	0	29
HMNF088	1	HM-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	HM-Sp	e	0	0	0	0	37	0	2	2	37
HMNF088	3	HM-Sp	e	0	0	0	0	30	1	1	2	31
HMNF098	1	HM-Sp	e	0	0	1	1	27	2	0	2	29
HMNF098	2	HM-Sp	e	0	0	0	0	34	0	0	0	34
HMNF098	3	HM-Sp	e	0	0	0	0	25	0	0	0	25
HMNF118	1	HM-Sp	e	0	1	1	0	24	1	1	2	25
HMNF118	2	HM-Sp	e	0	0	1	1	17	0	0	0	17
HMNF147	1	HM-Sp	e	0	0	0	0	41	0	4	4	41
HMNF147	2	HM-Sp	e	0	0	1	1	40	0	0	0	40
HMNF147	3	HM-Sp	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	HM-Sp	e	0	0	0	1	10	0	0	0	10
hyaline010	1	HM-Sp	e	0	1	1	0	6	0	0	0	6
hyaline010	2	HM-Sp	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HM-Sp	e	0	1	0	0	14	0	0	0	14
MCOR976D2	A	HM-Sp	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	HM-Sp	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	HM-Sp	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	HM-Sp	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	HM-Sp	e	0	0	1	0	4	0	2	2	4
MCOR976D9	A	HM-Sp	e	0	0	0	0	3	2	0	2	5
MCOR976D9	B	HM-Sp	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	HM-Sp	e	0	0	0	0	3	2	0	2	5
HMNF085	1	IG-Scot	e	0	0	0	0	32	2	0	2	34
HMNF085	3	IG-Scot	e	0	0	0	0	22	3	0	3	25
HMNF088	1	IG-Scot	e	0	0	0	0	35	0	0	0	35
HMNF088	2	IG-Scot	e	0	0	0	0	34	2	0	2	36
HMNF088	3	IG-Scot	e	0	0	0	0	27	0	1	1	27
HMNF098	1	IG-Scot	e	0	0	0	0	26	0	0	0	26
HMNF098	2	IG-Scot	e	0	0	0	0	33	0	0	0	33
HMNF098	3	IG-Scot	e	0	0	0	0	24	0	0	0	24
HMNF118	1	IG-Scot	e	0	1	1	0	23	1	0	1	24
HMNF118	2	IG-Scot	e	0	0	1	0	13	0	0	0	13
HMNF147	1	IG-Scot	e	0	0	0	0	34	1	3	4	35
HMNF147	2	IG-Scot	e	0	0	0	0	44	1	0	1	45

HMNF147	3	IG-Scot	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	IG-Scot	e	0	0	0	1	7	0	0	0	7
hyaline010	1	IG-Scot	e	0	1	1	0	5	0	0	0	5
hyaline010	2	IG-Scot	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IG-Scot	e	0	1	1	0	16	1	0	1	17
MCOR976D2	A	IG-Scot	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IG-Scot	e	1	0	0	0	2	1	1	2	3
MCOR976D2	C	IG-Scot	e	0	0	0	0	4	2	0	2	6
MCOR976D2	E	IG-Scot	e	0	0	0	0	5	0	2	2	5
MCOR976D2	F	IG-Scot	e	0	0	1	1	6	0	1	1	6
MCOR976D9	A	IG-Scot	e	1	0	1	0	3	1	0	1	4
MCOR976D9	B	IG-Scot	e	0	0	0	0	3	3	0	3	6
MCOR976D9	C	IG-Scot	e	0	0	1	0	3	3	0	3	6
HMNF085	1	SH-Irel	e	0	0	1	0	34	0	1	1	34
HMNF085	3	SH-Irel	e	0	0	1	1	31	3	0	3	34
HMNF088	1	SH-Irel	e	0	0	0	0	40	0	0	0	40
HMNF088	2	SH-Irel	e	0	0	0	1	32	0	1	1	32
HMNF088	3	SH-Irel	e	0	0	1	1	22	0	0	0	22
HMNF098	1	SH-Irel	e	1	0	0	0	23	0	0	0	23
HMNF098	2	SH-Irel	e	1	0	0	0	30	0	0	0	30
HMNF098	3	SH-Irel	e	0	0	0	0	19	0	1	1	19
HMNF118	1	SH-Irel	e	0	0	1	0	17	0	1	1	17
HMNF118	2	SH-Irel	e	0	0	1	0	11	0	0	0	11
HMNF147	1	SH-Irel	e	0	0	1	1	25	0	0	0	25
HMNF147	2	SH-Irel	e	0	1	1	0	31	0	0	0	31
HMNF147	3	SH-Irel	e	0	1	0	0	22	0	0	0	22
hmnotsogood	0	SH-Irel	e	0	0	1	0	6	0	0	0	6
hyaline010	1	SH-Irel	e	0	1	1	0	5	0	0	0	5
hyaline010	2	SH-Irel	e	0	1	1	0	7	0	0	0	7
hyaline010	3	SH-Irel	e	0	1	0	0	12	0	0	0	12
MCOR976D2	A	SH-Irel	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	SH-Irel	e	1	0	1	1	2	0	2	2	2
MCOR976D2	C	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	E	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	SH-Irel	e	0	0	0	1	4	0	3	3	4
MCOR976D9	A	SH-Irel	e	0	0	1	0	4	1	0	1	5
MCOR976D9	B	SH-Irel	e	0	0	1	0	4	3	0	3	7
MCOR976D9	C	SH-Irel	e	0	0	0	0	2	2	1	3	4
HMNF085	1	JRP-Sp	e	0	0	1	0	31	0	1	1	31
HMNF085	3	JRP-Sp	e	1	0	1	0	25	2	0	2	27
HMNF088	1	JRP-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	JRP-Sp	e	0	0	0	0	32	0	2	2	32
HMNF088	3	JRP-Sp	e	0	0	0	1	37	0	0	0	37
HMNF098	1	JRP-Sp	e	1	0	0	0	26	0	0	0	26
HMNF098	2	JRP-Sp	e	1	0	0	0	27	0	0	0	27
HMNF098	3	JRP-Sp	e	1	0	0	0	17	0	0	0	17
HMNF118	1	JRP-Sp	e	0	0	0	1	19	0	0	0	19
HMNF118	2	JRP-Sp	e	0	0	0	1	15	0	0	0	15
HMNF147	1	JRP-Sp	e	0	0	0	1	30	0	1	1	30
HMNF147	2	JRP-Sp	e	0	0	0	0	38	0	0	0	38
HMNF147	3	JRP-Sp	e	0	0	0	0	42	0	0	0	42
hmnotsogood	0	JRP-Sp	e	0	0	0	0	7	0	0	0	7
hyaline010	1	JRP-Sp	e	0	1	0	0	5	0	0	0	5
hyaline010	2	JRP-Sp	e	0	1	0	0	6	0	0	0	6
hyaline010	3	JRP-Sp	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	JRP-Sp	e	0	0	0	0	1	0	2	2	1
MCOR976D2	B	JRP-Sp	e	0	0	0	1	1	0	2	2	1
MCOR976D2	C	JRP-Sp	e	0	0	0	0	5	0	2	2	5
MCOR976D2	E	JRP-Sp	e	0	0	0	1	2	0	0	0	2
MCOR976D2	F	JRP-Sp	e	0	0	1	0	4	0	0	0	4
MCOR976D9	A	JRP-Sp	e	0	0	0	0	6	1	0	1	7
MCOR976D9	B	JRP-Sp	e	0	0	0	0	7	0	3	3	7
MCOR976D9	C	JRP-Sp	e	0	0	0	0	4	0	2	2	4
HMNF085	1	HW-Neth	e	0	0	0	0	32	0	0	0	32
HMNF085	3	HW-Neth	e	0	0	0	1	30	3	0	3	33
HMNF088	1	HW-Neth	e	0	0	0	0	33	0	0	0	33
HMNF088	2	HW-Neth	e	0	0	0	1	24	0	2	2	24
HMNF088	3	HW-Neth	e	0	0	1	1	23	0	1	1	23
HMNF098	1	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF098	2	HW-Neth	e	0	0	0	0	28	0	0	0	28
HMNF098	3	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF118	1	HW-Neth	e	0	1	0	0	15	0	0	0	15
HMNF118	2	HW-Neth	e	0	0	0	0	14	0	0	0	14
HMNF147	1	HW-Neth	e	0	0	1	1	29	0	2	2	29
HMNF147	2	HW-Neth	e	0	0	1	0	29	0	0	0	29
HMNF147	3	HW-Neth	e	0	0	0	0	26	0	0	0	26
hmnotsogood	0	HW-Neth	e	0	0	1	0	7	0	0	0	7
hyaline010	1	HW-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	HW-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HW-Neth	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	HW-Neth	e	0	0	0	1	2	0	2	2	2
MCOR976D2	B	HW-Neth	e	1	0	0	1	2	0	2	2	2
MCOR976D2	C	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	E	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	F	HW-Neth	e	0	0	1	1	5	0	2	2	5
MCOR976D9	A	HW-Neth	e	1	0	0	0	5	0	0	0	5
MCOR976D9	B	HW-Neth	e	0	0	0	1	4	0	3	3	4
MCOR976D9	C	HW-Neth	e	0	0	0	1	2	0	2	2	2

HMNF085		1	KM-Germ	n	0	0	0	0	23	0	0	0	23
HMNF085		3	KM-Germ	n	0	0	0	0	20	3	0	3	23
HMNF088		1	KM-Germ	n	0	0	0	0	22	2	0	2	24
HMNF088		2	KM-Germ	n	0	0	1	0	25	0	2	2	25
HMNF088		3	KM-Germ	n	0	0	0	0	16	0	3	3	16
HMNF098		1	KM-Germ	n	0	0	0	0	20	0	0	0	20
HMNF098		2	KM-Germ	n	0	0	0	0	28	2	0	2	30
HMNF098		3	KM-Germ	n	0	0	0	0	24	0	1	1	24
HMNF118		1	KM-Germ	n	0	1	1	0	9	0	2	2	9
HMNF118		2	KM-Germ	n	0	0	1	0	12	0	0	0	12
HMNF147		1	KM-Germ	n	0	0	0	0	26	0	4	4	26
HMNF147		2	KM-Germ	n	0	1	0	0	21	0	0	0	21
HMNF147		3	KM-Germ	n	0	0	0	0	28	0	1	1	28
hmnotsogood		0	KM-Germ	n	0	0	0	0	5	0	1	1	5
hyaline010		1	KM-Germ	n	0	1	0	0	4	0	0	0	4
hyaline010		2	KM-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		3	KM-Germ	n	0	1	0	0	3	0	1	1	3
MCOR976D2	A		KM-Germ	n	0	0	0	0	3	0	4	4	3
MCOR976D2	B		KM-Germ	n	0	0	0	0	4	0	3	3	4
MCOR976D2	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
MCOR976D2	E		KM-Germ	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	A		KM-Germ	n	0	0	1	0	6	0	0	0	6
MCOR976D9	B		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
HMNF085		1	DL-Irel	n	0	0	1	0	33	0	0	0	33
HMNF085		3	DL-Irel	n	0	0	1	0	32	0	0	0	32
HMNF088		1	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF088		2	DL-Irel	n	0	0	1	0	22	0	0	0	22
HMNF088		3	DL-Irel	n	1	0	1	0	13	0	0	0	13
HMNF098		1	DL-Irel	n	0	0	0	0	18	0	0	0	18
HMNF098		2	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF098		3	DL-Irel	n	0	0	1	0	14	0	0	0	14
HMNF118		1	DL-Irel	n	0	0	1	0	18	0	0	0	18
HMNF118		2	DL-Irel	n					12		0	0	12
HMNF147		1	DL-Irel	n	0	0	1	0	20	0	0	0	20
HMNF147		2	DL-Irel	n	0	1	0	0	26	0	0	0	26
HMNF147		3	DL-Irel	n	0	1	0	0	24	0	0	0	24
hmnotsogood		0	DL-Irel	n	0	0			8		0	0	8
hyaline010		1	DL-Irel	n	0	1	1	0	5	0	0	0	5
hyaline010		2	DL-Irel	n	0	1	0	0	7	0	0	0	7
hyaline010		3	DL-Irel	n	0	1	0	0	8	0	0	0	8
MCOR976D2	A		DL-Irel	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		DL-Irel	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C		DL-Irel	n	0	0	0	0	8	0	2	2	8
MCOR976D2	E		DL-Irel	n	0	0	0	0	6	0	1	1	6
MCOR976D2	F		DL-Irel	n	0	0	1	0	5	1	1	2	6
MCOR976D9	A		DL-Irel	n	0	0	0	1	2	0	1	1	2
MCOR976D9	B		DL-Irel	n	0	0	0	0	2	1	2	3	3
MCOR976D9	C		DL-Irel	n	0	0	0	0	1	0	3	3	1
HMNF085		1	GE-Neth	n	0	0	1	0	30	0	0	0	30
HMNF085		3	GE-Neth	n	0	0	1	0	31	0	0	0	31
HMNF088		1	GE-Neth	n	0	0	0	0	38	0	0	0	38
HMNF088		2	GE-Neth	n	0	0	0	0	41	2	0	2	43
HMNF088		3	GE-Neth	n	0	0	0	1	22	0	0	0	22
HMNF098		1	GE-Neth	n	0	0	0	0	25	0	0	0	25
HMNF098		2	GE-Neth	n	0	0	1	0	27	0	0	0	27
HMNF098		3	GE-Neth	n	0	0	0	1	21	0	0	0	21
HMNF118		1	GE-Neth	n	0	0	1	0	19	0	1	1	19
HMNF118		2	GE-Neth	n	0	0	1	1	12	0	0	0	12
HMNF147		1	GE-Neth	n	0	0	1	1	32	0	1	1	32
HMNF147		2	GE-Neth	n	0	0	1	0	40	0	0	0	40
HMNF147		3	GE-Neth	n	0	0	0	0	27	0	0	0	27
hmnotsogood		0	GE-Neth	n	0	0	0	1	7	0	0	0	7
hyaline010		1	GE-Neth	n	0	1	0	0	6	0	0	0	6
hyaline010		2	GE-Neth	n	0	1	0	0	8	0	0	0	8
hyaline010		3	GE-Neth	n	0	1	0	0	11	0	0	0	11
MCOR976D2	A		GE-Neth	n	0	0	0	0	2	2	0	2	4
MCOR976D2	B		GE-Neth	n	1	0	0	0	1	1	1	2	2
MCOR976D2	C		GE-Neth	n	0	0	0	0	3	0	2	2	3
MCOR976D2	E		GE-Neth	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		GE-Neth	n	0	0	1	0	6	0	2	2	6
MCOR976D9	A		GE-Neth	n	0	0	0	0	4	1	0	1	5
MCOR976D9	B		GE-Neth	n	0	0	0	0	2	2	1	3	4
MCOR976D9	C		GE-Neth	n	0	0	0	0	0	5	0	5	5
HMNF085		1	AMC-Port	e	0	0	0	0	30	1	0	1	31
HMNF085		3	AMC-Port	e	0	0	0	0	30	0	0	0	30
HMNF088		1	AMC-Port	e	0	0	0	0	40	0	0	0	40
HMNF088		2	AMC-Port	e	0	0	0	0	36	2	0	2	38
HMNF088		3	AMC-Port	e	0	0	0	0	28	3	0	3	31
HMNF098		1	AMC-Port	e	0	0	0	0	29	0	0	0	29
HMNF098		2	AMC-Port	e	0	0	0	0	32	0	0	0	32
HMNF098		3	AMC-Port	e	0	0	0	0	23	0	0	0	23
HMNF118		1	AMC-Port	e	0	1	0	0	25	0	0	0	25
HMNF118		2	AMC-Port	e	0	0	1	0	22	0	0	0	22
HMNF147		1	AMC-Port	e	0	0	1	0	32	3	0	3	35
HMNF147		2	AMC-Port	e	0	0	0	0	52	0	0	0	52
HMNF147		3	AMC-Port	e	0	0	0	0	41	0	0	0	41

hmnotsogood	0	AMC-Port	e	0	0	1	0	10	0	0	0	10
hyaline010	1	AMC-Port	e	0	1	0	0	5	0	0	0	5
hyaline010	2	AMC-Port	e	0	1	0	0	11	0	0	0	11
hyaline010	3	AMC-Port	e	0	1	0	0	15	0	0	0	15
MCOR976D2	A	AMC-Port	e	0	0	0	0	1	2	0	2	3
MCOR976D2	B	AMC-Port	e	1	0	0	0	2	2	0	2	4
MCOR976D2	C	AMC-Port	e	0	0	0	0	2	0	2	2	2
MCOR976D2	E	AMC-Port	e	0	0	0	0	4	2	0	2	6
MCOR976D2	F	AMC-Port	e	0	0	1	0	2	2	0	2	4
MCOR976D9	A	AMC-Port	e	1	0	0	0	7	2	0	2	9
MCOR976D9	B	AMC-Port	e	0	0	0	0	7	3	0	3	10
MCOR976D9	C	AMC-Port	e	0	0	0	0	2	3	0	3	5
HMNF085	1	Christie-En	n	0	0	1	0	28	0	0	0	28
HMNF085	3	Christie-En	n	0	0	0	0	26	6	0	6	32
HMNF088	1	Christie-En	n	0	0	0	0	38	3	0	3	41
HMNF088	2	Christie-En	n	0	0	1	0	28	3	0	3	31
HMNF088	3	Christie-En	n	0	0	0	0	18	0	3	3	18
HMNF098	1	Christie-En	n	0	0	0	0	26	0	0	0	26
HMNF098	2	Christie-En	n	0	0	0	0	28	2	0	2	30
HMNF098	3	Christie-En	n	0	0	0	0	24	0	1	1	24
HMNF118	1	Christie-En	n	0	0	0	0	15	6	0	6	21
HMNF118	2	Christie-En	n	0	0	0	0	16	2	0	2	18
HMNF147	1	Christie-En	n	0	0	0	1	30	3	1	4	33
HMNF147	2	Christie-En	n	0	0	0	0	18	0	0	0	18
HMNF147	3	Christie-En	n	0	0	0	0	18	2	0	2	20
hmnotsogood	0	Christie-En	n	0	0	0	0	3	2	0	2	5
hyaline010	1	Christie-En	n	0	1	0	0	5	0	0	0	5
hyaline010	2	Christie-En	n	0	1	0	0	6	0	0	0	6
hyaline010	3	Christie-En	n	0	0	0	0	9	0	0	0	9
MCOR976D2	A	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	C	Christie-En	n	0	0	0	0	4	0	1	1	4
MCOR976D2	E	Christie-En	n	0	0	0	0	4	0	2	2	4
MCOR976D2	F	Christie-En	n	0	0	0	0	5	0	2	2	5
MCOR976D9	A	Christie-En	n	0	0	0	0	2	1	0	1	3
MCOR976D9	B	Christie-En	n	0	0	0	0	1	0	3	3	1
MCOR976D9	C	Christie-En	n	0	0	0	1	2	2	0	2	4
HMNF085	1	NH-Germ	n	0	0	0	0	35	1	0	1	36
HMNF085	3	NH-Germ	n	0	0	1	0	38	1	0	1	39
HMNF088	1	NH-Germ	n	0	0	0	0	62	0	0	0	62
HMNF088	2	NH-Germ	n	0	0	0	1	42	1	1	2	43
HMNF088	3	NH-Germ	n	0	0	0	0	42	0	3	3	42
HMNF098	1	NH-Germ	n	0	0	0	0	37	0	0	0	37
HMNF098	2	NH-Germ	n	0	0	0	0	46	0	0	0	46
HMNF098	3	NH-Germ	n	0	0	0	0	31	0	0	0	31
HMNF118	1	NH-Germ	n	0	0	1	0	32	1	0	1	33
HMNF118	2	NH-Germ	n	0	0	1	0	26	0	0	0	26
HMNF147	1	NH-Germ	n	0	0	0	1	41	0	1	1	41
HMNF147	2	NH-Germ	n	0	0	0	1	62	0	0	0	62
HMNF147	3	NH-Germ	n	0	0	0	0	59	1	0	1	60
hmnotsogood	0	NH-Germ	n	0	0	0	1	10	0	0	0	10
hyaline010	1	NH-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010	2	NH-Germ	n	0	1	0	0	11	0	0	0	11
hyaline010	3	NH-Germ	n	0	1	0	0	16	0	0	0	16
MCOR976D2	A	NH-Germ	n	0	1	0	0	3	4	0	4	7
MCOR976D2	B	NH-Germ	n	1	0	0	0	3	1	2	3	4
MCOR976D2	C	NH-Germ	n	0	0	0	0	9	3	0	3	12
MCOR976D2	E	NH-Germ	n	0	1	0	0	5	2	0	2	7
MCOR976D2	F	NH-Germ	n	0	0	0	1	4	3	1	4	7
MCOR976D9	A	NH-Germ	n	0	1	0	0	2	2	0	2	4
MCOR976D9	B	NH-Germ	n	0	1	0	0	4	3	0	3	7
MCOR976D9	C	NH-Germ	n	0	0	1	0	6	3	0	3	9
HMNF085	1	PW-Eng	e	0	0	1	1	32	0	1	1	32
HMNF085	3	PW-Eng	e	0	0	0	0	29	3	0	3	32
HMNF088	1	PW-Eng	e	0	0	0	0	36	0	0	0	36
HMNF088	2	PW-Eng	e	0	0	0	1	35	0	1	1	35
HMNF088	3	PW-Eng	e	0	0	0	1	25	0	1	1	25
HMNF098	1	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF098	2	PW-Eng	e	1	0	0	0	31	0	0	0	31
HMNF098	3	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF118	1	PW-Eng	e	0	0	0	0	21	1	0	1	22
HMNF118	2	PW-Eng	e	0	0	0	0	17	0	0	0	17
HMNF147	1	PW-Eng	e	0	0	0	1	32	0	2	2	32
HMNF147	2	PW-Eng	e	0	0	0	0	30	0	0	0	30
HMNF147	3	PW-Eng	e	0	0	0	0	28	0	0	0	28
hmnotsogood	0	PW-Eng	e	0	0	0	1	9	0	0	0	9
hyaline010	1	PW-Eng	e	0	1	0	0	6	0	0	0	6
hyaline010	2	PW-Eng	e	0	1	0	0	8	0	0	0	8
hyaline010	3	PW-Eng	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	PW-Eng	e	0	0	0	0	2	0	2	2	2
MCOR976D2	B	PW-Eng	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	PW-Eng	e	0	0	0	0	2	1	2	3	3
MCOR976D2	E	PW-Eng	e	0	0	0	0	3	1	1	2	4
MCOR976D2	F	PW-Eng	e	0	0	1	0	3	1	1	2	4
MCOR976D9	A	PW-Eng	e	1	0	0	0	1	2	0	2	3
MCOR976D9	B	PW-Eng	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	PW-Eng	e	0	0	1	0	2	3	0	3	5

Average of vitellogenic oocytes		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	30	29	32	33	32	31	32	34	28	33	30	29	23	35
	3	30	29	30	30	22	25	29	31	26	32	31	31	20	38
HMNF088	1	40	40	33	38	35	40	36	40	38	27	38	36	22	62
	2	36	37	24	37	34	32	35	32	28	22	41	29	25	42
	3	28	30	23	28	27	37	25	22	18	13	22	20	16	42
HMNF098	1	29	27	23	25	26	26	26	23	26	18	25	22	20	37
	2	32	34	28	35	33	27	31	30	28	27	27	29	28	46
	3	23	25	23	22	24	17	26	19	24	14	21	22	24	31
HMNF118	1	25	24	15	22	23	19	21	17	15	18	19	19	9	32
	2	22	17	14	18	13	15	17	11	16	12	12	15	12	26
HMNF147	1	32	41	29	33	34	30	32	25	30	20	32	27	26	41
	2	52	40	29	36	44	38	30	31	18	26	40	26	21	62
	3	41	34	26	33	34	42	28	22	18	24	27	25	28	59
hmnotsogood	0	10	10	7	9	7	7	9	6	3	8	7	7	5	10
hyaline010	1	5	6	5	5	5	5	6	5	5	5	6	5	4	8
	2	11	7	7	7	7	6	8	7	6	7	8	7	8	11
	3	15	14	13	10	16	10	13	12	9	8	11	12	3	16
MCOR976D2	A	1	2	2	2	2	1	2	2	2	2	2	2	3	3
	B	2	2	2	2	2	1	2	2	2	2	1	2	4	3
	C	2	4	4	4	4	5	2	3	4	8	3	5	4	9
	E	4	3	4	4	5	2	3	3	4	6	6	2	6	5
	F	2	4	5	4	6	4	3	4	5	5	6	3	4	4
MCOR976D9	A	7	3	5	2	3	6	1	4	2	2	4	2	6	2
	B	7	2	4	2	3	7	2	4	1	2	2	1	4	4
	C	2	3	2	2	3	4	2	2	2	1	0	3	4	6

sample	minimum	round(aver	maximum
HMNF0	29	32	34
HMNF0	22	28	31
HMNF0	33	38	40
HMNF0	24	33	37
HMNF0	22	28	37
HMNF0	23	26	29
HMNF0	27	31	35
HMNF0	17	22	26
HMNF1	15	21	25
HMNF1	11	16	22
HMNF1	25	32	41
HMNF1	29	38	52
HMNF1	22	33	42
hmnots	6	8	10
hyaline	5	5	6
hyaline	6	8	11
hyaline	10	13	16
MCOR9	1	2	2
MCOR9	1	2	2
MCOR9	2	4	5
MCOR9	2	4	5
MCOR9	2	4	6
MCOR9	1	4	7
MCOR9	2	4	7
MCOR9	2	3	4

Sum of alfa atresia		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	1	0	0	1	2	1	1	1	0	0	0	0	0	1
	3	0	0	3	0	3	2	3	3	6	0	0	0	3	1
HMNF088	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0
	2	2	2	2	2	2	2	1	1	3	0	2	1	2	2
	3	3	2	1	3	1	0	1	0	3	0	0	0	3	3
HMNF098	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0
HMNF118	1	0	2	0	0	1	0	1	1	6	0	1	1	2	1
	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
HMNF147	1	3	4	2	3	4	1	2	0	4	0	1	1	4	1
	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	2	0	0	0	1	1
hmnotsogood	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	0	0	0	0	0	0	0	1	0
MCOR976D2	A	2	3	2	2	2	2	2	3	2	2	2	2	4	4
	B	2	2	2	2	2	2	2	2	2	2	2	2	3	3
	C	2	2	2	2	2	2	3	2	1	2	2	2	2	3
	E	2	2	2	2	2	0	2	2	2	1	2	2	2	2
	F	2	2	2	2	1	0	2	3	2	2	2	2	2	4
MCOR976D9	A	2	2	0	1	1	1	2	1	1	1	1	1	0	2
	B	3	3	3	3	3	3	3	3	3	3	3	3	2	3
	C	3	2	2	4	3	2	3	3	2	3	5	2	2	3

sample	minimum	round(aver	maximum
HMNF0	0	1	2
HMNF0	0	2	3
HMNF0	0	0	0
HMNF0	1	2	2
HMNF0	0	1	3
HMNF0	0	0	2
HMNF0	0	0	0
HMNF0	0	0	1
HMNF1	0	1	2
HMNF1	0	0	0
HMNF1	0	2	4
HMNF1	0	0	1
HMNF1	0	0	0
hmnots	0	0	0
hyaline	0	0	0
hyaline	0	0	0
hyaline	0	0	1
MCOR9	2	2	3
MCOR9	2	2	2
MCOR9	2	2	3
MCOR9	0	2	2
MCOR9	0	2	3
MCOR9	0	1	2
MCOR9	3	3	3
MCOR9	2	3	4

Sum of hydrated		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF098	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HMNF118	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	6
	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
hmnotsogood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyaline010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	13
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCOR976D9	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sum of POF		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	1	1	1	1	0	1	0	1	1	0	0	1	1	9
	3	0	0	1	1	1	0	1	0	1	1	0	1	0	1	8
HMNF088	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
	3	0	0	1	0	0	1	0	0	1	0	0	0	0	1	4
HMNF098	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HMNF118	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	9
	2	1	0		1	1	0	1	1	1	0	1	1	0	1	9
HMNF147	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	5
	2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	4
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hmnotsogood	0	1	0		0	0	1	0	0	0	0	0	0	0	1	3
hyaline010	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	1	0	1	1	1	1	1	1	1	1	1	0	1	0	11
MCOR976D9	A	0	0	0	0	0	0	0	1	1	0	1	0	0	1	4
	B	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
	C	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3

Average of vitellogenic oocytes		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	30	28	33	30	29	32	33	32	29	31	23	35	32	34	30.79
	3	30	26	32	31	29	30	30	22	31	25	20	38	29	31	28.86
HMNF088	1	40	38	27	38	40	33	38	35	36	40	22	62	36	40	37.5
	2	36	28	22	41	37	24	37	34	29	32	25	42	35	32	32.43
	3	28	18	13	22	30	23	28	27	20	37	16	42	25	22	25.07
HMNF098	1	29	26	18	25	27	23	25	26	22	26	20	37	26	23	25.21
	2	32	28	27	27	34	28	35	33	29	27	28	46	31	30	31.07
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	22.5
HMNF118	1	25	15	18	19	24	15	22	23	19	19	9	32	21	17	19.86
	2	22	16	12	12	17	14	18	13	15	15	12	26	17	11	15.71
HMNF147	1	32	30	20	32	41	29	33	34	27	30	26	41	32	25	30.86
	2	52	18	26	40	40	29	36	44	26	38	21	62	30	31	35.21
	3	41	18	24	27	34	26	33	34	25	42	28	59	28	22	31.5
hmnotsogood	0	10	3	8	7	10	7	9	7	7	7	5	10	9	6	7.5
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5.357
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	7.643
	3	15	9	8	11	14	13	10	16	12	10	3	16	13	12	11.57
MCOR976D2	A	1	2	2	2	2	2	2	2	2	1	3	3	2	2	2
	B	2	2	2	1	2	2	2	2	2	1	4	3	2	2	2.071
	C	2	4	8	3	4	4	4	4	5	5	4	9	2	3	4.357
	E	4	4	6	6	3	4	4	5	2	2	6	5	3	3	4.071
	F	2	5	5	6	4	5	4	6	3	4	4	4	3	4	4.214
MCOR976D9	A	7	2	2	4	3	5	2	3	2	6	6	2	1	4	3.5
	B	7	1	2	2	2	4	2	3	1	7	4	4	2	4	3.214
	C	2	2	1	0	3	2	2	3	3	4	4	6	2	2	2.571

all readers			
sample	minimum	round(average)	maximum
HMNF085-1	23	31	35
HMNF085-3	20	29	38
HMNF088-1	22	38	62
HMNF088-2	22	32	42
HMNF088-3	13	25	42
HMNF098-1	18	25	37
HMNF098-2	27	31	46
HMNF098-3	14	23	31
HMNF118-1	9	20	32
HMNF118-2	11	16	26
HMNF147-1	20	31	41
HMNF147-2	18	35	62
HMNF147-3	18	32	59
hmnotsogood	3	8	10
hyaline010-1	4	5	8
hyaline010-2	6	8	11
hyaline010-3	3	12	16
MCOR976D2-	1	2	3
MCOR976D2-	1	2	4
MCOR976D2-	2	4	9
MCOR976D2-	2	4	6
MCOR976D2-	2	4	6
MCOR976D9-	1	4	7
MCOR976D9-	1	3	7
MCOR976D9-	0	3	6

		NH-Germ	AMC-Port	HM-Sp	JRP-Sp	IG-Scot	IdB-Neth	HW-Neth	KM-Ger	GE-Ne	PW-Eng	SH-Irel	IM-Sp	DL-Irel	Christie-Eng	
HMNF085	1	0.137	-0.026	-0.058	0.007	0.039	0.072	0.039	-0.253	-0.026	0.039	0.104	-0.058	0.072	-0.090	(score-mean)/mean
	3	0.317	0.040	0.005	-0.134	-0.238	0.040	0.040	-0.307	0.074	0.005	0.074	0.074	0.109	-0.099	
HMNF088	1	0.653	0.067	0.067	0.067	-0.067	0.013	-0.120	-0.413	0.013	-0.040	0.067	-0.040	-0.280	0.013	
	2	0.295	0.110	0.141	-0.013	0.048	0.141	-0.260	-0.229	0.264	0.079	-0.013	-0.106	-0.322	-0.137	
	3	0.675	0.117	0.197	0.476	0.077	0.117	-0.083	-0.362	-0.123	-0.003	-0.123	-0.202	-0.481	-0.282	
HMNF098	1	0.467	0.150	0.071	0.031	0.031	-0.008	-0.088	-0.207	-0.008	0.031	-0.088	-0.127	-0.286	0.031	
	2	0.480	0.030	0.094	-0.131	0.062	0.126	-0.099	-0.099	-0.131	-0.002	-0.034	-0.067	-0.131	-0.099	
	3	0.378	0.022	0.111	-0.244	0.067	-0.022	0.022	0.067	-0.067	0.156	-0.156	-0.022	-0.378	0.067	
HMNF118	1	0.612	0.259	0.209	-0.043	0.158	0.108	-0.245	-0.547	-0.043	0.058	-0.144	-0.043	-0.094	-0.245	
	2	0.655	0.400	0.082	-0.045	-0.173	0.145	-0.109	-0.236	-0.236	0.082	-0.300	-0.045	-0.236	0.018	
HMNF147	1	0.329	0.037	0.329	-0.028	0.102	0.069	-0.060	-0.157	0.037	0.037	-0.190	-0.125	-0.352	-0.028	
	2	0.761	0.477	0.136	0.079	0.249	0.022	-0.176	-0.404	0.136	-0.148	-0.120	-0.262	-0.262	-0.489	
	3	0.873	0.302	0.079	0.333	0.079	0.048	-0.175	-0.111	-0.143	-0.111	-0.302	-0.206	-0.238	-0.429	
hmnotsogood	0	0.333	0.333	0.333	-0.067	-0.067	0.200	-0.067	-0.333	-0.067	0.200	-0.200	-0.067	0.067	-0.600	
hyaline010	1	0.493	-0.067	0.120	-0.067	-0.067	-0.067	-0.067	-0.253	0.120	0.120	-0.067	-0.067	-0.067	-0.067	
	2	0.439	0.439	-0.084	-0.215	-0.084	-0.084	-0.084	0.047	0.047	0.047	-0.084	-0.084	-0.084	-0.215	
	3	0.383	0.296	0.210	-0.136	0.383	-0.136	0.123	-0.741	-0.049	0.123	0.037	0.037	-0.309	-0.222	
MCOR976D2	A	0.500	-0.500	0.000	-0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	
	B	0.448	-0.034	-0.034	-0.517	-0.034	-0.034	-0.034	0.931	-0.517	-0.034	-0.034	-0.034	-0.034	-0.034	
	C	1.066	-0.541	-0.082	0.148	-0.082	-0.082	-0.082	-0.082	-0.311	-0.541	-0.311	0.148	0.836	-0.082	
	E	0.228	-0.018	-0.263	-0.509	0.228	-0.018	-0.018	0.474	0.474	-0.263	-0.263	-0.509	0.474	-0.018	
	F	-0.051	-0.525	-0.051	-0.051	0.424	-0.051	0.186	-0.051	0.424	-0.288	-0.051	-0.288	0.186	0.186	
MCOR976D9	A	-0.429	1.000	-0.143	0.714	-0.143	-0.429	0.429	0.714	0.143	-0.714	0.143	-0.429	-0.429	-0.429	
	B	0.244	1.178	-0.378	1.178	-0.067	-0.378	0.244	0.244	-0.378	-0.378	0.244	-0.689	-0.378	-0.689	
	C	1.333	-0.222	0.167	0.556	0.167	-0.222	-0.222	0.556	-1.000	-0.222	-0.222	0.167	-0.611	-0.222	
		0.465	0.133	0.050	0.036	0.044	-0.017	-0.036	-0.050	-0.055	-0.071	-0.081	-0.122	-0.129	-0.166	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	ranking

			reader														
sample	number	Data	AMC-Port	Christie	DL-Irel	GE-Net	HM-Sp	HW-Neth	IdB-Neth	IG-Sco	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-En	SH-Irel	average
HMNF085	1	Average of	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0.286
		Average of	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0.286
	3	Average of	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.714
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	Average of	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.357
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	2	3	0	2	0	0	0	2	1	0	0	1	0	0	0.786
		Average of	0	0	0	0	2	2	2	0	0	2	2	1	1	1	0.929
	3	Average of	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0.357

sample	atresia	minimum	round(aver	maximum
HMNF085-	Average of early alfa	0	0.29	2
HMNF085-	Average of early alfa	0	0.29	1
HMNF088-	Average of early alfa	0	1.71	6
HMNF088-	Average of early alfa	0	0	0
HMNF088-	Average of early alfa	0	0.36	3
HMNF098-	Average of early alfa	0	0	0
HMNF098-	Average of early alfa	0	0.79	3
HMNF098-	Average of early alfa	0	0.93	2
HMNF118-	Average of early alfa	0	0.36	3

HMNF088	3	Average of	0	3	0	0	1	1	2	1	0	0	3	3	1	0	1.071
HMNF098	1	Average of	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.286
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.214
HMNF118	1	Average of	0	6	0	0	1	0	0	1	1	0	0	1	1	0	0.786
		Average of	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0.357
	2	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	Average of	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0.5
		Average of	0	1	0	1	4	2	3	3	1	1	4	1	2	0	1.643
	2	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hmnotsogood	0	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hyaline010	1	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
MCOR976D2	A	Average of	2	0	0	2	0	0	2	2	0	0	0	4	0	0	0.857
		Average of	0	2	2	0	3	2	0	0	2	2	4	0	2	3	1.571
	B	Average of	2	0	0	1	0	0	1	1	0	0	0	1	0	0	0.429
		Average of	0	2	2	1	2	2	1	1	2	2	3	2	2	2	1.714
	C	Average of	0	0	0	0	0	0	0	2	1	0	0	3	1	0	0.5
		Average of	2	1	2	2	2	2	2	0	1	2	2	0	2	2	1.571
	E	Average of	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0.357
		Average of	0	2	1	2	2	2	2	2	2	0	2	0	1	2	1.429
	F	Average of	2	0	1	0	0	0	1	0	1	0	0	3	1	0	0.643
		Average of	0	2	1	2	2	2	1	1	1	0	2	1	1	3	1.357
MCOR976D9	A	Average of	2	1	0	1	2	0	1	1	0	1	0	2	2	1	1
		Average of	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.143
	B	Average of	3	0	1	2	2	0	3	3	1	0	0	3	2	3	1.643
		Average of	0	3	2	1	1	3	0	0	2	3	2	0	1	0	1.286
	C	Average of	3	2	0	5	2	0	4	3	2	0	0	3	3	2	2.071
		Average of	0	0	3	0	0	2	0	0	0	2	2	0	0	1	0.714

HMNF118-	Average of early alfa	0	1.07	3
HMNF147-	Average of early alfa	0	0.21	2
HMNF147-	Average of early alfa	0	0	0
HMNF147-	Average of early alfa	0	0.29	2
hmnotsogo	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0.21	1
hyaline010	Average of early alfa	0	0.79	6
MCOR976	Average of early alfa	0	0.36	2
MCOR976	Average of early alfa	0	0.15	2
MCOR976	Average of early alfa	0	0	0
MCOR976	Average of early alfa	0	0.5	3
MCOR976	Average of early alfa	0	1.64	4
MCOR976	Average of early alfa	0	0.07	1
MCOR976	Average of early alfa	0	0	0
MCOR976	Average of early alfa	0	0.21	2
HMNF085-	Average of late alfa	0	0.07	1
HMNF085-	Average of late alfa	0	0.15	2
HMNF088-	Average of late alfa	0	0.07	1
HMNF088-	Average of late alfa	0	0	0
HMNF088-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.86	4
HMNF147-	Average of late alfa	0	1.57	4
HMNF147-	Average of late alfa	0	0.43	2
HMNF147-	Average of late alfa	0	1.71	3
hmnotsogo	Average of late alfa	0	0.5	3
hyaline010	Average of late alfa	0	1.57	2
hyaline010	Average of late alfa	0	0.36	2
hyaline010	Average of late alfa	0	1.43	2
MCOR976	Average of late alfa	0	0.64	3
MCOR976	Average of late alfa	0	1.36	3
MCOR976	Average of late alfa	0	1	2
MCOR976	Average of late alfa	0	0.14	1
MCOR976	Average of late alfa	0	1.64	3
MCOR976	Average of late alfa	0	1.29	3
MCOR976	Average of late alfa	0	2.07	5
MCOR976	Average of late alfa	0	0.71	3

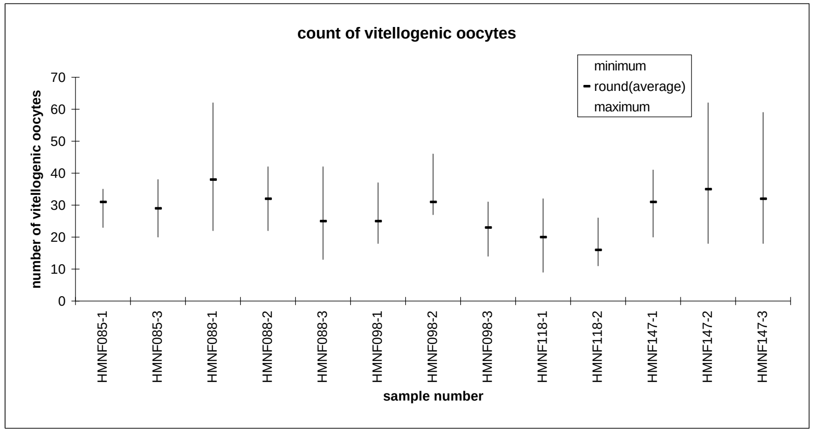
Sum of alfa atresia		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	1	0	0	0	0	0	1	2	0	1	0	1	1	1	0.57
	3	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.71
HMNF088	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.36
	2	2	3	0	2	2	2	2	2	1	2	2	2	1	1	1.71
	3	3	3	0	0	2	1	3	1	0	0	3	3	1	0	1.43
HMNF098	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.21
	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.29
	3	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.21
HMNF118	1	0	6	0	1	2	0	0	1	1	0	2	1	1	1	1.14
	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.14
HMNF147	1	3	4	0	1	4	2	3	4	1	1	4	1	2	0	2.14
	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.07
	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.29
hmnotsogood	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0.21
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.14
MCOR976D2	A	2	2	2	2	3	2	2	2	2	2	4	4	2	3	2.43
	B	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2.14
	C	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2.07
	E	2	2	1	2	2	2	2	2	2	0	2	2	2	2	1.79
	F	2	2	2	2	2	2	2	1	2	0	2	4	2	3	2.00
MCOR976D9	A	2	1	1	1	2	0	1	1	1	1	0	2	2	1	1.14
	B	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2.93

sample	minimum	round(aver	maximum
HMNF085-	0	0.571429	2
HMNF085-	0	1.714286	6
HMNF088-	0	0.357143	3
HMNF088-	0	1.714286	3
HMNF088-	0	1.428571	3
HMNF098-	0	0.214286	2
HMNF098-	0	0.285714	2
HMNF098-	0	0.214286	1
HMNF118-	0	1.142857	6
HMNF118-	0	0.142857	2
HMNF147-	0	2.142857	4
HMNF147-	0	0.071429	1
HMNF147-	0	0.285714	2
hmnotsogo	0	0.214286	2
hyaline010	0	0	0
hyaline010	0	0	0
hyaline010	0	0.142857	1
MCOR976	2	2.428571	4
MCOR976	2	2.142857	3
MCOR976	1	2.071429	3
MCOR976	0	1.785714	2
MCOR976	0	2	4
MCOR976	0	1.142857	2
MCOR976	2	2.928571	3

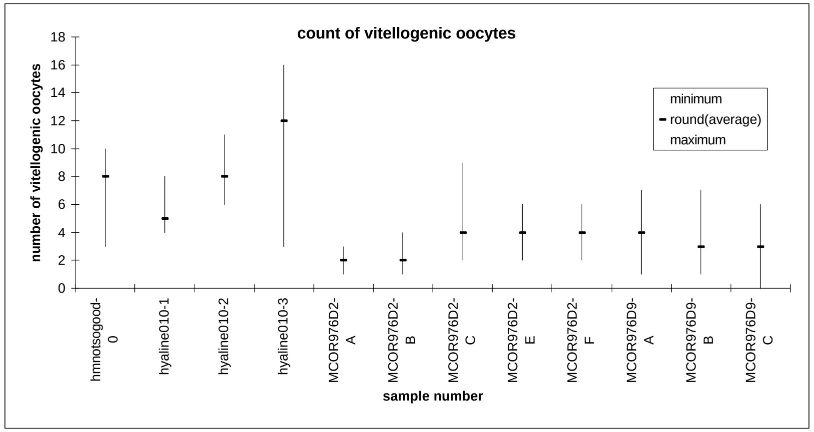
MCOR976D9	C	3	2	3	5	2	2	4	3	2	2	2	3	3	3	2.79		MCOR976I	2	2.785714	5

Sum of total oocytes		reader																			
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel		round(average)	sample	minimum	round(aver	maximum
HMNF085	1	31	28	33	30	29	32	33	34	29	31	23	36	32	34	31	31	HMNF085-	23	31	36
	3	30	32	32	31	29	33	30	25	31	27	23	39	32	34	31	31	HMNF085-	23	31	39
HMNF088	1	40	41	27	38	40	33	38	35	36	40	24	62	36	40	38	38	HMNF088-	24	38	62
	2	38	31	22	43	37	24	37	36	30	32	25	43	35	32	33	33	HMNF088-	22	33	43
	3	31	18	13	22	31	23	29	27	20	37	16	42	25	22	25	25	HMNF088-	13	25	42
HMNF098	1	29	26	18	25	29	23	25	26	23	26	20	37	26	23	25	25	HMNF098-	18	25	37
	2	32	30	27	27	34	28	35	33	29	27	30	46	31	30	31	31	HMNF098-	27	31	46
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	23	23	HMNF098-	14	23	31
HMNF118	1	25	21	18	19	25	15	22	24	20	19	9	33	22	17	21	21	HMNF118-	9	21	33
	2	22	18	12	12	17	14	18	13	15	15	12	26	17	11	16	16	HMNF118-	11	16	26
HMNF147	1	35	33	20	32	41	29	33	35	27	30	26	41	32	25	31	31	HMNF147-	20	31	41
	2	52	18	26	40	40	29	36	45	26	38	21	62	30	31	35	35	HMNF147-	18	35	62
	3	41	20	24	27	34	26	33	34	25	42	28	60	28	22	32	32	HMNF147-	20	32	60
hmnotsogood	0	10	5	8	7	10	7	9	7	7	7	5	10	9	6	8	8	hmnotsogo	5	8	10
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5	5	hyaline010	4	5	8
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	8	8	hyaline010	6	8	11
	3	15	9	8	11	14	13	10	17	12	10	3	16	13	12	12	12	hyaline010	3	12	17
MCOR976D2	A	3	2	2	4	2	2	4	4	2	1	3	7	2	2	3	3	MCOR976I	1	3	7
	B	4	2	2	2	2	2	3	3	2	1	4	4	2	2	3	3	MCOR976I	1	3	4
	C	2	4	8	3	4	4	4	6	6	5	4	12	3	3	5	5	MCOR976I	2	5	12
	E	6	4	6	6	3	4	4	5	2	2	6	7	4	3	4	4	MCOR976I	2	4	7
	F	4	5	6	6	4	5	5	6	4	4	4	7	4	4	5	5	MCOR976I	4	5	7
MCOR976D9	A	9	3	2	5	5	5	3	4	2	7	6	4	3	5	5	5	MCOR976I	2	5	9
	B	10	1	3	4	4	4	5	6	2	7	4	7	4	7	5	5	MCOR976I	1	5	10
	C	5	4	1	5	5	2	6	6	5	4	4	9	5	4	5	5	MCOR976I	1	5	9

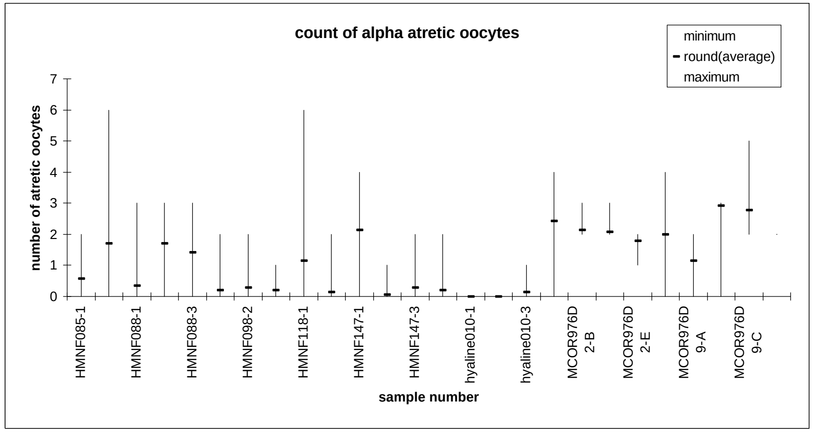
		NH-Germ	AMC-Port	IG-Scot	IdB-Neth	HM-Sp	GE-Neth	PW-Eng	JRP-Sp	SH-Irel	HW-Neth	IM-Sp	Christie-Er	KM-Germ	DL-Irel	
HMNF085	1	0.161	0.000	0.097	0.065	-0.065	-0.032	0.032	0.000	0.097	0.032	-0.065	-0.097	-0.258	0.065	
	3	0.258	-0.032	-0.194	-0.032	-0.065	0.000	0.032	-0.129	0.097	0.065	0.000	0.032	-0.258	0.032	
HMNF088	1	0.632	0.053	-0.079	0.000	0.053	0.000	-0.053	0.053	0.053	-0.132	-0.053	0.079	-0.368	-0.289	
	2	0.303	0.152	0.091	0.121	0.121	0.303	0.061	-0.030	-0.030	-0.273	-0.091	-0.061	-0.242	-0.333	
	3	0.680	0.240	0.080	0.160	0.240	-0.120	0.000	0.480	-0.120	-0.080	-0.200	-0.280	-0.360	-0.480	
HMNF098	1	0.480	0.160	0.040	0.000	0.160	0.000	0.040	0.040	-0.080	-0.080	-0.080	0.040	-0.200	-0.280	
	2	0.484	0.032	0.065	0.129	0.097	-0.129	0.000	-0.129	-0.032	-0.097	-0.065	-0.032	-0.032	-0.129	
	3	0.348	0.000	0.043	-0.043	0.087	-0.087	0.130	-0.261	-0.174	0.000	-0.043	0.043	0.043	-0.391	
HMNF118	1	0.571	0.190	0.143	0.048	0.190	-0.095	0.048	-0.095	-0.190	-0.286	-0.048	0.000	-0.571	-0.143	
	2	0.625	0.375	-0.188	0.125	0.063	-0.250	0.063	-0.063	-0.313	-0.125	-0.063	0.125	-0.250	-0.250	
HMNF147	1	0.323	0.129	0.129	0.065	0.323	0.032	0.032	-0.032	-0.194	-0.065	-0.129	0.065	-0.161	-0.355	
	2	0.771	0.486	0.286	0.029	0.143	0.143	-0.143	0.086	-0.114	-0.171	-0.257	-0.486	-0.400	-0.257	
	3	0.875	0.281	0.063	0.031	0.063	-0.156	-0.125	0.313	-0.313	-0.188	-0.219	-0.375	-0.125	-0.250	
hmnotsogood	0	0.250	0.250	-0.125	0.125	0.250	-0.125	0.125	-0.125	-0.250	-0.125	-0.125	-0.375	-0.375	0.000	
hyaline010	1	0.600	0.000	0.000	0.000	0.200	0.200	0.200	0.000	0.000	0.000	0.000	0.000	-0.200	0.000	
	2	0.375	0.375	-0.125	-0.125	-0.125	0.000	0.000	-0.250	-0.125	-0.125	-0.125	-0.250	0.000	-0.125	
	3	0.333	0.250	0.417	-0.167	0.167	-0.083	0.083	-0.167	0.000	0.083	0.000	-0.250	-0.750	-0.333	
MCOR976D2	A	1.333	0.000	0.333	0.333	-0.333	0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.000	-0.333	
	B	0.333	0.333	0.000	0.000	-0.333	-0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.333	-0.333	
	C	1.400	-0.600	0.200	-0.200	-0.200	-0.400	-0.400	0.000	-0.400	-0.200	0.200	-0.200	-0.200	0.600	
	E	0.750	0.500	0.250	0.000	-0.250	0.500	0.000	-0.500	-0.250	0.000	-0.500	0.000	0.500	0.500	
	F	0.400	-0.200	0.200	0.000	-0.200	0.200	-0.200	-0.200	-0.200	0.000	-0.200	0.000	-0.200	0.200	
MCOR976D9	A	-0.200	0.800	-0.200	-0.400	0.000	0.000	-0.400	0.400	0.000	0.000	-0.600	-0.400	0.200	-0.600	
	B	0.400	1.000	0.200	0.000	-0.200	-0.200	-0.200	0.400	0.400	-0.200	-0.600	-0.800	-0.200	-0.400	
	C	0.800	0.000	0.200	0.200	0.000	0.000	0.000	-0.200	-0.200	-0.600	0.000	-0.200	-0.200	-0.800	
		0.531	0.191	0.077	0.019	0.015	-0.012	-0.054	-0.070	-0.120	-0.129	-0.157	-0.164	-0.171	-0.187	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	rank



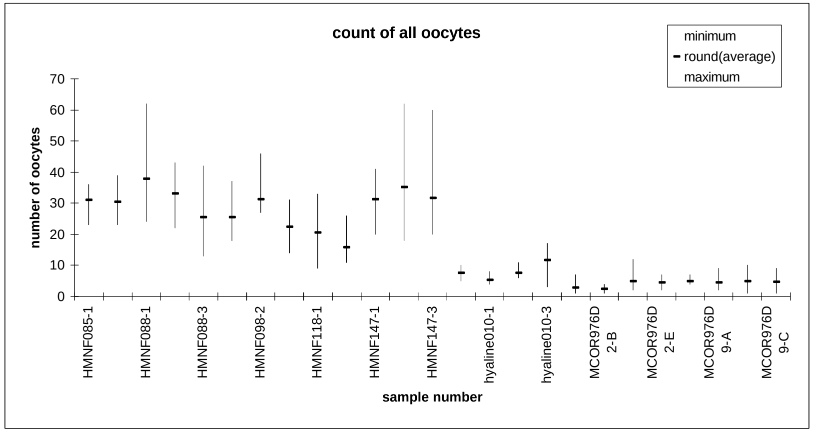
count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF085-3
HMNF088-1
HMNF088-2
HMNF088-3
HMNF098-1
HMNF098-2
HMNF098-3
HMNF118-1
HMNF118-2
HMNF147-1
HMNF147-2
HMNF147-3
sample number



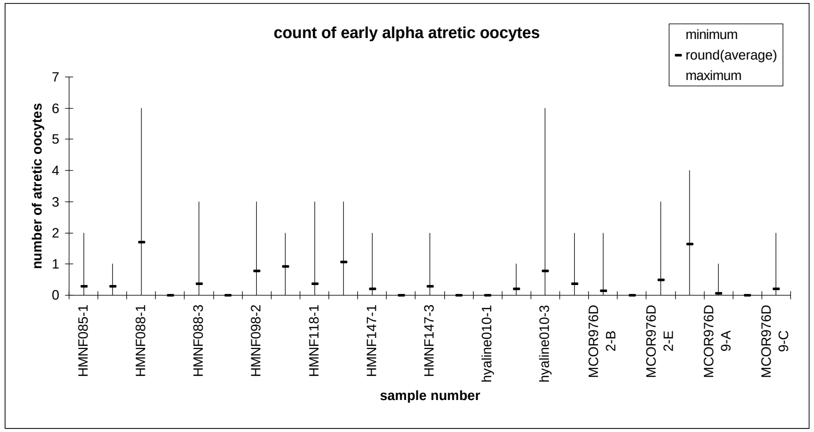
count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
2
4
6
8
10
12
14
16
18
hmnotsogood-0
hyaline010-1
hyaline010-2
hyaline010-3
MCOR976D2-A
MCOR976D2-B
MCOR976D2-C
MCOR976D2-E
MCOR976D2-F
MCOR976D9-A
MCOR976D9-B
MCOR976D9-C
sample number



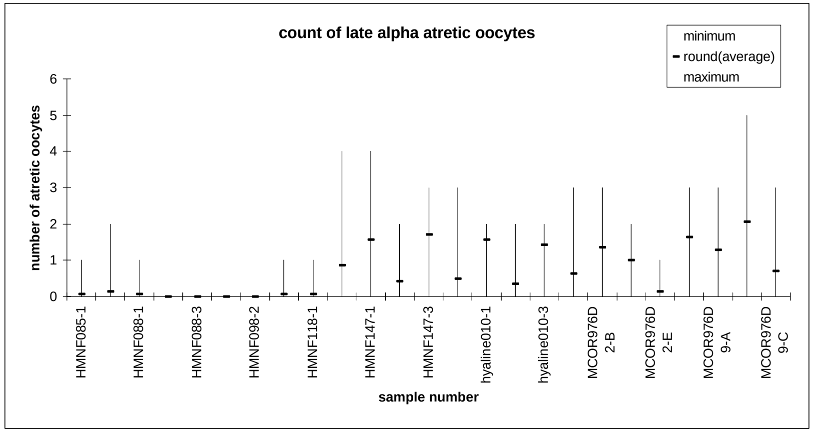
count of alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number



count of all oocytes
minimum
round(average)
maximum
number of oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number



count of early alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number



count of late alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number

Annex 4

Analysis of the interpretation of histological slides of mackerel and horse mackerel

sample	number	reader	experience	mig.nucleus	hydrated	POF	beta atr	vitellogenic	early alfa atresia	late alfa atr	alfa atresia	total oocytes
HMNF085	1	IdB-Neth	e	0	0	1	0	33	0	1	1	33
HMNF085	3	IdB-Neth	e	0	0	1	0	30	0	0	0	30
HMNF088	1	IdB-Neth	e	0	0	0	0	38	0	0	0	38
HMNF088	2	IdB-Neth	e	0	0	0	0	37	0	2	2	37
HMNF088	3	IdB-Neth	e	0	0	0	0	28	1	2	3	29
HMNF098	1	IdB-Neth	e	0	0	0	0	25	0	0	0	25
HMNF098	2	IdB-Neth	e	0	0	0	0	35	0	0	0	35
HMNF098	3	IdB-Neth	e	0	0	0	0	22	0	0	0	22
HMNF118	1	IdB-Neth	e	0	1	1	0	22	0	0	0	22
HMNF118	2	IdB-Neth	e	0	0	1	0	18	0	0	0	18
HMNF147	1	IdB-Neth	e	0	0	0	0	33	0	3	3	33
HMNF147	2	IdB-Neth	e	0	0	0	0	36	0	0	0	36
HMNF147	3	IdB-Neth	e	0	0	0	0	33	0	0	0	33
hmnotsogood	0	IdB-Neth	e	0	0	0	1	9	0	0	0	9
hyaline010	1	IdB-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	IdB-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IdB-Neth	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	IdB-Neth	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IdB-Neth	e	0	0	0	0	2	1	1	2	3
MCOR976D2	C	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	F	IdB-Neth	e	0	0	1	0	4	1	1	2	5
MCOR976D9	A	IdB-Neth	e	1	0	0	0	2	1	0	1	3
MCOR976D9	B	IdB-Neth	e	0	0	0	0	2	3	0	3	5
MCOR976D9	C	IdB-Neth	e	0	0	0	0	2	4	0	4	6
HMNF085	1	IM-Sp	n	0	0	1	0	29	0	0	0	29
HMNF085	3	IM-Sp	n	0	0	1	0	31	0	0	0	31
HMNF088	1	IM-Sp	n	0	0	1	0	36	0	0	0	36
HMNF088	2	IM-Sp	n	0	0	0	1	29	1	0	1	30
HMNF088	3	IM-Sp	n	0	0	1	1	20	0	0	0	20
HMNF098	1	IM-Sp	n	0	0	1	0	22	1	0	1	23
HMNF098	2	IM-Sp	n	0	0	0	0	29	0	0	0	29
HMNF098	3	IM-Sp	n	0	1	0	0	22	0	0	0	22
HMNF118	1	IM-Sp	n	0	0	1	0	19	1	0	1	20
HMNF118	2	IM-Sp	n	0	0	1	0	15	0	0	0	15
HMNF147	1	IM-Sp	n	0	0	0	1	27	0	1	1	27
HMNF147	2	IM-Sp	n	0	0	0	0	26	0	0	0	26
HMNF147	3	IM-Sp	n	0	0	0	0	25	0	0	0	25
hmnotsogood	0	IM-Sp	n	0	0	0	1	7	0	0	0	7
hyaline010	1	IM-Sp	n	0	1	0	0	5	0	0	0	5
hyaline010	2	IM-Sp	n	0	1	0	0	7	0	0	0	7
hyaline010	3	IM-Sp	n	0	1	0	0	12	0	0	0	12
MCOR976D2	A	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	IM-Sp	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C	IM-Sp	n	0	0	0	0	5	1	1	2	6
MCOR976D2	E	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	F	IM-Sp	n	0	0	1	0	3	1	1	2	4
MCOR976D9	A	IM-Sp	n	0	0	1	0	2	0	1	1	2
MCOR976D9	B	IM-Sp	n	0	0	0	0	1	1	2	3	2
MCOR976D9	C	IM-Sp	n	0	0	0	0	3	2	0	2	5
HMNF085	1	HM-Sp	e	0	0	1	1	29	0	0	0	29
HMNF085	3	HM-Sp	e	0	0	1	0	29	0	0	0	29
HMNF088	1	HM-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	HM-Sp	e	0	0	0	0	37	0	2	2	37
HMNF088	3	HM-Sp	e	0	0	0	0	30	1	1	2	31
HMNF098	1	HM-Sp	e	0	0	1	1	27	2	0	2	29
HMNF098	2	HM-Sp	e	0	0	0	0	34	0	0	0	34
HMNF098	3	HM-Sp	e	0	0	0	0	25	0	0	0	25
HMNF118	1	HM-Sp	e	0	1	1	0	24	1	1	2	25
HMNF118	2	HM-Sp	e	0	0	1	1	17	0	0	0	17
HMNF147	1	HM-Sp	e	0	0	0	0	41	0	4	4	41
HMNF147	2	HM-Sp	e	0	0	1	1	40	0	0	0	40
HMNF147	3	HM-Sp	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	HM-Sp	e	0	0	0	1	10	0	0	0	10
hyaline010	1	HM-Sp	e	0	1	1	0	6	0	0	0	6
hyaline010	2	HM-Sp	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HM-Sp	e	0	1	0	0	14	0	0	0	14
MCOR976D2	A	HM-Sp	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	HM-Sp	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	HM-Sp	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	HM-Sp	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	HM-Sp	e	0	0	1	0	4	0	2	2	4
MCOR976D9	A	HM-Sp	e	0	0	0	0	3	2	0	2	5
MCOR976D9	B	HM-Sp	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	HM-Sp	e	0	0	0	0	3	2	0	2	5
HMNF085	1	IG-Scot	e	0	0	0	0	32	2	0	2	34
HMNF085	3	IG-Scot	e	0	0	0	0	22	3	0	3	25
HMNF088	1	IG-Scot	e	0	0	0	0	35	0	0	0	35
HMNF088	2	IG-Scot	e	0	0	0	0	34	2	0	2	36
HMNF088	3	IG-Scot	e	0	0	0	0	27	0	1	1	27
HMNF098	1	IG-Scot	e	0	0	0	0	26	0	0	0	26
HMNF098	2	IG-Scot	e	0	0	0	0	33	0	0	0	33
HMNF098	3	IG-Scot	e	0	0	0	0	24	0	0	0	24
HMNF118	1	IG-Scot	e	0	1	1	0	23	1	0	1	24
HMNF118	2	IG-Scot	e	0	0	1	0	13	0	0	0	13
HMNF147	1	IG-Scot	e	0	0	0	0	34	1	3	4	35
HMNF147	2	IG-Scot	e	0	0	0	0	44	1	0	1	45

HMNF147		3	IG-Scot	e	0	0	0	0	34	0	0	0	34
hmnotsogood		0	IG-Scot	e	0	0	0	1	7	0	0	0	7
hyaline010		1	IG-Scot	e	0	1	1	0	5	0	0	0	5
hyaline010		2	IG-Scot	e	0	1	0	0	7	0	0	0	7
hyaline010		3	IG-Scot	e	0	1	1	0	16	1	0	1	17
MCOR976D2	A		IG-Scot	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B		IG-Scot	e	1	0	0	0	2	1	1	2	3
MCOR976D2	C		IG-Scot	e	0	0	0	0	4	2	0	2	6
MCOR976D2	E		IG-Scot	e	0	0	0	0	5	0	2	2	5
MCOR976D2	F		IG-Scot	e	0	0	1	1	6	0	1	1	6
MCOR976D9	A		IG-Scot	e	1	0	1	0	3	1	0	1	4
MCOR976D9	B		IG-Scot	e	0	0	0	0	3	3	0	3	6
MCOR976D9	C		IG-Scot	e	0	0	1	0	3	3	0	3	6
HMNF085		1	SH-Irel	e	0	0	1	0	34	0	1	1	34
HMNF085		3	SH-Irel	e	0	0	1	1	31	3	0	3	34
HMNF088		1	SH-Irel	e	0	0	0	0	40	0	0	0	40
HMNF088		2	SH-Irel	e	0	0	0	1	32	0	1	1	32
HMNF088		3	SH-Irel	e	0	0	1	1	22	0	0	0	22
HMNF098		1	SH-Irel	e	1	0	0	0	23	0	0	0	23
HMNF098		2	SH-Irel	e	1	0	0	0	30	0	0	0	30
HMNF098		3	SH-Irel	e	0	0	0	0	19	0	1	1	19
HMNF118		1	SH-Irel	e	0	0	1	0	17	0	1	1	17
HMNF118		2	SH-Irel	e	0	0	1	0	11	0	0	0	11
HMNF147		1	SH-Irel	e	0	0	1	1	25	0	0	0	25
HMNF147		2	SH-Irel	e	0	1	1	0	31	0	0	0	31
HMNF147		3	SH-Irel	e	0	1	0	0	22	0	0	0	22
hmnotsogood		0	SH-Irel	e	0	0	1	0	6	0	0	0	6
hyaline010		1	SH-Irel	e	0	1	1	0	5	0	0	0	5
hyaline010		2	SH-Irel	e	0	1	1	0	7	0	0	0	7
hyaline010		3	SH-Irel	e	0	1	0	0	12	0	0	0	12
MCOR976D2	A		SH-Irel	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B		SH-Irel	e	1	0	1	1	2	0	2	2	2
MCOR976D2	C		SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	E		SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F		SH-Irel	e	0	0	0	1	4	0	3	3	4
MCOR976D9	A		SH-Irel	e	0	0	1	0	4	1	0	1	5
MCOR976D9	B		SH-Irel	e	0	0	1	0	4	3	0	3	7
MCOR976D9	C		SH-Irel	e	0	0	0	0	2	2	1	3	4
HMNF085		1	JRP-Sp	e	0	0	1	0	31	0	1	1	31
HMNF085		3	JRP-Sp	e	1	0	1	0	25	2	0	2	27
HMNF088		1	JRP-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088		2	JRP-Sp	e	0	0	0	0	32	0	2	2	32
HMNF088		3	JRP-Sp	e	0	0	0	1	37	0	0	0	37
HMNF098		1	JRP-Sp	e	1	0	0	0	26	0	0	0	26
HMNF098		2	JRP-Sp	e	1	0	0	0	27	0	0	0	27
HMNF098		3	JRP-Sp	e	1	0	0	0	17	0	0	0	17
HMNF118		1	JRP-Sp	e	0	0	0	1	19	0	0	0	19
HMNF118		2	JRP-Sp	e	0	0	0	1	15	0	0	0	15
HMNF147		1	JRP-Sp	e	0	0	0	1	30	0	1	1	30
HMNF147		2	JRP-Sp	e	0	0	0	0	38	0	0	0	38
HMNF147		3	JRP-Sp	e	0	0	0	0	42	0	0	0	42
hmnotsogood		0	JRP-Sp	e	0	0	0	0	7	0	0	0	7
hyaline010		1	JRP-Sp	e	0	1	0	0	5	0	0	0	5
hyaline010		2	JRP-Sp	e	0	1	0	0	6	0	0	0	6
hyaline010		3	JRP-Sp	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A		JRP-Sp	e	0	0	0	0	1	0	2	2	1
MCOR976D2	B		JRP-Sp	e	0	0	0	1	1	0	2	2	1
MCOR976D2	C		JRP-Sp	e	0	0	0	0	5	0	2	2	5
MCOR976D2	E		JRP-Sp	e	0	0	0	1	2	0	0	0	2
MCOR976D2	F		JRP-Sp	e	0	0	1	0	4	0	0	0	4
MCOR976D9	A		JRP-Sp	e	0	0	0	0	6	1	0	1	7
MCOR976D9	B		JRP-Sp	e	0	0	0	0	7	0	3	3	7
MCOR976D9	C		JRP-Sp	e	0	0	0	0	4	0	2	2	4
HMNF085		1	HW-Neth	e	0	0	0	0	32	0	0	0	32
HMNF085		3	HW-Neth	e	0	0	0	1	30	3	0	3	33
HMNF088		1	HW-Neth	e	0	0	0	0	33	0	0	0	33
HMNF088		2	HW-Neth	e	0	0	0	1	24	0	2	2	24
HMNF088		3	HW-Neth	e	0	0	1	1	23	0	1	1	23
HMNF098		1	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF098		2	HW-Neth	e	0	0	0	0	28	0	0	0	28
HMNF098		3	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF118		1	HW-Neth	e	0	1	0	0	15	0	0	0	15
HMNF118		2	HW-Neth	e	0	0	0	0	14	0	0	0	14
HMNF147		1	HW-Neth	e	0	0	1	1	29	0	2	2	29
HMNF147		2	HW-Neth	e	0	0	1	0	29	0	0	0	29
HMNF147		3	HW-Neth	e	0	0	0	0	26	0	0	0	26
hmnotsogood		0	HW-Neth	e	0	0	1	0	7	0	0	0	7
hyaline010		1	HW-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010		2	HW-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010		3	HW-Neth	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A		HW-Neth	e	0	0	0	1	2	0	2	2	2
MCOR976D2	B		HW-Neth	e	1	0	0	1	2	0	2	2	2
MCOR976D2	C		HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	E		HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	F		HW-Neth	e	0	0	1	1	5	0	2	2	5
MCOR976D9	A		HW-Neth	e	1	0	0	0	5	0	0	0	5
MCOR976D9	B		HW-Neth	e	0	0	0	1	4	0	3	3	4
MCOR976D9	C		HW-Neth	e	0	0	0	1	2	0	2	2	2

HMNF085		1	KM-Germ	n	0	0	0	0	23	0	0	0	23
HMNF085		3	KM-Germ	n	0	0	0	0	20	3	0	3	23
HMNF088		1	KM-Germ	n	0	0	0	0	22	2	0	2	24
HMNF088		2	KM-Germ	n	0	0	1	0	25	0	2	2	25
HMNF088		3	KM-Germ	n	0	0	0	0	16	0	3	3	16
HMNF098		1	KM-Germ	n	0	0	0	0	20	0	0	0	20
HMNF098		2	KM-Germ	n	0	0	0	0	28	2	0	2	30
HMNF098		3	KM-Germ	n	0	0	0	0	24	0	1	1	24
HMNF118		1	KM-Germ	n	0	1	1	0	9	0	2	2	9
HMNF118		2	KM-Germ	n	0	0	1	0	12	0	0	0	12
HMNF147		1	KM-Germ	n	0	0	0	0	26	0	4	4	26
HMNF147		2	KM-Germ	n	0	1	0	0	21	0	0	0	21
HMNF147		3	KM-Germ	n	0	0	0	0	28	0	1	1	28
hmnotsogood		0	KM-Germ	n	0	0	0	0	5	0	1	1	5
hyaline010		1	KM-Germ	n	0	1	0	0	4	0	0	0	4
hyaline010		2	KM-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		3	KM-Germ	n	0	1	0	0	3	0	1	1	3
MCOR976D2	A		KM-Germ	n	0	0	0	0	3	0	4	4	3
MCOR976D2	B		KM-Germ	n	0	0	0	0	4	0	3	3	4
MCOR976D2	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
MCOR976D2	E		KM-Germ	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	A		KM-Germ	n	0	0	1	0	6	0	0	0	6
MCOR976D9	B		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
HMNF085		1	DL-Irel	n	0	0	1	0	33	0	0	0	33
HMNF085		3	DL-Irel	n	0	0	1	0	32	0	0	0	32
HMNF088		1	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF088		2	DL-Irel	n	0	0	1	0	22	0	0	0	22
HMNF088		3	DL-Irel	n	1	0	1	0	13	0	0	0	13
HMNF098		1	DL-Irel	n	0	0	0	0	18	0	0	0	18
HMNF098		2	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF098		3	DL-Irel	n	0	0	1	0	14	0	0	0	14
HMNF118		1	DL-Irel	n	0	0	1	0	18	0	0	0	18
HMNF118		2	DL-Irel	n					12		0	0	12
HMNF147		1	DL-Irel	n	0	0	1	0	20	0	0	0	20
HMNF147		2	DL-Irel	n	0	1	0	0	26	0	0	0	26
HMNF147		3	DL-Irel	n	0	1	0	0	24	0	0	0	24
hmnotsogood		0	DL-Irel	n	0	0			8		0	0	8
hyaline010		1	DL-Irel	n	0	1	1	0	5	0	0	0	5
hyaline010		2	DL-Irel	n	0	1	0	0	7	0	0	0	7
hyaline010		3	DL-Irel	n	0	1	0	0	8	0	0	0	8
MCOR976D2	A		DL-Irel	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		DL-Irel	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C		DL-Irel	n	0	0	0	0	8	0	2	2	8
MCOR976D2	E		DL-Irel	n	0	0	0	0	6	0	1	1	6
MCOR976D2	F		DL-Irel	n	0	0	1	0	5	1	1	2	6
MCOR976D9	A		DL-Irel	n	0	0	0	1	2	0	1	1	2
MCOR976D9	B		DL-Irel	n	0	0	0	0	2	1	2	3	3
MCOR976D9	C		DL-Irel	n	0	0	0	0	1	0	3	3	1
HMNF085		1	GE-Neth	n	0	0	1	0	30	0	0	0	30
HMNF085		3	GE-Neth	n	0	0	1	0	31	0	0	0	31
HMNF088		1	GE-Neth	n	0	0	0	0	38	0	0	0	38
HMNF088		2	GE-Neth	n	0	0	0	0	41	2	0	2	43
HMNF088		3	GE-Neth	n	0	0	0	1	22	0	0	0	22
HMNF098		1	GE-Neth	n	0	0	0	0	25	0	0	0	25
HMNF098		2	GE-Neth	n	0	0	1	0	27	0	0	0	27
HMNF098		3	GE-Neth	n	0	0	0	1	21	0	0	0	21
HMNF118		1	GE-Neth	n	0	0	1	0	19	0	1	1	19
HMNF118		2	GE-Neth	n	0	0	1	1	12	0	0	0	12
HMNF147		1	GE-Neth	n	0	0	1	1	32	0	1	1	32
HMNF147		2	GE-Neth	n	0	0	1	0	40	0	0	0	40
HMNF147		3	GE-Neth	n	0	0	0	0	27	0	0	0	27
hmnotsogood		0	GE-Neth	n	0	0	0	1	7	0	0	0	7
hyaline010		1	GE-Neth	n	0	1	0	0	6	0	0	0	6
hyaline010		2	GE-Neth	n	0	1	0	0	8	0	0	0	8
hyaline010		3	GE-Neth	n	0	1	0	0	11	0	0	0	11
MCOR976D2	A		GE-Neth	n	0	0	0	0	2	2	0	2	4
MCOR976D2	B		GE-Neth	n	1	0	0	0	1	1	1	2	2
MCOR976D2	C		GE-Neth	n	0	0	0	0	3	0	2	2	3
MCOR976D2	E		GE-Neth	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		GE-Neth	n	0	0	1	0	6	0	2	2	6
MCOR976D9	A		GE-Neth	n	0	0	0	0	4	1	0	1	5
MCOR976D9	B		GE-Neth	n	0	0	0	0	2	2	1	3	4
MCOR976D9	C		GE-Neth	n	0	0	0	0	0	5	0	5	5
HMNF085		1	AMC-Port	e	0	0	0	0	30	1	0	1	31
HMNF085		3	AMC-Port	e	0	0	0	0	30	0	0	0	30
HMNF088		1	AMC-Port	e	0	0	0	0	40	0	0	0	40
HMNF088		2	AMC-Port	e	0	0	0	0	36	2	0	2	38
HMNF088		3	AMC-Port	e	0	0	0	0	28	3	0	3	31
HMNF098		1	AMC-Port	e	0	0	0	0	29	0	0	0	29
HMNF098		2	AMC-Port	e	0	0	0	0	32	0	0	0	32
HMNF098		3	AMC-Port	e	0	0	0	0	23	0	0	0	23
HMNF118		1	AMC-Port	e	0	1	0	0	25	0	0	0	25
HMNF118		2	AMC-Port	e	0	0	1	0	22	0	0	0	22
HMNF147		1	AMC-Port	e	0	0	1	0	32	3	0	3	35
HMNF147		2	AMC-Port	e	0	0	0	0	52	0	0	0	52
HMNF147		3	AMC-Port	e	0	0	0	0	41	0	0	0	41

hmnotsogood	0	AMC-Port	e	0	0	1	0	10	0	0	0	10
hyaline010	1	AMC-Port	e	0	1	0	0	5	0	0	0	5
hyaline010	2	AMC-Port	e	0	1	0	0	11	0	0	0	11
hyaline010	3	AMC-Port	e	0	1	0	0	15	0	0	0	15
MCOR976D2	A	AMC-Port	e	0	0	0	0	1	2	0	2	3
MCOR976D2	B	AMC-Port	e	1	0	0	0	2	2	0	2	4
MCOR976D2	C	AMC-Port	e	0	0	0	0	2	0	2	2	2
MCOR976D2	E	AMC-Port	e	0	0	0	0	4	2	0	2	6
MCOR976D2	F	AMC-Port	e	0	0	1	0	2	2	0	2	4
MCOR976D9	A	AMC-Port	e	1	0	0	0	7	2	0	2	9
MCOR976D9	B	AMC-Port	e	0	0	0	0	7	3	0	3	10
MCOR976D9	C	AMC-Port	e	0	0	0	0	2	3	0	3	5
HMNF085	1	Christie-En	n	0	0	1	0	28	0	0	0	28
HMNF085	3	Christie-En	n	0	0	0	0	26	6	0	6	32
HMNF088	1	Christie-En	n	0	0	0	0	38	3	0	3	41
HMNF088	2	Christie-En	n	0	0	1	0	28	3	0	3	31
HMNF088	3	Christie-En	n	0	0	0	0	18	0	3	3	18
HMNF098	1	Christie-En	n	0	0	0	0	26	0	0	0	26
HMNF098	2	Christie-En	n	0	0	0	0	28	2	0	2	30
HMNF098	3	Christie-En	n	0	0	0	0	24	0	1	1	24
HMNF118	1	Christie-En	n	0	0	0	0	15	6	0	6	21
HMNF118	2	Christie-En	n	0	0	0	0	16	2	0	2	18
HMNF147	1	Christie-En	n	0	0	0	1	30	3	1	4	33
HMNF147	2	Christie-En	n	0	0	0	0	18	0	0	0	18
HMNF147	3	Christie-En	n	0	0	0	0	18	2	0	2	20
hmnotsogood	0	Christie-En	n	0	0	0	0	3	2	0	2	5
hyaline010	1	Christie-En	n	0	1	0	0	5	0	0	0	5
hyaline010	2	Christie-En	n	0	1	0	0	6	0	0	0	6
hyaline010	3	Christie-En	n	0	0	0	0	9	0	0	0	9
MCOR976D2	A	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	C	Christie-En	n	0	0	0	0	4	0	1	1	4
MCOR976D2	E	Christie-En	n	0	0	0	0	4	0	2	2	4
MCOR976D2	F	Christie-En	n	0	0	0	0	5	0	2	2	5
MCOR976D9	A	Christie-En	n	0	0	0	0	2	1	0	1	3
MCOR976D9	B	Christie-En	n	0	0	0	0	1	0	3	3	1
MCOR976D9	C	Christie-En	n	0	0	0	1	2	2	0	2	4
HMNF085	1	NH-Germ	n	0	0	0	0	35	1	0	1	36
HMNF085	3	NH-Germ	n	0	0	1	0	38	1	0	1	39
HMNF088	1	NH-Germ	n	0	0	0	0	62	0	0	0	62
HMNF088	2	NH-Germ	n	0	0	0	1	42	1	1	2	43
HMNF088	3	NH-Germ	n	0	0	0	0	42	0	3	3	42
HMNF098	1	NH-Germ	n	0	0	0	0	37	0	0	0	37
HMNF098	2	NH-Germ	n	0	0	0	0	46	0	0	0	46
HMNF098	3	NH-Germ	n	0	0	0	0	31	0	0	0	31
HMNF118	1	NH-Germ	n	0	0	1	0	32	1	0	1	33
HMNF118	2	NH-Germ	n	0	0	1	0	26	0	0	0	26
HMNF147	1	NH-Germ	n	0	0	0	1	41	0	1	1	41
HMNF147	2	NH-Germ	n	0	0	0	1	62	0	0	0	62
HMNF147	3	NH-Germ	n	0	0	0	0	59	1	0	1	60
hmnotsogood	0	NH-Germ	n	0	0	0	1	10	0	0	0	10
hyaline010	1	NH-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010	2	NH-Germ	n	0	1	0	0	11	0	0	0	11
hyaline010	3	NH-Germ	n	0	1	0	0	16	0	0	0	16
MCOR976D2	A	NH-Germ	n	0	1	0	0	3	4	0	4	7
MCOR976D2	B	NH-Germ	n	1	0	0	0	3	1	2	3	4
MCOR976D2	C	NH-Germ	n	0	0	0	0	9	3	0	3	12
MCOR976D2	E	NH-Germ	n	0	1	0	0	5	2	0	2	7
MCOR976D2	F	NH-Germ	n	0	0	0	1	4	3	1	4	7
MCOR976D9	A	NH-Germ	n	0	1	0	0	2	2	0	2	4
MCOR976D9	B	NH-Germ	n	0	1	0	0	4	3	0	3	7
MCOR976D9	C	NH-Germ	n	0	0	1	0	6	3	0	3	9
HMNF085	1	PW-Eng	e	0	0	1	1	32	0	1	1	32
HMNF085	3	PW-Eng	e	0	0	0	0	29	3	0	3	32
HMNF088	1	PW-Eng	e	0	0	0	0	36	0	0	0	36
HMNF088	2	PW-Eng	e	0	0	0	1	35	0	1	1	35
HMNF088	3	PW-Eng	e	0	0	0	1	25	0	1	1	25
HMNF098	1	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF098	2	PW-Eng	e	1	0	0	0	31	0	0	0	31
HMNF098	3	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF118	1	PW-Eng	e	0	0	0	0	21	1	0	1	22
HMNF118	2	PW-Eng	e	0	0	0	0	17	0	0	0	17
HMNF147	1	PW-Eng	e	0	0	0	1	32	0	2	2	32
HMNF147	2	PW-Eng	e	0	0	0	0	30	0	0	0	30
HMNF147	3	PW-Eng	e	0	0	0	0	28	0	0	0	28
hmnotsogood	0	PW-Eng	e	0	0	0	1	9	0	0	0	9
hyaline010	1	PW-Eng	e	0	1	0	0	6	0	0	0	6
hyaline010	2	PW-Eng	e	0	1	0	0	8	0	0	0	8
hyaline010	3	PW-Eng	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	PW-Eng	e	0	0	0	0	2	0	2	2	2
MCOR976D2	B	PW-Eng	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	PW-Eng	e	0	0	0	0	2	1	2	3	3
MCOR976D2	E	PW-Eng	e	0	0	0	0	3	1	1	2	4
MCOR976D2	F	PW-Eng	e	0	0	1	0	3	1	1	2	4
MCOR976D9	A	PW-Eng	e	1	0	0	0	1	2	0	2	3
MCOR976D9	B	PW-Eng	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	PW-Eng	e	0	0	1	0	2	3	0	3	5

Average of vitellogenic oocytes		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	30	29	32	33	32	31	32	34	28	33	30	29	23	35
	3	30	29	30	30	22	25	29	31	26	32	31	31	20	38
HMNF088	1	40	40	33	38	35	40	36	40	38	27	38	36	22	62
	2	36	37	24	37	34	32	35	32	28	22	41	29	25	42
	3	28	30	23	28	27	37	25	22	18	13	22	20	16	42
HMNF098	1	29	27	23	25	26	26	26	23	26	18	25	22	20	37
	2	32	34	28	35	33	27	31	30	28	27	27	29	28	46
	3	23	25	23	22	24	17	26	19	24	14	21	22	24	31
HMNF118	1	25	24	15	22	23	19	21	17	15	18	19	19	9	32
	2	22	17	14	18	13	15	17	11	16	12	12	15	12	26
HMNF147	1	32	41	29	33	34	30	32	25	30	20	32	27	26	41
	2	52	40	29	36	44	38	30	31	18	26	40	26	21	62
	3	41	34	26	33	34	42	28	22	18	24	27	25	28	59
hmnotsogood	0	10	10	7	9	7	7	9	6	3	8	7	7	5	10
hyaline010	1	5	6	5	5	5	5	6	5	5	5	6	5	4	8
	2	11	7	7	7	7	6	8	7	6	7	8	7	8	11
	3	15	14	13	10	16	10	13	12	9	8	11	12	3	16
MCOR976D2	A	1	2	2	2	2	1	2	2	2	2	2	2	3	3
	B	2	2	2	2	2	1	2	2	2	2	1	2	4	3
	C	2	4	4	4	4	5	2	3	4	8	3	5	4	9
	E	4	3	4	4	5	2	3	3	4	6	6	2	6	5
	F	2	4	5	4	6	4	3	4	5	5	6	3	4	4
MCOR976D9	A	7	3	5	2	3	6	1	4	2	2	4	2	6	2
	B	7	2	4	2	3	7	2	4	1	2	2	1	4	4
	C	2	3	2	2	3	4	2	2	2	1	0	3	4	6

sample	minimum	round(aver	maximum
HMNF0	29	32	34
HMNF0	22	28	31
HMNF0	33	38	40
HMNF0	24	33	37
HMNF0	22	28	37
HMNF0	23	26	29
HMNF0	27	31	35
HMNF0	17	22	26
HMNF1	15	21	25
HMNF1	11	16	22
HMNF1	25	32	41
HMNF1	29	38	52
HMNF1	22	33	42
hmnots	6	8	10
hyaline	5	5	6
hyaline	6	8	11
hyaline	10	13	16
MCOR9	1	2	2
MCOR9	1	2	2
MCOR9	2	4	5
MCOR9	2	4	5
MCOR9	2	4	6
MCOR9	1	4	7
MCOR9	2	4	7
MCOR9	2	3	4

Sum of alfa atresia		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	1	0	0	1	2	1	1	1	0	0	0	0	0	1
	3	0	0	3	0	3	2	3	3	6	0	0	0	3	1
HMNF088	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0
	2	2	2	2	2	2	2	1	1	3	0	2	1	2	2
	3	3	2	1	3	1	0	1	0	3	0	0	0	3	3
HMNF098	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0
HMNF118	1	0	2	0	0	1	0	1	1	6	0	1	1	2	1
	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
HMNF147	1	3	4	2	3	4	1	2	0	4	0	1	1	4	1
	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	2	0	0	0	1	1
hmnotsogood	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	0	0	0	0	0	0	0	1	0
MCOR976D2	A	2	3	2	2	2	2	2	3	2	2	2	2	4	4
	B	2	2	2	2	2	2	2	2	2	2	2	2	3	3
	C	2	2	2	2	2	2	3	2	1	2	2	2	2	3
	E	2	2	2	2	2	0	2	2	2	1	2	2	2	2
	F	2	2	2	2	1	0	2	3	2	2	2	2	2	4
MCOR976D9	A	2	2	0	1	1	1	2	1	1	1	1	1	0	2
	B	3	3	3	3	3	3	3	3	3	3	3	3	2	3
	C	3	2	2	4	3	2	3	3	2	3	5	2	2	3

sample	minimum	round(aver	maximum
HMNF0	0	1	2
HMNF0	0	2	3
HMNF0	0	0	0
HMNF0	1	2	2
HMNF0	0	1	3
HMNF0	0	0	2
HMNF0	0	0	0
HMNF0	0	0	1
HMNF1	0	1	2
HMNF1	0	0	0
HMNF1	0	2	4
HMNF1	0	0	1
HMNF1	0	0	0
hmnots	0	0	0
hyaline	0	0	0
hyaline	0	0	0
hyaline	0	0	1
MCOR9	2	2	3
MCOR9	2	2	2
MCOR9	2	2	3
MCOR9	0	2	2
MCOR9	0	2	3
MCOR9	0	1	2
MCOR9	3	3	3
MCOR9	2	3	4

Sum of hydrated		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF098	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HMNF118	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	6
	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
hmnotsogood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyaline010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	13
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCOR976D9	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sum of POF		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	1	1	1	1	0	1	0	1	1	0	0	1	1	9
	3	0	0	1	1	1	0	1	0	1	1	0	1	0	1	8
HMNF088	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
	3	0	0	1	0	0	1	0	0	1	0	0	0	0	1	4
HMNF098	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HMNF118	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	9
	2	1	0		1	1	0	1	1	1	0	1	1	0	1	9
HMNF147	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	5
	2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	4
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hmnotsogood	0	1	0		0	0	1	0	0	0	0	0	0	0	1	3
hyaline010	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	1	0	1	1	1	1	1	1	1	1	1	0	1	0	11
MCOR976D9	A	0	0	0	0	0	0	0	1	1	0	1	0	0	1	4
	B	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
	C	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3

Average of vitellogenic oocytes		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	30	28	33	30	29	32	33	32	29	31	23	35	32	34	30.79
	3	30	26	32	31	29	30	30	22	31	25	20	38	29	31	28.86
HMNF088	1	40	38	27	38	40	33	38	35	36	40	22	62	36	40	37.5
	2	36	28	22	41	37	24	37	34	29	32	25	42	35	32	32.43
	3	28	18	13	22	30	23	28	27	20	37	16	42	25	22	25.07
HMNF098	1	29	26	18	25	27	23	25	26	22	26	20	37	26	23	25.21
	2	32	28	27	27	34	28	35	33	29	27	28	46	31	30	31.07
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	22.5
HMNF118	1	25	15	18	19	24	15	22	23	19	19	9	32	21	17	19.86
	2	22	16	12	12	17	14	18	13	15	15	12	26	17	11	15.71
HMNF147	1	32	30	20	32	41	29	33	34	27	30	26	41	32	25	30.86
	2	52	18	26	40	40	29	36	44	26	38	21	62	30	31	35.21
	3	41	18	24	27	34	26	33	34	25	42	28	59	28	22	31.5
hmnotsogood	0	10	3	8	7	10	7	9	7	7	7	5	10	9	6	7.5
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5.357
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	7.643
	3	15	9	8	11	14	13	10	16	12	10	3	16	13	12	11.57
MCOR976D2	A	1	2	2	2	2	2	2	2	2	1	3	3	2	2	2
	B	2	2	2	1	2	2	2	2	2	1	4	3	2	2	2.071
	C	2	4	8	3	4	4	4	4	5	5	4	9	2	3	4.357
	E	4	4	6	6	3	4	4	5	2	2	6	5	3	3	4.071
	F	2	5	5	6	4	5	4	6	3	4	4	4	3	4	4.214
MCOR976D9	A	7	2	2	4	3	5	2	3	2	6	6	2	1	4	3.5
	B	7	1	2	2	2	4	2	3	1	7	4	4	2	4	3.214
	C	2	2	1	0	3	2	2	3	3	4	4	6	2	2	2.571

all readers			
sample	minimum	round(average)	maximum
HMNF085-1	23	31	35
HMNF085-3	20	29	38
HMNF088-1	22	38	62
HMNF088-2	22	32	42
HMNF088-3	13	25	42
HMNF098-1	18	25	37
HMNF098-2	27	31	46
HMNF098-3	14	23	31
HMNF118-1	9	20	32
HMNF118-2	11	16	26
HMNF147-1	20	31	41
HMNF147-2	18	35	62
HMNF147-3	18	32	59
hmnotsogood-	3	8	10
hyaline010-1	4	5	8
hyaline010-2	6	8	11
hyaline010-3	3	12	16
MCOR976D2-	1	2	3
MCOR976D2-	1	2	4
MCOR976D2-	2	4	9
MCOR976D2-	2	4	6
MCOR976D2-	2	4	6
MCOR976D9-	1	4	7
MCOR976D9-	1	3	7
MCOR976D9-	0	3	6

		NH-Germ	AMC-Port	HM-Sp	JRP-Sp	IG-Scot	IdB-Neth	HW-Neth	KM-Gern	GE-Ne	PW-Eng	SH-Irel	IM-Sp	DL-Irel	Christie-Eng	
HMNF085	1	0.137	-0.026	-0.058	0.007	0.039	0.072	0.039	-0.253	-0.026	0.039	0.104	-0.058	0.072	-0.090	(score-mean)/mean
	3	0.317	0.040	0.005	-0.134	-0.238	0.040	0.040	-0.307	0.074	0.005	0.074	0.074	0.109	-0.099	
HMNF088	1	0.653	0.067	0.067	0.067	-0.067	0.013	-0.120	-0.413	0.013	-0.040	0.067	-0.040	-0.280	0.013	
	2	0.295	0.110	0.141	-0.013	0.048	0.141	-0.260	-0.229	0.264	0.079	-0.013	-0.106	-0.322	-0.137	
	3	0.675	0.117	0.197	0.476	0.077	0.117	-0.083	-0.362	-0.123	-0.003	-0.123	-0.202	-0.481	-0.282	
HMNF098	1	0.467	0.150	0.071	0.031	0.031	-0.008	-0.088	-0.207	-0.008	0.031	-0.088	-0.127	-0.286	0.031	
	2	0.480	0.030	0.094	-0.131	0.062	0.126	-0.099	-0.099	-0.131	-0.002	-0.034	-0.067	-0.131	-0.099	
	3	0.378	0.022	0.111	-0.244	0.067	-0.022	0.022	0.067	-0.067	0.156	-0.156	-0.022	-0.378	0.067	
HMNF118	1	0.612	0.259	0.209	-0.043	0.158	0.108	-0.245	-0.547	-0.043	0.058	-0.144	-0.043	-0.094	-0.245	
	2	0.655	0.400	0.082	-0.045	-0.173	0.145	-0.109	-0.236	-0.236	0.082	-0.300	-0.045	-0.236	0.018	
HMNF147	1	0.329	0.037	0.329	-0.028	0.102	0.069	-0.060	-0.157	0.037	0.037	-0.190	-0.125	-0.352	-0.028	
	2	0.761	0.477	0.136	0.079	0.249	0.022	-0.176	-0.404	0.136	-0.148	-0.120	-0.262	-0.262	-0.489	
	3	0.873	0.302	0.079	0.333	0.079	0.048	-0.175	-0.111	-0.143	-0.111	-0.302	-0.206	-0.238	-0.429	
hmnotsogood	0	0.333	0.333	0.333	-0.067	-0.067	0.200	-0.067	-0.333	-0.067	0.200	-0.200	-0.067	0.067	-0.600	
hyaline010	1	0.493	-0.067	0.120	-0.067	-0.067	-0.067	-0.067	-0.253	0.120	0.120	-0.067	-0.067	-0.067	-0.067	
	2	0.439	0.439	-0.084	-0.215	-0.084	-0.084	-0.084	0.047	0.047	0.047	-0.084	-0.084	-0.084	-0.215	
	3	0.383	0.296	0.210	-0.136	0.383	-0.136	0.123	-0.741	-0.049	0.123	0.037	0.037	-0.309	-0.222	
MCOR976D2	A	0.500	-0.500	0.000	-0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	
	B	0.448	-0.034	-0.034	-0.517	-0.034	-0.034	-0.034	0.931	-0.517	-0.034	-0.034	-0.034	-0.034	-0.034	
	C	1.066	-0.541	-0.082	0.148	-0.082	-0.082	-0.082	-0.082	-0.311	-0.541	-0.311	0.148	0.836	-0.082	
	E	0.228	-0.018	-0.263	-0.509	0.228	-0.018	-0.018	0.474	0.474	-0.263	-0.263	-0.509	0.474	-0.018	
	F	-0.051	-0.525	-0.051	-0.051	0.424	-0.051	0.186	-0.051	0.424	-0.288	-0.051	-0.288	0.186	0.186	
MCOR976D9	A	-0.429	1.000	-0.143	0.714	-0.143	-0.429	0.429	0.714	0.143	-0.714	0.143	-0.429	-0.429	-0.429	
	B	0.244	1.178	-0.378	1.178	-0.067	-0.378	0.244	0.244	-0.378	-0.378	0.244	-0.689	-0.378	-0.689	
	C	1.333	-0.222	0.167	0.556	0.167	-0.222	-0.222	0.556	-1.000	-0.222	-0.222	0.167	-0.611	-0.222	
		0.465	0.133	0.050	0.036	0.044	-0.017	-0.036	-0.050	-0.055	-0.071	-0.081	-0.122	-0.129	-0.166	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	ranking

			reader														
sample	number	Data	AMC-Port	Christie	DL-Irel	GE-Net	HM-Sp	HW-Neth	IdB-Neth	IG-Sco	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-En	SH-Irel	average
HMNF085	1	Average of	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0.286
		Average of	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0.286
	3	Average of	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.714
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	Average of	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.357
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	2	3	0	2	0	0	0	2	1	0	0	1	0	0	0.786
		Average of	0	0	0	0	2	2	2	0	0	2	2	1	1	1	0.929
	3	Average of	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0.357

sample	atresia	minimum	round(avera	maximum
HMNF085-	Average of early alfa	0	0.29	2
HMNF085-	Average of early alfa	0	0.29	1
HMNF088-	Average of early alfa	0	1.71	6
HMNF088-	Average of early alfa	0	0	0
HMNF088-	Average of early alfa	0	0.36	3
HMNF098-	Average of early alfa	0	0	0
HMNF098-	Average of early alfa	0	0.79	3
HMNF098-	Average of early alfa	0	0.93	2
HMNF118-	Average of early alfa	0	0.36	3

HMNF088	3	Average of	0	3	0	0	1	1	2	1	0	0	3	3	1	0	1.071
HMNF098	1	Average of	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.286
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.214
HMNF118	1	Average of	0	6	0	0	1	0	0	1	1	0	0	1	1	0	0.786
		Average of	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0.357
	2	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	Average of	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0.5
		Average of	0	1	0	1	4	2	3	3	1	1	4	1	2	0	1.643
	2	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hmnotsogood	0	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hyaline010	1	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
MCOR976D2	A	Average of	2	0	0	2	0	0	2	2	0	0	0	4	0	0	0.857
		Average of	0	2	2	0	3	2	0	0	2	2	4	0	2	3	1.571
	B	Average of	2	0	0	1	0	0	1	1	0	0	0	1	0	0	0.429
		Average of	0	2	2	1	2	2	1	1	2	2	3	2	2	2	1.714
	C	Average of	0	0	0	0	0	0	0	2	1	0	0	3	1	0	0.5
		Average of	2	1	2	2	2	2	2	0	1	2	2	0	2	2	1.571
	E	Average of	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0.357
		Average of	0	2	1	2	2	2	2	2	2	0	2	0	1	2	1.429
	F	Average of	2	0	1	0	0	0	1	0	1	0	0	3	1	0	0.643
		Average of	0	2	1	2	2	2	1	1	1	0	2	1	1	3	1.357
MCOR976D9	A	Average of	2	1	0	1	2	0	1	1	0	1	0	2	2	1	1
		Average of	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.143
	B	Average of	3	0	1	2	2	0	3	3	1	0	0	3	2	3	1.643
		Average of	0	3	2	1	1	3	0	0	2	3	2	0	1	0	1.286
	C	Average of	3	2	0	5	2	0	4	3	2	0	0	3	3	2	2.071
		Average of	0	0	3	0	0	2	0	0	0	2	2	0	0	1	0.714

HMNF118-	Average of early alf	0	1.07	3
HMNF147-	Average of early alf	0	0.21	2
HMNF147-	Average of early alf	0	0	0
HMNF147-	Average of early alf	0	0.29	2
hmnotsogo	Average of early alf	0	0	0
hyaline010	Average of early alf	0	0	0
hyaline010	Average of early alf	0	0.21	1
hyaline010	Average of early alf	0	0.79	6
MCOR976	Average of early alf	0	0.36	2
MCOR976	Average of early alf	0	0.15	2
MCOR976	Average of early alf	0	0	0
MCOR976	Average of early alf	0	0.5	3
MCOR976	Average of early alf	0	1.64	4
MCOR976	Average of early alf	0	0.07	1
MCOR976	Average of early alf	0	0	0
MCOR976	Average of early alf	0	0.21	2
HMNF085-	Average of late alfa	0	0.07	1
HMNF085-	Average of late alfa	0	0.15	2
HMNF088-	Average of late alfa	0	0.07	1
HMNF088-	Average of late alfa	0	0	0
HMNF088-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.86	4
HMNF147-	Average of late alfa	0	1.57	4
HMNF147-	Average of late alfa	0	0.43	2
HMNF147-	Average of late alfa	0	1.71	3
hmnotsogo	Average of late alfa	0	0.5	3
hyaline010	Average of late alfa	0	1.57	2
hyaline010	Average of late alfa	0	0.36	2
hyaline010	Average of late alfa	0	1.43	2
MCOR976	Average of late alfa	0	0.64	3
MCOR976	Average of late alfa	0	1.36	3
MCOR976	Average of late alfa	0	1	2
MCOR976	Average of late alfa	0	0.14	1
MCOR976	Average of late alfa	0	1.64	3
MCOR976	Average of late alfa	0	1.29	3
MCOR976	Average of late alfa	0	2.07	5
MCOR976	Average of late alfa	0	0.71	3

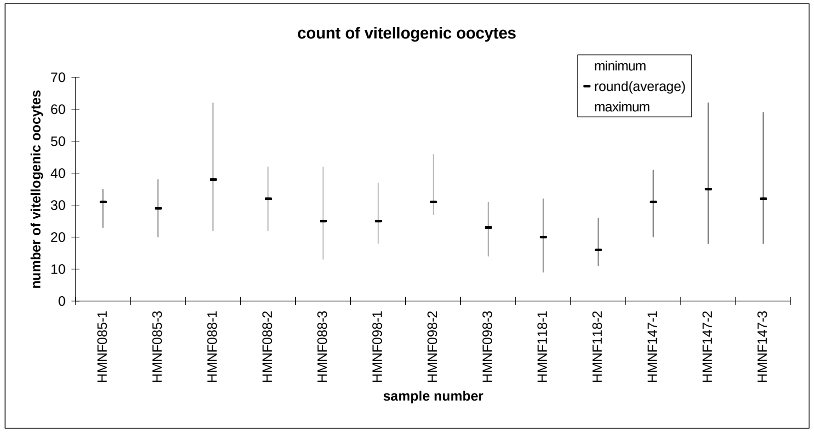
Sum of alfa atresia		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	1	0	0	0	0	0	1	2	0	1	0	1	1	1	0.57
	3	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.71
HMNF088	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.36
	2	2	3	0	2	2	2	2	2	1	2	2	2	1	1	1.71
	3	3	3	0	0	2	1	3	1	0	0	3	3	1	0	1.43
HMNF098	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.21
	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.29
	3	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.21
HMNF118	1	0	6	0	1	2	0	0	1	1	0	2	1	1	1	1.14
	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.14
HMNF147	1	3	4	0	1	4	2	3	4	1	1	4	1	2	0	2.14
	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.07
	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.29
hmnotsogood	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0.21
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.14
MCOR976D2	A	2	2	2	2	3	2	2	2	2	2	4	4	2	3	2.43
	B	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2.14
	C	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2.07
	E	2	2	1	2	2	2	2	2	2	0	2	2	2	2	1.79
	F	2	2	2	2	2	2	2	1	2	0	2	4	2	3	2.00
MCOR976D9	A	2	1	1	1	2	0	1	1	1	1	0	2	2	1	1.14
	B	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2.93

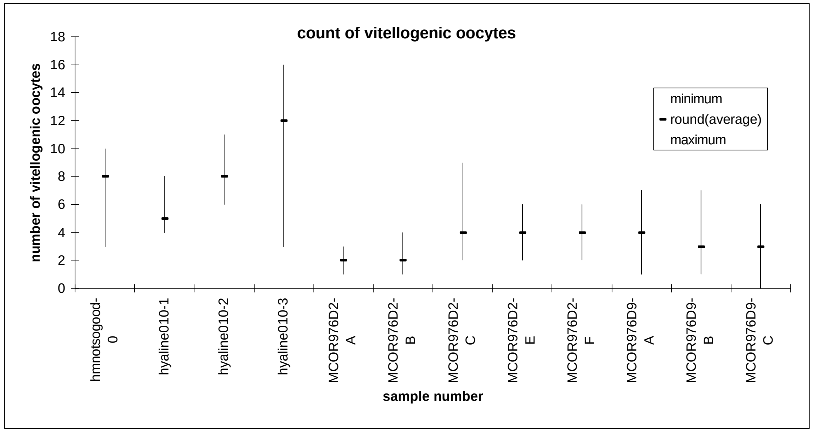
sample	minimum	round(aver	maximum
HMNF085-	0	0.571429	2
HMNF085-	0	1.714286	6
HMNF088-	0	0.357143	3
HMNF088-	0	1.714286	3
HMNF088-	0	1.428571	3
HMNF098-	0	0.214286	2
HMNF098-	0	0.285714	2
HMNF098-	0	0.214286	1
HMNF118-	0	1.142857	6
HMNF118-	0	0.142857	2
HMNF147-	0	2.142857	4
HMNF147-	0	0.071429	1
HMNF147-	0	0.285714	2
hmnotsogo	0	0.214286	2
hyaline010	0	0	0
hyaline010	0	0	0
hyaline010	0	0.142857	1
MCOR976	2	2.428571	4
MCOR976	2	2.142857	3
MCOR976	1	2.071429	3
MCOR976	0	1.785714	2
MCOR976	0	2	4
MCOR976	0	1.142857	2
MCOR976	2	2.928571	3

MCOR976D9	C	3	2	3	5	2	2	4	3	2	2	2	3	3	3	2.79		MCOR976I	2	2.785714	5

Sum of total oocytes		reader																			
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel		round(average)	sample	minimum	round(aver	maximum
HMNF085	1	31	28	33	30	29	32	33	34	29	31	23	36	32	34	31	31	HMNF085-	23	31	36
	3	30	32	32	31	29	33	30	25	31	27	23	39	32	34	31	31	HMNF085-	23	31	39
HMNF088	1	40	41	27	38	40	33	38	35	36	40	24	62	36	40	38	38	HMNF088-	24	38	62
	2	38	31	22	43	37	24	37	36	30	32	25	43	35	32	33	33	HMNF088-	22	33	43
	3	31	18	13	22	31	23	29	27	20	37	16	42	25	22	25	25	HMNF088-	13	25	42
HMNF098	1	29	26	18	25	29	23	25	26	23	26	20	37	26	23	25	25	HMNF098-	18	25	37
	2	32	30	27	27	34	28	35	33	29	27	30	46	31	30	31	31	HMNF098-	27	31	46
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	23	23	HMNF098-	14	23	31
HMNF118	1	25	21	18	19	25	15	22	24	20	19	9	33	22	17	21	21	HMNF118-	9	21	33
	2	22	18	12	12	17	14	18	13	15	15	12	26	17	11	16	16	HMNF118-	11	16	26
HMNF147	1	35	33	20	32	41	29	33	35	27	30	26	41	32	25	31	31	HMNF147-	20	31	41
	2	52	18	26	40	40	29	36	45	26	38	21	62	30	31	35	35	HMNF147-	18	35	62
	3	41	20	24	27	34	26	33	34	25	42	28	60	28	22	32	32	HMNF147-	20	32	60
hmnotsogood	0	10	5	8	7	10	7	9	7	7	7	5	10	9	6	8	8	hmnotsogo	5	8	10
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5	5	hyaline010	4	5	8
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	8	8	hyaline010	6	8	11
	3	15	9	8	11	14	13	10	17	12	10	3	16	13	12	12	12	hyaline010	3	12	17
MCOR976D2	A	3	2	2	4	2	2	4	4	2	1	3	7	2	2	3	3	MCOR976I	1	3	7
	B	4	2	2	2	2	2	3	3	2	1	4	4	2	2	3	3	MCOR976I	1	3	4
	C	2	4	8	3	4	4	4	6	6	5	4	12	3	3	5	5	MCOR976I	2	5	12
	E	6	4	6	6	3	4	4	5	2	2	6	7	4	3	4	4	MCOR976I	2	4	7
	F	4	5	6	6	4	5	5	6	4	4	4	7	4	4	5	5	MCOR976I	4	5	7
MCOR976D9	A	9	3	2	5	5	5	3	4	2	7	6	4	3	5	5	5	MCOR976I	2	5	9
	B	10	1	3	4	4	4	5	6	2	7	4	7	4	7	5	5	MCOR976I	1	5	10
	C	5	4	1	5	5	2	6	6	5	4	4	9	5	4	5	5	MCOR976I	1	5	9

		NH-Germ	AMC-Port	IG-Scot	IdB-Neth	HM-Sp	GE-Neth	PW-Eng	JRP-Sp	SH-Irel	HW-Neth	IM-Sp	Christie-Er	KM-Germ	DL-Irel	
HMNF085	1	0.161	0.000	0.097	0.065	-0.065	-0.032	0.032	0.000	0.097	0.032	-0.065	-0.097	-0.258	0.065	
	3	0.258	-0.032	-0.194	-0.032	-0.065	0.000	0.032	-0.129	0.097	0.065	0.000	0.032	-0.258	0.032	
HMNF088	1	0.632	0.053	-0.079	0.000	0.053	0.000	-0.053	0.053	0.053	-0.132	-0.053	0.079	-0.368	-0.289	
	2	0.303	0.152	0.091	0.121	0.121	0.303	0.061	-0.030	-0.030	-0.273	-0.091	-0.061	-0.242	-0.333	
	3	0.680	0.240	0.080	0.160	0.240	-0.120	0.000	0.480	-0.120	-0.080	-0.200	-0.280	-0.360	-0.480	
HMNF098	1	0.480	0.160	0.040	0.000	0.160	0.000	0.040	0.040	-0.080	-0.080	-0.080	0.040	-0.200	-0.280	
	2	0.484	0.032	0.065	0.129	0.097	-0.129	0.000	-0.129	-0.032	-0.097	-0.065	-0.032	-0.032	-0.129	
	3	0.348	0.000	0.043	-0.043	0.087	-0.087	0.130	-0.261	-0.174	0.000	-0.043	0.043	0.043	-0.391	
HMNF118	1	0.571	0.190	0.143	0.048	0.190	-0.095	0.048	-0.095	-0.190	-0.286	-0.048	0.000	-0.571	-0.143	
	2	0.625	0.375	-0.188	0.125	0.063	-0.250	0.063	-0.063	-0.313	-0.125	-0.063	0.125	-0.250	-0.250	
HMNF147	1	0.323	0.129	0.129	0.065	0.323	0.032	0.032	-0.032	-0.194	-0.065	-0.129	0.065	-0.161	-0.355	
	2	0.771	0.486	0.286	0.029	0.143	0.143	-0.143	0.086	-0.114	-0.171	-0.257	-0.486	-0.400	-0.257	
	3	0.875	0.281	0.063	0.031	0.063	-0.156	-0.125	0.313	-0.313	-0.188	-0.219	-0.375	-0.125	-0.250	
hmnotsogood	0	0.250	0.250	-0.125	0.125	0.250	-0.125	0.125	-0.125	-0.250	-0.125	-0.125	-0.375	-0.375	0.000	
hyaline010	1	0.600	0.000	0.000	0.000	0.200	0.200	0.200	0.000	0.000	0.000	0.000	0.000	-0.200	0.000	
	2	0.375	0.375	-0.125	-0.125	-0.125	0.000	0.000	-0.250	-0.125	-0.125	-0.125	-0.250	0.000	-0.125	
	3	0.333	0.250	0.417	-0.167	0.167	-0.083	0.083	-0.167	0.000	0.083	0.000	-0.250	-0.750	-0.333	
MCOR976D2	A	1.333	0.000	0.333	0.333	-0.333	0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.000	-0.333	
	B	0.333	0.333	0.000	0.000	-0.333	-0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.333	-0.333	
	C	1.400	-0.600	0.200	-0.200	-0.200	-0.400	-0.400	0.000	-0.400	-0.200	0.200	-0.200	-0.200	0.600	
	E	0.750	0.500	0.250	0.000	-0.250	0.500	0.000	-0.500	-0.250	0.000	-0.500	0.000	0.500	0.500	
	F	0.400	-0.200	0.200	0.000	-0.200	0.200	-0.200	-0.200	-0.200	0.000	-0.200	0.000	-0.200	0.200	
MCOR976D9	A	-0.200	0.800	-0.200	-0.400	0.000	0.000	-0.400	0.400	0.000	0.000	-0.600	-0.400	0.200	-0.600	
	B	0.400	1.000	0.200	0.000	-0.200	-0.200	-0.200	0.400	0.400	-0.200	-0.600	-0.800	-0.200	-0.400	
	C	0.800	0.000	0.200	0.200	0.000	0.000	0.000	-0.200	-0.200	-0.600	0.000	-0.200	-0.200	-0.800	
		0.531	0.191	0.077	0.019	0.015	-0.012	-0.054	-0.070	-0.120	-0.129	-0.157	-0.164	-0.171	-0.187	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	rank


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF085-3
HMNF088-1
HMNF088-2
HMNF088-3
HMNF098-1
HMNF098-2
HMNF098-3
HMNF118-1
HMNF118-2
HMNF147-1
HMNF147-2
HMNF147-3
sample number


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
2
4
6
8
10
12
14
16
18
hmnotsogood-0
hyaline010-1
hyaline010-2
hyaline010-3
MCOR976D2-A
MCOR976D2-B
MCOR976D2-C
MCOR976D2-E
MCOR976D2-F
MCOR976D9-A
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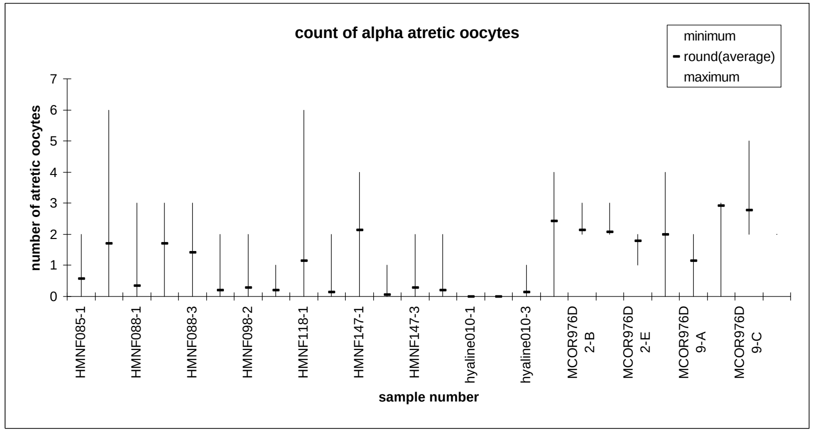
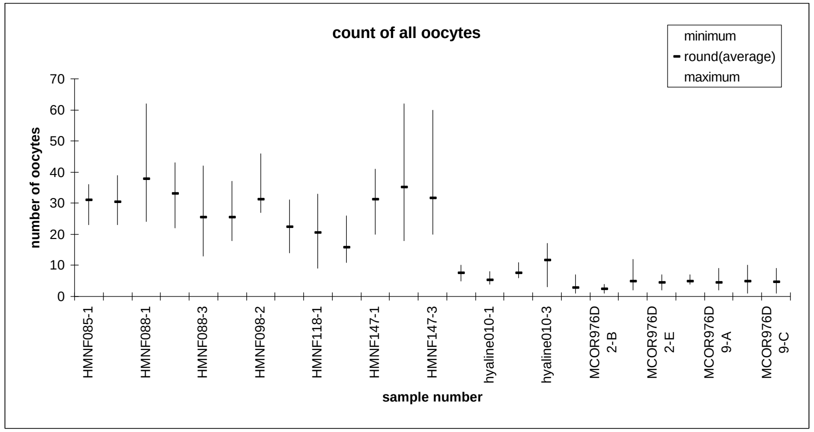
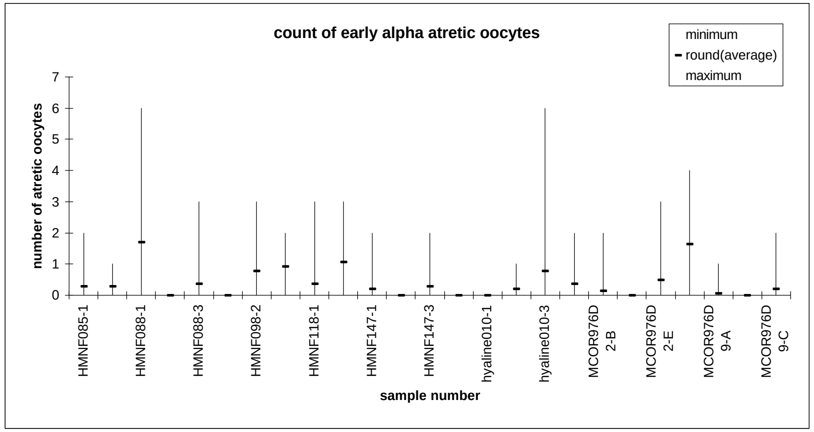
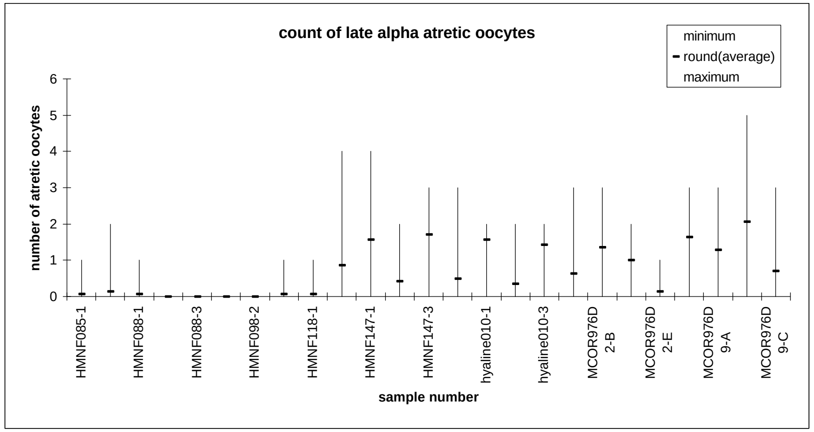
MCOR976D9-C
sample number


count of alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of all oocytes
minimum
round(average)
maximum
number of oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of early alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of late alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number

Annex 4

Analysis of the interpretation of histological slides of mackerel and horse mackerel

sample	number	reader	experience	mig.nucleus	hydrated	POF	beta atr	vitellogenic	early alfa atresia	late alfa atr	alfa atresia	total oocytes
HMNF085	1	IdB-Neth	e	0	0	1	0	33	0	1	1	33
HMNF085	3	IdB-Neth	e	0	0	1	0	30	0	0	0	30
HMNF088	1	IdB-Neth	e	0	0	0	0	38	0	0	0	38
HMNF088	2	IdB-Neth	e	0	0	0	0	37	0	2	2	37
HMNF088	3	IdB-Neth	e	0	0	0	0	28	1	2	3	29
HMNF098	1	IdB-Neth	e	0	0	0	0	25	0	0	0	25
HMNF098	2	IdB-Neth	e	0	0	0	0	35	0	0	0	35
HMNF098	3	IdB-Neth	e	0	0	0	0	22	0	0	0	22
HMNF118	1	IdB-Neth	e	0	1	1	0	22	0	0	0	22
HMNF118	2	IdB-Neth	e	0	0	1	0	18	0	0	0	18
HMNF147	1	IdB-Neth	e	0	0	0	0	33	0	3	3	33
HMNF147	2	IdB-Neth	e	0	0	0	0	36	0	0	0	36
HMNF147	3	IdB-Neth	e	0	0	0	0	33	0	0	0	33
hmnotsogood	0	IdB-Neth	e	0	0	0	1	9	0	0	0	9
hyaline010	1	IdB-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	IdB-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IdB-Neth	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	IdB-Neth	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IdB-Neth	e	0	0	0	0	2	1	1	2	3
MCOR976D2	C	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	F	IdB-Neth	e	0	0	1	0	4	1	1	2	5
MCOR976D9	A	IdB-Neth	e	1	0	0	0	2	1	0	1	3
MCOR976D9	B	IdB-Neth	e	0	0	0	0	2	3	0	3	5
MCOR976D9	C	IdB-Neth	e	0	0	0	0	2	4	0	4	6
HMNF085	1	IM-Sp	n	0	0	1	0	29	0	0	0	29
HMNF085	3	IM-Sp	n	0	0	1	0	31	0	0	0	31
HMNF088	1	IM-Sp	n	0	0	1	0	36	0	0	0	36
HMNF088	2	IM-Sp	n	0	0	0	1	29	1	0	1	30
HMNF088	3	IM-Sp	n	0	0	1	1	20	0	0	0	20
HMNF098	1	IM-Sp	n	0	0	1	0	22	1	0	1	23
HMNF098	2	IM-Sp	n	0	0	0	0	29	0	0	0	29
HMNF098	3	IM-Sp	n	0	1	0	0	22	0	0	0	22
HMNF118	1	IM-Sp	n	0	0	1	0	19	1	0	1	20
HMNF118	2	IM-Sp	n	0	0	1	0	15	0	0	0	15
HMNF147	1	IM-Sp	n	0	0	0	1	27	0	1	1	27
HMNF147	2	IM-Sp	n	0	0	0	0	26	0	0	0	26
HMNF147	3	IM-Sp	n	0	0	0	0	25	0	0	0	25
hmnotsogood	0	IM-Sp	n	0	0	0	1	7	0	0	0	7
hyaline010	1	IM-Sp	n	0	1	0	0	5	0	0	0	5
hyaline010	2	IM-Sp	n	0	1	0	0	7	0	0	0	7
hyaline010	3	IM-Sp	n	0	1	0	0	12	0	0	0	12
MCOR976D2	A	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	IM-Sp	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C	IM-Sp	n	0	0	0	0	5	1	1	2	6
MCOR976D2	E	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	F	IM-Sp	n	0	0	1	0	3	1	1	2	4
MCOR976D9	A	IM-Sp	n	0	0	1	0	2	0	1	1	2
MCOR976D9	B	IM-Sp	n	0	0	0	0	1	1	2	3	2
MCOR976D9	C	IM-Sp	n	0	0	0	0	3	2	0	2	5
HMNF085	1	HM-Sp	e	0	0	1	1	29	0	0	0	29
HMNF085	3	HM-Sp	e	0	0	1	0	29	0	0	0	29
HMNF088	1	HM-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	HM-Sp	e	0	0	0	0	37	0	2	2	37
HMNF088	3	HM-Sp	e	0	0	0	0	30	1	1	2	31
HMNF098	1	HM-Sp	e	0	0	1	1	27	2	0	2	29
HMNF098	2	HM-Sp	e	0	0	0	0	34	0	0	0	34
HMNF098	3	HM-Sp	e	0	0	0	0	25	0	0	0	25
HMNF118	1	HM-Sp	e	0	1	1	0	24	1	1	2	25
HMNF118	2	HM-Sp	e	0	0	1	1	17	0	0	0	17
HMNF147	1	HM-Sp	e	0	0	0	0	41	0	4	4	41
HMNF147	2	HM-Sp	e	0	0	1	1	40	0	0	0	40
HMNF147	3	HM-Sp	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	HM-Sp	e	0	0	0	1	10	0	0	0	10
hyaline010	1	HM-Sp	e	0	1	1	0	6	0	0	0	6
hyaline010	2	HM-Sp	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HM-Sp	e	0	1	0	0	14	0	0	0	14
MCOR976D2	A	HM-Sp	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	HM-Sp	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	HM-Sp	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	HM-Sp	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	HM-Sp	e	0	0	1	0	4	0	2	2	4
MCOR976D9	A	HM-Sp	e	0	0	0	0	3	2	0	2	5
MCOR976D9	B	HM-Sp	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	HM-Sp	e	0	0	0	0	3	2	0	2	5
HMNF085	1	IG-Scot	e	0	0	0	0	32	2	0	2	34
HMNF085	3	IG-Scot	e	0	0	0	0	22	3	0	3	25
HMNF088	1	IG-Scot	e	0	0	0	0	35	0	0	0	35
HMNF088	2	IG-Scot	e	0	0	0	0	34	2	0	2	36
HMNF088	3	IG-Scot	e	0	0	0	0	27	0	1	1	27
HMNF098	1	IG-Scot	e	0	0	0	0	26	0	0	0	26
HMNF098	2	IG-Scot	e	0	0	0	0	33	0	0	0	33
HMNF098	3	IG-Scot	e	0	0	0	0	24	0	0	0	24
HMNF118	1	IG-Scot	e	0	1	1	0	23	1	0	1	24
HMNF118	2	IG-Scot	e	0	0	1	0	13	0	0	0	13
HMNF147	1	IG-Scot	e	0	0	0	0	34	1	3	4	35
HMNF147	2	IG-Scot	e	0	0	0	0	44	1	0	1	45

HMNF147	3	IG-Scot	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	IG-Scot	e	0	0	0	1	7	0	0	0	7
hyaline010	1	IG-Scot	e	0	1	1	0	5	0	0	0	5
hyaline010	2	IG-Scot	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IG-Scot	e	0	1	1	0	16	1	0	1	17
MCOR976D2	A	IG-Scot	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IG-Scot	e	1	0	0	0	2	1	1	2	3
MCOR976D2	C	IG-Scot	e	0	0	0	0	4	2	0	2	6
MCOR976D2	E	IG-Scot	e	0	0	0	0	5	0	2	2	5
MCOR976D2	F	IG-Scot	e	0	0	1	1	6	0	1	1	6
MCOR976D9	A	IG-Scot	e	1	0	1	0	3	1	0	1	4
MCOR976D9	B	IG-Scot	e	0	0	0	0	3	3	0	3	6
MCOR976D9	C	IG-Scot	e	0	0	1	0	3	3	0	3	6
HMNF085	1	SH-Irel	e	0	0	1	0	34	0	1	1	34
HMNF085	3	SH-Irel	e	0	0	1	1	31	3	0	3	34
HMNF088	1	SH-Irel	e	0	0	0	0	40	0	0	0	40
HMNF088	2	SH-Irel	e	0	0	0	1	32	0	1	1	32
HMNF088	3	SH-Irel	e	0	0	1	1	22	0	0	0	22
HMNF098	1	SH-Irel	e	1	0	0	0	23	0	0	0	23
HMNF098	2	SH-Irel	e	1	0	0	0	30	0	0	0	30
HMNF098	3	SH-Irel	e	0	0	0	0	19	0	1	1	19
HMNF118	1	SH-Irel	e	0	0	1	0	17	0	1	1	17
HMNF118	2	SH-Irel	e	0	0	1	0	11	0	0	0	11
HMNF147	1	SH-Irel	e	0	0	1	1	25	0	0	0	25
HMNF147	2	SH-Irel	e	0	1	1	0	31	0	0	0	31
HMNF147	3	SH-Irel	e	0	1	0	0	22	0	0	0	22
hmnotsogood	0	SH-Irel	e	0	0	1	0	6	0	0	0	6
hyaline010	1	SH-Irel	e	0	1	1	0	5	0	0	0	5
hyaline010	2	SH-Irel	e	0	1	1	0	7	0	0	0	7
hyaline010	3	SH-Irel	e	0	1	0	0	12	0	0	0	12
MCOR976D2	A	SH-Irel	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	SH-Irel	e	1	0	1	1	2	0	2	2	2
MCOR976D2	C	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	E	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	SH-Irel	e	0	0	0	1	4	0	3	3	4
MCOR976D9	A	SH-Irel	e	0	0	1	0	4	1	0	1	5
MCOR976D9	B	SH-Irel	e	0	0	1	0	4	3	0	3	7
MCOR976D9	C	SH-Irel	e	0	0	0	0	2	2	1	3	4
HMNF085	1	JRP-Sp	e	0	0	1	0	31	0	1	1	31
HMNF085	3	JRP-Sp	e	1	0	1	0	25	2	0	2	27
HMNF088	1	JRP-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	JRP-Sp	e	0	0	0	0	32	0	2	2	32
HMNF088	3	JRP-Sp	e	0	0	0	1	37	0	0	0	37
HMNF098	1	JRP-Sp	e	1	0	0	0	26	0	0	0	26
HMNF098	2	JRP-Sp	e	1	0	0	0	27	0	0	0	27
HMNF098	3	JRP-Sp	e	1	0	0	0	17	0	0	0	17
HMNF118	1	JRP-Sp	e	0	0	0	1	19	0	0	0	19
HMNF118	2	JRP-Sp	e	0	0	0	1	15	0	0	0	15
HMNF147	1	JRP-Sp	e	0	0	0	1	30	0	1	1	30
HMNF147	2	JRP-Sp	e	0	0	0	0	38	0	0	0	38
HMNF147	3	JRP-Sp	e	0	0	0	0	42	0	0	0	42
hmnotsogood	0	JRP-Sp	e	0	0	0	0	7	0	0	0	7
hyaline010	1	JRP-Sp	e	0	1	0	0	5	0	0	0	5
hyaline010	2	JRP-Sp	e	0	1	0	0	6	0	0	0	6
hyaline010	3	JRP-Sp	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	JRP-Sp	e	0	0	0	0	1	0	2	2	1
MCOR976D2	B	JRP-Sp	e	0	0	0	1	1	0	2	2	1
MCOR976D2	C	JRP-Sp	e	0	0	0	0	5	0	2	2	5
MCOR976D2	E	JRP-Sp	e	0	0	0	1	2	0	0	0	2
MCOR976D2	F	JRP-Sp	e	0	0	1	0	4	0	0	0	4
MCOR976D9	A	JRP-Sp	e	0	0	0	0	6	1	0	1	7
MCOR976D9	B	JRP-Sp	e	0	0	0	0	7	0	3	3	7
MCOR976D9	C	JRP-Sp	e	0	0	0	0	4	0	2	2	4
HMNF085	1	HW-Neth	e	0	0	0	0	32	0	0	0	32
HMNF085	3	HW-Neth	e	0	0	0	1	30	3	0	3	33
HMNF088	1	HW-Neth	e	0	0	0	0	33	0	0	0	33
HMNF088	2	HW-Neth	e	0	0	0	1	24	0	2	2	24
HMNF088	3	HW-Neth	e	0	0	1	1	23	0	1	1	23
HMNF098	1	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF098	2	HW-Neth	e	0	0	0	0	28	0	0	0	28
HMNF098	3	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF118	1	HW-Neth	e	0	1	0	0	15	0	0	0	15
HMNF118	2	HW-Neth	e	0	0	0	0	14	0	0	0	14
HMNF147	1	HW-Neth	e	0	0	1	1	29	0	2	2	29
HMNF147	2	HW-Neth	e	0	0	1	0	29	0	0	0	29
HMNF147	3	HW-Neth	e	0	0	0	0	26	0	0	0	26
hmnotsogood	0	HW-Neth	e	0	0	1	0	7	0	0	0	7
hyaline010	1	HW-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	HW-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HW-Neth	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	HW-Neth	e	0	0	0	1	2	0	2	2	2
MCOR976D2	B	HW-Neth	e	1	0	0	1	2	0	2	2	2
MCOR976D2	C	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	E	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	F	HW-Neth	e	0	0	1	1	5	0	2	2	5
MCOR976D9	A	HW-Neth	e	1	0	0	0	5	0	0	0	5
MCOR976D9	B	HW-Neth	e	0	0	0	1	4	0	3	3	4
MCOR976D9	C	HW-Neth	e	0	0	0	1	2	0	2	2	2

HMNF085		1	KM-Germ	n	0	0	0	0	23	0	0	0	23
HMNF085		3	KM-Germ	n	0	0	0	0	20	3	0	3	23
HMNF088		1	KM-Germ	n	0	0	0	0	22	2	0	2	24
HMNF088		2	KM-Germ	n	0	0	1	0	25	0	2	2	25
HMNF088		3	KM-Germ	n	0	0	0	0	16	0	3	3	16
HMNF098		1	KM-Germ	n	0	0	0	0	20	0	0	0	20
HMNF098		2	KM-Germ	n	0	0	0	0	28	2	0	2	30
HMNF098		3	KM-Germ	n	0	0	0	0	24	0	1	1	24
HMNF118		1	KM-Germ	n	0	1	1	0	9	0	2	2	9
HMNF118		2	KM-Germ	n	0	0	1	0	12	0	0	0	12
HMNF147		1	KM-Germ	n	0	0	0	0	26	0	4	4	26
HMNF147		2	KM-Germ	n	0	1	0	0	21	0	0	0	21
HMNF147		3	KM-Germ	n	0	0	0	0	28	0	1	1	28
hmnotsogood		0	KM-Germ	n	0	0	0	0	5	0	1	1	5
hyaline010		1	KM-Germ	n	0	1	0	0	4	0	0	0	4
hyaline010		2	KM-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		3	KM-Germ	n	0	1	0	0	3	0	1	1	3
MCOR976D2	A		KM-Germ	n	0	0	0	0	3	0	4	4	3
MCOR976D2	B		KM-Germ	n	0	0	0	0	4	0	3	3	4
MCOR976D2	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
MCOR976D2	E		KM-Germ	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	A		KM-Germ	n	0	0	1	0	6	0	0	0	6
MCOR976D9	B		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
HMNF085		1	DL-Irel	n	0	0	1	0	33	0	0	0	33
HMNF085		3	DL-Irel	n	0	0	1	0	32	0	0	0	32
HMNF088		1	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF088		2	DL-Irel	n	0	0	1	0	22	0	0	0	22
HMNF088		3	DL-Irel	n	1	0	1	0	13	0	0	0	13
HMNF098		1	DL-Irel	n	0	0	0	0	18	0	0	0	18
HMNF098		2	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF098		3	DL-Irel	n	0	0	1	0	14	0	0	0	14
HMNF118		1	DL-Irel	n	0	0	1	0	18	0	0	0	18
HMNF118		2	DL-Irel	n					12		0	0	12
HMNF147		1	DL-Irel	n	0	0	1	0	20	0	0	0	20
HMNF147		2	DL-Irel	n	0	1	0	0	26	0	0	0	26
HMNF147		3	DL-Irel	n	0	1	0	0	24	0	0	0	24
hmnotsogood		0	DL-Irel	n	0	0			8		0	0	8
hyaline010		1	DL-Irel	n	0	1	1	0	5	0	0	0	5
hyaline010		2	DL-Irel	n	0	1	0	0	7	0	0	0	7
hyaline010		3	DL-Irel	n	0	1	0	0	8	0	0	0	8
MCOR976D2	A		DL-Irel	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		DL-Irel	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C		DL-Irel	n	0	0	0	0	8	0	2	2	8
MCOR976D2	E		DL-Irel	n	0	0	0	0	6	0	1	1	6
MCOR976D2	F		DL-Irel	n	0	0	1	0	5	1	1	2	6
MCOR976D9	A		DL-Irel	n	0	0	0	1	2	0	1	1	2
MCOR976D9	B		DL-Irel	n	0	0	0	0	2	1	2	3	3
MCOR976D9	C		DL-Irel	n	0	0	0	0	1	0	3	3	1
HMNF085		1	GE-Neth	n	0	0	1	0	30	0	0	0	30
HMNF085		3	GE-Neth	n	0	0	1	0	31	0	0	0	31
HMNF088		1	GE-Neth	n	0	0	0	0	38	0	0	0	38
HMNF088		2	GE-Neth	n	0	0	0	0	41	2	0	2	43
HMNF088		3	GE-Neth	n	0	0	0	1	22	0	0	0	22
HMNF098		1	GE-Neth	n	0	0	0	0	25	0	0	0	25
HMNF098		2	GE-Neth	n	0	0	1	0	27	0	0	0	27
HMNF098		3	GE-Neth	n	0	0	0	1	21	0	0	0	21
HMNF118		1	GE-Neth	n	0	0	1	0	19	0	1	1	19
HMNF118		2	GE-Neth	n	0	0	1	1	12	0	0	0	12
HMNF147		1	GE-Neth	n	0	0	1	1	32	0	1	1	32
HMNF147		2	GE-Neth	n	0	0	1	0	40	0	0	0	40
HMNF147		3	GE-Neth	n	0	0	0	0	27	0	0	0	27
hmnotsogood		0	GE-Neth	n	0	0	0	1	7	0	0	0	7
hyaline010		1	GE-Neth	n	0	1	0	0	6	0	0	0	6
hyaline010		2	GE-Neth	n	0	1	0	0	8	0	0	0	8
hyaline010		3	GE-Neth	n	0	1	0	0	11	0	0	0	11
MCOR976D2	A		GE-Neth	n	0	0	0	0	2	2	0	2	4
MCOR976D2	B		GE-Neth	n	1	0	0	0	1	1	1	2	2
MCOR976D2	C		GE-Neth	n	0	0	0	0	3	0	2	2	3
MCOR976D2	E		GE-Neth	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		GE-Neth	n	0	0	1	0	6	0	2	2	6
MCOR976D9	A		GE-Neth	n	0	0	0	0	4	1	0	1	5
MCOR976D9	B		GE-Neth	n	0	0	0	0	2	2	1	3	4
MCOR976D9	C		GE-Neth	n	0	0	0	0	0	5	0	5	5
HMNF085		1	AMC-Port	e	0	0	0	0	30	1	0	1	31
HMNF085		3	AMC-Port	e	0	0	0	0	30	0	0	0	30
HMNF088		1	AMC-Port	e	0	0	0	0	40	0	0	0	40
HMNF088		2	AMC-Port	e	0	0	0	0	36	2	0	2	38
HMNF088		3	AMC-Port	e	0	0	0	0	28	3	0	3	31
HMNF098		1	AMC-Port	e	0	0	0	0	29	0	0	0	29
HMNF098		2	AMC-Port	e	0	0	0	0	32	0	0	0	32
HMNF098		3	AMC-Port	e	0	0	0	0	23	0	0	0	23
HMNF118		1	AMC-Port	e	0	1	0	0	25	0	0	0	25
HMNF118		2	AMC-Port	e	0	0	1	0	22	0	0	0	22
HMNF147		1	AMC-Port	e	0	0	1	0	32	3	0	3	35
HMNF147		2	AMC-Port	e	0	0	0	0	52	0	0	0	52
HMNF147		3	AMC-Port	e	0	0	0	0	41	0	0	0	41

hmnotsogood		0	AMC-Port	e	0	0	1	0	10	0	0	0	10
hyaline010		1	AMC-Port	e	0	1	0	0	5	0	0	0	5
hyaline010		2	AMC-Port	e	0	1	0	0	11	0	0	0	11
hyaline010		3	AMC-Port	e	0	1	0	0	15	0	0	0	15
MCOR976D2	A		AMC-Port	e	0	0	0	0	1	2	0	2	3
MCOR976D2	B		AMC-Port	e	1	0	0	0	2	2	0	2	4
MCOR976D2	C		AMC-Port	e	0	0	0	0	2	0	2	2	2
MCOR976D2	E		AMC-Port	e	0	0	0	0	4	2	0	2	6
MCOR976D2	F		AMC-Port	e	0	0	1	0	2	2	0	2	4
MCOR976D9	A		AMC-Port	e	1	0	0	0	7	2	0	2	9
MCOR976D9	B		AMC-Port	e	0	0	0	0	7	3	0	3	10
MCOR976D9	C		AMC-Port	e	0	0	0	0	2	3	0	3	5
HMNF085		1	Christie-En	n	0	0	1	0	28	0	0	0	28
HMNF085		3	Christie-En	n	0	0	0	0	26	6	0	6	32
HMNF088		1	Christie-En	n	0	0	0	0	38	3	0	3	41
HMNF088		2	Christie-En	n	0	0	1	0	28	3	0	3	31
HMNF088		3	Christie-En	n	0	0	0	0	18	0	3	3	18
HMNF098		1	Christie-En	n	0	0	0	0	26	0	0	0	26
HMNF098		2	Christie-En	n	0	0	0	0	28	2	0	2	30
HMNF098		3	Christie-En	n	0	0	0	0	24	0	1	1	24
HMNF118		1	Christie-En	n	0	0	0	0	15	6	0	6	21
HMNF118		2	Christie-En	n	0	0	0	0	16	2	0	2	18
HMNF147		1	Christie-En	n	0	0	0	1	30	3	1	4	33
HMNF147		2	Christie-En	n	0	0	0	0	18	0	0	0	18
HMNF147		3	Christie-En	n	0	0	0	0	18	2	0	2	20
hmnotsogood		0	Christie-En	n	0	0	0	0	3	2	0	2	5
hyaline010		1	Christie-En	n	0	1	0	0	5	0	0	0	5
hyaline010		2	Christie-En	n	0	1	0	0	6	0	0	0	6
hyaline010		3	Christie-En	n	0	0	0	0	9	0	0	0	9
MCOR976D2	A		Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	C		Christie-En	n	0	0	0	0	4	0	1	1	4
MCOR976D2	E		Christie-En	n	0	0	0	0	4	0	2	2	4
MCOR976D2	F		Christie-En	n	0	0	0	0	5	0	2	2	5
MCOR976D9	A		Christie-En	n	0	0	0	0	2	1	0	1	3
MCOR976D9	B		Christie-En	n	0	0	0	0	1	0	3	3	1
MCOR976D9	C		Christie-En	n	0	0	0	1	2	2	0	2	4
HMNF085		1	NH-Germ	n	0	0	0	0	35	1	0	1	36
HMNF085		3	NH-Germ	n	0	0	1	0	38	1	0	1	39
HMNF088		1	NH-Germ	n	0	0	0	0	62	0	0	0	62
HMNF088		2	NH-Germ	n	0	0	0	1	42	1	1	2	43
HMNF088		3	NH-Germ	n	0	0	0	0	42	0	3	3	42
HMNF098		1	NH-Germ	n	0	0	0	0	37	0	0	0	37
HMNF098		2	NH-Germ	n	0	0	0	0	46	0	0	0	46
HMNF098		3	NH-Germ	n	0	0	0	0	31	0	0	0	31
HMNF118		1	NH-Germ	n	0	0	1	0	32	1	0	1	33
HMNF118		2	NH-Germ	n	0	0	1	0	26	0	0	0	26
HMNF147		1	NH-Germ	n	0	0	0	1	41	0	1	1	41
HMNF147		2	NH-Germ	n	0	0	0	1	62	0	0	0	62
HMNF147		3	NH-Germ	n	0	0	0	0	59	1	0	1	60
hmnotsogood		0	NH-Germ	n	0	0	0	1	10	0	0	0	10
hyaline010		1	NH-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		2	NH-Germ	n	0	1	0	0	11	0	0	0	11
hyaline010		3	NH-Germ	n	0	1	0	0	16	0	0	0	16
MCOR976D2	A		NH-Germ	n	0	1	0	0	3	4	0	4	7
MCOR976D2	B		NH-Germ	n	1	0	0	0	3	1	2	3	4
MCOR976D2	C		NH-Germ	n	0	0	0	0	9	3	0	3	12
MCOR976D2	E		NH-Germ	n	0	1	0	0	5	2	0	2	7
MCOR976D2	F		NH-Germ	n	0	0	0	1	4	3	1	4	7
MCOR976D9	A		NH-Germ	n	0	1	0	0	2	2	0	2	4
MCOR976D9	B		NH-Germ	n	0	1	0	0	4	3	0	3	7
MCOR976D9	C		NH-Germ	n	0	0	1	0	6	3	0	3	9
HMNF085		1	PW-Eng	e	0	0	1	1	32	0	1	1	32
HMNF085		3	PW-Eng	e	0	0	0	0	29	3	0	3	32
HMNF088		1	PW-Eng	e	0	0	0	0	36	0	0	0	36
HMNF088		2	PW-Eng	e	0	0	0	1	35	0	1	1	35
HMNF088		3	PW-Eng	e	0	0	0	1	25	0	1	1	25
HMNF098		1	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF098		2	PW-Eng	e	1	0	0	0	31	0	0	0	31
HMNF098		3	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF118		1	PW-Eng	e	0	0	0	0	21	1	0	1	22
HMNF118		2	PW-Eng	e	0	0	0	0	17	0	0	0	17
HMNF147		1	PW-Eng	e	0	0	0	1	32	0	2	2	32
HMNF147		2	PW-Eng	e	0	0	0	0	30	0	0	0	30
HMNF147		3	PW-Eng	e	0	0	0	0	28	0	0	0	28
hmnotsogood		0	PW-Eng	e	0	0	0	1	9	0	0	0	9
hyaline010		1	PW-Eng	e	0	1	0	0	6	0	0	0	6
hyaline010		2	PW-Eng	e	0	1	0	0	8	0	0	0	8
hyaline010		3	PW-Eng	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A		PW-Eng	e	0	0	0	0	2	0	2	2	2
MCOR976D2	B		PW-Eng	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C		PW-Eng	e	0	0	0	0	2	1	2	3	3
MCOR976D2	E		PW-Eng	e	0	0	0	0	3	1	1	2	4
MCOR976D2	F		PW-Eng	e	0	0	1	0	3	1	1	2	4
MCOR976D9	A		PW-Eng	e	1	0	0	0	1	2	0	2	3
MCOR976D9	B		PW-Eng	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C		PW-Eng	e	0	0	1	0	2	3	0	3	5

Average of vitellogenic oocytes		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	30	29	32	33	32	31	32	34	28	33	30	29	23	35
	3	30	29	30	30	22	25	29	31	26	32	31	31	20	38
HMNF088	1	40	40	33	38	35	40	36	40	38	27	38	36	22	62
	2	36	37	24	37	34	32	35	32	28	22	41	29	25	42
	3	28	30	23	28	27	37	25	22	18	13	22	20	16	42
HMNF098	1	29	27	23	25	26	26	26	23	26	18	25	22	20	37
	2	32	34	28	35	33	27	31	30	28	27	27	29	28	46
	3	23	25	23	22	24	17	26	19	24	14	21	22	24	31
HMNF118	1	25	24	15	22	23	19	21	17	15	18	19	19	9	32
	2	22	17	14	18	13	15	17	11	16	12	12	15	12	26
HMNF147	1	32	41	29	33	34	30	32	25	30	20	32	27	26	41
	2	52	40	29	36	44	38	30	31	18	26	40	26	21	62
	3	41	34	26	33	34	42	28	22	18	24	27	25	28	59
hmnotsogood	0	10	10	7	9	7	7	9	6	3	8	7	7	5	10
hyaline010	1	5	6	5	5	5	5	6	5	5	5	6	5	4	8
	2	11	7	7	7	7	6	8	7	6	7	8	7	8	11
	3	15	14	13	10	16	10	13	12	9	8	11	12	3	16
MCOR976D2	A	1	2	2	2	2	1	2	2	2	2	2	2	3	3
	B	2	2	2	2	2	1	2	2	2	2	1	2	4	3
	C	2	4	4	4	4	5	2	3	4	8	3	5	4	9
	E	4	3	4	4	5	2	3	3	4	6	6	2	6	5
	F	2	4	5	4	6	4	3	4	5	5	6	3	4	4
MCOR976D9	A	7	3	5	2	3	6	1	4	2	2	4	2	6	2
	B	7	2	4	2	3	7	2	4	1	2	2	1	4	4
	C	2	3	2	2	3	4	2	2	2	1	0	3	4	6

sample	minimum	round(aver	maximum
HMNF0	29	32	34
HMNF0	22	28	31
HMNF0	33	38	40
HMNF0	24	33	37
HMNF0	22	28	37
HMNF0	23	26	29
HMNF0	27	31	35
HMNF0	17	22	26
HMNF1	15	21	25
HMNF1	11	16	22
HMNF1	25	32	41
HMNF1	29	38	52
HMNF1	22	33	42
hmnots	6	8	10
hyaline	5	5	6
hyaline	6	8	11
hyaline	10	13	16
MCOR9	1	2	2
MCOR9	1	2	2
MCOR9	2	4	5
MCOR9	2	4	5
MCOR9	2	4	6
MCOR9	1	4	7
MCOR9	2	4	7
MCOR9	2	3	4

Sum of alfa atresia		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	1	0	0	1	2	1	1	1	0	0	0	0	0	1
	3	0	0	3	0	3	2	3	3	6	0	0	0	3	1
HMNF088	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0
	2	2	2	2	2	2	2	1	1	3	0	2	1	2	2
	3	3	2	1	3	1	0	1	0	3	0	0	0	3	3
HMNF098	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0
HMNF118	1	0	2	0	0	1	0	1	1	6	0	1	1	2	1
	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
HMNF147	1	3	4	2	3	4	1	2	0	4	0	1	1	4	1
	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	2	0	0	0	1	1
hmnotsogood	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	0	0	0	0	0	0	0	1	0
MCOR976D2	A	2	3	2	2	2	2	2	3	2	2	2	2	4	4
	B	2	2	2	2	2	2	2	2	2	2	2	2	3	3
	C	2	2	2	2	2	2	3	2	1	2	2	2	2	3
	E	2	2	2	2	2	0	2	2	2	1	2	2	2	2
	F	2	2	2	2	1	0	2	3	2	2	2	2	2	4
MCOR976D9	A	2	2	0	1	1	1	2	1	1	1	1	1	0	2
	B	3	3	3	3	3	3	3	3	3	3	3	3	2	3
	C	3	2	2	4	3	2	3	3	2	3	5	2	2	3

sample	minimum	round(aver	maximum
HMNF0	0	1	2
HMNF0	0	2	3
HMNF0	0	0	0
HMNF0	1	2	2
HMNF0	0	1	3
HMNF0	0	0	2
HMNF0	0	0	0
HMNF0	0	0	1
HMNF1	0	1	2
HMNF1	0	0	0
HMNF1	0	2	4
HMNF1	0	0	1
HMNF1	0	0	0
hmnots	0	0	0
hyaline	0	0	0
hyaline	0	0	0
hyaline	0	0	1
MCOR9	2	2	3
MCOR9	2	2	2
MCOR9	2	2	3
MCOR9	0	2	2
MCOR9	0	2	3
MCOR9	0	1	2
MCOR9	3	3	3
MCOR9	2	3	4

Sum of hydrated		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF098	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HMNF118	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	6
	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
hmnotsogood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyaline010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	13
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCOR976D9	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sum of POF		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	1	1	1	1	0	1	0	1	1	0	0	1	1	9
	3	0	0	1	1	1	0	1	0	1	1	0	1	0	1	8
HMNF088	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
	3	0	0	1	0	0	1	0	0	1	0	0	0	0	1	4
HMNF098	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HMNF118	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	9
	2	1	0		1	1	0	1	1	1	0	1	1	0	1	9
HMNF147	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	5
	2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	4
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hmnotsogood	0	1	0		0	0	1	0	0	0	0	0	0	0	1	3
hyaline010	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	1	0	1	1	1	1	1	1	1	1	1	0	1	0	11
MCOR976D9	A	0	0	0	0	0	0	0	1	1	0	1	0	0	1	4
	B	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
	C	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3

Average of vitellogenic oocytes		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	30	28	33	30	29	32	33	32	29	31	23	35	32	34	30.79
	3	30	26	32	31	29	30	30	22	31	25	20	38	29	31	28.86
HMNF088	1	40	38	27	38	40	33	38	35	36	40	22	62	36	40	37.5
	2	36	28	22	41	37	24	37	34	29	32	25	42	35	32	32.43
	3	28	18	13	22	30	23	28	27	20	37	16	42	25	22	25.07
HMNF098	1	29	26	18	25	27	23	25	26	22	26	20	37	26	23	25.21
	2	32	28	27	27	34	28	35	33	29	27	28	46	31	30	31.07
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	22.5
HMNF118	1	25	15	18	19	24	15	22	23	19	19	9	32	21	17	19.86
	2	22	16	12	12	17	14	18	13	15	15	12	26	17	11	15.71
HMNF147	1	32	30	20	32	41	29	33	34	27	30	26	41	32	25	30.86
	2	52	18	26	40	40	29	36	44	26	38	21	62	30	31	35.21
	3	41	18	24	27	34	26	33	34	25	42	28	59	28	22	31.5
hmnotsogood	0	10	3	8	7	10	7	9	7	7	7	5	10	9	6	7.5
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5.357
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	7.643
	3	15	9	8	11	14	13	10	16	12	10	3	16	13	12	11.57
MCOR976D2	A	1	2	2	2	2	2	2	2	2	1	3	3	2	2	2
	B	2	2	2	1	2	2	2	2	2	1	4	3	2	2	2.071
	C	2	4	8	3	4	4	4	4	5	5	4	9	2	3	4.357
	E	4	4	6	6	3	4	4	5	2	2	6	5	3	3	4.071
	F	2	5	5	6	4	5	4	6	3	4	4	4	3	4	4.214
MCOR976D9	A	7	2	2	4	3	5	2	3	2	6	6	2	1	4	3.5
	B	7	1	2	2	2	4	2	3	1	7	4	4	2	4	3.214
	C	2	2	1	0	3	2	2	3	3	4	4	6	2	2	2.571

all readers			
sample	minimum	round(average)	maximum
HMNF085-1	23	31	35
HMNF085-3	20	29	38
HMNF088-1	22	38	62
HMNF088-2	22	32	42
HMNF088-3	13	25	42
HMNF098-1	18	25	37
HMNF098-2	27	31	46
HMNF098-3	14	23	31
HMNF118-1	9	20	32
HMNF118-2	11	16	26
HMNF147-1	20	31	41
HMNF147-2	18	35	62
HMNF147-3	18	32	59
hmnotsogood-	3	8	10
hyaline010-1	4	5	8
hyaline010-2	6	8	11
hyaline010-3	3	12	16
MCOR976D2-	1	2	3
MCOR976D2-	1	2	4
MCOR976D2-	2	4	9
MCOR976D2-	2	4	6
MCOR976D2-	2	4	6
MCOR976D9-	1	4	7
MCOR976D9-	1	3	7
MCOR976D9-	0	3	6

		NH-Germ	AMC-Port	HM-Sp	JRP-Sp	IG-Scot	IdB-Neth	HW-Neth	KM-Gern	GE-Ne	PW-Eng	SH-Irel	IM-Sp	DL-Irel	Christie-Eng	
HMNF085	1	0.137	-0.026	-0.058	0.007	0.039	0.072	0.039	-0.253	-0.026	0.039	0.104	-0.058	0.072	-0.090	(score-mean)/mean
	3	0.317	0.040	0.005	-0.134	-0.238	0.040	0.040	-0.307	0.074	0.005	0.074	0.074	0.109	-0.099	
HMNF088	1	0.653	0.067	0.067	0.067	-0.067	0.013	-0.120	-0.413	0.013	-0.040	0.067	-0.040	-0.280	0.013	
	2	0.295	0.110	0.141	-0.013	0.048	0.141	-0.260	-0.229	0.264	0.079	-0.013	-0.106	-0.322	-0.137	
	3	0.675	0.117	0.197	0.476	0.077	0.117	-0.083	-0.362	-0.123	-0.003	-0.123	-0.202	-0.481	-0.282	
HMNF098	1	0.467	0.150	0.071	0.031	0.031	-0.008	-0.088	-0.207	-0.008	0.031	-0.088	-0.127	-0.286	0.031	
	2	0.480	0.030	0.094	-0.131	0.062	0.126	-0.099	-0.099	-0.131	-0.002	-0.034	-0.067	-0.131	-0.099	
	3	0.378	0.022	0.111	-0.244	0.067	-0.022	0.022	0.067	-0.067	0.156	-0.156	-0.022	-0.378	0.067	
HMNF118	1	0.612	0.259	0.209	-0.043	0.158	0.108	-0.245	-0.547	-0.043	0.058	-0.144	-0.043	-0.094	-0.245	
	2	0.655	0.400	0.082	-0.045	-0.173	0.145	-0.109	-0.236	-0.236	0.082	-0.300	-0.045	-0.236	0.018	
HMNF147	1	0.329	0.037	0.329	-0.028	0.102	0.069	-0.060	-0.157	0.037	0.037	-0.190	-0.125	-0.352	-0.028	
	2	0.761	0.477	0.136	0.079	0.249	0.022	-0.176	-0.404	0.136	-0.148	-0.120	-0.262	-0.262	-0.489	
	3	0.873	0.302	0.079	0.333	0.079	0.048	-0.175	-0.111	-0.143	-0.111	-0.302	-0.206	-0.238	-0.429	
hmnotsogood	0	0.333	0.333	0.333	-0.067	-0.067	0.200	-0.067	-0.333	-0.067	0.200	-0.200	-0.067	0.067	-0.600	
hyaline010	1	0.493	-0.067	0.120	-0.067	-0.067	-0.067	-0.067	-0.253	0.120	0.120	-0.067	-0.067	-0.067	-0.067	
	2	0.439	0.439	-0.084	-0.215	-0.084	-0.084	-0.084	0.047	0.047	0.047	-0.084	-0.084	-0.084	-0.215	
	3	0.383	0.296	0.210	-0.136	0.383	-0.136	0.123	-0.741	-0.049	0.123	0.037	0.037	-0.309	-0.222	
MCOR976D2	A	0.500	-0.500	0.000	-0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	
	B	0.448	-0.034	-0.034	-0.517	-0.034	-0.034	-0.034	0.931	-0.517	-0.034	-0.034	-0.034	-0.034	-0.034	
	C	1.066	-0.541	-0.082	0.148	-0.082	-0.082	-0.082	-0.082	-0.311	-0.541	-0.311	0.148	0.836	-0.082	
	E	0.228	-0.018	-0.263	-0.509	0.228	-0.018	-0.018	0.474	0.474	-0.263	-0.263	-0.509	0.474	-0.018	
	F	-0.051	-0.525	-0.051	-0.051	0.424	-0.051	0.186	-0.051	0.424	-0.288	-0.051	-0.288	0.186	0.186	
MCOR976D9	A	-0.429	1.000	-0.143	0.714	-0.143	-0.429	0.429	0.714	0.143	-0.714	0.143	-0.429	-0.429	-0.429	
	B	0.244	1.178	-0.378	1.178	-0.067	-0.378	0.244	0.244	-0.378	-0.378	0.244	-0.689	-0.378	-0.689	
	C	1.333	-0.222	0.167	0.556	0.167	-0.222	-0.222	0.556	-1.000	-0.222	-0.222	0.167	-0.611	-0.222	
		0.465	0.133	0.050	0.036	0.044	-0.017	-0.036	-0.050	-0.055	-0.071	-0.081	-0.122	-0.129	-0.166	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	ranking

			reader														
sample	number	Data	AMC-Port	Christie	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Sco	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-En	SH-Irel	average
HMNF085	1	Average of	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0.286
		Average of	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0.286
	3	Average of	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.714
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	Average of	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.357
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	2	3	0	2	0	0	0	2	1	0	0	1	0	0	0.786
		Average of	0	0	0	0	2	2	2	0	0	2	2	1	1	1	0.929
	3	Average of	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0.357

sample	atresia	minimum	round(aver	maximum
HMNF085-	Average of early alfa	0	0.29	2
HMNF085-	Average of early alfa	0	0.29	1
HMNF088-	Average of early alfa	0	1.71	6
HMNF088-	Average of early alfa	0	0	0
HMNF088-	Average of early alfa	0	0.36	3
HMNF098-	Average of early alfa	0	0	0
HMNF098-	Average of early alfa	0	0.79	3
HMNF098-	Average of early alfa	0	0.93	2
HMNF118-	Average of early alfa	0	0.36	3

HMNF088	3	Average of	0	3	0	0	1	1	2	1	0	0	3	3	1	0	1.071
HMNF098	1	Average of	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.286
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.214
HMNF118	1	Average of	0	6	0	0	1	0	0	1	1	0	0	1	1	0	0.786
		Average of	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0.357
	2	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	Average of	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0.5
		Average of	0	1	0	1	4	2	3	3	1	1	4	1	2	0	1.643
	2	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0.214
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hmnotsogood	0	Average of	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hyaline010	1	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
MCOR976D2	A	Average of	2	0	0	2	0	0	2	2	0	0	0	4	0	0	0.857
		Average of	0	2	2	0	3	2	0	0	2	2	4	0	2	3	1.571
	B	Average of	2	0	0	1	0	0	1	1	0	0	0	1	0	0	0.429
		Average of	0	2	2	1	2	2	1	1	2	2	3	2	2	2	1.714
	C	Average of	0	0	0	0	0	0	0	2	1	0	0	3	1	0	0.5
		Average of	2	1	2	2	2	2	2	0	1	2	2	0	2	2	1.571
	E	Average of	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0.357
		Average of	0	2	1	2	2	2	2	2	2	0	2	0	1	2	1.429
	F	Average of	2	0	1	0	0	0	1	0	1	0	0	3	1	0	0.643
		Average of	0	2	1	2	2	2	1	1	1	0	2	1	1	3	1.357
MCOR976D9	A	Average of	2	1	0	1	2	0	1	1	0	1	0	2	2	1	1
		Average of	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.143
	B	Average of	3	0	1	2	2	0	3	3	1	0	0	3	2	3	1.643
		Average of	0	3	2	1	1	3	0	0	2	3	2	0	1	0	1.286
	C	Average of	3	2	0	5	2	0	4	3	2	0	0	3	3	2	2.071
		Average of	0	0	3	0	0	2	0	0	0	2	2	0	0	1	0.714

HMNF118-	Average of early alfa	0	1.07	3
HMNF147-	Average of early alfa	0	0.21	2
HMNF147-	Average of early alfa	0	0	0
HMNF147-	Average of early alfa	0	0.29	2
hmnotsogo	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0.21	1
hyaline010	Average of early alfa	0	0.79	6
MCOR976I	Average of early alfa	0	0.36	2
MCOR976I	Average of early alfa	0	0.15	2
MCOR976I	Average of early alfa	0	0	0
MCOR976I	Average of early alfa	0	0.5	3
MCOR976I	Average of early alfa	0	1.64	4
MCOR976I	Average of early alfa	0	0.07	1
MCOR976I	Average of early alfa	0	0	0
MCOR976I	Average of early alfa	0	0.21	2
HMNF085-	Average of late alfa	0	0.07	1
HMNF085-	Average of late alfa	0	0.15	2
HMNF088-	Average of late alfa	0	0.07	1
HMNF088-	Average of late alfa	0	0	0
HMNF088-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0	0
HMNF098-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.07	1
HMNF118-	Average of late alfa	0	0.86	4
HMNF147-	Average of late alfa	0	1.57	4
HMNF147-	Average of late alfa	0	0.43	2
HMNF147-	Average of late alfa	0	1.71	3
hmnotsogo	Average of late alfa	0	0.5	3
hyaline010	Average of late alfa	0	1.57	2
hyaline010	Average of late alfa	0	0.36	2
hyaline010	Average of late alfa	0	1.43	2
MCOR976I	Average of late alfa	0	0.64	3
MCOR976I	Average of late alfa	0	1.36	3
MCOR976I	Average of late alfa	0	1	2
MCOR976I	Average of late alfa	0	0.14	1
MCOR976I	Average of late alfa	0	1.64	3
MCOR976I	Average of late alfa	0	1.29	3
MCOR976I	Average of late alfa	0	2.07	5
MCOR976I	Average of late alfa	0	0.71	3

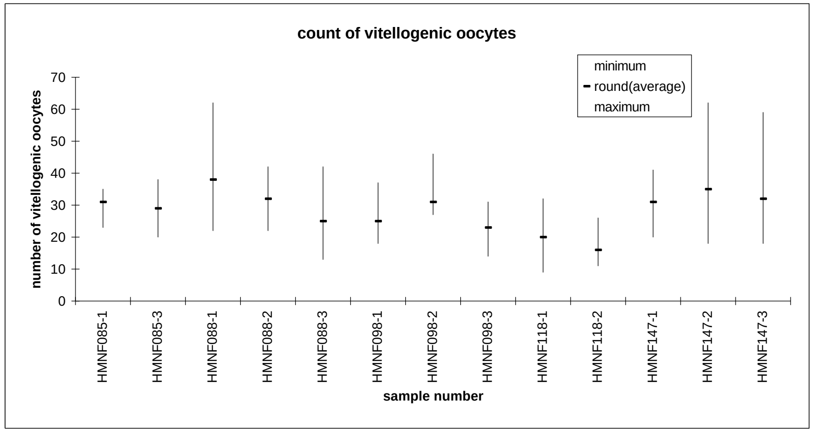
Sum of alfa atresia		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	1	0	0	0	0	0	1	2	0	1	0	1	1	1	0.57
	3	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.71
HMNF088	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.36
	2	2	3	0	2	2	2	2	2	1	2	2	2	1	1	1.71
	3	3	3	0	0	2	1	3	1	0	0	3	3	1	0	1.43
HMNF098	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.21
	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.29
	3	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.21
HMNF118	1	0	6	0	1	2	0	0	1	1	0	2	1	1	1	1.14
	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.14
HMNF147	1	3	4	0	1	4	2	3	4	1	1	4	1	2	0	2.14
	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.07
	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.29
hmnotsogood	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0.21
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.14
MCOR976D2	A	2	2	2	2	3	2	2	2	2	2	4	4	2	3	2.43
	B	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2.14
	C	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2.07
	E	2	2	1	2	2	2	2	2	2	0	2	2	2	2	1.79
	F	2	2	2	2	2	2	2	1	2	0	2	4	2	3	2.00
MCOR976D9	A	2	1	1	1	2	0	1	1	1	1	0	2	2	1	1.14
	B	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2.93

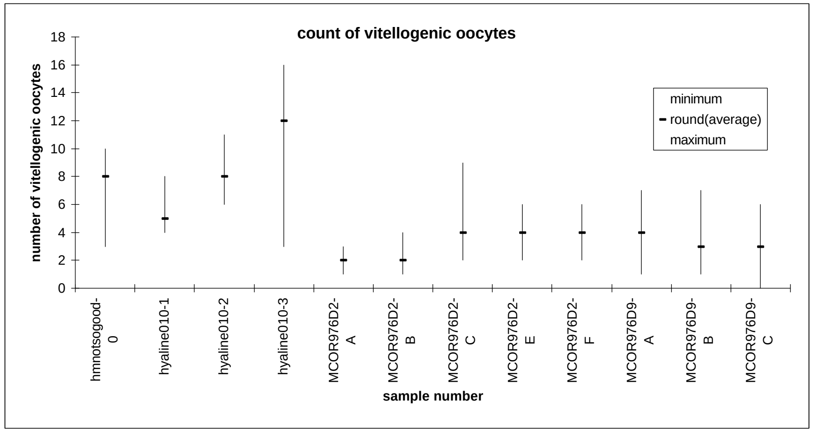
sample	minimum	round(aver	maximum
HMNF085-	0	0.571429	2
HMNF085-	0	1.714286	6
HMNF088-	0	0.357143	3
HMNF088-	0	1.714286	3
HMNF088-	0	1.428571	3
HMNF098-	0	0.214286	2
HMNF098-	0	0.285714	2
HMNF098-	0	0.214286	1
HMNF118-	0	1.142857	6
HMNF118-	0	0.142857	2
HMNF147-	0	2.142857	4
HMNF147-	0	0.071429	1
HMNF147-	0	0.285714	2
hmnotsogo	0	0.214286	2
hyaline010	0	0	0
hyaline010	0	0	0
hyaline010	0	0.142857	1
MCOR976I	2	2.428571	4
MCOR976I	2	2.142857	3
MCOR976I	1	2.071429	3
MCOR976I	0	1.785714	2
MCOR976I	0	2	4
MCOR976I	0	1.142857	2
MCOR976I	2	2.928571	3

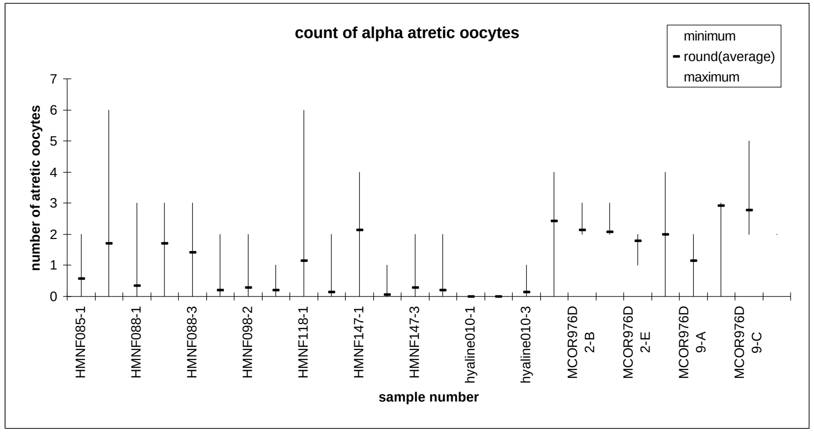
MCOR976D9	C	3	2	3	5	2	2	4	3	2	2	2	3	3	3	2.79		MCOR976I	2	2.785714	5

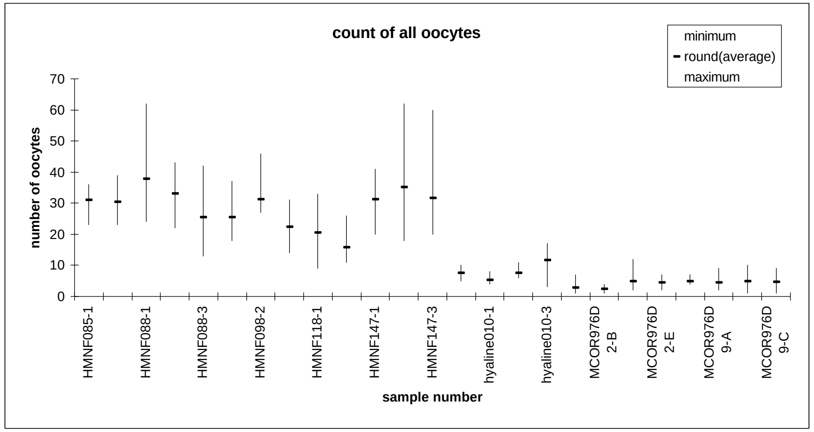
Sum of total oocytes		reader																			
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel		round(average)	sample	minimum	round(aver	maximum
HMNF085	1	31	28	33	30	29	32	33	34	29	31	23	36	32	34	31	31	HMNF085-	23	31	36
	3	30	32	32	31	29	33	30	25	31	27	23	39	32	34	31	31	HMNF085-	23	31	39
HMNF088	1	40	41	27	38	40	33	38	35	36	40	24	62	36	40	38	38	HMNF088-	24	38	62
	2	38	31	22	43	37	24	37	36	30	32	25	43	35	32	33	33	HMNF088-	22	33	43
	3	31	18	13	22	31	23	29	27	20	37	16	42	25	22	25	25	HMNF088-	13	25	42
HMNF098	1	29	26	18	25	29	23	25	26	23	26	20	37	26	23	25	25	HMNF098-	18	25	37
	2	32	30	27	27	34	28	35	33	29	27	30	46	31	30	31	31	HMNF098-	27	31	46
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	23	23	HMNF098-	14	23	31
HMNF118	1	25	21	18	19	25	15	22	24	20	19	9	33	22	17	21	21	HMNF118-	9	21	33
	2	22	18	12	12	17	14	18	13	15	15	12	26	17	11	16	16	HMNF118-	11	16	26
HMNF147	1	35	33	20	32	41	29	33	35	27	30	26	41	32	25	31	31	HMNF147-	20	31	41
	2	52	18	26	40	40	29	36	45	26	38	21	62	30	31	35	35	HMNF147-	18	35	62
	3	41	20	24	27	34	26	33	34	25	42	28	60	28	22	32	32	HMNF147-	20	32	60
hmnotsogood	0	10	5	8	7	10	7	9	7	7	7	5	10	9	6	8	8	hmnotsogo	5	8	10
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5	5	hyaline010	4	5	8
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	8	8	hyaline010	6	8	11
	3	15	9	8	11	14	13	10	17	12	10	3	16	13	12	12	12	hyaline010	3	12	17
MCOR976D2	A	3	2	2	4	2	2	4	4	2	1	3	7	2	2	3	3	MCOR976I	1	3	7
	B	4	2	2	2	2	2	3	3	2	1	4	4	2	2	3	3	MCOR976I	1	3	4
	C	2	4	8	3	4	4	4	6	6	5	4	12	3	3	5	5	MCOR976I	2	5	12
	E	6	4	6	6	3	4	4	5	2	2	6	7	4	3	4	4	MCOR976I	2	4	7
	F	4	5	6	6	4	5	5	6	4	4	4	7	4	4	5	5	MCOR976I	4	5	7
MCOR976D9	A	9	3	2	5	5	5	3	4	2	7	6	4	3	5	5	5	MCOR976I	2	5	9
	B	10	1	3	4	4	4	5	6	2	7	4	7	4	7	5	5	MCOR976I	1	5	10
	C	5	4	1	5	5	2	6	6	5	4	4	9	5	4	5	5	MCOR976I	1	5	9

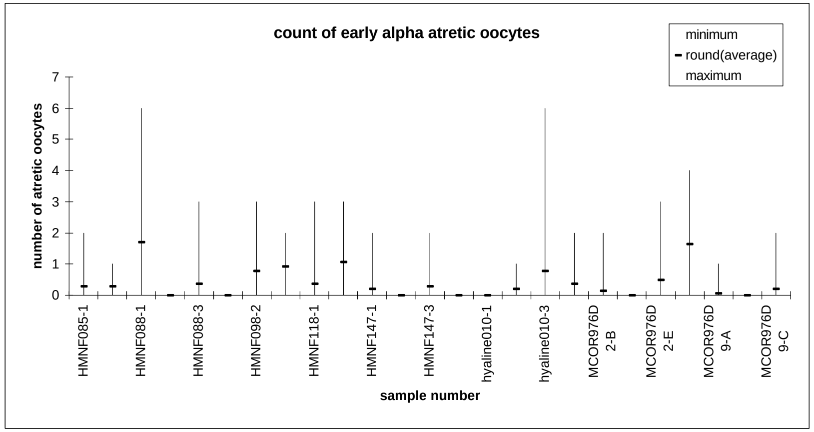
		NH-Germ	AMC-Port	IG-Scot	IdB-Neth	HM-Sp	GE-Neth	PW-Eng	JRP-Sp	SH-Irel	HW-Neth	IM-Sp	Christie-Er	KM-Germ	DL-Irel	
HMNF085	1	0.161	0.000	0.097	0.065	-0.065	-0.032	0.032	0.000	0.097	0.032	-0.065	-0.097	-0.258	0.065	
	3	0.258	-0.032	-0.194	-0.032	-0.065	0.000	0.032	-0.129	0.097	0.065	0.000	0.032	-0.258	0.032	
HMNF088	1	0.632	0.053	-0.079	0.000	0.053	0.000	-0.053	0.053	0.053	-0.132	-0.053	0.079	-0.368	-0.289	
	2	0.303	0.152	0.091	0.121	0.121	0.303	0.061	-0.030	-0.030	-0.273	-0.091	-0.061	-0.242	-0.333	
	3	0.680	0.240	0.080	0.160	0.240	-0.120	0.000	0.480	-0.120	-0.080	-0.200	-0.280	-0.360	-0.480	
HMNF098	1	0.480	0.160	0.040	0.000	0.160	0.000	0.040	0.040	-0.080	-0.080	-0.080	0.040	-0.200	-0.280	
	2	0.484	0.032	0.065	0.129	0.097	-0.129	0.000	-0.129	-0.032	-0.097	-0.065	-0.032	-0.032	-0.129	
	3	0.348	0.000	0.043	-0.043	0.087	-0.087	0.130	-0.261	-0.174	0.000	-0.043	0.043	0.043	-0.391	
HMNF118	1	0.571	0.190	0.143	0.048	0.190	-0.095	0.048	-0.095	-0.190	-0.286	-0.048	0.000	-0.571	-0.143	
	2	0.625	0.375	-0.188	0.125	0.063	-0.250	0.063	-0.063	-0.313	-0.125	-0.063	0.125	-0.250	-0.250	
HMNF147	1	0.323	0.129	0.129	0.065	0.323	0.032	0.032	-0.032	-0.194	-0.065	-0.129	0.065	-0.161	-0.355	
	2	0.771	0.486	0.286	0.029	0.143	0.143	-0.143	0.086	-0.114	-0.171	-0.257	-0.486	-0.400	-0.257	
	3	0.875	0.281	0.063	0.031	0.063	-0.156	-0.125	0.313	-0.313	-0.188	-0.219	-0.375	-0.125	-0.250	
hmnotsogood	0	0.250	0.250	-0.125	0.125	0.250	-0.125	0.125	-0.125	-0.250	-0.125	-0.125	-0.375	-0.375	0.000	
hyaline010	1	0.600	0.000	0.000	0.000	0.200	0.200	0.200	0.000	0.000	0.000	0.000	0.000	-0.200	0.000	
	2	0.375	0.375	-0.125	-0.125	-0.125	0.000	0.000	-0.250	-0.125	-0.125	-0.125	-0.250	0.000	-0.125	
	3	0.333	0.250	0.417	-0.167	0.167	-0.083	0.083	-0.167	0.000	0.083	0.000	-0.250	-0.750	-0.333	
MCOR976D2	A	1.333	0.000	0.333	0.333	-0.333	0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.000	-0.333	
	B	0.333	0.333	0.000	0.000	-0.333	-0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.333	-0.333	
	C	1.400	-0.600	0.200	-0.200	-0.200	-0.400	-0.400	0.000	-0.400	-0.200	0.200	-0.200	-0.200	0.600	
	E	0.750	0.500	0.250	0.000	-0.250	0.500	0.000	-0.500	-0.250	0.000	-0.500	0.000	0.500	0.500	
	F	0.400	-0.200	0.200	0.000	-0.200	0.200	-0.200	-0.200	-0.200	0.000	-0.200	0.000	-0.200	0.200	
MCOR976D9	A	-0.200	0.800	-0.200	-0.400	0.000	0.000	-0.400	0.400	0.000	0.000	-0.600	-0.400	0.200	-0.600	
	B	0.400	1.000	0.200	0.000	-0.200	-0.200	-0.200	0.400	0.400	-0.200	-0.600	-0.800	-0.200	-0.400	
	C	0.800	0.000	0.200	0.200	0.000	0.000	0.000	-0.200	-0.200	-0.600	0.000	-0.200	-0.200	-0.800	
		0.531	0.191	0.077	0.019	0.015	-0.012	-0.054	-0.070	-0.120	-0.129	-0.157	-0.164	-0.171	-0.187	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	rank

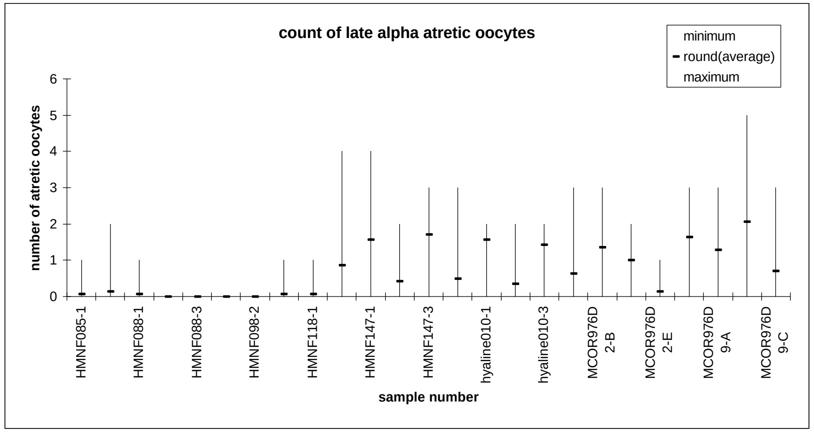

count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF085-3
HMNF088-1
HMNF088-2
HMNF088-3
HMNF098-1
HMNF098-2
HMNF098-3
HMNF118-1
HMNF118-2
HMNF147-1
HMNF147-2
HMNF147-3
sample number


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
2
4
6
8
10
12
14
16
18
hmnotsogood-0
hyaline010-1
hyaline010-2
hyaline010-3
MCOR976D2-A
MCOR976D2-B
MCOR976D2-C
MCOR976D2-E
MCOR976D2-F
MCOR976D9-A
MCOR976D9-B
MCOR976D9-C
sample number


count of alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of all oocytes
minimum
round(average)
maximum
number of oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of early alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of late alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number

Annex 4

Analysis of the interpretation of histological slides of mackerel and horse mackerel

sample	number	reader	experience	mig.nucleus	hydrated	POF	beta atr	vitellogenic	early alfa atresia	late alfa atr	alfa atresia	total oocytes
HMNF085	1	IdB-Neth	e	0	0	1	0	33	0	1	1	33
HMNF085	3	IdB-Neth	e	0	0	1	0	30	0	0	0	30
HMNF088	1	IdB-Neth	e	0	0	0	0	38	0	0	0	38
HMNF088	2	IdB-Neth	e	0	0	0	0	37	0	2	2	37
HMNF088	3	IdB-Neth	e	0	0	0	0	28	1	2	3	29
HMNF098	1	IdB-Neth	e	0	0	0	0	25	0	0	0	25
HMNF098	2	IdB-Neth	e	0	0	0	0	35	0	0	0	35
HMNF098	3	IdB-Neth	e	0	0	0	0	22	0	0	0	22
HMNF118	1	IdB-Neth	e	0	1	1	0	22	0	0	0	22
HMNF118	2	IdB-Neth	e	0	0	1	0	18	0	0	0	18
HMNF147	1	IdB-Neth	e	0	0	0	0	33	0	3	3	33
HMNF147	2	IdB-Neth	e	0	0	0	0	36	0	0	0	36
HMNF147	3	IdB-Neth	e	0	0	0	0	33	0	0	0	33
hmnotsogood	0	IdB-Neth	e	0	0	0	1	9	0	0	0	9
hyaline010	1	IdB-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	IdB-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IdB-Neth	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	IdB-Neth	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IdB-Neth	e	0	0	0	0	2	1	1	2	3
MCOR976D2	C	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	IdB-Neth	e	0	0	0	0	4	0	2	2	4
MCOR976D2	F	IdB-Neth	e	0	0	1	0	4	1	1	2	5
MCOR976D9	A	IdB-Neth	e	1	0	0	0	2	1	0	1	3
MCOR976D9	B	IdB-Neth	e	0	0	0	0	2	3	0	3	5
MCOR976D9	C	IdB-Neth	e	0	0	0	0	2	4	0	4	6
HMNF085	1	IM-Sp	n	0	0	1	0	29	0	0	0	29
HMNF085	3	IM-Sp	n	0	0	1	0	31	0	0	0	31
HMNF088	1	IM-Sp	n	0	0	1	0	36	0	0	0	36
HMNF088	2	IM-Sp	n	0	0	0	1	29	1	0	1	30
HMNF088	3	IM-Sp	n	0	0	1	1	20	0	0	0	20
HMNF098	1	IM-Sp	n	0	0	1	0	22	1	0	1	23
HMNF098	2	IM-Sp	n	0	0	0	0	29	0	0	0	29
HMNF098	3	IM-Sp	n	0	1	0	0	22	0	0	0	22
HMNF118	1	IM-Sp	n	0	0	1	0	19	1	0	1	20
HMNF118	2	IM-Sp	n	0	0	1	0	15	0	0	0	15
HMNF147	1	IM-Sp	n	0	0	0	1	27	0	1	1	27
HMNF147	2	IM-Sp	n	0	0	0	0	26	0	0	0	26
HMNF147	3	IM-Sp	n	0	0	0	0	25	0	0	0	25
hmnotsogood	0	IM-Sp	n	0	0	0	1	7	0	0	0	7
hyaline010	1	IM-Sp	n	0	1	0	0	5	0	0	0	5
hyaline010	2	IM-Sp	n	0	1	0	0	7	0	0	0	7
hyaline010	3	IM-Sp	n	0	1	0	0	12	0	0	0	12
MCOR976D2	A	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	IM-Sp	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C	IM-Sp	n	0	0	0	0	5	1	1	2	6
MCOR976D2	E	IM-Sp	n	0	0	0	0	2	0	2	2	2
MCOR976D2	F	IM-Sp	n	0	0	1	0	3	1	1	2	4
MCOR976D9	A	IM-Sp	n	0	0	1	0	2	0	1	1	2
MCOR976D9	B	IM-Sp	n	0	0	0	0	1	1	2	3	2
MCOR976D9	C	IM-Sp	n	0	0	0	0	3	2	0	2	5
HMNF085	1	HM-Sp	e	0	0	1	1	29	0	0	0	29
HMNF085	3	HM-Sp	e	0	0	1	0	29	0	0	0	29
HMNF088	1	HM-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	HM-Sp	e	0	0	0	0	37	0	2	2	37
HMNF088	3	HM-Sp	e	0	0	0	0	30	1	1	2	31
HMNF098	1	HM-Sp	e	0	0	1	1	27	2	0	2	29
HMNF098	2	HM-Sp	e	0	0	0	0	34	0	0	0	34
HMNF098	3	HM-Sp	e	0	0	0	0	25	0	0	0	25
HMNF118	1	HM-Sp	e	0	1	1	0	24	1	1	2	25
HMNF118	2	HM-Sp	e	0	0	1	1	17	0	0	0	17
HMNF147	1	HM-Sp	e	0	0	0	0	41	0	4	4	41
HMNF147	2	HM-Sp	e	0	0	1	1	40	0	0	0	40
HMNF147	3	HM-Sp	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	HM-Sp	e	0	0	0	1	10	0	0	0	10
hyaline010	1	HM-Sp	e	0	1	1	0	6	0	0	0	6
hyaline010	2	HM-Sp	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HM-Sp	e	0	1	0	0	14	0	0	0	14
MCOR976D2	A	HM-Sp	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	HM-Sp	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	HM-Sp	e	0	0	0	0	4	0	2	2	4
MCOR976D2	E	HM-Sp	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	HM-Sp	e	0	0	1	0	4	0	2	2	4
MCOR976D9	A	HM-Sp	e	0	0	0	0	3	2	0	2	5
MCOR976D9	B	HM-Sp	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	HM-Sp	e	0	0	0	0	3	2	0	2	5
HMNF085	1	IG-Scot	e	0	0	0	0	32	2	0	2	34
HMNF085	3	IG-Scot	e	0	0	0	0	22	3	0	3	25
HMNF088	1	IG-Scot	e	0	0	0	0	35	0	0	0	35
HMNF088	2	IG-Scot	e	0	0	0	0	34	2	0	2	36
HMNF088	3	IG-Scot	e	0	0	0	0	27	0	1	1	27
HMNF098	1	IG-Scot	e	0	0	0	0	26	0	0	0	26
HMNF098	2	IG-Scot	e	0	0	0	0	33	0	0	0	33
HMNF098	3	IG-Scot	e	0	0	0	0	24	0	0	0	24
HMNF118	1	IG-Scot	e	0	1	1	0	23	1	0	1	24
HMNF118	2	IG-Scot	e	0	0	1	0	13	0	0	0	13
HMNF147	1	IG-Scot	e	0	0	0	0	34	1	3	4	35
HMNF147	2	IG-Scot	e	0	0	0	0	44	1	0	1	45

HMNF147	3	IG-Scot	e	0	0	0	0	34	0	0	0	34
hmnotsogood	0	IG-Scot	e	0	0	0	1	7	0	0	0	7
hyaline010	1	IG-Scot	e	0	1	1	0	5	0	0	0	5
hyaline010	2	IG-Scot	e	0	1	0	0	7	0	0	0	7
hyaline010	3	IG-Scot	e	0	1	1	0	16	1	0	1	17
MCOR976D2	A	IG-Scot	e	0	0	0	0	2	2	0	2	4
MCOR976D2	B	IG-Scot	e	1	0	0	0	2	1	1	2	3
MCOR976D2	C	IG-Scot	e	0	0	0	0	4	2	0	2	6
MCOR976D2	E	IG-Scot	e	0	0	0	0	5	0	2	2	5
MCOR976D2	F	IG-Scot	e	0	0	1	1	6	0	1	1	6
MCOR976D9	A	IG-Scot	e	1	0	1	0	3	1	0	1	4
MCOR976D9	B	IG-Scot	e	0	0	0	0	3	3	0	3	6
MCOR976D9	C	IG-Scot	e	0	0	1	0	3	3	0	3	6
HMNF085	1	SH-Irel	e	0	0	1	0	34	0	1	1	34
HMNF085	3	SH-Irel	e	0	0	1	1	31	3	0	3	34
HMNF088	1	SH-Irel	e	0	0	0	0	40	0	0	0	40
HMNF088	2	SH-Irel	e	0	0	0	1	32	0	1	1	32
HMNF088	3	SH-Irel	e	0	0	1	1	22	0	0	0	22
HMNF098	1	SH-Irel	e	1	0	0	0	23	0	0	0	23
HMNF098	2	SH-Irel	e	1	0	0	0	30	0	0	0	30
HMNF098	3	SH-Irel	e	0	0	0	0	19	0	1	1	19
HMNF118	1	SH-Irel	e	0	0	1	0	17	0	1	1	17
HMNF118	2	SH-Irel	e	0	0	1	0	11	0	0	0	11
HMNF147	1	SH-Irel	e	0	0	1	1	25	0	0	0	25
HMNF147	2	SH-Irel	e	0	1	1	0	31	0	0	0	31
HMNF147	3	SH-Irel	e	0	1	0	0	22	0	0	0	22
hmnotsogood	0	SH-Irel	e	0	0	1	0	6	0	0	0	6
hyaline010	1	SH-Irel	e	0	1	1	0	5	0	0	0	5
hyaline010	2	SH-Irel	e	0	1	1	0	7	0	0	0	7
hyaline010	3	SH-Irel	e	0	1	0	0	12	0	0	0	12
MCOR976D2	A	SH-Irel	e	0	0	0	0	2	0	3	3	2
MCOR976D2	B	SH-Irel	e	1	0	1	1	2	0	2	2	2
MCOR976D2	C	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	E	SH-Irel	e	0	0	0	0	3	0	2	2	3
MCOR976D2	F	SH-Irel	e	0	0	0	1	4	0	3	3	4
MCOR976D9	A	SH-Irel	e	0	0	1	0	4	1	0	1	5
MCOR976D9	B	SH-Irel	e	0	0	1	0	4	3	0	3	7
MCOR976D9	C	SH-Irel	e	0	0	0	0	2	2	1	3	4
HMNF085	1	JRP-Sp	e	0	0	1	0	31	0	1	1	31
HMNF085	3	JRP-Sp	e	1	0	1	0	25	2	0	2	27
HMNF088	1	JRP-Sp	e	0	0	0	0	40	0	0	0	40
HMNF088	2	JRP-Sp	e	0	0	0	0	32	0	2	2	32
HMNF088	3	JRP-Sp	e	0	0	0	1	37	0	0	0	37
HMNF098	1	JRP-Sp	e	1	0	0	0	26	0	0	0	26
HMNF098	2	JRP-Sp	e	1	0	0	0	27	0	0	0	27
HMNF098	3	JRP-Sp	e	1	0	0	0	17	0	0	0	17
HMNF118	1	JRP-Sp	e	0	0	0	1	19	0	0	0	19
HMNF118	2	JRP-Sp	e	0	0	0	1	15	0	0	0	15
HMNF147	1	JRP-Sp	e	0	0	0	1	30	0	1	1	30
HMNF147	2	JRP-Sp	e	0	0	0	0	38	0	0	0	38
HMNF147	3	JRP-Sp	e	0	0	0	0	42	0	0	0	42
hmnotsogood	0	JRP-Sp	e	0	0	0	0	7	0	0	0	7
hyaline010	1	JRP-Sp	e	0	1	0	0	5	0	0	0	5
hyaline010	2	JRP-Sp	e	0	1	0	0	6	0	0	0	6
hyaline010	3	JRP-Sp	e	0	1	0	0	10	0	0	0	10
MCOR976D2	A	JRP-Sp	e	0	0	0	0	1	0	2	2	1
MCOR976D2	B	JRP-Sp	e	0	0	0	1	1	0	2	2	1
MCOR976D2	C	JRP-Sp	e	0	0	0	0	5	0	2	2	5
MCOR976D2	E	JRP-Sp	e	0	0	0	1	2	0	0	0	2
MCOR976D2	F	JRP-Sp	e	0	0	1	0	4	0	0	0	4
MCOR976D9	A	JRP-Sp	e	0	0	0	0	6	1	0	1	7
MCOR976D9	B	JRP-Sp	e	0	0	0	0	7	0	3	3	7
MCOR976D9	C	JRP-Sp	e	0	0	0	0	4	0	2	2	4
HMNF085	1	HW-Neth	e	0	0	0	0	32	0	0	0	32
HMNF085	3	HW-Neth	e	0	0	0	1	30	3	0	3	33
HMNF088	1	HW-Neth	e	0	0	0	0	33	0	0	0	33
HMNF088	2	HW-Neth	e	0	0	0	1	24	0	2	2	24
HMNF088	3	HW-Neth	e	0	0	1	1	23	0	1	1	23
HMNF098	1	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF098	2	HW-Neth	e	0	0	0	0	28	0	0	0	28
HMNF098	3	HW-Neth	e	0	0	0	0	23	0	0	0	23
HMNF118	1	HW-Neth	e	0	1	0	0	15	0	0	0	15
HMNF118	2	HW-Neth	e	0	0	0	0	14	0	0	0	14
HMNF147	1	HW-Neth	e	0	0	1	1	29	0	2	2	29
HMNF147	2	HW-Neth	e	0	0	1	0	29	0	0	0	29
HMNF147	3	HW-Neth	e	0	0	0	0	26	0	0	0	26
hmnotsogood	0	HW-Neth	e	0	0	1	0	7	0	0	0	7
hyaline010	1	HW-Neth	e	0	1	0	0	5	0	0	0	5
hyaline010	2	HW-Neth	e	0	1	0	0	7	0	0	0	7
hyaline010	3	HW-Neth	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	HW-Neth	e	0	0	0	1	2	0	2	2	2
MCOR976D2	B	HW-Neth	e	1	0	0	1	2	0	2	2	2
MCOR976D2	C	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	E	HW-Neth	e	0	0	0	1	4	0	2	2	4
MCOR976D2	F	HW-Neth	e	0	0	1	1	5	0	2	2	5
MCOR976D9	A	HW-Neth	e	1	0	0	0	5	0	0	0	5
MCOR976D9	B	HW-Neth	e	0	0	0	1	4	0	3	3	4
MCOR976D9	C	HW-Neth	e	0	0	0	1	2	0	2	2	2

HMNF085		1	KM-Germ	n	0	0	0	0	23	0	0	0	23
HMNF085		3	KM-Germ	n	0	0	0	0	20	3	0	3	23
HMNF088		1	KM-Germ	n	0	0	0	0	22	2	0	2	24
HMNF088		2	KM-Germ	n	0	0	1	0	25	0	2	2	25
HMNF088		3	KM-Germ	n	0	0	0	0	16	0	3	3	16
HMNF098		1	KM-Germ	n	0	0	0	0	20	0	0	0	20
HMNF098		2	KM-Germ	n	0	0	0	0	28	2	0	2	30
HMNF098		3	KM-Germ	n	0	0	0	0	24	0	1	1	24
HMNF118		1	KM-Germ	n	0	1	1	0	9	0	2	2	9
HMNF118		2	KM-Germ	n	0	0	1	0	12	0	0	0	12
HMNF147		1	KM-Germ	n	0	0	0	0	26	0	4	4	26
HMNF147		2	KM-Germ	n	0	1	0	0	21	0	0	0	21
HMNF147		3	KM-Germ	n	0	0	0	0	28	0	1	1	28
hmnotsogood		0	KM-Germ	n	0	0	0	0	5	0	1	1	5
hyaline010		1	KM-Germ	n	0	1	0	0	4	0	0	0	4
hyaline010		2	KM-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010		3	KM-Germ	n	0	1	0	0	3	0	1	1	3
MCOR976D2	A		KM-Germ	n	0	0	0	0	3	0	4	4	3
MCOR976D2	B		KM-Germ	n	0	0	0	0	4	0	3	3	4
MCOR976D2	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
MCOR976D2	E		KM-Germ	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	A		KM-Germ	n	0	0	1	0	6	0	0	0	6
MCOR976D9	B		KM-Germ	n	0	0	1	0	4	0	2	2	4
MCOR976D9	C		KM-Germ	n	0	0	0	0	4	0	2	2	4
HMNF085		1	DL-Irel	n	0	0	1	0	33	0	0	0	33
HMNF085		3	DL-Irel	n	0	0	1	0	32	0	0	0	32
HMNF088		1	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF088		2	DL-Irel	n	0	0	1	0	22	0	0	0	22
HMNF088		3	DL-Irel	n	1	0	1	0	13	0	0	0	13
HMNF098		1	DL-Irel	n	0	0	0	0	18	0	0	0	18
HMNF098		2	DL-Irel	n	0	0	0	0	27	0	0	0	27
HMNF098		3	DL-Irel	n	0	0	1	0	14	0	0	0	14
HMNF118		1	DL-Irel	n	0	0	1	0	18	0	0	0	18
HMNF118		2	DL-Irel	n					12		0	0	12
HMNF147		1	DL-Irel	n	0	0	1	0	20	0	0	0	20
HMNF147		2	DL-Irel	n	0	1	0	0	26	0	0	0	26
HMNF147		3	DL-Irel	n	0	1	0	0	24	0	0	0	24
hmnotsogood		0	DL-Irel	n	0	0			8		0	0	8
hyaline010		1	DL-Irel	n	0	1	1	0	5	0	0	0	5
hyaline010		2	DL-Irel	n	0	1	0	0	7	0	0	0	7
hyaline010		3	DL-Irel	n	0	1	0	0	8	0	0	0	8
MCOR976D2	A		DL-Irel	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B		DL-Irel	n	1	0	0	0	2	0	2	2	2
MCOR976D2	C		DL-Irel	n	0	0	0	0	8	0	2	2	8
MCOR976D2	E		DL-Irel	n	0	0	0	0	6	0	1	1	6
MCOR976D2	F		DL-Irel	n	0	0	1	0	5	1	1	2	6
MCOR976D9	A		DL-Irel	n	0	0	0	1	2	0	1	1	2
MCOR976D9	B		DL-Irel	n	0	0	0	0	2	1	2	3	3
MCOR976D9	C		DL-Irel	n	0	0	0	0	1	0	3	3	1
HMNF085		1	GE-Neth	n	0	0	1	0	30	0	0	0	30
HMNF085		3	GE-Neth	n	0	0	1	0	31	0	0	0	31
HMNF088		1	GE-Neth	n	0	0	0	0	38	0	0	0	38
HMNF088		2	GE-Neth	n	0	0	0	0	41	2	0	2	43
HMNF088		3	GE-Neth	n	0	0	0	1	22	0	0	0	22
HMNF098		1	GE-Neth	n	0	0	0	0	25	0	0	0	25
HMNF098		2	GE-Neth	n	0	0	1	0	27	0	0	0	27
HMNF098		3	GE-Neth	n	0	0	0	1	21	0	0	0	21
HMNF118		1	GE-Neth	n	0	0	1	0	19	0	1	1	19
HMNF118		2	GE-Neth	n	0	0	1	1	12	0	0	0	12
HMNF147		1	GE-Neth	n	0	0	1	1	32	0	1	1	32
HMNF147		2	GE-Neth	n	0	0	1	0	40	0	0	0	40
HMNF147		3	GE-Neth	n	0	0	0	0	27	0	0	0	27
hmnotsogood		0	GE-Neth	n	0	0	0	1	7	0	0	0	7
hyaline010		1	GE-Neth	n	0	1	0	0	6	0	0	0	6
hyaline010		2	GE-Neth	n	0	1	0	0	8	0	0	0	8
hyaline010		3	GE-Neth	n	0	1	0	0	11	0	0	0	11
MCOR976D2	A		GE-Neth	n	0	0	0	0	2	2	0	2	4
MCOR976D2	B		GE-Neth	n	1	0	0	0	1	1	1	2	2
MCOR976D2	C		GE-Neth	n	0	0	0	0	3	0	2	2	3
MCOR976D2	E		GE-Neth	n	0	0	0	0	6	0	2	2	6
MCOR976D2	F		GE-Neth	n	0	0	1	0	6	0	2	2	6
MCOR976D9	A		GE-Neth	n	0	0	0	0	4	1	0	1	5
MCOR976D9	B		GE-Neth	n	0	0	0	0	2	2	1	3	4
MCOR976D9	C		GE-Neth	n	0	0	0	0	0	5	0	5	5
HMNF085		1	AMC-Port	e	0	0	0	0	30	1	0	1	31
HMNF085		3	AMC-Port	e	0	0	0	0	30	0	0	0	30
HMNF088		1	AMC-Port	e	0	0	0	0	40	0	0	0	40
HMNF088		2	AMC-Port	e	0	0	0	0	36	2	0	2	38
HMNF088		3	AMC-Port	e	0	0	0	0	28	3	0	3	31
HMNF098		1	AMC-Port	e	0	0	0	0	29	0	0	0	29
HMNF098		2	AMC-Port	e	0	0	0	0	32	0	0	0	32
HMNF098		3	AMC-Port	e	0	0	0	0	23	0	0	0	23
HMNF118		1	AMC-Port	e	0	1	0	0	25	0	0	0	25
HMNF118		2	AMC-Port	e	0	0	1	0	22	0	0	0	22
HMNF147		1	AMC-Port	e	0	0	1	0	32	3	0	3	35
HMNF147		2	AMC-Port	e	0	0	0	0	52	0	0	0	52
HMNF147		3	AMC-Port	e	0	0	0	0	41	0	0	0	41

hmnotsogood	0	AMC-Port	e	0	0	1	0	10	0	0	0	10
hyaline010	1	AMC-Port	e	0	1	0	0	5	0	0	0	5
hyaline010	2	AMC-Port	e	0	1	0	0	11	0	0	0	11
hyaline010	3	AMC-Port	e	0	1	0	0	15	0	0	0	15
MCOR976D2	A	AMC-Port	e	0	0	0	0	1	2	0	2	3
MCOR976D2	B	AMC-Port	e	1	0	0	0	2	2	0	2	4
MCOR976D2	C	AMC-Port	e	0	0	0	0	2	0	2	2	2
MCOR976D2	E	AMC-Port	e	0	0	0	0	4	2	0	2	6
MCOR976D2	F	AMC-Port	e	0	0	1	0	2	2	0	2	4
MCOR976D9	A	AMC-Port	e	1	0	0	0	7	2	0	2	9
MCOR976D9	B	AMC-Port	e	0	0	0	0	7	3	0	3	10
MCOR976D9	C	AMC-Port	e	0	0	0	0	2	3	0	3	5
HMNF085	1	Christie-En	n	0	0	1	0	28	0	0	0	28
HMNF085	3	Christie-En	n	0	0	0	0	26	6	0	6	32
HMNF088	1	Christie-En	n	0	0	0	0	38	3	0	3	41
HMNF088	2	Christie-En	n	0	0	1	0	28	3	0	3	31
HMNF088	3	Christie-En	n	0	0	0	0	18	0	3	3	18
HMNF098	1	Christie-En	n	0	0	0	0	26	0	0	0	26
HMNF098	2	Christie-En	n	0	0	0	0	28	2	0	2	30
HMNF098	3	Christie-En	n	0	0	0	0	24	0	1	1	24
HMNF118	1	Christie-En	n	0	0	0	0	15	6	0	6	21
HMNF118	2	Christie-En	n	0	0	0	0	16	2	0	2	18
HMNF147	1	Christie-En	n	0	0	0	1	30	3	1	4	33
HMNF147	2	Christie-En	n	0	0	0	0	18	0	0	0	18
HMNF147	3	Christie-En	n	0	0	0	0	18	2	0	2	20
hmnotsogood	0	Christie-En	n	0	0	0	0	3	2	0	2	5
hyaline010	1	Christie-En	n	0	1	0	0	5	0	0	0	5
hyaline010	2	Christie-En	n	0	1	0	0	6	0	0	0	6
hyaline010	3	Christie-En	n	0	0	0	0	9	0	0	0	9
MCOR976D2	A	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	B	Christie-En	n	0	0	0	0	2	0	2	2	2
MCOR976D2	C	Christie-En	n	0	0	0	0	4	0	1	1	4
MCOR976D2	E	Christie-En	n	0	0	0	0	4	0	2	2	4
MCOR976D2	F	Christie-En	n	0	0	0	0	5	0	2	2	5
MCOR976D9	A	Christie-En	n	0	0	0	0	2	1	0	1	3
MCOR976D9	B	Christie-En	n	0	0	0	0	1	0	3	3	1
MCOR976D9	C	Christie-En	n	0	0	0	1	2	2	0	2	4
HMNF085	1	NH-Germ	n	0	0	0	0	35	1	0	1	36
HMNF085	3	NH-Germ	n	0	0	1	0	38	1	0	1	39
HMNF088	1	NH-Germ	n	0	0	0	0	62	0	0	0	62
HMNF088	2	NH-Germ	n	0	0	0	1	42	1	1	2	43
HMNF088	3	NH-Germ	n	0	0	0	0	42	0	3	3	42
HMNF098	1	NH-Germ	n	0	0	0	0	37	0	0	0	37
HMNF098	2	NH-Germ	n	0	0	0	0	46	0	0	0	46
HMNF098	3	NH-Germ	n	0	0	0	0	31	0	0	0	31
HMNF118	1	NH-Germ	n	0	0	1	0	32	1	0	1	33
HMNF118	2	NH-Germ	n	0	0	1	0	26	0	0	0	26
HMNF147	1	NH-Germ	n	0	0	0	1	41	0	1	1	41
HMNF147	2	NH-Germ	n	0	0	0	1	62	0	0	0	62
HMNF147	3	NH-Germ	n	0	0	0	0	59	1	0	1	60
hmnotsogood	0	NH-Germ	n	0	0	0	1	10	0	0	0	10
hyaline010	1	NH-Germ	n	0	1	0	0	8	0	0	0	8
hyaline010	2	NH-Germ	n	0	1	0	0	11	0	0	0	11
hyaline010	3	NH-Germ	n	0	1	0	0	16	0	0	0	16
MCOR976D2	A	NH-Germ	n	0	1	0	0	3	4	0	4	7
MCOR976D2	B	NH-Germ	n	1	0	0	0	3	1	2	3	4
MCOR976D2	C	NH-Germ	n	0	0	0	0	9	3	0	3	12
MCOR976D2	E	NH-Germ	n	0	1	0	0	5	2	0	2	7
MCOR976D2	F	NH-Germ	n	0	0	0	1	4	3	1	4	7
MCOR976D9	A	NH-Germ	n	0	1	0	0	2	2	0	2	4
MCOR976D9	B	NH-Germ	n	0	1	0	0	4	3	0	3	7
MCOR976D9	C	NH-Germ	n	0	0	1	0	6	3	0	3	9
HMNF085	1	PW-Eng	e	0	0	1	1	32	0	1	1	32
HMNF085	3	PW-Eng	e	0	0	0	0	29	3	0	3	32
HMNF088	1	PW-Eng	e	0	0	0	0	36	0	0	0	36
HMNF088	2	PW-Eng	e	0	0	0	1	35	0	1	1	35
HMNF088	3	PW-Eng	e	0	0	0	1	25	0	1	1	25
HMNF098	1	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF098	2	PW-Eng	e	1	0	0	0	31	0	0	0	31
HMNF098	3	PW-Eng	e	0	0	0	0	26	0	0	0	26
HMNF118	1	PW-Eng	e	0	0	0	0	21	1	0	1	22
HMNF118	2	PW-Eng	e	0	0	0	0	17	0	0	0	17
HMNF147	1	PW-Eng	e	0	0	0	1	32	0	2	2	32
HMNF147	2	PW-Eng	e	0	0	0	0	30	0	0	0	30
HMNF147	3	PW-Eng	e	0	0	0	0	28	0	0	0	28
hmnotsogood	0	PW-Eng	e	0	0	0	1	9	0	0	0	9
hyaline010	1	PW-Eng	e	0	1	0	0	6	0	0	0	6
hyaline010	2	PW-Eng	e	0	1	0	0	8	0	0	0	8
hyaline010	3	PW-Eng	e	0	1	0	0	13	0	0	0	13
MCOR976D2	A	PW-Eng	e	0	0	0	0	2	0	2	2	2
MCOR976D2	B	PW-Eng	e	1	0	0	0	2	0	2	2	2
MCOR976D2	C	PW-Eng	e	0	0	0	0	2	1	2	3	3
MCOR976D2	E	PW-Eng	e	0	0	0	0	3	1	1	2	4
MCOR976D2	F	PW-Eng	e	0	0	1	0	3	1	1	2	4
MCOR976D9	A	PW-Eng	e	1	0	0	0	1	2	0	2	3
MCOR976D9	B	PW-Eng	e	0	0	0	0	2	2	1	3	4
MCOR976D9	C	PW-Eng	e	0	0	1	0	2	3	0	3	5

Average of vitellogenic oocytes		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	30	29	32	33	32	31	32	34	28	33	30	29	23	35
	3	30	29	30	30	22	25	29	31	26	32	31	31	20	38
HMNF088	1	40	40	33	38	35	40	36	40	38	27	38	36	22	62
	2	36	37	24	37	34	32	35	32	28	22	41	29	25	42
	3	28	30	23	28	27	37	25	22	18	13	22	20	16	42
HMNF098	1	29	27	23	25	26	26	26	23	26	18	25	22	20	37
	2	32	34	28	35	33	27	31	30	28	27	27	29	28	46
	3	23	25	23	22	24	17	26	19	24	14	21	22	24	31
HMNF118	1	25	24	15	22	23	19	21	17	15	18	19	19	9	32
	2	22	17	14	18	13	15	17	11	16	12	12	15	12	26
HMNF147	1	32	41	29	33	34	30	32	25	30	20	32	27	26	41
	2	52	40	29	36	44	38	30	31	18	26	40	26	21	62
	3	41	34	26	33	34	42	28	22	18	24	27	25	28	59
hmnotsogood	0	10	10	7	9	7	7	9	6	3	8	7	7	5	10
hyaline010	1	5	6	5	5	5	5	6	5	5	5	6	5	4	8
	2	11	7	7	7	7	6	8	7	6	7	8	7	8	11
	3	15	14	13	10	16	10	13	12	9	8	11	12	3	16
MCOR976D2	A	1	2	2	2	2	1	2	2	2	2	2	2	3	3
	B	2	2	2	2	2	1	2	2	2	2	1	2	4	3
	C	2	4	4	4	4	5	2	3	4	8	3	5	4	9
	E	4	3	4	4	5	2	3	3	4	6	6	2	6	5
	F	2	4	5	4	6	4	3	4	5	5	6	3	4	4
MCOR976D9	A	7	3	5	2	3	6	1	4	2	2	4	2	6	2
	B	7	2	4	2	3	7	2	4	1	2	2	1	4	4
	C	2	3	2	2	3	4	2	2	2	1	0	3	4	6

sample	minimum	round(aver	maximum
HMNF0	29	32	34
HMNF0	22	28	31
HMNF0	33	38	40
HMNF0	24	33	37
HMNF0	22	28	37
HMNF0	23	26	29
HMNF0	27	31	35
HMNF0	17	22	26
HMNF1	15	21	25
HMNF1	11	16	22
HMNF1	25	32	41
HMNF1	29	38	52
HMNF1	22	33	42
hmnots	6	8	10
hyaline	5	5	6
hyaline	6	8	11
hyaline	10	13	16
MCOR9	1	2	2
MCOR9	1	2	2
MCOR9	2	4	5
MCOR9	2	4	5
MCOR9	2	4	6
MCOR9	1	4	7
MCOR9	2	4	7
MCOR9	2	3	4

Sum of alfa atresia		experience	reader												
		e								n					
sample	number	AMC-Port	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	JRP-Sp	PW-Eng	SH-Irel	Christie-Eng	DL-Irel	GE-Neth	IM-Sp	KM-Germ	NH-Germ
HMNF085	1	1	0	0	1	2	1	1	1	0	0	0	0	0	1
	3	0	0	3	0	3	2	3	3	6	0	0	0	3	1
HMNF088	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0
	2	2	2	2	2	2	2	1	1	3	0	2	1	2	2
	3	3	2	1	3	1	0	1	0	3	0	0	0	3	3
HMNF098	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0
HMNF118	1	0	2	0	0	1	0	1	1	6	0	1	1	2	1
	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
HMNF147	1	3	4	2	3	4	1	2	0	4	0	1	1	4	1
	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	2	0	0	0	1	1
hmnotsogood	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	0	0	0	0	0	0	0	1	0
MCOR976D2	A	2	3	2	2	2	2	2	3	2	2	2	2	4	4
	B	2	2	2	2	2	2	2	2	2	2	2	2	3	3
	C	2	2	2	2	2	2	3	2	1	2	2	2	2	3
	E	2	2	2	2	2	0	2	2	2	1	2	2	2	2
	F	2	2	2	2	1	0	2	3	2	2	2	2	2	4
MCOR976D9	A	2	2	0	1	1	1	2	1	1	1	1	1	0	2
	B	3	3	3	3	3	3	3	3	3	3	3	3	2	3
	C	3	2	2	4	3	2	3	3	2	3	5	2	2	3

sample	minimum	round(aver	maximum
HMNF0	0	1	2
HMNF0	0	2	3
HMNF0	0	0	0
HMNF0	1	2	2
HMNF0	0	1	3
HMNF0	0	0	2
HMNF0	0	0	0
HMNF0	0	0	1
HMNF1	0	1	2
HMNF1	0	0	0
HMNF1	0	2	4
HMNF1	0	0	1
HMNF1	0	0	0
hmnots	0	0	0
hyaline	0	0	0
hyaline	0	0	0
hyaline	0	0	1
MCOR9	2	2	3
MCOR9	2	2	2
MCOR9	2	2	3
MCOR9	0	2	2
MCOR9	0	2	3
MCOR9	0	1	2
MCOR9	3	3	3
MCOR9	2	3	4

Sum of hydrated		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF098	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HMNF118	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	6
	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
hmnotsogood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyaline010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	13
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCOR976D9	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sum of POF		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	Grand Total
HMNF085	1	0	1	1	1	1	0	1	0	1	1	0	0	1	1	9
	3	0	0	1	1	1	0	1	0	1	1	0	1	0	1	8
HMNF088	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
	3	0	0	1	0	0	1	0	0	1	0	0	0	0	1	4
HMNF098	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HMNF118	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	9
	2	1	0		1	1	0	1	1	1	0	1	1	0	1	9
HMNF147	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	5
	2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	4
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hmnotsogood	0	1	0		0	0	1	0	0	0	0	0	0	0	1	3
hyaline010	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MCOR976D2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	1	0	1	1	1	1	1	1	1	1	1	0	1	0	11
MCOR976D9	A	0	0	0	0	0	0	0	1	1	0	1	0	0	1	4
	B	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
	C	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3

Average of vitellogenic oocytes		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	30	28	33	30	29	32	33	32	29	31	23	35	32	34	30.79
	3	30	26	32	31	29	30	30	22	31	25	20	38	29	31	28.86
HMNF088	1	40	38	27	38	40	33	38	35	36	40	22	62	36	40	37.5
	2	36	28	22	41	37	24	37	34	29	32	25	42	35	32	32.43
	3	28	18	13	22	30	23	28	27	20	37	16	42	25	22	25.07
HMNF098	1	29	26	18	25	27	23	25	26	22	26	20	37	26	23	25.21
	2	32	28	27	27	34	28	35	33	29	27	28	46	31	30	31.07
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	22.5
HMNF118	1	25	15	18	19	24	15	22	23	19	19	9	32	21	17	19.86
	2	22	16	12	12	17	14	18	13	15	15	12	26	17	11	15.71
HMNF147	1	32	30	20	32	41	29	33	34	27	30	26	41	32	25	30.86
	2	52	18	26	40	40	29	36	44	26	38	21	62	30	31	35.21
	3	41	18	24	27	34	26	33	34	25	42	28	59	28	22	31.5
hmnotsogood	0	10	3	8	7	10	7	9	7	7	7	5	10	9	6	7.5
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5.357
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	7.643
	3	15	9	8	11	14	13	10	16	12	10	3	16	13	12	11.57
MCOR976D2	A	1	2	2	2	2	2	2	2	2	1	3	3	2	2	2
	B	2	2	2	1	2	2	2	2	2	1	4	3	2	2	2.071
	C	2	4	8	3	4	4	4	4	5	5	4	9	2	3	4.357
	E	4	4	6	6	3	4	4	5	2	2	6	5	3	3	4.071
	F	2	5	5	6	4	5	4	6	3	4	4	4	3	4	4.214
MCOR976D9	A	7	2	2	4	3	5	2	3	2	6	6	2	1	4	3.5
	B	7	1	2	2	2	4	2	3	1	7	4	4	2	4	3.214
	C	2	2	1	0	3	2	2	3	3	4	4	6	2	2	2.571

all readers			
sample	minimum	round(average)	maximum
HMNF085-1	23	31	35
HMNF085-3	20	29	38
HMNF088-1	22	38	62
HMNF088-2	22	32	42
HMNF088-3	13	25	42
HMNF098-1	18	25	37
HMNF098-2	27	31	46
HMNF098-3	14	23	31
HMNF118-1	9	20	32
HMNF118-2	11	16	26
HMNF147-1	20	31	41
HMNF147-2	18	35	62
HMNF147-3	18	32	59
hmnotsogood-	3	8	10
hyaline010-1	4	5	8
hyaline010-2	6	8	11
hyaline010-3	3	12	16
MCOR976D2-	1	2	3
MCOR976D2-	1	2	4
MCOR976D2-	2	4	9
MCOR976D2-	2	4	6
MCOR976D2-	2	4	6
MCOR976D9-	1	4	7
MCOR976D9-	1	3	7
MCOR976D9-	0	3	6

		NH-Germ	AMC-Port	HM-Sp	JRP-Sp	IG-Scot	IdB-Neth	HW-Neth	KM-Ger	GE-Ne	PW-Eng	SH-Irel	IM-Sp	DL-Irel	Christie-Eng	
HMNF085	1	0.137	-0.026	-0.058	0.007	0.039	0.072	0.039	-0.253	-0.026	0.039	0.104	-0.058	0.072	-0.090	(score-mean)/mean
	3	0.317	0.040	0.005	-0.134	-0.238	0.040	0.040	-0.307	0.074	0.005	0.074	0.074	0.109	-0.099	
HMNF088	1	0.653	0.067	0.067	0.067	-0.067	0.013	-0.120	-0.413	0.013	-0.040	0.067	-0.040	-0.280	0.013	
	2	0.295	0.110	0.141	-0.013	0.048	0.141	-0.260	-0.229	0.264	0.079	-0.013	-0.106	-0.322	-0.137	
	3	0.675	0.117	0.197	0.476	0.077	0.117	-0.083	-0.362	-0.123	-0.003	-0.123	-0.202	-0.481	-0.282	
HMNF098	1	0.467	0.150	0.071	0.031	0.031	-0.008	-0.088	-0.207	-0.008	0.031	-0.088	-0.127	-0.286	0.031	
	2	0.480	0.030	0.094	-0.131	0.062	0.126	-0.099	-0.099	-0.131	-0.002	-0.034	-0.067	-0.131	-0.099	
	3	0.378	0.022	0.111	-0.244	0.067	-0.022	0.022	0.067	-0.067	0.156	-0.156	-0.022	-0.378	0.067	
HMNF118	1	0.612	0.259	0.209	-0.043	0.158	0.108	-0.245	-0.547	-0.043	0.058	-0.144	-0.043	-0.094	-0.245	
	2	0.655	0.400	0.082	-0.045	-0.173	0.145	-0.109	-0.236	-0.236	0.082	-0.300	-0.045	-0.236	0.018	
HMNF147	1	0.329	0.037	0.329	-0.028	0.102	0.069	-0.060	-0.157	0.037	0.037	-0.190	-0.125	-0.352	-0.028	
	2	0.761	0.477	0.136	0.079	0.249	0.022	-0.176	-0.404	0.136	-0.148	-0.120	-0.262	-0.262	-0.489	
	3	0.873	0.302	0.079	0.333	0.079	0.048	-0.175	-0.111	-0.143	-0.111	-0.302	-0.206	-0.238	-0.429	
hmnotsogood	0	0.333	0.333	0.333	-0.067	-0.067	0.200	-0.067	-0.333	-0.067	0.200	-0.200	-0.067	0.067	-0.600	
hyaline010	1	0.493	-0.067	0.120	-0.067	-0.067	-0.067	-0.067	-0.253	0.120	0.120	-0.067	-0.067	-0.067	-0.067	
	2	0.439	0.439	-0.084	-0.215	-0.084	-0.084	-0.084	0.047	0.047	0.047	-0.084	-0.084	-0.084	-0.215	
	3	0.383	0.296	0.210	-0.136	0.383	-0.136	0.123	-0.741	-0.049	0.123	0.037	0.037	-0.309	-0.222	
MCOR976D2	A	0.500	-0.500	0.000	-0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	
	B	0.448	-0.034	-0.034	-0.517	-0.034	-0.034	-0.034	0.931	-0.517	-0.034	-0.034	-0.034	-0.034	-0.034	
	C	1.066	-0.541	-0.082	0.148	-0.082	-0.082	-0.082	-0.082	-0.311	-0.541	-0.311	0.148	0.836	-0.082	
	E	0.228	-0.018	-0.263	-0.509	0.228	-0.018	-0.018	0.474	0.474	-0.263	-0.263	-0.509	0.474	-0.018	
	F	-0.051	-0.525	-0.051	-0.051	0.424	-0.051	0.186	-0.051	0.424	-0.288	-0.051	-0.288	0.186	0.186	
MCOR976D9	A	-0.429	1.000	-0.143	0.714	-0.143	-0.429	0.429	0.714	0.143	-0.714	0.143	-0.429	-0.429	-0.429	
	B	0.244	1.178	-0.378	1.178	-0.067	-0.378	0.244	0.244	-0.378	-0.378	0.244	-0.689	-0.378	-0.689	
	C	1.333	-0.222	0.167	0.556	0.167	-0.222	-0.222	0.556	-1.000	-0.222	-0.222	0.167	-0.611	-0.222	
		0.465	0.133	0.050	0.036	0.044	-0.017	-0.036	-0.050	-0.055	-0.071	-0.081	-0.122	-0.129	-0.166	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	ranking

			reader														
sample	number	Data	AMC-Port	Christie	DL-Irel	GE-Net	HM-Sp	HW-Neth	IdB-Neth	IG-Sco	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-En	SH-Irel	average
HMNF085	1	Average of	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0.286
		Average of	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0.286
	3	Average of	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.714
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF088	1	Average of	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.357
		Average of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of	2	3	0	2	0	0	0	2	1	0	0	1	0	0	0.786
		Average of	0	0	0	0	2	2	2	0	0	2	2	1	1	1	0.929
	3	Average of	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0.357

sample	atresia	minimum	round(avera	maximum
HMNF085-	Average of early alfa	0	0.29	2
HMNF085-	Average of early alfa	0	0.29	1
HMNF088-	Average of early alfa	0	1.71	6
HMNF088-	Average of early alfa	0	0	0
HMNF088-	Average of early alfa	0	0.36	3
HMNF098-	Average of early alfa	0	0	0
HMNF098-	Average of early alfa	0	0.79	3
HMNF098-	Average of early alfa	0	0.93	2
HMNF118-	Average of early alfa	0	0.36	3

HMNF088	3	Average of l	0	3	0	0	1	1	2	1	0	0	3	3	1	0	1.071
HMNF098	1	Average of e	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.214
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of e	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.286
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of l	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.214
HMNF118	1	Average of e	0	6	0	0	1	0	0	1	1	0	0	1	1	0	0.786
		Average of l	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0.357
	2	Average of e	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMNF147	1	Average of e	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0.5
		Average of l	0	1	0	1	4	2	3	3	1	1	4	1	2	0	1.643
	2	Average of e	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of e	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0.214
		Average of l	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hmnotsogood	0	Average of e	0	2		0	0	0	0	0	0	0	0	0	0	0	0.154
		Average of l	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
hyaline010	1	Average of e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	Average of e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Average of l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	Average of e	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.071
		Average of l	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.071
MCOR976D2	A	Average of e	2	0	0	2	0	0	2	2	0	0	0	4	0	0	0.857
		Average of l	0	2	2	0	3	2	0	0	2	2	4	0	2	3	1.571
	B	Average of e	2	0	0	1	0	0	1	1	0	0	0	1	0	0	0.429
		Average of l	0	2	2	1	2	2	1	1	2	2	3	2	2	2	1.714
	C	Average of e	0	0	0	0	0	0	0	2	1	0	0	3	1	0	0.5
		Average of l	2	1	2	2	2	2	2	0	1	2	2	0	2	2	1.571
	E	Average of e	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0.357
		Average of l	0	2	1	2	2	2	2	2	2	0	2	0	1	2	1.429
	F	Average of e	2	0	1	0	0	0	1	0	1	0	0	3	1	0	0.643
		Average of l	0	2	1	2	2	2	1	1	1	0	2	1	1	3	1.357
MCOR976D9	A	Average of e	2	1	0	1	2	0	1	1	0	1	0	2	2	1	1
		Average of l	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.143
	B	Average of e	3	0	1	2	2	0	3	3	1	0	0	3	2	3	1.643
		Average of l	0	3	2	1	1	3	0	0	2	3	2	0	1	0	1.286
	C	Average of e	3	2	0	5	2	0	4	3	2	0	0	3	3	2	2.071
		Average of l	0	0	3	0	0	2	0	0	0	2	2	0	0	1	0.714

HMNF118-	Average of early alfa	0	1.07	3
HMNF147-	Average of early alfa	0	0.21	2
HMNF147-	Average of early alfa	0	0	0
HMNF147-	Average of early alfa	0	0.29	2
hmnotsogo	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0	0
hyaline010	Average of early alfa	0	0.21	1
hyaline010	Average of early alfa	0	0.79	6
MCOR976I	Average of early alfa	0	0.36	2
MCOR976I	Average of early alfa	0	0.15	2
MCOR976I	Average of early alfa	0	0	0
MCOR976I	Average of early alfa	0	0.5	3
MCOR976I	Average of early alfa	0	1.64	4
MCOR976I	Average of early alfa	0	0.07	1
MCOR976I	Average of early alfa	0	0	0
MCOR976I	Average of early alfa	0	0.21	2
HMNF085-	Average of late alfa a	0	0.07	1
HMNF085-	Average of late alfa a	0	0.15	2
HMNF088-	Average of late alfa a	0	0.07	1
HMNF088-	Average of late alfa a	0	0	0
HMNF088-	Average of late alfa a	0	0	0
HMNF098-	Average of late alfa a	0	0	0
HMNF098-	Average of late alfa a	0	0	0
HMNF098-	Average of late alfa a	0	0.07	1
HMNF118-	Average of late alfa a	0	0.07	1
HMNF118-	Average of late alfa a	0	0.86	4
HMNF147-	Average of late alfa a	0	1.57	4
HMNF147-	Average of late alfa a	0	0.43	2
HMNF147-	Average of late alfa a	0	1.71	3
hmnotsogo	Average of late alfa a	0	0.5	3
hyaline010	Average of late alfa a	0	1.57	2
hyaline010	Average of late alfa a	0	0.36	2
hyaline010	Average of late alfa a	0	1.43	2
MCOR976I	Average of late alfa a	0	0.64	3
MCOR976I	Average of late alfa a	0	1.36	3
MCOR976I	Average of late alfa a	0	1	2
MCOR976I	Average of late alfa a	0	0.14	1
MCOR976I	Average of late alfa a	0	1.64	3
MCOR976I	Average of late alfa a	0	1.29	3
MCOR976I	Average of late alfa a	0	2.07	5
MCOR976I	Average of late alfa a	0	0.71	3

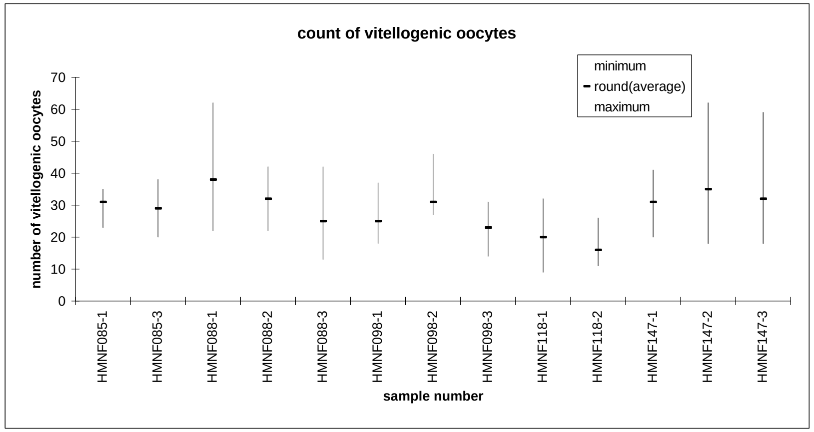
Sum of alfa atresia		reader														
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel	average
HMNF085	1	1	0	0	0	0	0	1	2	0	1	0	1	1	1	0.57
	3	0	6	0	0	0	3	0	3	0	2	3	1	3	3	1.71
HMNF088	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0.36
	2	2	3	0	2	2	2	2	2	1	2	2	2	1	1	1.71
	3	3	3	0	0	2	1	3	1	0	0	3	3	1	0	1.43
HMNF098	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.21
	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0.29
	3	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.21
HMNF118	1	0	6	0	1	2	0	0	1	1	0	2	1	1	1	1.14
	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.14
HMNF147	1	3	4	0	1	4	2	3	4	1	1	4	1	2	0	2.14
	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.07
	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.29
hmnotsogood	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0.21
hyaline010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.14
MCOR976D2	A	2	2	2	2	3	2	2	2	2	2	4	4	2	3	2.43
	B	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2.14
	C	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2.07
	E	2	2	1	2	2	2	2	2	2	0	2	2	2	2	1.79
	F	2	2	2	2	2	2	2	1	2	0	2	4	2	3	2.00
MCOR976D9	A	2	1	1	1	2	0	1	1	1	1	0	2	2	1	1.14
	B	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2.93

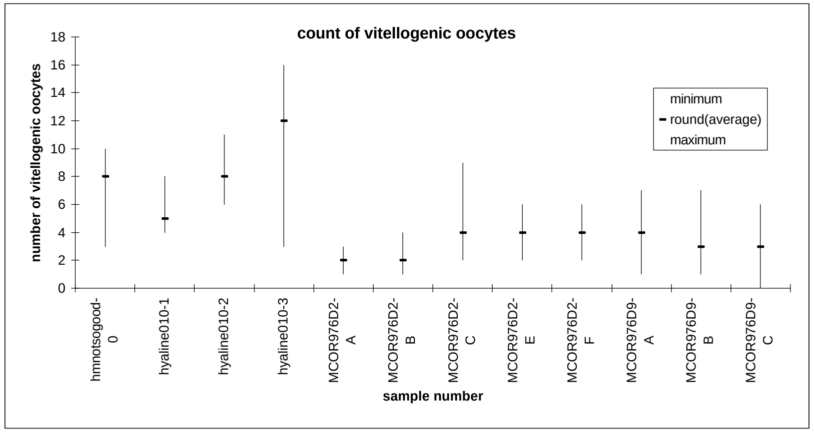
sample	minimum	round(aver	maximum
HMNF085-	0	0.571429	2
HMNF085-	0	1.714286	6
HMNF088-	0	0.357143	3
HMNF088-	0	1.714286	3
HMNF088-	0	1.428571	3
HMNF098-	0	0.214286	2
HMNF098-	0	0.285714	2
HMNF098-	0	0.214286	1
HMNF118-	0	1.142857	6
HMNF118-	0	0.142857	2
HMNF147-	0	2.142857	4
HMNF147-	0	0.071429	1
HMNF147-	0	0.285714	2
hmnotsogo	0	0.214286	2
hyaline010	0	0	0
hyaline010	0	0	0
hyaline010	0	0.142857	1
MCOR976I	2	2.428571	4
MCOR976I	2	2.142857	3
MCOR976I	1	2.071429	3
MCOR976I	0	1.785714	2
MCOR976I	0	2	4
MCOR976I	0	1.142857	2
MCOR976I	2	2.928571	3

MCOR976D9	C	3	2	3	5	2	2	4	3	2	2	2	3	3	3	2.79		MCOR976I	2	2.785714	5

Sum of total oocytes		reader																			
sample	number	AMC-Port	Christie-Eng	DL-Irel	GE-Neth	HM-Sp	HW-Neth	IdB-Neth	IG-Scot	IM-Sp	JRP-Sp	KM-Germ	NH-Germ	PW-Eng	SH-Irel		round(average)	sample	minimum	round(aver	maximum
HMNF085	1	31	28	33	30	29	32	33	34	29	31	23	36	32	34	31	31	HMNF085-	23	31	36
	3	30	32	32	31	29	33	30	25	31	27	23	39	32	34	31	31	HMNF085-	23	31	39
HMNF088	1	40	41	27	38	40	33	38	35	36	40	24	62	36	40	38	38	HMNF088-	24	38	62
	2	38	31	22	43	37	24	37	36	30	32	25	43	35	32	33	33	HMNF088-	22	33	43
	3	31	18	13	22	31	23	29	27	20	37	16	42	25	22	25	25	HMNF088-	13	25	42
HMNF098	1	29	26	18	25	29	23	25	26	23	26	20	37	26	23	25	25	HMNF098-	18	25	37
	2	32	30	27	27	34	28	35	33	29	27	30	46	31	30	31	31	HMNF098-	27	31	46
	3	23	24	14	21	25	23	22	24	22	17	24	31	26	19	23	23	HMNF098-	14	23	31
HMNF118	1	25	21	18	19	25	15	22	24	20	19	9	33	22	17	21	21	HMNF118-	9	21	33
	2	22	18	12	12	17	14	18	13	15	15	12	26	17	11	16	16	HMNF118-	11	16	26
HMNF147	1	35	33	20	32	41	29	33	35	27	30	26	41	32	25	31	31	HMNF147-	20	31	41
	2	52	18	26	40	40	29	36	45	26	38	21	62	30	31	35	35	HMNF147-	18	35	62
	3	41	20	24	27	34	26	33	34	25	42	28	60	28	22	32	32	HMNF147-	20	32	60
hmnotsogood	0	10	5	8	7	10	7	9	7	7	7	5	10	9	6	8	8	hmnotsogo	5	8	10
hyaline010	1	5	5	5	6	6	5	5	5	5	5	4	8	6	5	5	5	hyaline010	4	5	8
	2	11	6	7	8	7	7	7	7	7	6	8	11	8	7	8	8	hyaline010	6	8	11
	3	15	9	8	11	14	13	10	17	12	10	3	16	13	12	12	12	hyaline010	3	12	17
MCOR976D2	A	3	2	2	4	2	2	4	4	2	1	3	7	2	2	3	3	MCOR976I	1	3	7
	B	4	2	2	2	2	2	3	3	2	1	4	4	2	2	3	3	MCOR976I	1	3	4
	C	2	4	8	3	4	4	4	6	6	5	4	12	3	3	5	5	MCOR976I	2	5	12
	E	6	4	6	6	3	4	4	5	2	2	6	7	4	3	4	4	MCOR976I	2	4	7
	F	4	5	6	6	4	5	5	6	4	4	4	7	4	4	5	5	MCOR976I	4	5	7
MCOR976D9	A	9	3	2	5	5	5	3	4	2	7	6	4	3	5	5	5	MCOR976I	2	5	9
	B	10	1	3	4	4	4	5	6	2	7	4	7	4	7	5	5	MCOR976I	1	5	10
	C	5	4	1	5	5	2	6	6	5	4	4	9	5	4	5	5	MCOR976I	1	5	9

		NH-Germ	AMC-Port	IG-Scot	IdB-Neth	HM-Sp	GE-Neth	PW-Eng	JRP-Sp	SH-Irel	HW-Neth	IM-Sp	Christie-Er	KM-Germ	DL-Irel	
HMNF085	1	0.161	0.000	0.097	0.065	-0.065	-0.032	0.032	0.000	0.097	0.032	-0.065	-0.097	-0.258	0.065	
	3	0.258	-0.032	-0.194	-0.032	-0.065	0.000	0.032	-0.129	0.097	0.065	0.000	0.032	-0.258	0.032	
HMNF088	1	0.632	0.053	-0.079	0.000	0.053	0.000	-0.053	0.053	0.053	-0.132	-0.053	0.079	-0.368	-0.289	
	2	0.303	0.152	0.091	0.121	0.121	0.303	0.061	-0.030	-0.030	-0.273	-0.091	-0.061	-0.242	-0.333	
	3	0.680	0.240	0.080	0.160	0.240	-0.120	0.000	0.480	-0.120	-0.080	-0.200	-0.280	-0.360	-0.480	
HMNF098	1	0.480	0.160	0.040	0.000	0.160	0.000	0.040	0.040	-0.080	-0.080	-0.080	0.040	-0.200	-0.280	
	2	0.484	0.032	0.065	0.129	0.097	-0.129	0.000	-0.129	-0.032	-0.097	-0.065	-0.032	-0.032	-0.129	
	3	0.348	0.000	0.043	-0.043	0.087	-0.087	0.130	-0.261	-0.174	0.000	-0.043	0.043	0.043	-0.391	
HMNF118	1	0.571	0.190	0.143	0.048	0.190	-0.095	0.048	-0.095	-0.190	-0.286	-0.048	0.000	-0.571	-0.143	
	2	0.625	0.375	-0.188	0.125	0.063	-0.250	0.063	-0.063	-0.313	-0.125	-0.063	0.125	-0.250	-0.250	
HMNF147	1	0.323	0.129	0.129	0.065	0.323	0.032	0.032	-0.032	-0.194	-0.065	-0.129	0.065	-0.161	-0.355	
	2	0.771	0.486	0.286	0.029	0.143	0.143	-0.143	0.086	-0.114	-0.171	-0.257	-0.486	-0.400	-0.257	
	3	0.875	0.281	0.063	0.031	0.063	-0.156	-0.125	0.313	-0.313	-0.188	-0.219	-0.375	-0.125	-0.250	
hmnotsogood	0	0.250	0.250	-0.125	0.125	0.250	-0.125	0.125	-0.125	-0.250	-0.125	-0.125	-0.375	-0.375	0.000	
hyaline010	1	0.600	0.000	0.000	0.000	0.200	0.200	0.200	0.000	0.000	0.000	0.000	0.000	-0.200	0.000	
	2	0.375	0.375	-0.125	-0.125	-0.125	0.000	0.000	-0.250	-0.125	-0.125	-0.125	-0.250	0.000	-0.125	
	3	0.333	0.250	0.417	-0.167	0.167	-0.083	0.083	-0.167	0.000	0.083	0.000	-0.250	-0.750	-0.333	
MCOR976D2	A	1.333	0.000	0.333	0.333	-0.333	0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.000	-0.333	
	B	0.333	0.333	0.000	0.000	-0.333	-0.333	-0.333	-0.667	-0.333	-0.333	-0.333	-0.333	0.333	-0.333	
	C	1.400	-0.600	0.200	-0.200	-0.200	-0.400	-0.400	0.000	-0.400	-0.200	0.200	-0.200	-0.200	0.600	
	E	0.750	0.500	0.250	0.000	-0.250	0.500	0.000	-0.500	-0.250	0.000	-0.500	0.000	0.500	0.500	
	F	0.400	-0.200	0.200	0.000	-0.200	0.200	-0.200	-0.200	-0.200	0.000	-0.200	0.000	-0.200	0.200	
MCOR976D9	A	-0.200	0.800	-0.200	-0.400	0.000	0.000	-0.400	0.400	0.000	0.000	-0.600	-0.400	0.200	-0.600	
	B	0.400	1.000	0.200	0.000	-0.200	-0.200	-0.200	0.400	0.400	-0.200	-0.600	-0.800	-0.200	-0.400	
	C	0.800	0.000	0.200	0.200	0.000	0.000	0.000	-0.200	-0.200	-0.600	0.000	-0.200	-0.200	-0.800	
		0.531	0.191	0.077	0.019	0.015	-0.012	-0.054	-0.070	-0.120	-0.129	-0.157	-0.164	-0.171	-0.187	average
		5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	rank


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF085-3
HMNF088-1
HMNF088-2
HMNF088-3
HMNF098-1
HMNF098-2
HMNF098-3
HMNF118-1
HMNF118-2
HMNF147-1
HMNF147-2
HMNF147-3
sample number


count of vitellogenic oocytes
minimum
round(average)
maximum
number of vitellogenic oocytes
0
2
4
6
8
10
12
14
16
18
hmnotsogood-0
hyaline010-1
hyaline010-2
hyaline010-3
MCOR976D2-A
MCOR976D2-B
MCOR976D2-C
MCOR976D2-E
MCOR976D2-F
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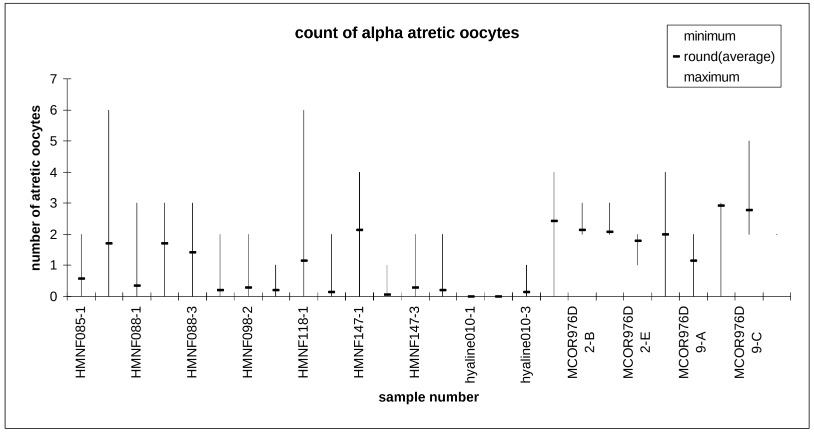
MCOR976D9-C
sample number


count of alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
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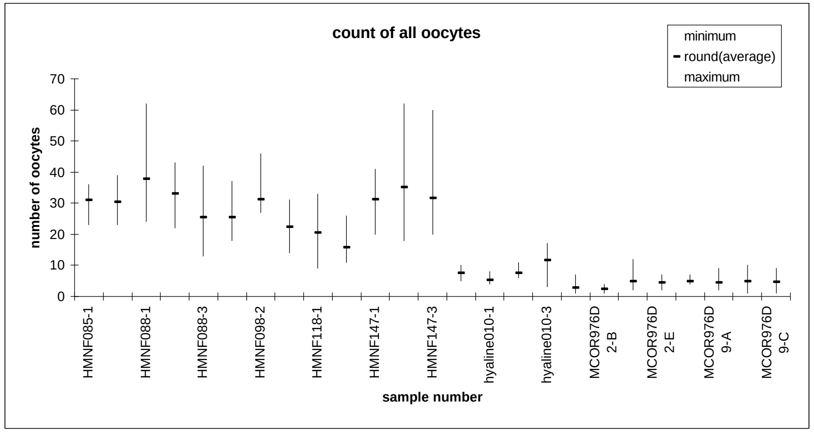
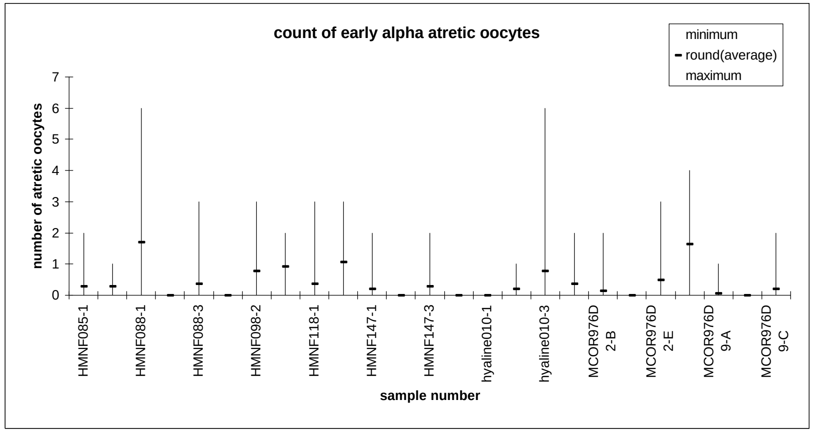
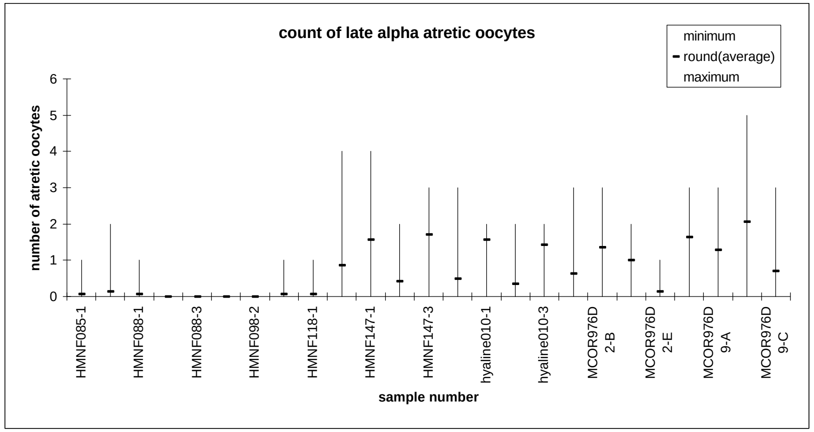
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of all oocytes
minimum
round(average)
maximum
number of oocytes
0
10
20
30
40
50
60
70
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of early alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
7
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number


count of late alpha atretic oocytes
minimum
round(average)
maximum
number of atretic oocytes
0
1
2
3
4
5
6
HMNF085-1
HMNF088-1
HMNF088-3
HMNF098-2
HMNF118-1
HMNF147-1
HMNF147-3
hyaline010-1
hyaline010-3
MCOR976D 2-B
MCOR976D 2-E
MCOR976D 9-A
MCOR976D 9-C
sample number

Annex 5

A Manual for the Estimation of Fecundity and Atresia in Mackerel and Horse Mackerel

A manual for the estimation of fecundity and atresia in Mackerel and Horse mackerel

Editor P.R.Witthames

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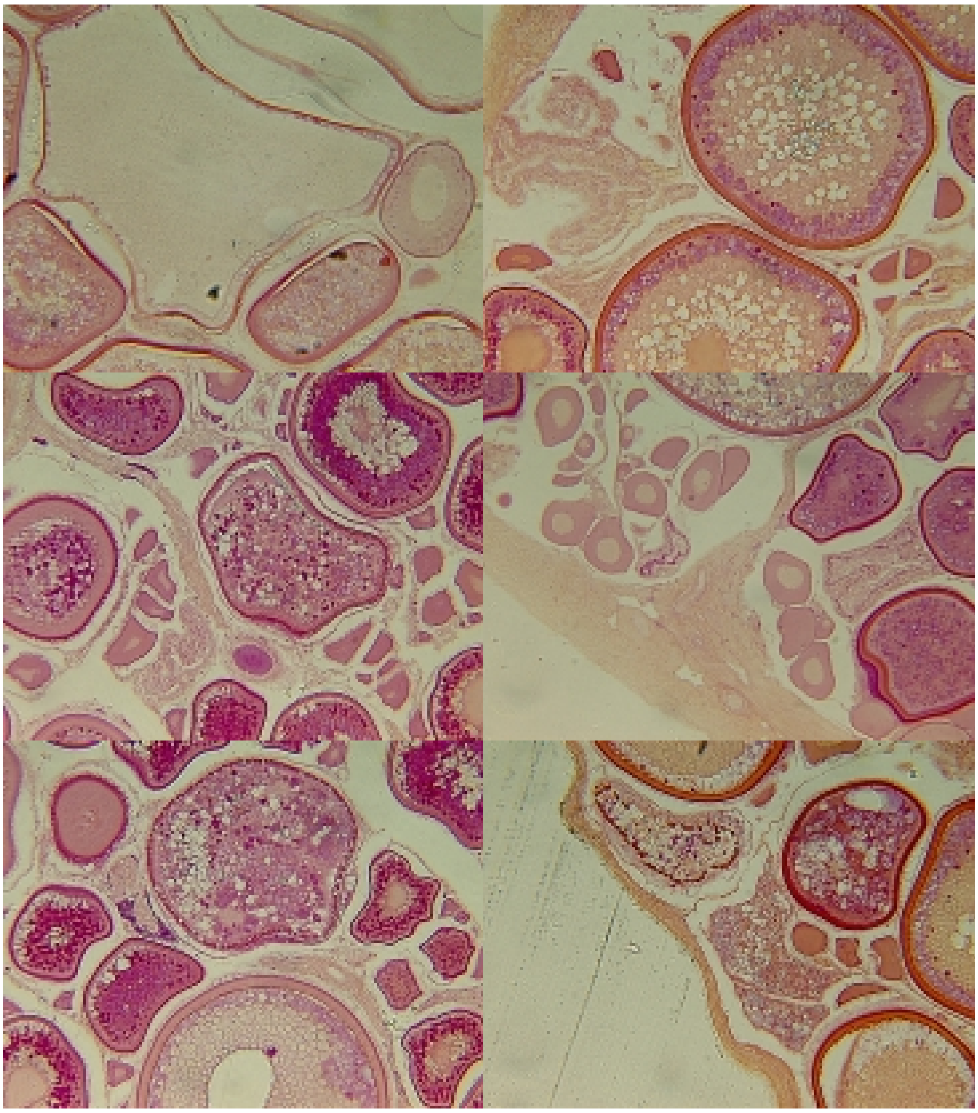

This manual was prepared following an EU funded meeting that took place at CEFAS Lowestoft from the 11 to 13 December 2000 as part of contract QLAM200000031 to discuss and provide training on the methods used to estimate fecundity and atresia in Mackerel and Horse mackerel. All the participants below have contributed to the manual though questions during discussion.

Participants

Institutes / Countries	Particpants		
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IMR / Norway	I. Maria Beck		
MLA / Scotland	I.Gibb		
MI / Ireland	S. Hoey	D. Lynch	
IEO / Spain	J. Ramon Perez		
AZTI / Spain	M Santos	H. Murua	I. Martin
IPIMAR / Portugal	A. Costa		

[1] Participants with training responsibilities

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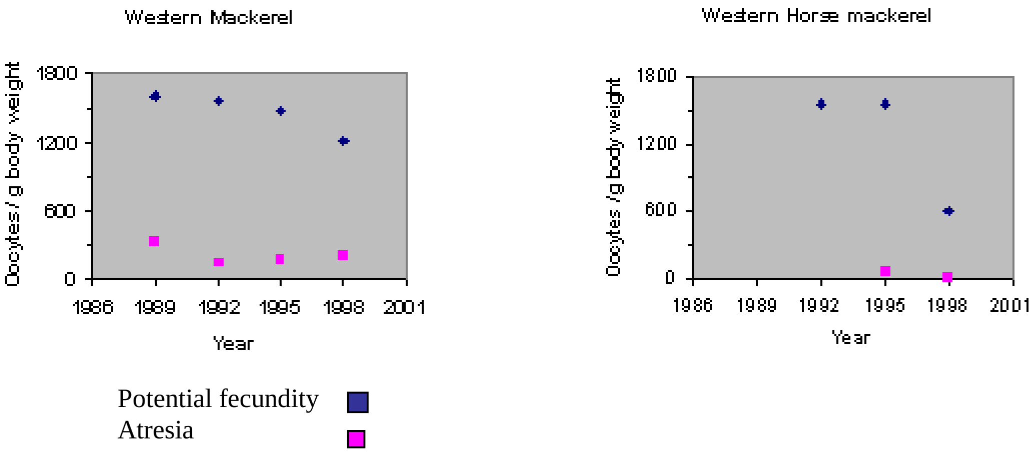
Section 1: Introduction

The aim of this manual is to provide a guide to the current methods used as part of the Mackerel and Horse mackerel Triennial survey to estimate potential fecundity (number of vitellogenic oocytes in the ovary just prior to spawning) and atresia (number of oocytes aborting development). The contents cover all the practical aspects including sources of equipment and consumables.

Following the first triennial survey in 1977 [1] the methods and equipment have changed as our understanding of the reproductive biology has improved. On the first survey it was assumed that pre-spawning fish could be selected by macroscopic criteria to estimate the annual potential fecundity. Subsequently, in 1986 [2], this was shown not to be reliable and the ovaries in the fecundity sample were examined following histological preparation to select only pre-spawning fish for the fecundity estimate. The selection was based on searching for the

presence of hyaline oocytes or post ovulatory follicles to reject spawning fish from the fecundity estimate. Further work [3,4] identified the minimum size of ooctyes that should be included in annual fecundity and the need to discount the loss of atretic oocytes (vitellogenic oocytes that abort development in the ovary). This was necessary because the realised fecundity (the number of eggs spawned) was much lower than the potential fecundity, especially in mackerel, and the difference was not consistent between years [5].
The graphs below show estimates of potential fecundity and atresia determined for the Triennial surveys carried out since 1989 for mackerel and horse mackerel. Of particular concern is the decline in potential annual fecundity, especially horse mackerel, seen in 1998. More extensive temporal and geographic sampling is planned for 2001 to give more confidence in the estimate of potential fecundity and atresia.



Section 7 contains details of the equipment, including suppliers and costs, that would be required to undertake this work. It is possible to contract out the preparation of slides to either BS&S Scotland or CEFAS Lowestoft. However the microscopes are essential and the associated software, such as image analysers, improve the quality of results and can semi-automate a large range of laboratory measurement applications. An alternative to the image analyser is based on manual analysis of photographic slides and although it relies on the same method, it is more labour intensive.

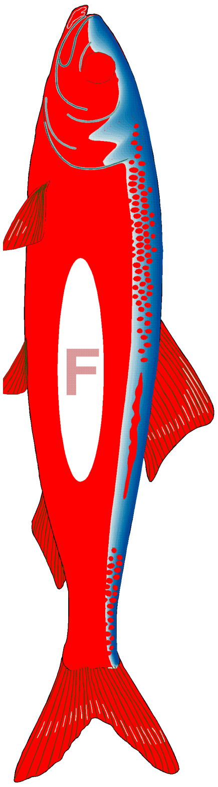
Section 2: Sampling mackerel and horse mackerel for fecundity and atresia

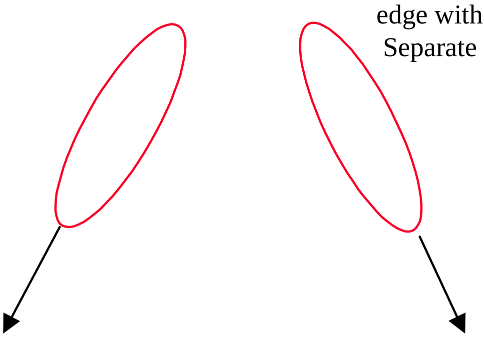
This section concerns the processing of ovary samples from trawl caught mackerel and horse mackerel for estimation of total fecundity and atresia. The sampling procedure including the number of fish required for population estimates is not within the scope of the manual and is described in the planning documents for the triennial survey.

Instructions to collect mackerel fecundity samples:

Select maturity stage 3 females [3], measure and record:
fish total length (mm) and total weight (g). Following the procedure below dissect out both ovaries, weigh (to 0.1 g) each ovary and put one in Gilson and the other in formaldehyde. Remove, wash and store otoliths.

Split the body from the cloaca,
towards the gills with round nose scissors.
Use the fine point to penetrate and the
edge with the round point to cut forward.
Separate the two ovaries from the fish.





Cut open the ovary longitudinally and
place in Gilson fixative.
Ovaries <24 g use a 100 ml jar
Ovaries >24 g use a 200 ml jar

<u>Gravimetric sample</u>
Gilson label
Date
Station
Otolith ref.

Put the whole ovary in 4% formaldehyde
Ovaries <24 g use a 100 ml jar
Ovaries >24 g use a 200 ml jar

<u>Histology sample</u>
Formaldehyde label
Date
Station
Otolith ref.

Ware vinyl gloves for this operation (You are handling poisons)
•Hold the open jars over a tray to collect any spillage
• Drop the ovary slowly into the jar replace insert and screw the lid on <u>tightly</u>.
•Store the bottles so they do not tip over.

Processing samples

Gilson samples require about 3 months for the acidic fixative to release the developing oocytes from the ovary tissue. Fecundity is determined as in section 5. The ovary fixed in formaldehyde is used to check the maturity stage assigned by macroscopic examination. A 5 mm cross section is removed from the formaldehyde fixed ovary and infiltrated in resin (see section 3). Each ovary should be examined for the presence of spawning markers as described in section 4.

Instructions to collect mackerel atresia samples

A stereometric method is used to estimate atresia in mackerel and this requires that both ovaries are dissected whole from the fish without damaging the outer muscular wall or tunica of the ovary. Particular attention should be paid to fixing the ovary within 1 hour of death to avoid post mortem changes that impair staining. Weigh, measure the length of the fish and remove the ovaries and otoliths as above. Measure the ovary weight and fix it whole in a minimum of two volumes of 4 % formaldehyde buffered with 0.1M sodium phosphate. Details of the stereomtric method follow in section 6.

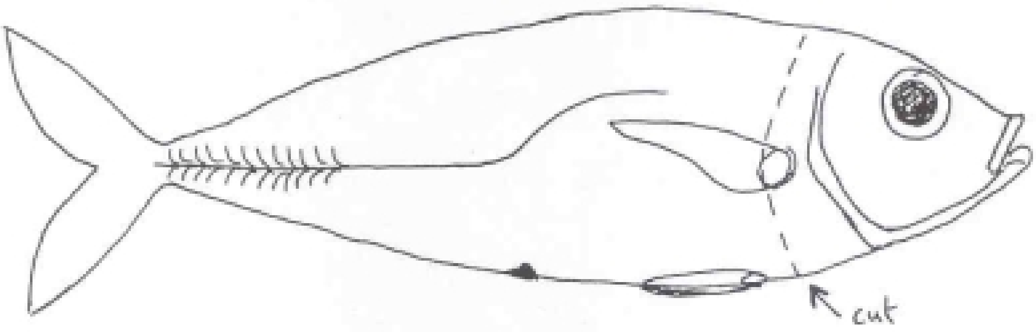
Instructions to collect Horse mackerel fecundity and atresia samples

Select only fish that have been dead less than 1 hour to give good preservation of tissue structure. Record the total weight and length followed by removal of the otoliths for age determination. The ovary dissection in horse mackerel is difficult because a central spine runs down from the backbone to the ventral fin rays. A method to remove the ovary without damage has been described by Trevor Boon, CEFAS and is shown on the following page. An alternative is to split the fish along each flank and then place the labelled fish in a large barrel of 4% neutral buffered formaldehyde for preservation. After fixation the ovary is much easier to remove from the fish without damage. Fixation will be better in fish when the fat deposition is less extensive, as during spawning, rather than earlier in the maturation cycle. Details of the stereometric analysis are described in section 6.

Removal of horse mackerel (*Trachurus trachurus*) ovaries

(A technique that was found to work well during Ciro 2/00)

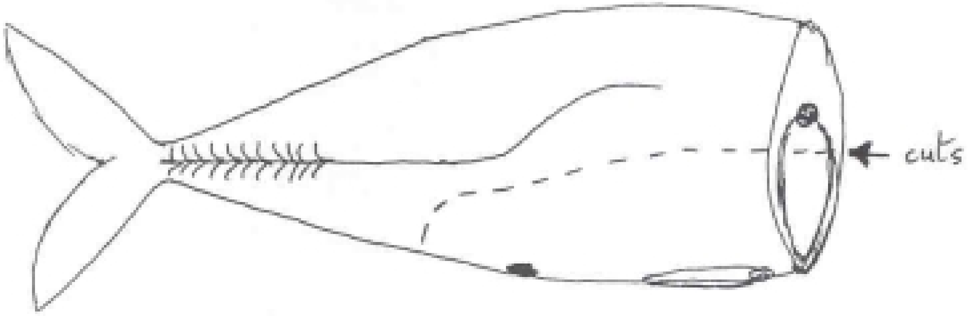
1) Measure and weigh the fish and make a temporary note of the information.
2) With a knife cut round the shoulders of the fish in a line just behind the base of the pectoral fins. Using blunt nosed scissors, join these cuts round the body cavity wall forward of the pelvic fins and sever the vertebral column.



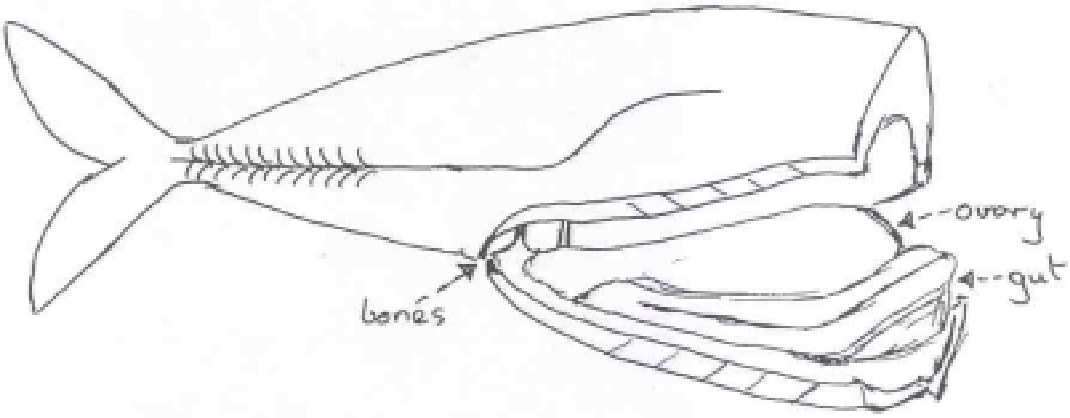
3) Remove and discard the head and as much gut as you can carefully pull out with it. Ascertain the sex and maturity and if appropriate then continue.

NB All work is now carried out with blunt nosed scissors.

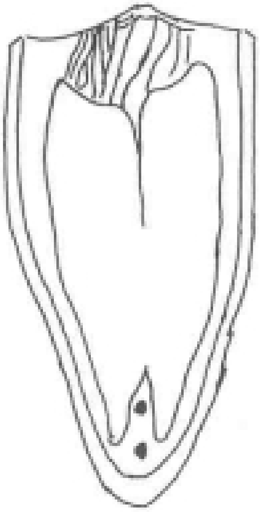
4) Make a cut either side of the fish high along the body cavity wall to a point about 2cm beyond the vent and join these two cuts through the keel of the fish.

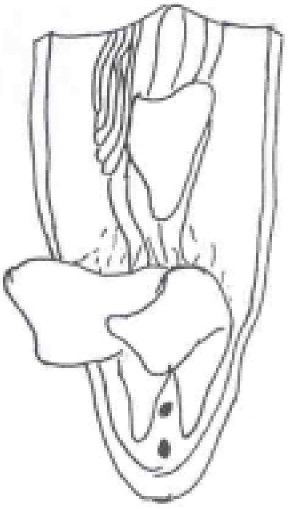


5) Hold the body of the fish allowing the ovary, remaining gut and severed body cavity wall to hang down. Working from one side, the ovary may now be teased away from the body. If fat depositions are heavy some may be removed during this part of the process. Beyond the vent, two heavy vertical bones will be encountered separating the posterior lobes of the ovary. These should be cut. It should now be possible to separate the ovary, remaining gut and body cavity wall from the body. Discard the body.



6) Further fat and viscera may now be removed from the dorsal surfaces of the ovaries but be aware that the ovary wall is very fragile.
7) Hold the forward end of the body wall and the gut with the ovaries towards you. The ovaries may now be teased free allowing their own weight to draw them down and away from the body wall and guts. Continue this process until the ovary duct is reached. Now tease each posterior lobe free in turn. The ovary should now be hanging by the ovary duct, free from the gut and body wall.





8) Now either cut the duct, in which case an area of eggs will be exposed, or cut away the body wall around the vent. This will keep the ovary sealed.

Section 3: Preparing slides for estimating fecundity and atresia in mackerel and horse mackerel including histology equipment.

Method Overview

5 mm thick cross sections are taken from the middle of each ovary to infiltrate with resin. This involves replacing the tissue storage solution (4% formaldehyde or 70% industrial methylated spirit (IMS)) with resin by moving the samples through ascending concentrations of alcohol (**dehydration)** and resin (**infiltration)**.

The tissue samples are put in PTFE moulds and **polymerised** into resin blocks which are then glued to pieces of wood using a 2 part mounting resin. Cooling is important during polymerisation as the reaction is exothermic and gas bubbles can be formed if the process is not controlled. If this occurs, white, soft areas appear in the block which damage section quality or ruin the block in extreme cases. The block is sectioned at 5µm and dried on a hot plate set at 100^{o} C and the sections stained to identify spawning markers (see section 4 histology of mackerel and horse mackerlel ovaries).

Sampling Ovaries (in the fume cupboard)

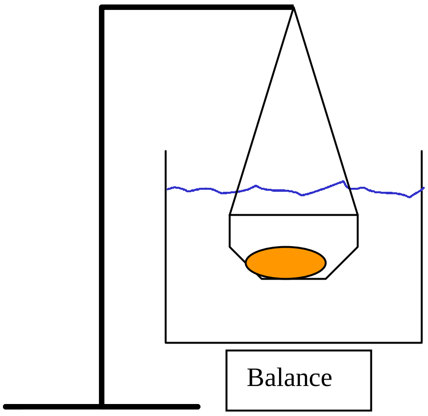
Personnel protective equipment

Latex gloves
Tongs

Control measures

Fume cupboard

1. Open the bottle containing the sample and remove the pair of ovaries with tongs.
2. Immerse the ovaries in 0.9% sodium chloride to wash off surface formaldehyde.
3. Blot, measure and record the combined weight of both ovaries.
4. Remove the fat deposits found on the ovaries of horse mackerel prior to weighing and measuring the displaced weight.
5. Measure the combined ovary displaced weight by suspending the ovaries in a net completely submerged in a container of 0.9% saline resting on a balance.



To measure the ovary volume (v)
suspend the ovary in 0.9% saline
and measure the displaced weight (w).
v = w/s.
s = the specific gravity of the saline (g ml^{-1})

6. Cut 5 mm thick cross section tissue samples from the middle part of each ovary and carefully place the two pieces in a labelled cassette before transferring to 70% IMS for at least 2 hours prior to dehydration.

Dehydration and infiltration with Technovit resin

1. Pass the tissue samples through a series of IMS solutions followed by resin as in the table below. Transfer the cassettes gently between baths using forceps and place the bath on an orbital shaker for a minimum of 1 hour in each solution.

Step	Infiltration solution	Duration	Process temperature
1	500ml 90% IMS (IMS + RO(1) water)	2 hours	Room temperature
2	500ml 90% IMS	1 hour	Room temperature
3	500ml 90% IMS + 1* resin (1:1 ratio) prepared by diluting 250ml 1* resin from step 4.	2 hours or overnight	Store cool (+5°C) after the orbital shaker
4	1* resin (500ml) partly made up from resin left over from step 5 / 6.	2-3 days	Store cool (+5°C) after the orbital shaker
5	'Final' resin 500ml freshly prepared as per kit instructions (catalysed by benzoyl peroxide).	2-3 days	Store cool (+5°C) after the orbital shaker
6	Polymerise in blocks using resin from step 5. The residual resin is used in step 4.		

Dilute IMS with water purified by reverse osmosis, ion exchange of distillation

Polymerisation details for step 6 (on the bench but keep the windows open for good ventilation)

1. Switch on the cooling plate for about 30 minutes before starting to polymerise the blocks with dimethyl sulphoxide and barbituate solution (supplied in 40ml bottles with the Technovit 7100 kit). Store the moulds in the fridge to pre-cool them prior to use and apply release wax to the larger elliptical moulds before placing them on the cold plate. Store the final infiltration mixture on ice whilst dispensing 5ml of catalysed resin into each large mould (2ml small round moulds) followed by 0.5ml (0.2ml small moulds) hardener using the Eppendorf multipipette. Mix the resin mixture thoroughly with a disposable plastic Pasteur pipette.

2. Safety note: Gloves only give splash proof protection against resin and it is therefore not advisable to handle resin soaked cassettes directly with gloved hands. Lift each cassette out of the Final resin with tongs, drain off resin, and use pliers to break off the lid. Work over an aluminium tray to catch the resin draining out of the cassette and place the tissue into the pre-filled moulds. Wash the cassette box with water, dry with Kimwipe and leave the cassette box on top of the mould to identify sample. Mix the resin around the piece of tissue.

3. Transfer the moulds with samples to the fridge and store at 0-5°C overnight
4. Label a wooden block (SECURLINE MARKER II BAYER) along its top edge with the code on the cassette leaving the blocks resting on the cassettes for attaching when polymerisation is complete.

Block Preparation (in the fume cupboard)

5. Transfer the moulds to the fume cupboard to attach the wooden blocks with mounting media (2.5ml methyl methacrylate methanol mixture plus heaped teaspoon of poly methylmethacrylate). Mix the two ingredients in a small poly ethylene bottle (cut down to remove the narrow neck) and pour rapidly to cover the top of the polymerised resin block. Place the wooden block end grain (unlabelled end) down. This quantity of mix will attach 3-4 blocks. The mounting media sets very rapidly and can be used only for about 5 minutes. The blocks should be firmly attached by about 1/2 hour and ready for removal

with the extraction tool. Store blocks in the storage box with controlled humidity (supplied by a mixture of 70% glycerol in the bottom). Water evaporates from the 70% glycerol and requires the storage box to be topped up to target weight with water.

Disposal of waste resin (in the fume cupboard)

After step 3 the 1:1 resin mix should be put in an aluminium tray and left in the fume cupboard over a few days to allow the IMS to evaporate from the resin. Use about 1g hardener to 100g resin to polymerise and wrap the block in a poly bag for disposal. Caution the reaction is exothermic and potentially hazardous if too much hardener is added.

Knife Sharpening

Personnel protective equipment : None

Control measures: Fume cupboard (to clean sharpening plates)

Concept

The sharpening process involves two machines (Shandon MK 4 & Mk 5) each with a specific task.

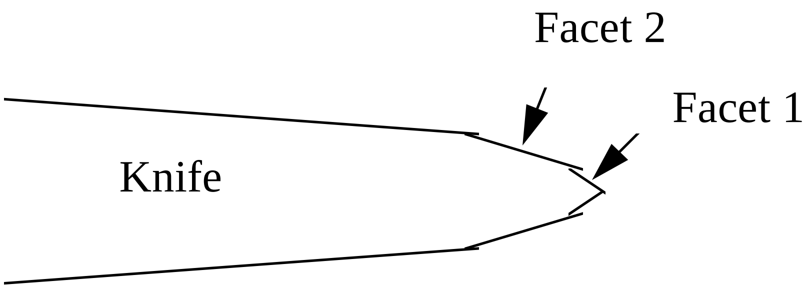
Task 1

Coarse grind facet 2 to reduce facet 1 (Fig. 1) with Shandon Mk 4 using 6µm diamond yellow paste at maximum pressure with no turnover.

Task 2

Polish facet 1 using 1µm diamond blue paste on Shandon Mk 5 to remove nicks and prepare a smooth knife edge. A 5 second turnover prevents wire edge development. The criteria for assessing the edge quality is to view under an inverted microscope at 250 magnification.

Fig. 1



Method

Edge check

1. Clean the knife with tissue and observe under the inverted microscope at 250 magnification (use less than 6 volts on the rheostat). Mark the side of the knife with a felt tip pen where nicks appear in the knife edge.

Coarse grind facet 2

1. Replace the knife in the box and mount the knife holder on the pre-tapped holes. Apply 4 spots of yellow paste and about 1 ml of oil to prepare the coarse plate in sharpener 4. Smear the oil and paste over the plate with the modified Pasteur pipette.
2. Mount the knife facing towards you and set the turnover off at maximum pressure with a 32 ^{o} sharpening angle. Run the machine for 15 minutes. Turn the knife over and repeat on the other edge. Clean the plate with dry tissue and lubricate it for one more sharpening cycle with the next knife.

Fine polish facet 1

1. Prepare the plate in sharpener 5 as 4 but use blue paste. Clean the knife with new tissue, to remove old 6 µm paste. Mount the knife in sharpener 5 and load with the edge facing the front and the side marked "mount down" onto the plate surface. Set the turnover to 5 sec at pressure 3 and 39 ^{o} angle and run the machine to sharpen for 15 minutes. Observe and adjust the damper so that the knife is placed softly on the plate during the turnover sequence.
2. Park the knife facing rear but above the plate to allow safe access whilst the plate is cleaned and lubricated.
3. Repeat the first polishing step but at reduced pressure (1)
4. Clean the knife with new tissue and check to see if the damaged areas have been polished out of the knife edge using the microscope as above.

Plate maintenance

1. Clean plates at the end of each sharpening cycle with stabalised trichloroethylene solvent and Kimwipe in the fume cupboard (see COSHH). Ensure the plate is dry before bringing into the laboratory. Leave the contaminated Kimwipe in the fume cupboard until the solvent has dried.

Problems

- If the knife still shows nicks after polishing on the fine plate Facet 1 is too large and needs reducing with more time on the coarse plate. It maybe necessary to regrind Facet 2 to less than 32^{o} either with machine 4 or a professional regrind. Another short term fix is to increase the angle of facet 2 to 34^{o}.
- The size of the facets can be viewed by marking the edge at several points with a lab marker and grinding on a clean lubricated plate for a few seconds. The polished area shows how wide the facet is.

Sectioning

Personnel protective equipment: None

Control measures: Fume cupboard (use the emergency exhaust)

1. To remove fumes given off when opening the block store.
2. To control the spread of resin particles produced when sanding the block to expose ovary tissue in the resin.

Method

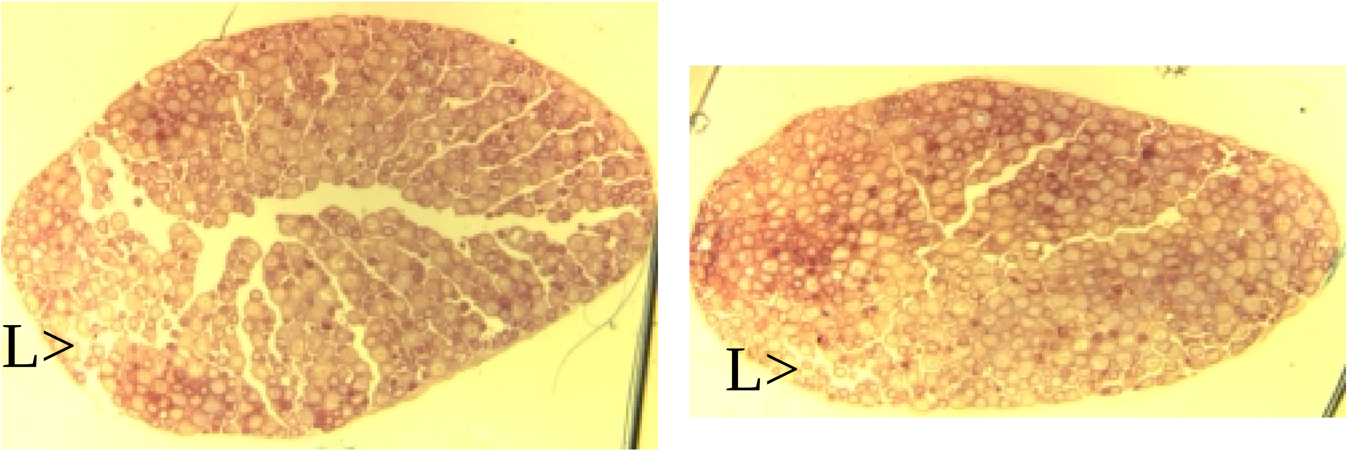
Refer to the cryostat manual to identify the cryostat controls and for further information such as removing the microtome for cleaning.

1. Store the blocks in a high humidity chamber created by holding them above a 70 % glycerol solution. Only open the chamber in the fume cupboard. Maintain the empty chamber including glycerol at constant weight by adding water occasionally
2. Position the sanding jig so its long axis is parallel with the fume cupboard sash and the top of the jig-vice jaws are above the bottom of the sash. In this position it is possible to sit in front of the fume cupboard whilst holding the sander in the fume cupboard with its' weight partially supported by the jig. During the sanding operation it is also essential to view progress through the sash.
3. Place the block in the jig with the resin face approximately 2 mm above the face of the vice.

4. Hold the belt sander on the top of the jig-jaws to sand and thus expose the full cross section of the ovary slices.
5. Park the microtome with the arm up and ¾ retracted.
6. Move the specimen holder back, if required, to locate the block clear of the knife.
7. Disengage the clutch on the motor drive and locate the block in the jaws of the microtome. The trailing edge of the block has an overhang of resin following sanding and this should be placed facing down in the microtome.
8. Move the microtome stage holder forward and the arm holding the specimen down until the middle of the block is level with the knife edge.
9. When the block touches the knife edge loosen the microtome jaw and push the block forward so its whole face rests on the knife edge.
10. Loosely tighten the jaw, retract the microtome half a turn and fully secure the block in the jaw.
11. Manually advance the arm on 10 µm feed and moisten the block surface to limit wear on the knife edge.
12. Cut in to fully expose the cross sections of both ovary cross sections.
13. Adjust the microtome feed to 5 µm and take a section.
14. Float the sections on a warm water bath, pick them up on a slide and dry at 100^{o}C on the hot plate.
15. Examine the section for damage and integrity as in the plate below. Take a new section if the block is not cut in to expose the whole ovary cross section (area of low packing density) or the section is either broken or badly scored with knife marks. Move the knife to the left to use an undamaged part if the scores are too large. The sections below from a mackerel block are acceptable. Note the lamellae holding the developing oocytes tend to have a gap in the middle running horizontal. Signs to watch out for are low packed oocytes as in the bottom left hand corner of the ovary cross sections below.
16. Cryostat maintenance.

    Periodically defrost the cryostat and use a vacuum cleaner to remove resin shavings / dust from the cryostat and fume cupboard.

Cross sections of mackerel ovaries showing finger like lamellae protruding inwards from the outer ovary Tunica. Note the area of low density packing (L>)



Staining sections using SCHIFFS - MALLORY TRICROME & H&E SCHEDULE
Equipment
Racks to hold slides during staining
Staining wells
Low temperature oven 37-41°C for drying slides
Personnel protective equipment: latex gloves and eye protection

Control measures: Fume cupboard

Concept

The Schiffs or PAS produces a dark magenta (red / blue) stain reacting with the glycogen in the cortical alveoli in sections of mackerel ovaries and provides a marker to identify the smallest stage oocytes recruiting to vitellogenesis. A further advantage of this stain is that the basement membrane (found between the granulosa and thecal cells of the post ovulatory follicle) is also stained as a thin red line. As the post ovulatory follicle ages, this PAS staining persists becoming more intense with time and has been shown to last for more than 6 weeks in post spawning cod. The Mallory's trichrome counter stains and shows nuclei to age post ovulatory follicles and yolk granules. Horse Mackerel cortical alveoli do not stain with PAS and to date H&E (see below) has been used with this species.

Chemicals

Periodic acid
Pararosaniline chloride
Potassium metabisulphite
Concentrated (35%) Hydrochloric acid
Activated charcoal
Filter paper
Acid Fuchsin
Phosphomolybdic acid
Aniline blue
Industrial methylated spirit
Citroclear (Xylene substitute)
DPX

SCHEDULE

Fill each staining well with 200 ml solution for 25 x 75 mm slides

	Solution	Time
1	5% periodic acid	4.5 mins
2	Wash 5 times thoroughly	
3	Schiffs reagent	60 mins
4	Wash running tap water	10 mins
5	1% Acid Fuchsin	1 min
6	Wash distilled water	30 secs
7	Wash distilled water	30 secs
8	1% Phospho molybdic acid	1 min
9	Wash distilled water	10 secs
10	Mallory Trichrome	15 secs
11	Distilled water	10 secs
12	90% IMS	5 secs
13	100% IMS	5 secs
14	100% IMS	5 secs
15	1:1 IMS - Citroclear	5 secs
16	Citroclear	5 secs
17	Citroclear	5 secs
18	Mount DPX, dry at 40^{o} C overnight	

Preparation of special solutions

Schiffs

Quantity		Item / comment
200ml	800ml	RO water heat to just off boiling stir and add
1g	4g	Pararosaniline
2g	8g	Potassium metabisulphite after cooling to
2ml	8ml	Conc 35% HCl add after cooling to room temperature
2g	8g	Activated charcoal overnight in a stoppered flask

Filter through Whatman N^{o} 1. Stable in the fridge for weeks, discard when pink. Maybe used for several times

Mallory Trichrome

200 ml	500ml	RO water
1.0 g	2.5 g	Aniline blue
4.0 g	10.0 g	Orange G
4.0 g	10.0 g	Oxalic acid

Staining resin sections using H & E

Concept

This schedule uses heamotoxylin to stain nuclei dark blue and provides an important marker to age post ovulatory follicles. Cytoplasm of perinuclei stage primary oocytes also shows up well with heamotoxylin but larger previtellogenic oocytes are less well stained. Clear non stained vacuoles in the cytoplasm indicate the presence of cortical alveoli, a key marker to identify the smallest oocytes that comprise the annual fecundity in horse mackerel. Eosin counter stains the section to show cytoplasmic components such as yolk granules.

Chemicals

Harris Heamotoxylin (ready made formulation eg. Merck cat code 35194ST)
Hydrochloric acid
Lithium carbonate
Water soluble eosin
Industrial methylated spirit
Citroclear (Xylene substitute)
DPX

1. 15 minutes Merck Harris Heamotoxylin
2. Rinse in tap water
3. Differentiate with acid alcohol 3-10 dips upto 15 secs Nuclei should be distinct with light colouless background.
4. 10 Wash tap water (use to blue heamotoxylin maybe done also by 5 quick dips in 1% lithium carbonate if the water from the tap is not hard >300 ppm Ca.
5. 15 secs in 1% water soluble Eosin.

6. 4 mins wash in tap water
7. 10 secs 70% IMS
8. 10 secs 100% IMS
9. 10 secs 100% IMS
10.10 secs 1:1 IMS citroclear
11. 10 secs citro clear
12. 10 secs citro clear
13. Mount in DPX and dry in the oven at 35 C^o

Solutions
Acid alcohol 1% conc HCl in 70% IMS
1% water soluble Eosin in tap water

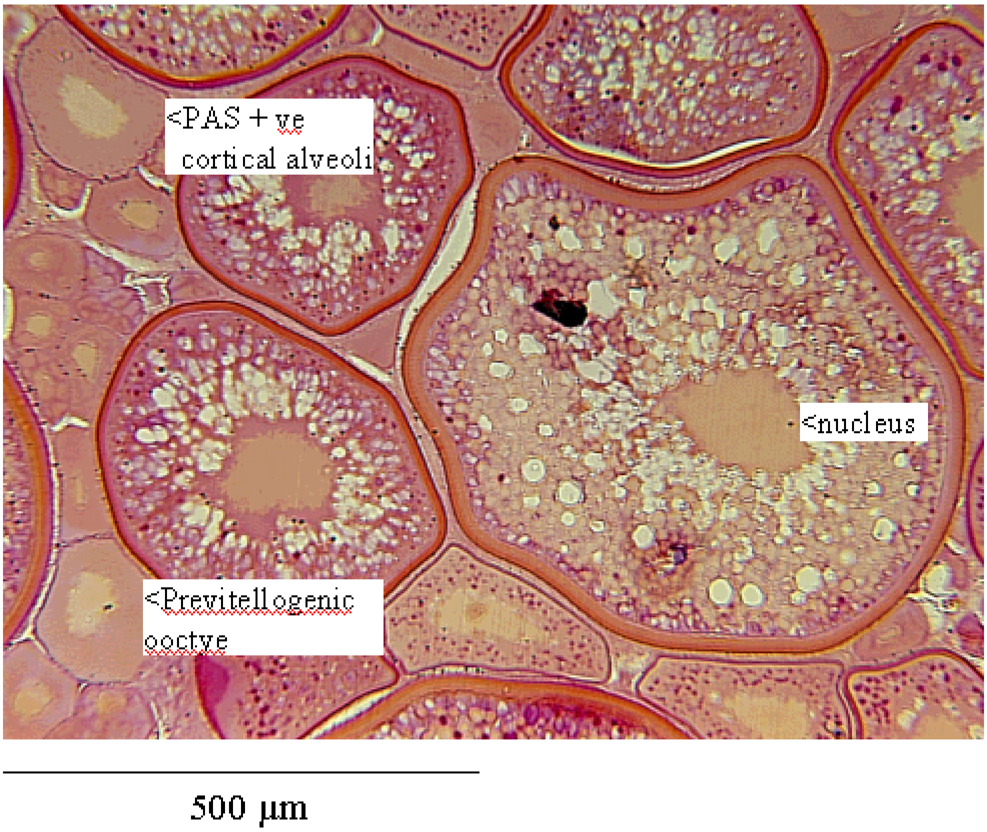
Section 4: Histology of Mackerel and Horse mackerel ovaries

Screening Mackerel and Horse mackerel ovaries to reject spawning fish from the assessment of fecundity

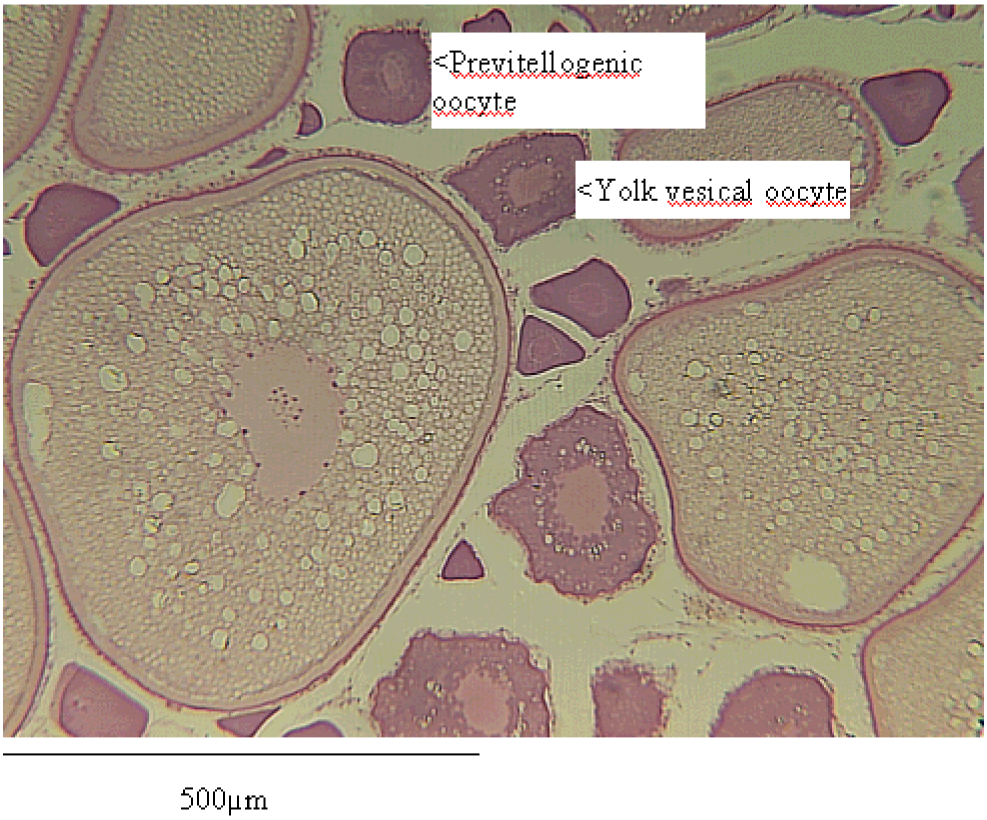
Equipment: Compound microscope with 4-40 objectives

If no hydrated eggs are found in or around the formaldehyde fixed ovary a histological section should be examined to ensure that the fish has not commenced the annual batch production cycle. Any fish with the following spawning markers; migratory nuclei, hydrated oocytes and / or post ovulatory follicles (POFS) should not be included in the assessment of annual potential fecundity. A previous report concerning the persistence of POF in captive cod [6] suggests that these structures can be identified, following staining with PAS Mallory, up to 6 weeks after spawning. The persistence of POF is likely to be shorter in mackerel and horse mackerel because they are spawning in warmer water (>12 ^{o}C) compared to 9 ^{o}C in the cod experiment but they should still be discernible for well over a week under conditions of higher temperature. As this period is longer than the average inter batch interval of mackerel (2 days) and horse mackerel (8 days) it gives a reliable screening method providing the batch production is a continuous process. An entire ovary cross section containing several 100 vitellogenic oocytes should be examined. This increases the probability of detecting a spawning marker as the batch fecundity of mackerel is only in the order of 2-3 % of potential fecundity [7]. Ovaries that contain mainly atretic oocytes, especially in the largest classes, are considered to be resorbing virgins and are not included in the estimate of fecundity. The following annotated images identify all the above markers with additional details to illustrate how the morphology changes in ageing post ovulatory and atretic follicles.

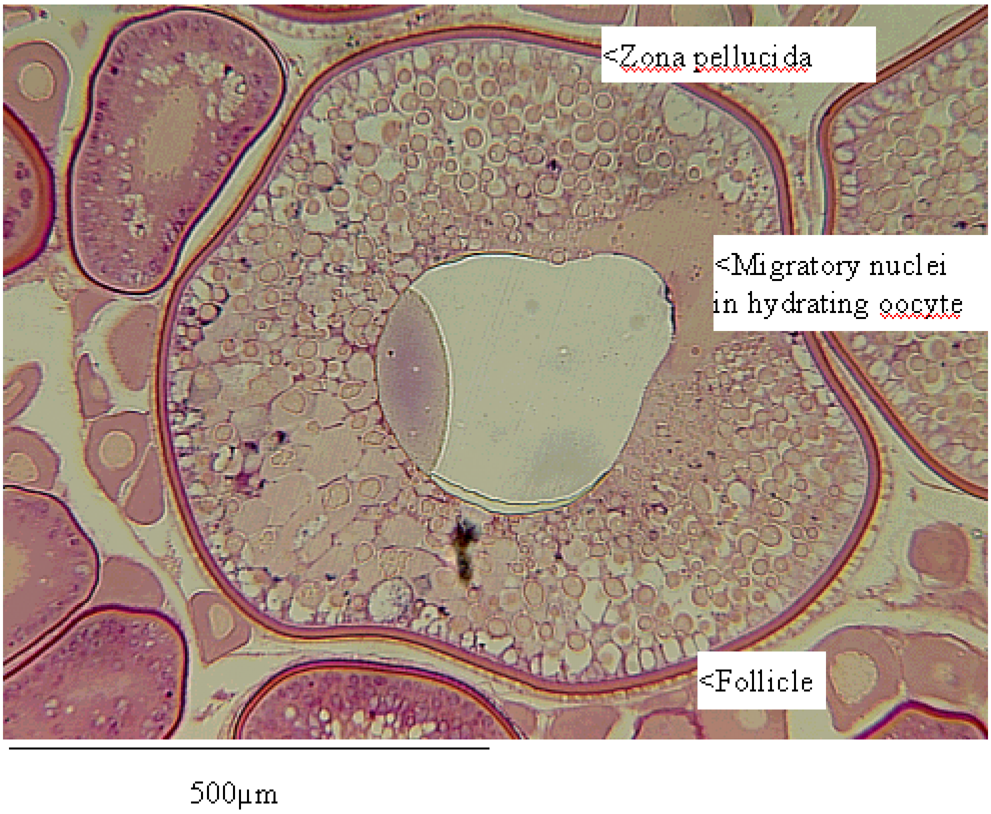
Previtellogenic and Yolk vesical stage oocytes in a mackerel ovary resin section stained with PAS Mallory. Yolk vesical stage ooctyes are identified by PAS +ve flecks indicating the presence of cortical alveoli and the start of endogenous vitellogenesis. Note that the position of nuclei are almost central in developing oocytes, as indicated in the largest yolk granule stage oocyte in the picture. Previtellogenic oocytes are much more numerous in the ovary but previous research shows they do not start vitellogensis during the spawning season.



Heamotoxylin Eosin stained Horse Mackerel ovary resin section annotated to show previtellogenic and yolk vesical stage oocytes. Cortical alveoli in the yolk vesical stage appear as clear vacuoles.

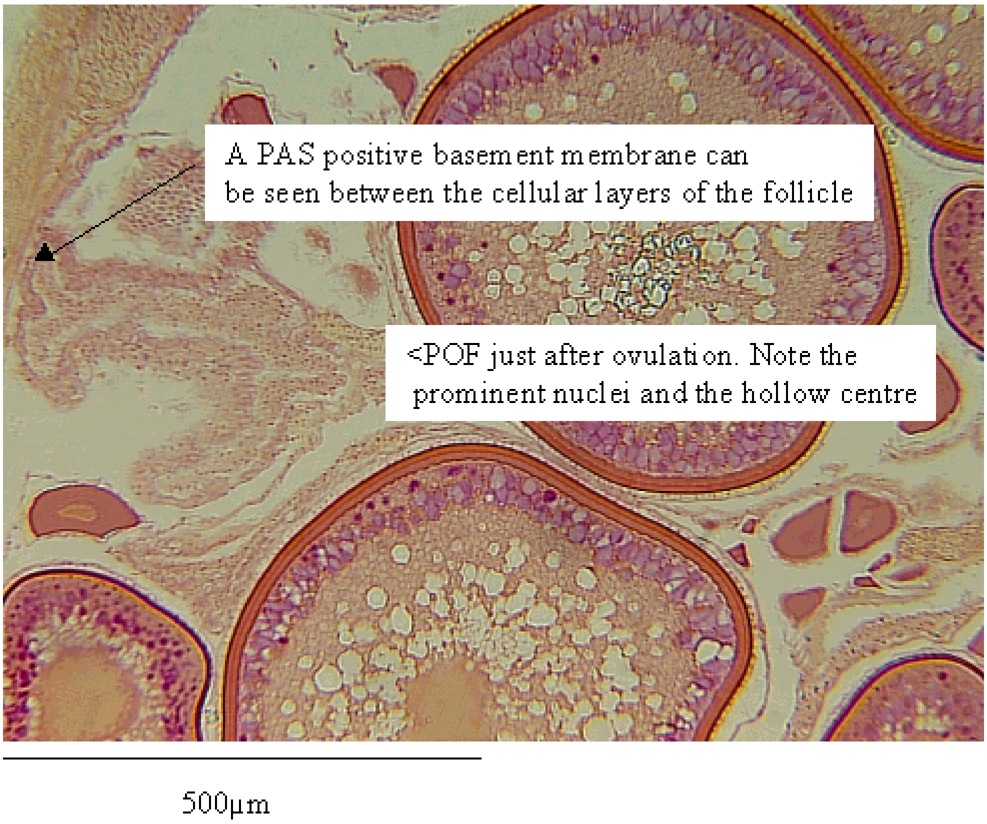


Migratory nuclei stage oocytes show the nucleus displaced to the cell periphery with a large central lipid droplet. This section was prepared from a mackerel ovary stained by PAS Mallory.

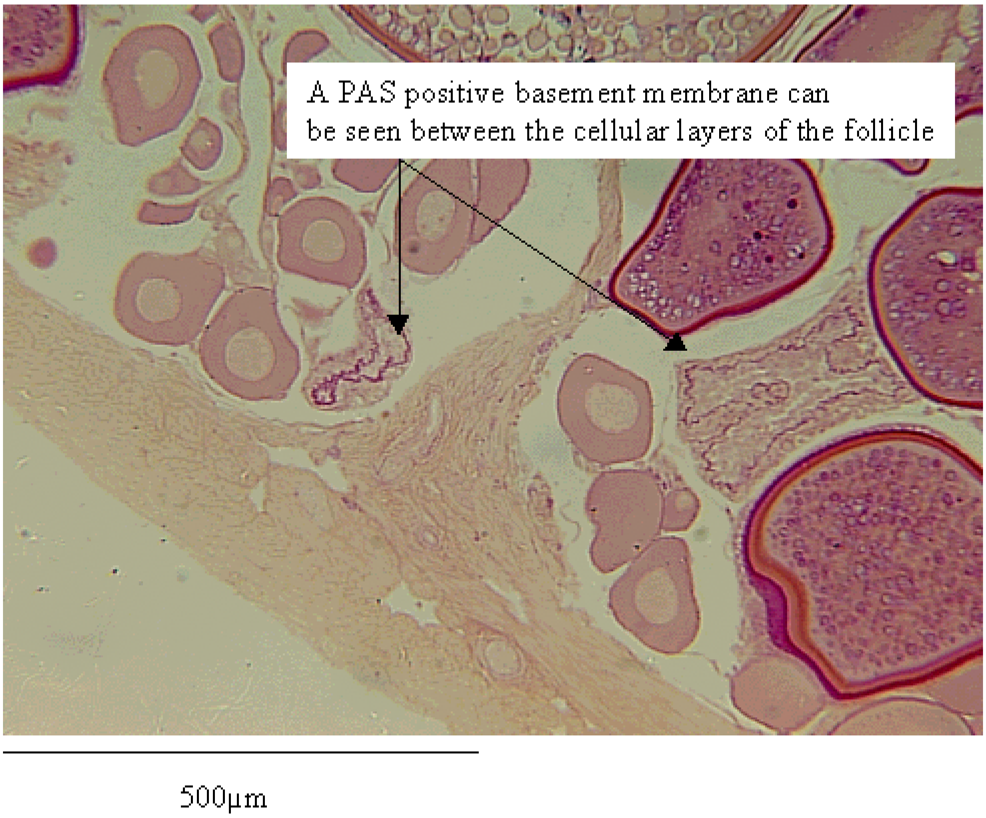


Hydrated oocyte just prior to ovulation (follicle rupture) PAS Mallory stained mackerel section

POF within 24 hours of ovulation [5 8] This section was prepared from a mackerel ovary stained by PAS Mallory.



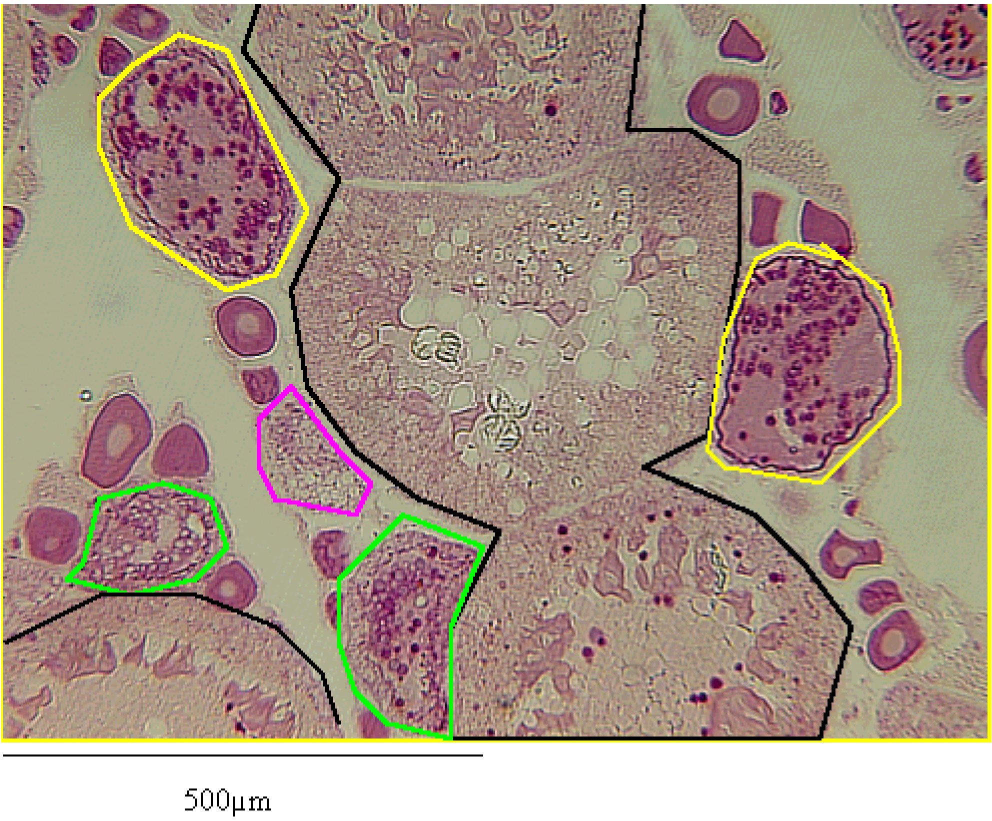
POF > 7 days old [8,9]. This section was prepared from a mackerel ovary stained by PAS Mallory. A previous experiment reported POF were still present in mackerel ovaries 13 days post spawning [10].



Identification of atresia

Atretic oocytes have been identified in most teleost species [5,7] and atresia has been recognised as a significant regulatory process of realised fecundity in western mackerel since 1989[3,11]. Since that date Triennial assessments have quantified the early alpha stage for determining atresia in mackerel and the whole alpha stage for horse mackerel. Classification of atretic oocytes is based mainly on the breakdown of the zona pellucida, but other changes also occur. They include much more pronounced PAS staining in yolk vesical stage oocytes and yolk granule break down in oocytes closer to final maturation. The follicular layer becomes much more developed and the zona pellucida appears to move in towards the centre of the oocyte. Subdivision of the alpha stage into early alpha and late alpha atresia is based on the size of breaks and position of the zona pellucida. If any nick or breakdown in the zona pellucida is observed and if the breaks are smaller than twice the width of the zona pellucida thickness, the oocyte is classed as early alpha atretic. If the zona pellucida has breaks more than twice its width and the fragments are displaced inwards from the outer follicle boundary the ooctye is classed as late alpha. After the zona pellucida has disappeared the breakdown progresses from the alpha into the beta stage and the oocyte is now much reduced in size, highly vacuolated and with no yolk contents visible.

PAS Mallory stained sections of mackerel to illustrate atresia stages.
Early alpha yolk vesical stage oocytes 🟨
Late alpha stage yolk vesical oocytes 🟩
late alpha stage yolk granule oocytes ⬛
Beta atresia stage 🟪



Start of early alpha atresia in a yolk granule stage oocyte. 🟨

End of early alpha in a yolk granule oocyte 🟨

Beta atresia stage 🟪
Late alpha stage atresia ⬛

Section 5: **Gravimetric estimation of Mackerel fecundity**.

Personnel protective equipment: Latex gloves
Control measures: Fume cupboard

Task

To estimate the number of oocytes larger than 130 µm in Gilson fixed ovary samples. The size thresh hold to include or exclude oocytes was determined previously [3] and is based on the largest previtellogenic oocyte found in spent females and is lower than the estimate of minimum size of vitellogenic oocyte shown in section 4.

Equipment

- Three speed domestic mixer mounted on a stand.
- 1000g balance with 0.1g resolution
- 100g balance with 0.001g resolution
- 0.5ml nominal volume stempel pipette
- sieve to retain >100µm particles
- sieve to retain >900µm particles
- large crystal dish
- plastic container 90mm diameter x 130 mm deep (sampling bucket)
- Binocular microscope with either eyepiece graticule or photo tube attached to a PC video image analysis system.
- Counting trays (field width optimised to fill binocular field)

Solutions

Sucrose solution: 1215g sugar dissolved in 810g tap water prepared previously to allow displaced air bubbles to disperse. Mix the sugar-water suspension immediately with the mixer to ensure it is completely dissolved.

Gilson Fixative (Recipe to produce 5 litres)

Safety: Mercuric chloride is an acute poison

In the Fume cupboard:
Add to a 10 litre poly bottle (should be new and not brittle through UV degradation as some pressure is developed): 100 g mercuric chloride (GPR)
300 ml industrial methylated spirit
2000 ml hot tap water ~ 60°C

Screw the bottle top down firmly and dissolve the mercuric chloride with a magnetic stirrer.
Avoid splashing the bottle top, depressurise bottle by slackening the top.
Check the mercuric chloride has dissolved by viewing through the base of the bottle.

Add 180 ml 50% glacial acetic acid
171 ml 35% nitric acid
make up to 5 litres with cold tap water

Fecundity Method

Safety: Consult the COSHH assessment for chemicals.

1. Shake the sample bottles regularly (wear gloves) from the time of collection at sea over a period of three months until the analysis. The shaking is important to free the developing oocytes from the ovary lamellae and reduce the number clumped oocytes that are difficult to count and measure.
2. Remove the bottle cap and wash the sample with tap water through the 100µm sieve collecting the filtrate in a crystal dish and particles >100µm in the sieve. Wear gloves and eye protection during handling and keep the open sample jar in a fume cupboard.
3. Dispose of the waste Gilson fixative by an approved method of disposal.
4. Wash the sample through the 900µm sieve collecting the eggs in the crystal dish using the jet from a wash bottle to force clumps of eggs through the mesh. Transfer the material retained in the 900µm sieve to the plastic tub for vigorous mixing to separate clumps and remove eggs from the remaining ovary skin. Check and cut open any remaining clumps of ovary tissue.
5. Repeat 4; add the eggs passing the 900µm sieve to the remainder of the sample, retain skin and large particles to add back to the sample when analysis is finished. Suspend the sample in approximately 100 ml water.
6. Weigh out 485g of sucrose solution into the tared sampling bucket, add the sample and make up to 700g.
7. Stir the sample at speed 1 to mix and work the stemple pipette mechanism immersed in the stirred solution to lubricate and prepare for sampling.
8. Blot/wipe the stemple pipette to constant weight and tare on the 0.001g resolution balance.
9. Increase the mixer speed (2) and take a sample by pushing the stemple pipette barrel down the piston. Keep the mixer speed to minimum apart from when the sample is taken.
10. Blot/wipe the stemple pipette to constant weight (SS1) and place on the 0.001g resolution balance to estimate the sample weight and to check the pipette is full.
11. Wash the sample into the counting tray. Take three separate samples one each from the top, middle and bottom of the stirred sampling bucket. Mackerel < 35cm, may require a combined double or triple sample from each level.
12. Re-suspend the sample in water using the 100µm sieve to discard the sucrose solution.
13. Count all eggs >130µm mackerel, using the PC video image analysis system in at least two samples and do extra counts if the results differ by more than 5
14. Return all of the subsamples to the main sample and store in 4% formaldehyde.
15. Fecundity=oocyte count >130µm * 700 / mean SS1 *raising factor. Raising factor is whole ovary weight/gilson ovary weight. If this data is not available use 2 assuming that a complete ovary was placed in the Gilson fixative.

Section 6: Stereometric assessment of fecundity in horse mackerel and atresia in mackerel and horse mackerel.

Equipment
Compound photo microscope or microscope with photo tube attached to a PC video image analysis system.

A stereological method [12] has been adopted by ICES triennial survey participants to estimate fecundity and atresia. The following equation describes the relationship between fecundity (F) and its dependent variables:

$$F = Ov \bullet \frac{K}{B} \bullet \frac{Na^{3/2}}{Vi^{1/2}}$$

Where
B = ratio between the longest and shortest axis of the oocytes transected and is assumed to be a constant value of 0.72 [12]

$$K = \left[\frac{M_3}{M_1} \right]^{3/2}$$

M_1 is the mean diameter

$$M_1 = \left[(D_1 + D_2 + D_n) / n \right]$$

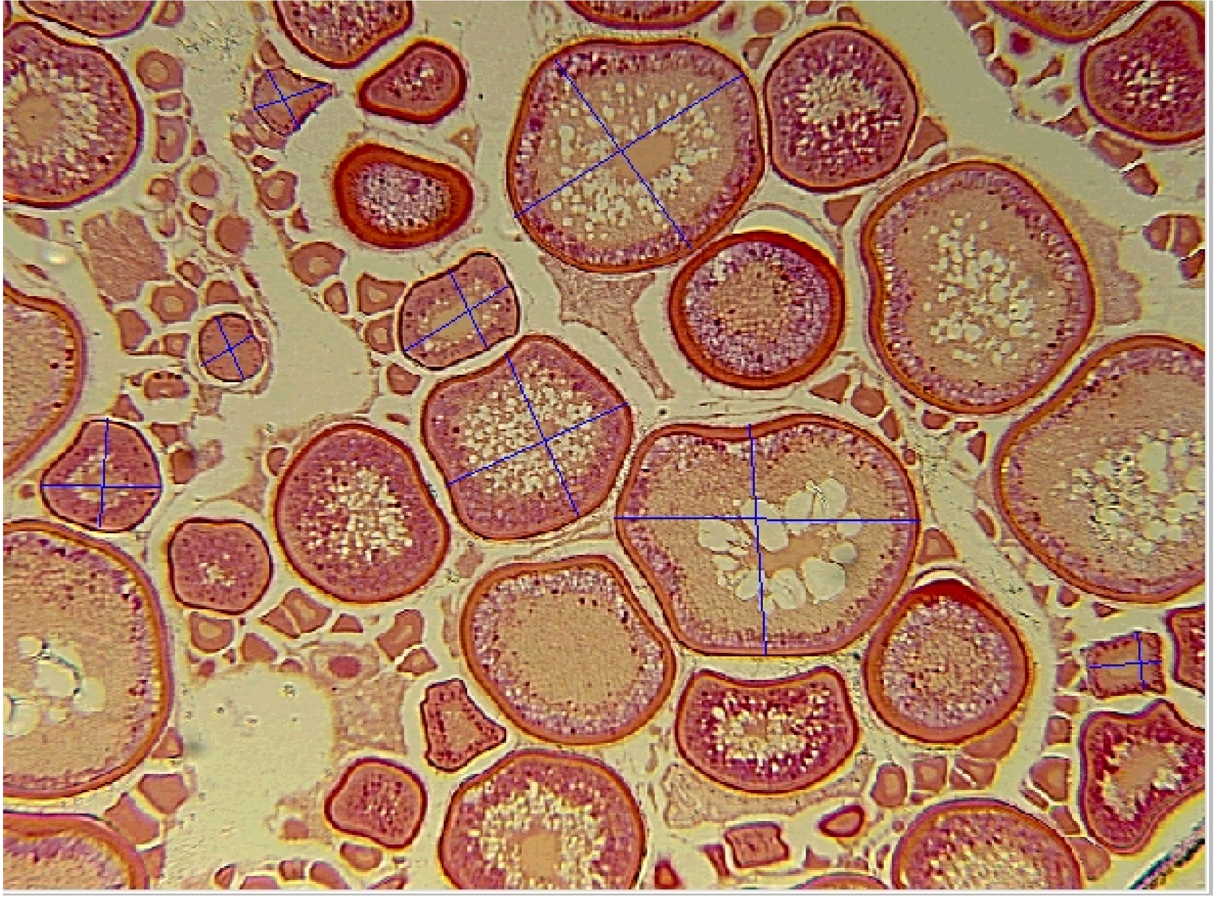
M_3 is the cube root of the third moment about the mean of the oocyte distribution.

$$M_3 = \left[\frac{(D_1)^3 + (D_2)^3 + (D_n)^3}{n} \right]^{1/3}$$

O_v = ovary volume
N_a = number of vitellogenic oocyte transections per unit area
V_i = partial area of vitellogenic oocytes in the histological section
Early alpha and late alpha atresia are estimated in the same process by classifying the partial area and numbers per unit area for the three type of oocyte (vitellogenic, Early alpha and late alpha atresia).

The parameter K is determined by measuring the oocyte diameter in a sample of vitellogenic oocytes transected through the nucleus. The following illustration shows an example in mackerel where the mean of the maximum and minimum diameter of each oocyte is defined by 4 points . From experience, measuring 50 oocytes is sufficient to give a stable value of K for the ovary.

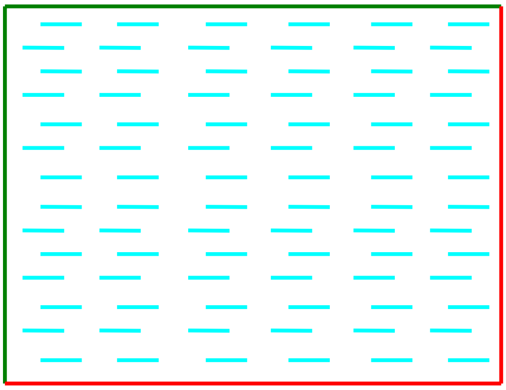
Measurement of vitellogenic oocyte diameter (the mean of the largest and smallest diameters shown in blue).



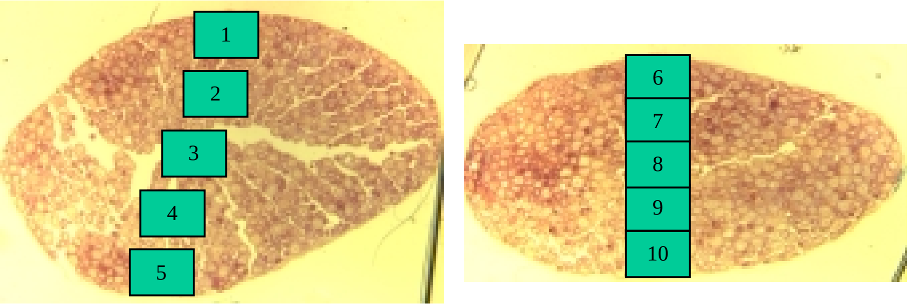
This method to estimate oocyte size frequency assumes that nucleus diameter is constant over the whole size range of vitellogenic oocytes measured [12]. However, all species examined to date, do not conform to this criteria and data to correct the observed oocyte diameter in section to the real diameter are available for bass, cod, mackerel and sole. Where the data is not available, the relationship between oocyte and nucleus diameter should be determined [11] in the resin section.

Measurement of N_a

A Wieble grid made up of 168 test points is superimposed on the section in order to estimate the partial area of vitellogenic, early alpha and late alpha atretic oocytes as a proportion of the total surface area in the sample frame. The test points are located at the ends of the 84 pale blue lines in the grid as below.

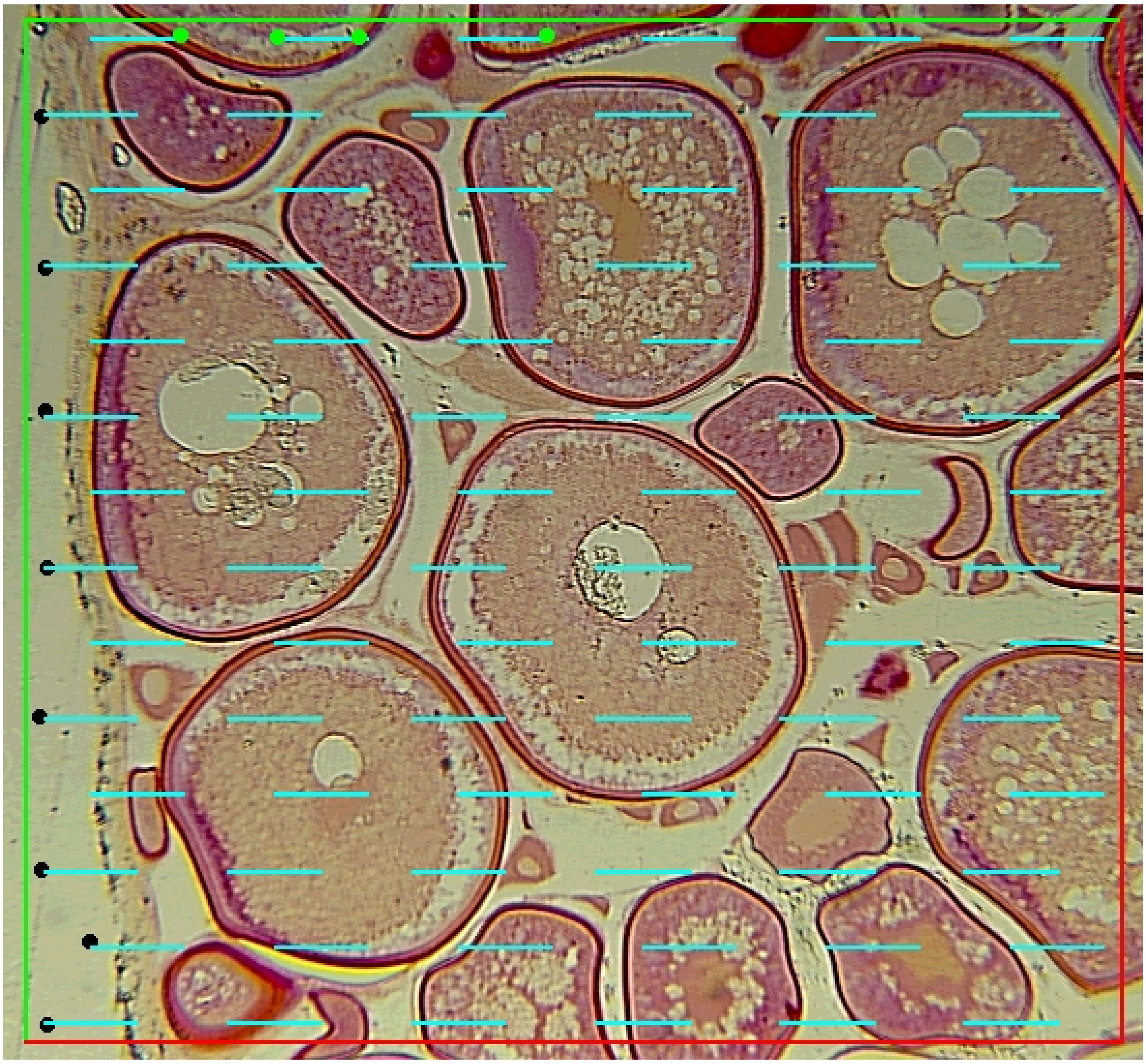


A number of grids (1-10) are distributed across both ovary sections at regular intervals in order to estimate the mean Na for the fish.

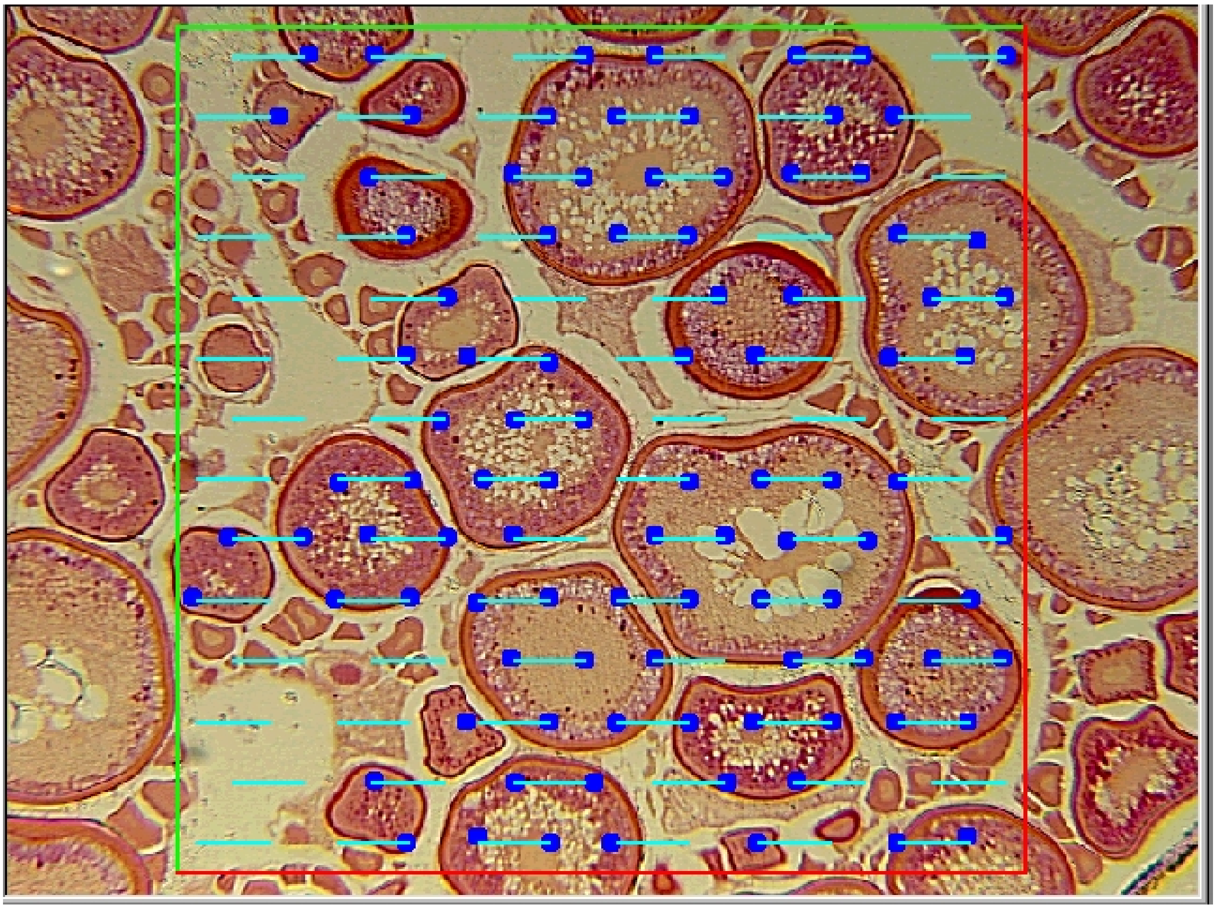


The outer grids should include area occupied by the ovary tunica and points lying outside the ovary (black in the example below) should be discounted. The green spots indicate test points lying over vitellogenic oocytes. If the oocyte is just cut through the outer margin of the Zona pellucida as the example on the upper margin below it should also be scored if it lies under a bar end.

Wieble grid superimposed on a mackerel ovary section showing excluded area (black points) and sample points overlying vitellogenic oocytes (partially complete)

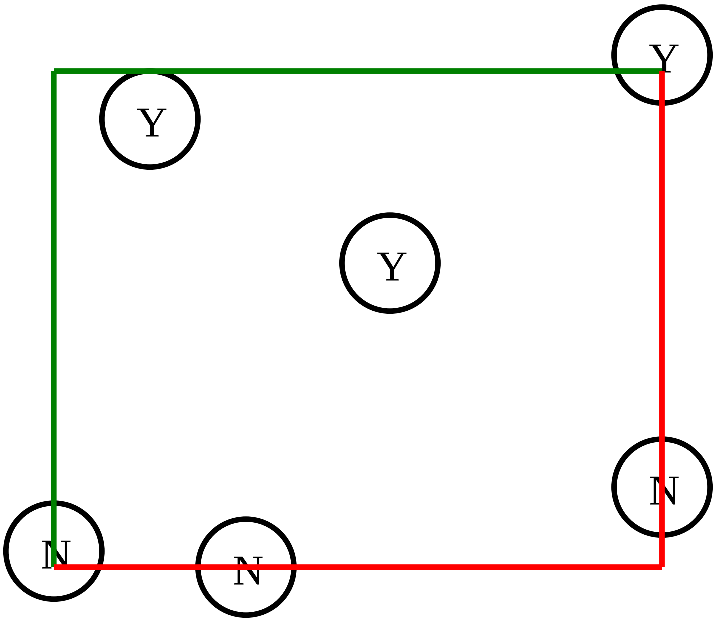


The count (97 blue spots) in the example below is completed and show a partial area of 97/168 = 57.7%.

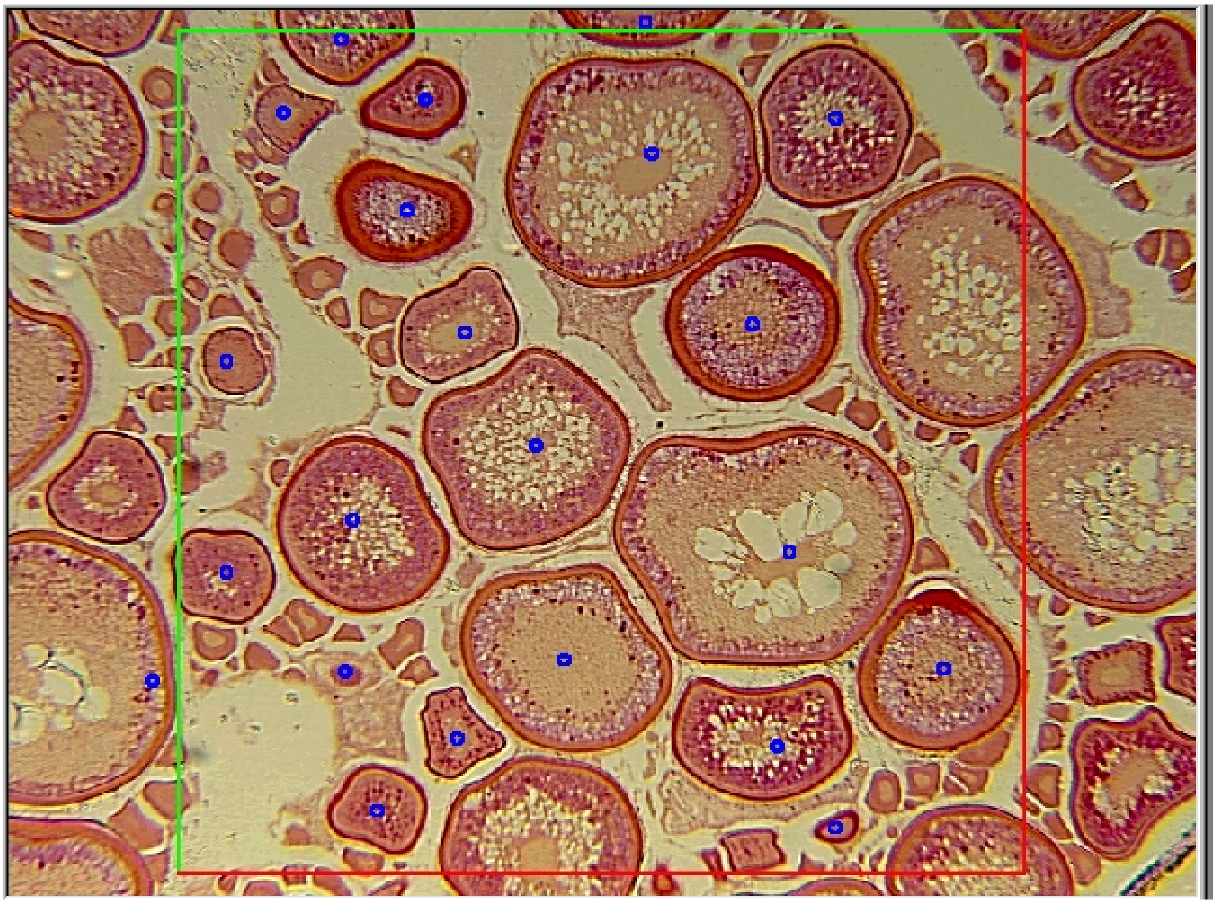


Measurement of V_i

A frame is superimposed over the section and the number of each class of oocyte counted using the rules shown in the illustration below. The count in the example below is 3 (Y) because there is one within the frame, one on the green line and one in the counting corner. Those oocytes (N) in the bottom left corner or across the red lines are not counted



The surface area (cm^2) of section covered by the sample frame is determined using a calibration slide and is dependent on the magnification used to view the slide. A value of 0.036 (cm^2) provides a compromise between the power to resolve histological detail and to provide a stable mean of V_i and N_a in a minimum of 8 fields. If the area of section is 0.036 cm^2 and the count is 22 vitellogenic profiles the value of N_a is 611.1 profiles cm^2.



In samples used to determine atresia the number of fields analysed should be proportional to the ovary weight.

Ovary weight	Number of fields analysed
2-9	8
10-19	12
20-29	16
>30	20

New developments in image analysis suggest that some of the process can be semi-automated and these routines can be attached to the software listed in the equipment section as part of the purchase price.   Further upgrades will be available if the annual support option is selected.

Section 7: Equipment

Histology		
Hardware items	Supplier	Cost (£)
Fridge	General Laboratory supplier	400
Cold plate	General Laboratory supplier	
Orbital shaker	General Laboratory supplier	514
Auto pipette	General Laboratory supplier	240
Knife sharpener	Shandon Scientific ltd 93-96 Chadwick Road Astmoor Runcorn Cheshire WA7 1PR	5831
Microtome knives	Shandon Scientific	170
Cryostat	Bright Instrument Co.	9000
Microscope	Zeis / Leica / Olympus 6.3 * objective	2800
PTFE Mould (5 place)	John Mayzes Crompton Road Lowestoft	90
Slide staining equipment	Merck	200

Histology consumables		
Cassettes	Merck	0.0033
Hard wood blocks	Local DIY store	0.16 each
Resin	Taab 3, Minerva house Calleva Park, Aldermaston RG7 8NA	60
Liquid mounting media	Taab	24
Powder mounting media	Taab	50
Stain reagents & slides	Merck	100

Fecundity & atresia estimation		
Item	Supplier	Cost (£)
Stereo-binocular zoom magnification microscope with phototube	Zeis / Leica/ Olympus	6000
Stempel pipette option 1 Option 2 Electronic	Hydrobios FRS (Aberdeen Scotland)	100 600-1000
Counting cells	John Mayzes Crompton Road Lowestoft	40
Domestic mixer on stand	Retail supplier	30
Compound microscope including phototube and 4 – 40 times objectives	Zeis / Leica/ Olympus Merck	See above (2800)
3 1/3 inch chip RGB camera	JAI CV-M90 Vortex vision	2162
Frame store IC2-RGB	Vortex Vision Old Search lights Runwick Lane Farnham Surrey GU10 5EF	1283
PC optical drive + CD read/ writer	PC superstore	1200
Camera coupler	Diagnostic instruments	1200
Image analysis software	Pilkington image analysis company	2000

Acknowledgements

I would like to acknowledge Dr. Beatriz Roel and Christie Stewart for reviewing the first draft of the manual and making helpful suggestions.

Section 8: References

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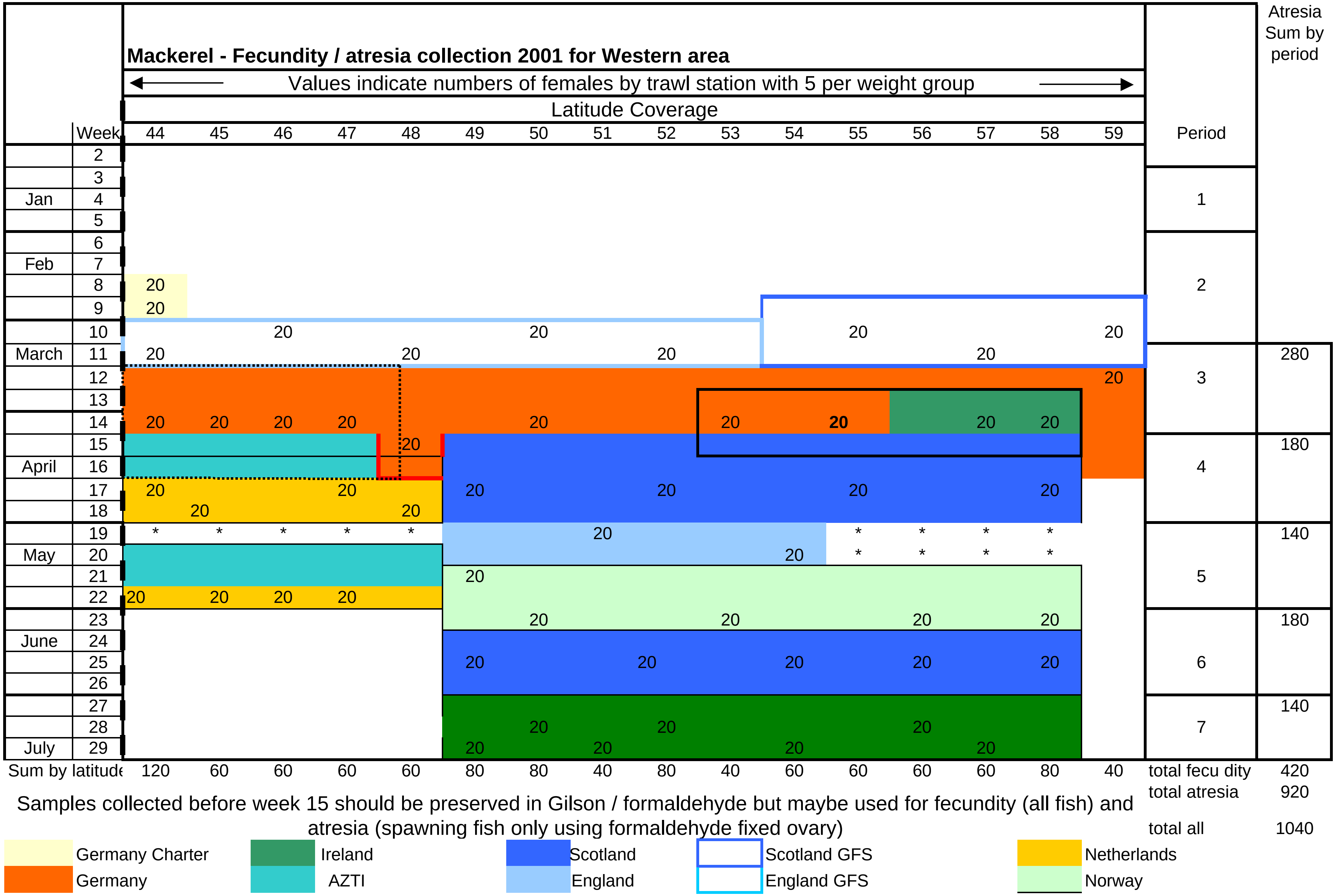
[12] Emerson, L., Greer Walker, M., and Witthames, P.R., 1990. A stereological method for estimating fish fecundity. *J.Fish.Biol.* 36:721-730.

Annex 6

Tables for fecundity sampling for mackerel and horse mackerel



Mackerel - Fecundity / atresia collection 2001 for Western area

Values indicate numbers of females by trawl station with 5 per weight group

Latitude Coverage

	Week	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	Period	Atresia Sum by period
	2																		
	3																		
Jan	4																	1	
	5																		
	6																		
Feb	7																		
	8	20																2	
	9	20																	
	10			20				20					20				20		
March	11	20				20				20					20				280
	12																20	3	
	13																		
	14	20	20	20	20			20			20		**20**		20	20			
	15					20													180
April	16																	4	
	17	20			20		20			20			20			20			
	18		20			20													
	19	*	*	*	*	*			20				*	*	*	*			140
May	20											20	*	*	*	*			
	21						20											5	
	22	20	20	20	20														
	23							20			20			20		20			180
June	24																		
	25						20			20		20		20		20		6	
	26																		
	27																		140
	28							20		20				20				7	
July	29						20		20			20			20				
Sum by latitude		120	60	60	60	60	80	80	40	80	40	60	60	60	60	80	40	total fecu dity	420
																		total atresia	920
																		total all	1040

Samples collected before week 15 should be preserved in Gilson / formaldehyde but maybe used for fecundity (all fish) and atresia (spawning fish only using formaldehyde fixed ovary)

🟨	Germany Charter	🟩	Ireland	🟦	Scotland	☐	Scotland GFS	🟨	Netherlands
🟧	Germany	🟦	AZTI	🟦	England	☐	England GFS	🟩	Norway

WESTERN Horse Mackerel Fecundity and Atresia Sampling in 2001

FECUNDITY

A sampling strategy for the collection of horse mackerel ovaries is proposed for 2001.

Fecundity should be estimated over the period January – July 2001 from the main spawning area southwest of Ireland. During this period every two weeks fecundity samples should be collected only for the most relevant weight class (150-249g) either from the commercial fleet or from research vessels in order to follow over time the production of vitellogenic oocytes, the increase in fecundity, the residual fecundity, and the atresia. In addition the fecundity should be estimated extensively for all weight classes during the first half of April, which was traditionally the period for taking fecundity samples. At the same time in the first half of April 2001 the fecundity samples should be collected in such way that they are area distributed in order to detect changes is fecundity in a north-south and a east-west direction.

It is recommended to measure the egg diameter frequency distributions from the formalin ovaries directly and not from the slides, because the oocytes are not sliced through the middle in the slides!

The coordinator for fecundity sampling of western horse mackerel is Guus Eltink.

The text table below shows the sampling for horse mackerel fecundity:

	WEIGHT CLASSES for Horse Mackerel Fecundity Sampling		
	150 - 249 g	**250 - 349 g**	**350 - 449 g**
PERIOD	(approx. 26 - 32 cm)	(approx. 32 - 35 cm)	(approx. 35 - 38 cm)
1-15 Jan 2001	30		
16-31 Jan 2001	30		
1-14 Feb 2001	30		
15-28 Feb 2001	30		
1-15 Mar 2001	30		
16-31 Mar 2001	30		
1-15 Apr 2001	30 + 240 extra ##	30	30
16-30 Apr 2001	30		
1-15 May 2001	30		
16-31 May 2001	30		
1-15 Jun 2001	30		
16-30 Jun 2001	30		
1-15 July 2001	30		
16-31 Jul 2001	30		
TOTAL	660	30	30

8 samples of 30 fish (240 extra fish) should be collected in a north-south and east-west direction in order to enable the detection of changes in fecundity due to geografical area.

ATRESIA

A separate sampling scheme for the research vessels during the egg survey is not needed for horse mackerel atresia estimation during all covarages of the egg survey in 2001, because during earlier egg surveys atresia has been estimated to be very low compared to fecundity (appr. 1%) and because atresia will be estimated anyway in the long time series of fecundity sampling from January - July 2001. It is more usefull to spend all effort on horse mackerel fecundity!

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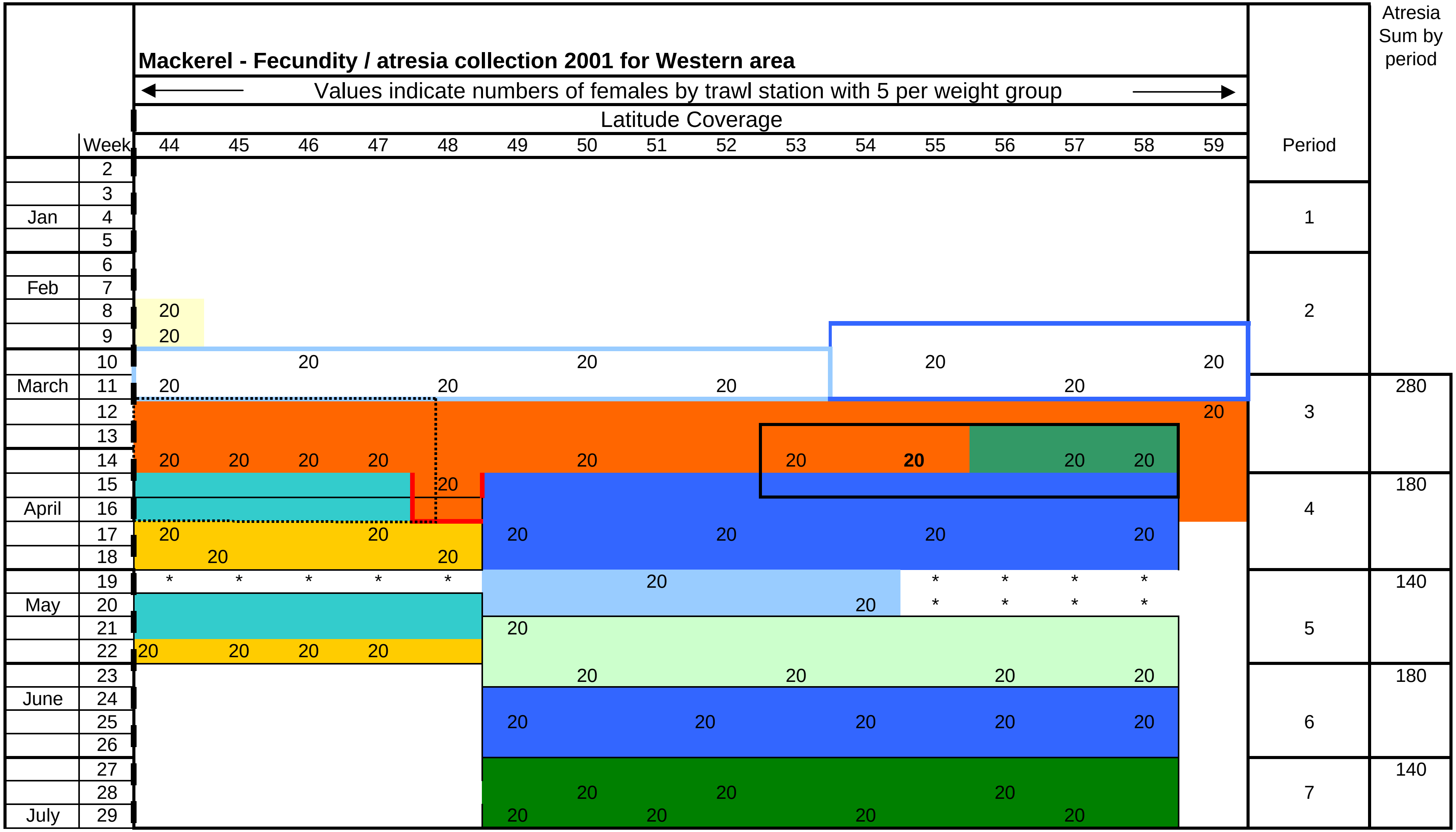

Mackerel - Fecundity / atresia collection 2001 for Western area

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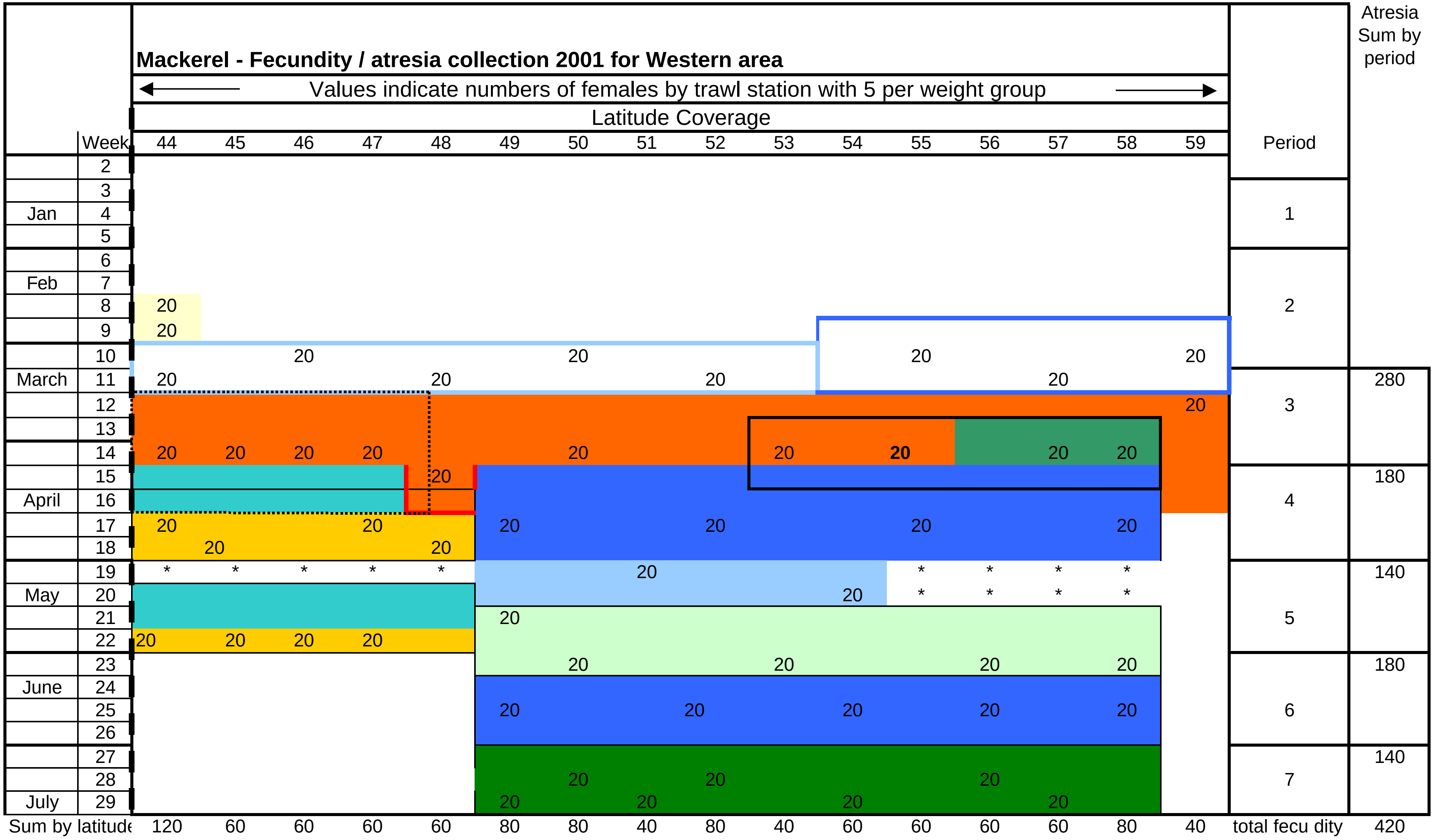

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	9	20																	
	10			20				20					20				20		
March	11	20				20				20					20				280
	12																20	3	
	13																		
	14	20	20	20	20			20			20		**20**		20	20			
	15					20													180
April	16																	4	
	17	20			20		20			20			20			20			
	18		20			20													
	19	*	*	*	*	*			20				*	*	*	*			140
May	20											20	*	*	*	*			
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	22	20	20	20	20														
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	26																		
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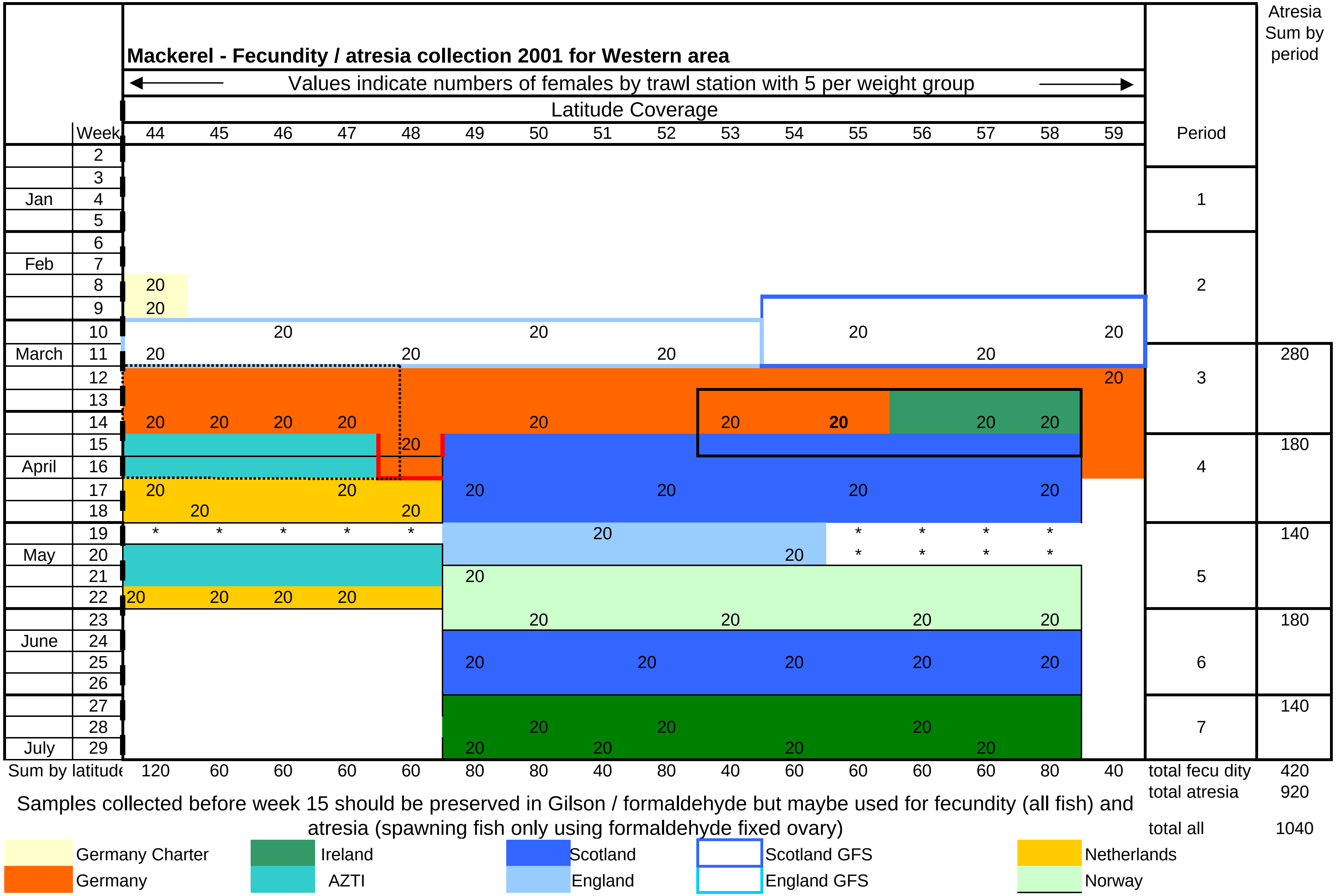
	28							20		20				20				7	
July	29						20		20			20			20				
Sum by latitude		120	60	60	60	60	80	80	40	80	40	60	60	60	60	80	40	total fecu dity	420
																		total atresia	920
																		total all	1040

Samples collected before week 15 should be preserved in Gilson / formaldehyde but maybe used for fecundity (all fish) and atresia (spawning fish only using formaldehyde fixed ovary)

🟨	Germany Charter	🟩	Ireland	🟦	Scotland	☐	Scotland GFS	🟨	Netherlands
🟧	Germany	🟦	AZTI	🟦	England	☐	England GFS	🟩	Norway



Mackerel - Fecundity / atresia collection 2001 for Western area

← Values indicate numbers of females by trawl station with 5 per weight group →

Latitude Coverage

	Week	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	Period	Atresia Sum by period
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	5																		
	6																		
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	8	20																2	
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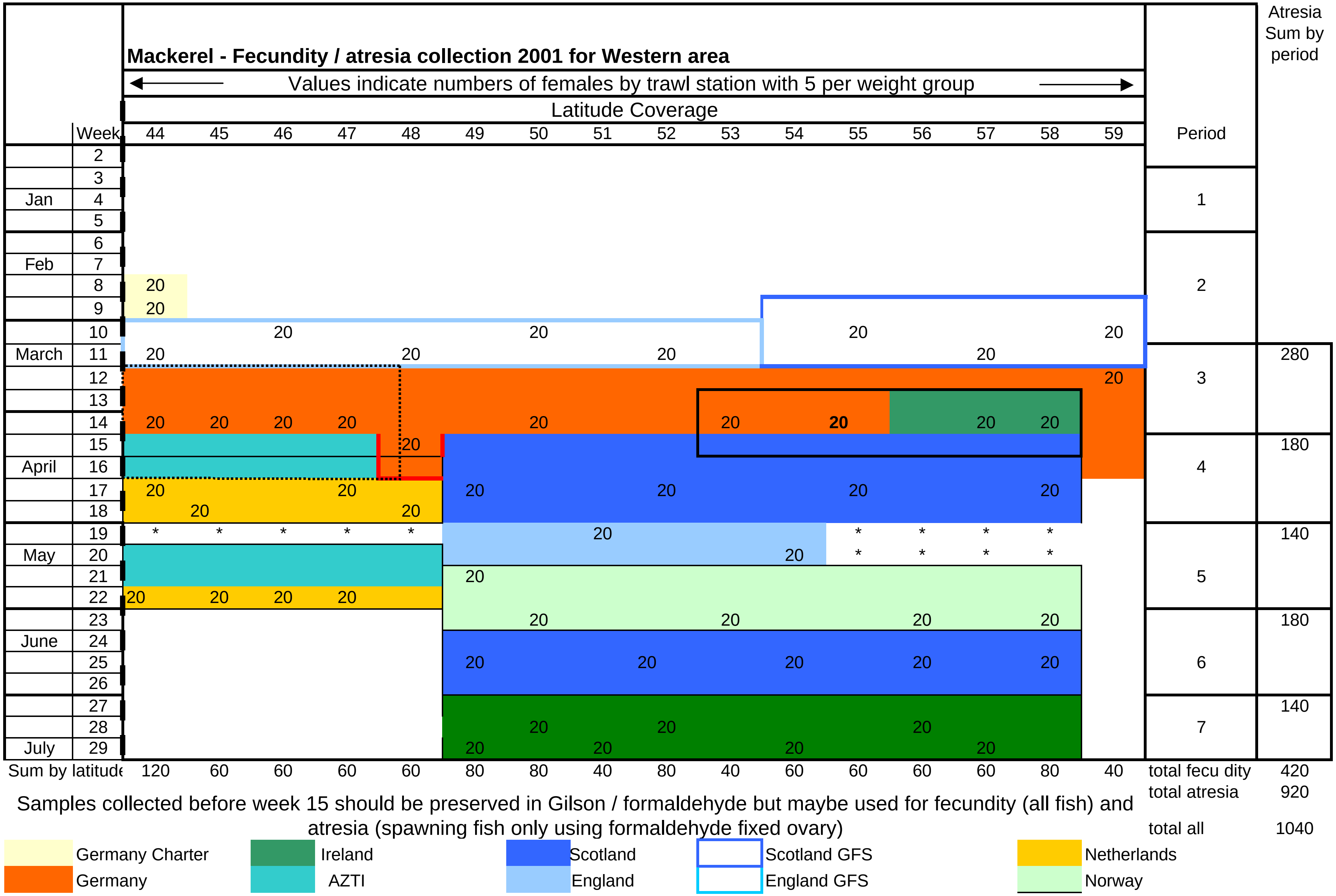
Germany Charter	Ireland	Scotland	Scotland GFS	Netherlands
Germany	AZTI	England	England GFS	Norway

Annex 6

Tables for fecundity sampling for mackerel and horse mackerel



Mackerel - Fecundity / atresia collection 2001 for Western area

← Values indicate numbers of females by trawl station with 5 per weight group →

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	19	*	*	*	*	*			20				*	*	*	*			140
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	25						20			20		20		20		20		6	
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	28							20		20				20				7	
July	29						20		20			20			20				
Sum by latitude		120	60	60	60	60	80	80	40	80	40	60	60	60	60	80	40	total fecu dity	420
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Samples collected before week 15 should be preserved in Gilson / formaldehyde but maybe used for fecundity (all fish) and atresia (spawning fish only using formaldehyde fixed ovary)

- 🟨 Germany Charter
- 🟧 Germany
- 🟩 Ireland
- 🟦 AZTI
- 🟦 Scotland
- 🟦 England
- ☐ Scotland GFS
- ☐ England GFS
- 🟨 Netherlands
- 🟩 Norway

WESTERN Horse Mackerel Fecundity and Atresia Sampling in 2001

FECUNDITY

A sampling strategy for the collection of horse mackerel ovaries is proposed for 2001.

Fecundity should be estimated over the period January – July 2001 from the main spawning area southwest of Ireland. During this period every two weeks fecundity samples should be collected only for the most relevant weight class (150-249g) either from the commercial fleet or from research vessels in order to follow over time the production of vitellogenic oocytes, the increase in fecundity, the residual fecundity, and the atresia. In addition the fecundity should be estimated extensively for all weight classes during the first half of April, which was traditionally the period for taking fecundity samples. At the same time in the first half of April 2001 the fecundity samples should be collected in such way that they are area distributed in order to detect changes is fecundity in a north-south and a east-west direction.

It is recommended to measure the egg diameter frequency distributions from the formalin ovaries directly and not from the slides, because the oocytes are not sliced through the middle in the slides!

The coordinator for fecundity sampling of western horse mackerel is Guus Eltink.

The text table below shows the sampling for horse mackerel fecundity:

	WEIGHT CLASSES for Horse Mackerel Fecundity Sampling		
	150 - 249 g (approx. 26 - 32 cm)	**250 - 349 g** (approx. 32 - 35 cm)	**350 - 449 g** (approx. 35 - 38 cm)
PERIOD			
1-15 Jan 2001	30		
16-31 Jan 2001	30		
1-14 Feb 2001	30		
15-28 Feb 2001	30		
1-15 Mar 2001	30		
16-31 Mar 2001	30		
1-15 Apr 2001	30 + 240 extra ##	30	30
16-30 Apr 2001	30		
1-15 May 2001	30		
16-31 May 2001	30		
1-15 Jun 2001	30		
16-30 Jun 2001	30		
1-15 July 2001	30		
16-31 Jul 2001	30		
TOTAL	660	30	30

8 samples of 30 fish (240 extra fish) should be collected in a north-south and east-west direction in order to enable the detection of changes in fecundity due to geografical area.

ATRESIA

A separate sampling scheme for the research vessels during the egg survey is not needed for horse mackerel atresia estimation during all covarages of the egg survey in 2001, because during earlier egg surveys atresia has been estimated to be very low compared to fecundity (appr. 1%) and because atresia will be estimated anyway in the long time series of fecundity sampling from January - July 2001. It is more usefull to spend all effort on horse mackerel fecundity!

Annex 7

Sorting Procedure for Mackerel and Horse Mackerel by Nation

Sorting Procedure of Mackerel and Horse Mackerel Eggs by Nation

England

Samples are preserved in 4% formaldehyde at sea. Eggs are only sorted from the samples at sea when approaching the western end of a transect. This is in order to determine the edge of the distribution before progressing on the next east/west transect. The eggs are left in the formaldehyde for at least 12 hours before sorting commences, to allow the eggs to become opaque and easier to see. All samples are returned to the laboratory where the eggs are sorted, identified and staged.

If a sample contains many hundreds of eggs, the sample is sub-sampled using a Folsom splitter. The eggs are sorted from the rest of the plankton using a microscope. All eggs are removed from the sample (or sub-sample) and are identified to species where possible. Where it is not possible to determine the species, the egg diameters (and oil globules) are measured. Mackerel and horse mackerel eggs are staged to six (or five) development stages, respectively. A maximum of one hundred eggs of each species are staged from each sample and the rest apportioned proportionally between the stages.

Germany

The samples are preserved for a duration of at least 12 hrs before sorting is allowed to start. This is usually done on board of the research vessel. For sorting, the samples are drained of most of the preservative liquid by means of a fine gaze sieve. When the plankton mass has lost so much fluid that it has reached a semi-liquid consistency and the particles stick together by the remaining moisture, portions are put on a petri dish under a binocular microscope with appropriate cold light illumination and magnification. Then all mackerel and horse mackerel eggs are picked out with soft forceps and placed in separate jars for mackerel and horse mackerel. Once the entire plankton sample on the petri dish is scrutinized, it is checked a second time and even a third time if during the second sorting, eggs are still found.

The number of eggs placed in the jars are recorded with hand counters. Sub samples are never taken, all eggs are always sorted out. From the total of eggs sub samples are taken for staging and measuring (100-200 eggs per sample maximum). The percentages of stages are then directly related to the total of eggs determined with the hand counters.

Ireland

Samples taken at sea are preserved in buffered formaldehyde as per instructions from the planning group for the international mackerel egg survey. No sample sorting is carried out at sea. Samples checked approximately 1hr after fixation to see if there are any mackerel or horse mackerel eggs present. This is carried out to see if further sampling stations are required.

Back at the lab all samples are completely sorted. All fish larvae are removed and sent to Julie Fives, MRI Galway. All eggs are removed, mackerel and horse mackerel eggs are retained by the Marine Institute and the remainder are sent to the egg coordinator for the International mackerel egg survey.

Normally all mackerel and horse mackerel eggs are counted. However if there is a sample with a very large amount of eggs this sample is split at the unsorted stage and all the eggs are counted. If there are too many eggs again this sample is then split at this stage.

The standard number of eggs counted by the MI is not known at this stage as the person responsible for this in previous years has recently left work. In light of this, our procedure will be reviewed and updated, and this procedure will be forwarded to the group.

Netherlands

Samples are preserved in 4% formaldehyde at sea. Eggs are only roughly sorted from the samples at sea when approaching the western end of a transect. This is in order to determine the edge of the distribution before progressing on the next east/west transect. All samples are returned to the laboratory where the eggs are sorted, identified and staged.

If a sample contains many hundreds of eggs, the sample is sub-sampled using a Folsom splitter. The eggs are sorted from the rest of the plankton using a large magnifying glass. All mackerel and horse mackerel eggs are removed from the sample (or sub-sample). Mackerel and horse mackerel eggs are staged to 5 and 4 development stages, respectively. A maximum of one hundred eggs of each species are staged from each sample and the rest apportioned proportionally between the stages.

Norway

The plankton-samples are kept in formalin 4% for a minimum of two hours, then rinsed in seawater and moved into a petri dish with seawater. A black background is used and the content of the petri-dish is placed on four small glass blocks to avoid condensation. A black background and two cold light sources are used to make it easy to spot the eggs and larvae. It is made sure that there is a lot of water and very little plankton in the dish. The seawater is changed often, although this is depending on the sample size. If the sample is big it will be fractioned. All this is done on board of the research vessel. Eggs are separated from the larvae (sometimes visa-versa), and then mackerel from horse-mackerel. All other species will be taken away, kept and recorded. The eggs are then carefully sucked into a pipette without any plankton getting into it. When all eggs and larvae have been sorted, they are checked again by changing the black background to a white background. The white background makes it easy to spot the larvae eyes and possibly pigmentation on the embryo in the egg. Thereafter 100-200 mackerel eggs and the same number of horse-mackerel eggs are picked out by hand and counted while they are all staged.

From the total of eggs subsamples are taken for staging and measuring (100-200 eggs per sample). The percentages of stages are then directly related to the total of eggs determined with the hand counters. All mackerel eggs/larvae, and horse mackerel/larvae, are kept in separate tubes. The other species are also kept in a third tube, but not sorted.

Portugal

The samples are preserved in 4% formaldehyde at sea. All samples are returned to the laboratory where all the eggs and larvae are sorted using the microscope. All eggs are removed from the sample and are identified to species where possible. Where it is not possible to determine the species, the egg diameters (and oil globules) are measured. Mackerel, horse mackerel, sardine and anchovy eggs are staged.

Scotland

1. Plankton samples are transferred from the Gulf III into 4% buffered formalin for a minimum of four hours.
2. Plankton samples are then washed through 250 sieve then transferred to a beaker and diluted to 6L, with seawater, depending on the amount of plankton in sample.
3.Subsamples are then transferred into a sorting tray (segmented Perspex tray with black base, 25x20cm). Illumination is from a cold light source and anglepoise lamp.
4. All eggs are then extracted and counted using a pipette and magnifier, then placed in a vial with 4% formalin.
5. The plankton sample is sieved and placed back in formalin then left for at least 12 hours before sampling again from No 2.
6. Egg samples are placed in a Perspex egg tray (6x4cm) on the microscope then identified and staged at the same time. A total of 200-400 eggs are identified and staged from each sample then raised to the total count of pick 1 and 2 combined.

Spain (AZTI)

After taken the samples at sea, and kept them in buffered formaline (4%) in sea water, the process of the samples is totally made in the laboratory. Plankton samples are washed with fresh water through 150µm sieve, then transferred to a beaker of 1litre.

Once the sample is in the beaker, it is put in small amounts (to be sure all the eggs are sorted out) into a divided petri dish, located on a black background, using a magnifying glass with top light. In that way, all the eggs and larvae are picked out, of each amount, placing them in small different dishes. All eggs are always sorted out. After sorted all the samples out, 10% of them is checked. Eggs and larvae are separated and identified by species, using a binocular microscope, counted with hand counters and kept them in separate tubes, with buffered formaline.

If a tube contains many hundreds eggs, those are sub-sampled at random, to be staged, a maximum of one hundred eggs are staged and the rest apportioned proportionally between the stages.

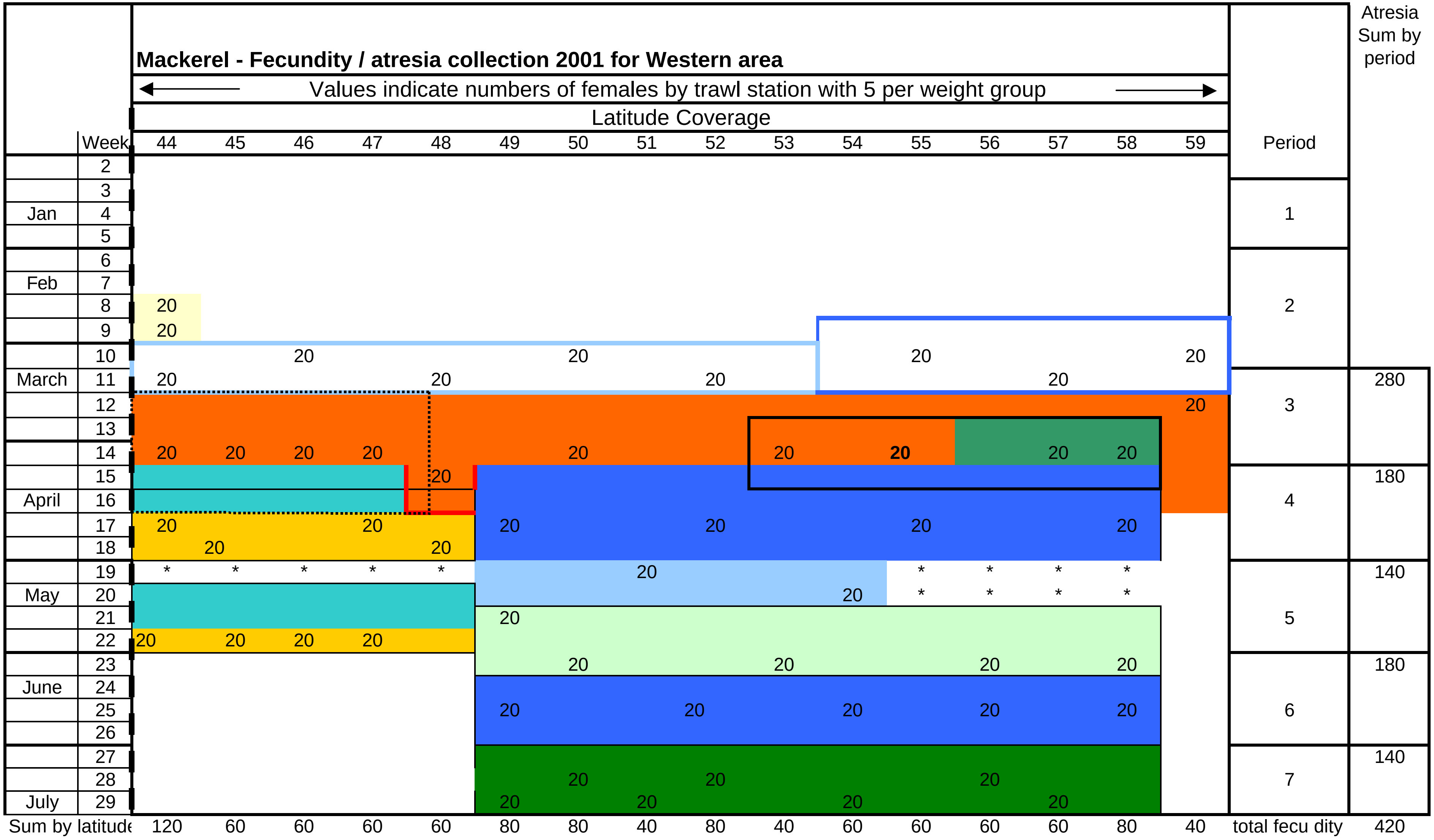
Spain (IEO)

Plankton samples are preserved on board in a 4% solution of buffered formaldehyde in seawater. In case the main objective of the survey are eggs, the sample is firstly sorted on board using a binocular microscope in order to obtain some preliminary results of the most important commercial species. In case the main objective of the survey are larvae, the sample is sorted into a glass tray located on a black background using a magnifying glass with top light. Then, the larvae are identified using a binocular microscope.

In the lab, all the samples are sorted totally, and sub samples are never taken. Eggs and larvae are separated and identified by species, using a binocular microscope, counted with hand counters and kept them in separate tubes, with buffered formaldehyde. All mackerel and horse mackerel eggs are staged according to their development stages, respectively and sub samples are never taken.

Annex 6

Tables for fecundity sampling for mackerel and horse mackerel



Mackerel - Fecundity / atresia collection 2001 for Western area

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