

Norwegian Tagging of Harp Seals and Hooded Seals in north atlantic waters

Ey

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Introduction

The harp seal, *Pagophilus groenlandicus* (Erxleben), and the hooded seal, *Cystophora cristata* (Erxleben), both breed at Newfoundland and in the Jan Mayen area, the former species also in the White Sea. Whereas the harp seals of the three areas are regarded as three separate and self-sustaining herds or populations, even as separate races (SIVERTSEN 1941), the hooded seal is believed to consist of only one population (RASMUSSEN 1960), as hooded seals from both the Jan Mayen and the Newfoundland breeding areas probably mix during the summer moult in the Denmark Strait. But the question of populations has never been finally solved for these species.

As part of a program that includes craniometry, and recently also blood-typing and study of haemoglobins and serum-proteins by electrophoresis, both harps and hoods have been and are being tagged in North Atlantic waters by the Institute of Marine Research. The purpose of the tagging is primarily to gain further knowledge of the migrations and distribution of both species, and thus get clues for solving the question of populations. A second aim is to verify the annual formation of the dentine layers in the teeth, used as basis for age determinations (RASMUSSEN 1957a and 1960).

Taggings and recoveries in separate years have been published in printed reports of field work for the years 1951—1954 (HALMÖ 1952 and 1955; RASMUSSEN 1952, 1954, and 1957b; ÖYNES and RASMUSSEN 1955), and some of the results have also been mentioned in previous papers by RASMUSSEN (1957a and 1960). The present paper is an attempt to summarize all taggings performed in the years 1951—1963, and to report all recoveries up to 15th October 1963.

Methods

A modification of the tail tag described by SIVERTSEN (1941), made of plastic material was adopted for this program. In the years 1951—1959, 30 mm wide discs made of yellow polystyrene, were used. Two holes were drilled in the discs, 20 mm apart, and on each disc a black triangle, the

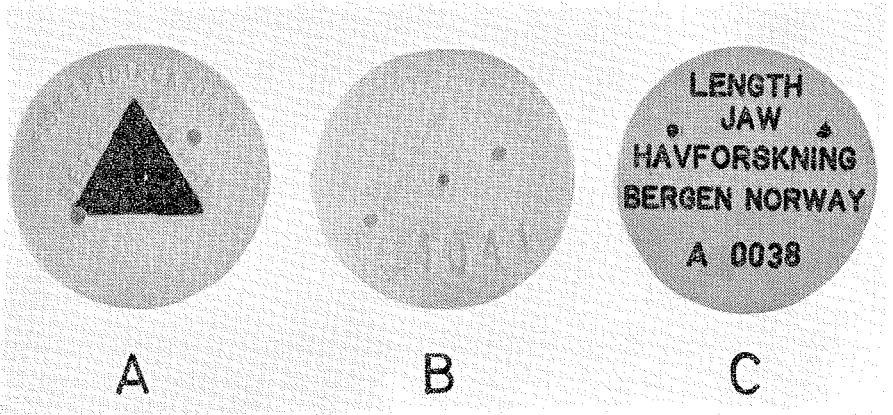


Fig. 1. Plastic tail tags: A) disc made of polystyrene, used 1951 – 1959. B) disc made of polyethylene, used 1960 – 1962. C) disc made of PVC (polyvinylchloride), used 1963.

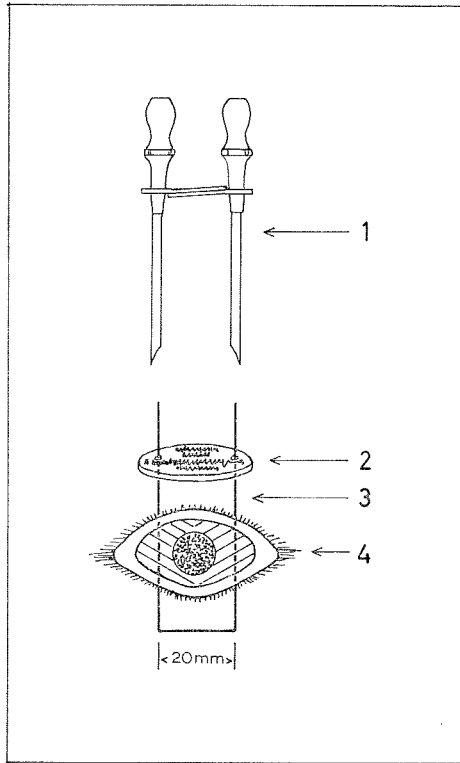


Fig. 2. Schematic illustration of the tagging procedure. 1) Two hollow needles soldered together. 2) Plastic tag. 3) Silver wire loop. 4) Section through root of the seal's tail.

name and address of the Institute, and a serial number were printed (Fig. 1A). The material of these discs is brittle, and the tags are liable to break when applied, so in 1960–1962 they were replaced with discs made of polyethylene, without the black triangles (Fig. 1B). As a further improvement, tags made of PVC (polyvinylchloride) were used in the 1963-season (Fig. 1C).

Two hollow needles, soldered together, are used to apply the tag (see Fig. 2). With these needles the root of the seal's tail is perforated from the dorsal side, on each side of the vertebra. A loop of silver wire, 1.4 mm thick, is then inserted into the needles from under the tail, and the needles are pulled out. The ends of the wire are threaded through the holes in the tag, and twisted together above the tag with or without pliers. When twisting, the tip of one finger is held in the loop under the tail to make room for future growth.

A few measures to avoid sepsis were introduced in the 1963-season: The needles and the wire loops are kept in a jar with 70% alcohol, and the loops are smeared with an antibiotic ointment before use.

After tagging, a cross is painted on the back and belly of the animal, with fast-drying cellulose-paint that is rubbed into the fur. The purpose of the paint is to let the sealers know, even at a distance, that the animal

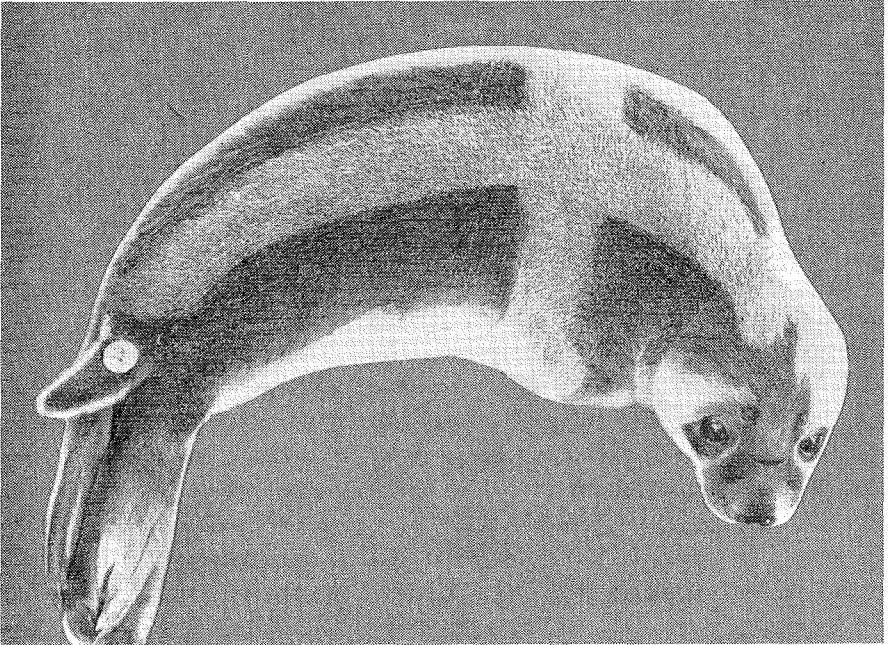


Fig. 3. Tagged and painted hooded seal pup.

is tagged and should be left alive. Red paint was used the first years, but the paint was in some cases mistaken for blood, and some of the tagged seals were shot, so from 1959 on, yellow paint was used for the bluebacks or hooded seal pups, while green paint was used for the whitecoated harp seal pups. A tagged and painted hooded seal pup is shown in Fig. 3.

A reward, 25.— N. kroner, is paid for the report or return of each tag from animals that are killed one year or more after the tagging. For the lower jaw of tagged animals, an extra reward of 10.— N. kroner is paid. No reward is paid for the recapture of seals that are tagged within the same season.

Taggings in the years 1951—1963

The number of seals tagged in the separate years and in the different areas, are set out in Table 1. It will appear that a total of 711 seals have been tagged in the 13 seasons which have passed since the taggings were started. Of these 523 were harp seals and 188 were hooded seals.

Canadian biologists conduct seal research at Newfoundland. With limited resources, the Norwegian taggings and other seal-studies therefore have been concentrated to the Jan Mayen area since 1953. The studies were extended to include also harp seals in the Barents Sea in 1963, when a total of 31 harp seals were tagged in that area by Per Öynes, observer from the Institute of Marine research. As an experiment he tagged one mature male and 18 immature seals. This was achieved without any severe difficulty: Once the seals were chased down and were resting on the ice, they could be kept quiet with a moderate pressure on the neck.

Excepting this experiment, only pups have been tagged every year in all areas. In the first year an effort was made to tag only weaned pups, but as it appeared that tagged and painted pups were readily accepted by their mothers (RASMUSSEN 1952), in subsequent years all available pups were tagged. Lactating pups of both species are easy to hold during the tagging process, but the hooded seal mothers may disturb and even prevent the tagging, while defending their young against any intruder. This never happens with harp seal mothers who desert their pups for the slightest reason. Weaned pups are easily exited, and it is preferable to have a helper hold the seal while it is being tagged, but even the most quick-tempered blueback may be tagged singlehanded.

All taggings have been performed by observers on commercial sealing vessels, and from 1953 on, also by observers and crew-members on the relief vessel operating in the Jan Mayen area during the sealing season every year.

All animals tagged from the sealing vessels are regarded as part of the ships' catches, and must be paid according to top skin value. The relief

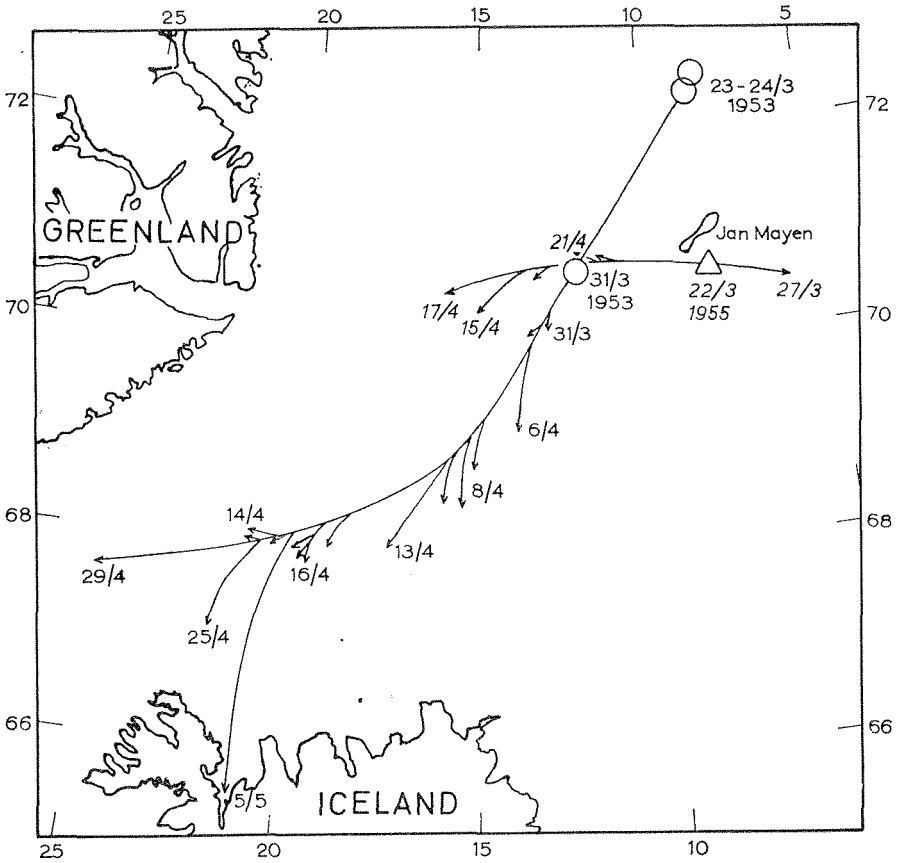


Fig. 4. The dispersion of weaned harp seal pups in the Jan Mayen area in 1953 and 1955. Tagging localities are plotted as rings (1953) and triangle (1955). Arrows indicate recaptures within the first six weeks after tagging.

vessel on the other hand, must be available for medical or technical assistance to the sealers at any moment. These economic and practical factors limit the number of seals that can be tagged in any one season.

Recoveries during the tagging-season

The paint-marks on the tagged pups last for 8–14 days only, and give them protection from the sealers while it is most needed, i.e. before they take to the water. The tagging program is made known to the sealers by radio-telephone every year, and being keenly interested in the experiments, the men will leave the painted pups alive. Nevertheless, some tagged pups are killed by unavoidable accident before the season is over. In Table 1 these are set out as “recoveries, same year”. In fact they are

Table 1. Summary of Norwegian tagging of seal pups and recoveries up to 15th October 1963.

Year of tagging	Harp seals			Hooded seals		
	Number tagged	Recoveries		Number tagged	Recoveries	
		Same year	Later		Same year	Later
A) <i>Newfoundland</i>						
1951	29	6	1	1		1
1952	68	6	1	0		
SUM A) ..	97	12	2	1		1
B) <i>Jan Mayen Area</i>						
1951	50	0	0	18	0	0
1952	33	0	1	13	1	0
1953	159	17	4	8	0	1
1954	17	2	0	0		
1955	99	9	1	4	0	0
1956	0			16	3	0
1957	2	0	0	0		
1958	18	1	1	9	0	0
1959	1	1		21	2	1
1960	2	1	0	18	1	1
1961	9	0	1	26	1	0
1962	0			11	1	0
1963	5	0		43	2	
SUM B) ...	395	31	8	187	11	3
C) <i>Barents Sea</i>						
1963	31*	0		0		
Total	523	43	10	188	11	4

* 12 pups, 18 subadults, 1 adult.

all recaptured within six weeks after the tagging. The mean number of such immediate recoveries for all years as calculated from Table 1, constitute about 7.6 per cent of all seals marked.

All early recoveries of harp seal pups are listed in Table 2, and early recoveries of hooded seal pups are listed in Table 3. One tag, S 434, which was returned three years after the tagging without any information on the recovery, is included in Table 2. It is assumed that this animal was recaptured in the tagging season.

In the Jan Mayen area the greatest number of pups were tagged in 1953 (167) and in 1955 (103). All early recoveries in 1953, and 6 recoveries in 1955, yield some information on the dispersion of harp seal pups after weaning, as shown in Fig. 4. The movements of weaned pups are composed of an active wandering from the breeding lairs toward

Table 2. Recoveries of tagged Harp seal pups within the first 6 weeks.

Tag No.	Tagged		Recovered	
	Date	Position	Date	Position
<i>Newfoundland</i>				
S 210	09.03.51	52°15' N, 54°50' W	27.03.51	Horse Isl., Nfl.
S 215	10.03.51	52°00' N, 55°05' W	s. d.	s. pos.
S 225	11.03.51	51°57' N, 55°14' W		
S 226	—	— —		
S 227	—	— —	Same week	Same area
S 228	—	— —	Same week	Same area
S 232	15.03.52	52°18' N, 55°31' W	31.03.52	Horse Isl., Nfl.
S 235	16.03.52	52°18' N, 55°30' W	06.04.52	50°07' N, 55°27' W
S 253	19.03.52	51°45' N, 56°05' W	09.04.52	50°25' N, 55°10' W
S 270	24.03.52	51°04' N, 55°13' W	s. d.	s. pos.
S 272	—	— —	07.04.52	50°07' N, 55°26' W
S 276	—	— —	01.04.52	Horse Isl., Nfl.
<i>Jan Mayen area</i>				
S 127	23.03.53	72°30' N, 08°15' W	13.04.53	68°24' N, 16°00' W
S 145	—	— —	29.04.53	67°40' N, 25°00' W
S 150	—	— —	14.04.53	68°02' N, 21°10' W
S 160	24.03.53	72°20' N, 08°30' W	16.04.53	67°54' N, 19°45' W
S 173	—	— —	31.03.53	70°04' N, 13°30' W
S 176	—	— —	25.04.53	67°10' N, 22°00' W
S 180	—	— —	08.04.53	68°46' N, 15°10' W
S 188	—	— —	13.04.53	68°00' N, 17°30' W
S 190	—	— —	31.03.53	70°04' N, 13°30' W
S 310	—	— —	17.04.53	68°00' N, 20°30' W
S 314	—	— —	05.05.53	Hunafloi, Iceland (65°22' N, 21°10' W)
S 316	—	— —	14.04.53	67°58' N, 20°00' W
S 323	—	— —	06.04.53	69°10' N, 14°00' W
S 342	31.03.53	70°40' N, 12°10' W	16.04.53	67°54' N, 19°45' W
S 344	24.03.53	72°20' N, 08°30' W	08.04.53	68°22' N, 15°30' W
S 353	—	— —	14.04.53	68°02' N, 21°10' W
S 388	31.03.53	70°40' N, 12°10' W	14.04.53	68°00' N, 19°00' W
S 392	14.04.54	72°27' N, 00°15' E	24.04.54	72°07' N, 00°00' W
S 404	—	— —	—	72°00' N, 00°00' W
S 377	22.03.55	70°40' N, 08°14' W	20.04.55	70°40' N, 13°15' W
S 421	—	— —	27.03.55	70°28' N, 05°58' W
S 431	—	— —	21.04.55	70°48' N, 12°00' W
S 434	—	— —	?	?
S 438	—	— —	17.04.55	70°30' N, 16°00' W
S 441	—	— —	15.04.55	70°18' N, 15°00' W
S 462	—	— —	21.04.55	70°48' N, 11°30' W
S 489	12.04.55	71°42' N, 11°48' W	25.04.55	73°20' N, 02°30' W
S 500	—	— —	21.04.55	70°40' N, 12°30' W
S 566	15.04.58	71°30' N, 13°20' W	s. d.	s. pos.
S 701	21.03.59	72°30' N, 08°00' W	25.03.59	72°40' N, 06°10' W
S 1001	30.03.60	71°00' N, 16°30' W	21.04.60	s.area

Table 3. Recoveries within the first 6 weeks, of Hooded seal pups tagged in the Jan Mayen area.

Tag. No.	Tagged		Recovered	
	Date	Position	Date	Position
S 73	28.03.52	71°46' N, 13°00' W	31.03.52	71°10' N, 11°00' W
S 502	24.03.56	72°32' N, 10°50' W	02.04.56	72°09' N, 11°00' W
S 516	—	—	29.03.56	72°24' N, 11°20' W
S 519	25.03.56	72°45' N, 10°00' W	31.03.56	72°20' N, 10°10' W
S 576	04.04.59	71°28' N, 14°15' W	s. d.	s. pos.
S 702	08.04.59	70°10' N, 14°50' W	..04.59	69°50' N, 13°00' W
S 1006	15.04.60	67°30' N, 24°00' W	18.04.60	67°30' N, 27°00' W
S 1023	08.04.61	69°09' N, 15°45' W	09.04.61	s. pos.
S 1031	18.03.62	71°38' N, 17°30' W	s. season	?
A 0001	26.03.63	72°23' N, 06°44' W	29.04.63	72°35' N, 09°30' W
A 0102	06.04.63	71°44' N, 09°05' W	08.04.63	71°22' N, 09°10' W

the edge of the pack-ice, and a passive drift with the pack, following the prevailing winds and currents.

In 1953 the pups drifted south-westwards at an average speed of 16—17 nautical miles per day. The longest drift observed was 500 miles in about one month (RASMUSSEN 1957a). In 1955 the pups were tagged in a projecting tongue of pack-ice to the south-east of Jan Mayen, and one recovery was made east of the tagging locality within a few days. Easterly winds prevailed during the first two weeks of April, however, and later recoveries were made westwards from the tagging locality.

Recoveries one year or more after the tagging

A total of 14 recoveries made one year or more after tagging, are recorded in Table 1. The particulars of these are listed in Table 4, while the tagging- and recovery-localities are plotted in Fig. 5.

Most of the tagged animals are recaptured in the same area where they were tagged. The recapture of S 336, a female hooded seal with a pup, is mentioned in a discussion of sexual maturity in this species by RASMUSSEN (1960). This is one of three recaptures of hoods in the Jan Mayen area that show no marked trend of migration. The one male hooded seal, S 230, that was tagged at Newfoundland in 1951 and recaptured near Cape Farewell, Greenland, five years later, indicates a connection between the hooded seals that breed at Newfoundland and the moulting hooded seals in the Denmark Strait (RASMUSSEN 1957a and 1960). The animal was killed in February, when mature hooded seals are migrating towards Newfoundland or Jan Mayen to breed, and therefore probably was a late straggler.

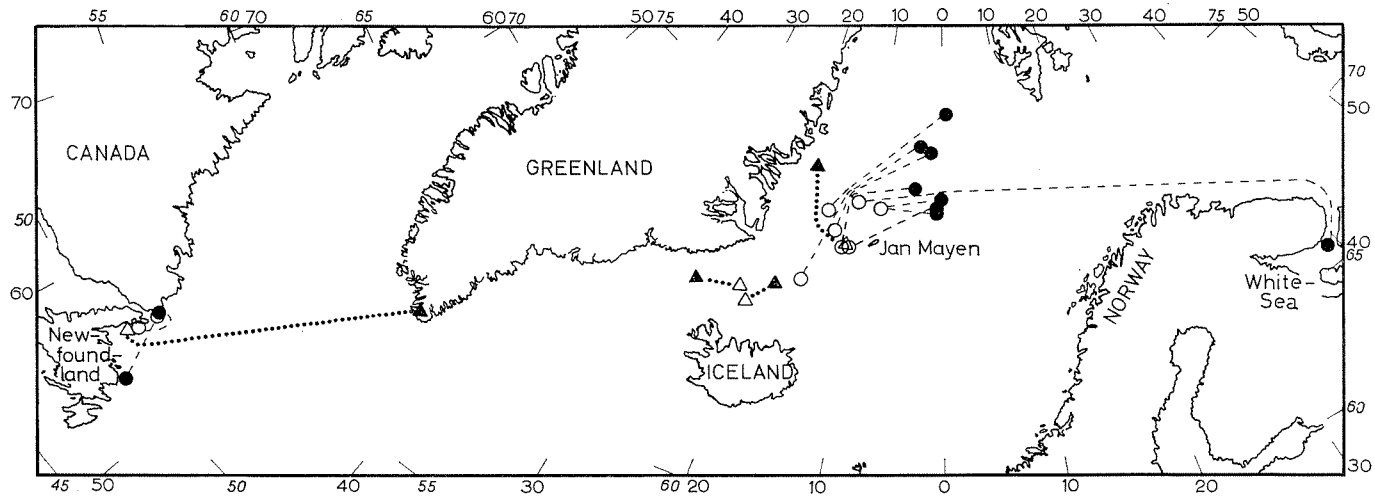


Fig. 5. Tagged harp seals (rings) and hooded seals (triangles) recaptured one year or more after the tagging. Open symbols indicate tagging localities, and filled-in symbols indicate recaptures.

Table 4. Seal-tags recovered one year or more after tagging.

Tag No.	Tagged		Recovered	
	Date	Position	Date	Position
<i>Harp seals</i>				
S 217	10.03.51	52°00' N, 55°05' W	09.04.52	49°35' N, 53°15' W
S 277	24.03.52	51°04' N, 55°13' W	18.04.55	52°10' N, 55°05' W
S 98	29.03.52	72°40' N, 11°00' W	25.04.53	White Sea
S 124	23.03.53	72°30' N, 08°15' W	12.05.54	73°00' N, 00°15' W
S 130	23.03.53	72°30' N, 08°15' W	03.05.54	72°27' N, 01°00' W
S 335	31.03.53	70°40' N, 12°10' W	02.05.63	73°20' N, 04°00' W
S 374	31.03.53	70°40' N, 12°10' W	05.05.54	72°35' N, 01°00' E
S 471	18.04.55	71°17' N, 13°05' W	03.05.61	74°50' N, 02°00' W
S 554	11.04.58	72°00' N, 14°30' W	03.05.62	76°25' N, 00°45' E
S 1021	08.04.61	69°09' N, 15°45' W	21.04.62	75°00' N, 03°30' W
<i>Hooded seals</i>				
S 230	31.03.51	50°42' N, 55°23' W	11.03.56	Augpilagtok, Gr.l.d. (60°07' N, 44°15' W)
S 336	31.03.53	70°40' N, 12°10' W	29.03.58	73°30' N, 17°20' W
S 707	29.04.59	67°35' N, 20°30' W	28.04.60	68°33' N, 18°25' W
S 1104	07.04.60	68°04' N, 21°45' W	30.04.61	67°40' N, 26°00' W

Up to now only one recovery has verified the ageing-method for hooded seals: S 707 was recaptured one year after tagging. The lower jaw was delivered with the tag, and in the dentine of the canine teeth, a pattern of rings was found inside the neo-natal line, corresponding to a full first-year zone.

All late recaptures of harp seals within the Jan Mayen area have been made to the north-east or east of the tagging localities. This trend may be explained by the fact that very few adult harp seals are caught in the breeding lairs in this area. The males do not stay on the ice during the lactation period, and the females will readily desert their pups when disturbed, if ice-conditions so permit. Practically all of the immatures and adult harp seals taken in this area, are killed in the moulting patches usually situated to the north-east of where the breeding lairs are found earlier in the season.

One important recovery of a harp seal tag reported in December 1962, has been made by Russian biologists: S 98 was tagged in the Jan Mayen area in 1952, and recaptured in the White Sea one year later. This is the only indication known to us of any interchange between the White Sea and the Jan Mayen populations of harp seals.

One recovery has so far verified the ageing-method for harp seals: One canine tooth from S 554, recaptured four years after tagging, show four fully developed year-zones.

Discussion

With regard to migrations and the question of mixing of animals from different breeding grounds, the tagging experiments have so far yielded only suggestive results. There is no indication of any mixing of harp seals from Jan Mayen and Newfoundland, and further taggings might verify the assumed separation of these two populations. The recaptures of 7 tagged harp seals within the tagging area in the Greenland Sea in the present program, and 3 recaptures within the Barents Sea of harp seals tagged earlier in the White Sea (SIVERTSEN 1941), all seemed to rule out the possibility of mixing between the Jan Mayen and the White Sea populations. It is, however, probable that animals from both areas in May—June may meet in the drift ice off South Cape of Spitsbergen. The recovery of S 98 in the White Sea indicates that such mixing may occur, at least among immature animals. Only further tagging experiments, supported by other studies, can give an idea of the extent of mixing of these populations.

The recoveries of hooded seals are even less conclusive. Migrations from the Newfoundland breeding ground to the West Greenland coast and past Cape Farewell to and from the summer moult in the Denmark Strait, are known (RASMUSSEN 1960). Only future recoveries and continued taggings can give further clues to the possible exchange of hoods between the breeding grounds at Newfoundland and Jan Mayen.

The tagging of harp and hooded seals will therefore be continued at every opportunity. Also other types of tags and new tagging methods are being considered as supplements to the current method.

Only a total of 68 seals have been recaptured of 711 animals tagged. The paint-marks on the tagged pups, the reward system, and the goodwill of interested sealers, tend to keep the number of immediate recoveries within the tagging-season low. The taggings are not intended as studies of pup-production or taxation. The very low number of late recoveries is discouraging, however: From 580 seals tagged in the years 1951—1962 and not reported captured again during the tagging-seasons, only 14 tags have been recovered one or more years after the taggings. Of many possible causes for this, one may be that the tags break or wear down, as suggested by two recovered polystyrene tags (Fig. 6). It is hoped that the new PVC tags will minimize this factor.

The fact that the tags are fastened to the dorsal side of the tail, may be significant, as killed animals always are skinned from the ventral side,

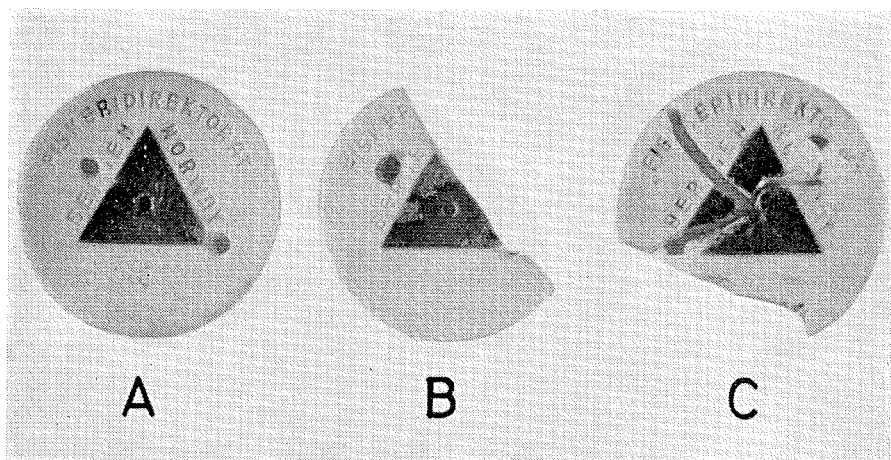


Fig. 6. Recovered polystyrene tags. A) Tag No. S 336, recovered after 5 years. B) Tag No. S 554, recovered after 4 years. C) Tag No. S 335, recovered after 10 years.

and tags therefore may be overlooked. A measure as simple as putting a blind tag under the tail might remedy this deficiency of the tagging method.

Sepsis caused by the tag has only been reported once (S 124). The paint-marks on the tagged harp seal pups cause no harm, as the white coat with the paint is shed after a short interval. As regards the paint-marks on the hooded seal pups, this may reduce the insulating power of the fur. However, paint-marks on hood pups kept both on board a sealing vessel for two weeks as well as in the Bergen Aquarium wore off rather quickly and did not seem to do any harm. Mortality caused directly or indirectly by the tagging is assumed to be low, but no estimate of this factor can be made.

It may be repeated in this connection that the enthusiasm of Norwegian sealers is great, and it is believed that a very high proportion of recovered tags are reported. In recent years also foreign sealers have reported recaptures.

Summary

The tail tag and the tagging method are described. A total of 711 harp and hooded seals have been tagged in the years 1951—1963.

Excepting experimental tagging of one adult and 18 immature harp seals in the Barents Sea in 1963, all seals have been tagged as pups, at Newfoundland in 1951—1952, in the Jan Mayen area in 1951—1963, and in the Barents Sea in 1963.

Of the tagged seals, 54 have been recaptured within the first six weeks after tagging. Early recoveries in 1953 and 1955 illustrate the dispersion of weaned harp seal pups in the Jan Mayen area.

Recoveries after one or more years amount to 14, and most of these are from the tagging areas. One recovery indicates a connection between hooded seals breeding at Newfoundland and the moulting hoods in the Denmark Strait. One other recovery suggests some contact between the Jan Mayen and the White Sea harp seal populations.

Recaptures of one harp and one hooded seal have provisionally verified the ageing method based on dentine growth zones for these species.

Finally, some factors that may influence the number of recoveries are discussed, and means of improving the tagging method are suggested.

Acknowledgements

For bringing the observers to the ice, and for assistance with the taggings, we owe a debt of gratitude to owners, skippers, and crews of the following sealing vessels: "Brandal", "Eskimo", "Fortuna", "Kvitungen", "Norbjörn", "Polarfart", and "Polaris". Our thanks are also due to Björn Berland, Alfred Fröland, Kaare Halmö, Gunnar Nævdal, and Per Öynes who have been responsible for the taggings in different years.

Selfangstrådet (The Norwegian Sealing Council) has supported the tagging program with grants from the Sealing Fund, and this is gratefully acknowledged.

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