International Council for the Exploration of the Sea

C.M.1979/B:20
Fishing Technology Committee

Qualitative contrast comparisons of differently coloured gillnets.

by

Karl Kr. Angelsen & Ingvar Huse

Institute of Fishery Technology Research
Box 1964, N-5011 Nordnes, Norway

1. INTRODUCTION

A regularly returning problem for Norwegian gill net manufacturers has been that fishermen often change their fancy for gill net colours, and also that fishermen from different districts have separate colour preferences. This necessitates production and stocking of a great variety of differently coloured nets, and also creates peak demands for special colours. On this background a small scale qualitative contrast comparison experiment was carried out in an attempt to evaluate the significance of the different colours.

2. MATERIAL AND METHODS.

Panels of netting were mounted vertically on a frame in front of a horizontally mounted low light underwater TV-camera at a least distance of 1,5 m. Two panels were compared for each submersion. Illumination (lux) was measured at each 10 m step by a light meter mounted in the same direction as the TV-camera. Submersion continued to a deep where none of the panels could be seen on the TV-monitor. 8 comparisons were done in midwater while one was done on bottom.

2. RESULTS AND DISCUSSION

2.1 Midwater tests.

In seven of the midwater tests the following nets were compared with white multifilament nylon net:

1. Blue multifilament nylon.
2. Yellow multifilament nylon.
3. Black multifilament nylon.
4. Red-brown multifilament nylon.
5. Pale grey multimono nylon.
6. Yellow-green monofilament nylon.
7. Pale green monofilament nylon.

Common for all those comparisons were that the meshes could not be seen when the rig hung just below the surface. This is due to the automatic aperture control of the camera and even though the eye functions in a similar way it is hard to interprete the behaviour implications this may have on the fish. At 10 m depth the white standard net was clearly visible in all tests and remained so down to 80 m in 3 tests and to 90 m in 4 tests. The white standard net had best visibility of all nets tested. Of the multifilament nylon nets the yellow net had only marginally lower visibility than the white net. The red-brown, the black , and the blue had all markedly lower visibility than white and yellow nets. Of these three the blue was slightly less visible than the red-brown, which again was slightly less visible than the black one. None of these were visible below 60 m in any of the tests.

None of the monofilament nets were visible below 40 m. The pale green net was slightly less visible than the yellow-green one.

The pale grey multimono net was visible down to 60 m, but the illumination level was higher in this test than in the others.

The eighth midwater test compared green monofilament nylon to green multimono nylon. Illumination was very low at this test (650 lux below surface to ordinarily ca. 2000 during this experiment) and the monofilament net was hardly visible at all during the descent. The multimono net was discernable from 20 to 45 m.

The conclusion must be that with the sea as a background dark multifilament nylon nets are less visible than light ones. Also monofilament nets seen to be less visible than multimono nets. As expected both monofilament and multimono nets were generally less visible than dark multifilament nets, but pale grey multimono seemed to have slightly higher visibility than blue multifilament.

During descent the observation rig had a tendency to tip over so that the nets could be viewed with the surface as a background. This disclosed that the dark multifilament nets were very easily seen against the surface. The light multifilaments, however, disappeared. The effect was far less dramatic with the monofilament and multimono nets, and neither of them had much greater visibility with the surface than with the sea as background. This conforms will with the two principles of invisibility: Either to reflect or transmit the same amount and quality of light as the background, or to be transparent. The multifilament net is based upon the first principle while the monofilament and multimono net materials have optical qualities which in water conform agreably well with the second principle.

2.2 Bottom test

The ninth comparison was done on bottom at 38 m with an illumination of 5 lux. The substrate consisted of sand and gravel and must be classified as rather light bottom. The nets compared were dark green and pale grey multimono. At the top of each of the two panels there was one mesh of multifilament nylon with the same colour as the panel. The green panel could hardly be discerned whiled the pale grey panel was visible although poorly. The pale grey multifilament meshes were clearly visible while the green ones were poorly visible.

The overall conclusion seems to be that apart from surface nets, dark nets seem to be preferrable, and that blue or green seem to be good colours. This, however, is all related to human visual perception and the optic qualities of the water and the background during the experiment.