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FRV *Clupea*

Cruise 1493C

REPORT

13-26 July 1993

Personnel

C S Wardle	SPSO
C W Glass	HSO
P Barkel	PTO
A Walker	Visitor

Objectives

1. To observe and document the reaction behaviour of fish within the extension and cod-end regions of a net.

2. To investigate visual contrast as a means of modifying reaction behaviour of fish in cod-ends.

Narrative

Clupea sailed on 13 July and made first tows during 14 July docking in Buckie that evening for the Gyro Compass to be repaired. Twenty five trawl tows were made during the next 12 days during which various experimental arrangements of the extension between net and cod-end were observed with the TUV and 16 video tapes made in natural light of mainly juvenile haddock and whiting reactions. A standard square mesh window (length 3 m and width 1.4 m) was observed (13 to 21 July) with one half of the window black and the other white split longitudinally. Behind the window was fitted a 3 m long black PVC tunnel found on previous cruises to promote fish escape. Preliminary analysis shows that of 5,639 fish escaping 4,057 chose to pass through the white and 1,582 through the black zone a ratio of about 2:1. The left right position of the two panels was reversed for half these observations. Close up film of the haddock escapes were made and will be used to analyse energetics and dynamics of swimming performance of fish escaping through fast moving extension window panels.

Some unusual and very dramatic fiery bioluminescence was filmed on the netting panels during several days fishing in the Copinsay area. The organism responsible seemed to be a comb jelly which in large numbers appeared to burst into flames on striking the netting. The effect was seen in daylight levels of about 10-2 Lax when the net was still visible.

A second experiment looked at the choice of escape direction when all directions were equally available. An extension made up from a sequence of three rings each 0.5 m wide of white, black and white fully open square mesh was positioned just ahead of the black PVC tunnel. The direction taken by 1,021 fish escaping ahead of the tunnel was recorded. As a percentage of all escapes seen those escaping were top front white 10.8%, top black 8.85%, top rear white 58.27%. Those from the bottom panels front white 0.63%, black 1.79%, rear bottom white 10.90%. The black mesh ring was then lined with a sheet of black PVC.

More fish then left from the top of the first white ring. Top, front white 64.53%, top rear white ring 29.98, bottom front white ring 4.39, bottom rear white ring 1.09%. A third experiment looked at an orange square mesh extension which would appear as if coloured grey when viewed near the sea bed deeper than 20 m. One metre behind its front edge a 0.5 m band of black PVC was mounted to line the inside of the netting as a ring. A large proportion of the fish seen escaped just ahead of this ring 86.36% going up and 13.64% going down. All these extensions were filmed from the fishes point of view by mounting them in turn on the towed vehicle and towing at 40 metres. The significance of these results and their possible application is being analysed.

Clem Wardle

29 July 1993