THE TARGET STRENGTH OF JELLYFISH (AURELIA AUTRANS)

by
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ABSTRACT

Jellyfish were suspended in a thin nylon gut frame. Their ventral aspect target strengths at the frequencies 38 kHz and 120 kHz were observed. The results are summarized below:

Number of fishes	Diameter (cm)	Average target strength (dB)	
		38 kHz	120 kHz
1	16	-51.7	-50.1
1	8	-54.0	-54.2
1	13	-52.3	-51.0
5	5-10	-40.1	-46.4

These observations indicate a tendency towards increasing target strength with increasing diameter of the jellyfish. The observed target strengths are within the range of those which are to be expected of small fishes of 5-10 cm in length.

DISCUSSION FOLLOWING THE PAPER BY MR.O.NAKKEN : THE TARGET STRENGTH OF JELLYFISH.

MR.O.NAKKEN: Some of these measurements date back to 1971 and were taken between some TS measurements of fish on the day when fish were not available. 1 - 38 kHz and 1 - 120 kHz transducer at a depth of 10m looking up towards the sea surface. There was a raft on the surface with an arrangement where we could place the fish or target that we wanted to measure in a suspension of nylon cord at 2½m depth. The reason that the operation was turned upside down was to work with fish with swimbladders to get over the adaption problems. We stunned the fish and turned them upside down. Later control measurements were made on dorsal aspect and ventral aspect so we kept the fish in their natural position and measured TS of the ventral aspect. There were statistical corrections between ventral and dorsal aspects. The jellyfish were attached to the nylon cord, great care being taken to avoid entrapping air when they were handled. These particular jellyfish (Aurelia) were expected to have low TS. The measurement given is of average TS, the variation being about 3dB, a maximum value of 3 dB per target. TS is seen to increase slightly with diameter. All the TS are in the range where we expect small fish TS to lie, so we must take the presence of jellyfish into account when fish abundance surveys are being carried out.

DR.CUSHING: Yes, the jellyfish are Aurelia not the sort with air bubbles in (Siphenophores).

DR.F.R.HARDEN JONES: What happened when there were air bubbles trapped beneath the umbrella ?

MR.NAKKEN: TS of -40, -43 dB were obtained.

DR.B.S.McCARTNEY: Could I ask if you have done any other measurements on properties of jellyfish, that is the density and compressibility. It worries me that on measurements like this, however careful one is and I know the difficulties, the possibilities of even minute air bubbles make enormous differences to the TS. Even though the air bubbles cannot be seen, there is a possibility that air is present in the experiment which may not be there in the sea. From the check of these figures at -50dB or so it would be nice to see some measurements of density which, one assumes, will be very close to unity for the jellyfish to be near ventrally buoyant and more particularly some measurements on compressibility so that we get some idea of why these TS are so high.

MR.NAKKEN: We were not able to carry out such measurements all this time.

DR.PAWSON: Did you make any dorsal TS measurements on jellyfish ?

MR.NAKKEN: That is not easy because we put the nylon cord through the jellyfish and had a very small disc on the other side and the jellyfish were moving, swimming, fluctuating from one side to another on the suspension which was approximately 15cm.

DR.PAWSON: Would the concave as opposed to the convex surface make any difference ?

MR.NAKKEN: I don't know, this is the ventral aspect that we measured.

DR.F.R.HARDEN JONES: Did any free living jellyfish swim across your sounder beam ?

MR.NAKKEN: Yes, but never through the acoustic axis.