

ADVANCES FOR FISH ABUNDANCE ESTIMATION

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The possibility of several technical procedures for fish prospection on board the R/V "Cornide de Saavedra" suggest new methods in biomass evaluation.

The first aim is to obtain the most exact measure from this aspect connected with the environmental parameters. The biological as well as physical and chemical properties are simultaneously determined.

The system is constituted by an echosounder, SIMRAD EK 38 linked to an Integrator QM (SIMRAD).

The possibility to obtain individual echoes and the integrated values for each minute (time) or nautical mile (space) was utilized in this and several of the oceanographical cruises. Only two levels can be examined with a maximum amplitude of 200 meters in each level. An important advance is to survey total biological information in a very narrow vertical scanning.

The possibility of passing directly the echointegrator information to a computer (IBM 1130) through a suitable interface, (explained in last part) gives a quantitative, real time information of several echo intensities during each pulse of the transducer. The picture is the same as the vertical distribution of the several echos received in the echosounder recorder, whose integration is equivalent to the integrated value in the channel A of Integrator using the "Function Soundino"

The picture is similar to the marine distributions of bodies transmitting echos.

This method has just echo-transmitting bodies been developed and several points especially for its interpretation, are now being investigated.

The particular marine ground examined has been analyzed for the following aspects: 1) bottom fishing; 2) graphic control in SIMRAD EK 38 echosounder, channel A.1 (hallow water); 3) Integrator one channel, function Sounding; 4) recorded on magnetic tape for its ulterior examination in the laboratory and; 5) scanning of each individual echo by means of the "interface" and computer.

Ther last four aspects are redundant and only the experimental bottom fishing is the controlling aspect particularly for bottom biomass. Hydrographical stations were made in the initial and the final points of the area (for know of the physical and the chiminal oceanographical properties).

The most important difficulty we are facing to adequately develop this system is centered in the correct interpretation of the series of values obtained in the vertical and total scanning: first point by the inherent complexity for the same special mechanisms of the gear system and second two, from the great biological variability of the echos returns.

The problem related to the correct interpretation of the several echos reponses are the same that in the integrator values. Is possible this problem prior elucidated than the others problems from the biological nature of marine echos.

TABLE I

Trawling nº 3 1 May 1973 1.500 - 1.600
 Botton depth 20 meters
 Num. of individuals with length above 20 cm. (xx) 31

Biomass distribution

<u>Depth (meters) (x)</u>	<u>Nº echoes</u>	<u>Integral</u>	<u>Mean</u>
10,2	1	31	31
17,3	3	19	6
17,6	14	441	31
18-	12	530	44
18,3	8	224	28
18,7	11	219	19
19-	3	86	28
19,5	3	69	23
19,7	2	47	23
20-	2	71	35
Total	<u>59</u>		

(x) Depth interval at which trawl operates (average opening 5 m.)

(xx) Resolution length of the echosounder

TABLE II

Relation between echo-intensity and gish size (above 20 cm.)
 contributions.

<u>Size</u>	<u>Number of fish congh</u>	<u>Relative Echo- Intensity</u>	<u>Number of echoes</u>
21-23	10	1-20	18
24-26	4	11-20	5
27-29	5	21-30	6
30-32	2	31-40	12
33-35	6	41-50	1
36-38	1	51-60	7
39-41	0	61-70	1
42-44	2	71-80	3
45-47	1	81-90	2
48-50	0	91-100	1

Table I shows the distribution with depth of the number of echoes with response and the energy integration at each depth level (30 cm.) as well as the mean value of the received energy. We have only considered a zone 10 meters above the bottom where the bottom trawl with a vertical opening of about 3 to 5 meters way be working.

The difference between the number of echoes received (59) and the number of gish caught, with total length above 20 cm. considered as the minimum detectable size (31) may be due to fish escaping the mouth of the trawl.

On the other and Table II shows some accordance between the energy distribution of the received echoes and the size distribution of the caught fishes.

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