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Stock assessment of Loligo in ICNAF Subarea 5 and Statistical Area 6

by

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Introduction

Stock assessment of Loligo in ICNAF Subarea 5 and Statistical Area 6 had been made by the areal method for four seasons from 1968/69 to 1971/72 (Ikeda et al, 1973). This method was again applied to the two recent seasons, 1972/73 and 1973/74. Results of calculations are shown in Table 1.

Calculated initial stock size of squid do not vary greatly for five seasons up to 1972/73. All values fall in the range of 600-700 x 10^6 individuals in spite of considerable change in the area of fishing grounds covered. In 1973/74, however, the initial stock size estimated is well over the range and amounts to 779 x 10^6 individuals, although the area covered by Japanese commercial fleets was very limited, roughly less than half of the areas in the previous seasons. This aparently indicates the behaviour of commercial fleets reflected by the density of squid.

As was mentioned in the previous paper, the stock size estimated by the direct method (areal method) must be more or less underestimated because some unknown fraction of squid stock are distributing outside the fishing grounds. The survey by the Albatross IV in 1968 and 1969 indicates that Loligo were collected from wider area on the shelf up to 200 m

in depth particularly in fall (october-November). Even in spring (March-April). they were observed widely along the contour of 100-200 m in Divisions 6B-C, 6A, 5Zw and 5Ze. The stock size estimated by areal method, therefore, must be far below the real value.

For better estimate of the stock size, Pope's Cohort Analysis was applied on the basis of the 1972/73 data. In view of long spawning season and fast growth of this species, three groups are picked up, squid of 9.8 cm in mantle length as April blood as of October, those of 8.3 cm as May blood and those of 6.8 cm as June blood. Stock size, as of October, of each of those groups are calculated by the Pope's method. Based on the calculated stock size and the catch in October, the rate of exploitation were estimated. The rate of exploitation, thus estimated, was about 0.01. Since the total catch in October was 15.08×10^6 individuals, the total stock size in number in October would be approximately $1,500 \times 10^6$ squids. Mean body weight during the 1972/73 fishing season was 59 g, so that the total biomass of squid must be 88×10^3 tons.

REFERENCES

Grosslin, M.D. and E. Bowman 1973 Mixture of species in Subarea 5 and 6. ICNAF Redbook, 1973 Part III (163-208)

Ikeda I., F. Nagasaki and H. Imanaga 1973 Stock assessment of common American squid in ICNAF Subarea 5 and Statistical Area 6. ICNAF Redbook, 1973 Part III (145-151)

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Table 1. Stock size in number of squid in Subarea 5 and Statistical Area 6.

Item	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
Area of fishing grounds (km^2)	5,145	6,688	7,974	5,917	6,174	2,830
Catch per haul in number (10^3)	33.41	29.07	21.28	32.75	36.18	106.36
Hours per haul	1.61	1.72	1.64	1.82	2.09	2.29
Speed of net (knots)	3.75	3.75	3.75	3.75	3.75	3.75
Width of the wing (m)	25	25	25	25	25	25
Area covered by one haul (km^2)	0.280	0.299	0.285	0.317	0.363	0.398
Density ($10^3/km^2$)	119.3	97.2	74.7	103.3	99.7	267.2
Stock size on the grounds (10^6)	613.8	649.4	595.7	611.2	615.4	756.3
Initial stock size (10^6)	628.6	693.1	641.7	634.6	628.2	779.3

Table 2 Possible stock size of Loligo in Subarea 5 and Statistical
Area 6.

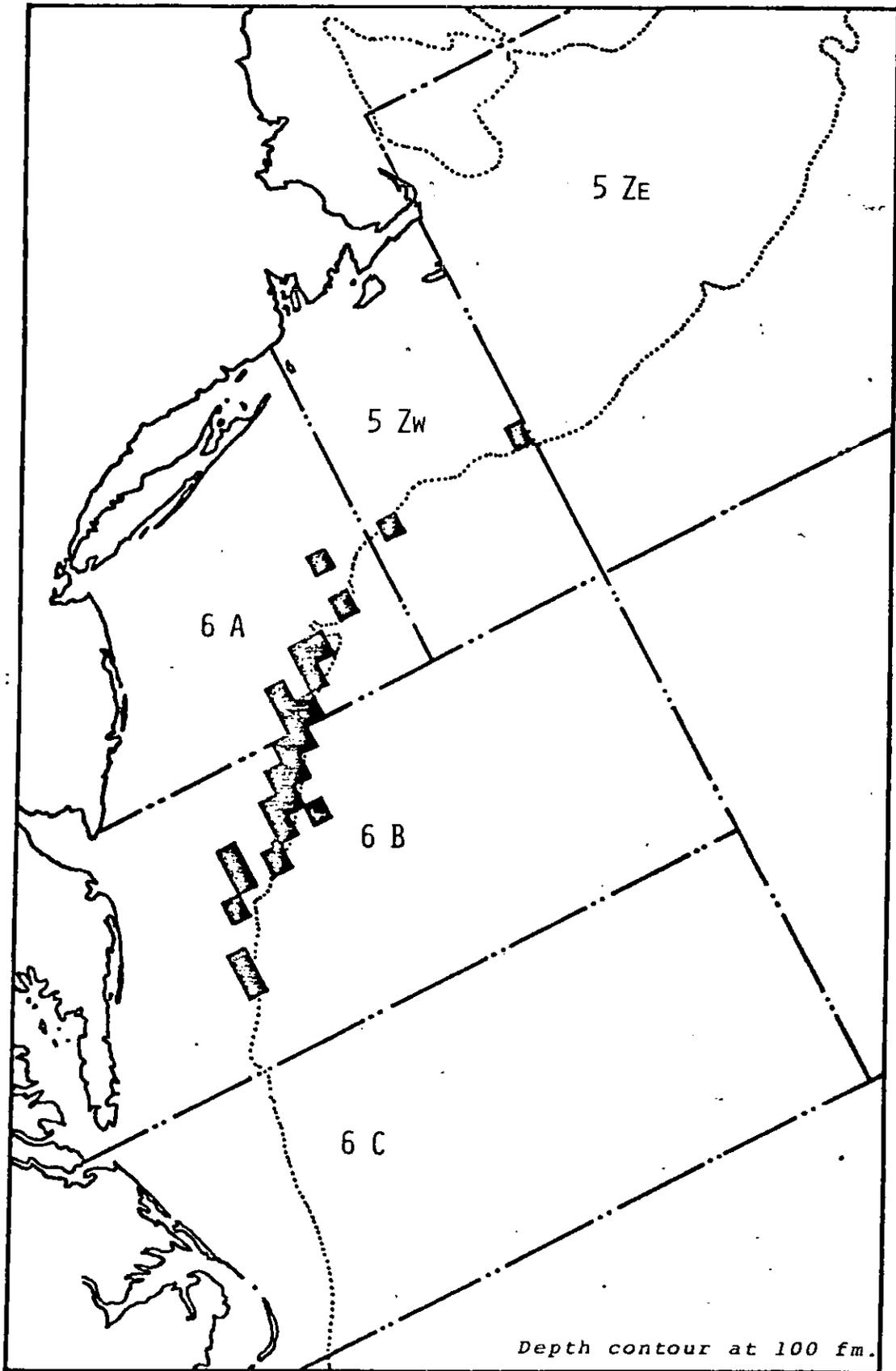|	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74
Stock size (10^6)						
by areal method	628.6	693.1	641.7	634.6	628.2	779.3
by Pope's method			1,500			
Mean body weight (g)	71	70	65	77	59	68

Fig. 1   Fishing grounds operated by Japanese trawlers during the first

ten days in December, 1972.   Estimation of stock size of common

American squid in 1972/73 fishing season is based on this area.

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