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The 1984 Fishery for Illex illecebrosus in SA 4 and
Biological Characteristics of the Stocks

by

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Introduction

The SA4 fishery for Illex illecebrosus has been summarized for previous years by Waldron (1979a, 1979b), Amaratunga & Roberge (1981), Amaratunga et al (1982), and Rowell & Budden (1983, 1984). This paper describes the 1984 fishery as well as the biological characteristics of Illex as derived from both the international observer program and research survey data.

Material & Methods

The FLASH information system provided statistical information on the international offshore fishery, including for each participating country, area fished, squid by-catch, directed squid catch, and directed effort days. Information on the Canadian offshore fishery and the inshore fishery were obtained from quota management reports and sales slip data summaries respectively.

Biological data from the international offshore fishery were obtained from random samples by international observers. Research cruises also provided biological and hydrographic data for the offshore areas. Morphometric measurements were taken at sea by international observers on samples of 100 squid as described by Amaratunga & Durward (1979). Measurements on research survey samples and on samples from the IOP processed in the lab were taken on 50 squid. These data were used to describe size and weight composition, growth, and the progression of maturity stages throughout the on-shelf residency sampling period.

International Offshore Fishery

Six countries (Cuba, France, Japan, German Democratic Republic, Portugal, and the U.S.S.R.) reported by-catches of Illex in the international offshore fishery during 1984. Japan was the only nation to carry on a fishery for Illex, with 7 days of directed effort (Table 1).

The distribution of fishing effort in the years 1981-84, based on the locations from which international observer samples were taken, are presented in Fig. 1. In 1984 the fishery operated between 60°W and 63°W along the small mesh gear line with most of the effort between 61°W and 63°W. This is similar to the distribution of effort in 1982 and 1983 when it was concentrated between 62°W and 63°W.

A total of 403.3 tons were landed in the 1984 international offshore fishery; all from SA4 (Table 1, Fig. 2). This level of landings essentially matches the 1983 catch of 408.6 tons. Although these landings are very low, compared to the 1979 peak of more than 65,000 tons in SA4, this is the first year since 1979 that landings have not decreased from the previous year's level (Fig. 2).

The directed fishery accounted for only 16.2 tons (4%) of the total in 1984 compared with 332.6 tons (81%) of the total in 1983 and directed effort was down significantly from 61 days in 1983 to 7 days in 1984. However, catches of squid as by-catch in the silver-hake fishery increased from 75.7 tons in 1983 to 387.1 tons in 1984, the bulk of this being taken by the U.S.S.R.

Squid was first reported as by-catch during week 17 (last week of April), approximately 8 weeks earlier than in 1983, and even slightly earlier than in the years 1979-1982 (Table 1, Fig. 3). Catches remained low until the first week of July (week 27) when both Cuban and Soviet by-catches increased substantially. The cessation of U.S.S.R. by-catch after week 33 reflects the departure of the U.S.S.R. vessels from the area as they reached their silver hake quota.

The directed fishery operated in weeks 35 & 36 and again in week 41, however, directed catches only occurred in weeks 35 & 36. The average 1984 CPUE of 2.31 tons per day was only about half the value for 1983 of 5.45 tons per day and similar to that of 1982 (2.40 tons/day).

Canadian Domestic Fishery

There was no participation in the Canadian offshore fishery in 1984.

The inshore fishery in SA4 landed only one ton; a continuation of the decrease from 1130 tons in 1982 and 8 tons in 1983.

Biological Characteristics

Mean mantle lengths obtained by averaging the first three weeks of data from the international observer program indicate the first arrivals in 1984 were considerably larger and between one and two months earlier than the first 1983 arrivals (Table 2). These early season squid were similar in size to those seen in the same periods between 1978 and 1982.

Data on mean weight of squid in each week from international observer and research surveys are presented for the years 1977-1984 in Table 3. Mean weights early in the season were similar to previous years, with the exception of 1983 when the squid arriving on the shelf were very small. After week 33 samples came primarily from research surveys and mean weights were, as in 1982 and 1983, significantly lower than in years 1977-1981. Mean weights decreased due to an influx of smaller squid after week 40. This influx is apparent in the length frequency data from the international observer program (Fig. 4), where a second cohort of squid having mantle lengths in the range of 100-135 mm is seen after week 31, and in the decrease in mean mantle lengths seen after week 40 (Fig. 5).

The growth pattern during the period of on-shelf residency, for male and female Illex in 1984, as determined from research survey and observer sample data, is presented in Fig. 5. These data suggest that squid captured in 1984 displayed a similar growth pattern to animals caught in 1977-1982, and were larger earlier than animals caught in 1983.

Cumulative percentage of squid at each maturity stage and mantle length are presented in Fig. 6. In males, maturity stages 1 & 2 predominated with only a few stage 3 specimens appearing around week 24, and then later again after week 36. In general, female maturity stage 1 & 2 predominated, although by week 42 more than 50% had reached maturity stage 3. Nidamental gland/mantle length ratios suggested small numbers of stage 4 and stage 5 were present as early as week 20 in females greater than 160 mm ML, but with no confirmation from detailed observations on the state of the reproductive organs, these must be considered suspect.

References

- Amaratunga, T., and R.D. Durward. 1978. Standardization of data collection for the short-finned squid Illex illecebrosus. ICNAF Sel. Papers, No. 5, 37-41 p.
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- Amaratunga, T., J. Young, and F. Budden. 1982. Update for 1981 of the squid Illex illecebrosus fishery in Subarea 4. NAFO SCR Doc. 82/VI/29, Ser. No. N517.
- Rowell, T.W., and F. Budden. 1983. The 1982 Fishery for Illex illecebrosus in SA4 and Biological Characteristics of the Stock. NAFO SCR Doc. 83/VI/40, Ser. No. N694.
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- Waldron, D.E. 1979a. Catch and Effort Statistics from the 1978 International Squid (Illex illecebrosus) Fishery in Subarea 4. ICNAF Res. Doc. 79/11/18, Ser. No. 5344.
- Waldron, D.E. 1979b. Assessment of the 1978 4VWX Squid (Illex illecebrosus) Fishery. ICNAF Res. Doc. 79/11/19, Ser. No. 5345.

Table 1. Catch (t) of Illex, directed effort (days), and CPUE (directed) of countries participating in the 1984 international fishery in SAH.

WEEK ENDING	CUBA		JAPAN		PORTUGAL		USSR		OTHER COUNTRIES		TOTAL	
	By- catch	Dir. days	By- catch	Dir. days	By- catch	Dir. days	By- catch	Dir. days	By- catch	Dir. days	By- catch	Dir. days
Apr 28 (17)									0.72*			
May 05 (18)												
May 12 (19)												
May 19 (20)	0.70						0.10		0.05**			
May 26 (21)												
Jun 02 (22)	0.80						0.80					
Jun 09 (23)	5.80						6.10					
Jun 16 (24)												
Jun 23 (25)												
Jun 30 (26)												
Jul 07 (27)	26.60			7.59			119.30					153.49
Jul 14 (28)												
Jul 21 (29)												
Jul 28 (30)	2.50			7.94			93.30					103.74
Aug 04 (31)							52.20					52.20
Aug 11 (32)							4.00					4.00
Aug 18 (33)							5.10					5.10
Aug 25 (34)							1.20					1.20
Sep 01 (35)			7.40	10.20	4	2.55						7.40+10.2
Sep 08 (36)			39.00	6.00	1	6.00						39.00 6.0
Sep 15 (37)			3.60									3.60
Sep 22 (38)			1.60									1.60
Sep 29 (39)												
Oct 06 (40)			0.70		2	0.00						0.70 0.0
Oct 13 (41)												
Total	36.4		52.3	16.2	7	2.31	15.53	282.10	0.77			387.1 16.2 7 2.31

*France
**German Democratic Republic

Table 2. Mean Squid Length at Arrival on Shelf.

Year	Male	Female
1978	145.29 (17-19)	148.86 (17-19)
1979	134.16 (19-21)	140.25 (19-21)
1980	155.56 (20-22)	164.40 (20-22)
1981	140.55 (20-22)	149.68 (20-22)
1982	145.81 (22-24)	151.53 (22-24)
1983	108.22 (24-25)	113.78 (24-25)
1984	134.09 (18-20)	141.28 (18-20)*

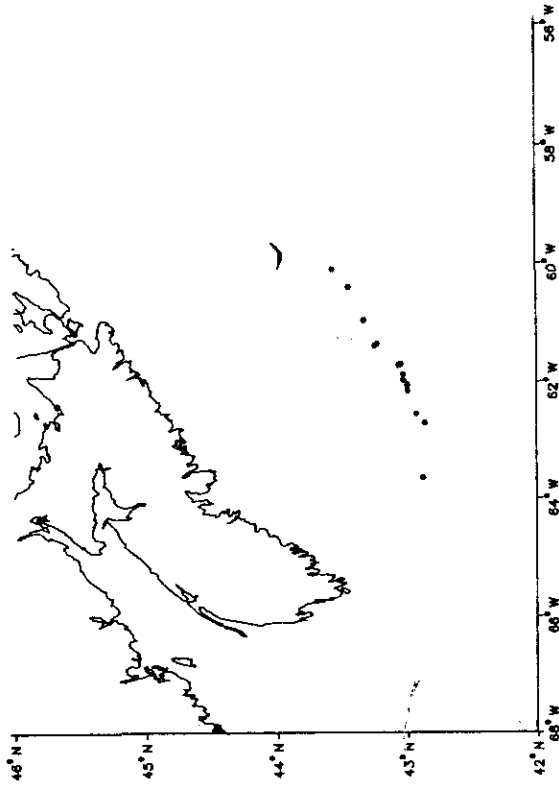
*Numbers in brackets refer to consecutive week within year. Means are obtained by averaging first three weeks of data from the observer program.

Table 3. Mean weight (g) of *Illex* from international observer samples and research surveys. Survey means are presented in parenthesis.

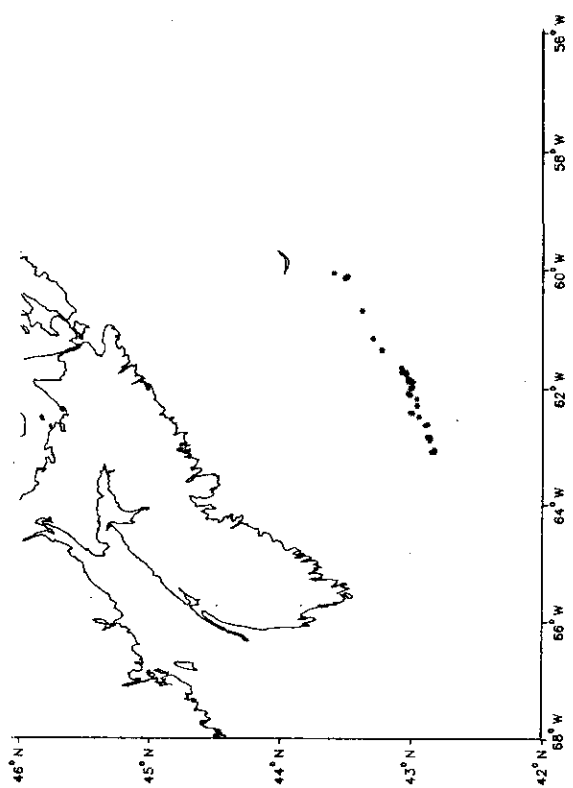
Week	1977	1978	1979	1980	1981	1982	1983	1984
16	37							
17								
18	56							45.0
19						67.5		53.9
20	70				(31.1)			79.5
21				150.0 (97.9)	76.2			66.2
22	101			90.1	54.8 (51.0)	57.9		86.7
23				97.8	(59.9)	58.6		71.4
24	123			103.9 (96.3)	(63.3)	80.7	15.6	90.0
25				11.2 (86.5)	120.1	74.5	38.4	90.9
26	165			85.9 (70.9)	112.6	68.0		97.9
27		137.9	137.1	136.5 (103.3)	150.5			
28	189	134.8	134.0	141.5	172.8		(42.1)	143.6
29		138.4	138.1	92.5	192.8	94.4		116.2 (84.1)
30	197	189.6	149.9	104.3	174.5	112.5	(39.3)	133.2 (91.4)
31		159.9	159.8	130.3	-			108.4 (52.2)
32	213	171.1	169.7	101.7	203.5	132.8	86.1	
33		179.8	179.5	205.7	206.2		86.0	
34	240	189.8	189.4	215.3	209.8	130.0	121.3	
35		199.3	199.3	138.4	231.4	109.9		165.4 (121.3)
36	251	209.4	209.2	196.5	248.8	117.5	120.9 (124.9)	(131.2)
37		219.3	219.1	183.6	237.2	127.2	131.6 (137.8)	(146.4)
38	265	229.2	228.9	303.3	234.8	157.2	189.4 (156.2)	(151.8)
39		239.1	238.8	217.1			(158.5)	(161.3)
40	278	248.8	248.7	233.5			(170.4)	(185.0)
41		258.7	258.6	249.2				(110.6)
42	289	268.7	268.5	225.7				*(224.7)
43		309.0	308.2	264.2				(120.1)
44	305	312.3	311.5	292.1			(113.56)	(76.9)
45		314.5	313.8	240.0			(108.38)	
46	286	277.5	275.5	243.4				
47		292.2	291.8	285.1				

*small sample size - only 14 animals.

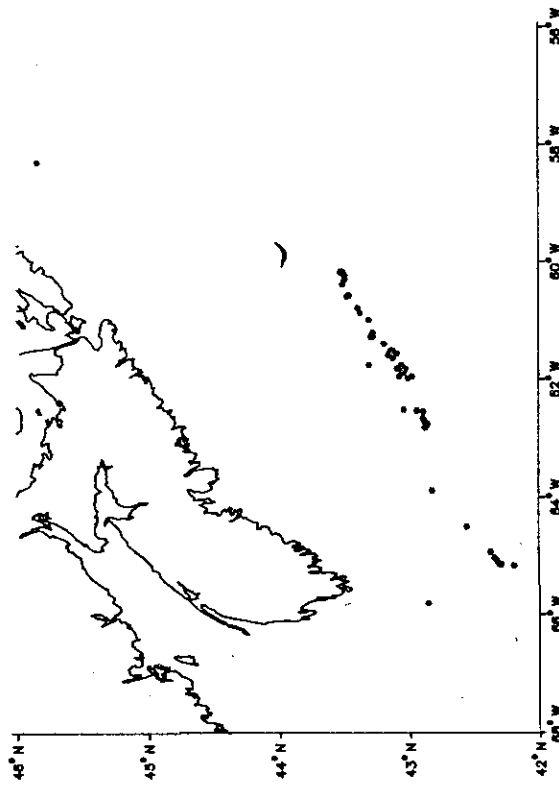
OBSERVER SAMPLES - 1982



OBSERVER SAMPLES - 1984



OBSERVER SAMPLES - 1981



OBSERVER SAMPLES - 1983

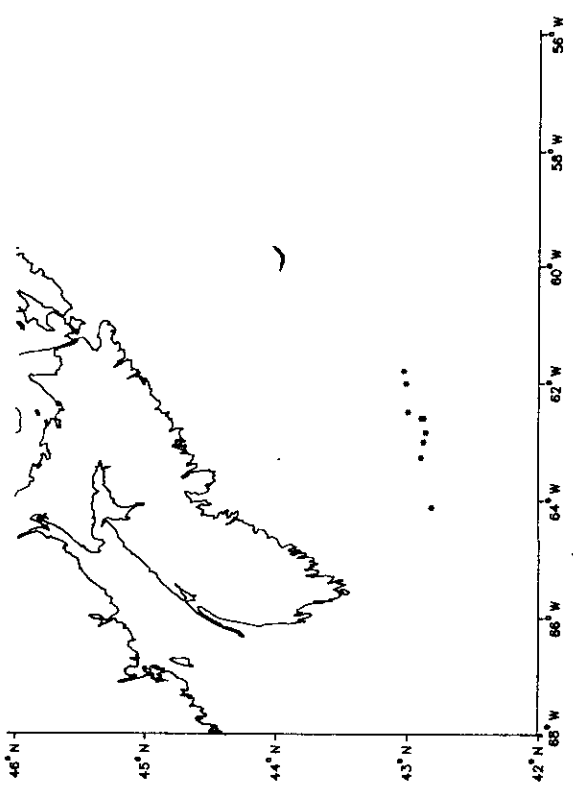


Fig. 1. Locations sampled by international observers during 1981 to 1984 squid fisheries in SA 4.

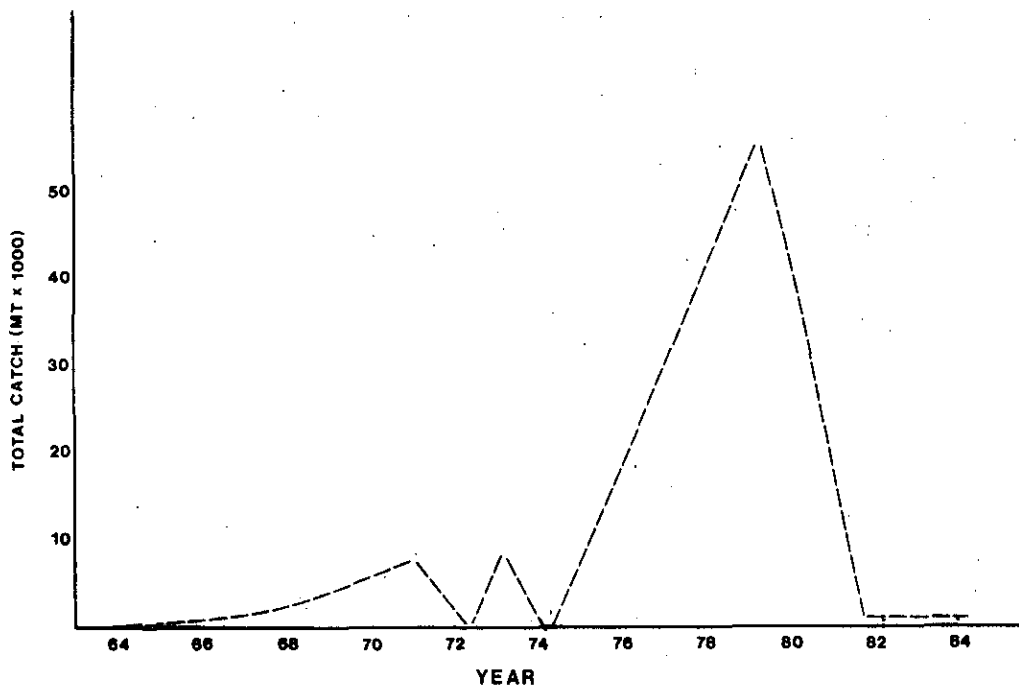


Fig. 2. Annual catches of *Illex illecebrosus* by the international fishery in SA 4.

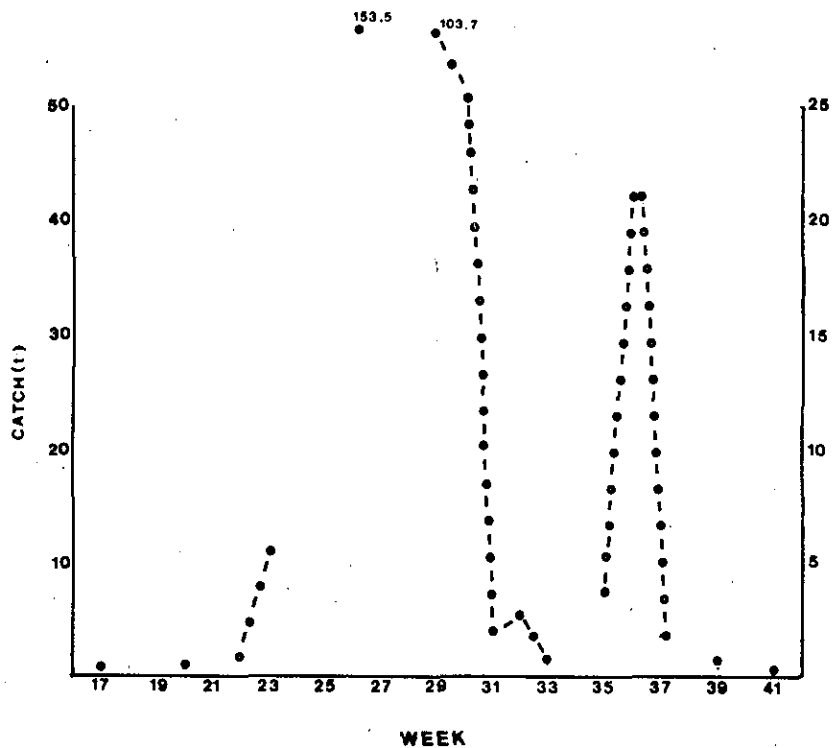


Fig. 3. Non-directed squid catches as reported to FLASH for 1984 for Subarea 4.

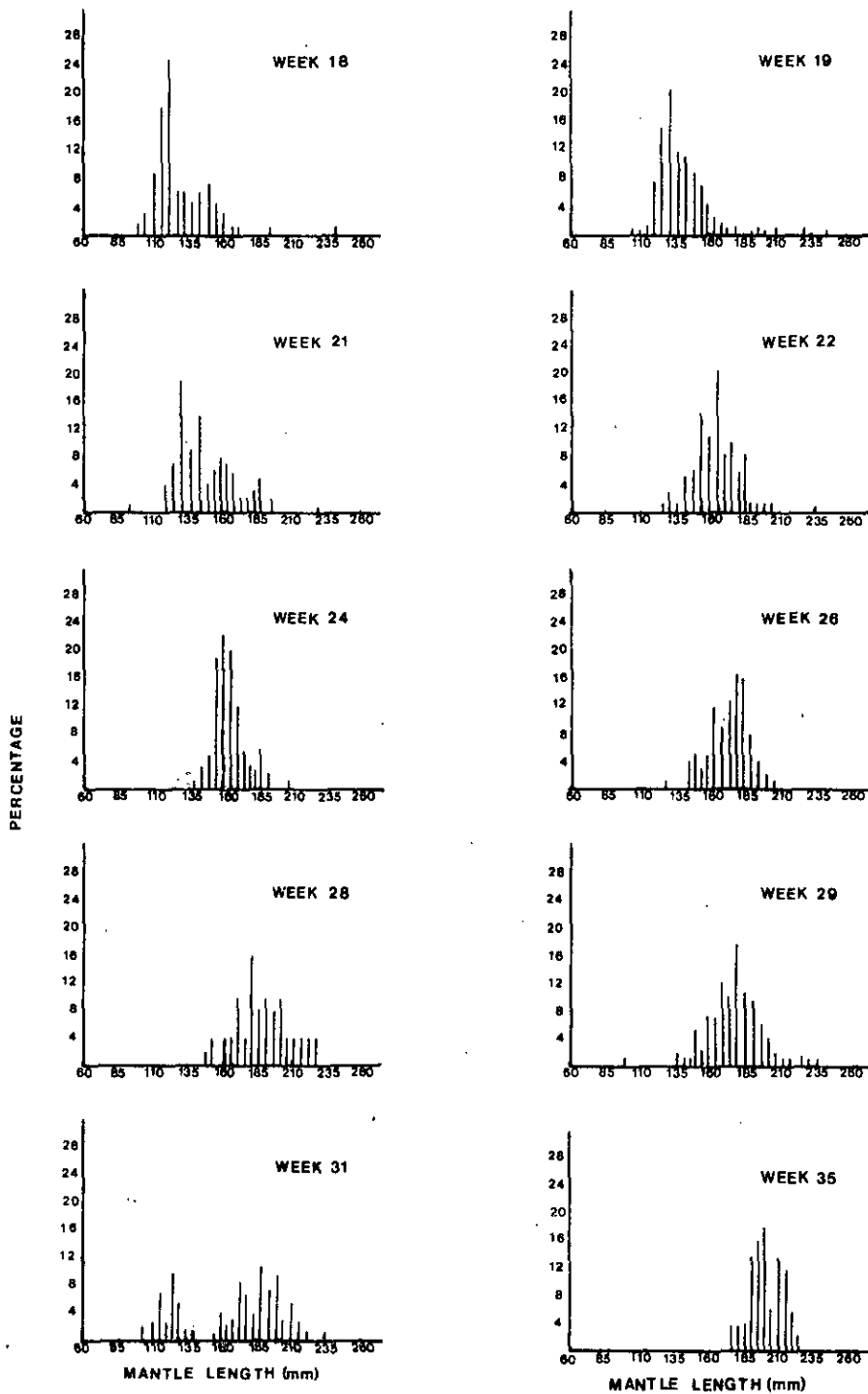


Fig. 4. Percent length frequency distribution of *Illex* from international observer samples.

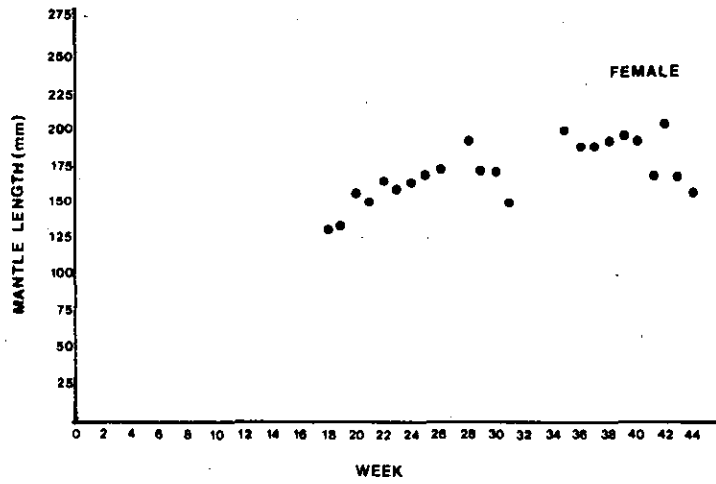
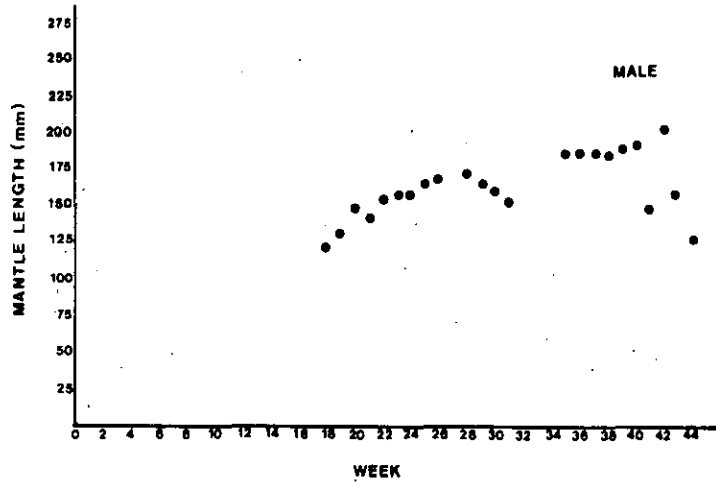


Fig. 5. Mean mantle lengths of *Illex* in 1984 from research and international observer data.

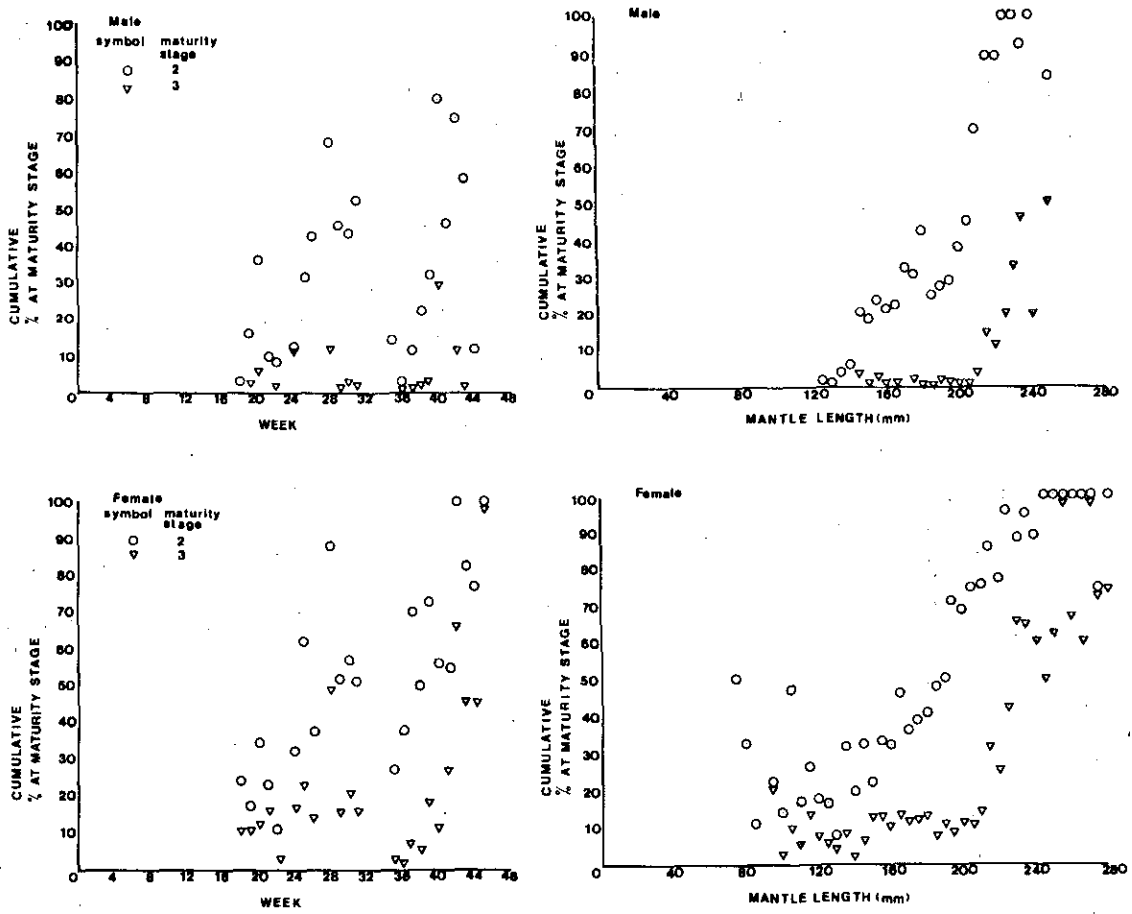


Fig. 6. Cumulative percentage of squid at each maturity stage by week and mantle length. Immature stage 1's are not shown. Data is from research survey and laboratory sampled international observer data.

