Northwest Atlantic Fisheries Organization

Serial No. N1140

NAFO SCR Doc. 86/26

SCIENTIFIC COUNCIL MEETING - JUNE 1986

The 1985 Fishery and Biological Characteristics of Illex illecebrosus in Subarea 4

by

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Introduction

The SA4 fishery for Illex illecebrosus has been summarized for previous years by Waldron (1979a, 1979b); Amaratunga and Roberge (1981); Amaratunga et al. (1982), and Rowell and Budden (1983, 1984, 1985). This paper describes the 1985 fishery as well as the biological characteristics of Illex as derived from International Observer Program (IOP) sampling.

Materials and Methods

The FLASH information system was used to obtain 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 taken and frozen at sea by international observers and later treated in the laboratory. In the laboratory 50 squid from each sample were processed and the data used to describe size and weight composition, growth, and the progression of maturity stages throughout the squids' on-shelf residency period. Maturity stages are as defined by Amaratunga and Durward (1979).

International Offshore Fishery

Three countries (Cuba, Japan, and the U.S.S.R.) reported by-catches of

Illex in 1985 (Table 1). The directed fishery consisted of a single days effort by Japan.

Figure 1 shows the distribution of International Observer Program (Scotia-Fundy Region) sampling in 1985 as well as the distribution of squid catches (kg/hr) per 0.5 degree square. As in previous years, the bulk of squid catches were from the area enclosed by the SMGL. It was only in July and August that catches dominated by Illex were taken.

A total of 240.1 tons of squid were caught in the 1985 international fishery; all from SA4 (Table 1, Fig. 2). This is the lowest catch level since the 1960's and represents a continuation of the decline which has persisted since the peak year of 1979.

The directed fishery accounted for only 0.1 ton of the 1985 total, with only one day of effort being expended.

Catches of squid as by-catch were of the same order of magnitude as in 1983 and 1984, amounting to 240 tons. As in previous years, the bulk of the by-catch was taken by the U.S.S.R. in the silver hake fishery.

Squid were first reported as by-catch during week 21 (mid-May). This arrival time, although 3 weeks later than in 1984, is similar to that seen in most recent years (Table 1 and 2, Fig. 3). Catches remained very low (<10 tons/wk) until week 28 (mid-July) after which they rose to a peak of 69 tons in week 32 (mid-August) and then declined rapidly.

Canadian Domestic Fishery

There was no participation in the offshore fishery by Canadian vessels in 1985. Landings in the SA4 inshore fishery remained very low at 11 tons.

Biological Characteristics

Mean mantle lengths (ML), obtained by averaging the first three weeks of data from IOP samples, indicate that the first squid arrivals in 1985 were slightly smaller than those seen in recent years (1978-1984) with the sole exception of 1983 (Table 2, Fig. 4).

Figure 4 presents mean mantle length (sexes combined) of first sampled arrivals against week of sampling (mid-point of sample period) for the years 1978-85. Although a regression of ML against week of sampling first arrivals gives a very poor correlation (R^2=0.25), the data do suggest that in years when squid arrive on-shelf later in the season they are also smaller.

Data on the mean weight of squid, by week, from both International Observer Program samples and research survey samples (except for 1985) are

presented for the years 1977-1985 in Table 3. Mean weights early in the season were similar to those seen in previous years, but did not show the same degree of increase as the season progressed. This very limited progression in weight is parallelled by the small degree of shift in population structure seen in Figure 5. Mean weights remained low both because of the smaller size distribution of the population as a whole (modes of 150, 170, and 155 mm in weeks 28, 29, and 33 respectively) and the influx of smaller squid after week 29.

Mean lengths (ML) by week for both males and females are shown in Figure 6. Although the pattern of increasing mantle lengths, as the period of on-shelf residency increases, is the same as seen in other years, mean mantle lengths were generally less than previously observed.

The cumulative percentage of squid at each maturity stage, other than stage 1 (immature), and mantle length are presented in Figure 7. For males, stages 1 and 2 predominated, with a few stage 3 animals (7 squid in a sample of 74) appearing during week 21 (mid-May) at mantle lengths between 145-180 mm. Stages 1 and 2 also predominated for females, and again in weeks 21-26 a few more mature animals showed up (in a sample of 77 animals 24, were stage 4 and 1 was stage 5).

Mantle lengths of stage 4 females ranged from 160-220 mm, while the one fully mature (stage 5) had a mantle length of 210 mm.

Acknowledgements

The authors thank G. Black for his assistance with computer graphics.

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Table 1. Catch (t) of Illex, directed effort (days), and CPUE (directed) of countries participating in the 1985 international fishery in SA4.

	CUBA				JAPAN				USSR				TOTAL			
WEEK ENDING	By-catch	Dir. catch	Dir. days	CPUE	By-catch	Dir. catch	Dir. days	CPUE	By-catch	Dir. catch	Dir. days	CPUE	By-catch	Dir. catch	Dir. days	CPUE
June 1 (22)									0.5				0.5			
June 8 (23)									0.2				0.2			
June 15 (24)									1.0				1.0			
June 22 (25)	0.4								3.2				3.6			
June 29 (26)	1.7								7.3				9.0			
July 6 (27)	0.2								4.3				4.5			
July 13 (28)	1.4								18.3				19.7			
July 20 (29)	2.1								30.5				32.6			
July 27 (30)	0.2								14.1				14.3			
Aug. 3 (31)	1.6								56.5				58.1			
Aug. 10 (32)									68.8				68.8			
Aug. 17 (33)									18.5				18.5			
Aug. 24 (34)									6.4				6.4			
Aug. 31 (35)																
Sept. 7 (36)					0.5	0.1	1	0.1					0.5	0.1	1	0.1
Sept. 14 (37)					2.3								2.3			
TOTAL	7.6				2.8	0.1	1	0.1	229.6				240.0	0.1	1	0.1

Table 2. Mean squid length at arrival on Shelf.

		Mantle length (mm)	
Year	Weeks	Male	Female
1978	17-19	145.29	148.86
1979	19-21	134.16	140.25
1980	20-22	155.56	164.40
1981	20-22	140.55	149.68
1982	22-24	145.81	151.53
1983	24-25	108.22	113.78
1984	18-20	134.09	141.28
1985	21-23	127.13	136.20

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		1985
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		68.8
22	101			90.1		54.8	(51.0)	57.9				86.7		38.9
23				97.8			(59.9)	58.6				71.4		42.1
24	123			103.9	(96.3)		(63.3)	80.7	15.6			90.0		65.8
25				11.2	(86.5)	120.1		74.5	38.4			90.9		
26	165			5.9	(70.9)	112.6		68.0				97.9		75.7
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		74.5
29		138.4	138.1	92.5		192.8		94.4				116.2	(84.1)	79.5
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					84.9
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.

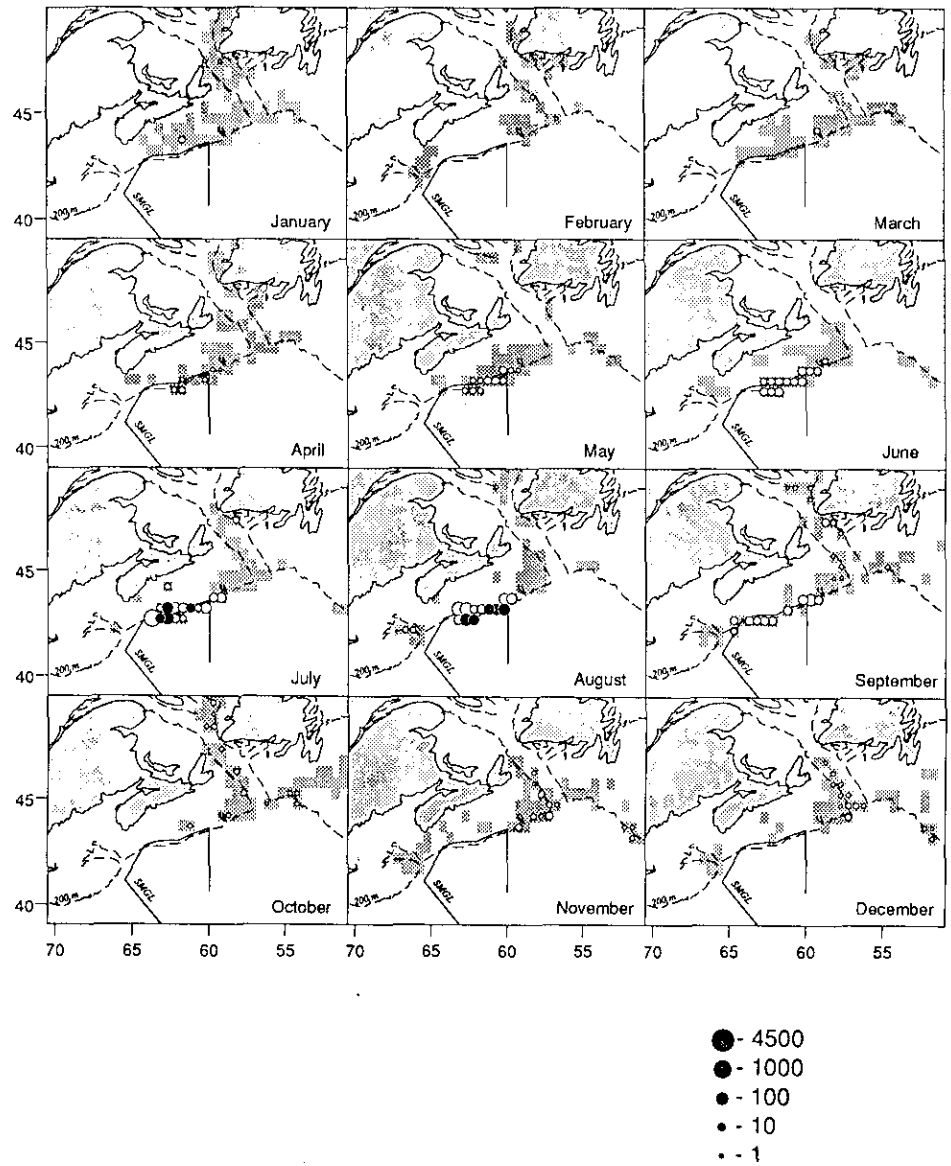


Fig. 1. Distribution of 1985 directed catch and by-catch [mean catch (kg/hr) per 0.5 degree square] of Illex illecebrosus as derived from International Observer Program sampling. Hatched areas represent sampling coverage, open circles represent squid by-catch, and closed circles represent directed catch. The 200 m depth contour and the Small Mesh Gear Line are also shown.

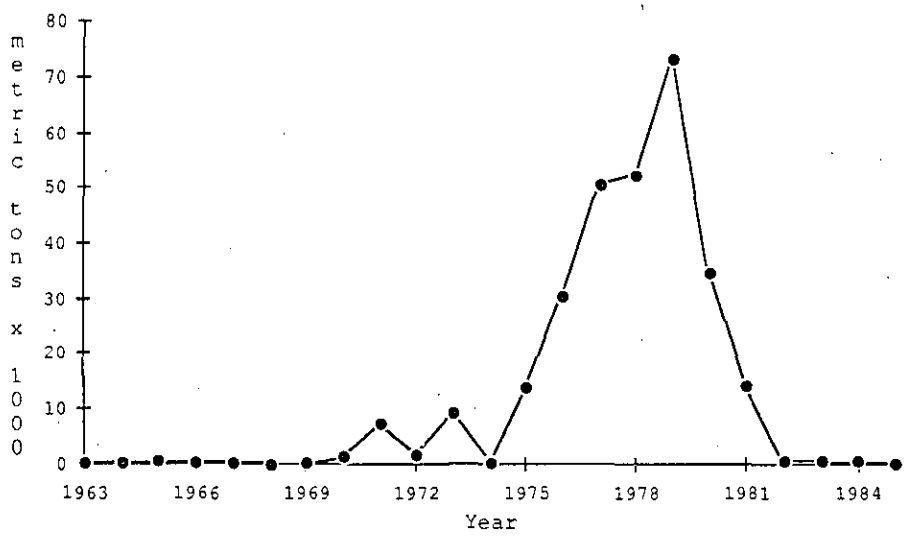


Fig. 2. Annual catches of Illex Illecebrosus by the international fishery in SA 4.

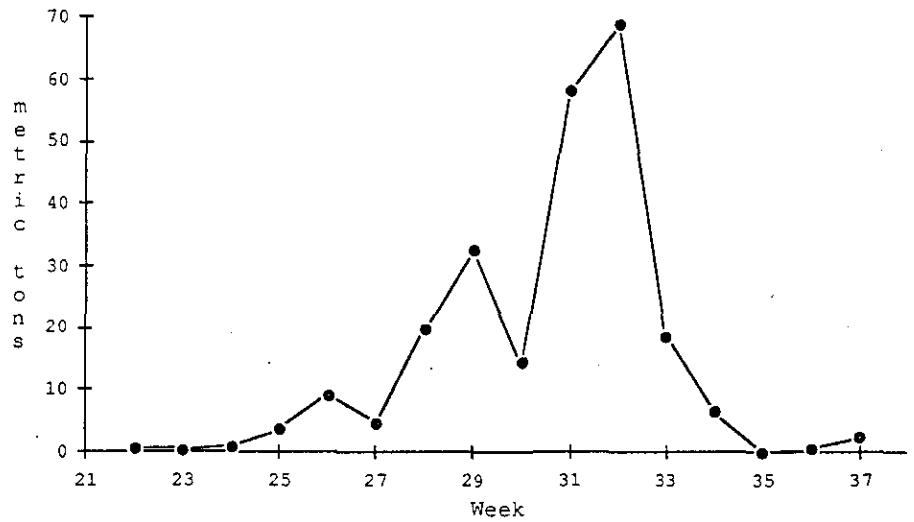


Fig. 3. Non-directed squid catches as reported to FLASH for 1985 for subarea 4.

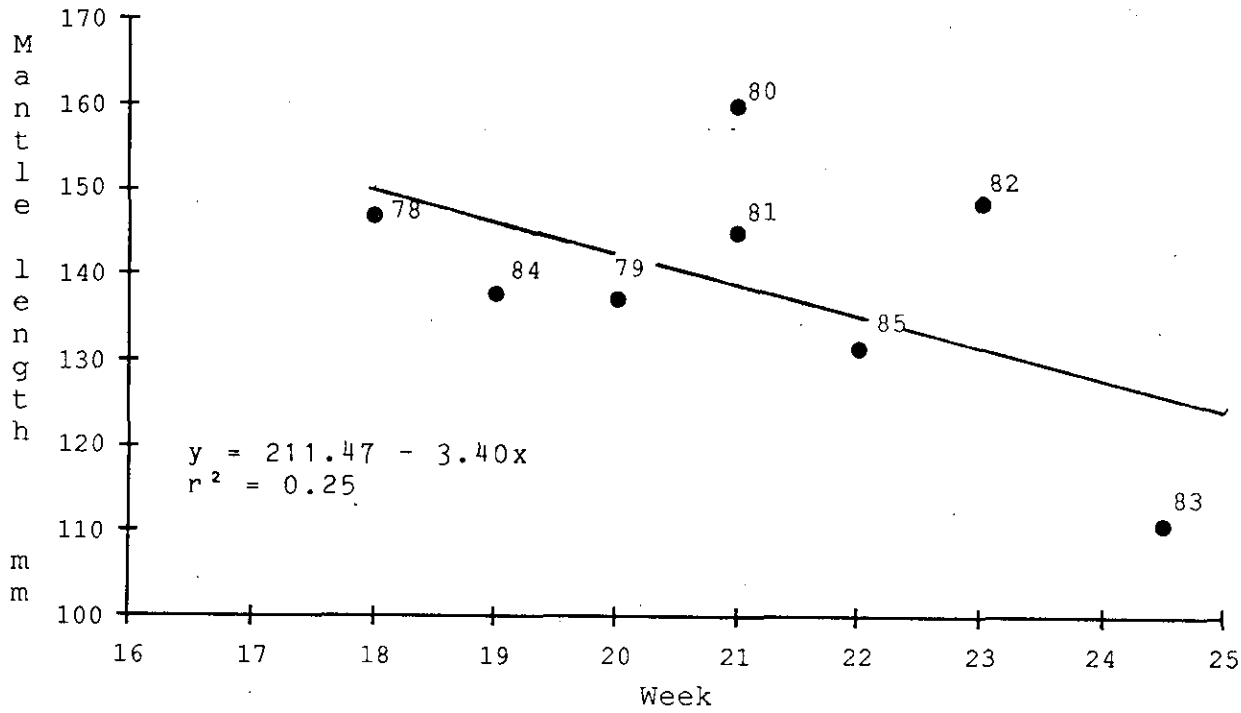


Fig. 4. Mean mantle lengths during weeks of arrival by year.

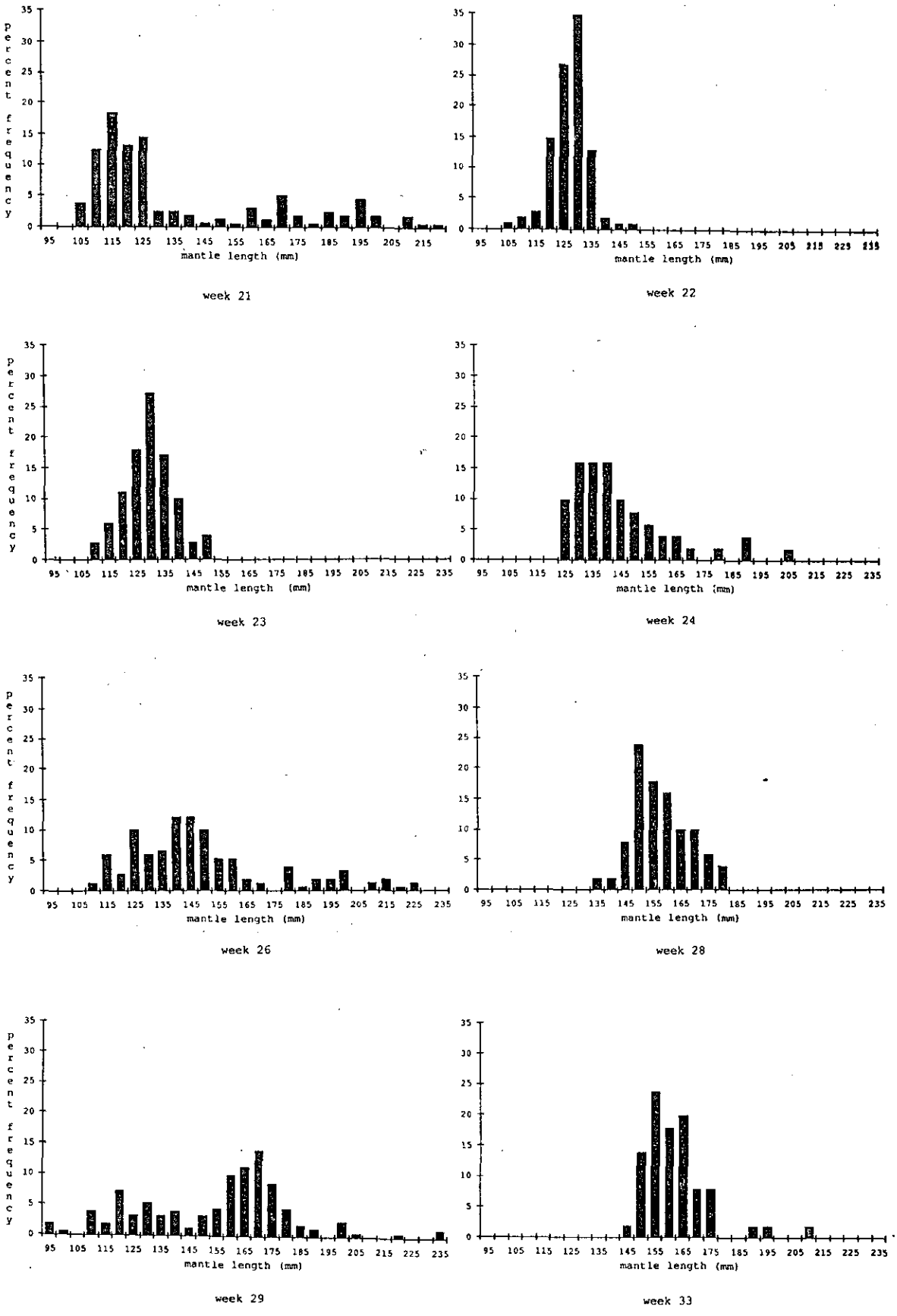
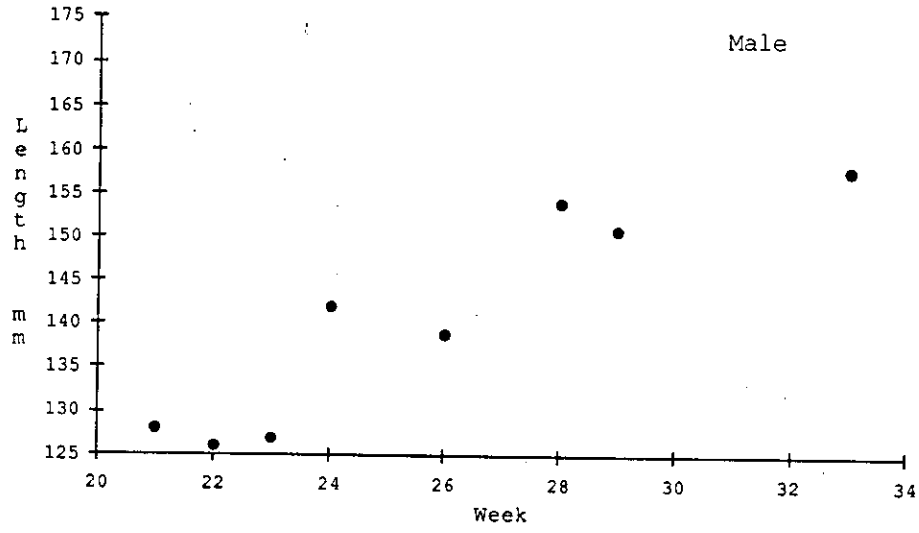


Fig. 5. Percent length frequency distribution of Illex from international observer samples.



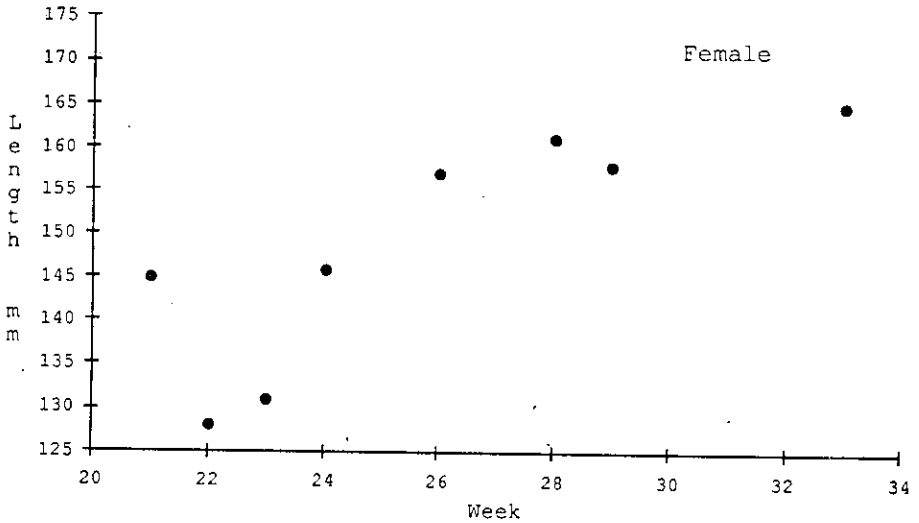


Fig. 6. Mean mantle lengths of Illex in 1985 from international observer data.

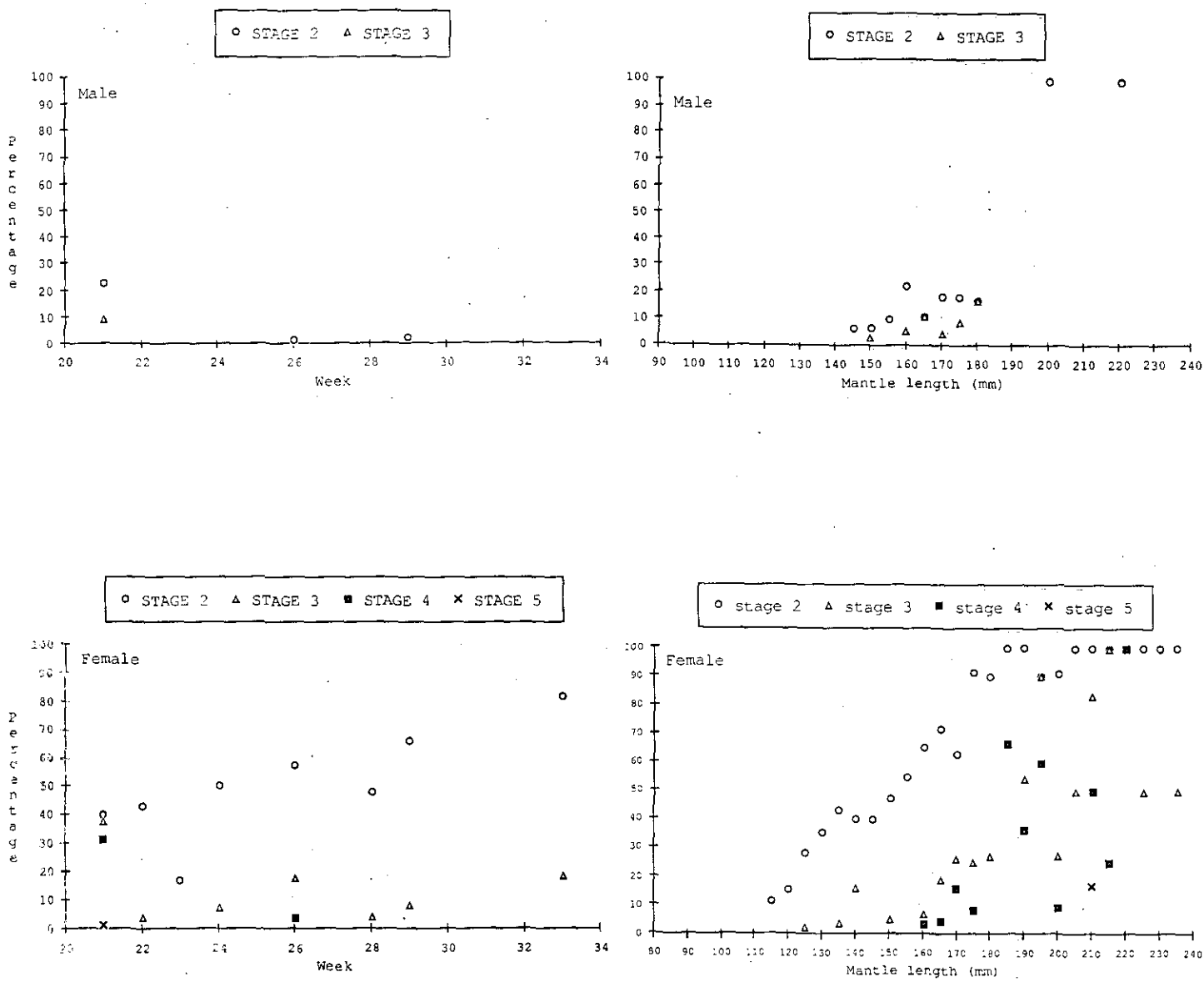


Fig. 7. Cumulative percentage of squid at each maturity stage by week and mantle length. Immature Stage 1's are not shown. Data is from laboratory sampled international observer data.