

Northwest Atlantic



Fisheries Organization

Serial No. N317

NAFO SCR Doc. 81/VI/35

SCIENTIFIC COUNCIL MEETING - JUNE 1981

Summary of 1980 Illex illecebrosus fishery in SA 4
in relation to 1977-1979 data

by

T. Amaratunga and M. Roberge

Fisheries and Oceans Canada
Resource Branch
Invertebrates and Marine Plants Division
P.O. Box 550, Halifax, N.S. B3J 2S7

INTRODUCTION

Roberge and Amaratunga (1980) summarized 1978 and 1979 inshore and offshore squid fisheries. This paper summarizes the 1980 fisheries statistics and reconsiders 1977 to 1979 offshore data.

Statistics compiled on the international and Canadian offshore fishery were obtained from the FLASH information system (Roberge & Amaratunga, 1980). Information on the area fished, vessel class, directed squid catch, squid as by-catch and effort were extracted from FLASH for this study. Inshore statistics are comprised of sales slip data summaries.

International Offshore Fishery

A total of 32 033 MT were landed offshore by the international trawlers fishing in SA 3 & 4 (Table 1), out of which 0.3 MT were caught in SA 3. This represented an overall decrease of 28% from the 1979 fishery, which caught 44 510 MT; 86% of the 1980 catch came from the directed squid fishery which opened on July 1. However, from the 2nd week in May squid were being landed as by-catch in other fisheries. These by-catches were made by Bulgaria, Cuba and USSR before 6 other countries entered the fishery on July 1. During the first

three weeks of July, non-directed landings were equivalent to or higher than the directed landings. 70.4% of the non-directed squid landings occurred before the 1st week in August. Non-directed landings in 1979 also began in the 2nd week in May and 54.1% of the total non-directed landings occurred before the 1st week in August.

Directed squid catches fluctuated through the year with a general decreasing trend (Table 1 and Figure 1). Fishing was "concentrated" (>1000 MT/week) over a 14 week period (August 4 to November 3) commencing 3 weeks later than in 1979 (July 15 to November 4). "Intensive" fishing (>1500 MT/week) occurred over an 11 week period (August 11 and October 20).

Effort showed a similar pattern to directed catch. The highest catch rates in 1980 occurred in August and September (14.97 and 13.14 respectively) which were considerable lower in comparison to the high catch rates in July and September 1979 (23.79 and 21.85 respectively).

Catch and effort reported for 1977 (Amaratunga et al, 1978) and 1978 and 1979 (Roberge and Amaratunga, 1980) were reconsidered along with new 1980 data, to determine number of Illex removed each year. Weekly (bi-weekly in 1977) mean weights of males and females taken from morphometric studies (Amaratunga et al, 1978; Amaratunga, 1980) were weighted according to sex ratio. Weekly weighted mean weights of individual squid were used to convert weekly directed catch in MT to numbers of squid (Tables 2, 3, 4 & 5). Weekly (bi-weekly in 1977) catch rates were calculated as number of squid landed per day and are depicted for 1977-1980 in Figures 2, 3, 4 & 5). Distinct downward slopes are apparent in 1977, 1979 and 1980 of the 4 years. Downward trend in 1977 began in week 24 (June 13) and in 1979 began in week 28 (July 8) and in 1980 began in week 29 (July 14). These dates correspond to when individual squid had reached only 30-40% of their potential maximum weights. The anomalous pattern in 1978 showed a general upward trend until the last 3 weeks of the fishery.

Table 6 summarizes international offshore catch statistics for 1980 by vessel tonnage class. 47% and 94% of the directed and non-directed catches respectively were taken by vessel >2000 tons. Directed catches were converted to numbers of squid landed per week for each vessel class in Table 7. Using ANOVA the monthly variations of these catch rates were tested within each vessel class and between them. Significant differences ($P < 0.01$) between catch rates were noted except between vessel classes. Because catch rates and effort varied by month, the CPUE's for August and September, which provided 61% of the total catch of Illex during 1980, were taken as most representative of differences in fishing power. Allowing a factor of 1.0 for tonnage class 151-500 tons, the factors for the other classes were 0.5 for class 501-1000 tons, 3.7 for class 1001-2000 tons, and 6.8 for vessels greater than 2,000 tons.

Canadian offshore and inshore catch

The Canadian offshore catch as reported by FLASH extended from August through to November (Table 8) in SA 4 only. A total of 1414.36 MT was caught, a decrease of 93.40% from the previous year (21 432.88 MT). The inshore catch (Maritime region only) showed a decrease of 86.69% with 872 MT (Table 9) caught in 1980 as compared to 6556 MT in 1979.

REFERENCES

- Amaratunga, T. 1980. Growth and maturation patterns of short-finned squid (Illex illecebrosus) on the Scotian Shelf. NAFO SCR Doc. 80/II/30, Serial No. N062.
- Amaratunga, T., M. Roberge, and L. Wood. 1978. An outline of the fishery and biology of the short-finned squid Illex illecebrosus in eastern Canada. In Fish. Mar. Serv. Tech. Rep. 833: 2.1-2.17.

Roberge, M., and T. Amaratunga. 1980. A review of the Illex fishery in Subareas 3 and 4, with special reference to 1978 and 1979 flash data reported to Canada. NAFO SCR Doc. 80/II/32, Serial No. N064.

Table 1. Weekly international offshore catch statistics for squid (Illex illecebrosus) in Subarea 3 & 4 as reported to FLASH for 1980.

Week	Squid Catch (MT)		Effort	Directed C/E (MT/day)
	Directed	Non-directed		
May 12(20)	-	0.10	-	-
19(21)	-	4.90	-	-
26(22)	-	51.20	-	-
June 2(23)	-	68.50	-	-
9(24)	-	135.79	-	-
16(25)	-	139.84	-	-
23(26)	-	184.12	-	-
30(27)	-	363.42	-	-
July 7(28)	411.29	389.13	37	11.12
14(29)	199.15	520.96	19	10.48
21(30)	516.93	641.30	46	11.24
28(31)	853.15	285.01	79	10.80
August 4(32)	1246.97	400.30	140	8.91
11(33)	1692.68	241.38	173	9.78
18(34)	2725.09	212.80	182	14.97
25(35)	1647.07	104.24	145	11.36
September 1(36)	2172.96	32.30	171	12.71
8(37)	1820.44	16.90	164	11.10
15(38)	2418.42	23.41	184	13.14
22(39)	1687.80	14.40	179	9.43
29(40)	1786.51	22.87	184	9.71
October 6(41)	1672.48	30.85	155	10.79
13(42)	2102.43	13.46	184	11.43
20(43)	1856.91	8.61	159	11.68
27(44)	816.31	22.70	155	5.27
November 3(45)	1211.49	6.00	158	7.67
10(46)	866.41	18.10	99	8.75
17(47)	374.41	1.10	25	14.98
TOTAL	28078.90	3953.69	2638	10.64

Table 2 . Estimated number of Illex removed in the international directed fishery in 1977. (N.B. Data are summarized bi-weekly).

<u>Date and Week Number</u>	<u>Directed Catch (MT)</u>	<u>Effort (Days)</u>	<u>Estimated Mean Wt. (gm) of Squid</u>	<u># of Squid Landed/week</u>	<u># of Squid Landed/Day</u>
Apr. 17(16)	3.3	29	37	0.89×10^6	3.07×10^4
May 2(18)	32.8	83	56	0.59×10^6	0.71×10^4
16(20)	614.3	139	70	8.78×10^6	6.32×10^4
30(22)	2575.8	184	101	25.50×10^6	13.86×10^4
June 13(24)	6111.6	245	123	49.69×10^6	20.28×10^4
27(26)	6853.6	319	165	41.54×10^6	13.02×10^4
July 11(28)	6485.3	463	189	34.41×10^6	7.43×10^4
25(30)	7790.2	397	197	39.54×10^6	9.96×10^4
Aug. 8(32)	4062.8	312	213	19.07×10^6	6.11×10^4
22(34)	4192.5	244	240	17.47×10^6	7.16×10^4
Sept 5(36)	3891.7	254	251	15.50×10^6	6.10×10^4
19(38)	1623.9	251	265	6.13×10^6	2.44×10^4
Oct. 3(40)	2305.5	246	278	8.29×10^6	3.37×10^4
17(42)	1051.6	197	289	3.64×10^6	1.85×10^4
31(44)	343.7	81	305	1.13×10^6	1.40×10^4
Nov. 14(46)	553.4	93	286	1.93×10^6	2.08×10^4

Table 3. Estimated number of Illex removed in the international directed fishery in 1978.

<u>Date and Week Number</u>	<u>Directed Catch (MT)</u>	<u>Effort (Days)</u>	<u>Estimated mean wt. (gm) of squid</u>	<u># of squid Landed/week</u>	<u># of squid landed/day</u>
July 2(27)	161.4	158	137.9	1.17×10^6	0.74×10^4
9(28)	164.5	197	134.8	1.22×10^6	0.62×10^4
16(29)	357.2	232	138.4	2.58×10^6	1.11×10^4
23(30)	3095.1	287	189.6	16.32×10^6	5.69×10^4
30(31)	6828.8	336	159.9	42.71×10^6	12.71×10^4
Aug. 6(32)	1899.5	276	171.1	11.10×10^6	4.02×10^4
13(33)	924.3	158	179.8	5.14×10^6	3.25×10^4
20(34)	650.9	118	189.8	3.43×10^6	2.91×10^4
27(35)	1572.7	129	199.3	7.89×10^6	6.12×10^4

Table 3. Continued

<u>Date and Week Number</u>	<u>Directed Catch (MT)</u>	<u>Effort (Days)</u>	<u>Estimated mean wt. (gm) of squid</u>	<u># of squid Landed/week</u>	<u># of squid landed/day</u>
Sept 3(36)	1413.3	128	209.4	6.45×10^6	5.27×10^4
10(37)	818.1	68	219.3	3.73×10^6	5.49×10^4
17(38)	1157.5	89	229.2	5.05×10^6	5.67×10^4
24(39)	1389.2	98	239.1	5.81×10^6	5.93×10^4
Oct. 1(40)	1249.2	96	248.8	5.02×10^6	5.23×10^4
8(41)	582.1	62	258.7	5.25×10^6	3.63×10^4
15(42)	378.8	54	268.7	1.41×10^6	2.61×10^4
22(43)	716.9	64	309.0	2.32×10^6	3.63×10^4
29(44)	955.6	53	312.3	3.06×10^6	5.77×10^4
Nov. 5(45)	748.6	33	314.5	2.38×10^6	7.21×10^4
12(46)	327.4	24	277.5	1.18×10^6	4.92×10^4
19(47)	97.3	13	292.2	0.33×10^6	2.56×10^4

Table 4. Estimated number of *Illex* removed by the international directed squid fishery in Subarea 4 in 1979.

<u>Date and Week Number</u>	<u>Directed Catch (MT)</u>	<u>Effort (Days)</u>	<u>Estimated mean wt. (gm) of squid</u>	<u># of squid Landed/week</u>	<u># of squid landed/day</u>
July 1(27)	5.0	1	137.12	3.65×10^6	3.65×10^4
8(28)	852.6	38	133.95	6.37×10^6	16.8×10^4
15(29)	1559.8	83	138.08	11.30×10^6	13.6×10^4
22(30)	2354.8	99	149.90	15.71×10^6	15.87×10^4
29(31)	3209.1	187	159.78	20.08×10^6	10.74×10^4
Aug. 5(32)	2587.0	170	169.66	15.25×10^6	8.97×10^4
12(33)	2517.0	192	179.54	14.02×10^6	7.30×10^4
19(34)	2719.0	178	189.42	14.36×10^6	8.06×10^4
26(35)	2198.1	117	199.30	11.03×10^6	9.43×10^4
Sept 2(36)	3496.1	160	209.18	16.71×10^6	10.45×10^4
9(37)	1952.5	112	219.06	8.91×10^6	7.96×10^4
16(38)	1965.8	114	228.94	8.59×10^6	7.53×10^4
23(39)	1555.9	104	238.83	6.51×10^6	6.26×10^4
30(40)	1329.2	64	248.71	5.34×10^6	8.35×10^4

Table 4. Continued

Date and Week Number	Directed Catch (MT)	Effort (Days)	Estimated mean wt. (gm) of squid	# of squid Landed/week	# of squid landed/day
Oct. 7(41)	1079.2	61	258.59	4.17×10^6	6.84×10^4
14(42)	1158.1	76	268.47	4.31×10^6	0.57×10^4
21(43)	1340.6	73	308.18	4.35×10^6	5.96×10^4
28(44)	1085.4	87	311.49	3.48×10^6	4.01×10^4
Nov. 4(45)	1024.8	85	313.75	3.27×10^6	3.84×10^4
11(46)	671.6	55	275.54	2.44×10^6	4.43×10^4
18(47)	220.1	14	291.82	0.75×10^6	5.39×10^4

Table 5. Estimated number of Illex removed in the international directed fishery in 1980.

Date and Week Number	Directed Catch (MT)	Effort (Days)	Estimated mean wt. (gm) of squid	# of squid Landed/week	# of squid Landed/day
July 7(28)	411.29	37	141.53	2.91×10^6	7.85×10^4
14(29)	199.15	19	92.57	2.15×10^6	11.32×10^4
21(30)	516.93	46	104.29	4.96×10^6	10.78×10^4
28(31)	853.15	79	130.31	6.55×10^6	8.29×10^4
Aug. 4(32)	1246.97	140	101.71	12.26×10^6	8.76×10^4
11(33)	1692.68	173	205.71	8.23×10^6	4.76×10^4
18(34)	2725.09	182	215.32	12.66×10^6	6.95×10^4
25(35)	1647.07	145	138.44	11.90×10^6	8.21×10^4
Sept 1(36)	2172.96	171	196.53	10.06×10^6	6.47×10^4
8(37)	1820.44	164	183.63	9.91×10^6	6.04×10^4
15(38)	2418.42	184	303.29	7.97×10^6	4.33×10^4
22(39)	1687.80	179	217.12	7.77×10^6	4.34×10^4
29(40)	1786.51	184	233.50	7.65×10^6	4.16×10^4
Oct. 6(41)	1672.48	155	249.15	6.71×10^6	4.33×10^4
13(42)	2102.43	184	225.73	9.31×10^6	5.06×10^4
20(43)	1856.91	159	264.22	7.03×10^6	4.42×10^4
27(44)	816.31	155	292.07	2.79×10^6	1.80×10^4
Nov. 3(45)	1211.49	158	240.01	5.05×10^6	3.19×10^4
10(46)	866.41	99	243.43	3.56×10^6	3.60×10^4
17(47)	374.41	25	285.06	1.31×10^6	5.25×10^4

Table 6. Breakdown of the international offshore catch (MT) for I. illecebrosus by tonnage class in Subareas 3 & 4 as reported to FLASH for 1980.

	Tonnage Class			
	101-500	501-1000	1001-2000	> 2000
Directed Catch (MT)	4574.19	892.01	9528.74	13083.99
Non-Directed Catch (MT)	97.00	0.2	153.12	3703.37
Effort (days)	554.0	83.0	906.0	1095.0
Catch rate (Directed Catch/ Effort)	8.26	10.75	10.52	11.95

Table 7. Mean catch rates (number of squid per week) of each vessel class summarized from the 1980 fishery.

MONTH	MEAN #/ WEEK			
	TON 151 - 500	TON 501-1000	TON 1001 - 2000	TON >2000
MAY	1.37×10^4	-	-	2.46×10^5
JUNE	7.24×10^4	-	-	1.87×10^6
JULY	9.93×10^5	2.84×10^4	3.80×10^5	7.02×10^6
AUGUST	7.70×10^5	4.05×10^5	3.50×10^6	8.28×10^6
SEPTEMBER	1.05×10^6	5.20×10^5	3.30×10^6	4.04×10^6
OCTOBER	2.38×10^6	2.97×10^5	2.10×10^6	1.69×10^6
NOVEMBER	5.44×10^5	-	1.65×10^6	1.50×10^6

Table 8. Canadian offshore squid (Illex illecebrosus) catch as reported by FLASH for 1980 for Subarea 4.

Month	Squid Catch (MT)		Effort	Directed C/E (MT/Day)
	Directed	Non-Directed		
August	60.736	-	14	4.34
September	524.874	-	26	20.19
October	787.280	-	52	15.14
November	39.975	1.490	16	2.50
TOTAL	1412.865	1.490	108	13.08

Table 9. Provisional nominal squid catch (MT) in the Maritimes (excluding Newfoundland) 1980.

<u>Month</u>	<u>Catch (MT) - 1980</u>
January	0.567
February	2.472
March	1.476
April	2.113
May	0.477
June	28.497
July	154.265
August	97.396
September	298.303
October	217.243
November	69.641
December	-
TOTAL	<u>872.450</u>

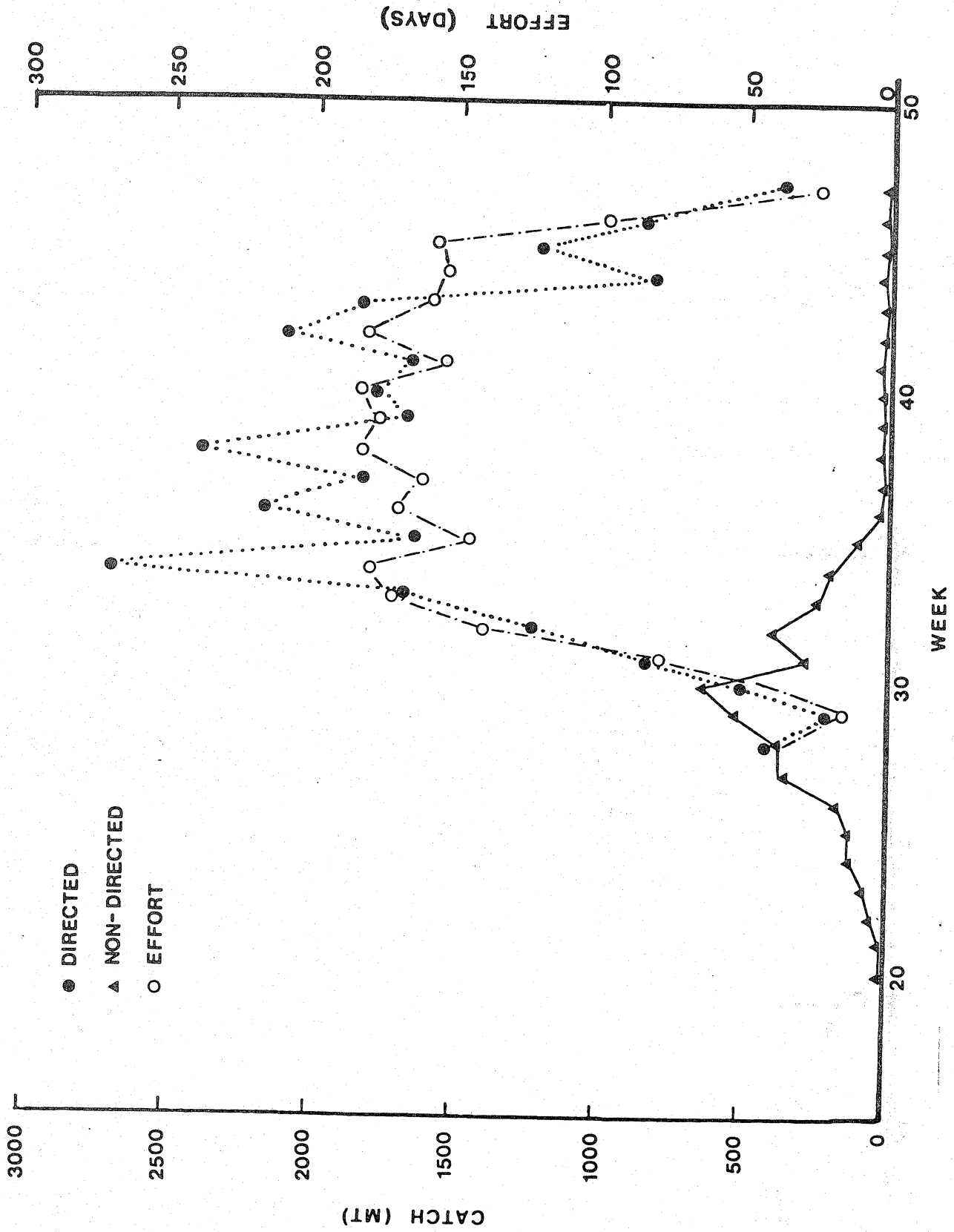


Figure 1. Catch and effort patterns in the directed international fishery in SA 3&4 in 1980.

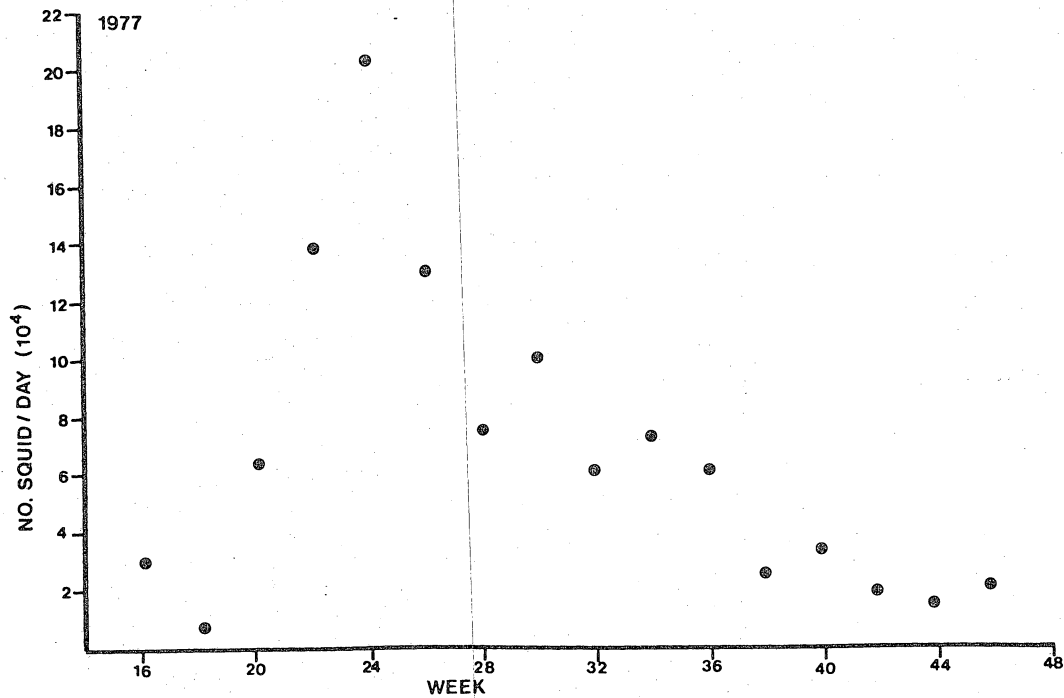


Figure 2. Bi-weekly catch rates (number of squid landed per day) in the international directed fishery in SA 4 in 1977.

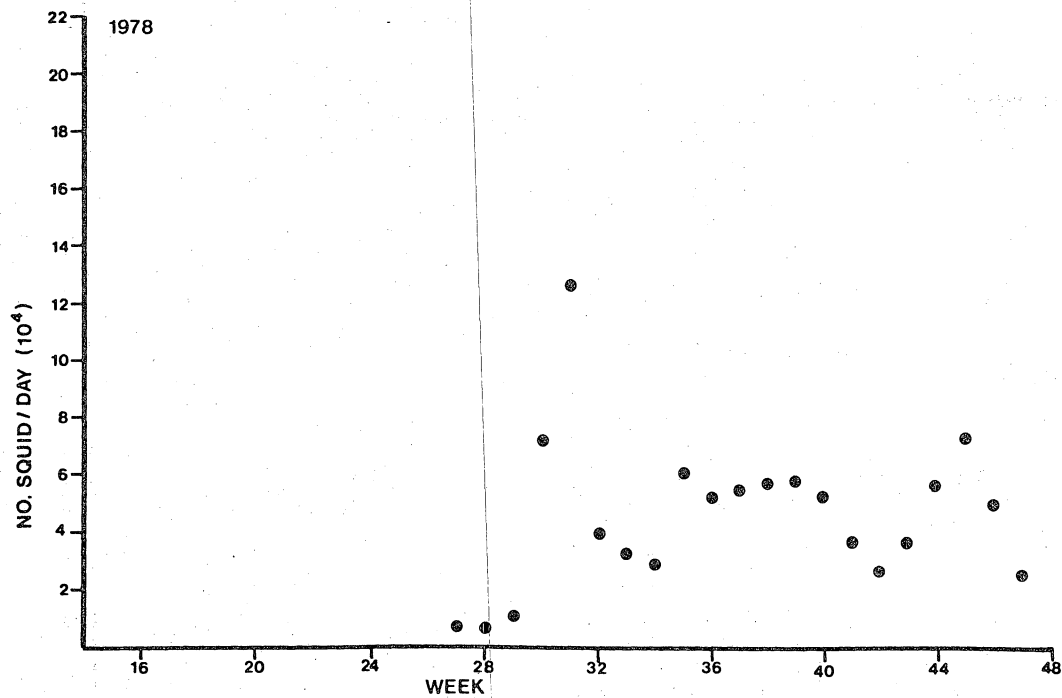


Figure 3. Weekly catch rates (number of squid landed per day) in the international directed fishery in SA 4 in 1978.

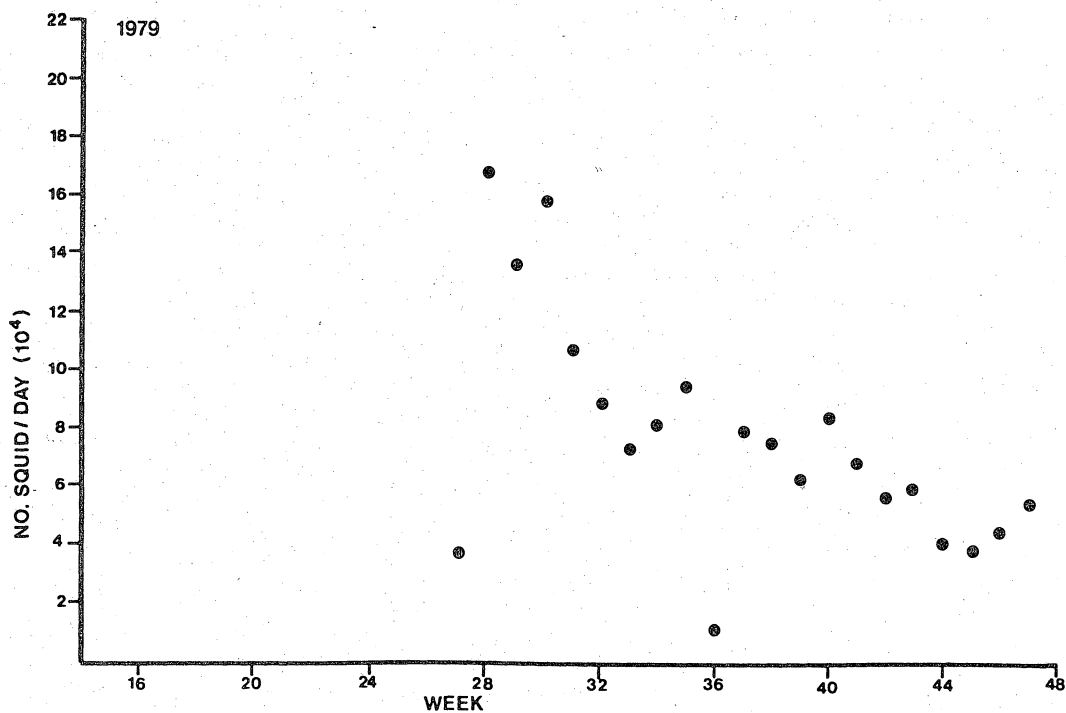


Figure 4. Weekly catch rates (number of squid landed per day) in the international directed fishery in SA 4 in 1979.

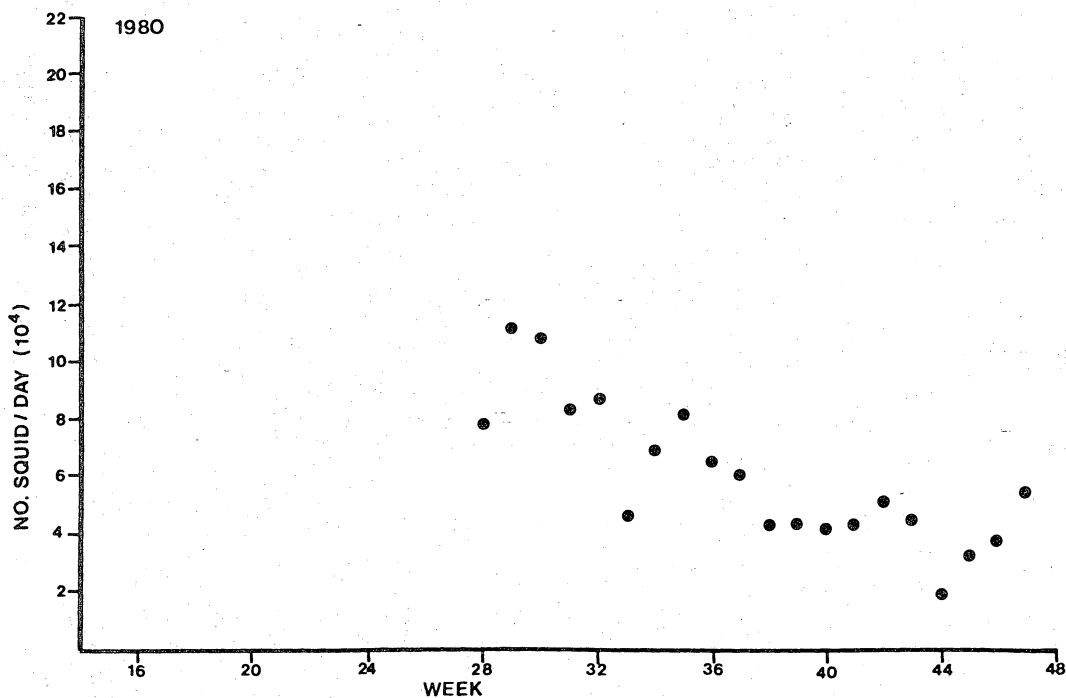


Figure 5. Weekly catch rates (number of squid landed per day) in the international directed fishery in SA 3 & 4 in 1980.