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A Review of the *Illex* Fishery in Subareas 3 and 4 with  
Special Reference to 1978 and 1979 FLASH Data

by

M. Roberge and T. Amaratunga  
Department of Fisheries and Oceans, Resource Branch  
P. O. Box 550, Halifax, Nova Scotia, Canada

INTRODUCTION

Historically, the squid *Illex illecebrosus* has been of importance to Canada only as a small inshore fishery in Newfoundland. Fluctuations in inshore squid landings, which were common prior to 1975, were probably related to the availability of squid and not to any change in effort. Recently, the inshore and offshore fisheries have become important and have resulted in a tremendous upsurge in the fishery's economy and effort. In this paper, data from 1977 (Amaratunga et al., 1977) are reviewed and data from 1978 and 1979 are reported.

The statistics compiled on the international and Canadian offshore fishery in this report were obtained from the FLASH computer information system which was introduced in 1977 to monitor all offshore fishing activity in Subareas 3 and 4 on a weekly basis. All vessels on ground were required to provide weekly information on the area fished, catch by species, and effort. These data were stored in a computer for instantaneous withdrawal of fisheries information. Statistics on the inshore fishery were acquired from sales slips which provided information on the catch including catch weight, date, area, and gear used.

HISTORIC TRENDS

Squid catches since 1963 are shown in Table 1 and Figure 1. Mercer (1973) reported periodic cycles in the inshore squid landings from Nova Scotia from 1920 to 1968. These fluctuations were probably related to the availability of squid. The offshore catch data (Subarea 4 in Table 1) in this report were statistically incomplete prior to 1972 due to the lack of importance of the fishery. Prior to 1975, species separation between *Loligo* and *Illex* were not reported by all countries.

Since 1975, both inshore and offshore landings and effort have shown a tremendous upsurge, with unprecedented catches recorded (Table 1). An increase of 135.2% in the offshore fishery occurred from 1975 to 1976 with increases of 91.4% and 23.3% in squid landings for the years 1977 and 1978 in Subareas 3 and 4. These recent increases are probably related to international interests in the offshore squid fishery. Total allowable catch (TAC) for the fishery was introduced in 1977 with a TAC of 25000 MT+ in Subareas 3 and 4. A TAC of 100000 MT and 120000 MT were allocated for 1978 and 1979 respectively (Sum. Doc., 1978, 1979). Opening dates for the fishery were set at June 15 in 1978 and July 1 in 1979.

A summary of the international offshore fishery from 1977 to 1979 is shown in Table 2. Figure 2 depicts cumulative catch in Subareas 3 and 4 for 1977, 1978, and 1979. In 1977, with no opening date for the fishery, the catch began to increase the week of May 20 and fishing was concentrated between the weeks of June 10 and September 9. In 1978, with an opening date of June 15, fishing was concentrated between the week commencing July 23 and the week of October 1. The fishery in 1979 opened on July 1 and fishing was concentrated between the week commencing July 8 and November 4. It must be noted here that in all three years, participating countries fished within quota allocations.

#### 1978 INTERNATIONAL OFFSHORE FISHERY

A total of 29,570 MT of squid were caught offshore by the international fishing fleet in 1978 with 2922.3 MT and 26647.7 MT being caught in ICNAF Subareas 3 and 4 respectively (Table 3a and b). Sixty-four percent (Subarea 3) and 95.8% (Subarea 4) of the total squid catch was a result of directed fishing.

Directed and non-directed squid catches fluctuated throughout the year in Subarea 3 without any apparent pattern (Table 3 and Figure 3). In Subarea 4, directed fishing was concentrated between the weeks of July 23 and August 6 (Table 3b and Figure 3), while three smaller peak periods occurred in the week commencing August 27 to September 3, September 17 to October 1, and October 29.

Effort (reported in days) was high during the months of July and August. Catch rates, however, fluctuated over the year with a high of 20.32 and 22.68 occurring during the week of July 30 and November 5 respectively.

#### 1979 INTERNATIONAL OFFSHORE FISHERY

A total squid catch of 44510 MT was recorded in Subareas 3 and 4 by the international fishing fleet in 1979 with 2144.8 MT and 42365.2 MT being caught in Subareas 3 and 4 respectively (Table 4a and b). Ninety-six percent (Subarea 3) and 82% (Subarea 4) of the total squid catch resulted from directed squid fishing.

In Subarea 3, directed and non-directed squid catches fluctuated throughout the year without any apparent pattern (Table 4a and Figure 4). Fishing in Subarea 4 was concentrated over a period of 17 weeks (July 15-November 4) with intensive directed fishing occurring between the weeks of July 29 and September 2 (Table 4b and Figure 4). Effort showed a similar pattern. The highest catch rates occurred in the months of July and September (22.44-23.79 and 21.85-20.77 respectively).

Table 5 summarizes the 1979 total offshore fishery. Eighty-three percent of the total offshore squid catch in Subareas 3 and 4 was a result of directed fishing.

#### CANADIAN INSHORE AND OFFSHORE FISHERY - 1978 AND 1979

The inshore and offshore catch for Canada increased in 1979 by 3721.2 MT and 4983.9 MT respectively, producing an overall increase of 47.9% between 1978 and 1979 (Table 6).

In 1978, Maritime inshore fishing was concentrated during the months of July, August, October, and November (Table 7). In 1979, reports extended from January through December. It is very likely that some of the early-season low values include delayed returns of sales slips from the 1978 fishery. The highest catches were 1376.75 MT and 1514.466 MT reported in August and October.

The Canadian offshore catch as reported by FLASH for 1979 extended from July 16 through to December 2 in Subarea 4 and from August 27 through to September 24 in Subarea 3 (Table 8). A total of 253.06 MT and 21432.88 MT were caught in Subareas 3 and 4 respectively.

#### BIOMASS ESTIMATES

The Leslie method of plotting cumulative catch (MT) versus catch rate was used to estimate squid biomass (MT) from the 1979 international fishery in Subarea 4 only. Effort used in calculating catch rates were reported on a weekly basis and not on a set-by-set basis. Consideration was also not given to the size class of the vessels nor to the type of gear used. Since these and other errors are associated in using this data base, the biomass estimates need to be considered accordingly.

Two linear regressions were made, one starting from the week of July 8 and the other from September 2. Starting points for the linear regression were arbitrarily placed at the week beginning July 8, which corresponded with the first major squid landings, while September 2 was a period of increased catch rates later in the season. Estimates of the squid biomass (MT) ranged from 132000 MT for July 8 to 62000 MT for September 2 (Figure 5).

The estimated numbers of squid removed by the 1979 international fishery in Subarea 4 is shown in Table 9. The total estimated number removed was  $1.77 \times 10^8$  animals. Using the average weight of a squid through the season at 220.44 gm, the above estimated biomass translates to  $2.81 \times 10^8$  and  $5.99 \times 10^8$  animals respectively.

#### REFERENCES

- Amaratunga, T., M. Roberge, and L. Wood. 1978. A study of the 1977 international catch statistics for the squid, Illex illecebrosus fishery in ICNAF Subareas 3 and 4. ICNAF Res. Doc. 78/II/3.
- Mercer, M.C. 1973. Nominal catch of squid in Canadian Atlantic waters (Subareas 2-4), 1920-1968. ICNAF Res. Doc. 73/73.
- ICNAF Sum. Doc. 78/VI/3.
- ICNAF Sum. Doc. 79/VI/5.

TABLE 1. Nominal catches (metric tons) of Illex by Subareas, 1963-1979.

Year	Subareas			Total SA2-4	Total SA5-6
	2	3	4		
1963		2199	103	2222	1210 <sup>1</sup>
1964		10408	369	10777	193 <sup>1</sup>
1965		7831	433	8264	563 <sup>1</sup>
1966		5017	201	5218	1562 <sup>1</sup>
1967		6907	126	7033	2662 <sup>1</sup>
1968		9	47	56	4948 <sup>1</sup>
1969		21	65	86	2802 <sup>1</sup>
1970		111	1274	1385	2453 <sup>1</sup>
1971		1067	7299	8906	4036 <sup>2</sup>
1972		26	1842	1868	14713 <sup>2</sup>
1973	2	620	9255	9877	15178 <sup>2</sup>
1974	31	17	389	437	16653 <sup>2</sup>
1975		3764	13993	17757	13790 <sup>2</sup>
1976		11254	30510	41764	27717 <sup>2</sup>
1977	6	32748 <sup>3</sup>	47199 <sup>3</sup>	79953 <sup>3</sup>	24792 <sup>3</sup>
1978		45472 <sup>3</sup>	53118 <sup>3</sup>	98590 <sup>3</sup>	17695 <sup>3</sup>
1979		81820 <sup>3</sup>	71279 <sup>3</sup>	153099 <sup>3</sup>	

<sup>1</sup> Combined Illex and Loligo, USSR catches included.

<sup>2</sup> Excludes USSR catches which have not been reported for Illex and Loligo separately.

<sup>3</sup> Preliminary data.

Table 2. FLASH catch statistics for the international squid (Illex illecebrosus) fishery summarized by year and week in Subareas 3 and 4.

Week		Total squid catch (MT)		
		Subarea 3	Subarea 4	Subareas 3 and 4
16	1977	-	0.3	0.3
	78			
	79			
17	1977	-	1.0	1.0
	78			
	79			
18	1977	-	8.7	8.7
	78			
	79			
19	1977	-	18.0	18.0
	78		7.2	7.2
	79			
20	1977	-	10.2	10.2
	78	-	31.3	31.3
	79	-	0.3	0.3

Table 2 Contd...

Week		Total squid catch (MT)		
		Subarea 3	Subarea 4	Subareas 3 and 4
21	1977		171.8	171.8
	78	-	21.5	21.5
	79	-	4.2	4.2
22	1977	19.4	480.6	500.0
	78	0.4	19.7	20.1
	79	-	3.5	3.5
23	1977	1.0	955.2	956.2
	78	8.2	35.1	43.3
	79	-	23.5	23.5
24	1977	-	1706.5	1706.5
	78	4.0	38.9	42.9
	79	2.6	61.6	64.2
25	1977	-	2295.4	2295.4
	78	-	28.5	28.5
	79	-	196.6	196.6
26	1977	2.0	3942.9	3944.9
	78	215.2	74.6	289.8
	79	9.8	393.7	403.5
27	1977	23.3	3476.4	3499.7
	78	67.9	201.4	269.3
	79	5.0	392.5	397.5
28	1977	-	2828.8	2828.8
	78	210.1	213.6	423.7
	79	14.2	1493.4	1507.6
29	1977	35.0	3849.9	3884.9
	78	196.6	358.8	555.4
	79	108.5	1965.7	2074.2
30	1977	16.4	3753.1	3769.5
	78	47.7	3286.3	3334.0
	79	98.1	2926.4	3024.5
31	1977	21.0	3967.9	3988.9
	78	70.9	6848.1	6919.0
	79	144.2	4591.8	4736.0
32	1977	3.0	2054.2	2057.2
	78	136.1	2001.1	2137.2
	79	32.8	3862.8	3895.6
33	1977	-	1636.6	1636.6
	78	141.6	971.3	1112.9
	79	10.6	3244.3	3254.9
34	1977	-	975.2	975.2
	78	255.1	666.3	921.4
	79	61.0	3234.5	3295.6
35	1977	-	1726.3	1726.3
	78	557.3	1715.7	2273.0
	79	362.3	2351.1	2713.4

Table 2 Contd...

Week		Total squid catch (MT)		
		Subarea 3	Subarea 4	Subareas 3 and 4
36	1977	0.4	1344.3	1344.7
	78	368.4	1413.3	1781.7
	79	137.5	3588.6	3726.1
37	1977	0.1	1551.3	1551.4
	78	255.8	829.4	1085.2
	79	294.8	2024.4	2319.2
38	1977	-	441.8	441.8
	78	128.7	1279.1	1407.8
	79	189.3	2026.2	2215.5
39	1977	0.2	598.4	598.6
	78	93.9	1389.2	1483.1
	79	67.9	1580.0	1617.8
40	1977	0.1	854.7	854.8
	78	97.0	1249.2	1346.2
	79	292.8	1434.6	1727.4
41	1977	-	853.9	853.9
	78	10.0	585.4	595.4
	79	121.3	1154.0	1275.1
42	1977	-	592.9	592.9
	78	10.0	420.4	430.4
	79	1.5	1171.8	1173.3
43	1977	-	71.0	71.0
	78	47.4	722.2	769.6
	79	-	1415.5	1415.5
44	1977	-	28.5	28.5
	78	-	967.5	967.5
	79	137.3	1190.3	1327.6
45	1977	-	106.9	106.9
	78	-	778.3	778.3
	79	-	1074.3	1074.3
46	1977	85.8	75.2	161.0
	78	-	388.3	388.3
	79	0.02	732.6	732.6
47	1977	-	164.3	164.3
	78	-	98.0	98.0
	79	53.3	227.0	280.3
48	1977	-	128.8	128.8
	78	-	8.0	8.0
	79	-	-	-
49	1977	13.0	37.7	50.7
	78	-	-	-
	79	-	-	-
50	1977	-	6.3	6.3
	78	-	-	-
	79	-	-	-
TOTAL	1977	220.7	40715.0	40935.7
	78	2922.3	26647.7	29570.0
	79	2144.8	42365.2	44510.0

Table 3a. Weekly international offshore catch statistics for squid (Illex illecebrosus) in Subarea 3 as reported to FLASH for 1978.

Week	Squid catch (MT)		Effort (days)	Directed C/E (MT/Day)
	Directed	Non-Directed		
May 21 (21)	-	-	-	-
28 (22)	-	0.4	-	-
June 4 (23)	-	8.2	-	-
11 (24)	-	4.0	-	-
18 (25)	-	-	-	-
25 (26)	198.5	16.7	3	66.17
July 2 (27)	62.9	5.0	12	5.24
9 (28)	210.1	-	23	9.13
16 (29)	155.6	41.0	26	5.98
23 (30)	37.7	10.0	14	2.69
30 (31)	20.9	50.0	5	4.18
Aug. 6 (32)	74.4	61.7	5	14.88
13 (33)	109.3	32.3	22	4.97
20 (34)	172.2	82.9	29	5.94
27 (35)	242.9	314.4	26	9.34
Sept. 3 (36)	140.3	228.1	17	8.25
10 (37)	144.1	111.7	21	6.86
17 (38)	84.1	44.6	5	16.82
24 (39)	54.5	39.4	7	7.79
Oct. 1 (40)	95.0	2.0	17	5.59
8 (41)	10.0	-	4	2.50
15 (42)	10.0	-	3	3.33
22 (43)	47.4	-	10	4.74
29 (44)	-	-	-	-
TOTAL	1869.9	1052.4	249	7.51

Table 3b. Weekly international offshore catch statistics for squid (Illex illecebrosus) in Subarea 4 as reported to FLASH for 1978.

Week	Squid catch (MT)		Effort (days)	Directed C/E (MT/Day)
	Directed	Non-Directed		
May 7 (19)	-	7.2	-	-
14 (20)	-	31.3	-	-
21 (21)	-	21.5	-	-
28 (22)	-	19.7	-	-
June 4 (23)	-	35.1	-	-
11 (24)	-	38.9	-	-
18 (25)	-	28.5	-	-
25 (26)	36.5	38.1	80	0.46
July 2 (27)	161.4	40.0	158	1.02
9 (28)	164.5	49.1	197	0.84
16 (29)	357.2	1.6	232	1.54
23 (30)	3095.1	191.2	287	10.78
30 (31)	6828.8	19.3	336	20.32
Aug. 6 (32)	1899.5	101.6	276	6.88
13 (33)	924.3	47.0	158	5.85
20 (34)	650.9	15.4	118	5.52
27 (35)	1572.7	143.0	129	12.19
Sept. 3 (36)	1413.3	-	128	11.04
10 (37)	818.1	11.3	68	12.03
17 (38)	1157.5	121.6	89	13.01
24 (39)	1389.2	-	98	14.18
Oct. 1 (40)	1249.2	-	96	13.01
8 (41)	582.1	3.3	62	9.39
15 (42)	378.8	41.6	54	7.01
22 (43)	716.9	5.3	64	11.20
29 (44)	955.6	11.9	53	18.03
Nov. 5 (45)	748.6	29.7	33	22.68
12 (46)	327.4	60.9	24	13.64
19 (47)	97.3	0.7	13	7.48
26 (48)	8.0	-	3	2.67
TOTAL	25532.9	1114.8	2756	9.26



Table 4a. Weekly international offshore catch statistics for squid (Illex illecebrosus) in Subarea 3 as reported to FLASH for 1979.

Week	Squid catch (MT)		Effort (days)	Directed C/E (MT/Day)
	Directed	Non-Directed		
June 10 (24)	-	2.6	-	-
17 (25)	-	-	-	-
24 (26)	-	9.8	-	-
July 1 (27)	-	5.0	-	-
8 (28)	11.8	2.4	3	3.93
15 (29)	108.5	-	5	21.70
22 (30)	98.1	-	6	16.35
29 (31)	144.2	-	9	16.02
Aug. 5 (32)	32.8	-	7	4.69
12 (33)	10.1	0.5	4	2.53
19 (34)	47.0	14.0	7	6.71
26 (35)	358.3	4.0	18	19.91
Sept. 2 (36)	135.3	2.2	14	9.66
9 (37)	294.3	0.5	27	10.90
16 (38)	187.1	2.2	18	10.39
23 (39)	63.0	4.9	11	5.73
30 (40)	291.2	1.6	12	24.27
Oct. 7 (41)	90.9	30.4	9	10.10
14 (42)	-	1.5	-	-
21 (43)	-	-	-	-
28 (44)	137.3	-	4	34.33
Nov. 4 (45)	-	-	-	-
11 (46)	0.02	-	1	0.02
18 (47)	53.3	-	8	6.66
TOTAL	2063.2	81.6	163	12.66

Table 4b. Weekly international offshore catch statistics for squid (Illex illecebrosus) in Subarea 4 as reported to FLASH for 1979.

Week	Squid catch (MT)		Effort (days)	Directed C/E (MT/Day)
	Directed	Non-Directed		
May 13 (20)	-	0.3	-	-
20 (21)	-	4.2	-	-
27 (22)	-	3.5	-	-
June 3 (23)	-	23.5	-	-
10 (24)	-	61.6	-	-
17 (25)	-	196.6	-	-
24 (26)	-	393.7	-	-
July 1 (27)	5.0	387.5	1	5.00
8 (28)	852.6	640.8	38	22.44
15 (29)	1559.8	405.9	83	18.79
22 (30)	2354.8	571.6	99	23.79
29 (31)	3209.1	1382.7	187	17.16
Aug. 5 (32)	2587.0	1275.8	170	15.22
12 (33)	2517.0	727.3	192	13.11
19 (34)	2719.0	515.5	178	15.28
26 (35)	2198.1	153.0	117	18.79
Sept. 2 (36)	3496.1	92.5	160	21.85
9 (37)	1952.5	71.9	112	17.43
16 (38)	1965.8	60.4	114	17.24
23 (39)	1555.9	24.1	104	14.96
30 (40)	1329.2	105.4	64	20.77
Oct. 7 (41)	1079.2	74.8	61	17.69
14 (42)	1158.1	13.7	76	15.24
21 (43)	1340.6	74.9	73	18.36
28 (44)	1085.4	104.9	87	12.48
Nov. 4 (45)	1024.8	49.5	85	12.06
11 (46)	671.6	61.0	55	12.21
18 (47)	220.1	6.9	14	15.72
TOTAL	34881.7	7483.5	2070	16.85

Table 5. Weekly international offshore catch statistics for squid (*Illex illecebrosus*) in Subareas 3 and 4 as reported to FLASH for 1979.

Week	Total Subareas 3 and 4		
	Directed	Non-Directed	Total
May 13 (20)	-	0.3	0.3
20 (21)	-	4.2	4.2
27 (22)	-	3.5	3.5
June 3 (23)	-	23.5	23.5
10 (24)	-	64.2	64.2
17 (25)	-	196.6	196.6
24 (26)	-	403.5	403.5
July 1 (27)	5.0	392.5	397.5
8 (28)	864.4	643.2	1507.6
15 (29)	1668.3	405.4	2074.2
22 (30)	2452.9	571.6	3024.5
29 (31)	3353.3	1382.7	4736.0
Aug. 5 (32)	2619.8	1275.8	3895.6
12 (33)	2527.1	727.8	3254.9
19 (34)	2766.1	529.5	3295.6
26 (35)	2556.4	157.0	2713.4
Sept. 2 (36)	3631.4	94.7	3726.1
9 (37)	2246.8	72.4	2319.2
16 (38)	2152.9	62.6	2215.5
23 (39)	1618.9	29.0	1647.9
30 (40)	1625.3	107.0	1732.3
Oct. 7 (41)	1170.1	105.2	1275.3
14 (42)	1158.1	15.2	1173.3
21 (43)	1340.6	74.9	1415.5
28 (44)	1222.7	104.9	1327.6
Nov. 4 (45)	1024.8	49.5	1074.3
11 (46)	671.6	61.0	732.6
18 (47)	273.4	6.9	280.3
TOTAL	36945.0	7565.1	44510.1

Table 6. Total squid catch (MT) in the Maritimes (excluding Newfoundland) for 1978 and 1979.

Year	Squid catch (MT)		Total catch (MT)
	Inshore	Offshore	
1978	1044.0	16702.0	17746.00
1979 <sup>†</sup>	4765.20 <sup>†</sup>	21685.9 <sup>†</sup>	26451.10 <sup>†</sup>

<sup>†</sup>Provisional as reported by FLASH.

Table 7. Provisional nominal squid (Illex illecebrosus)  
catch (MT) in the Maritimes (excluding Newfoundland).

a) 1978

Month	Catch (MT)	Cumulative Catch (MT)
April	0.454	0.454
May	0.046	0.500
June	0.733	1.233
July	285.677	286.910
August	277.486	564.396
September	21.112	585.508
October	338.067	923.575
November	132.239	1055.814
December	0.132	1055.946

b) 1979

Month	Catch (MT)	Cumulative Catch (MT)
January	0.340	0.340
February	0.498	0.838
March	0.363	1.201
April	0.544	1.745
May	11.404	13.149
June	391.014	404.163
July	533.771	937.934
August	1376.750	2314.684
September	706.815	3021.499
October	1514.466	4535.965
November	22.330	4558.295
December	206.900	4765.195

Table 8a. Canadian offshore squid (*Illex illecebrosus*) catch as reported by FLASH for 1979 for Subarea 3.

Week	Squid Catch(MT)		Effort	Directed (MT/DAY)
	Directed	Non-directed		
Aug.27(35)	138.87	-	4	34.72
Sept.3(36)	16.97	-	2	8.49
10(37)	-	-	-	-
17(38)	57.33	-	2	28.67
24(39)	39.89	-	1	39.89
Total	253.06 <sup>†</sup>	-	9	28.12

Table 8b. Canadian offshore squid (*Illex illecebrosus*) catch as reported by FLASH for 1979 for Subarea 4.

Week	Squid Catch(MT)		Effort	Directed C/E (MT/DAY)
	Directed	Non-directed		
July 16(29)	105.90	-	13	8.15
23(30)	264.98	9.70	22	12.04
30(31)	433.95	12.00	32	13.56
Aug.6(32)	424.22	1.70	27	15.71
13(33)	643.95	-	42	15.33
20(34)	1342.94	-	61	22.02
27(35)	899.80	-	44	20.45
Sept.3(36)	1574.39	-	73	21.57
10(37)	2172.75	-	79	27.50
17(38)	2242.77	-	84	26.70
24(39)	1768.90	-	65	27.21
Oct.1(40)	2144.97	-	83	25.84
8(41)	1855.35	-	79	23.49
15(42)	1743.82	-	63	27.68
22(43)	1144.18	-	44	26.00
29(44)	965.58	-	47	20.54
Nov.5(45)	839.11	-	30	27.97
12(46)	476.23	-	22	21.65
19(47)	200.27	-	15	13.35
26(48)	142.70	-	13	10.98
Dec.2(49)	22.72	-	3	7.57
Total	21409.48 <sup>†</sup>	23.40	941	22.75

<sup>†</sup>Preliminary data

Table 9. Estimated number of *Illex* removed by the international directed squid fishery in Subarea 4 in 1979.

Week	Directed squid catch (MT)	Estimated mean weight (gm) of squid	Estimated no. of squid	Cumulative estimated no. of squid
July 1 (27)	5.0	137.12	$3.65 \times 10^4$	$3.65 \times 10^4$
8 (28)	852.6	133.95	$6.37 \times 10^6$	$6.41 \times 10^6$
15 (29)	1559.8	138.08	$1.13 \times 10^7$	$1.77 \times 10^7$
22 (30)	2354.8	149.90	$1.57 \times 10^7$	$3.34 \times 10^7$
29 (31)	3209.1	159.78	$2.01 \times 10^7$	$5.35 \times 10^7$
Aug. 5 (32)	2587.0	169.66	$1.52 \times 10^7$	$6.87 \times 10^7$
12 (33)	2517.0	179.54	$1.40 \times 10^7$	$8.27 \times 10^7$
19 (34)	2719.0	189.42	$1.44 \times 10^7$	$9.71 \times 10^7$
26 (35)	2198.1	199.30	$1.10 \times 10^7$	$1.08 \times 10^8$
Sept. 2 (36)	3496.1	209.18	$1.67 \times 10^7$	$1.25 \times 10^8$
9 (37)	1952.5	219.06	$8.91 \times 10^6$	$1.34 \times 10^8$
16 (38)	1965.8	228.94	$8.59 \times 10^6$	$1.42 \times 10^8$
23 (39)	1555.9	238.83	$6.51 \times 10^6$	$1.49 \times 10^8$
30 (40)	1329.2	248.71	$5.34 \times 10^6$	$1.54 \times 10^8$
Oct. 7 (41)	1079.2	258.59	$4.17 \times 10^6$	$1.58 \times 10^8$
14 (42)	1158.1	268.47	$4.31 \times 10^6$	$1.63 \times 10^8$
21 (43)	1340.6	308.18	$4.35 \times 10^6$	$1.67 \times 10^8$
28 (44)	1085.4	311.49	$3.48 \times 10^6$	$1.70 \times 10^8$
Nov. 4 (45)	1024.8	313.75	$3.27 \times 10^6$	$1.74 \times 10^8$
11 (46)	671.6	275.54	$2.44 \times 10^6$	$1.76 \times 10^8$
18 (47)	220.1	291.82	$7.54 \times 10^5$	$1.77 \times 10^8$

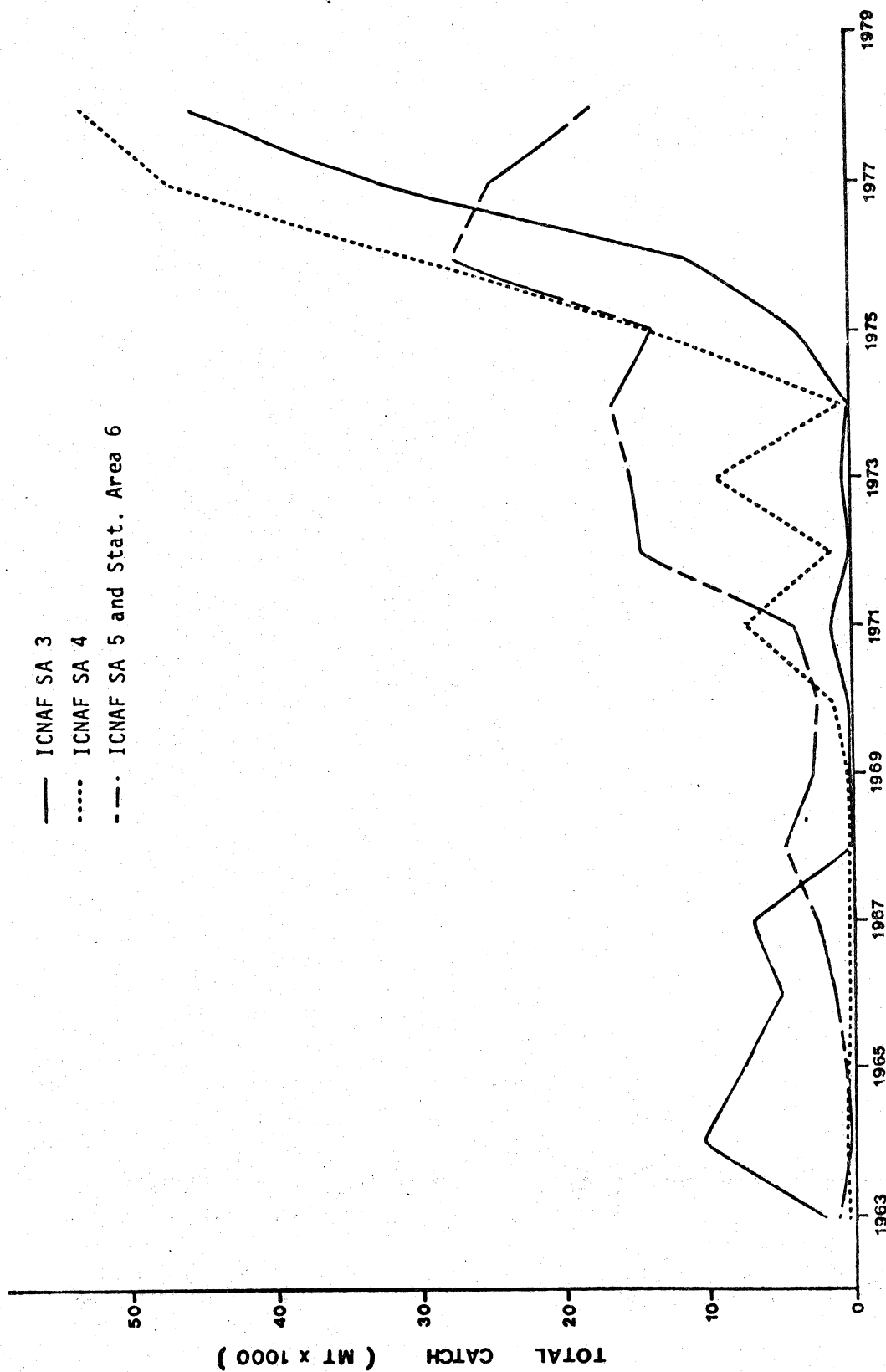


Figure 1. Annual total catches of Illex in the Northwest Atlantic from 1963-1978, for ICNAF Subareas 3 and 4 and Subarea 5 and Statistical Area 6.

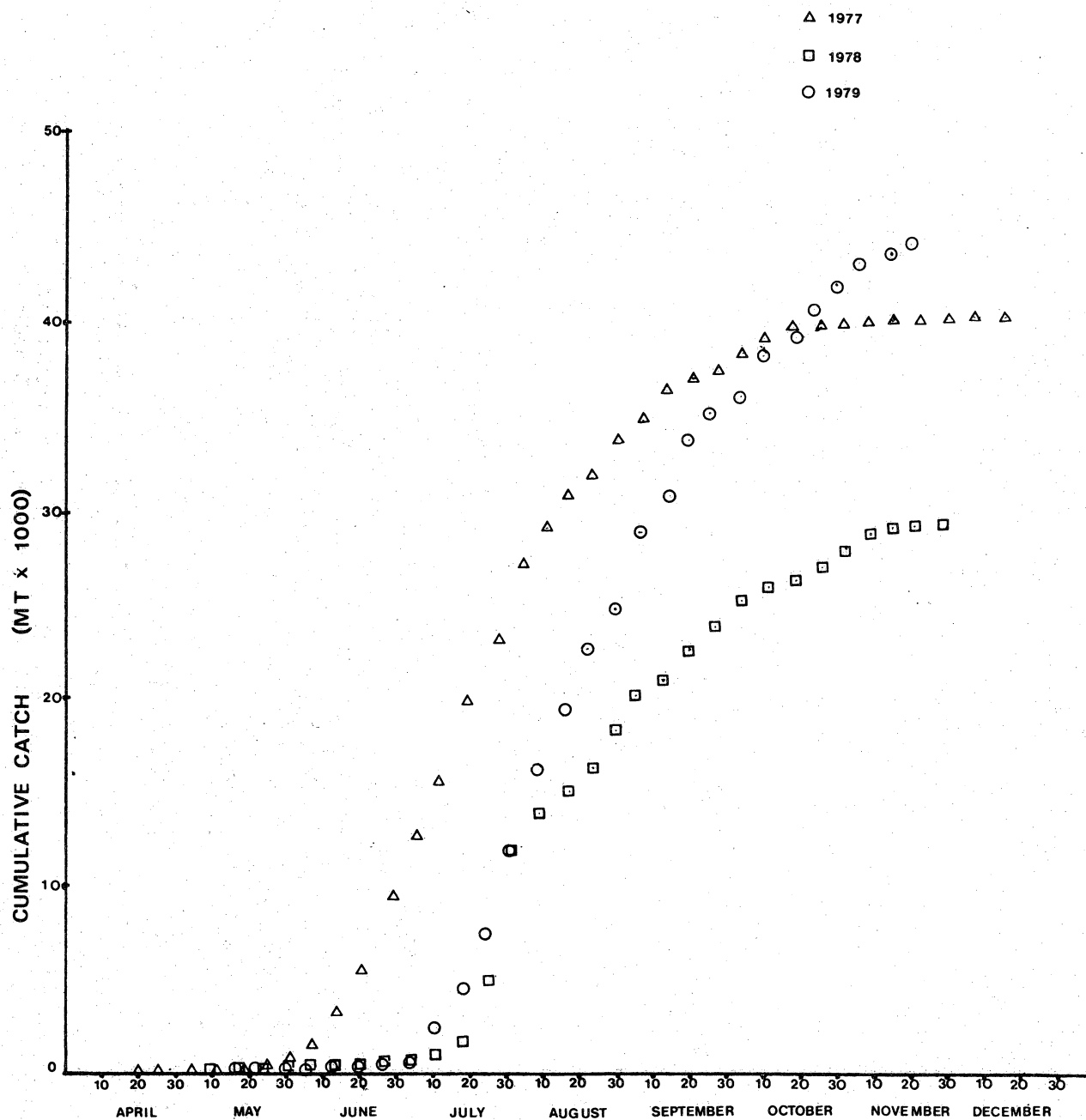


Figure 2. Cumulative catch (MT) of Illex in ICNAF Subareas 3 and 4 in 1977, 1978, and 1979.



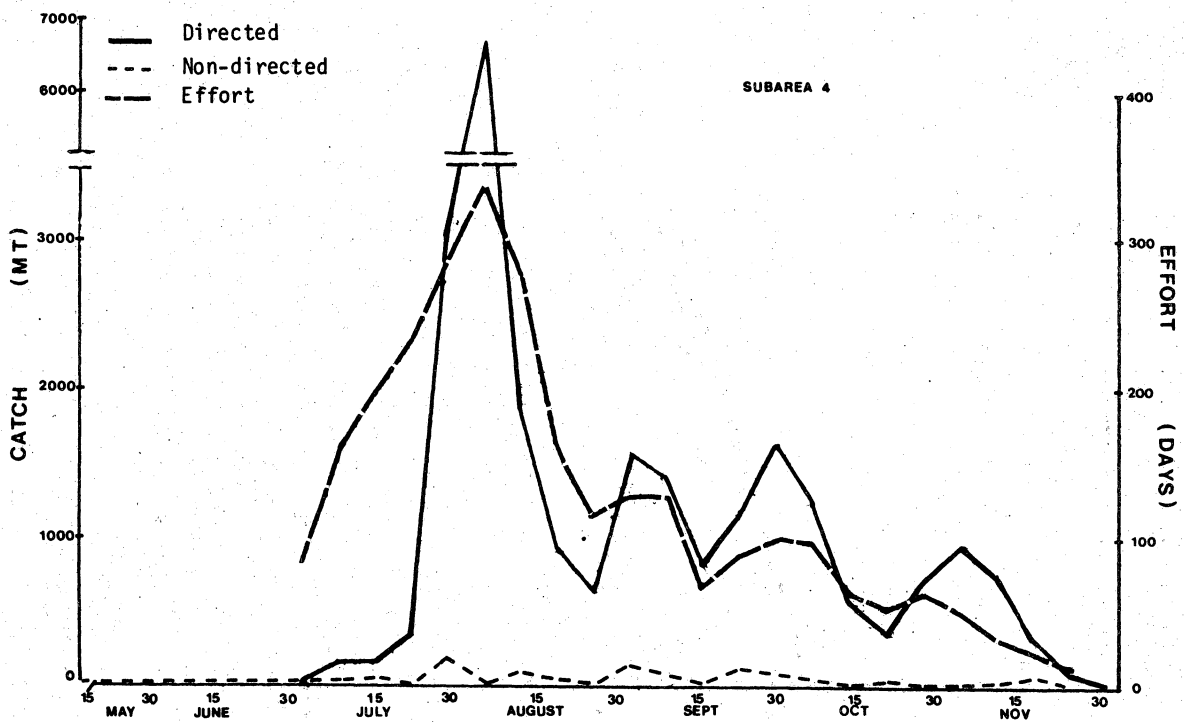
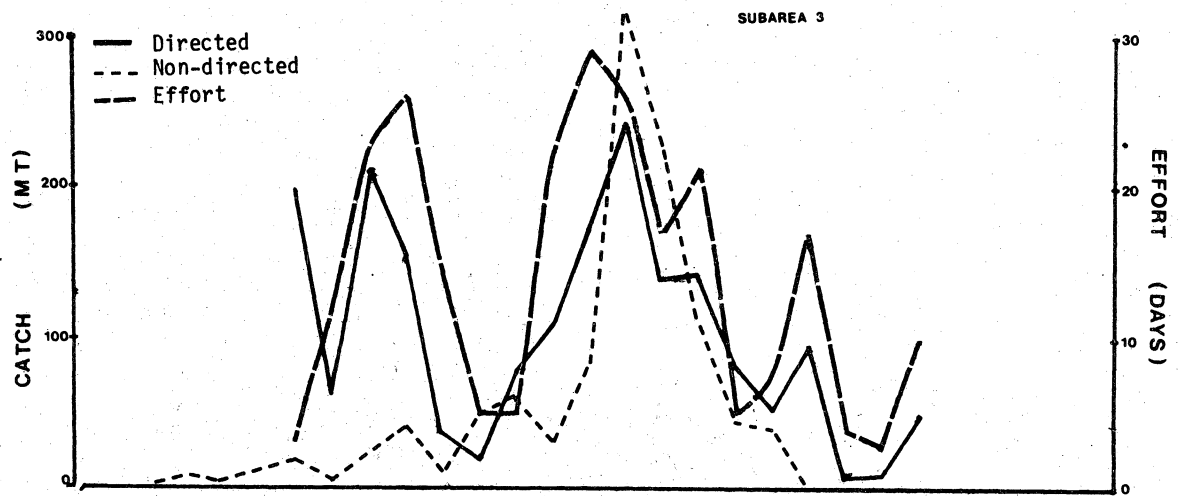


Figure 3. Directed and non-directed squid catch and effort as reported to FLASH for 1979.

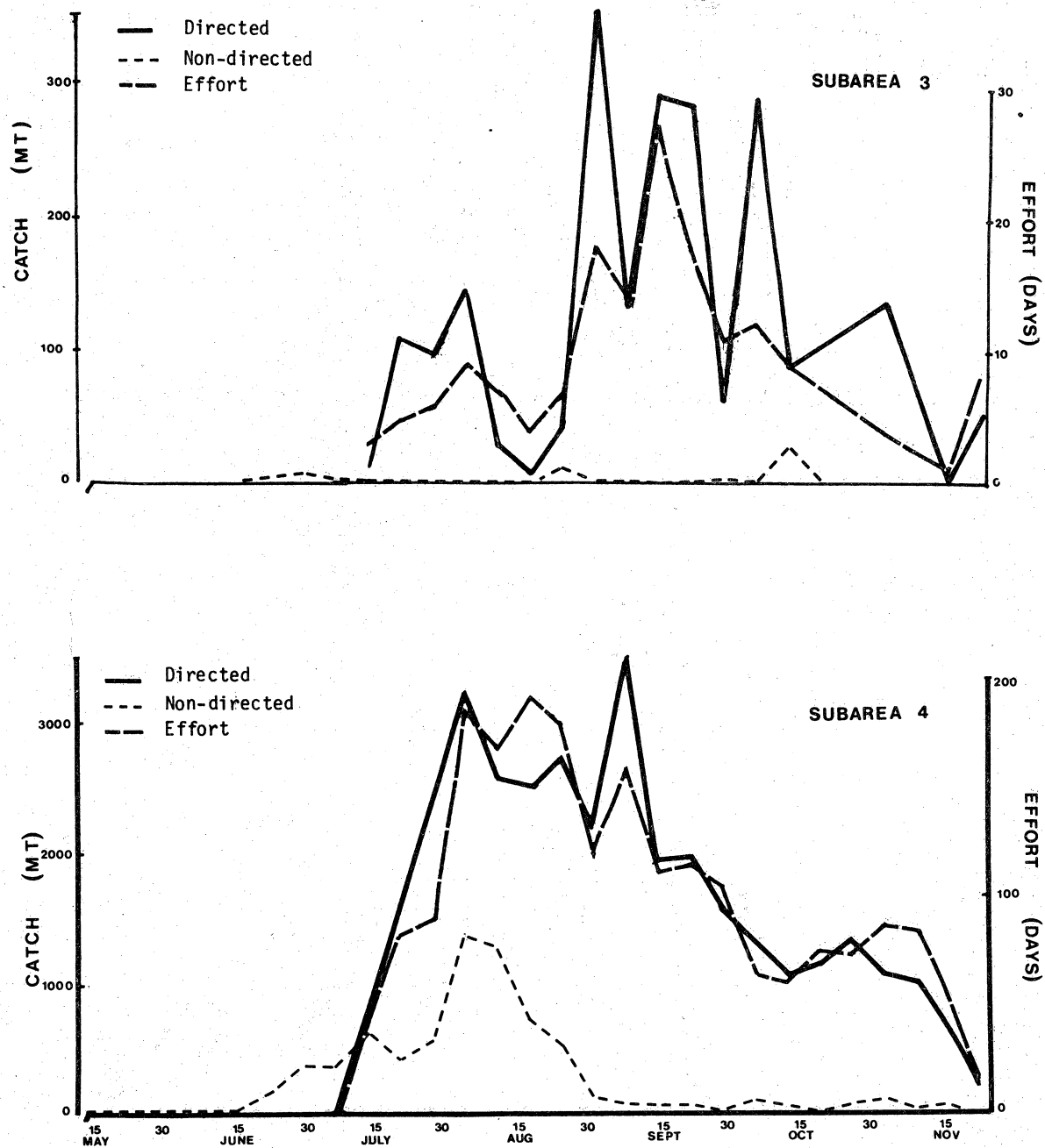


Figure 4. Directed and non-directed squid catch and effort as reported to FLASH for 1979.

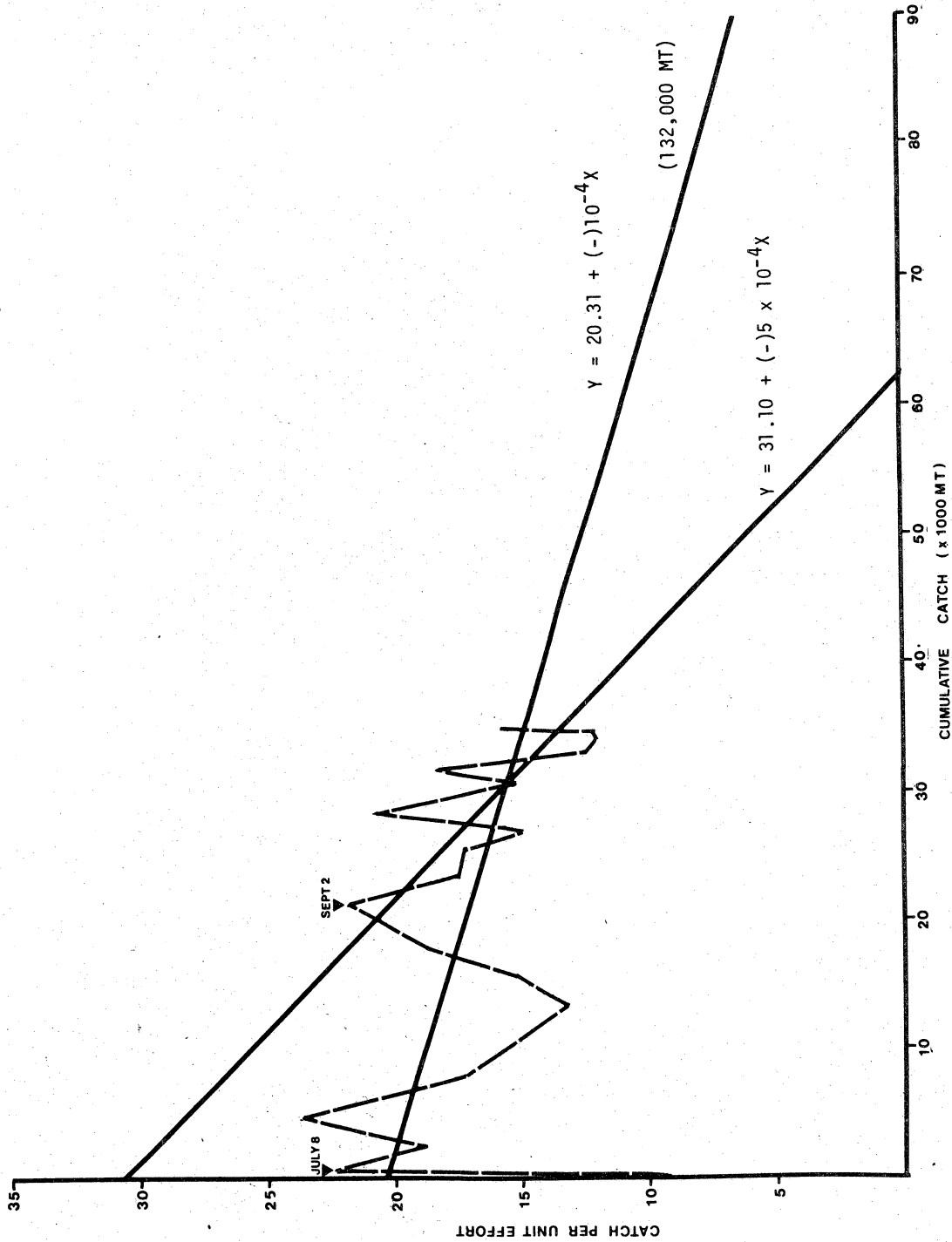


Figure 5. Estimation of the squid (*Illex illecebrosus*) biomass from the 1979 international fishery in Subarea 4 using the Leslie method of plotting cumulative catch (MT) versus catch rate.