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Catch/effort statistics of the Canadian squid (*Illex illecebrosus*) fishery in Subarea 4 in 1977

by

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### Introduction

The 1977 Canadian offshore fishery in Subareas 3 and 4 consisted of fishing arrangements between Canada and the Federal Republic of Germany, Poland, and USSR, as well as an individual Canadian operation. Although catch information is reported in Amaratunga et al. (1978), effort data and the Canadian operation were not included.

This paper provides background data on the Canadian squid fishery in Subarea 4 with a reported total catch of 8,810.91 MT. The offshore and inshore fishing consisted of 8,340.06 MT and 470.85 MT, respectively. The offshore squid fishery included both directed and non-directed fishing. The squid catch data were analyzed in relation to total catch, effort, and their subsequent catch rates. Catch rates for the inshore fishery, which was primarily a small craft industry, are not reported because effort data were unobtainable.

### Catch and Effort Data

The squid catch and by-catch information were compiled for Poland and USSR from weekly reports, although some vessels reported on a daily basis; effort being recorded as days on ground. The Federal Republic of Germany recorded all data on a set-by-set basis with effort recorded as trawling time. The data supplied an estimation of effort on a squid-directed fishery, although in order to correlate effort data with Poland and USSR this was con-

verted to days on ground.

All vessels actively fishing for squid were also licensed for other fisheries; therefore, the effort was not directed to squid at all times.

All data were summarized in bi-weekly periods for each individual country and combined for the total Canadian catch. Catch rates were also determined for each period and each vessel.

#### Observations

The total Canadian offshore catch was 8,340.06 MT. This constituted 4,449.4 MT by the Federal Republic of Germany, 2,644.8 MT by Poland, 940.0 MT by USSR, and 305.9 MT by the Canadian operation. The total fishing period of 30 weeks (16 May to 28 November) includes periods when fishing was not directed towards squid. Total inshore catch was 470.85 MT.

#### Poland and USSR

The catch data obtained from the cooperative arrangement with Poland and USSR (Tables 1 and 2) indicate directed squid fishing until and including the two-week periods beginning 5 September and 3 October, respectively. Poland ceased directed squid fishing on 3 September. After this date, by-catch and its corresponding effort were reported even when there was no squid catch. USSR ceased directed squid fishing 10 October. Effort reported in days was used to estimate catch rates. It is apparent that when fishing was squid-directed, the percentages of squid in the total catches were very high and, in most cases, 100 percent.

Fig. 1 and 2 depict catch rate, percent squid catch, and total catch during Poland and USSR operations.

#### Federal Republic of Germany

The arrangement between Canada and the Federal Republic of Germany consisted of five separate cruises commencing 17 May through 26 October with one- to two-week intervals between cruises (ICNAF Res. Doc. 78/II/4),

accounting for as little as two days on ground in some two-week periods (Table 3). Catch rates for squid in general show a steady increase until Sept. 5 when completely by-catch free trawls were observed (Fig. 3).

#### Canadian Offshore Operation

Offshore catch was recorded for a single vessel (Table 4). Fishing from Nov. 14 to Dec. 12 (Table 4) shows low catch rates and low by-catch during this period.

#### Total Canadian Offshore Fishery

Table 5 shows the total Canadian offshore fishery. Although all countries were not actively fishing throughout the whole season, a general trend towards decreasing by-catch is apparent from the period 13 June through to the period beginning 19 September. Fig. 4 depicts catch rate, % squid catch, and total catch for the entire Canadian offshore fishery.

Individual vessel reports are summarized in Table 6 and 7. The first four vessels in Poland displayed the highest catch rates (Table 6) because these vessels conducted a squid-directed fishery until Sept. 3. Subsequent fishing by these four vessels and the remaining four Polish vessels reported squid as by-catch. Hence, these catch rates were relatively low. Similarly, the first two vessels from USSR (Table 6) conducted a squid-directed fishery until period beginning October 3. Subsequent fishing by USSR reported squid as by-catch.

Catch rates were highest between the periods 27 June to 5 September, indicating squid-directed fishing. After this period, squid catch decreased with a corresponding increase in effort, indicating effort was directed to other fisheries; and squid was usually a by-catch.

REFERENCE

Amaratunga, T., M. Roberge, and L. Wood. The 1977 Canadian offshore catch statistics of the squid, *Illex illecebrosus*, fishery in ICNAF Subareas 3 and 4. ICNAF Res. Doc. 78/II/4, Serial No. 5156 (mimeographed).

Table 1. Catch/Effort Statistics for Poland in Subarea 4.

| Period Beginning | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|------------------|------------------|------------------|---------------|---------------|------------|
| Aug. 8           | 722.6            | 722.6            | 100.00        | 22            | 32.85      |
| Aug. 22          | 1,208.5          | 1,211.8          | 99.73         | 37            | 32.66      |
| Sept. 5          | 448.8            | 527.9            | 85.02         | 34            | 13.20      |
| Sept. 19         | 14.5             | 575.9            | 2.52          | 53            | 0.27       |
| Oct. 3           | 2.5              | 782.3            | 0.32          | 62            | 0.04       |
| Oct. 17          | 16.4             | 947.1            | 1.73          | 97            | 0.17       |
| Oct. 31          | 217.8            | 739.6            | 29.45         | 58            | 3.76       |
| Nov. 14          | 13.7             | 115.9            | 11.82         | 43            | 0.32       |
| Total            | 2,644.8          | 5,623.1          | 47.03         | 406           | 6.51       |

Table 2. Catch/Effort Statistics for the USSR in Subarea 4.

| Period Beginning | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|------------------|------------------|------------------|---------------|---------------|------------|
| Aug. 22          | 123.0            | 150.0            | 82.00         | 11            | 11.18      |
| Sept. 5          | 279.0            | 279.0            | 100.00        | 21            | 13.29      |
| Sept. 19         | 380.0            | 380.0            | 100.00        | 28            | 13.57      |
| Oct. 3           | 128.0            | 128.0            | 100.00        | 7             | 18.29      |
| Oct. 17          | 10.0             | 47.0             | 21.28         | 12            | 0.83       |
| Oct. 31          | 19.0             | 68.0             | 27.94         | 17            | 1.12       |
| Nov. 14          | 1.0              | 14.0             | 7.14          | 2             | 0.50       |
| Total            | 940.0            | 1,066.0          | 88.18         | 98            | 9.59       |

Table 3. Catch/Effort Statistics for Federal Republic of Germany in Subarea 4.

| Period Beginning | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day   |
|------------------|------------------|------------------|---------------|---------------|--------------|
| May 16           | 59.4             | 427.5            | 13.89         | 12            | 4.95         |
| May 30           | 144.0            | 552.0            | 26.09         | 14            | 10.29        |
| June 13          | 283.5            | 462.0            | 61.36         | 11            | 25.77        |
| June 27          | 649.0            | 854.0            | 76.00         | 14            | 46.36        |
| July 11          | 372.0            | 449.5            | 82.76         | 8             | 46.50        |
| July 25          | 899.0            | 977.0            | 92.02         | 14            | 64.21        |
| Aug. 8           | 125.0            | 160.0            | 78.13         | 2             | 62.50        |
| Aug. 22          | -                | -                | -             | -             | -            |
| Sept. 5          | 898.0            | 898.0            | 100.00        | 13            | 69.08        |
| Sept. 19         | -                | -                | -             | -             | -            |
| Oct. 3           | 631.0            | 664.5            | 94.96         | 11            | 57.36        |
| Oct. 17          | 388.5            | 404.5            | 96.04         | 10            | 38.85        |
| Oct. 31          | -                | -                | -             | -             | -            |
| Nov. 14          | -                | -                | -             | -             | -            |
| Nov. 28          | -                | -                | -             | -             | -            |
| <b>Total</b>     | <b>4,449.4</b>   | <b>5,849.5</b>   | <b>76.06</b>  | <b>109</b>    | <b>40.82</b> |

Table 4. Catch/Effort Statistics for the Canadian Operation in Subarea 4.

| Period Beginning | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day   |
|------------------|------------------|------------------|---------------|---------------|--------------|
| Nov. 14          | 260.68           | 284.81           | 91.53         | 14            | 18.62        |
| Nov. 28          | 45.18            | 45.72            | 98.82         | 12            | 3.77         |
| <b>Total</b>     | <b>305.86</b>    | <b>330.53</b>    | <b>92.54</b>  | <b>26</b>     | <b>11.76</b> |

Table 5. Catch/Effort Statistics for the total Canadian offshore Squid Fishery in Subarea 4.

| Period Beginning | Squid Catch<br>(MT) | Total Catch<br>(MT) | % Squid<br>Catch | Effort<br>(Days) | C/E<br>MT/Day |
|------------------|---------------------|---------------------|------------------|------------------|---------------|
| May 16           | 59.4                | 427.5               | 13.89            | 12               | 4.95          |
| May 30           | 144.0               | 552.0               | 26.09            | 14               | 10.29         |
| June 13          | 283.5               | 462.0               | 61.36            | 11               | 25.77         |
| June 27          | 649.0               | 854.0               | 76.00            | 14               | 46.36         |
| July 11          | 372.0               | 449.5               | 82.76            | 8                | 46.50         |
| July 25          | 899.0               | 977.0               | 92.02            | 14               | 64.21         |
| Aug. 8           | 847.6               | 882.6               | 96.03            | 24               | 35.32         |
| Aug. 22          | 1,331.5             | 1,361.8             | 97.78            | 48               | 27.74         |
| Sept. 5          | 1,625.8             | 1,704.9             | 95.36            | 68               | 23.91         |
| Sept. 19         | 394.5               | 955.9               | 41.27            | 81               | 4.87          |
| Oct. 3           | 761.5               | 1,574.8             | 48.36            | 80               | 9.52          |
| Oct. 17          | 414.9               | 1,398.6             | 29.67            | 119              | 3.49          |
| Oct. 31          | 236.8               | 807.6               | 29.32            | 75               | 3.16          |
| Nov. 14          | 275.38              | 414.71              | 66.40            | 59               | 4.67          |
| Nov. 28          | 45.18               | 45.72               | 98.82            | 12               | 3.77          |
| <b>Total</b>     | <b>8,340.06</b>     | <b>12,868.63</b>    | <b>64.81</b>     | <b>639</b>       | <b>13.05</b>  |

Table 6. Vessel Reports for the Canadian offshore fishery in Subarea 4.

POLAND

| Vessel | Fishing Period      | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|--------|---------------------|------------------|------------------|---------------|---------------|------------|
| 1.     | Aug. 8-<br>Sept. 19 | 458.60           | 629.10           | 72.90         | 36.0          | 12.74      |
| 2.     | Aug. 8-<br>Oct. 31  | 788.30           | 1,305.10         | 60.40         | 75.0          | 10.51      |
| 3.     | Aug. 8-<br>Oct. 31  | 810.50           | 1,457.50         | 55.61         | 69.0          | 11.75      |
| 4.     | Aug. 29-<br>Oct. 31 | 403.90           | 948.70           | 42.57         | 64.0          | 6.31       |
| 5.     | Oct. 3-<br>Nov. 4   | 31.90            | 339.20           | 9.40          | 46.0          | 0.69       |
| 6.     | Oct. 3-<br>Nov. 14  | 61.80            | 341.20           | 18.11         | 42.0          | 1.47       |
| 7.     | Oct. 3-<br>Nov. 14  | 47.80            | 294.00           | 16.26         | 38.0          | 1.26       |
| 8.     | Oct. 3-<br>Oct. 31  | 42.00            | 308.20           | 13.63         | 36.0          | 1.17       |

USSR

| Vessel | Fishing Period       | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|--------|----------------------|------------------|------------------|---------------|---------------|------------|
| 1.     | Sept. 18-<br>Oct. 12 | 359.0            | 359.0            | 100.00        | 21.00         | 17.10      |
| 2.     | July 28-<br>Nov. 13  | 568.0            | 627.0            | 90.59         | 55.00         | 10.33      |
| 3.     | Oct. 23-<br>Nov. 11  | 13.0             | 80.0             | 16.25         | 22.00         | 0.59       |

Canadian Operation

| Vessel | Fishing Period     | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|--------|--------------------|------------------|------------------|---------------|---------------|------------|
| 1.     | Nov. 14-<br>Dec. 9 | 305.86           | 330.53           | 92.54         | 26.0          | 11.76      |

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| Vessel | Fishing Period     | Squid Catch (MT) | Total Catch (MT) | % Squid Catch | Effort (Days) | C/E MT/Day |
|--------|--------------------|------------------|------------------|---------------|---------------|------------|
| 1.     | May 16-<br>Oct. 17 | 4,449.4          | 5,849.5          | 76.06         | 109.0         | 40.82      |

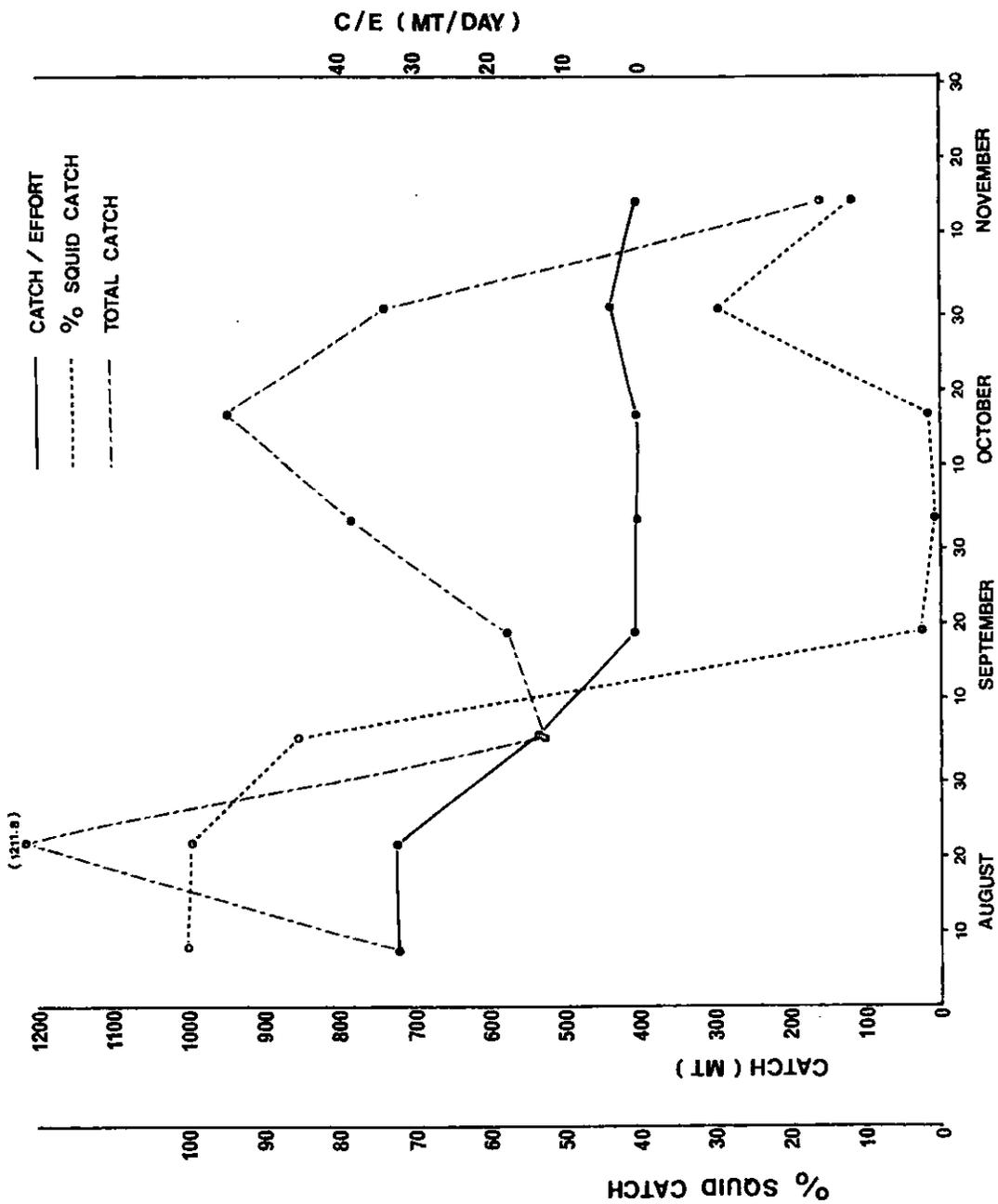


FIG. 1. Catch/Effort, Percent Squid Catch, and Total Catch for Poland in Subarea 4 for 1977.

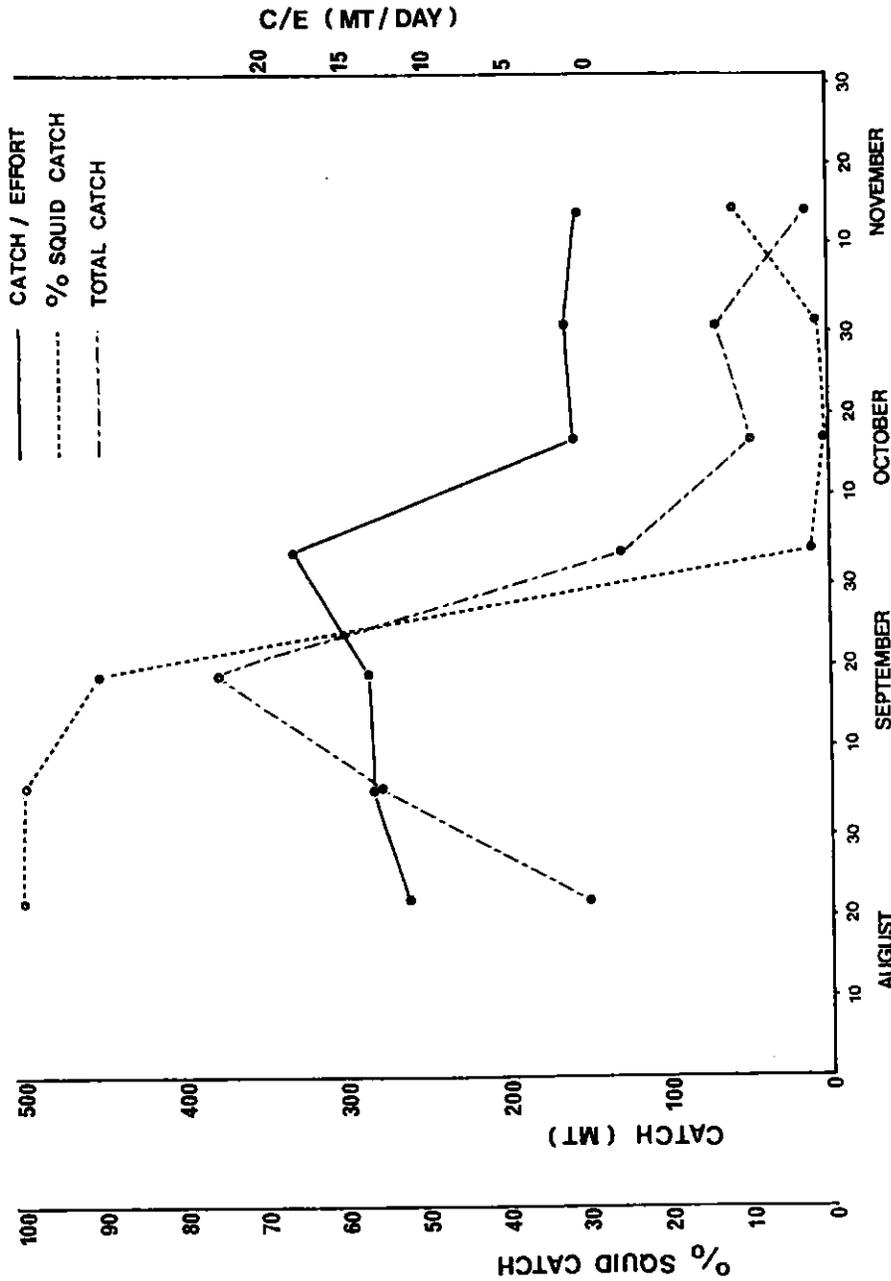


FIG. 2. Catch/Effort, Percent Squid Catch, and Total Catch for USSR in Subarea 4 for 1977.

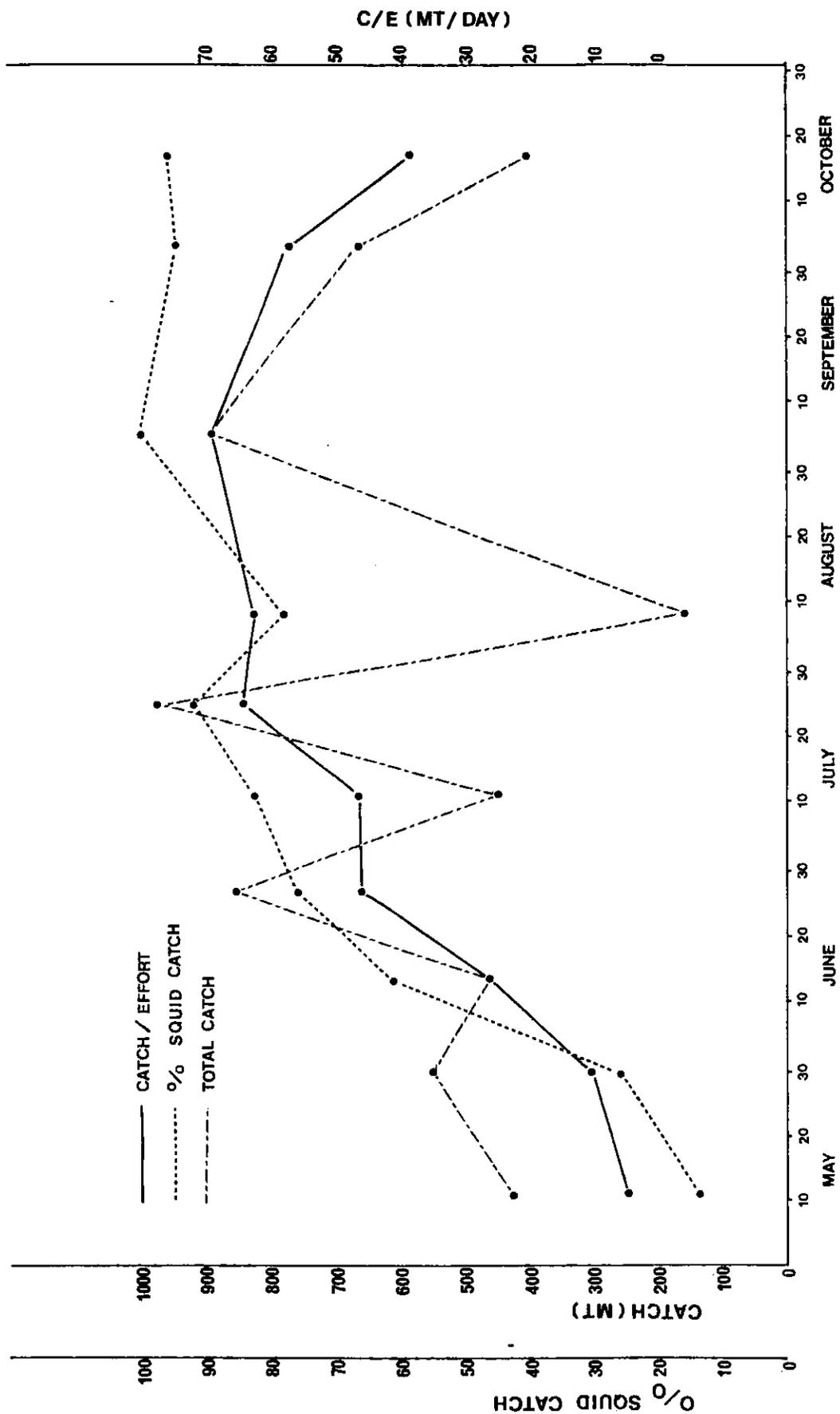


FIG. 3. Catch/Effort, Percent Squid Catch, and Total Catch for The Federal Republic of Germany in Subarea 4 for 1977.

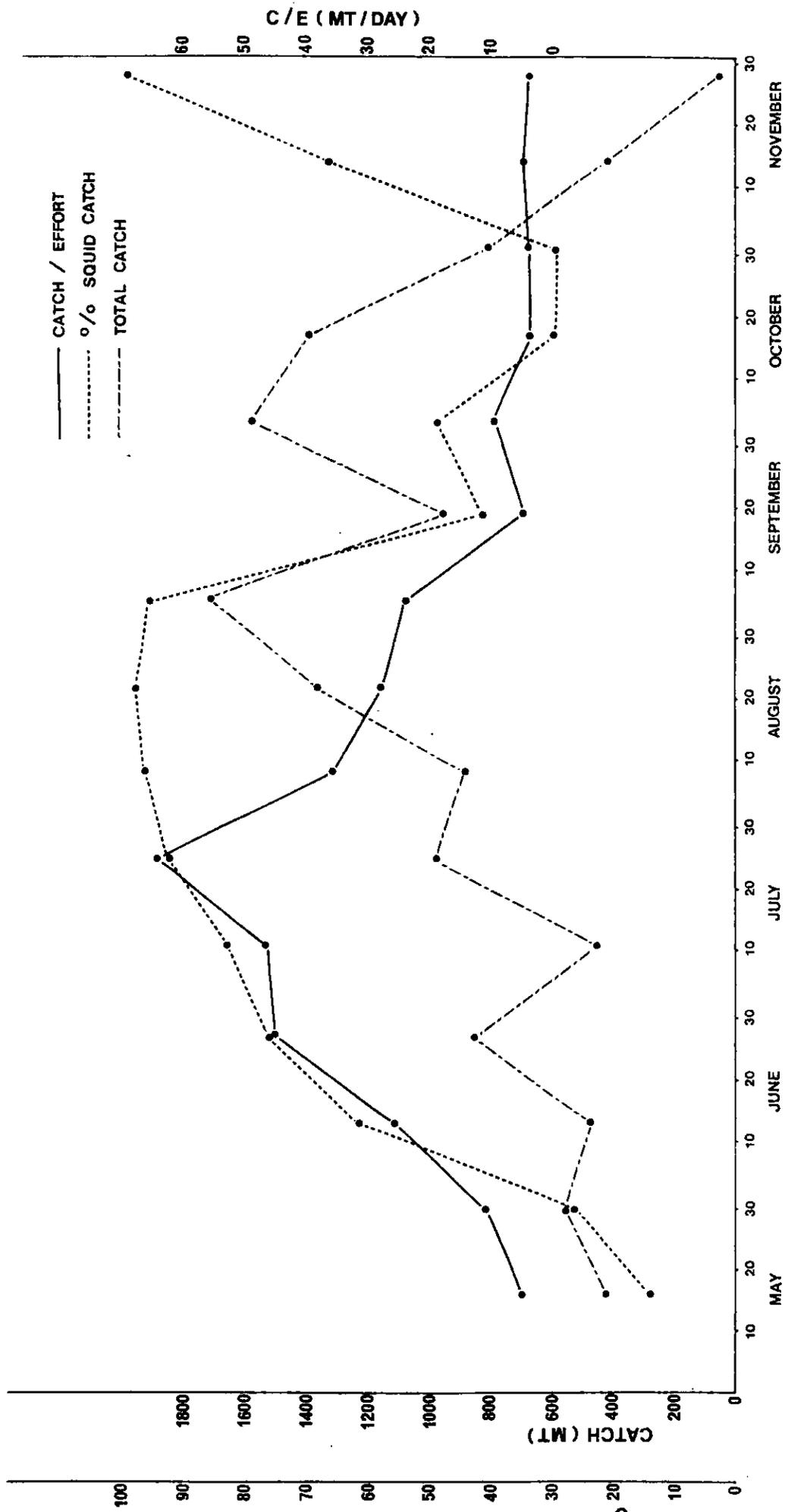


FIG. 4. Catch Performance for the Total Canadian Operation in Subarea 4 for 1977.

