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Breakdown for 1982 squid (Illex illecebrosus) catches in NAFO Subarea 3, and Division 2J and 4R, with length and sex composition from Newfoundland inshore samples and early season offshore samples.

by

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INTRODUCTION

Inshore Newfoundland squid catches have been described by Mercer (MS 1973a) for the period 1955-72. Information on biological characteristics of squid from inshore localities is also available for some years within the period 1965-73 (Mercer MS 1975). Such information has been provided for the period 1975-77 by Collins and Ennis (MS 1978). Since then yearly catches and biological characteristics of squid from NAFO Subarea 3 have been documented yearly for offshore as well as inshore areas (Hurley et al., MS 1979; Beck et al., MS 1980, MS 1981, MS 1982).

This paper provides a description of the 1982 fishery for Illex illecebrosus in NAFO Subarea 3. Commercial catches are broken down by month, NAFO Division, and processing category. Temporal and areal variation in length, maturity and sex composition are described for samples from the inshore fishery and from an offshore research cruise in May-June within NAFO Divisions 3N, 3O and 3P.

MATERIALS AND METHODS

Monthly inshore squid catches by NAFO Divisions (Fig. 1) were obtained from the Economics and Intelligence Branch, Department of Fisheries and Oceans, Newfoundland Region. Inshore samples were collected using Japanese mechanical jigger at representative localities (Fig. 2). Samples were taken from the commercial fishery at Holyrood (NAFO Div. 3L) and La Scie (NAFO Div. 3K). Additional samples from Div. 3K were collected at Campbellton and Hampden (Fig. 2) by staff of the Fisheries Research Branch. Offshore samples were collected aboard the Canadian Research vessel Gadus Atlantica during a May 25-June 13 research survey on the southwest slope of the Grand Bank and St. Pierre Bank (Fig. 3). Sampling was carried out using an Engels 145 bottom trawl with a 1 1/8" knotless codend liner. Temperature data from Holyrood were collected at a depth of approximately 10 m using thermographs.

Squid were measured in dorsal mantle length to the nearest 0.5 cm and later grouped into 1 cm intervals, except for Holyrood samples which were measured to the nearest centimeter. Samples, collected weekly when available, were summarized by bimonthly periods for descriptions of length, maturity and sex composition. Maturity in males was classified according to Mercer (1973b).

RESULTS AND DISCUSSION

Reported Catches

The 1982 NAFO Subarea 3 squid catch was 11,160 t (Table 1), down from the 1981 catch of 17,303 t (Beck et al., MS 1982). As for 1981, virtually all the Subarea 3 catch came from the inshore fishery with an offshore catch for 1982 of 0.1 t (unpublished data, FLASH information system). The inshore catch represents the lowest since 1976 and was undoubtedly related to low availability of squid, since favourable markets and good prices offered to fishermen resulted in a high level of fishing effort. Low inshore availability was also reflected in the fact that 3,543 t of squid, or 32% of the catch was dried. This represents the highest

proportion of dried squid in recent years (Hurley, 1980; Dawe, 1981), and no doubt relates to the fact that financial return for the dried product is greater than that for fresh squid. Thus, in such years of low squid availability, the labour-intensive process of preparing dried squid is more worthwhile than it would be in years when large quantities could be caught and sold in fresh condition.

The pattern of distribution of squid around insular Newfoundland was quite unusual in comparison to recent years. Largest squid concentrations appeared to be in the vicinity of Notre Dame Bay, White Bay and north almost to the tip of the Great Northern Peninsula (Fig. 1). In fact much more squid was caught in NAFO Div. 3K (7,685 t, Table 1) than in Div. 3L (3,383 t). This represents the first year since 1955 when the largest catch was not derived from Div. 3L, the area of the Avalon Peninsula (Mercer, MS 1973a; Collins and Ennis, MS 1978; Hurley et al., MS 1979; Beck et al., MS 1980, MS 1981, MS 1982). The unusual northward extension of squid concentrations was also reflected in the fact that 1982 catch has been reported from Labrador, Div. 2J, (0.2 t, not shown in Table 1).

Squid was first captured inshore in May, with a catch of 0.2 t recorded for that month from Div. 3L (not shown in Table 1). The seasonal distribution of catches was similar to that observed during 1981, with the maximum monthly catch occurring during August (5,745 t, Table 1). Monthly catches were lower thereafter, with a remarkable decline between September and October, as also seen during the previous year (Beck et al., MS 1982). The seasonal trend in catch noted for 1981 and 1982 is quite unusual. For most previous years, peak catch occurred during September or October. For those earlier years when the catch did peak during August, the October catch did not reflect a sharp decline as described here (Mercer, MS 1973a; Collins and Ennis, MS 1978; Hurley et al., MS 1979; Beck et al., MS 1980, MS 1981, MS 1982).

The decline in catch after August and overall low availability of squid cannot likely be attributed to inshore temperature conditions, at least for Holyrood (Fig. 5). Daily bottom temperature first exceeded 5°C during early June and fluctuated considerably until the end of August. However, temperature remained constantly above 5°C during September and October, peaking at 12.5°C, approximately 3.5°C below the 1981 peak (Beck et al., MS 1982) and 2.0°C below the 1979 peak (Dawe and Beck, MS 1980).

Biological Characteristics

Length frequency distributions by sex are presented in Fig. 6 for samples collected during May and June from the St. Pierre Bank and Grand Bank. Distributions of mantle length by sex and, for males, maturity are shown for inshore samples collected during July-August at Holyrood (Fig. 7) and during August-September at La Scie (Fig. 8). Samples from later in the season were available only from Hampden and Campbellton (Fig. 9). As in other years, length frequency distributions were typically unimodal. Smallest sizes were encountered during May-June on the Continental Shelf. Modal length was 14 cm for both sexes during the first half of June from NAFO Div. 3O, where samples were largest (Fig. 6). By July, squid collected at Holyrood had increased in size, with modal length of 18 cm for both sexes (Fig. 7). The seasonal progression of modal length is difficult to describe, since few samples were collected from any single locality. Largest specimens were collected latest in the year, as seen at Campbellton, where, during the first half of November modal lengths were 25 cm and 27 cm for males and females respectively (Fig. 9).

Those September-November samples from Hampden and Campbellton (Fig. 9) show the progression of sexual maturity in males toward the end of the inshore fishing season, as previously documented (Mercer, MS 1975; Collins and Ennis MS 1978; Hurley et al., MS 1979; Beck et al., MS 1980; MS 1981; MS 1982). The apparent high proportion of males in Stage A of maturity from Holyrood (Fig. 7) and La Scie (Fig. 8) is believed to be largely an artifact due to difference in examiners and the somewhat subjective criteria used to assign maturity stages.

For all offshore and inshore areas, females were overall larger than males as seen by differences in mean length (Fig. 6-9). The increase in mean mantle length throughout the season is shown in Fig. 10 for both sexes. At La Scie rapid growth was evident during August and September as males increased in mean length from 19.5 cm to 23.7 cm and females increased from 20.1 cm to 24.8 cm. This increase was greater than that observed at other Northeast Newfoundland localities during 1978-80 (Beck et al., MS 1982).

Sex composition is presented in Fig. 11. Overall the sexes were approximately equal for those localities and time intervals sampled. This is unusual, especially for the November 15

sample from Campbellton, where males represented 50% of the specimens examined. Usually the sex ratio favours females, especially later in the season (Collins and Ennis MS 1978; Hurley et al., MS 1979, Beck et al., MS 1981).

ACKNOWLEDGEMENTS

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Table 1. Squid catch (metric tons) by processing category at Newfoundland by NAFO Division for 1982.

Div.	Processing Category	Month							TOTAL
		June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
3K	round	2	33	3069	1997	132			5233
	tubes			55	21				76
	dry		58	1152	717	365	82	2	2376
	Total	2	91	4276	2735	497	82	2	7685
3L	round	1	660	989	303	142	38		2133
	tubes				77	22	6		105
	dry		22	447	327	266	78	5	1145
	Total	1	682	1436	707	430	122	5	3383
3P	round		3	19	29	2	1		54
	dry				4	6	1		11
	Total		3	19	33	8	2		65
4R	round			6	9	2			17
	dry			8	2				10
	Total			14	11	2			27
Combined	round	3	696	4083	2338	278	39		7436
	tubes			55	98	22	6		181
	dry		80	1607	1050	637	161	7	3543
	Total	3	776	5745	3486	937	206	7	11160

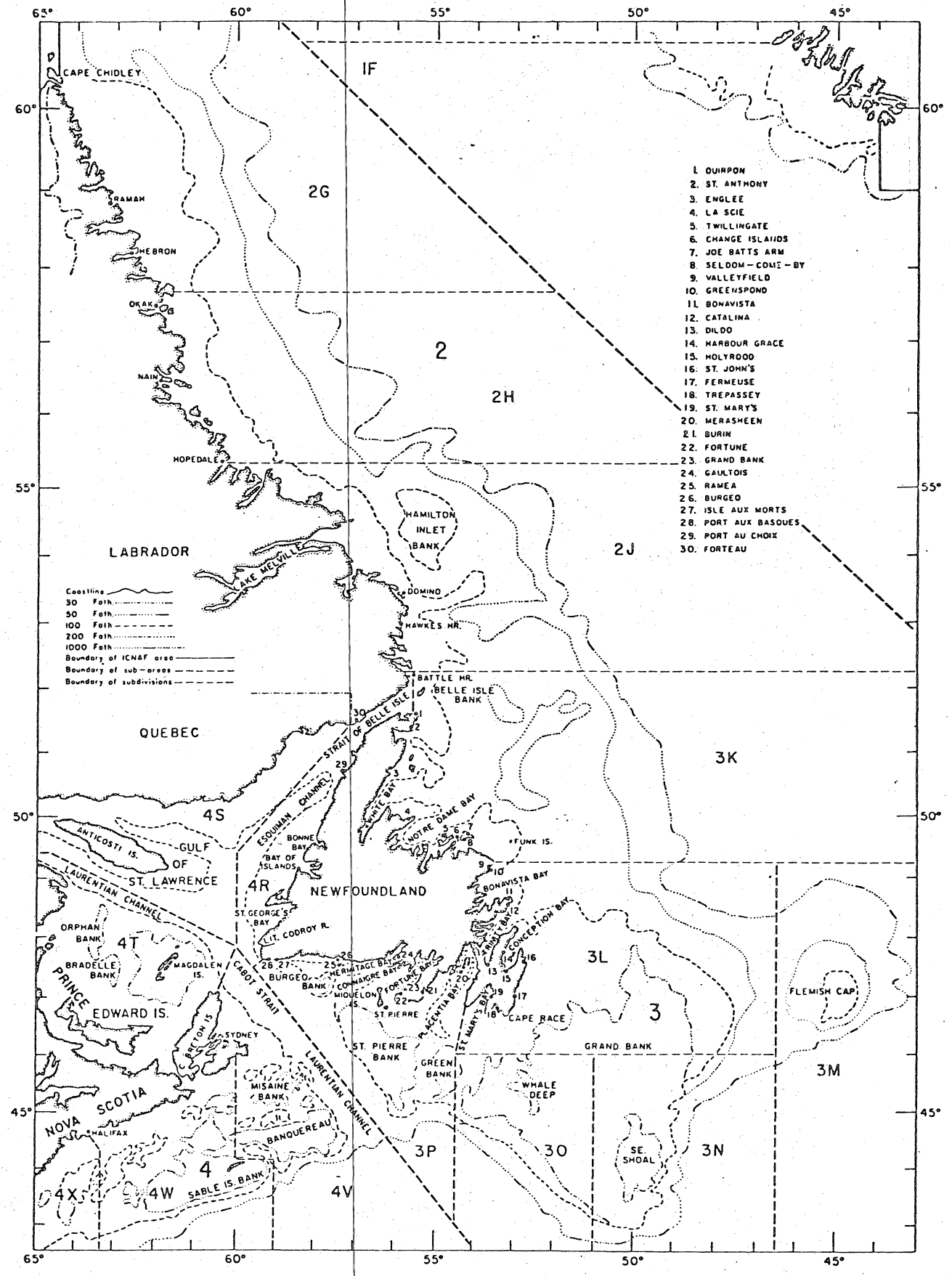

Fig. 1. Map of northwest Atlantic NAFO Subareas.

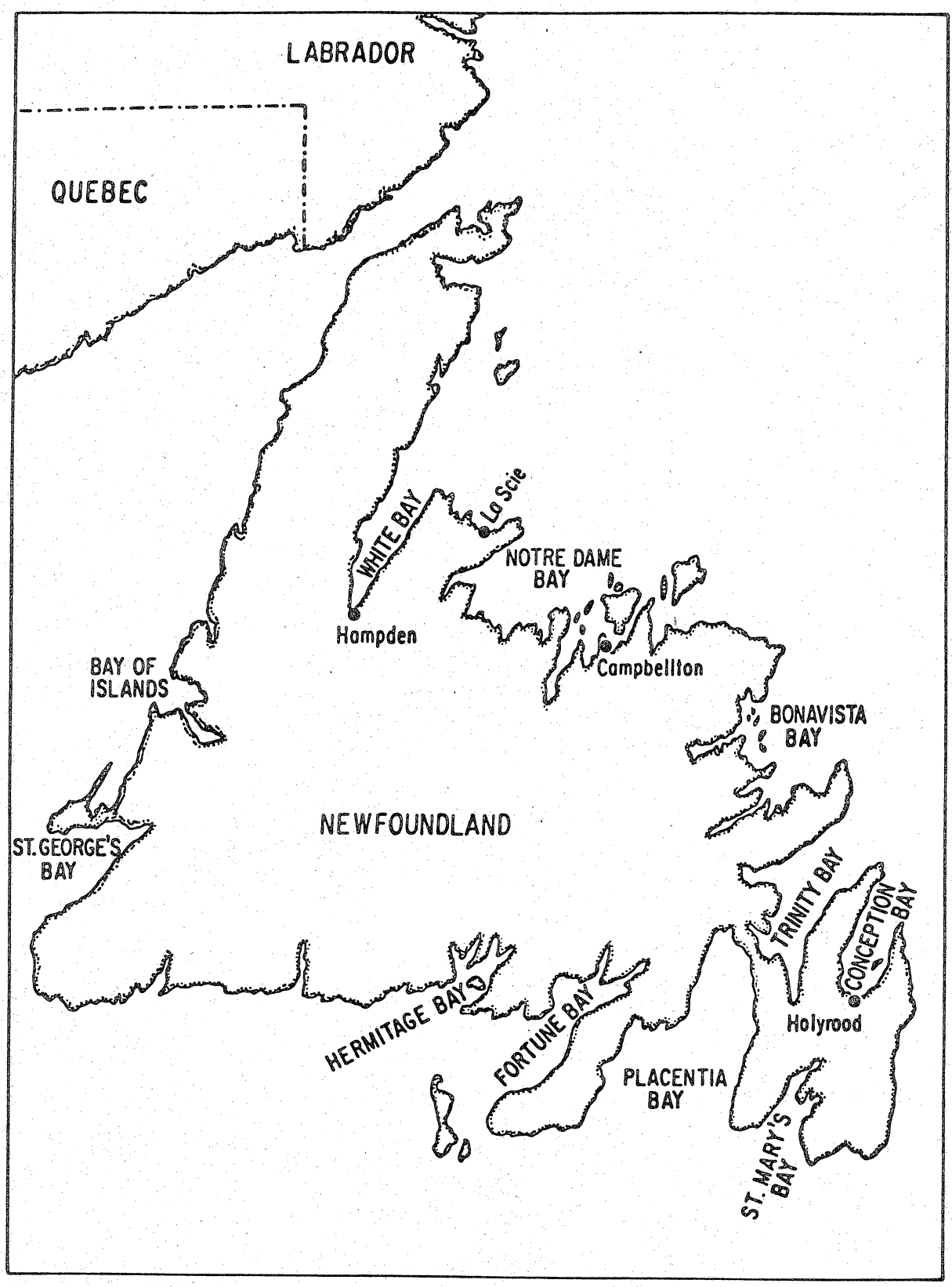

Fig. 2. Map of Newfoundland inshore sampling locations.

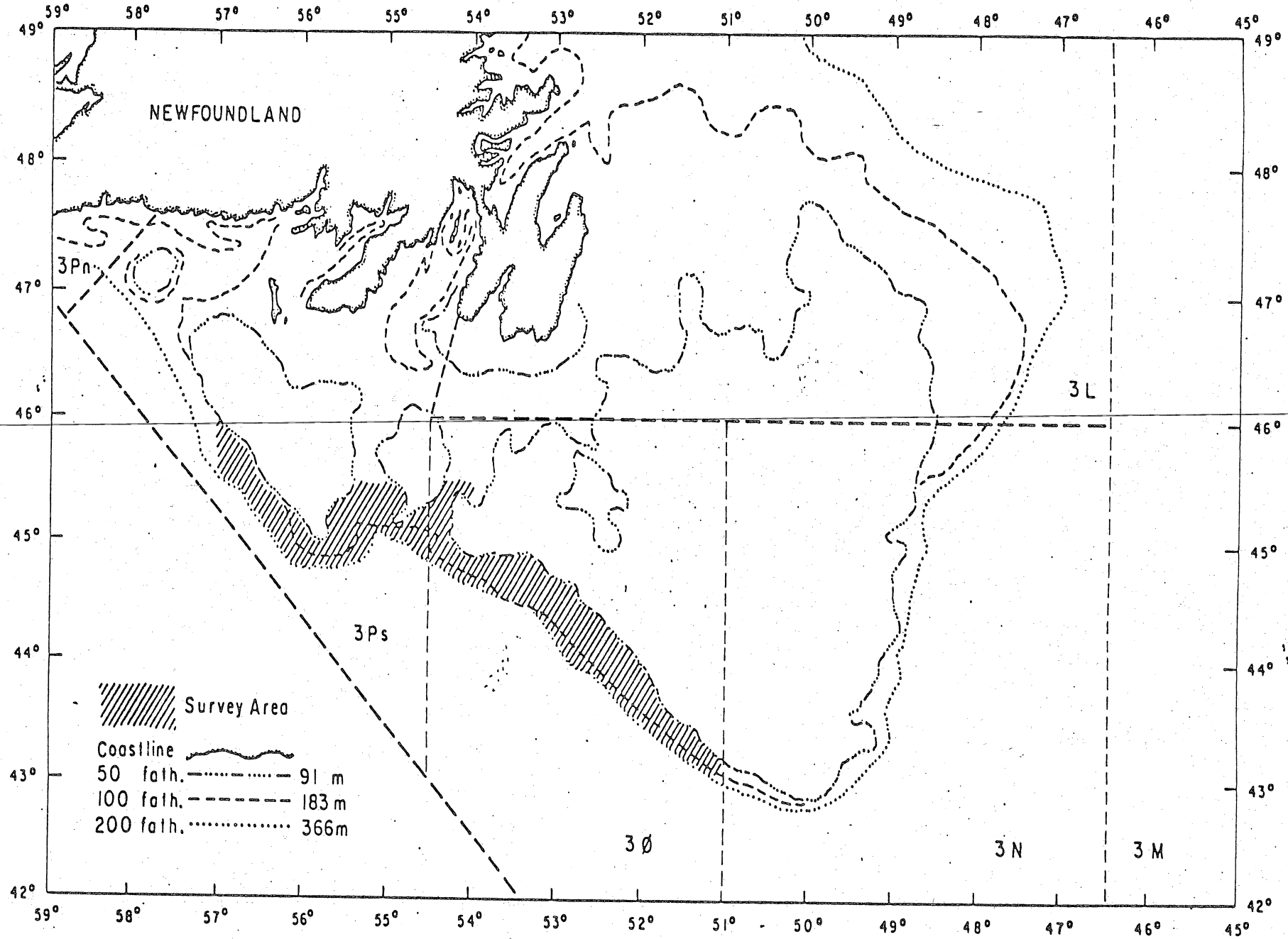

Fig. 3. Area surveyed on Gadus Atlantica Trip 65, May 25-June 13, 1982.

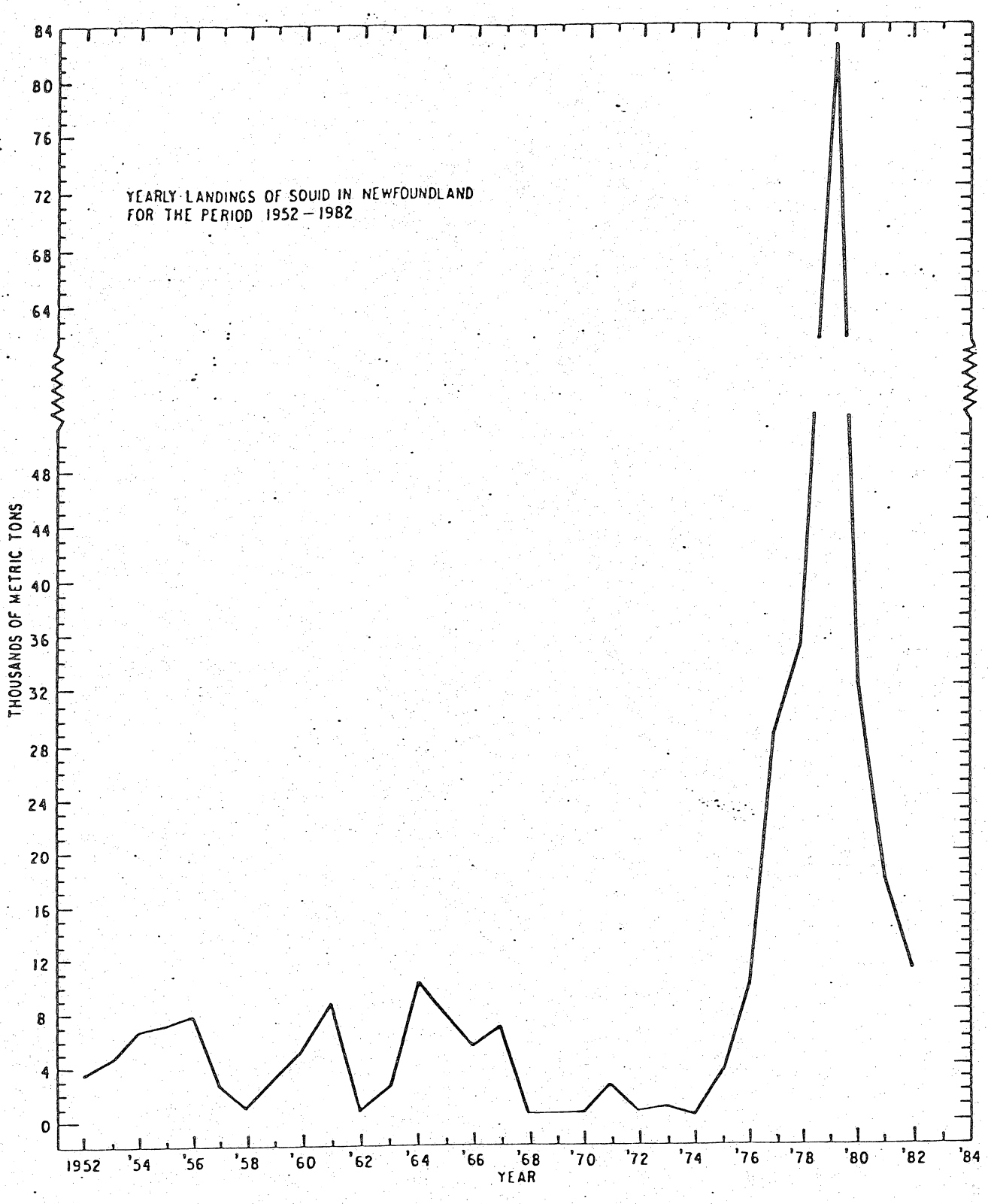

Fig. 4. Yearly catches of squid in Newfoundland for the period 1952-82.

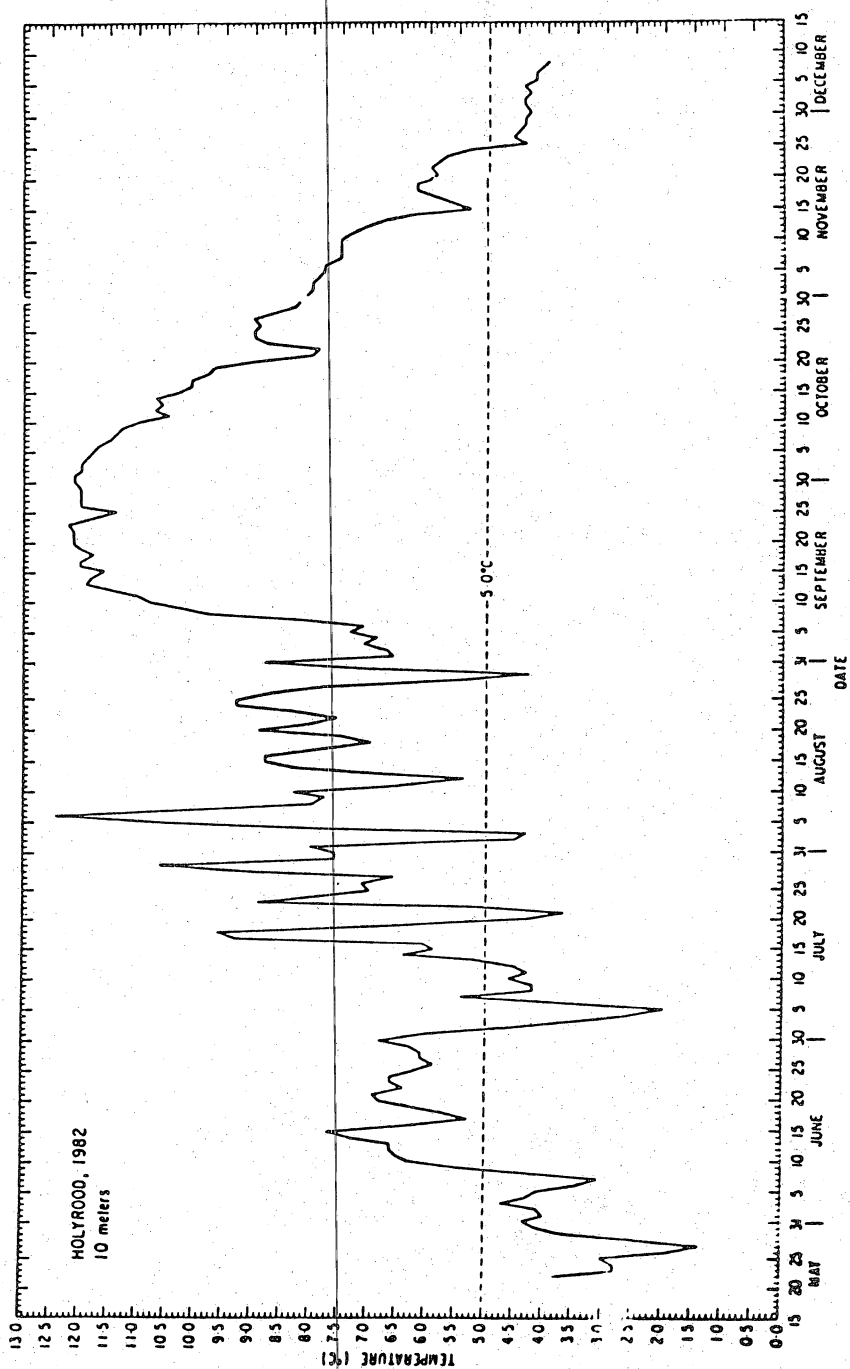

Fig. 5. Average daily temperature at Holyrood for May-December 1982.

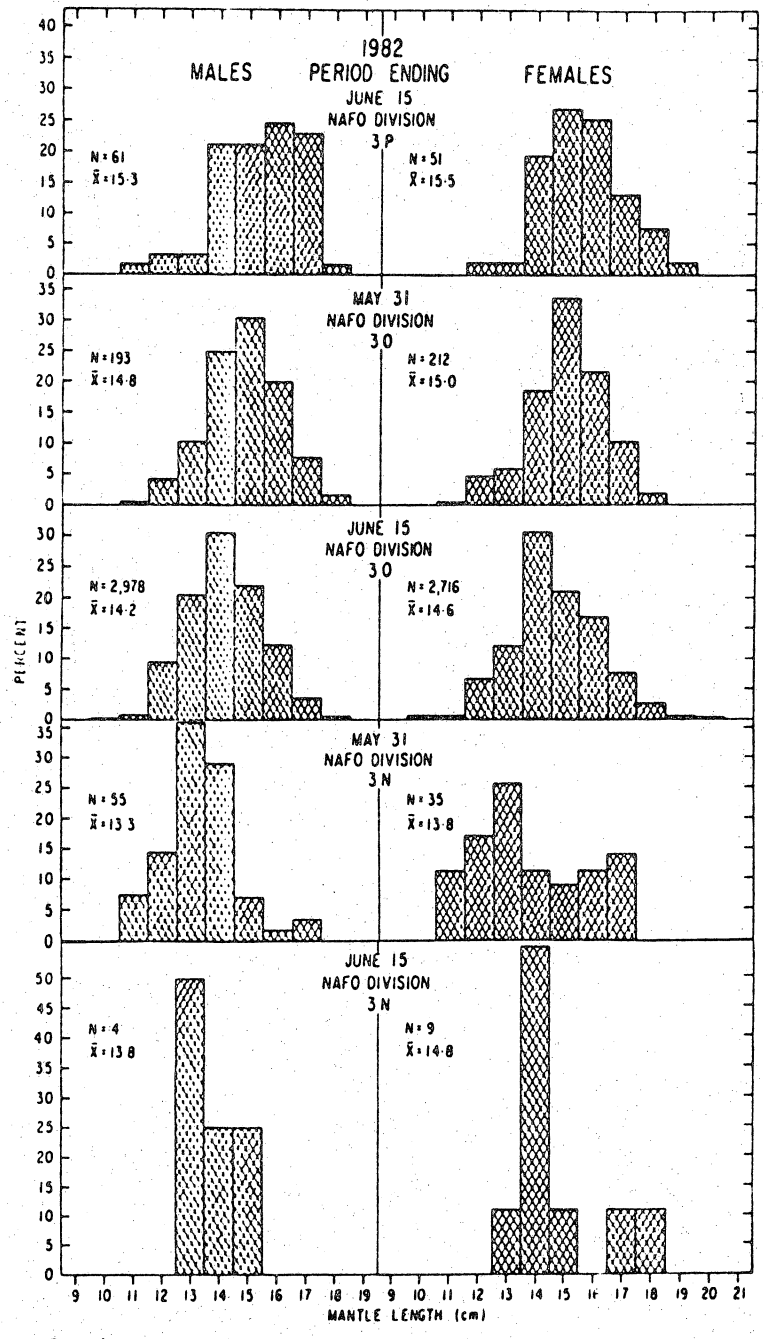

Fig. 6. Length frequencies for bi-monthly periods from offshore NAFO Divisions 3N, 3O, and 3P.

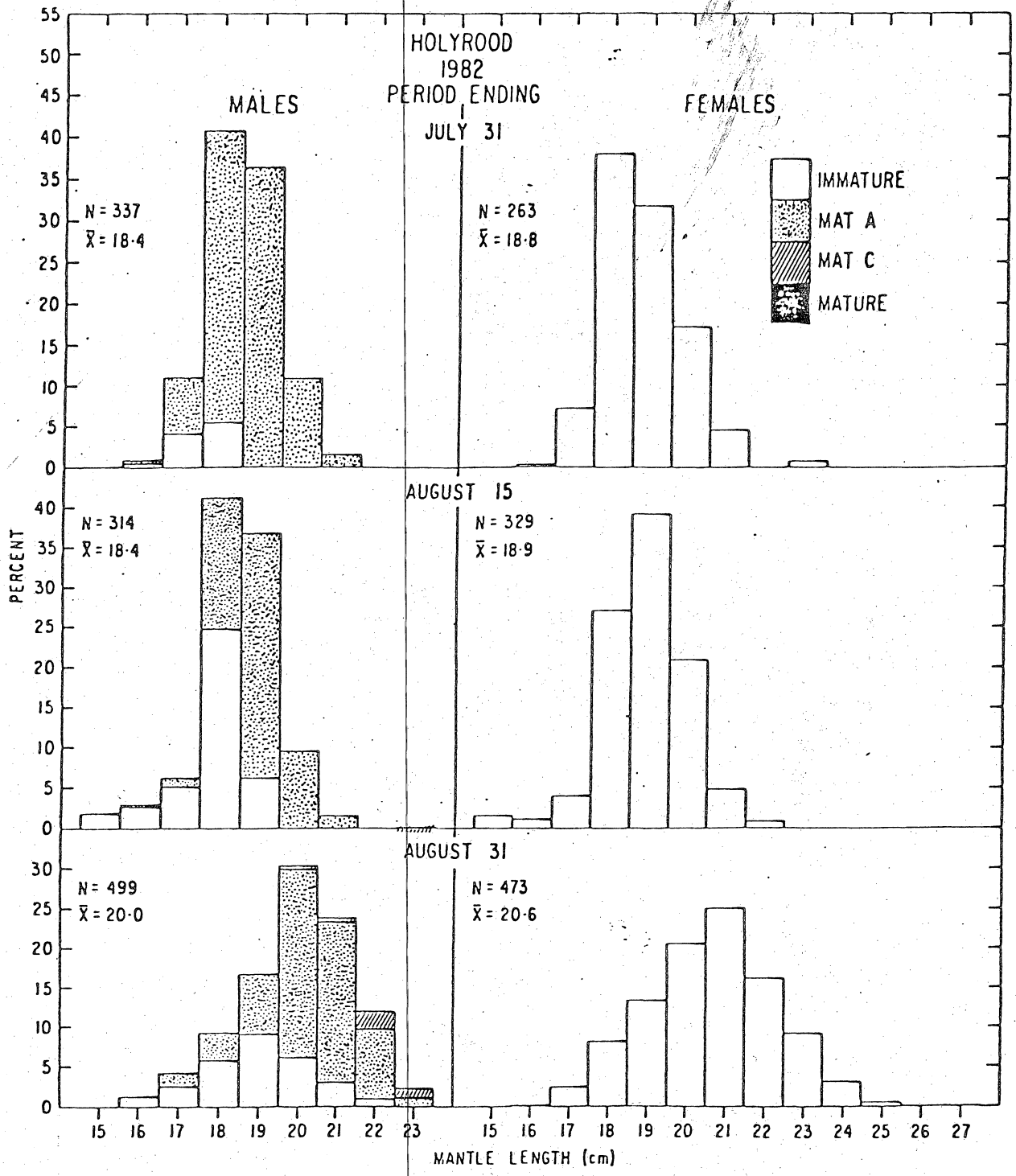

Fig. 7. Length frequencies and maturity stages by sex for bi-monthly periods in 1982 at Holyrood.

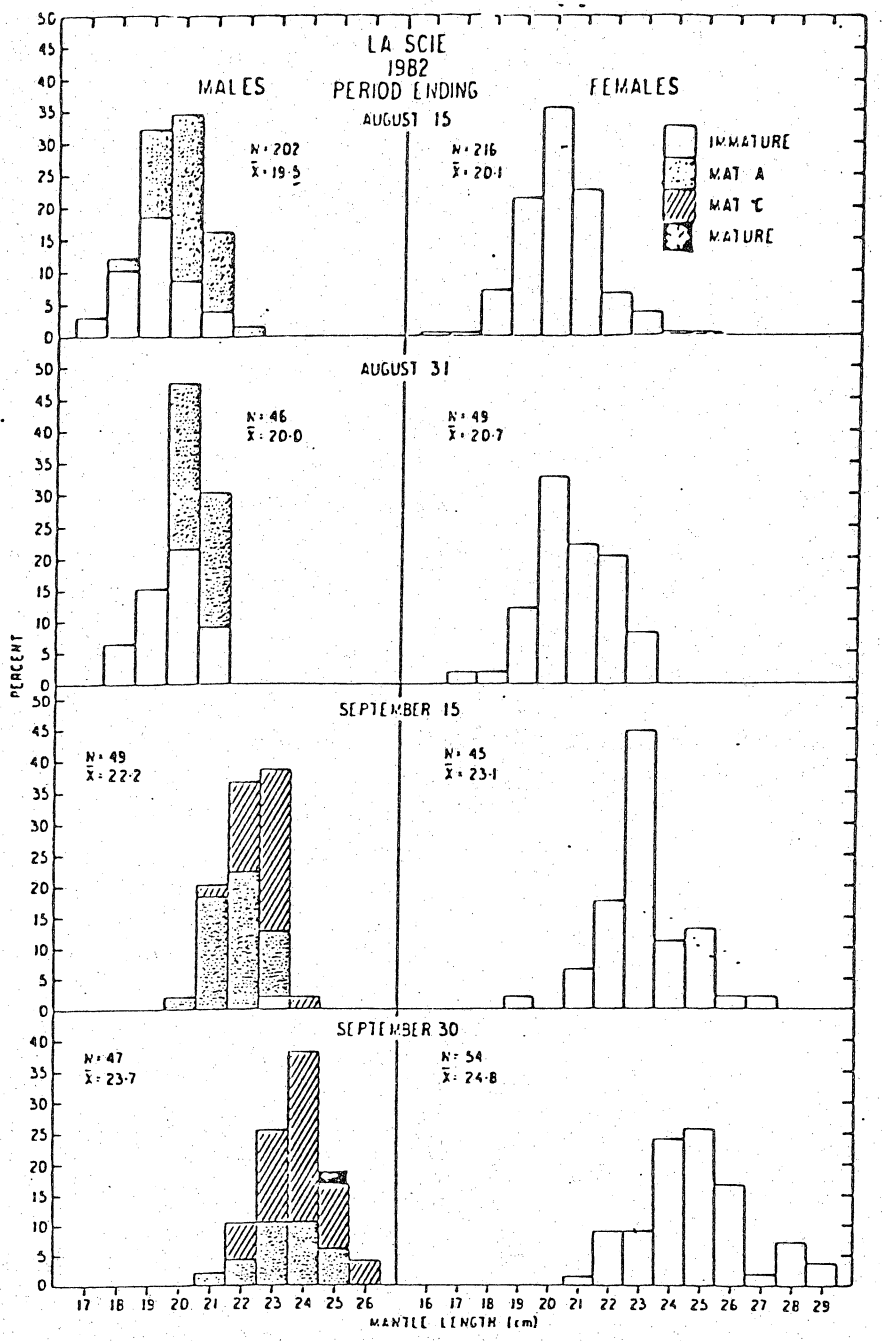

Fig. 8. Length frequencies and maturity stages by sex for bi-monthly periods in 1982 at La Scie.

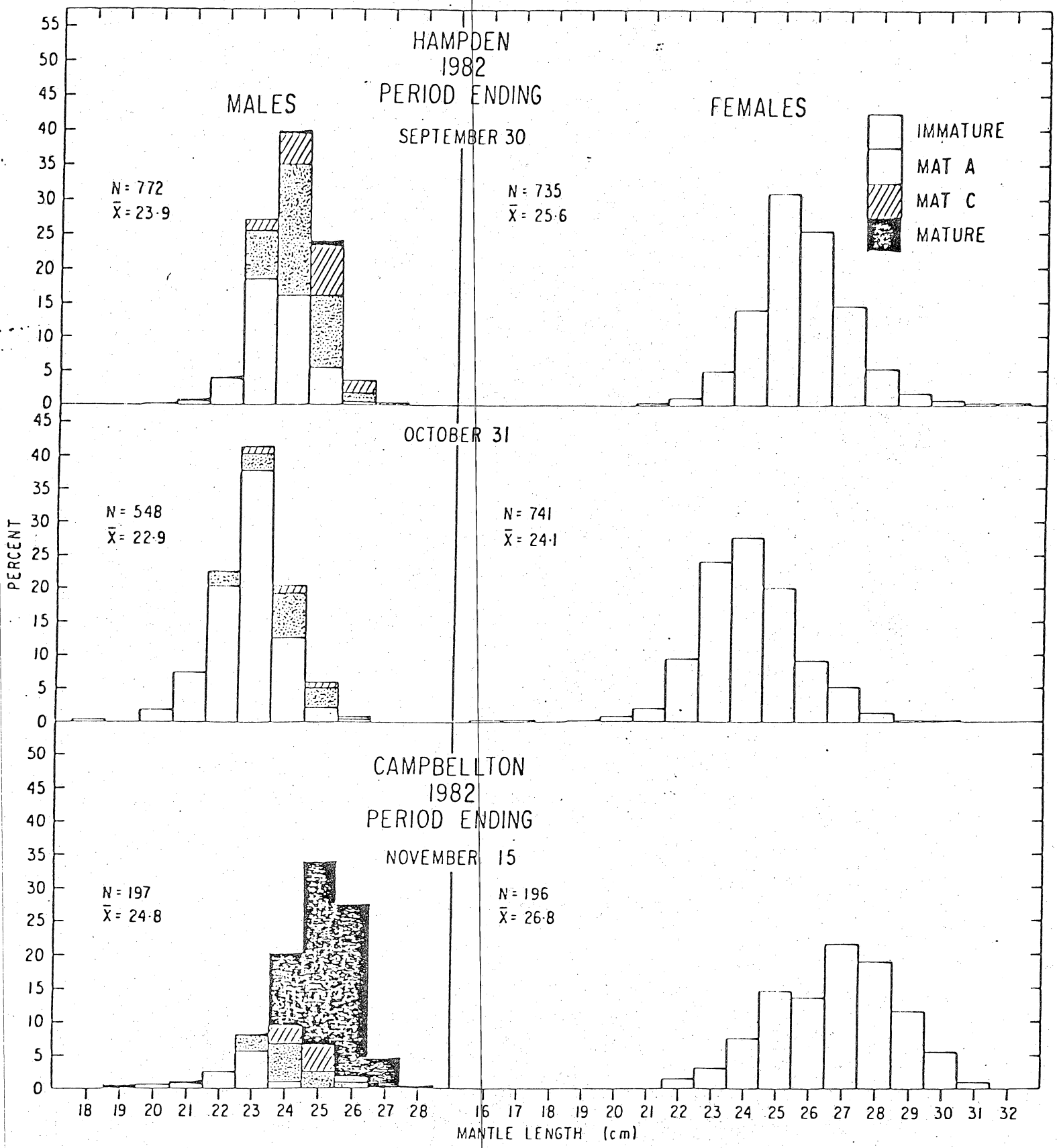

Fig. 9. Length frequencies and maturity stages by sex for bi-monthly periods in 1982 at Hampden and Campbellton.

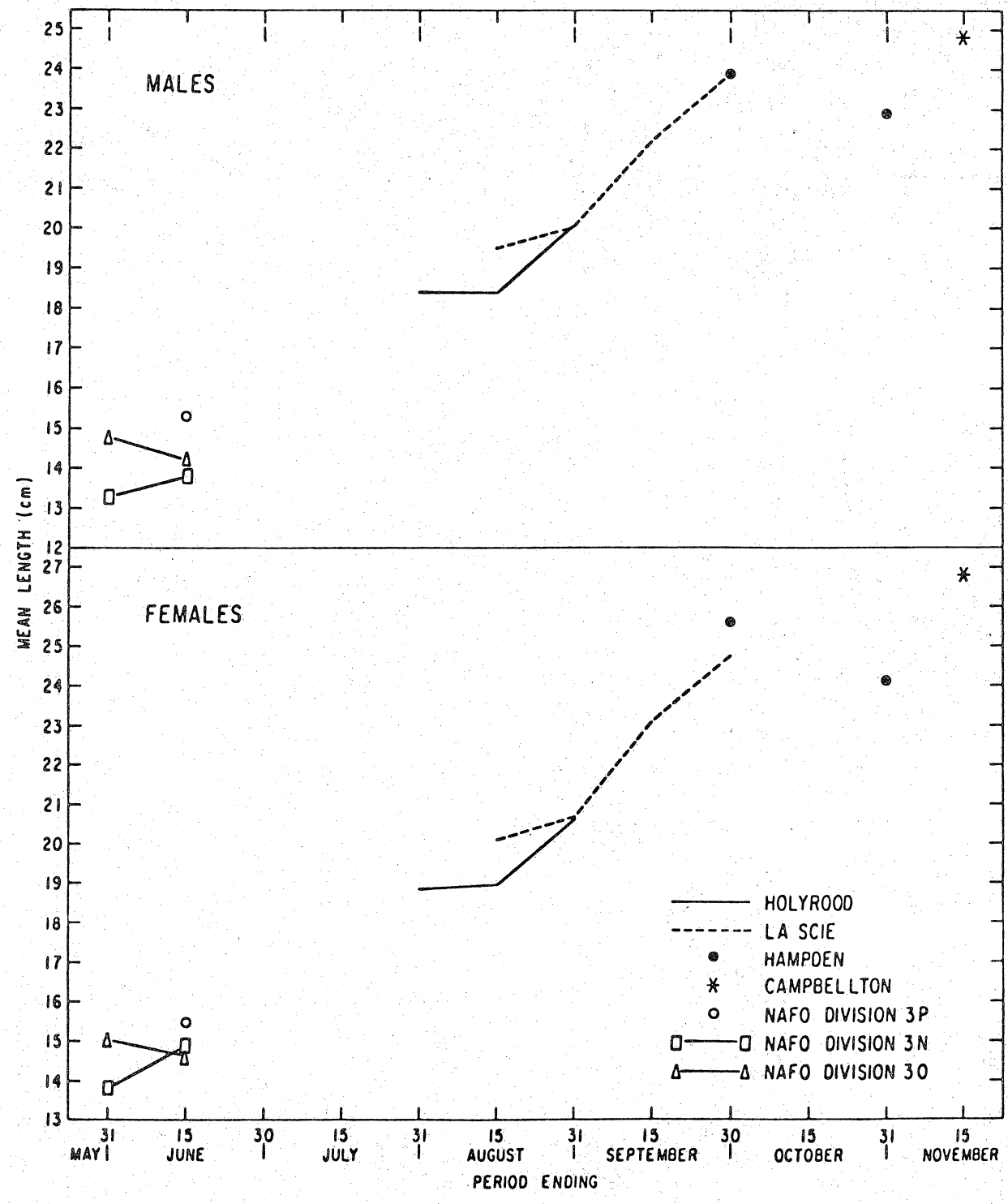

Fig. 10. Seasonal change in mean length by sex and sampling area.

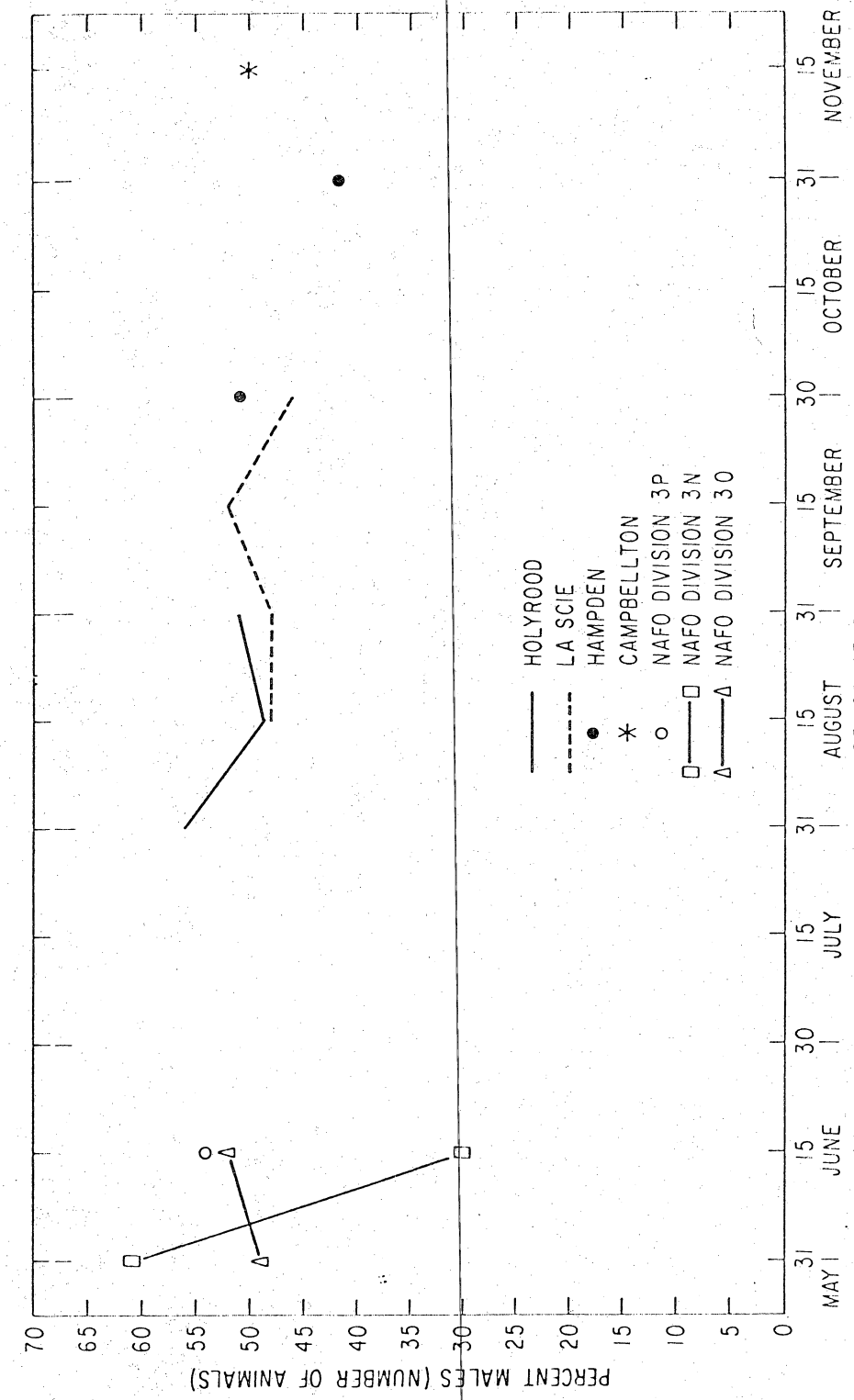

Fig. 11. Percent males over the fishing season by sampling area.