Lobster (*Homarus americanus)* fishery sea sampling data from 1989 to 1994, for fishing Area 26B in the southern Gulf of St. Lawrence.

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ABSTRACT

Between 1989 and 1994, sea sampling data were collected during the lobster fishing season in Port Hood, Margaree and Pleasant Bay, N.S. (Lobster Fishing Area 26B). Lenght frequency distributions for males, females and berried females were compiled for each year. The percentages of sub-legal, canner and market size lobster for each port, and the catch composition (males, females and berried females) at the beginning, middle and end of the fishing season are presented in this report.

RÉSUMÉ

Entre 1989 et 1994, des données d'échantillonnage en mer ont été recueillies durant la saison de pêche au homard dans les régions de Port Hood, Margaree et de Pleasant Bay, N.-É. (zone de pêche au homard 26B). Des distributions de fréquence de taille pour les mâles, les femelles et les femelles ovigères ont été produites pour chaque année. Les pourcentages de homards de taille sous-légale, de conserverie (canner) et de marché (market) pour chacun des ports, ainsi que la composition (mâles, femelles et femelles ovigères) de la capture au début, au milieu et à la fin de la saison de pêche sont présentés dans ce rapport .

INTRODUCTION

The lobster (*Homarus americanus)* fishery is the most important coastal fishery in the southern Gulf of St. Lawrence. In 1994, 3,203 licences were issued and the total landings were 17,864 tons for a value of $137 millions. Landings for lobster fishing area (LFA) 23, 24, 25, 26A and 26B were 4078 t, 4762 t, 4444 t, 3470 t and 1110 t respectively. The number of licences in 1994 in each LFA was 712 (23), 631 (24), 865 (25), 754 (26A) and 241(26B) (Lanteigne and Mallet, 1995). Although lobster fishers often have fishing licences for other species, it can be assumed that the lobster fishery would represent the biggest proportion of their income.

The lobster fishery in the southern Gulf of St. Lawrence is managed in the following five LFA; 23, 24, 25, 26A, 26B (Fig. 1). Each LFA has different management regulations such as season, minimum carapace size and number of traps allowed by fisher (Table 1-3).

To monitor population dynamics and interregional biological variations, a sea sampling program was initiated in the southern Gulf of St.Lawrence in 1983. Until 1988, sea samples were taken randomly on commercial lobster vessels by the Department of Fisheries and Oceans (DFO) Science Branch personnel. In 1989, the sea sampling program was modified to target specific sites or reference ports in each LFA. This report summarizes sea sampling data collected between 1989 and 1994 at three reference ports in LFA 26B.

MATERIALS AND METHODS

Between 1989 and 1994, sea samples were taken at three reference ports in LFA 26B (Port Hood, Margaree and Pleasant Bay, N.S, Fig. 1). These ports were chosen as sites representing the surrounding area in term of fishing characteristics.

The sixty day lobster season was broken down into three sampling periods, the beginning (day 1 to 20), middle (day 21 to 40) and end (day 41 to 60) (Table 4). At each site, DFO personnel conducted a one day sampling procedure on board commercial lobster vessels two to three times during the fishing season (one sample per period).

A standard sampling protocol was used for all samples. The carapace length (Fig. 2) of all lobsters

in the trap was measured and recorded down to the nearest mm using calipers. The sex, claw status (missing or regenerated), visual index of eggs development on ovigerous female lobster (black, tan to brown and hatching), shell condition (soft or hard) and the numbers of traps fished were also recorded. Information on fishing location (Loran C or lat.- long.), water depth, surface and bottom water temperature were also noted as well as climatic conditions such as wind direction, wind speed, wave height, air temperature and cloud cover.

Data from the three reference ports were analyzed by period of the fishing season (beginning, middle and end). The results are presented in four sections: 1 - carapace size frequency distributions of males, females and ovigerous females lobster; 2 - catch ratio of male, female and ovigerous female; 3 - catch composition (% of sub-legal, canners and markets as defined bellow); and 4 - cumulative catch per 1.58 mm (1/16") size class.

The size categories used in this report are:

- sub-legal: all lobster smaller than the legal minimum carapace size for that year as indicated in Table 2;
- canner size: fixed at the legal minimum carapace size for that given year as indicated in Table 2, to the market size;
- market size: 81.0 mm and greater.

The graphic representation of the cumulative catch for the sampling day was obtained by transforming carapace length (mm) into lobster weight (g) using the following allometric equation (Maynard et al. 1992):

1) male: $0.00140744 \times C.L.^{2.8675}$

2) female: $0.0031 \times C.L.^{2.6838}$

Therefore, it is assumed that the size distributions obtained during the sea sampling are a true representation of the catch size distribution.

RESULTS

Size frequency distributions observed at sea for male, female and berried female lobsters at the beginning, middle and end of the fishery season in Port Hood, Margaree and Pleasant Bay, N.S. are

presented in Fig. 3 to 8. The catch composition (sub-legal, canner and market) and the catch ratio (male, female and ovigerous female) for the same three periods and three reference ports are presented in Fig. 9 to 12. Cumulative catch per 1.58 mm (1/16") size class are presented in Fig. 13 to 15.

DISCUSSION

The sampling protocol established in 1989 does not consider certain aspect of lobster biology and characteristics of a trap fishery such as:

1- Multiple recaptures of sub-legal size lobsters and berried females over the fishing season, which may causes an overestimation of the quantity of these categories;

2- Trap selectivity due to the different trap types and escape mechanisms used could influence the catchability of lobster between samples from the same ports;

3- Yearly composition of the size frequency distribution will be influenced by any minimum carapace size increase as indicated in Table 2.

ACKNOWLEDGEMENT

The authors would like to thank all the fishers from lobster fishery Area 26B who provided space aboard their vessels and assistance to DFO personnel when conducting sea samples. Thanks also to Greg Roach of the Nova Scotia Department of Fisheries who hired summer students for this program. Special thanks to Don Maynard who initiated this sea sampling program and to Marcel Hébert, Claude Leblanc and Mikio Moriyasu from the Department of Fisheries and Ocean who made corrections to this manuscript.

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Table 1. Dates of lobster fishing seasons*, trap limits and minimum carapace size by lobster fishing area (LFA) in 1994 for the southern Gulf of St. Lawrence (Maritimes Region).

LFA	Fishing seasons	Trap limits	Minimum carapace size
23	May 01 to June 30	375	66.7 mm
24	May 01 to June 30	300	63.5 mm
25	August 10 to October 10	250	66.7 mm
26A	May 01 to June 30	300	65.1 mm
26B	May 01 to June 30	300	70.0 mm

* fishing season are modified according to ice conditions, the dates presented in the table are those stated in the Atlantic Regulations (101).

Table 2. Year of legal minimum carapace size change by lobster fishing area (LFA) in the southern Gulf of St. Lawrence (Maritime Region).

	Minimum carapace size				
LFA	63.5 mm	65.1 mm	66.7 mm	68.3 mm	70 mm
23	1957	1990	1991		
24	1957				
25	1957	1990	1991		
26A	1957	1991			
26B	1957	1987	1988	1989	1990

Table 3 The opening and closing dates of the lobster fishing season for each lobster fishing area (LFA) between 1989 and 1994.

YEAR	LFA 23	LFA 24	LFA 25	LFA 26A	LFA 26B
1989	April 29-June 30	April 29-June 30	Aug. 9-Oct. 10	April 29-June 30	April 29-June 30
1990	April 30-July 7	April 30-June 30	Aug. 9-Oct. 10	April 30-June 30	April 30-June 30
1991	May 1-June 30	May 6-July 1	Aug. 8-Oct. 8	May 3-July 3	May 6-July 3
1992	May 4-July 4	May 14-July 6	Aug. 6-Oct. 7	May 14-July 6	May 16-July 8
1993	May 7-July 6	May 10-July 6	Aug. 10-Oct. 11	May 5-July 5	May 5-July 5
1994	May 5-July 6	May 1-June 30	Aug. 10-Oct. 11	May 1-June 30	May 1-June 30

Table 4. Dates of lobster sea sampling between 1989 and 1994 for three reference ports in LFA 26B. The number of traps sampled for each sample are indicated (N).

Port	Period	1989	1990	1991	1992	1993	1994
Port Hood, N.S.	Beginning	May 13,17 (N=138)	May 3,5,8,10,15,16 (N=629)	May 7,13,20 (N=273)	May 25 June 3 (N=311)	May 13,19 (N=486)	May 4,5,10,11,17,18 (N=526)
	Middle	May 24,31 June 6,8 (N=555)	May 23,24,26,29,30 (N=499)	May 28 June 3, 10 (N=326)	June 8,16,17,25 July 6 (N=533)	May 26 June 4, 9 (N=866)	May 25,26,31 June 2,7,9 (N=676)
	End	June 13,20,28 (N=357)	June 12,14,18,25,26 (N=469)	June 17,24 (N=384)	June 29 July 3 (N=359)	June 18,25 July 2 (N=702)	June14,16,21,22,27,28 (N=530)
Margaree, N.S.	Beginning	May 16 (N=110)	May 2,7,10,15 (N=412)	May 9,21 (N=192)	May 21,25,29 June 4 (N=427)	May 12,18,24 (N=457)	May 5,6,11,13,20 (N=309)
	Middle	May 26 June 8 (N=260)	May 24,25,28 June 1,6,7 (N=497)	May 29 June 4,11 (N=255)	June12,19,24 (N=540)	June 3,10,13 (N=452)	May 26,27 June 1,2,8,9 (N=448)
	End	June 15,21 (N=449)	June 14,20,21,22,26 (N=390)	June 22,25,29 (N=319)	June 26 (N=71)	June 25,28 (N=299)	June 14,16,23,24,29,30 (N=328)
Pleasant Bay, N.S.	Beginning	No sample	May 2,4,9,16 (N=746)	May 11,15,22 (N=389)	May 22,26 (N=475)	May 13,17 (N=209)	May 4,13,20 (N=544)
	Middle	June 2 (N=141)	May 28 June 1,7,8 (N=575))	May 27 June 6,12 (N=550)	June 18 (N=264)	May 26 June 6,10,14 (N=738)	May 21,23,27,30 June 5,8,9 (N=744)
	End	No sample	June 11,18,20,27 (N=759)	June 23,26 (N=247)	No sample	June 17,25 July 2 (N=827)	June 15,17,22,26,29 (N=383)

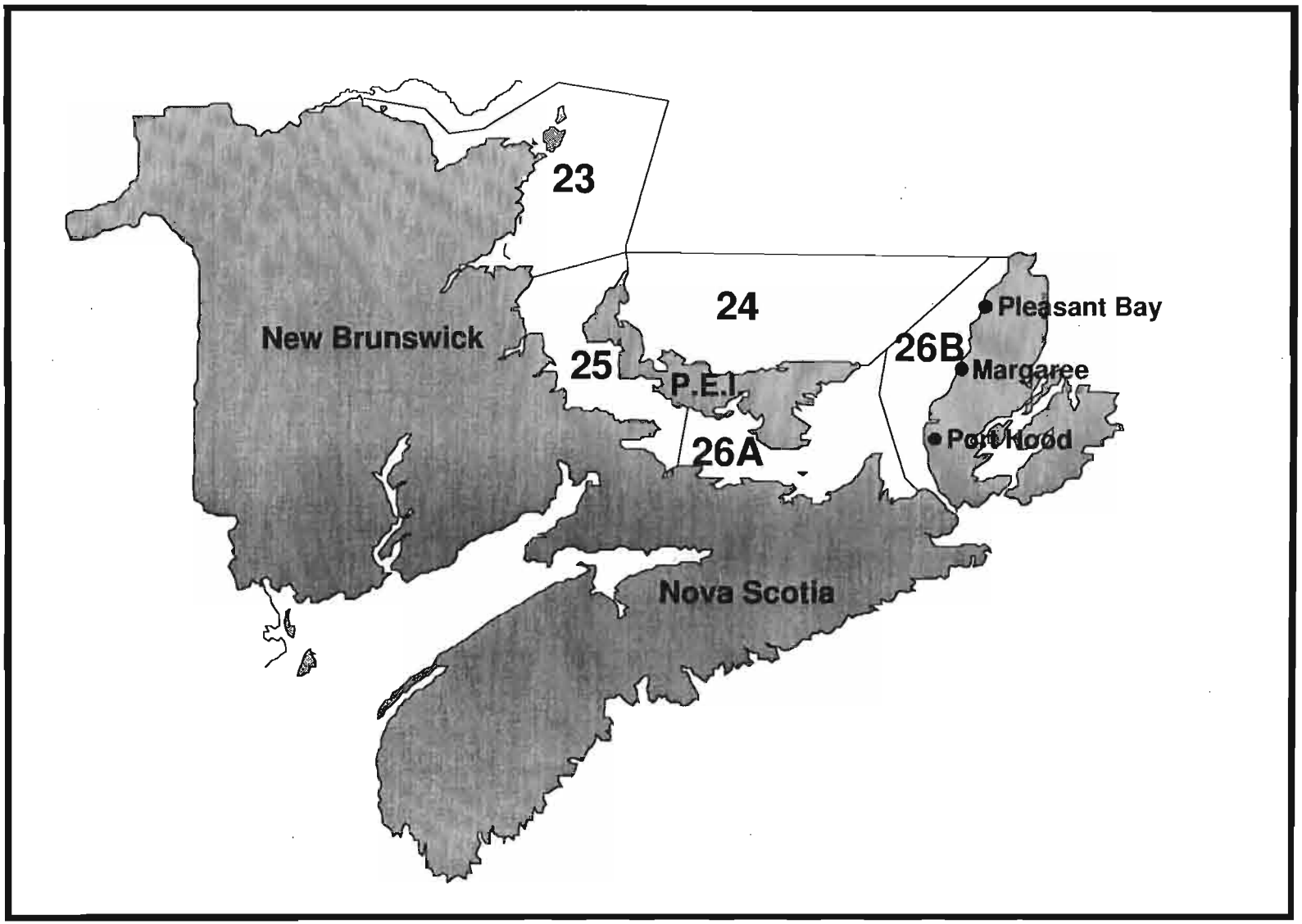


Figure 1. Lobster fishing areas (LFA) in the southern Gulf of St. Lawrence and reference ports in area 26B.

● reference port

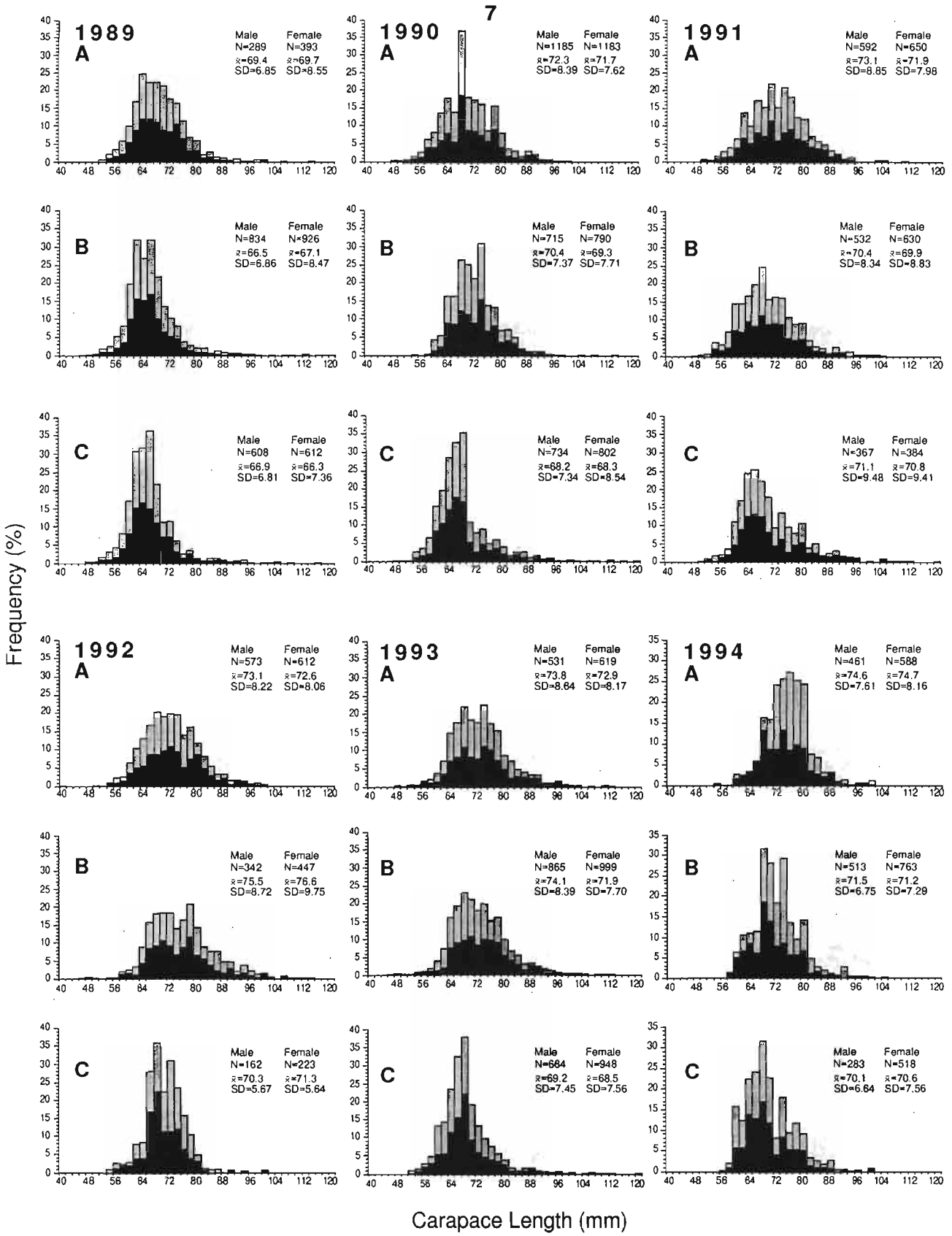


Figure 3. Lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Port Hood, N.S. (Area 26B).
Male ■ Female ▒

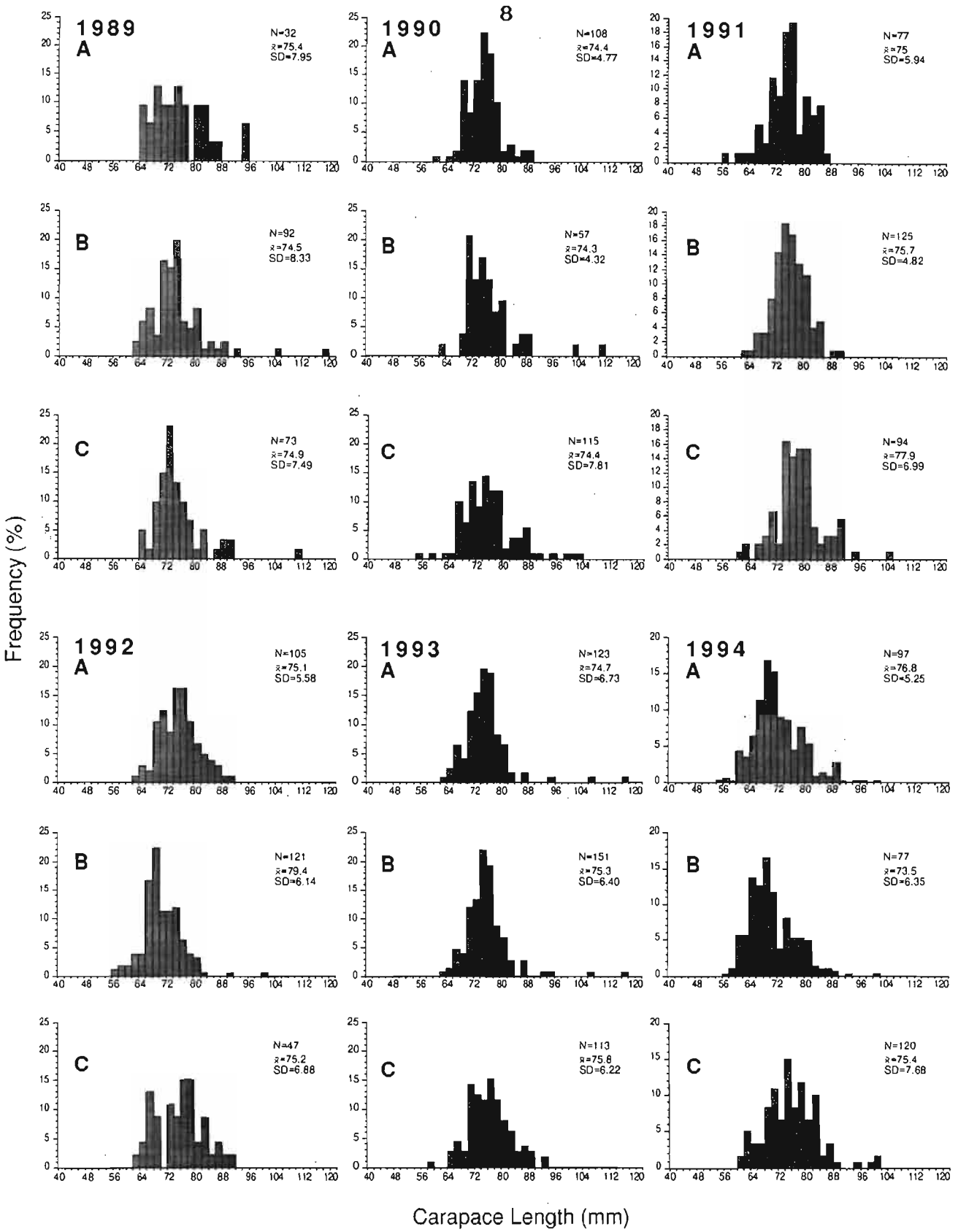


Figure 4. Berried female lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Port Hood, N.S. (Area 26B).

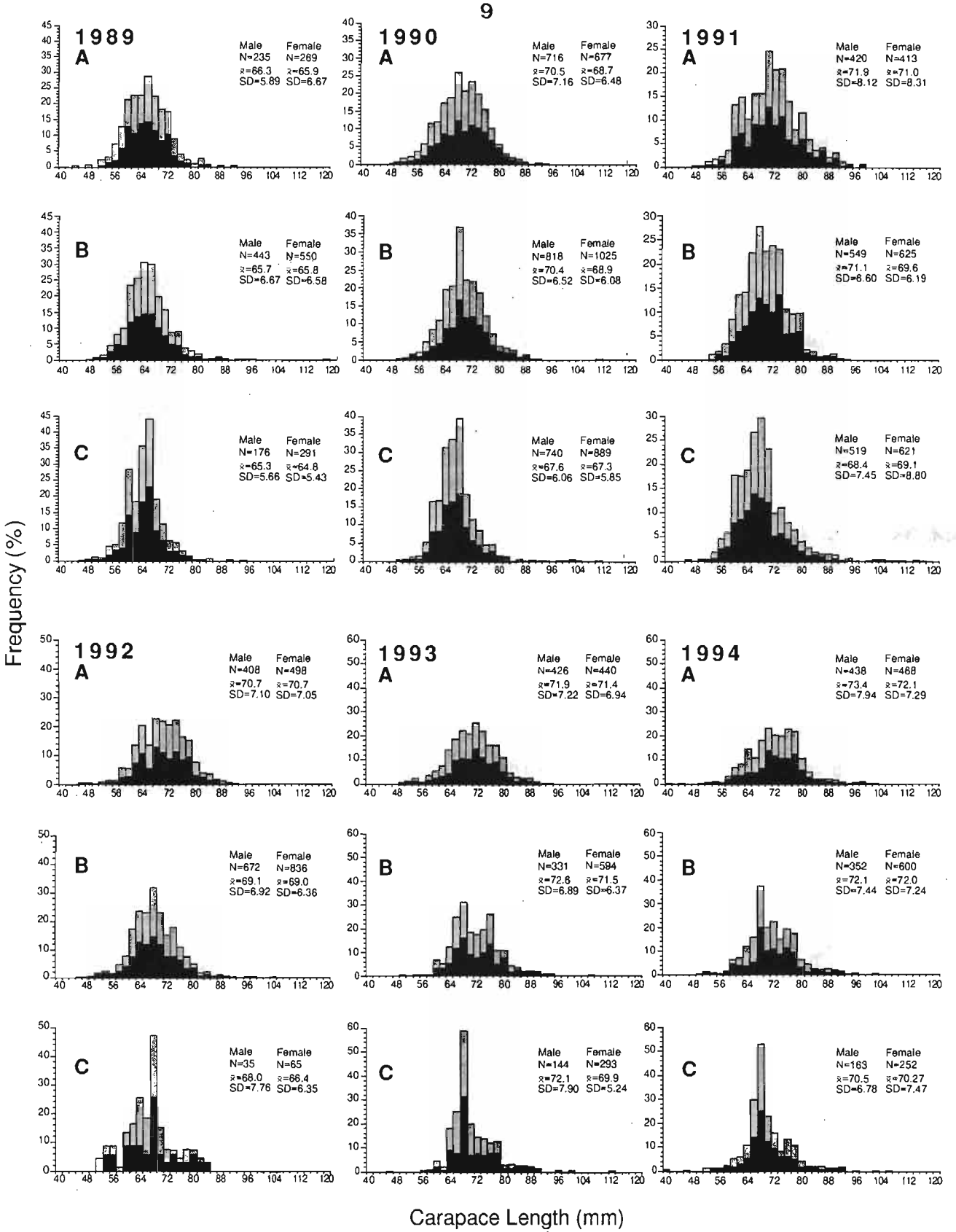


Figure 5. Lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Margaree, N.S. (Area 26B).
Male ■ Female ▒

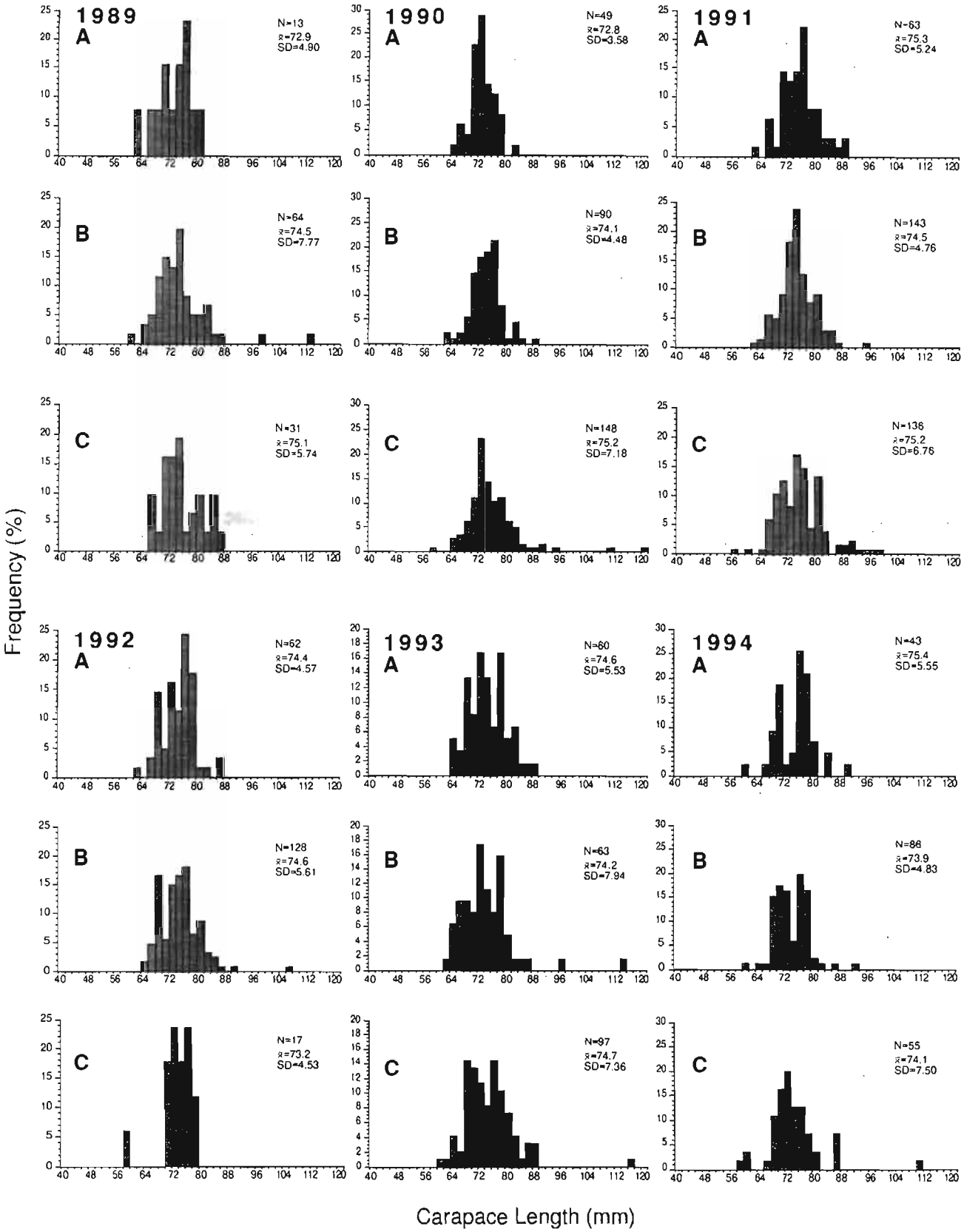


Figure 6. Berried female lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Margaree, N.S. (Area 26B).

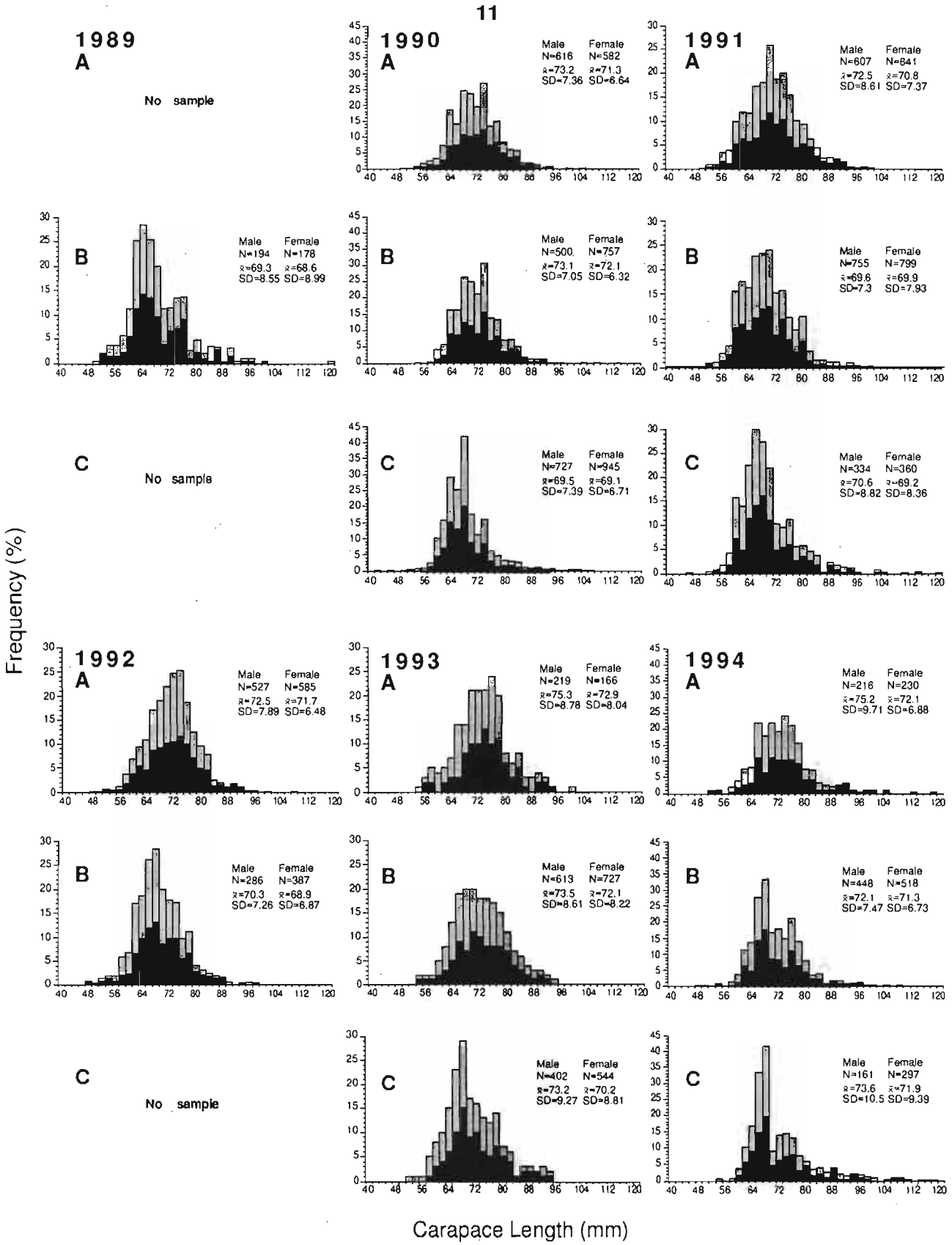


Figure 7. Lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Pleasant Bay, N.S. (Area 26B).
Male ■ Female ■

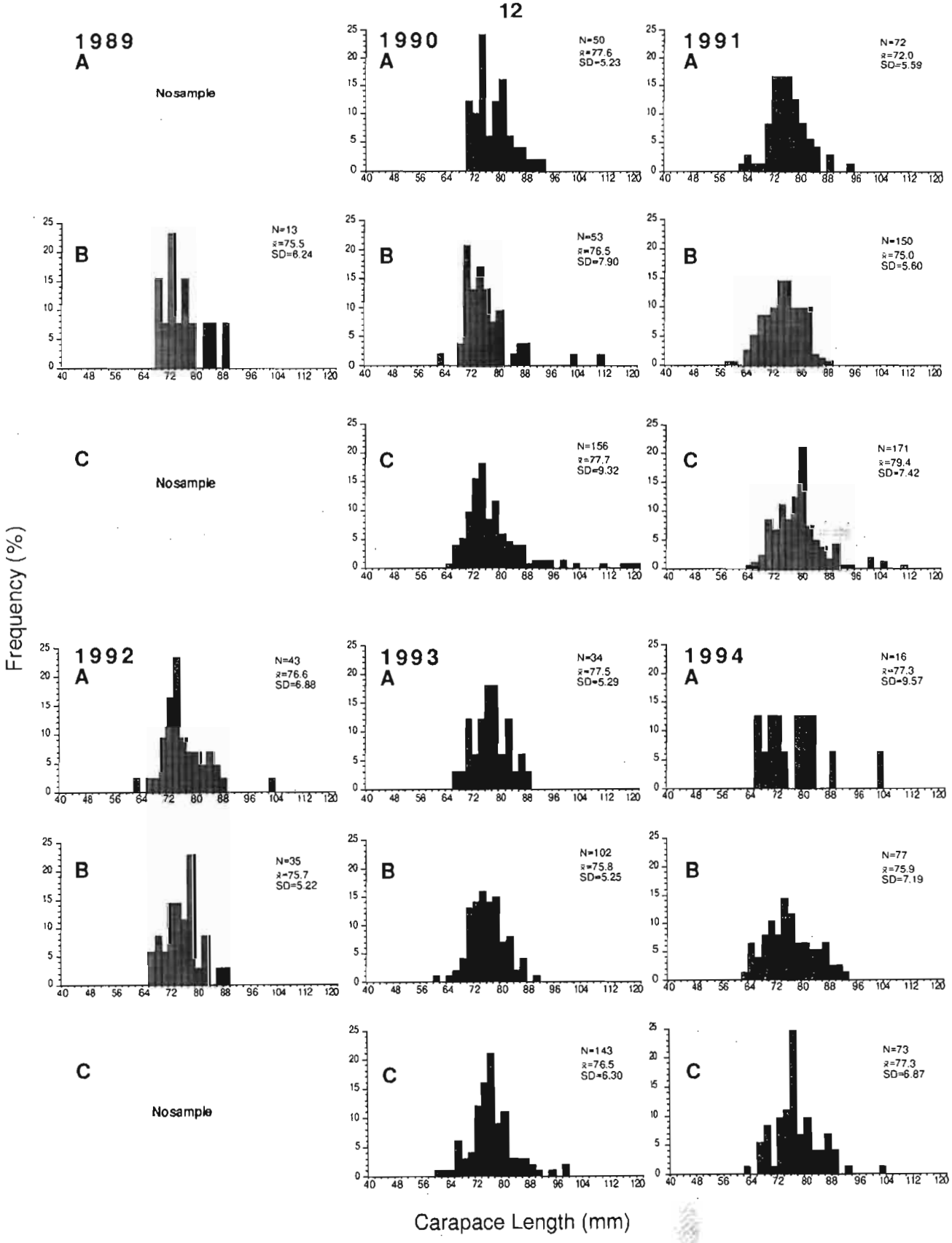


Figure 8. Berried female lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning (A), middle (B) and end (C) of the fishing season in Pleasant Bay, N.S. (Area 26B).

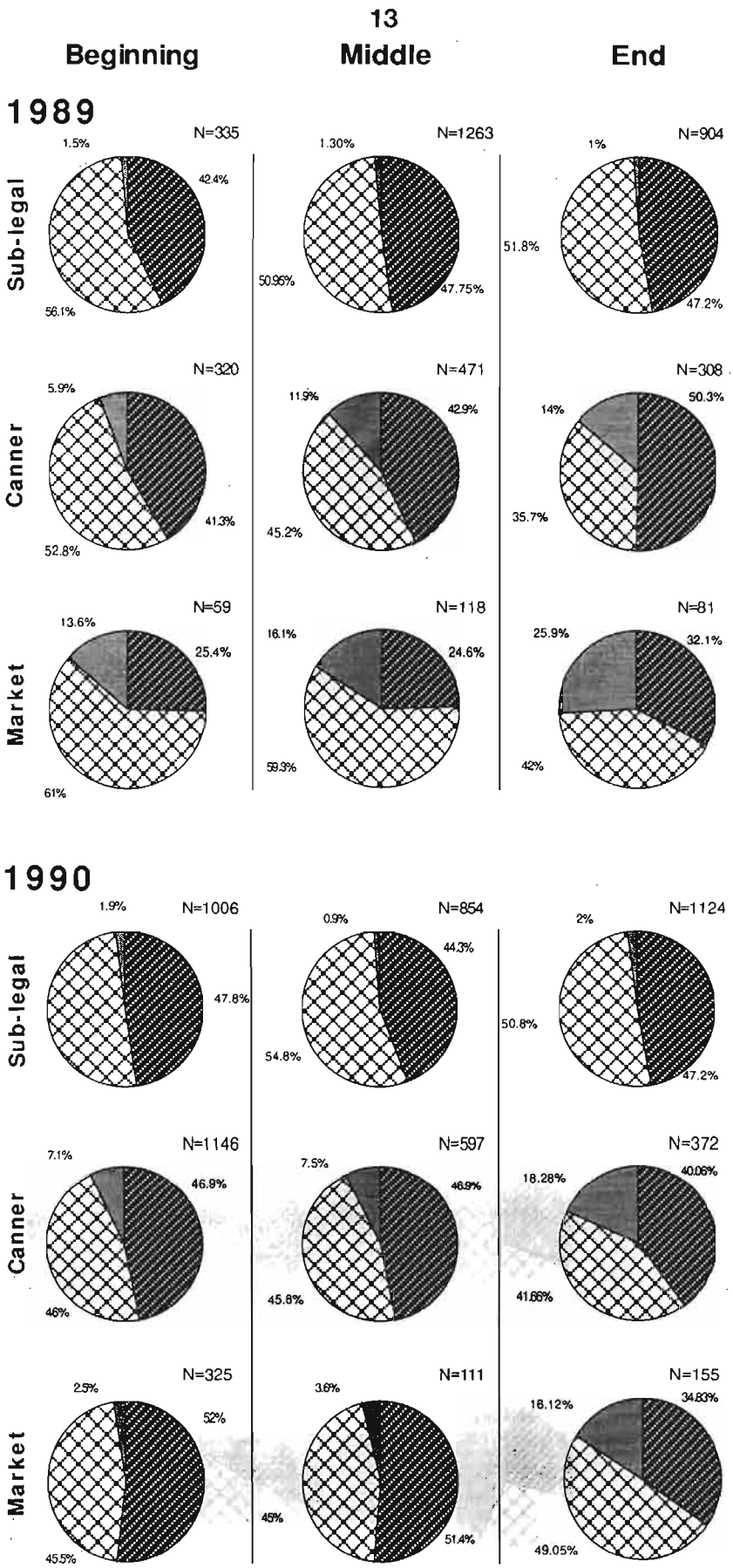
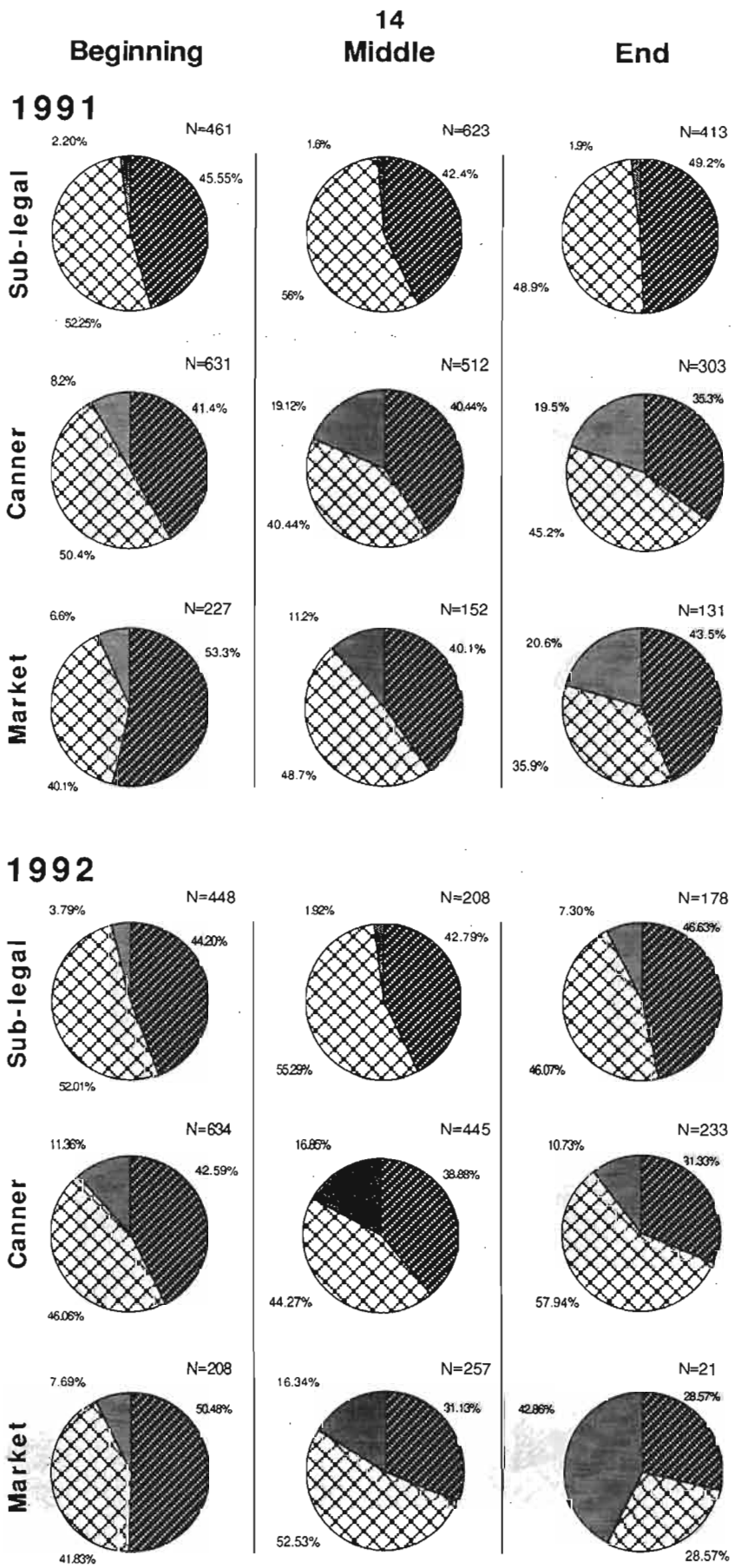


Figure 9. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Port Hood, N.S. between 1989 and 1994.
Male Female Berried



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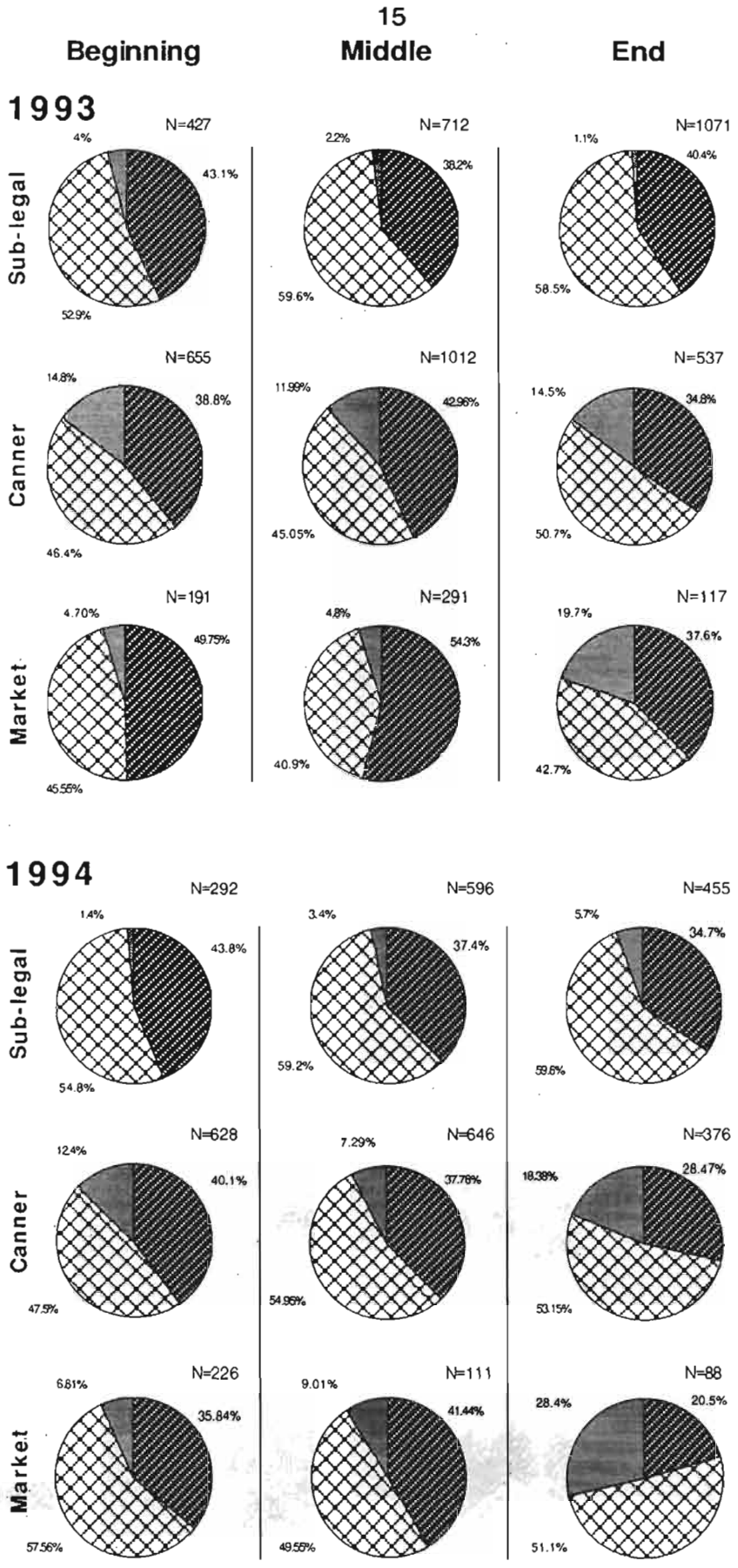

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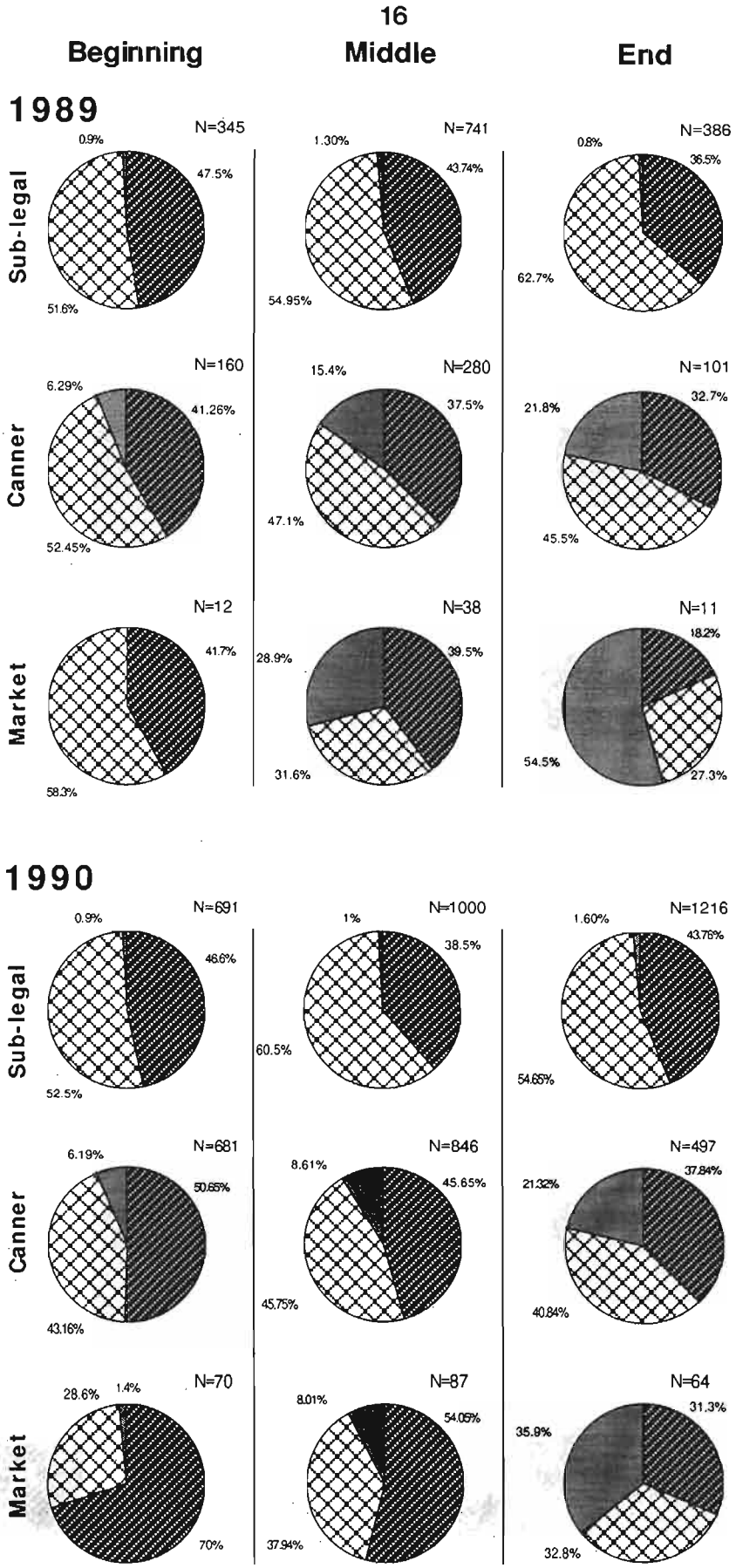
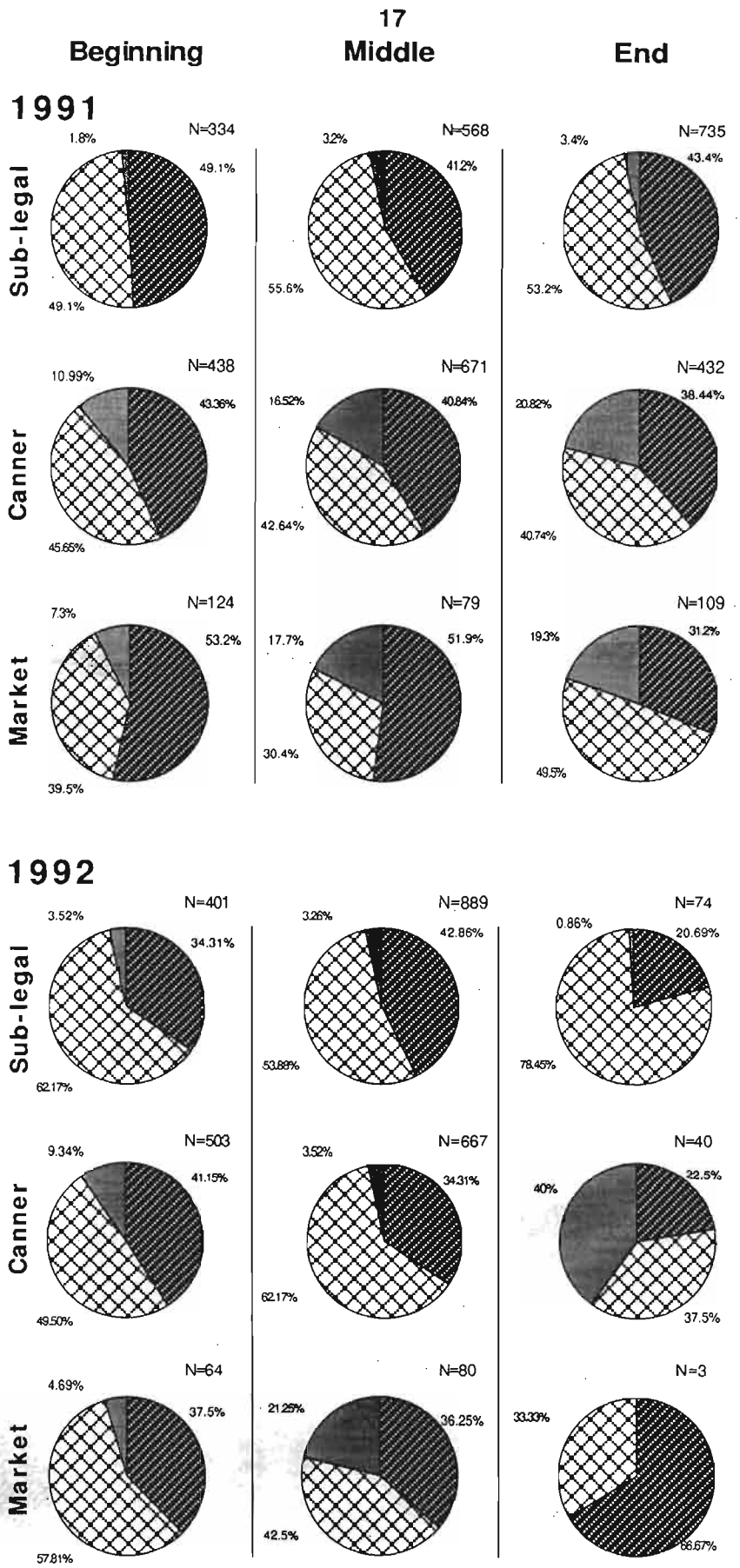


Figure 10. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Margaree, N.S. between 1989 and 1994.
Male Female Berried



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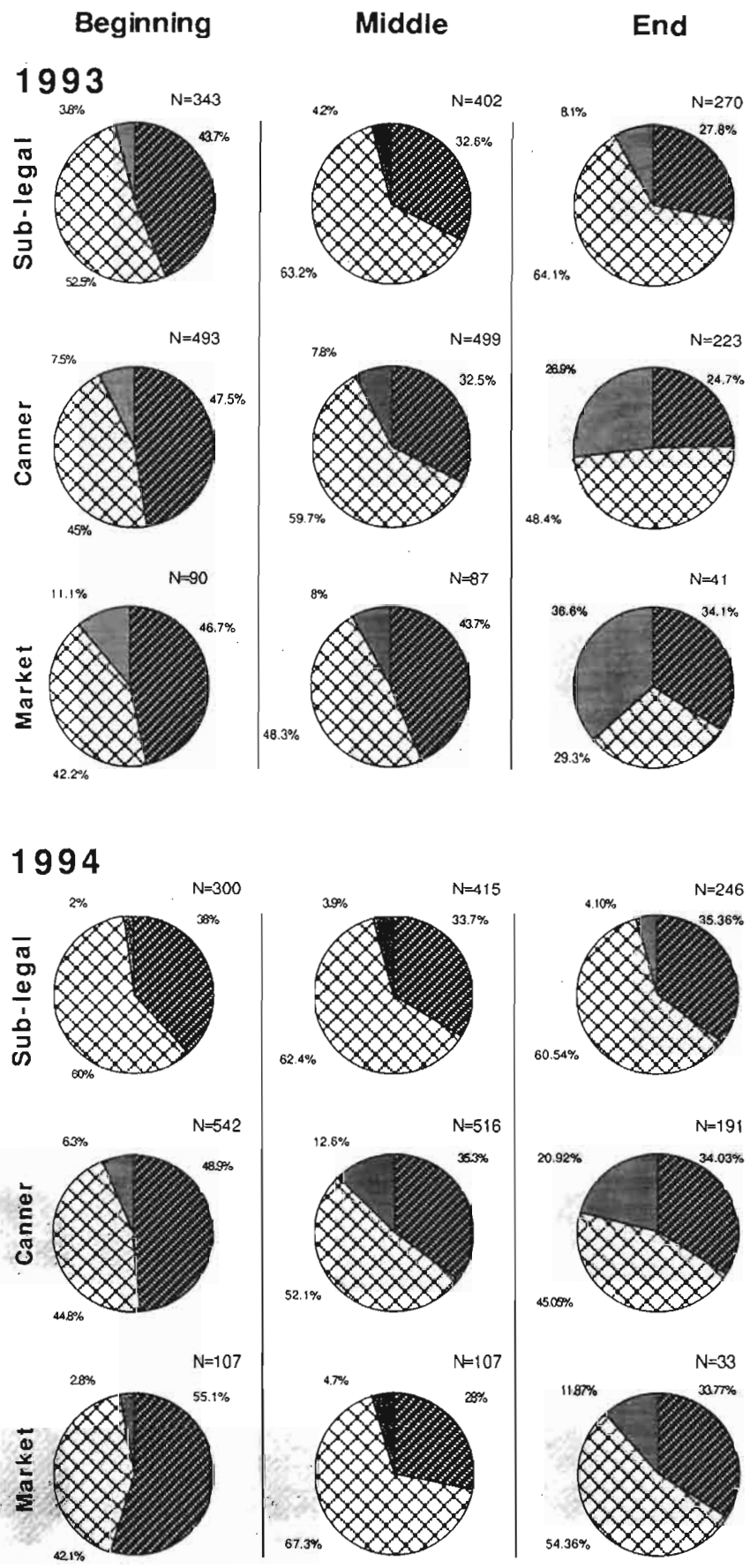

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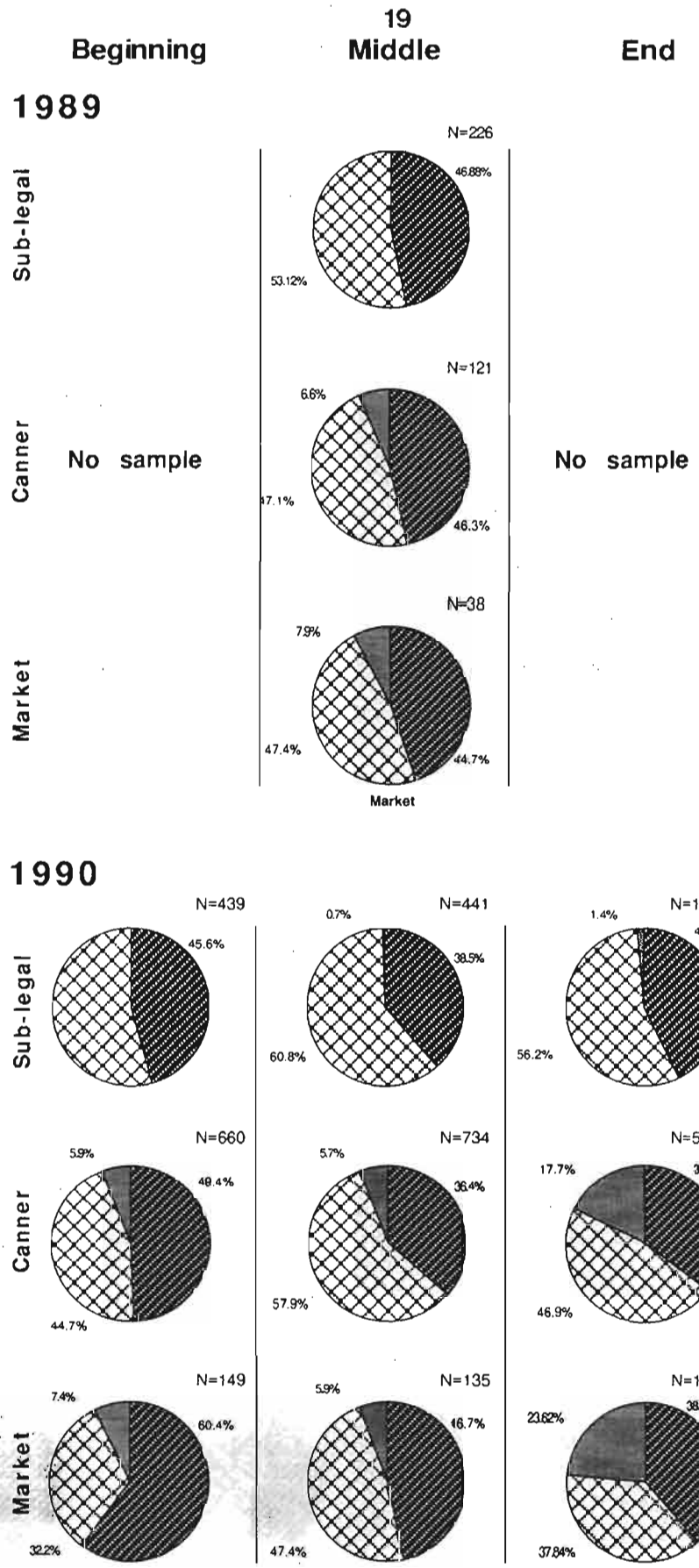
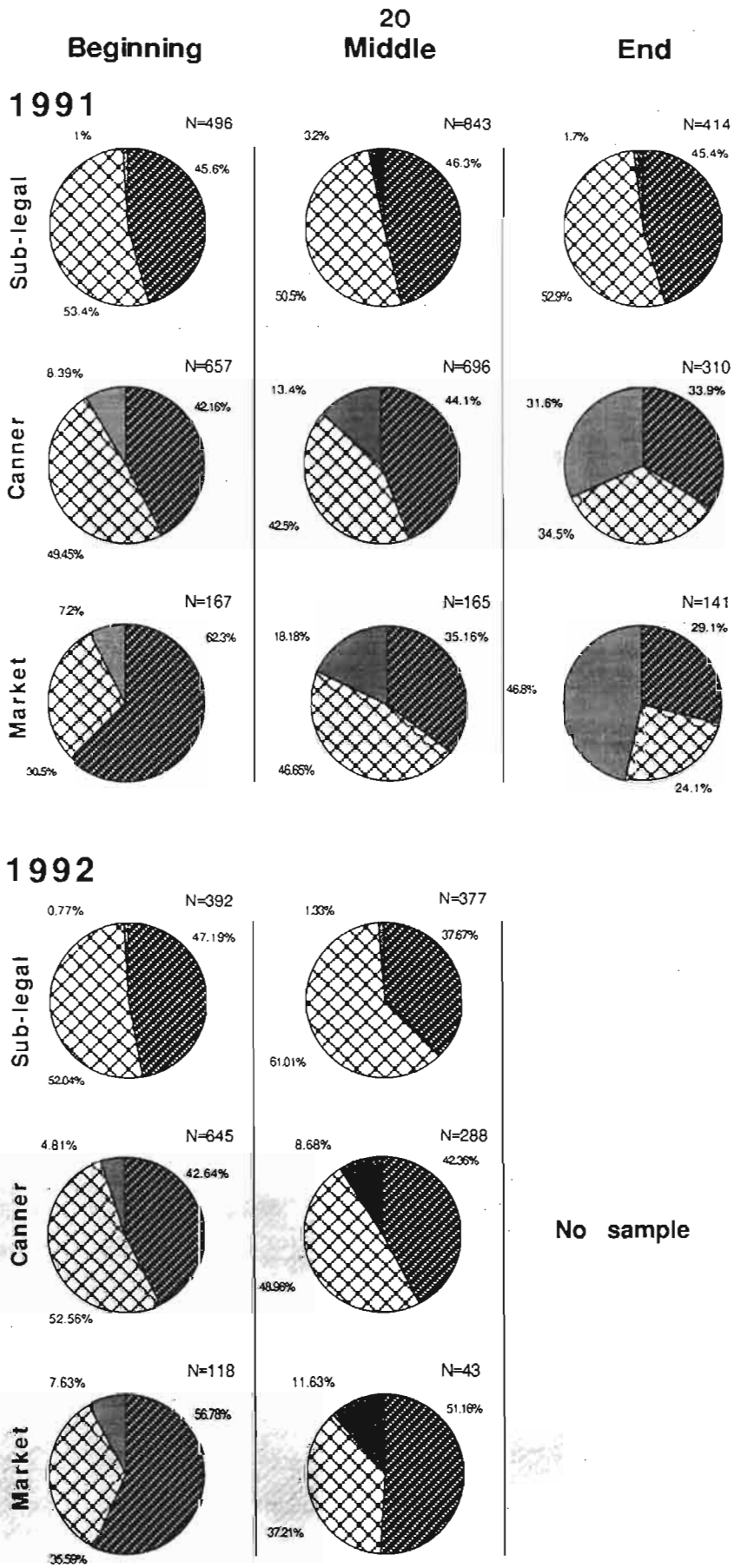


Figure 11. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Pleasant Bay, N.S. between 1989 and 1994.
Male Female Berried



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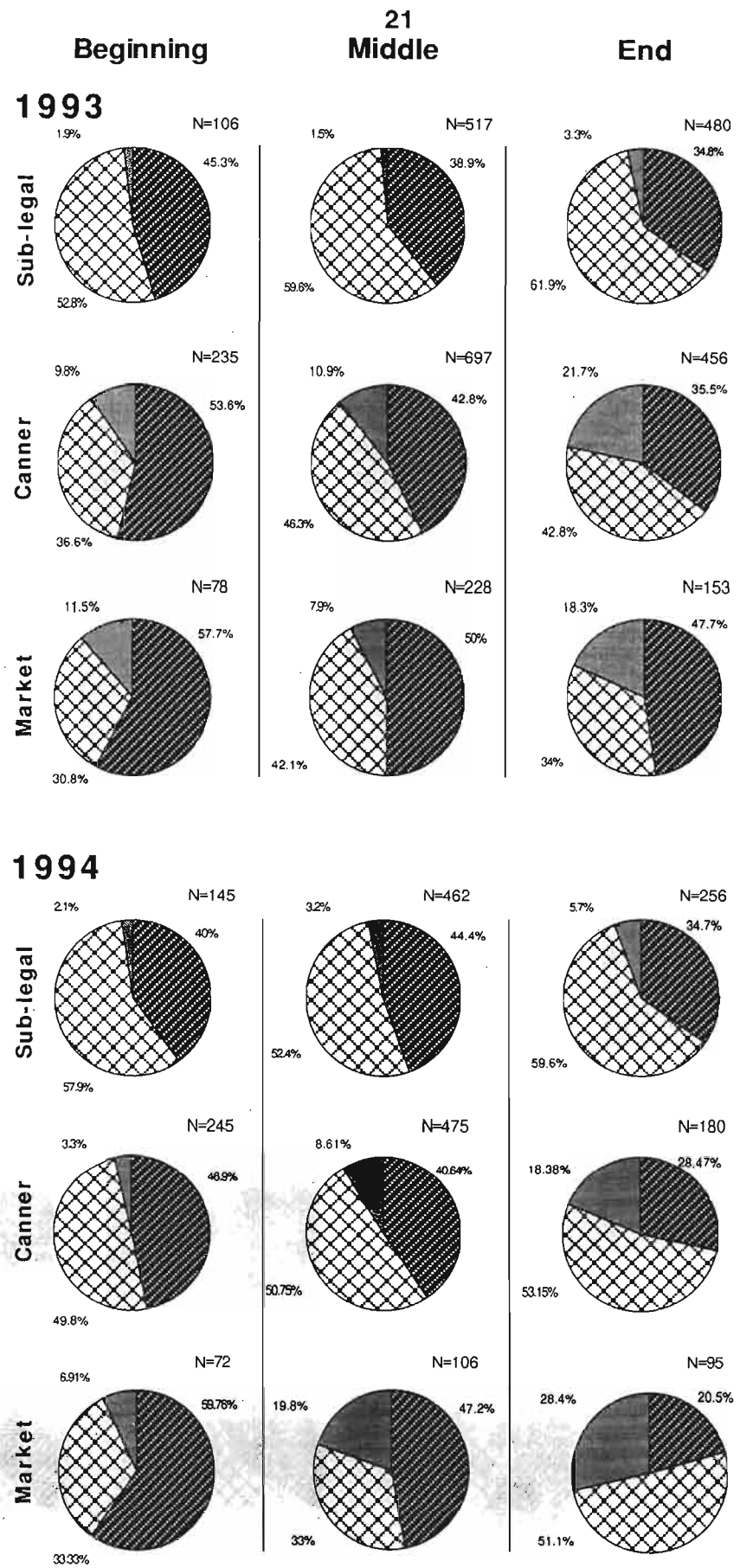

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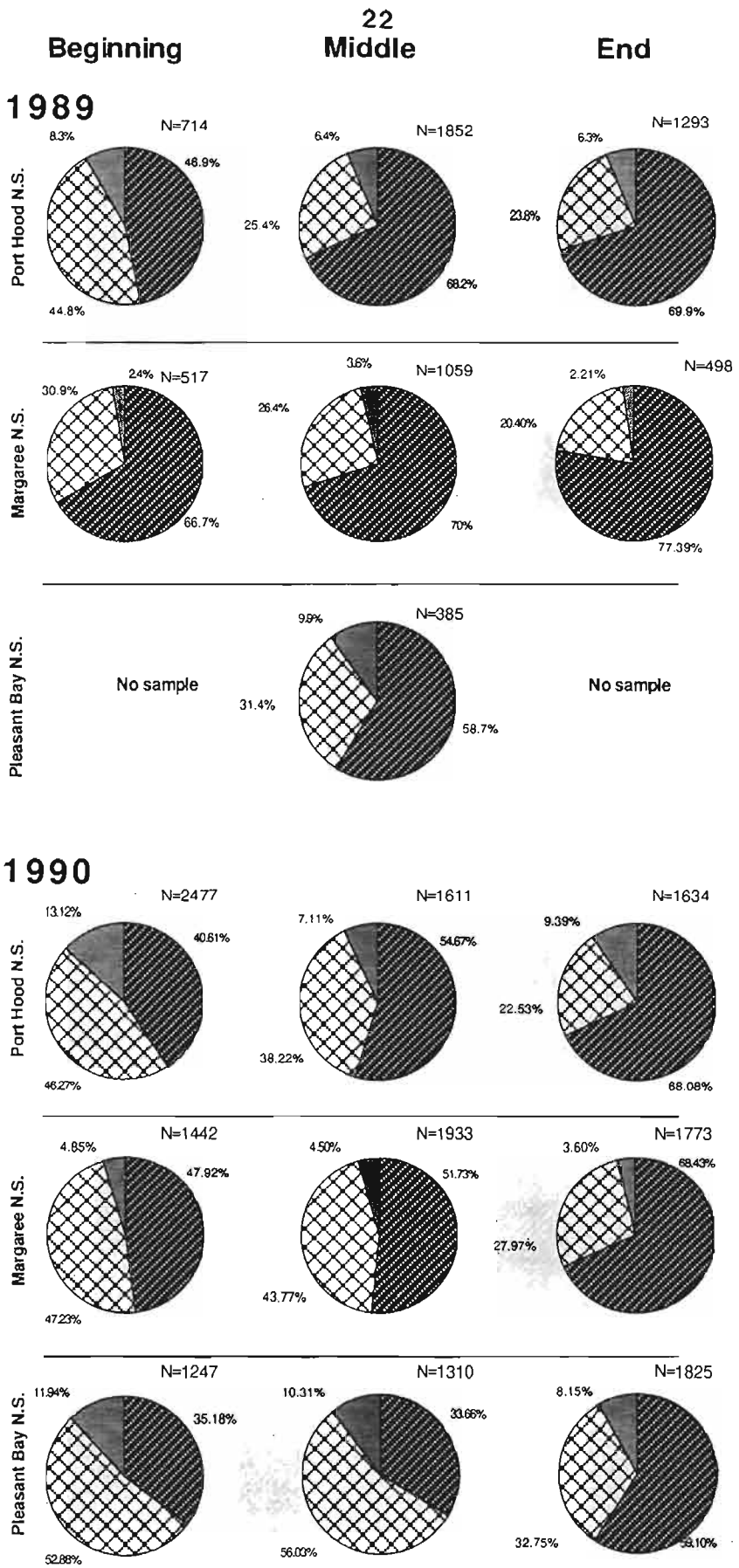
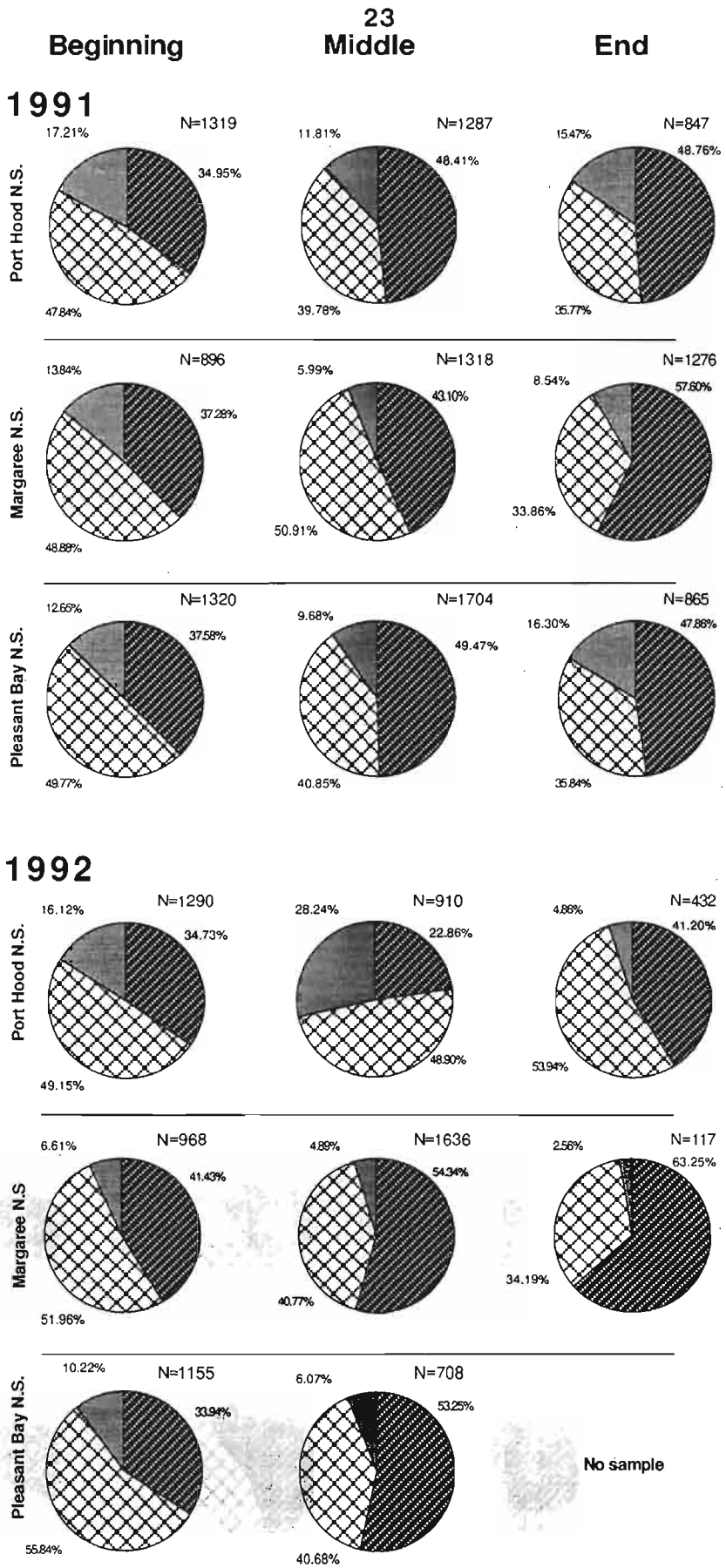


Figure 12. Percentages of sub-legal, canner and market lobsters sampled in Port Hood, Margaree, and Pleasant Bay, N.S. between 1989 to 1994.
Sub-legal Canner Market



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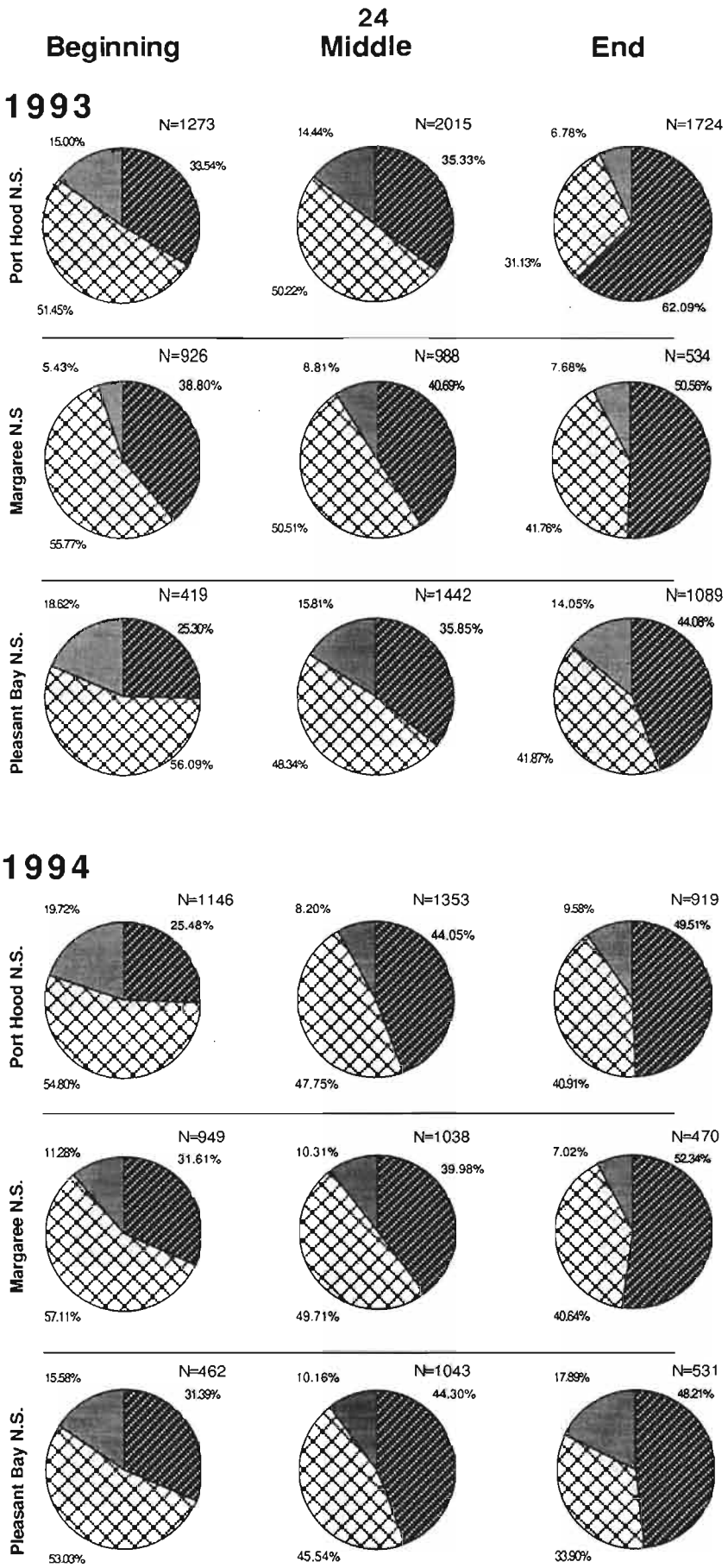

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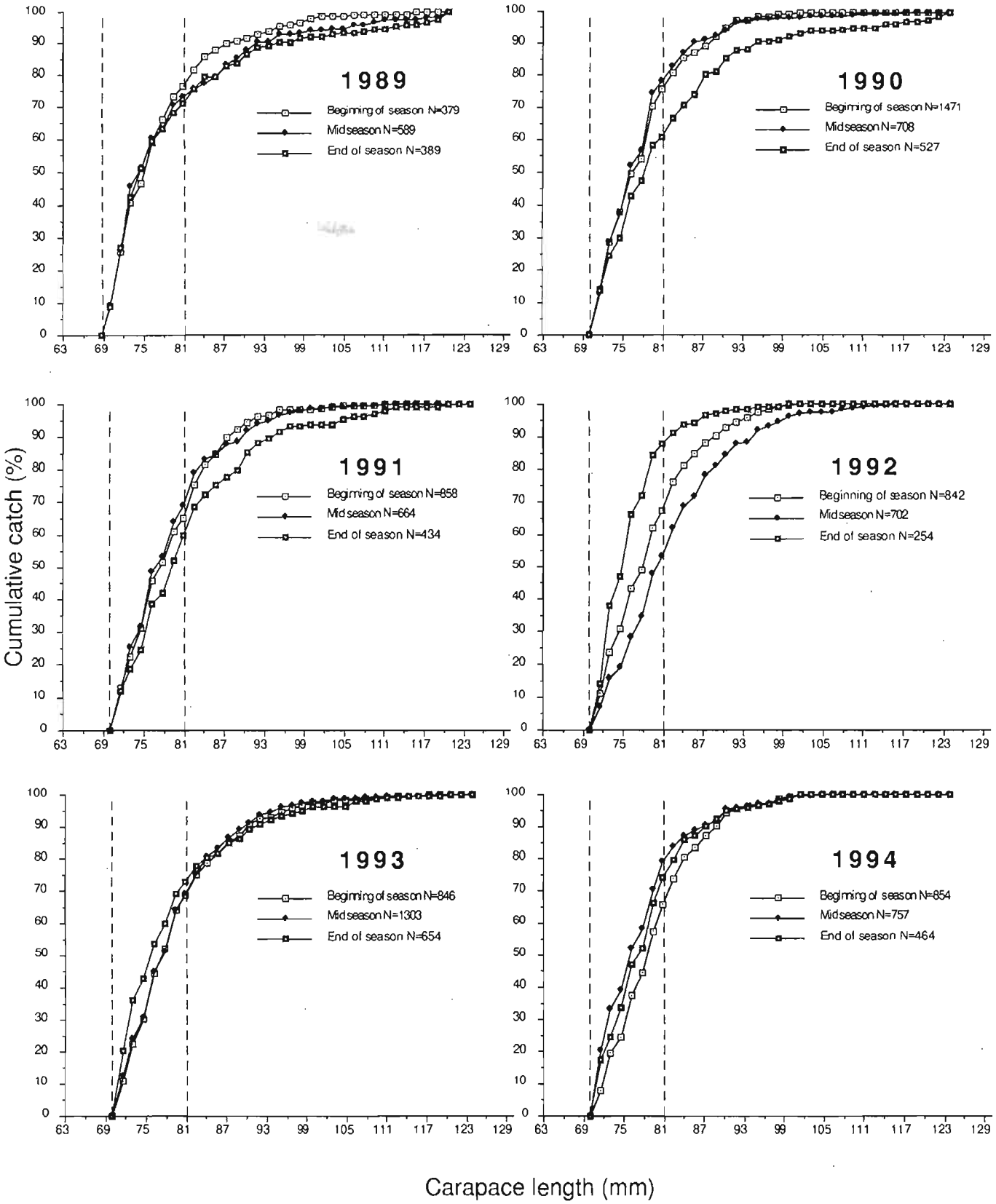

Figure 13. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Port Hood , N.S.1989 and 1994. Dotted vertical lines represent minimum carapace size for canner and market lobsters respectively.

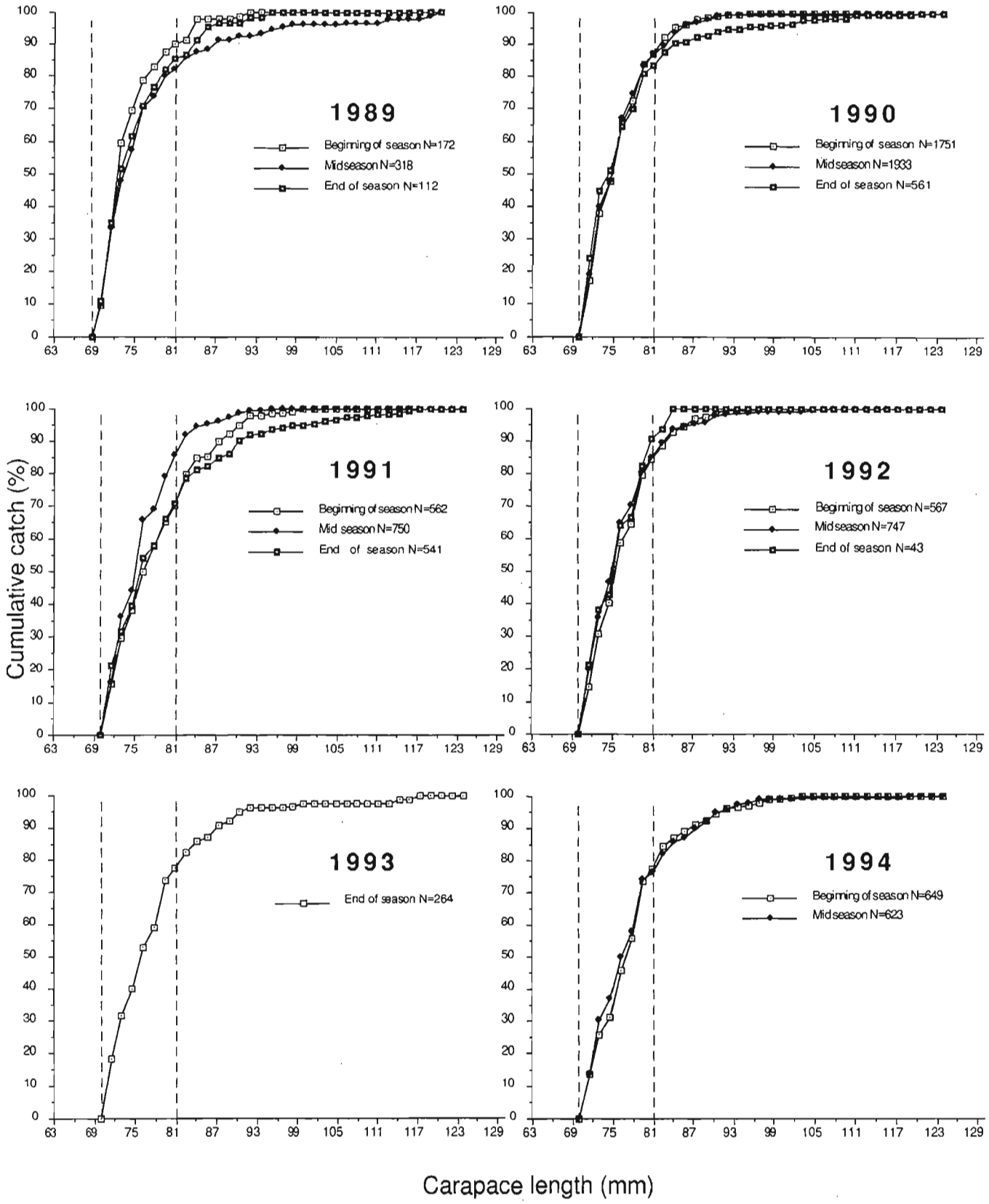

Figure 14. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Margaree , N.S.1989 and 1994. Dotted vertical lines represent minimum carapace size for canner and market lobsters respectively.

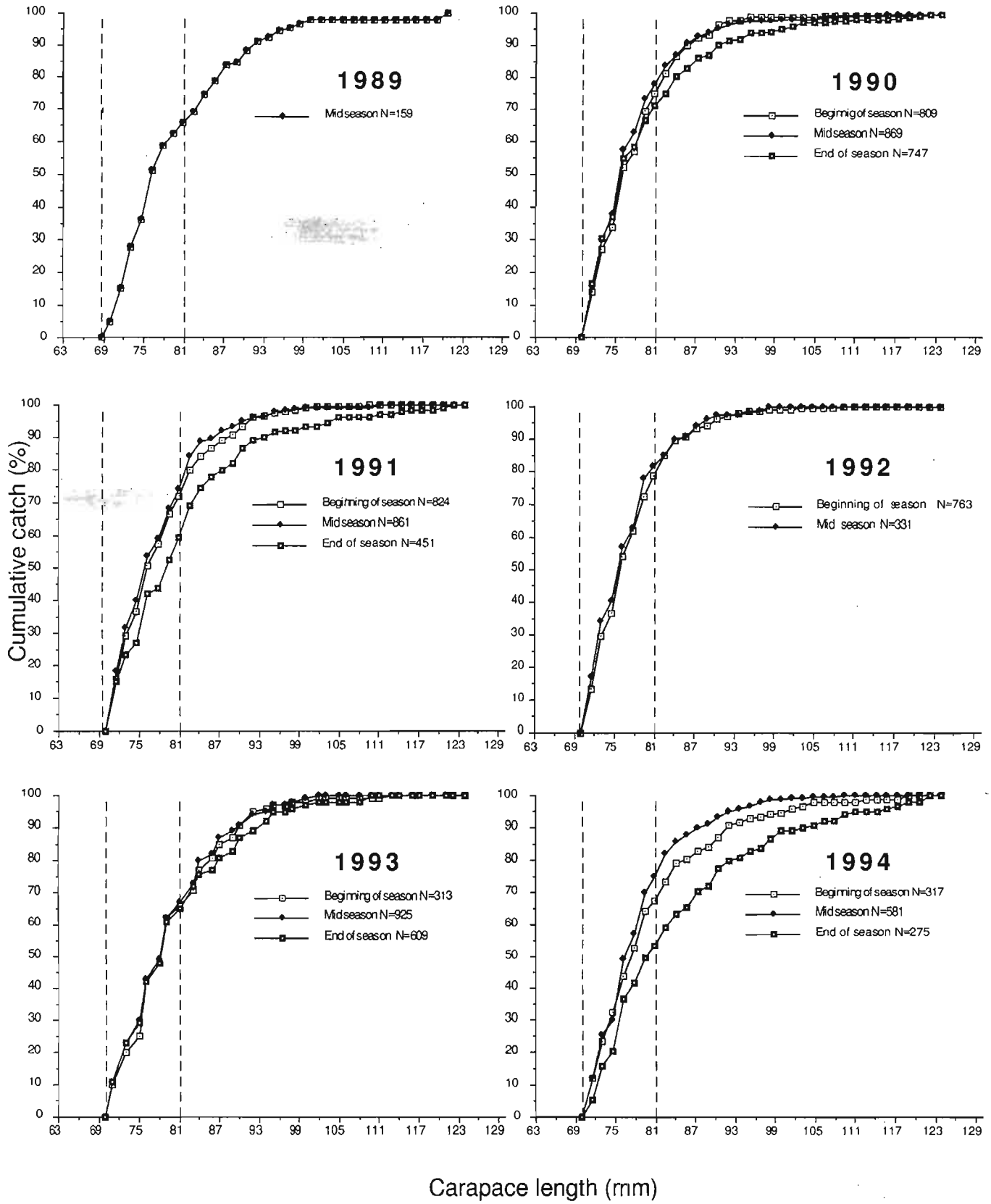

Figure 15. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Pleasant Bay , N.S.1989 and 1994. Dotted vertical lines represent minimum carapace size for canner and market lobsters respectively.