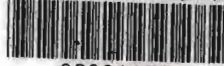




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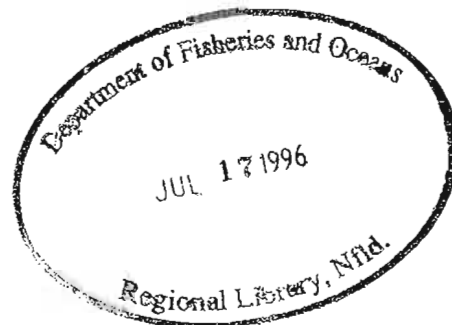
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Lobster (*Homarus americanus*) fishery sea sampling data from 1989 to 1994, for fishing Area 24 in the southern Gulf of St. Lawrence.

Robichaud G., F. Savoie, W. Landsburg, P. Mallet and M. Lanteigne

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Science Branch, Maritimes Region
P.O. Box 5030
Moncton, New Brunswick
E1C 9B6



1996

**Canadian Data Report
of Fisheries and Aquatic Sciences 989**



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Canadian Data Report of Fisheries and Aquatic Sciences

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Canadian Data Report of
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by

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ABSTRACT

Between 1989 and 1994, sea sampling data were collected during the lobster fishing season in Tignish, Malpeque, Tracadie Bay and North Lake, P.E.I. (Lobster Fishing Area 24). Length 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 Tignish, Malpeque, Tracadie Bay et North Lake, I.P.E. (zone de pêche au homard 24). 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 four reference ports in LFA 24.

MATERIALS AND METHODS

Between 1989 and 1994, sea samples were taken at four reference ports in LFA 24 (Tignish, Malpeque, Tracadie Bay and North Lake, P.E.I., 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 four 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 below); 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):

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

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

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 Tignish, Malpeque, Tracadie Bay and North Lake, P.E.I. are presented in Fig. 3 to 10. The catch composition (sub-legal, canner and market) and the catch

ratio (male, female and ovigerous female) for the same three periods and four reference ports are presented in Fig. 11 to 15. Cumulative catch per 1.58 mm (1/16") size class are presented in Fig.16 to 19.

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 24 who provided space aboard their vessels and assistance to DFO personnel when conducting sea samples. To Don Jones of the Department of Fisheries and Oceans who performed sea sampling in Prince Edward Island. Thanks also to Dave Gillis of the Prince Edward Island Department of Agriculture, Fisheries and Forestry 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).

LFA	Minimum carapace size				
	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 the reference ports in LFA 24. The number of traps sampled for each sample are indicated (N).

Port	Period	1989	1990	1991	1992	1993	1994
Tignish, P.E.I.	Beginning	No sample	May 4 (N=235)	May 17 (N=83)	May 26 (N=142)	May 20 (N=288)	May 20 (N=181)
	Middle	No sample	June 6 (N=129)	June 11 (N=185)	June 9 (N=152)	No sample	No sample
	End	No sample	June 28 (N=72)	June 28 (N=122)	July 1 (N=228)	June 25 (N=278)	June 29 (N=191)
Malpeque, P.E.I.	Beginning	May 2,11,15,18 (N=430)	May 8,17 (N=119)	May 10,21 (N=146)	May 27 (N=137)	May 19 (N=274)	May 17 (N=)
	Middle	May 24,31 June 7 (N=360)	June 13,14 (N=122)	June 13 (N=194)	June 5 (N=156)	No sample	No sample
	End	June 17,22,23,26 (N=327)	June 20,29 (N=121)	June 20,26 (N=266)	July 6 (N=212)	June 22 (N=209)	June 28 (N=295)
Tracadie Bay, P.E.I.	Beginning	May 3 (N=291)	No sample	May 24 (N=63)	May 28 (N=115)	May 18 (N=250)	May 13 (N=194)
	Middle	May 23,30 June 8 (N=760)	No sample	June 7 (N=155)	June 4 (N=94)	No sample	No sample
	End	June 16,23 (N=467)	No sample	June 22 (N=62)	June 25 (N=230)	June 17 (N=212)	June 24 (N=256)
North Lake, P.E.I.	Beginning	No sample	No sample	No sample	May 23 (N=82)	May 26 (N=62)	May 10 (N=114)
	Middle	No sample	No sample	May 31 June 11 (N=214)	May 29 June 2 (N=204)	June 5 (N=143)	No sample
	End	No sample	No sample	June 18,24 (N=292)	July 4 (N=107)	June 21 (N=105)	June 21 (N=246)

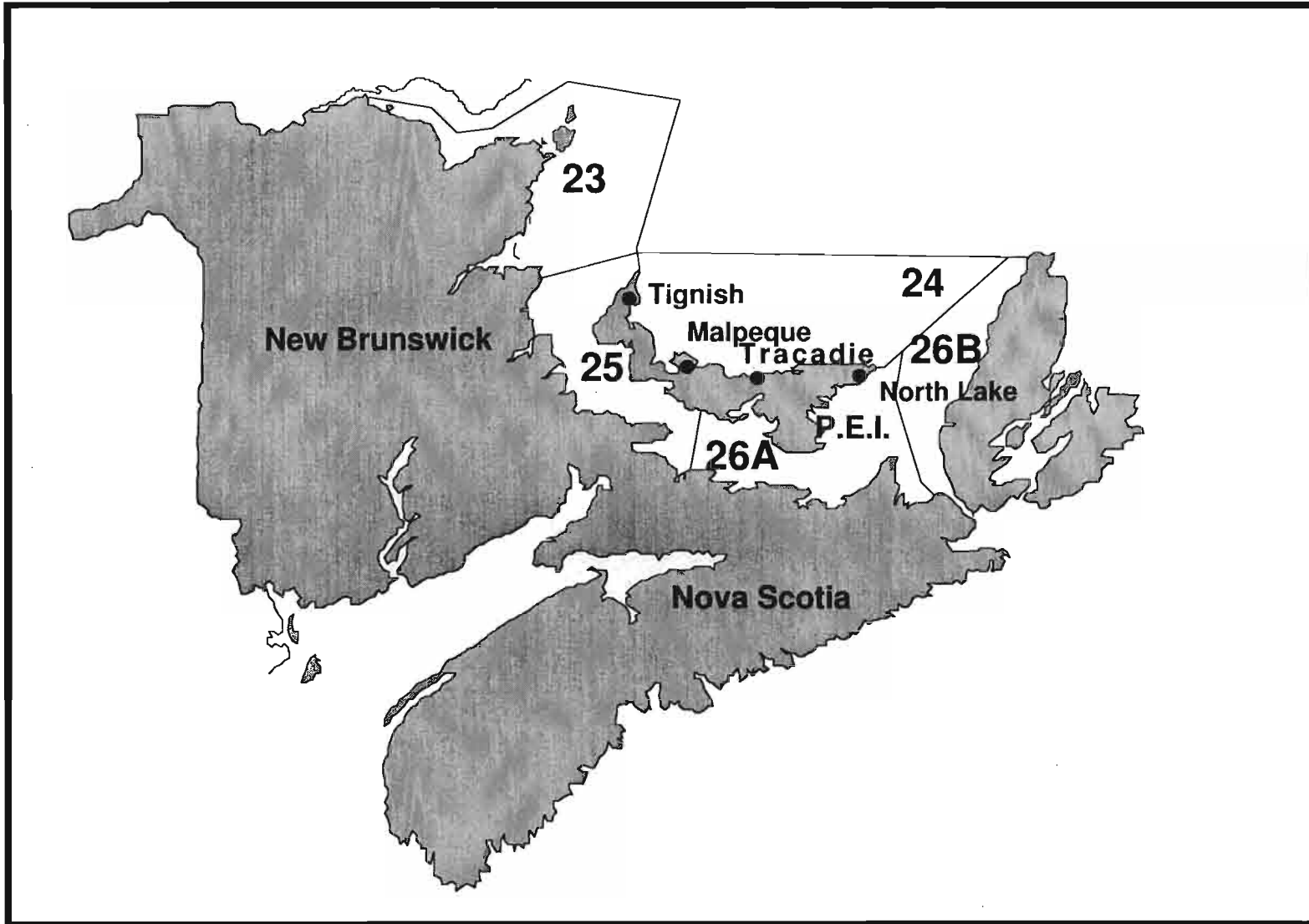


Figure 1. Lobster fishing areas (LFA) in the southern Gulf of St. Lawrence and reference ports in area 24.
● reference port

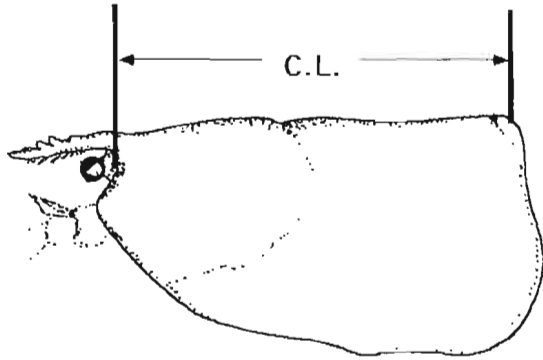


Figure 2. Lobster carapace length (C.L.) as measured during sea sampling.

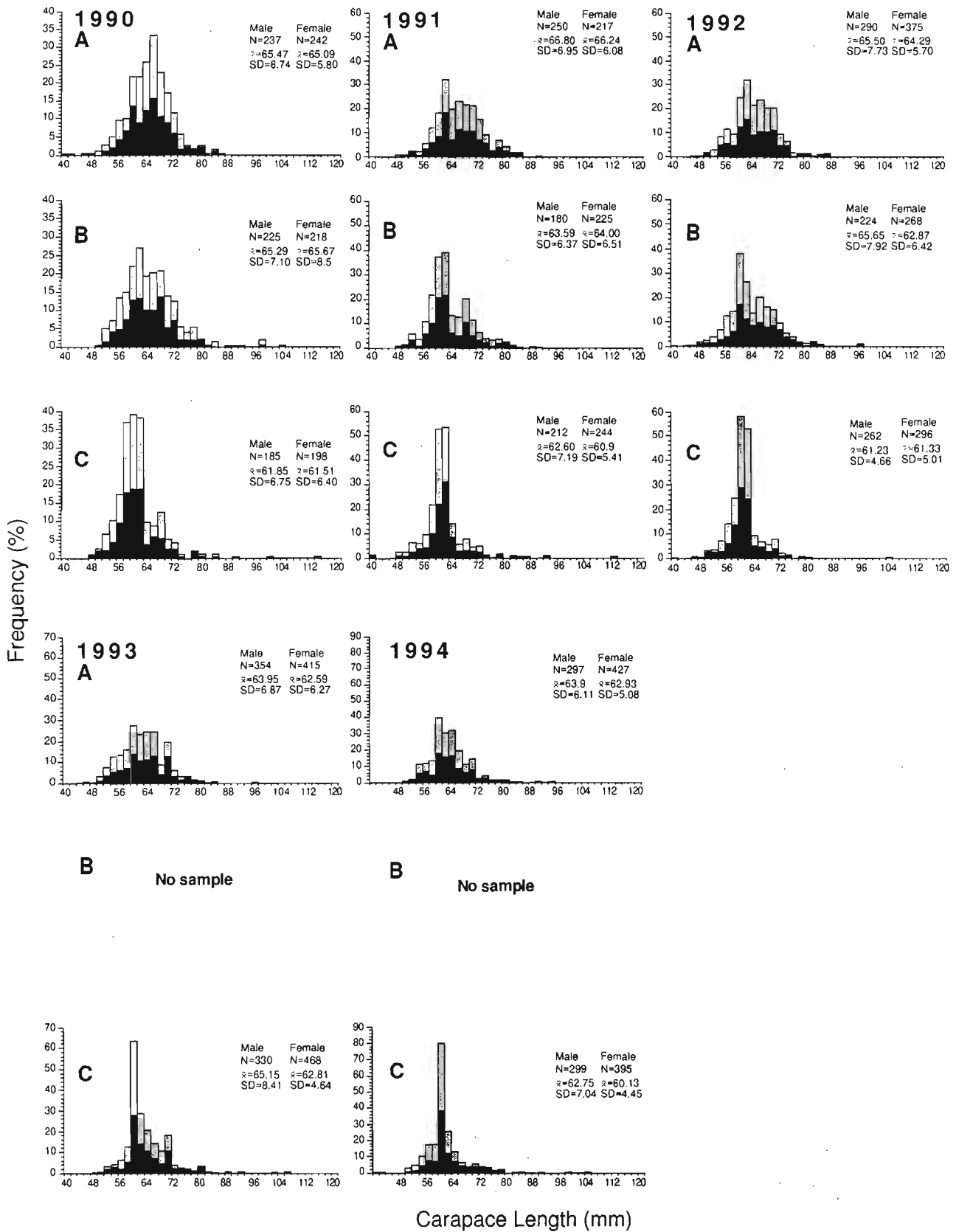


Figure 3. Lobster size frequency distribution for sea samples taken from 1990 to 1994 at the beginning, middle and end of the fishing season in Tignish, P.E.I. (Area 24)

Male Female

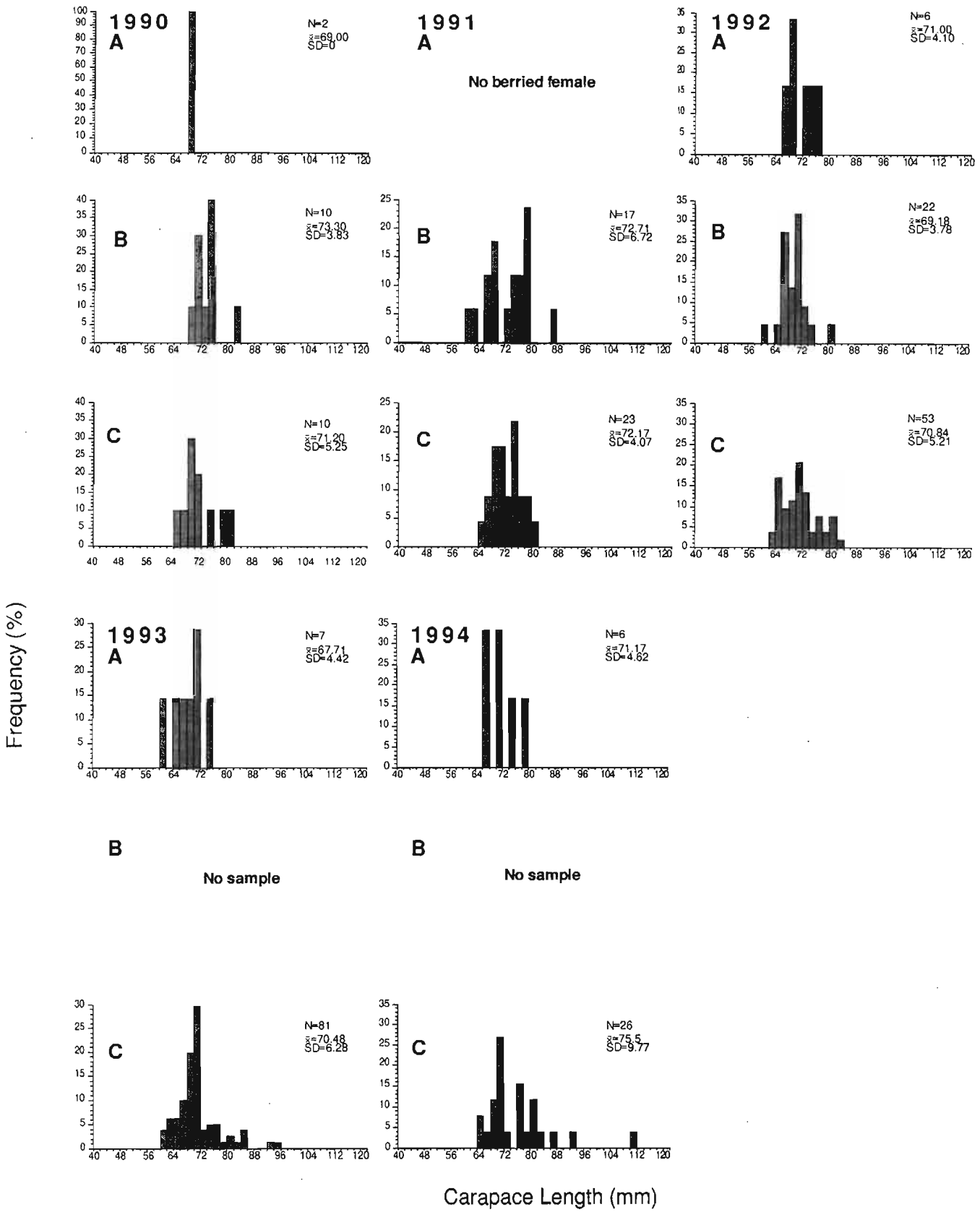


Figure 4. Berried female lobster size frequency distributions for sea samples taken from 1990 to 1994 at the beginning, middle and end of the fishing season in Tignish, P.E.I. (Area 24).

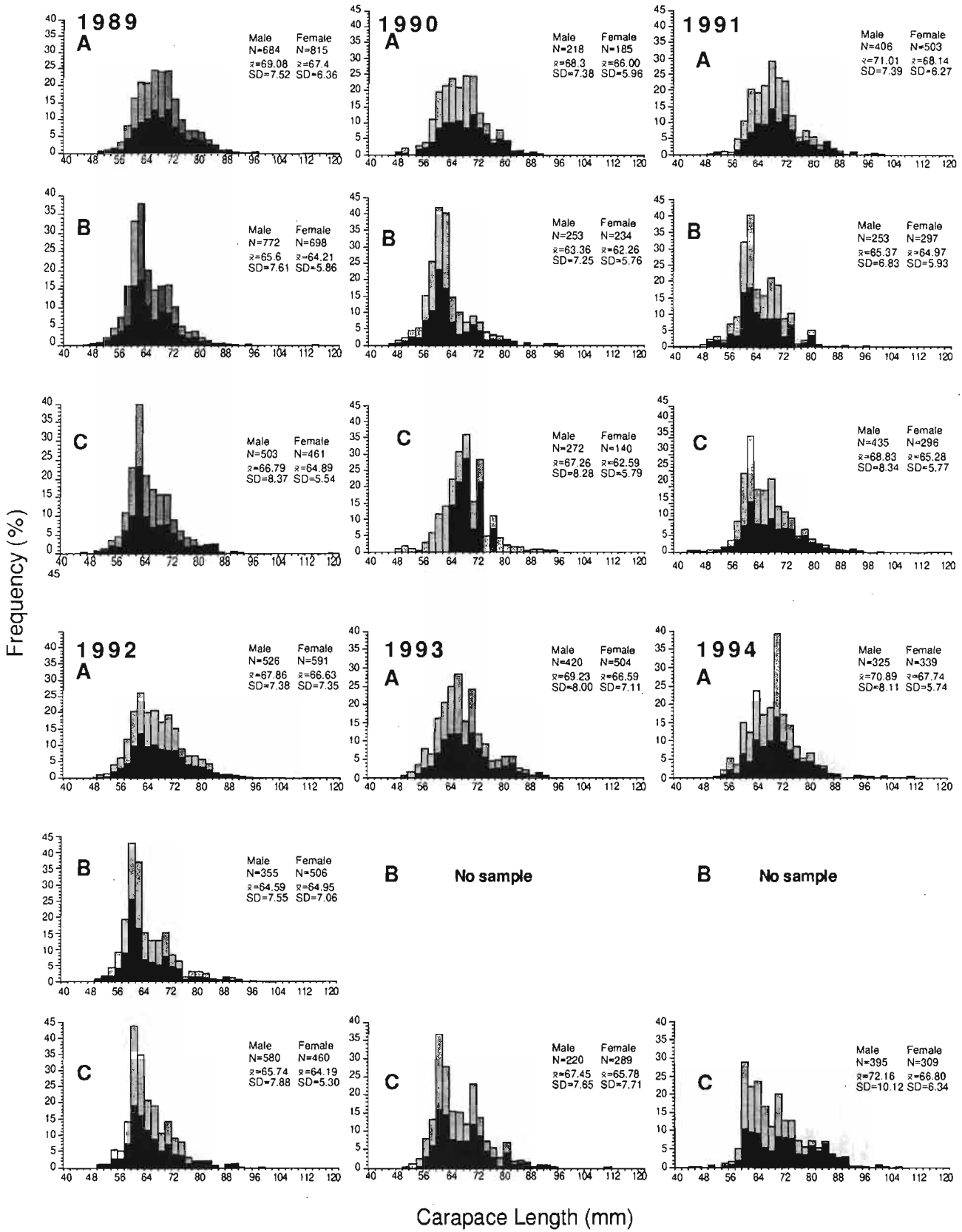


Figure 5. Lobster size frequency distribution for sea samples taken from 1989 to 1994 at the beginning, middle and end of the fishing season in Malpeque, P.E.I. (Area 24)
 Male Female

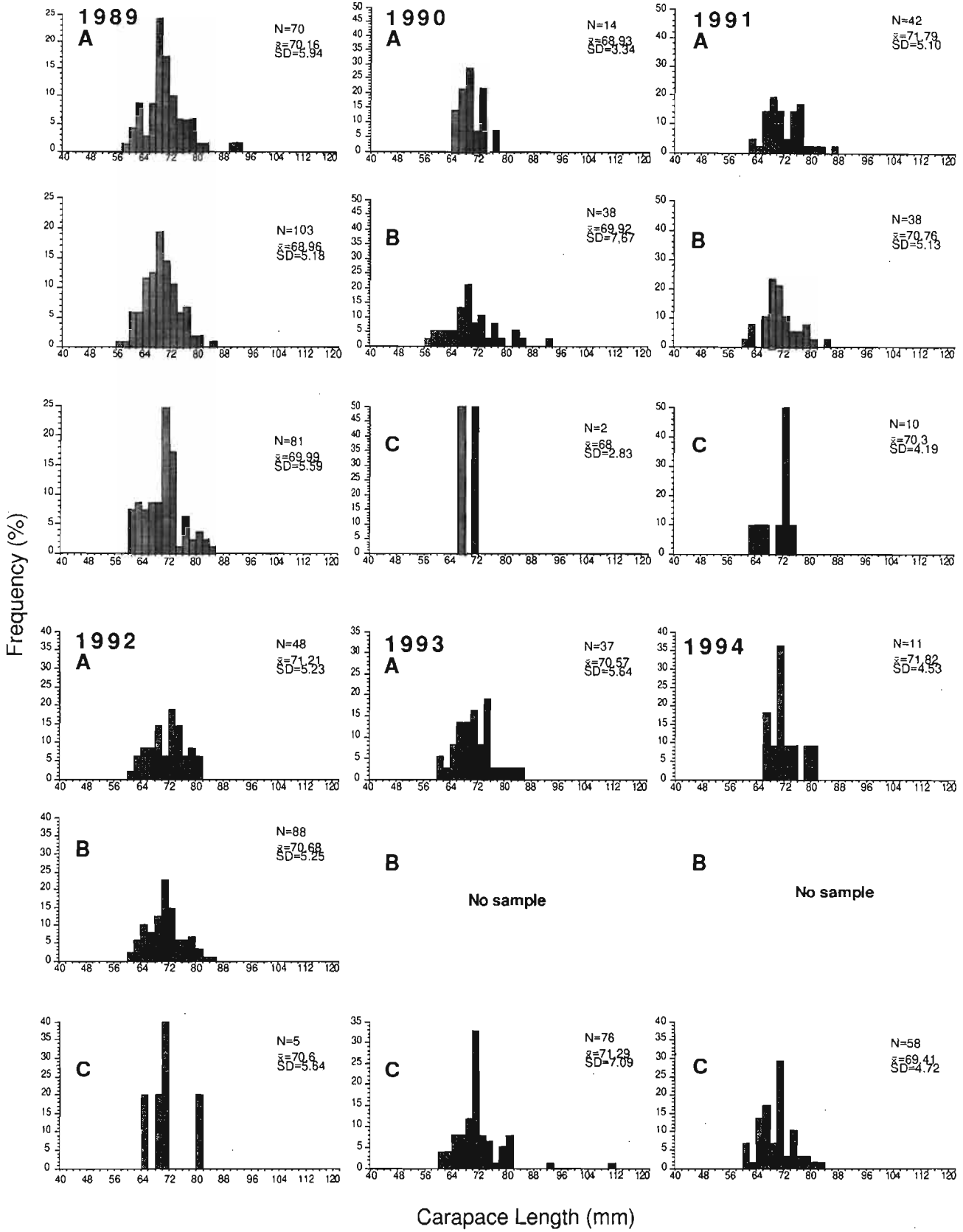


Figure 6. Berried female lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning, middle and end of the fishing season in Malpeque, P.E.I. (Area 24).

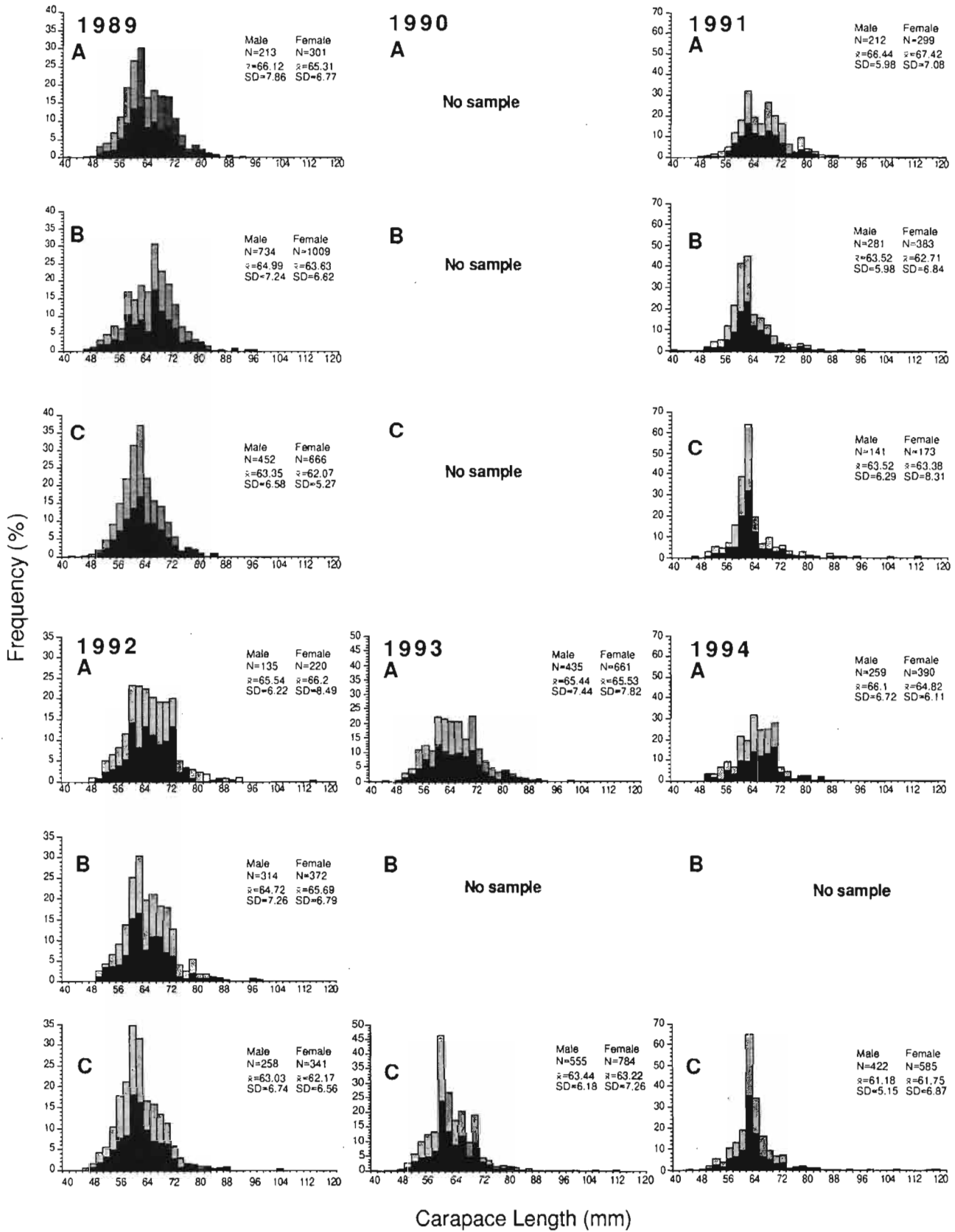


Figure 7. Lobster size frequency distribution for sea samples taken from 1989 to 1994 at the beginning, middle and end of the fishing season in Tracadie, P.E.I. (Area 24)

Male Female

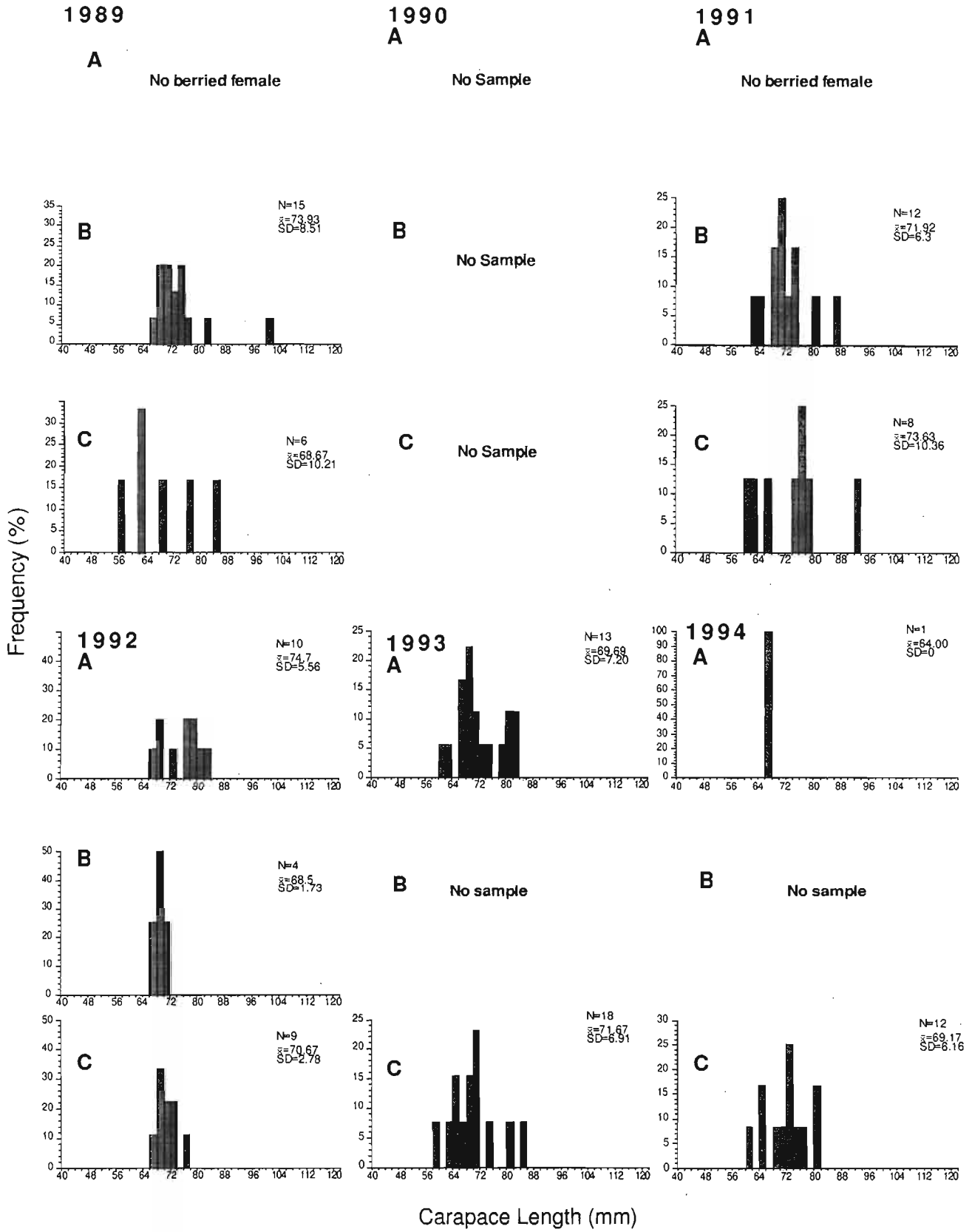


Figure 8. Berried female lobster size frequency distributions for sea samples taken from 1989 to 1994 at the beginning, middle and end of the fishing season in Tracadie, P.E.I. (Area 24).

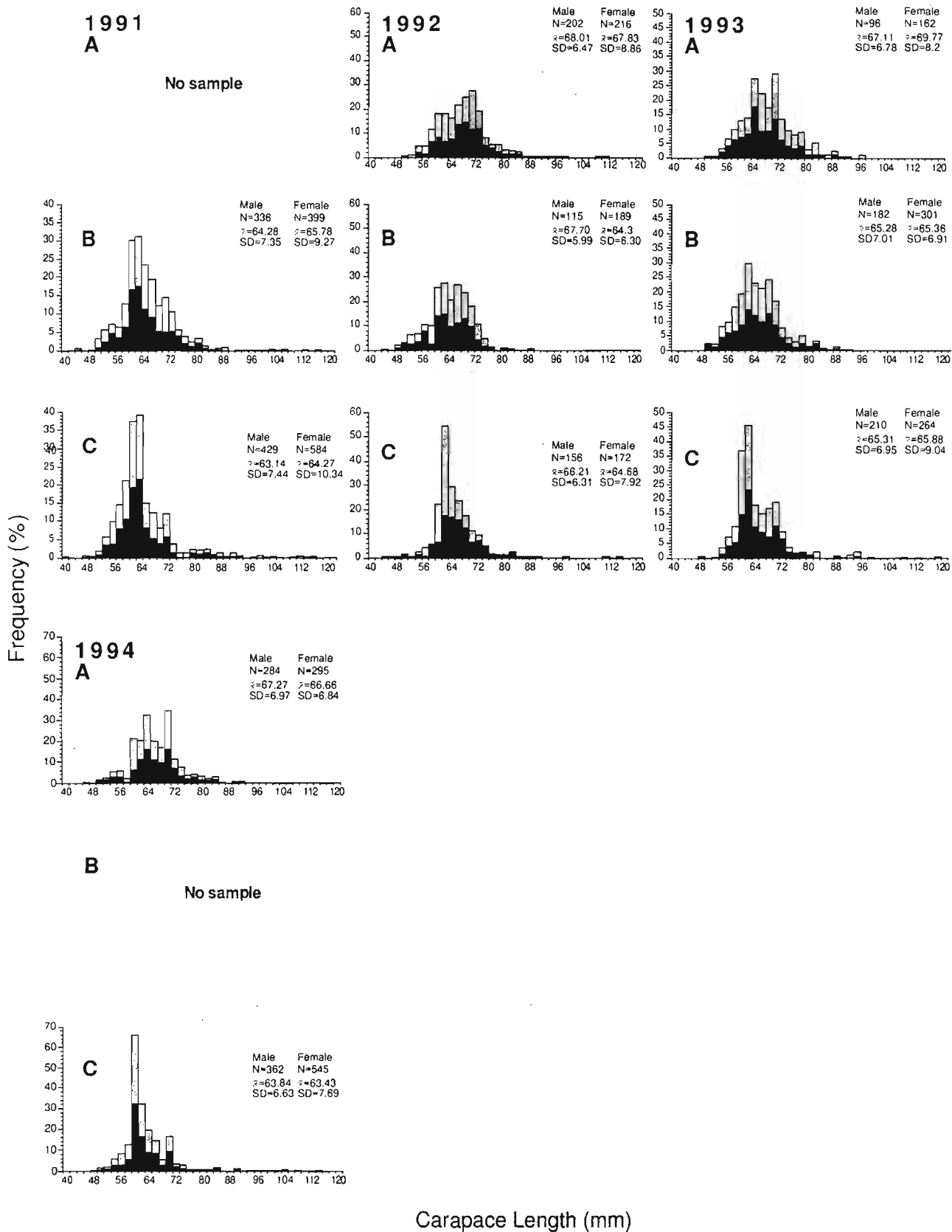


Figure 9. Lobster size frequency distribution for sea samples taken from 1991 to 1994 at the beginning, middle and end of the fishing season in North Lake, P.E.I. (Area 24)

Male Female

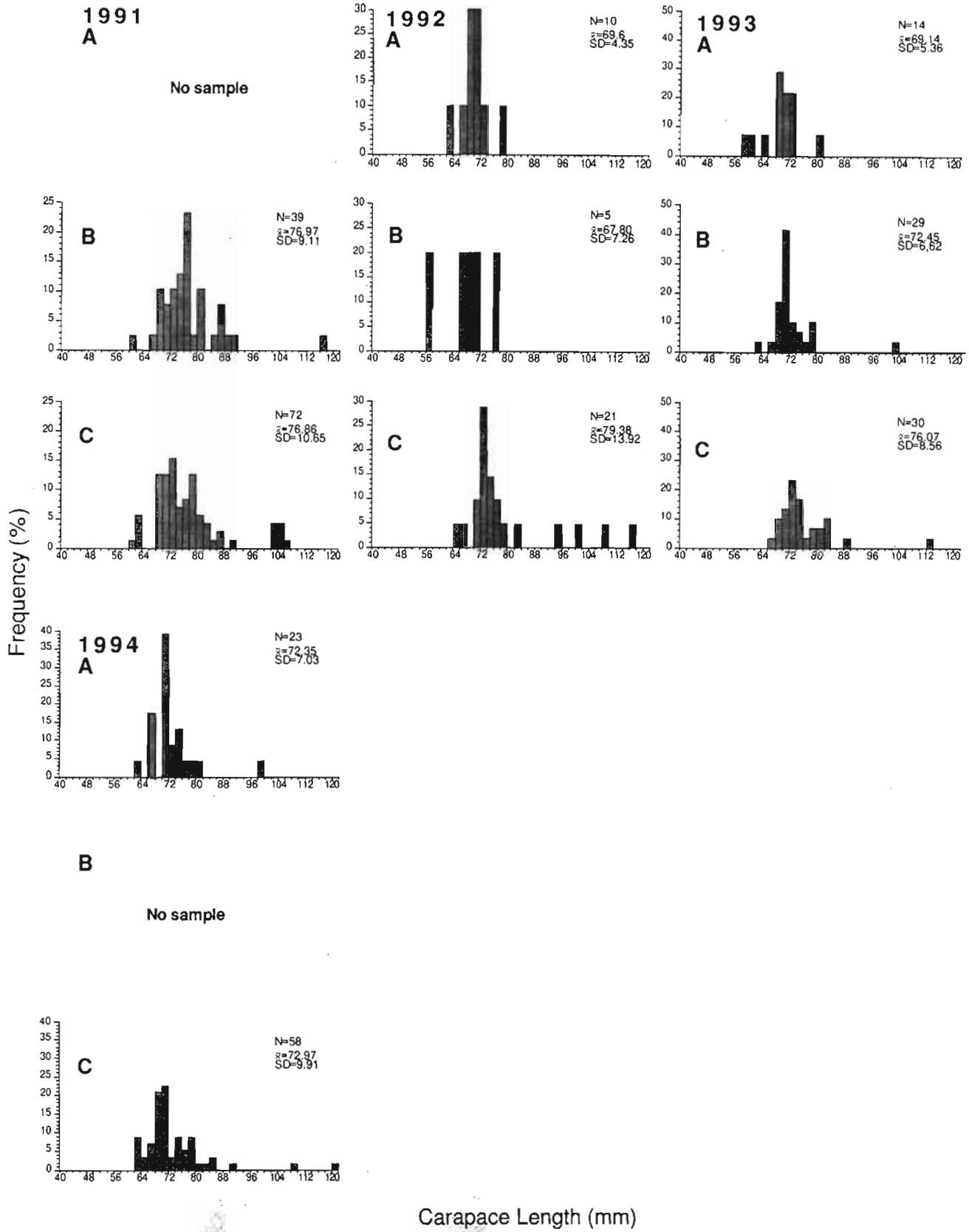


Figure 10 Berried female lobster size frequency distributions for sea samples taken from 1991 to 1994 at the beginning , middle and end of the fishing season in North Lake, P.E.I. (Area 24).

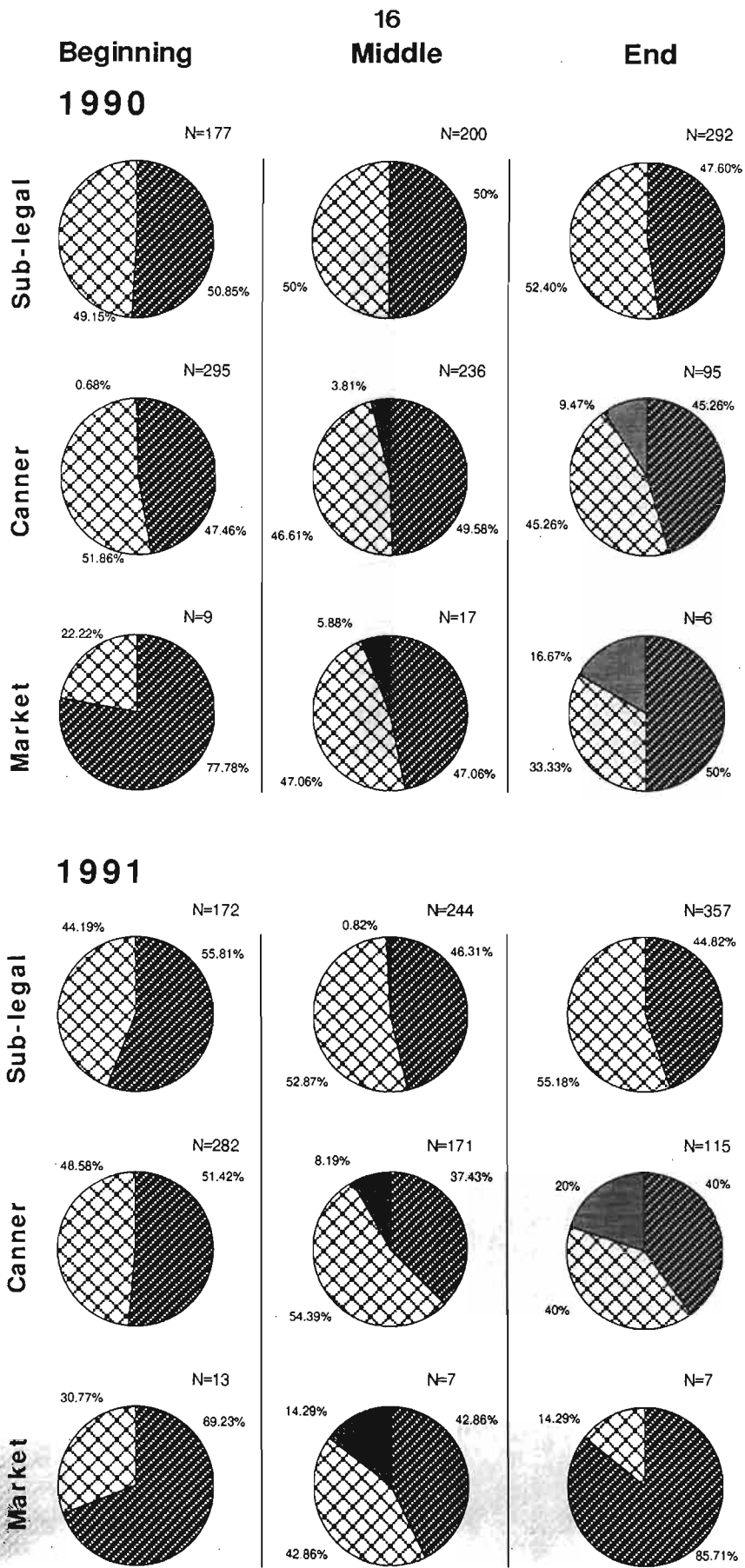
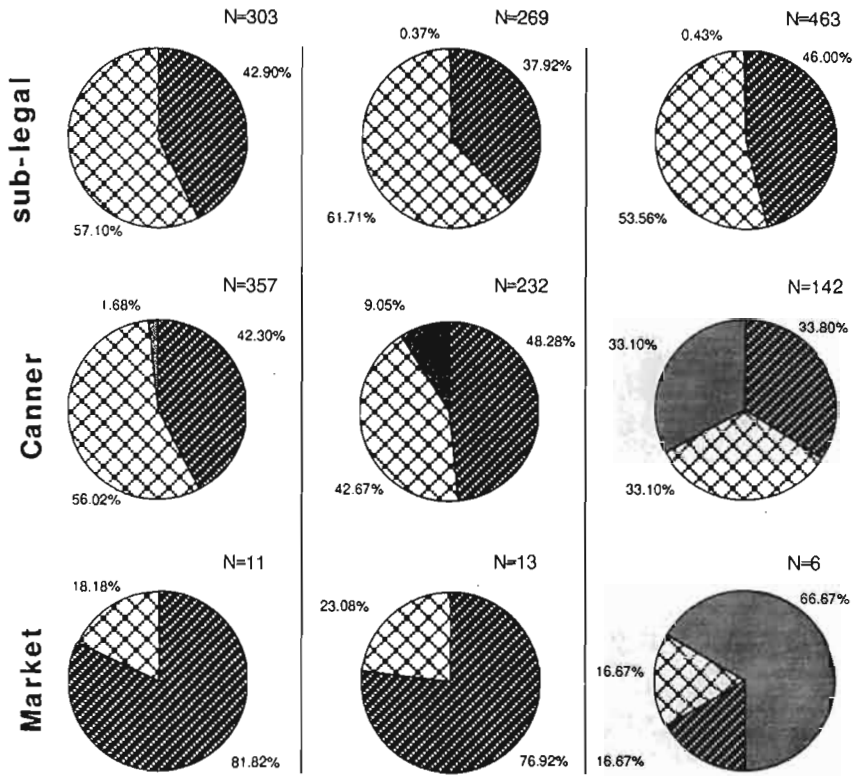


Figure 11. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Tignish, P.E.I. between 1990 and 1994.

17

Beginning 1992 Middle End



1993

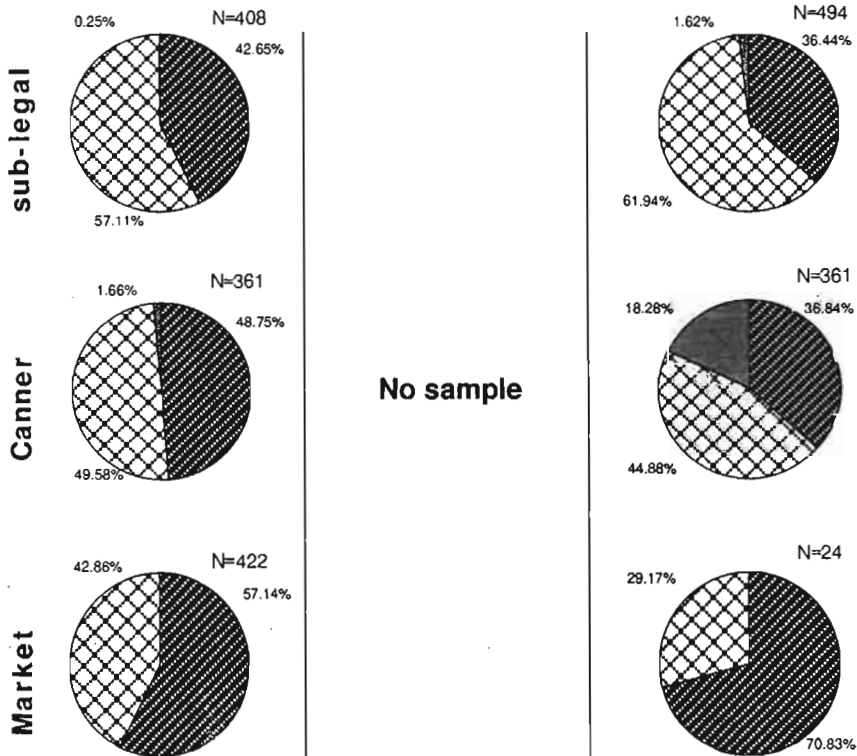


Figure 11. Cont.

Beginning
1994

18
Middle

End

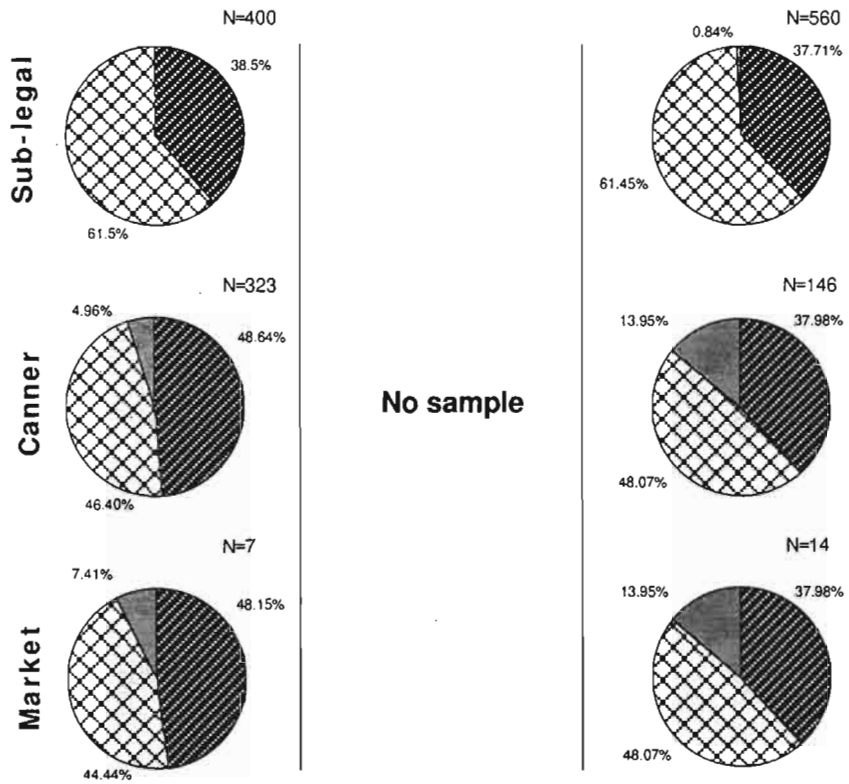


Figure 11.

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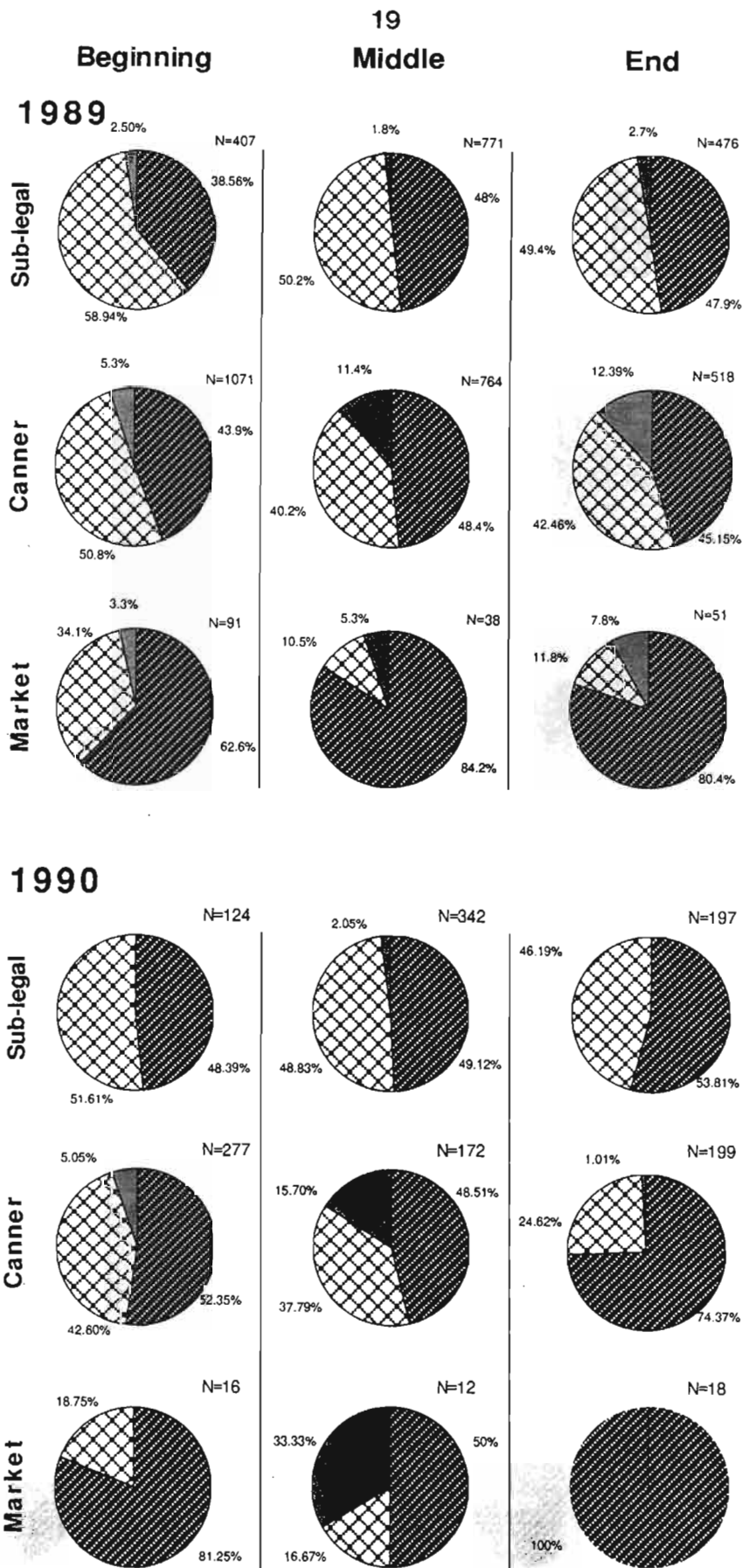


Figure 12. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Malpeque, P.E.I. between 1989 and 1994.
 Male Female Berried

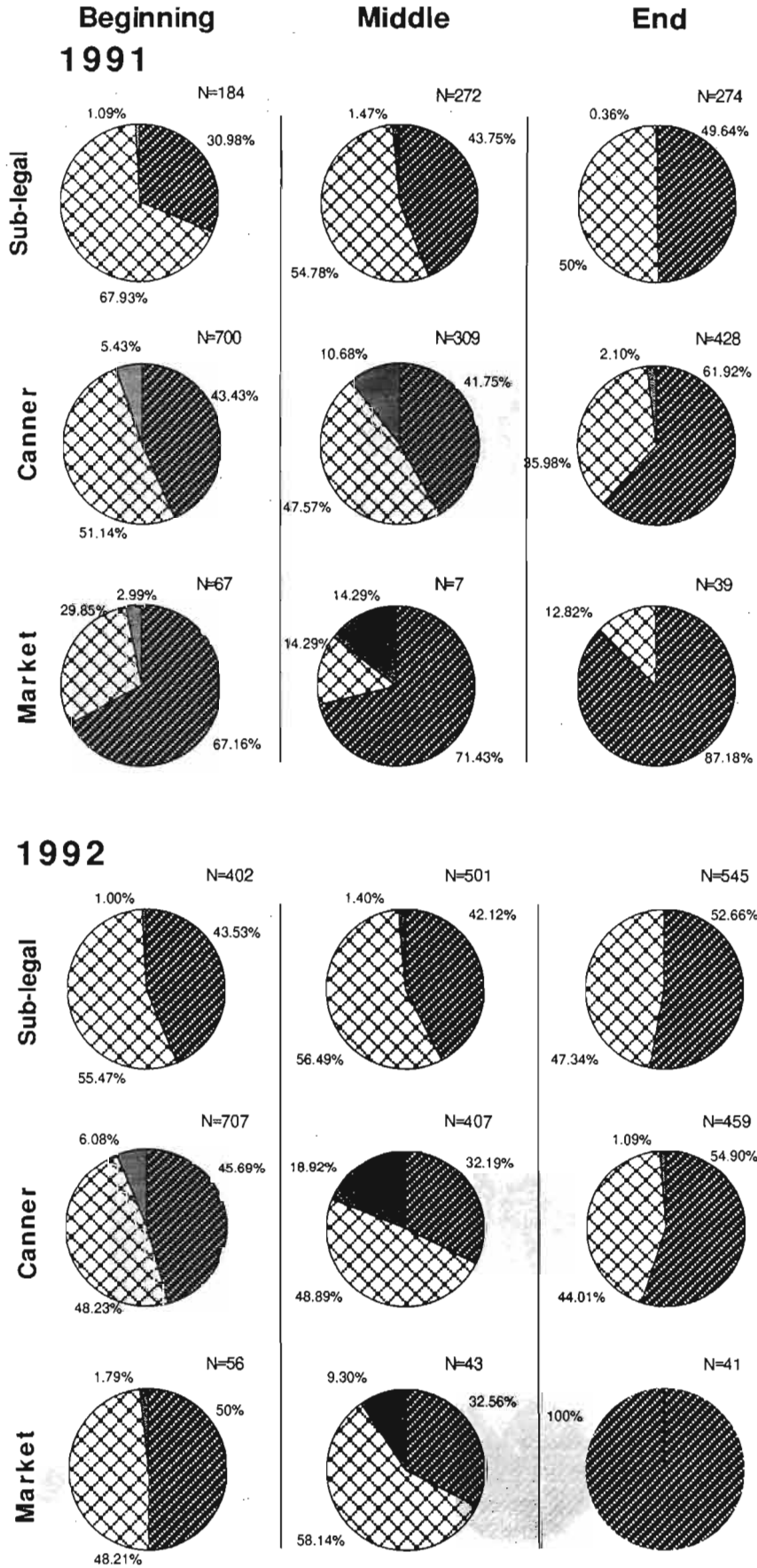


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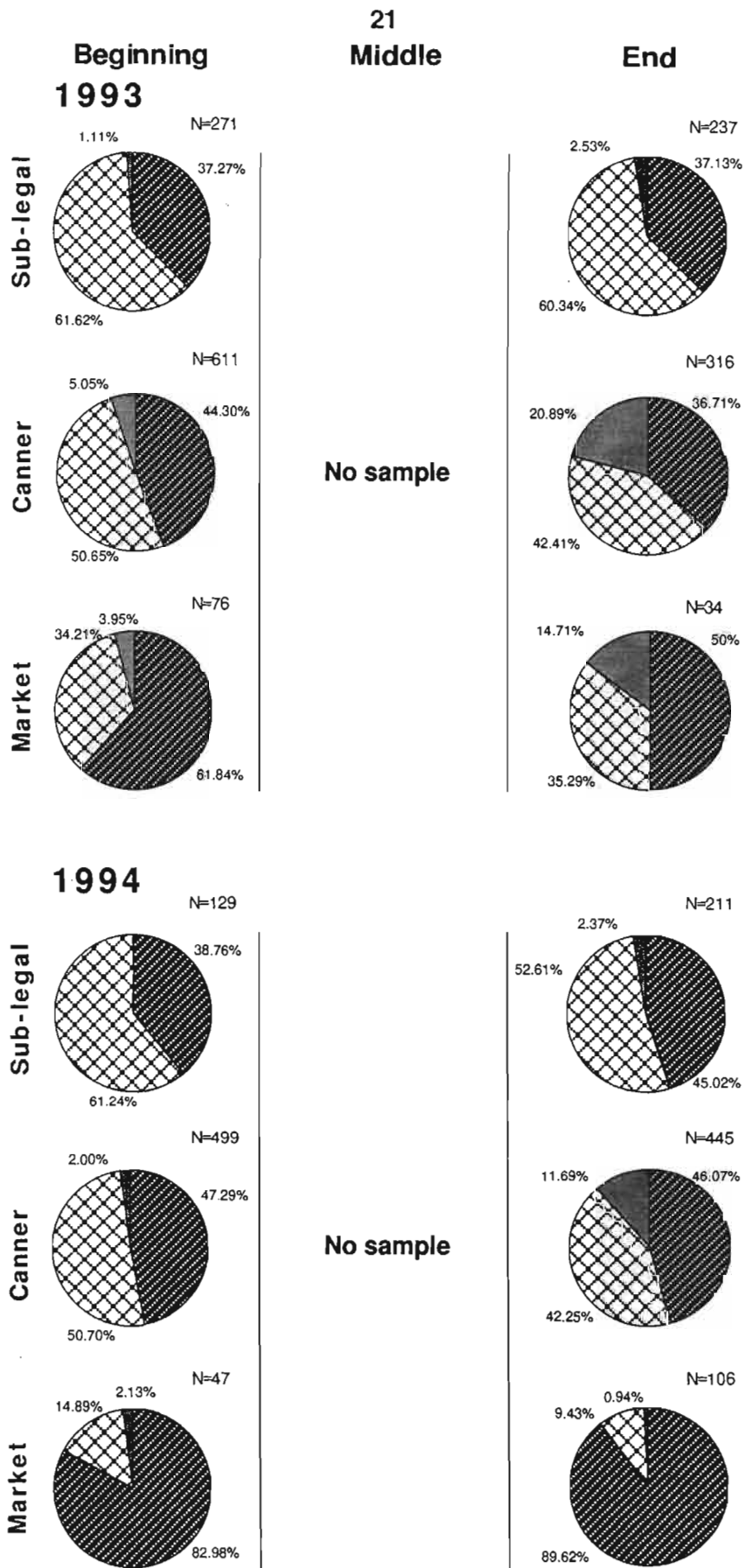
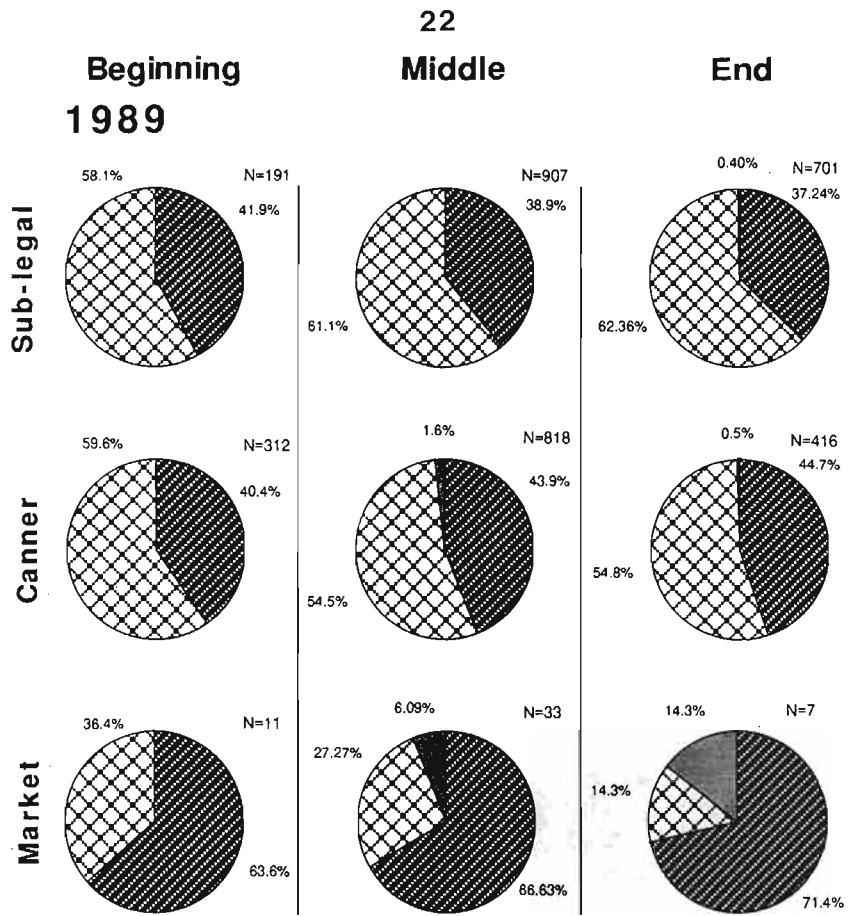


Figure 12. Cont.



1990

No sample

Figure 13. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in Tracadie, P.E.I. between 1989 and 1994.

Male Female Berried

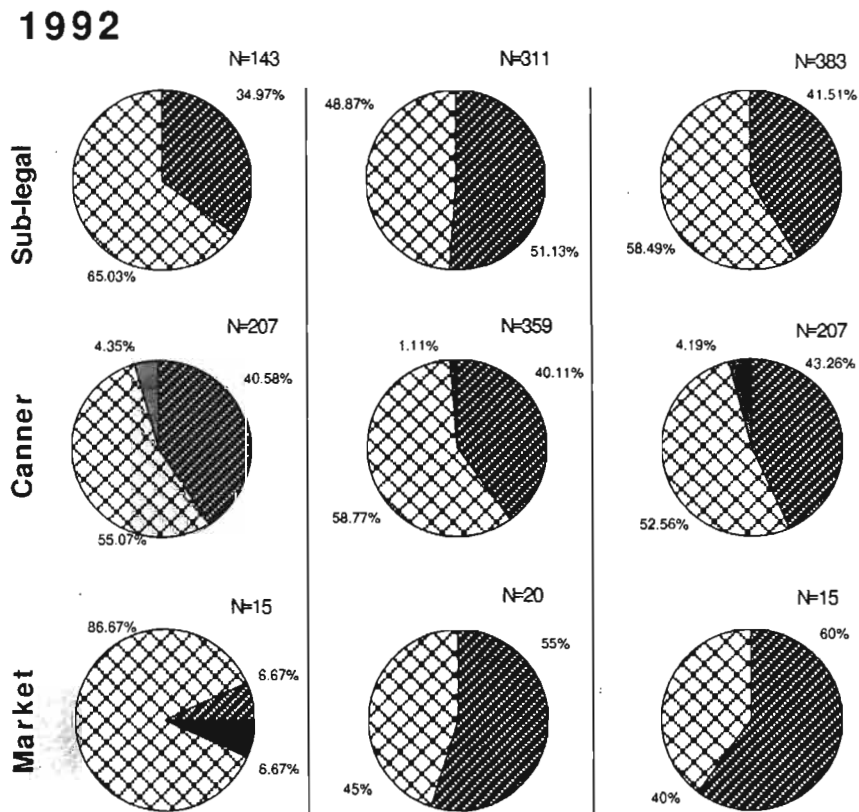
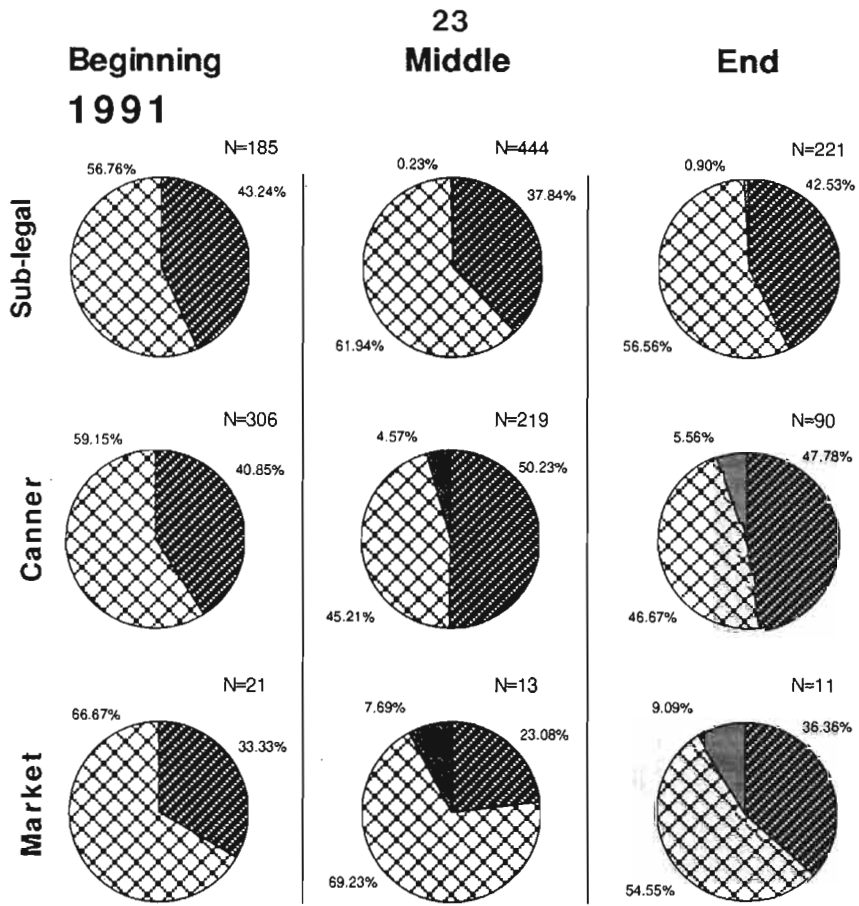
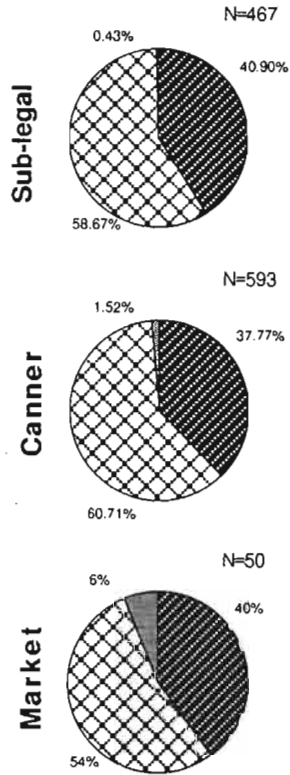


Figure 13. Cont.

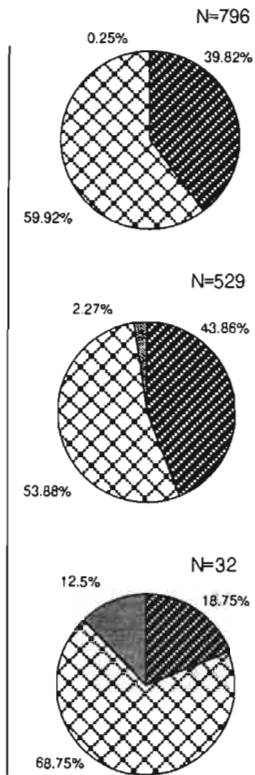
**Beginning
1993**



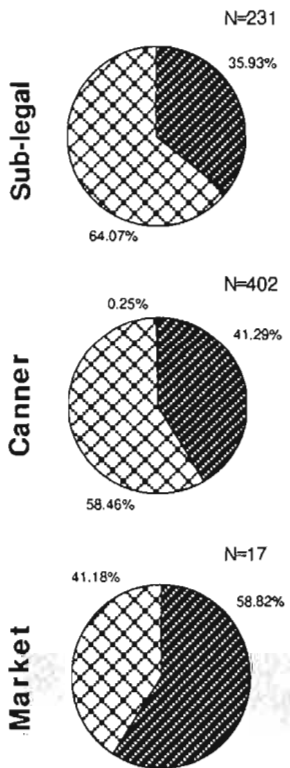
Middle

No sample

End



1994



No sample

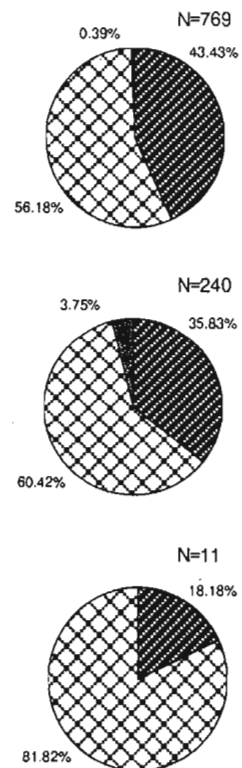


Figure 13. Cont

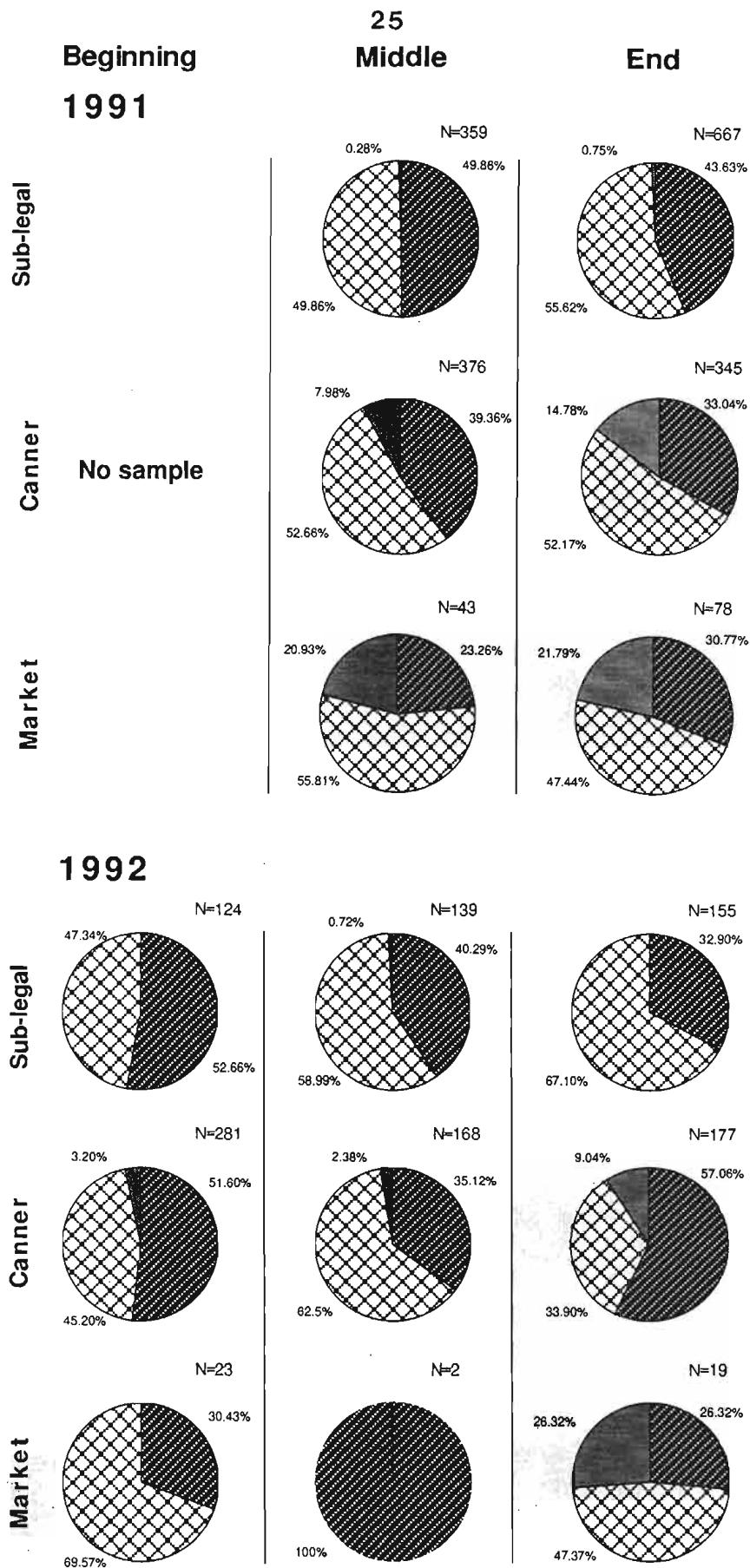


Figure 14. Percentages of males, females and berried females for sub-legal, canner and market lobster sampled in North Lake, P.E.I. between 1991 and 1994.
 Male Female Berried

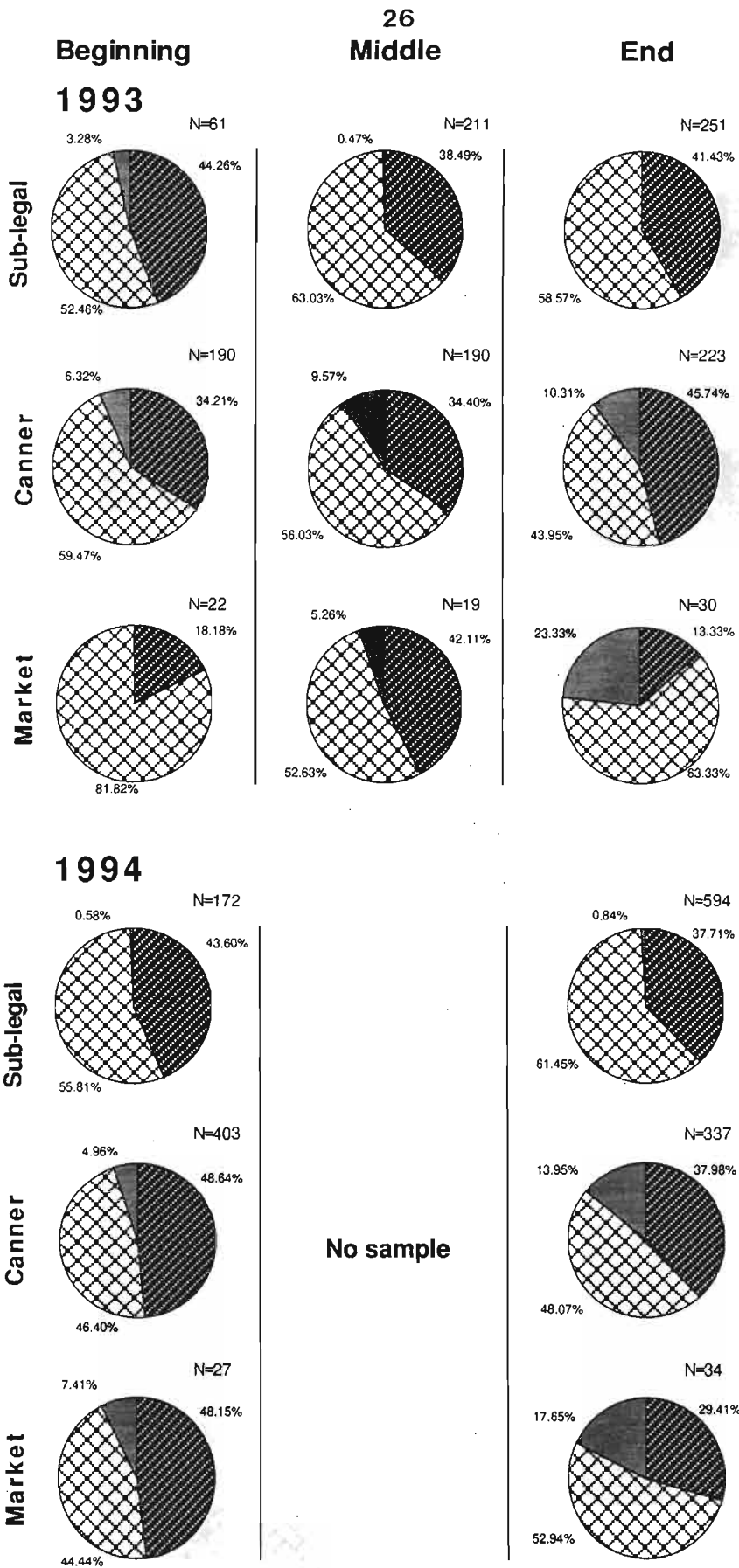
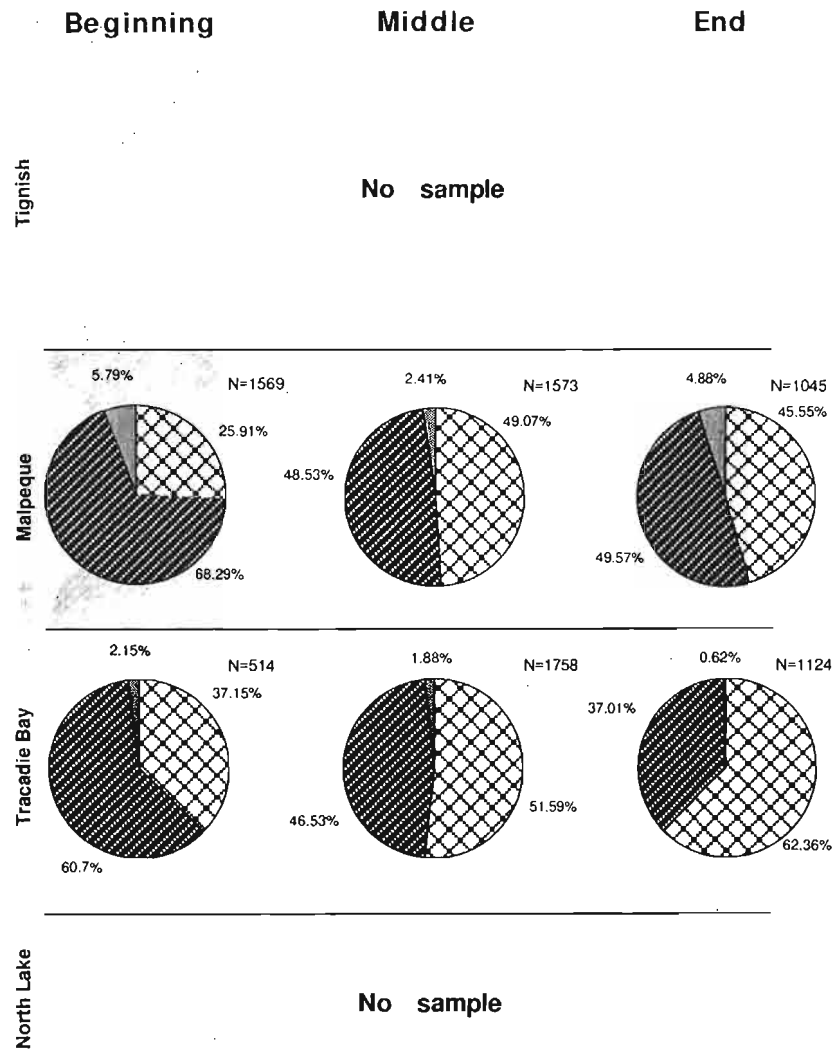


Figure 14. Cont.

1989



1990

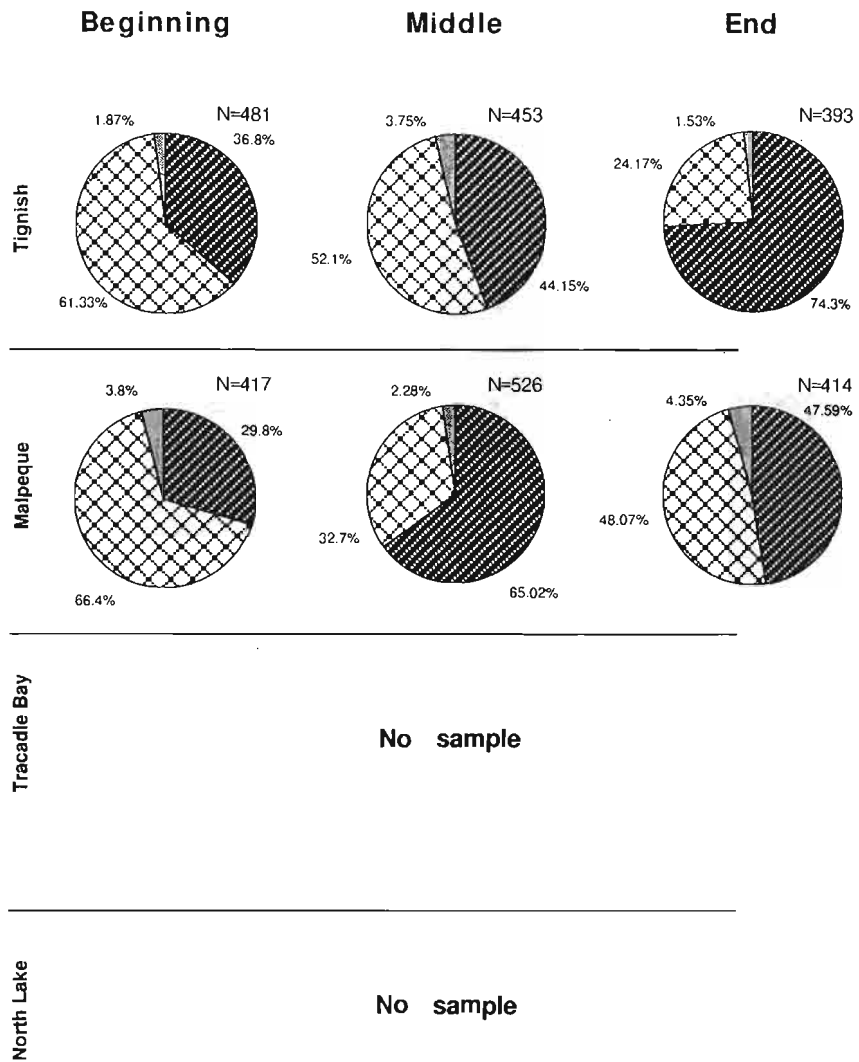



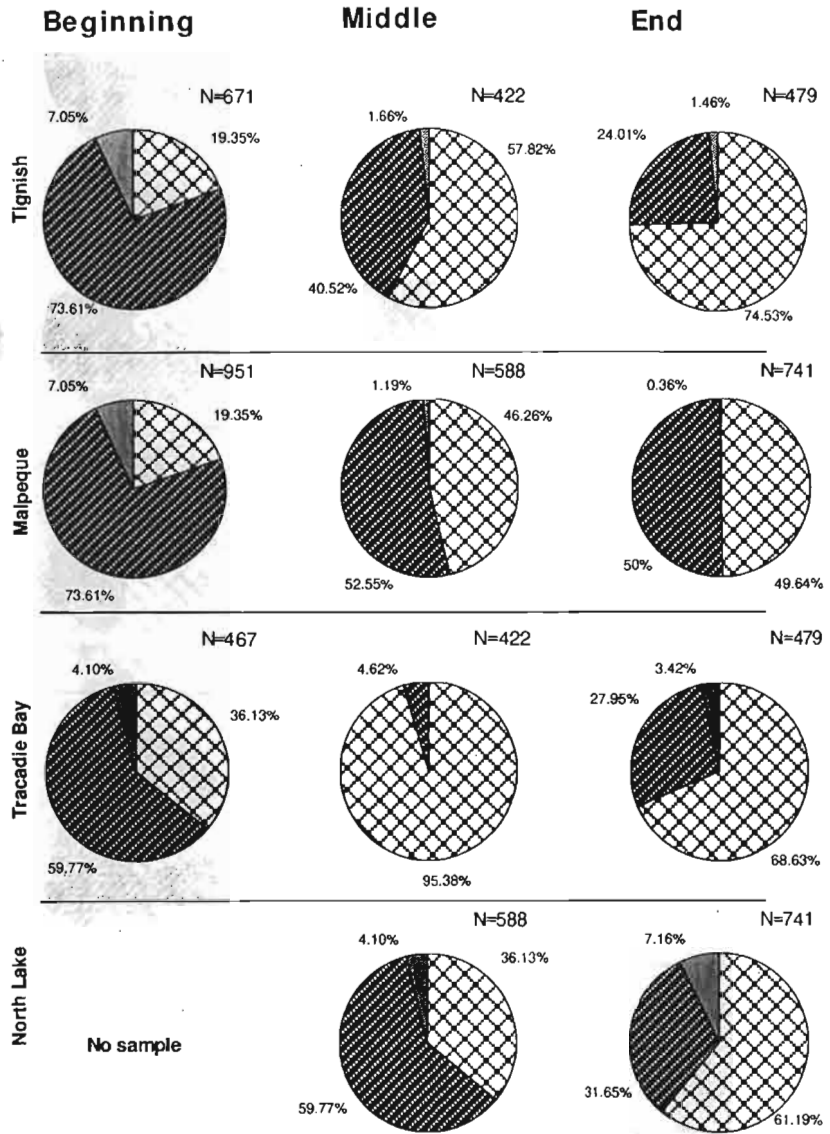


Figure 15 Percentages of sub-legal, canner and market lobster sampled in Tignish, Malpeque, Tracadie and North Lake, P.E.I. between 1989 and 1994. Sub-legal  canner  market 

1991



1992

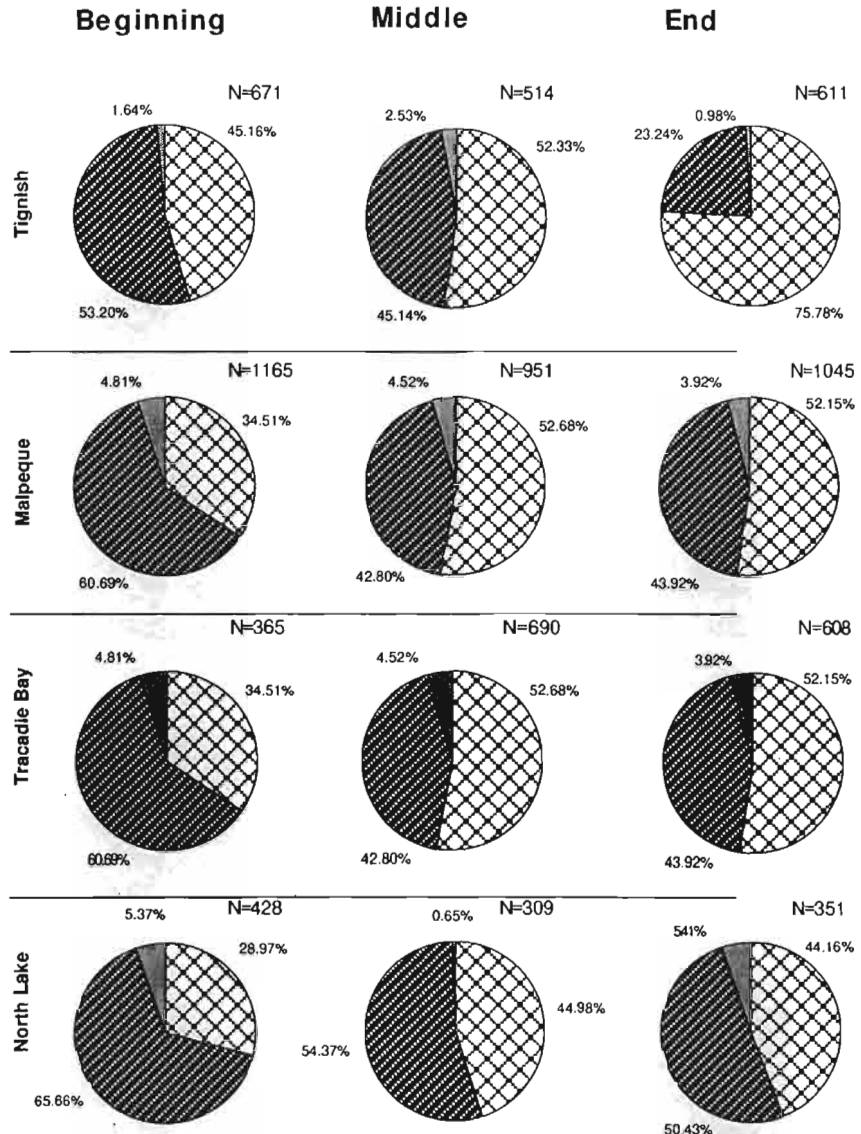


Figure 15. Cont.

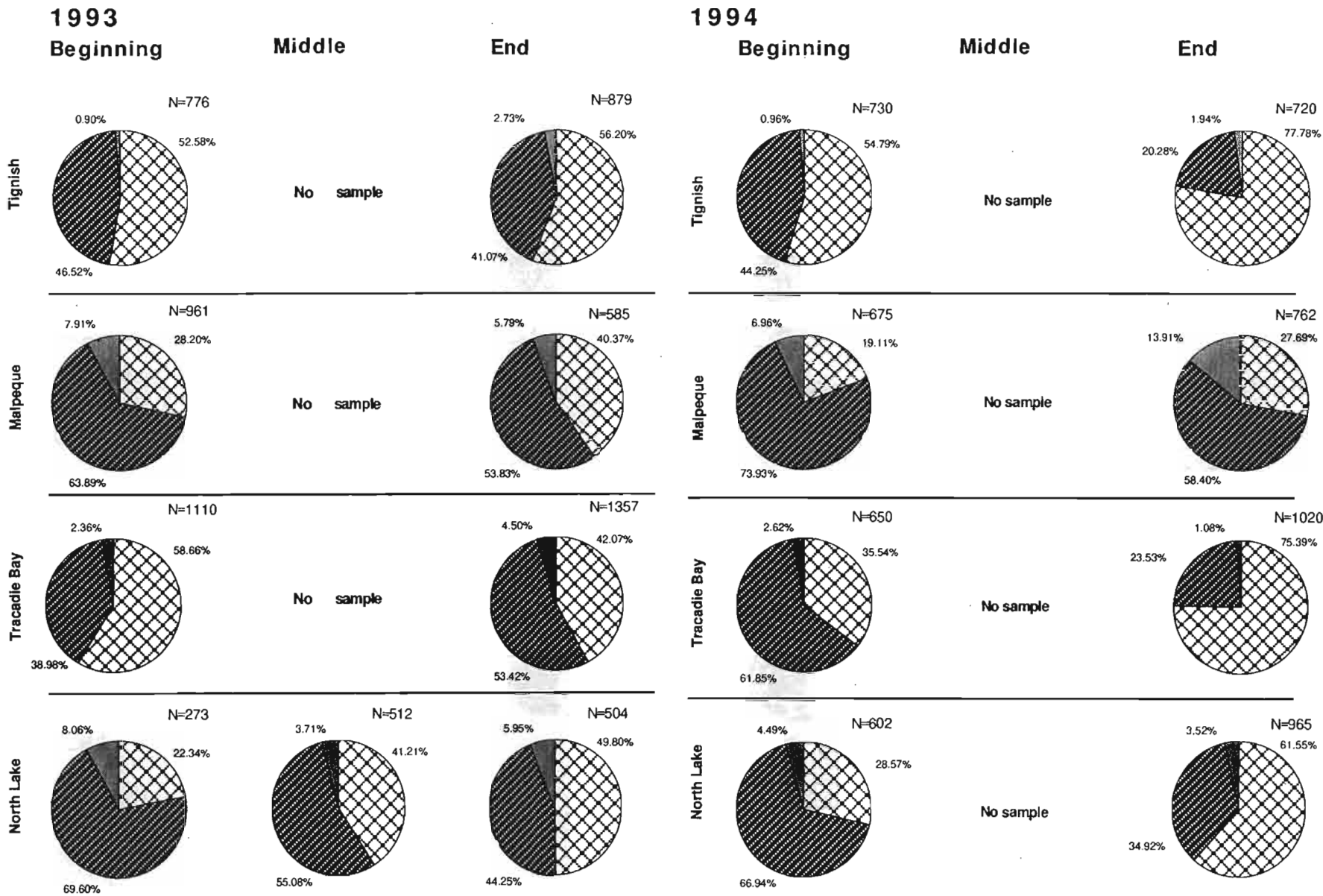


Figure 15 Cont.

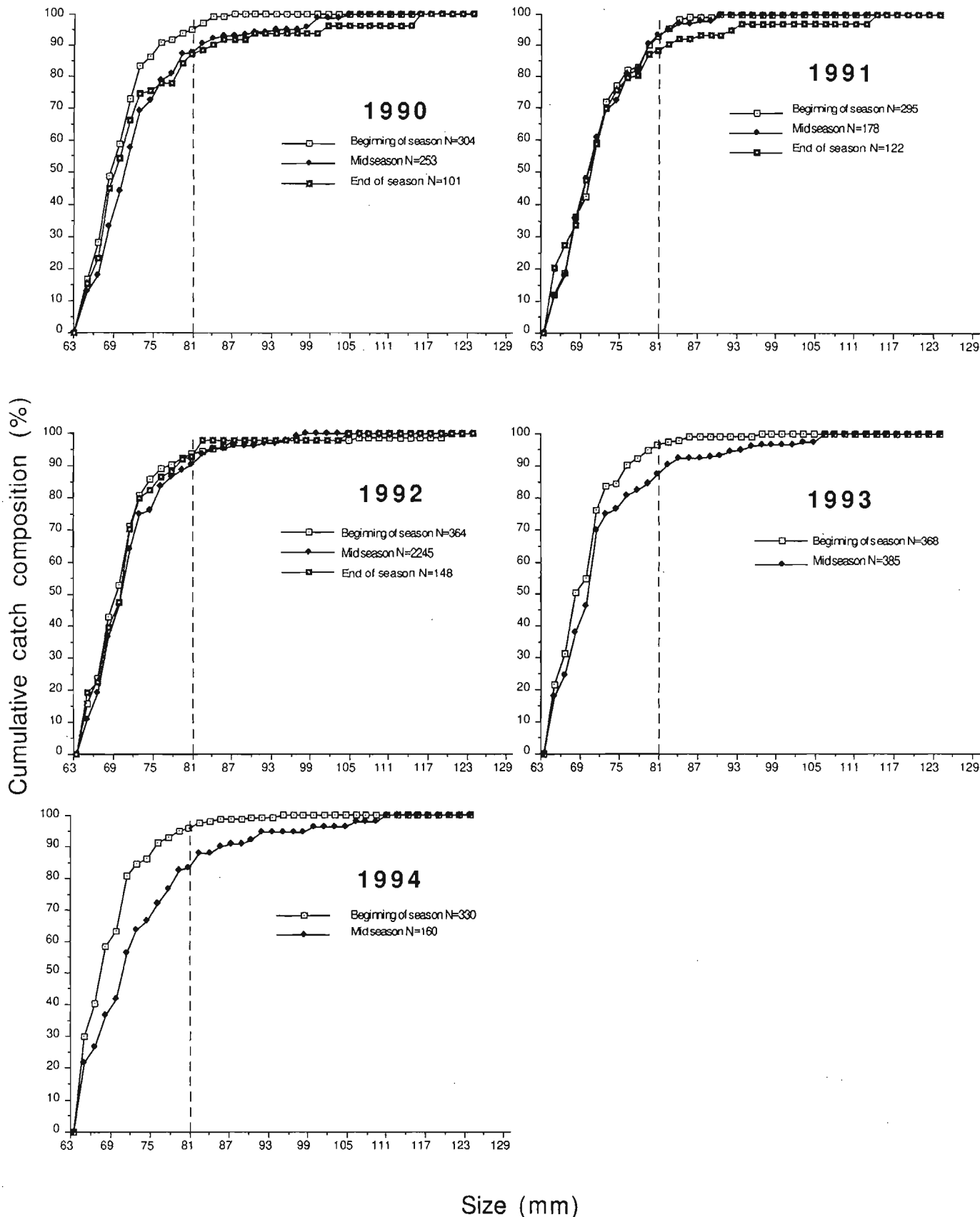


Figure 16. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Tignish, P.E.I. between 1990 and 1994. Vertical line represents the minimum size for market lobsters.

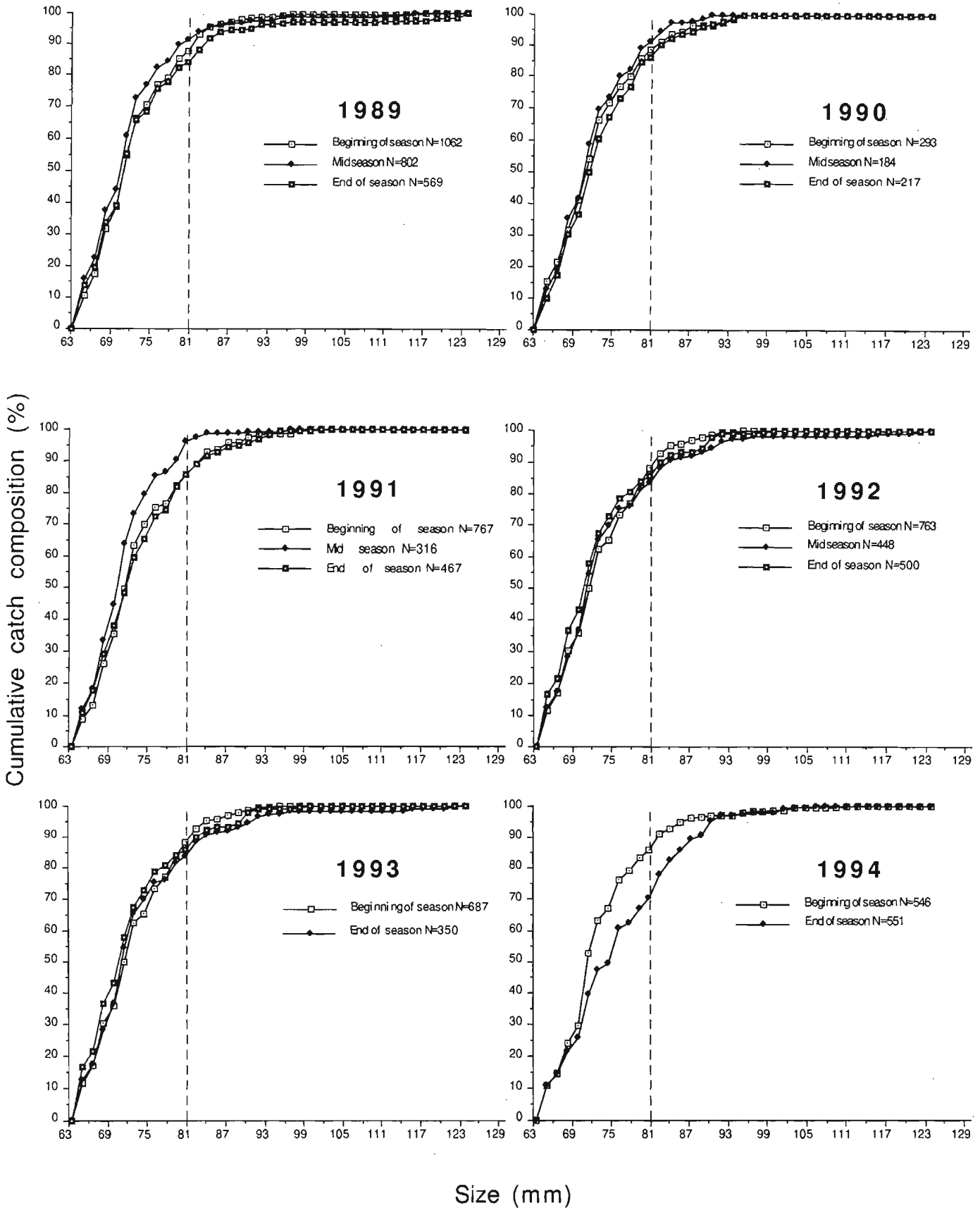


Figure 17. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Malpeque, P.E.I. between 1989 and 1994. Dotted vertical line represents minimum carapace size for market lobsters.

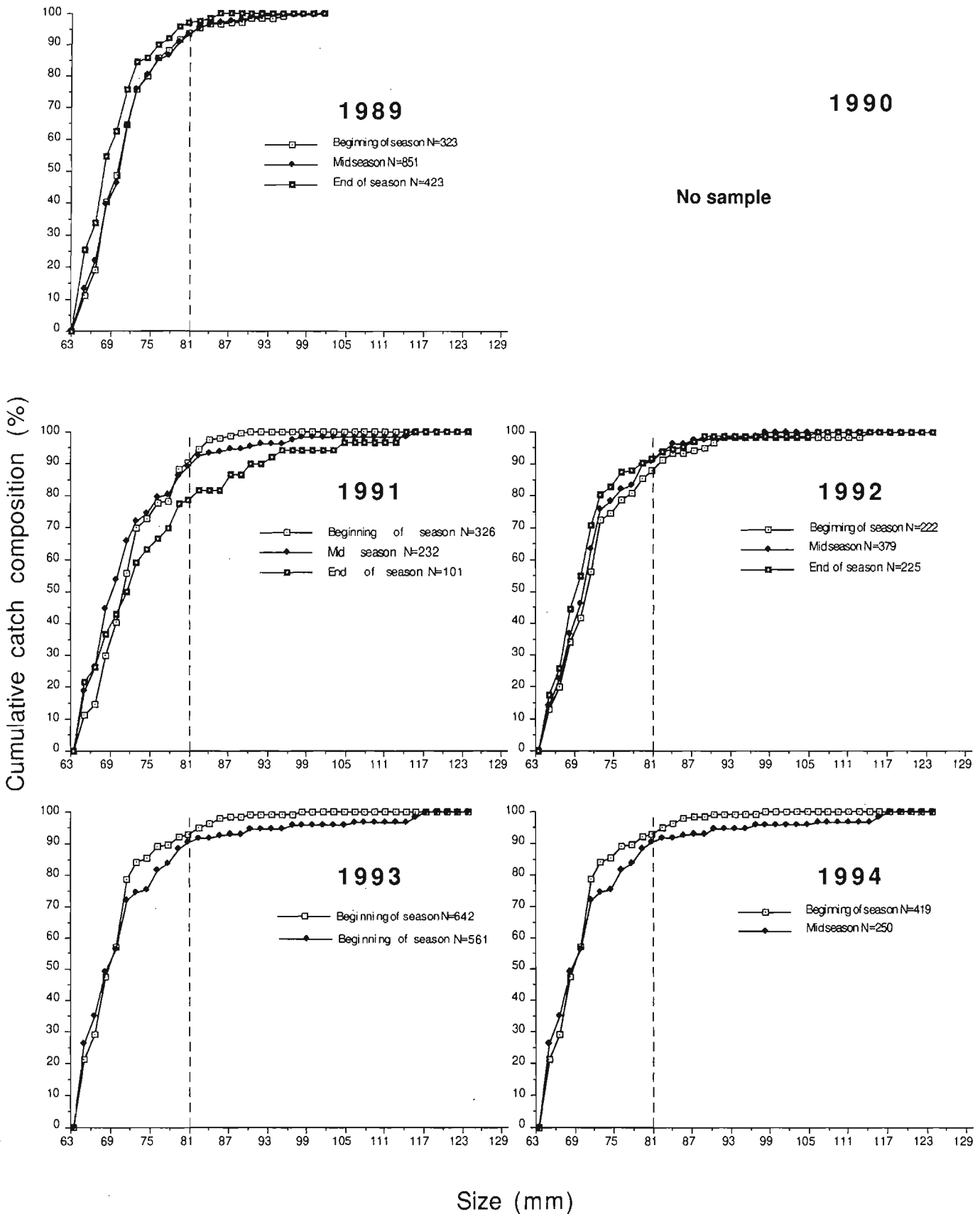


Figure 18. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in Tracadie, P.E.I. between 1989 and 1994. Dotted vertical line represents minimum carapace size for market lobsters.

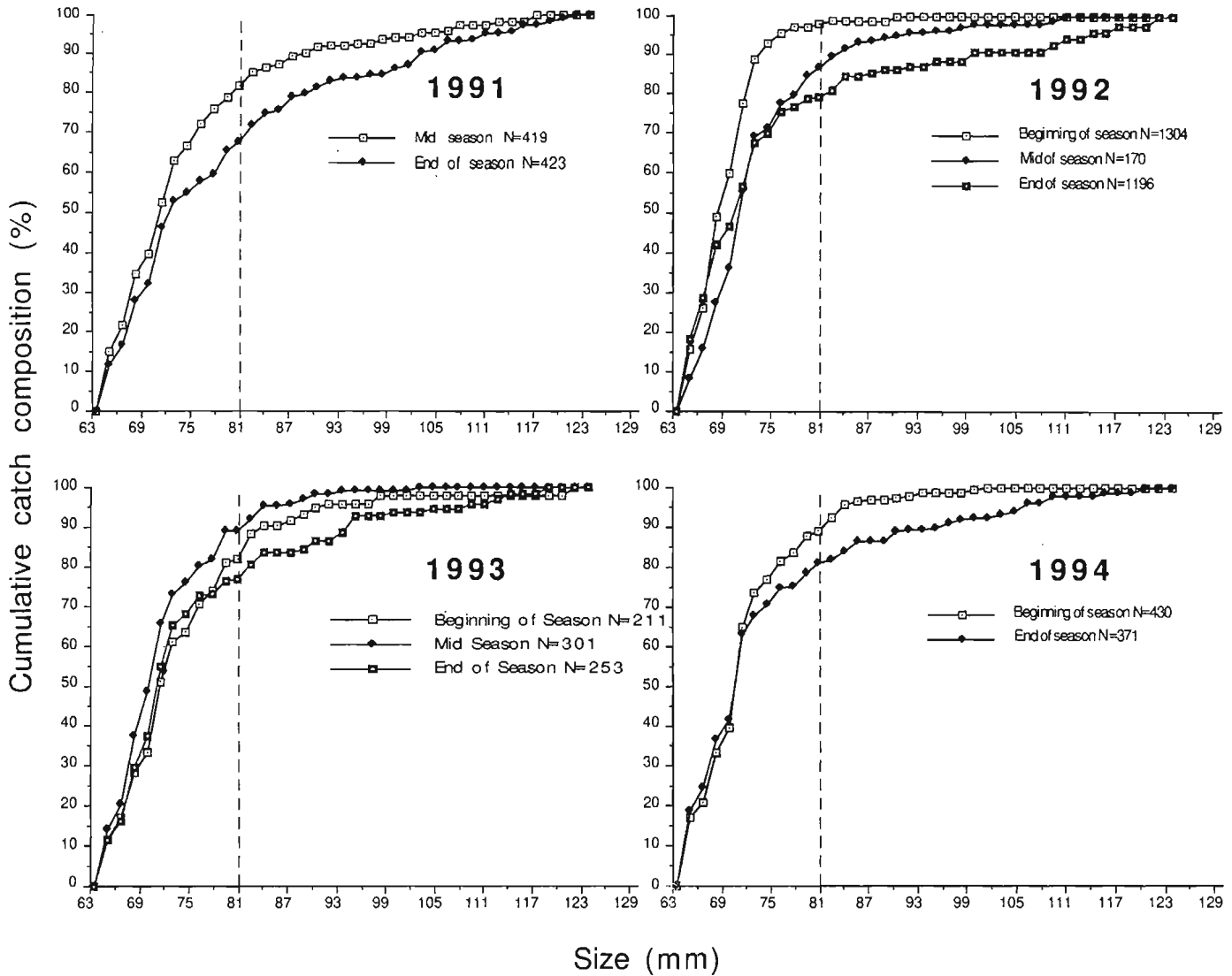


Figure 19. Cumulative lobster catch per 1.58 mm size class at the beginning, middle and end of the fishing season in North Lake, P.E.I. between 1991 and 1994. Vertical line represents minimum carapace size for market size lobsters.