Northwest Atlantic Fisheries Organization

Serial No. N3046 NAFO SCR Doc. 98/55

SCIENTIFIC COUNCIL MEETING - JUNE 1998

An Update of the Fishery for Short-finned Squid(*Illex illecebrosus*) in the Newfoundland Area During 1994-97 with Descriptions of Some Biological Characteristics

by

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Introduction

This paper provides a description of the fishery for Illex illecebrosus in the Newfoundland area (NAFO Subarea 3) during 1994-97. Commercial catches are broken down by month, NAFO Division, and processing category.

Length composition and (for males) maturity are described for those biological samples which could be obtained. Yearly catches and biological characteristics have been described for most years between 1965 and 1993 (Mercer MS 1975; Collins and Ennis MS 1978; Hurley et al. MS 1979; Beck et al. MS 1980, MS 1981, MS 1982, MS 1983, MS 1986, MS 1989; MS 1994; Drew et al. MS 1984, MS 1985).

Materials and Methods

Data on monthly inshore squid catches by NAFO Division were obtained from the Fisheries Systems and Statistics Branch, Department of Fisheries and Oceans, Newfoundland Region. Biological samples were taken (from the commercial jig fishery), when available, at Holyrood and New Bonaventure in NAFO Div. 3L (Fig. 1) and at LaScie and Jacksons Arm in NAFO Div. 3K in 1994 and 1996-97 (Fig. 1).

All squid samples were dissected, sexed, and measured in dorsal mantle length (DML) to the nearest 0.5 cm. Maturity stages for males were assigned according to Mercer (MS 1973a). Samples were pooled over biweekly periods for descriptions of length, sex, and maturity composition.

Results and Discussion

Reported Catches

The annual Newfoundland squid catch increased gradually since 1986, to 3101 t in 1989 and 4,440 t in 1990 (Fig. 2). It subsequently declined regularly to 924 t in 1992 and only about 270 t in 1993 (Beck et al. MS 1994). The marginal improvement in the squid fishery in 1989 and 1990 reflected slight increases in abundance of squid in those years. Catch was low during 1994-95 (1,951 t and 69 t, respectively) but increased to 8,233 t in 1996 and 12,616 t (preliminary data) in 1997 (Table 1, Fig. 2). The increase in 1996 ended a 13-year period of low squid abundance, the longest on record. Increase in abundance in 1996-97 was associated with improvement in the oceanographic regime (Dawe et al., this meeting). High abundance in 1996-97 is not as well reflected by catch as it was during 1975-82 because effort is limited by a squid licencing policy which was initiated in 1990, with only full-time fishers eligible to purchase squid licences (Fig. 3).

Largest monthly catches occurred in August in 1994 and in September for 1995-97), as has commonly been observed. Historically, most of the annual catch has been derived from Div. 3L (Mercer 1973b), as was also true during 1987 and 1988 (Beck et al. 1989). During 1989-92, however, most of the annual catch (52-84%) was derived from Div. 3K (Beck et al. 1994). It was suggested that this change in spatial distribution of the catch may be due to a northern shift in distribution of the local population, perhaps in response to prey distribution. In 1996 most of the catch was again derived from Div. 3K, whereas in 1997 most was from Div. 3L (Table 1).

Most production was in the form of round (whole) squid, with dried squid also prevalent (Table 1). A seasonal trend was evident, whereby round squid predominated early in the season (June-September) and dried squid production was most prevalent late in the season (October-December). This change in prominence of production categories was probably related to seasonal increase in squid size.

Biological Characteristics

Length frequency distributions were unimodal for most localities and biweekly periods sampled during 1994 and 1996-97 (Fig. 4-6). The presence of more than one modal group is rarely observed within length-frequency distributions which are aggregated over two-week periods. At least two modal groups were occasionally evident (e.g. LaScie 1994, Fig. 4). Seasonal change in size frequencies reflect dynamic interchange of individuals within local populations, due to continuous recruitment, emigration and size-related cannibalism. These processes are reflected by seasonal increase in small squid and decline in mean mangle length (e.g. LaScie 1997, Fig. 6).

Mean biweekly mantle lengths throughout 1989-93 were generally smaller than those of any earlier years during 1978-88 (Beck et al. MS 1982, MS 1983, MS 1986, MS 1989). This trend continued to 1996, with more than one size group evident in 1994 (Fig. 4). However in 1997 size frequencies were again unimodal and mean ML larger than in recent years. This may be related to relatively early spawning in years of high abundance.

Sexual maturation of males progressed throughout the season, as is usual (Fig. 4-6). Some males achieved advanced maturity by the end of the season. Male maturation appeared to be more advanced in 1994 (Fig. 4) than in the recent years (Fig. 4-6), particularly for a group of large squid sampled at LaScie in late September (Fig. 4).

Acknowledgements

The authors would like to thank M. Y. Rees who assisted in the preparation of the manuscript.

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Table 1. NAFO Subarea 3 Division 4R short-finned squid Catch (t) by month and processing category for 1994-1997.

Year	Div.	Proc. Cat.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1994	3K	Round				45	22	6	2		75
		Dried				11	21	24	2		58
		Total				**56**	**43**	**30**	**4**		**133**
	3L	Round		1	1	799	710	102	21		1634
		Dried			2	12	10	11			35
		Tubes				1	19	11	3		34
		Dressed Cut					1				1
		Total		**1**	**3**	**812**	**740**	**124**	**24**		**1704**
	3P	Round			1	34	48	5			88
		Dried				2	6	2	2		12
		Tubes					1				1
		Total			**1**	**36**	**55**	**7**	**2**		**101**
	4R	Round			1	2		1			4
		Dried					9				9
		Total			**1**	**2**	**9**	**1**			**13**
COMBINED		Round		1	3	880	780	114	23		1801
		Dried			2	25	46	37	4		114
		Tubes				1	20	11	3		35
		Dressed Cut					1				
		Total		**1**	**5**	**906**	**847**	**162**	**30**		**1951**
1995	3K	Round				1	4	1			6
		Dried			1	1	2				4
		Total			**1**	**2**	**6**	**1**			**10**
	3L	Round				1	9	4			14
		Dried					4				4
		Total				**1**	**13**	**4**			**18**
	3P	Round				11	9				20
		Dried				1					1
		Tubes				2	2				4
		Total				**14**	**11**				**25**
	4R	Dried				5	5	5	1		16
		Total				**5**	**5**	**5**	**1**		**16**
COMBINED		Round				13	22	5			40
		Dried			1	7	11	5	1		25
		Tubes				2	2				4
		Total			**1**	**22**	**35**	**10**	**1**		**69**

Table 1. NAFO Subarea 3 Division 4R short-finned squid Catch (t) by month and processing category for 1994-1997.

Year	Div.	Proc. Cat.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1996	3K	Round		1		1360	3392	126	2	2	4883
		Dried				5	301	354	36	1	697
		Tubes					64				64
		Total		**1**		**1365**	**3757**	**480**	**38**	**3**	**5644**
	3L	Round	1			187	818	1215	92	1	2314
		Dried					36	133	22	3	194
		Tubes						2			2
		Dressed Cut						1			1
		Total	**1**			**187**	**854**	**1351**	**114**	**4**	**2511**
	3P	Round					5	69	3		77
		Dried						1			1
		Total					**5**	**70**	**3**		**78**
COMBINED		Round	1	1		1547	4215	1410	97	3	7274
		Dried				5	337	488	58	4	892
		Tubes					64	2			66
		Dressed Cut						1			1
		Total	**1**	**1**		**1552**	**4616**	**1901**	**155**	**7**	**8233**
1997	3K	Round				136	2356	335	5		2832
		Dried				4	274	110	246	4	638
		Tubes					119	11			130
		Total				**140**	**2749**	**456**	**251**	**4**	**3600**
	3L	Round				243	3807	3411	790		8251
		Dried					118	239	71	8	436
		Tubes					94	223	10		327
		Total				**243**	**4019**	**3873**	**871**	**8**	**9014**
	3P	Round				2					2
		Total				**2**					**2**
COMBINED		Round				381	6163	3746	795		11085
		Dried				4	392	349	317	12	1074
		Tubes					213	234	10		457
		Total				**385**	**6768**	**4329**	**1122**	**12**	**12616**

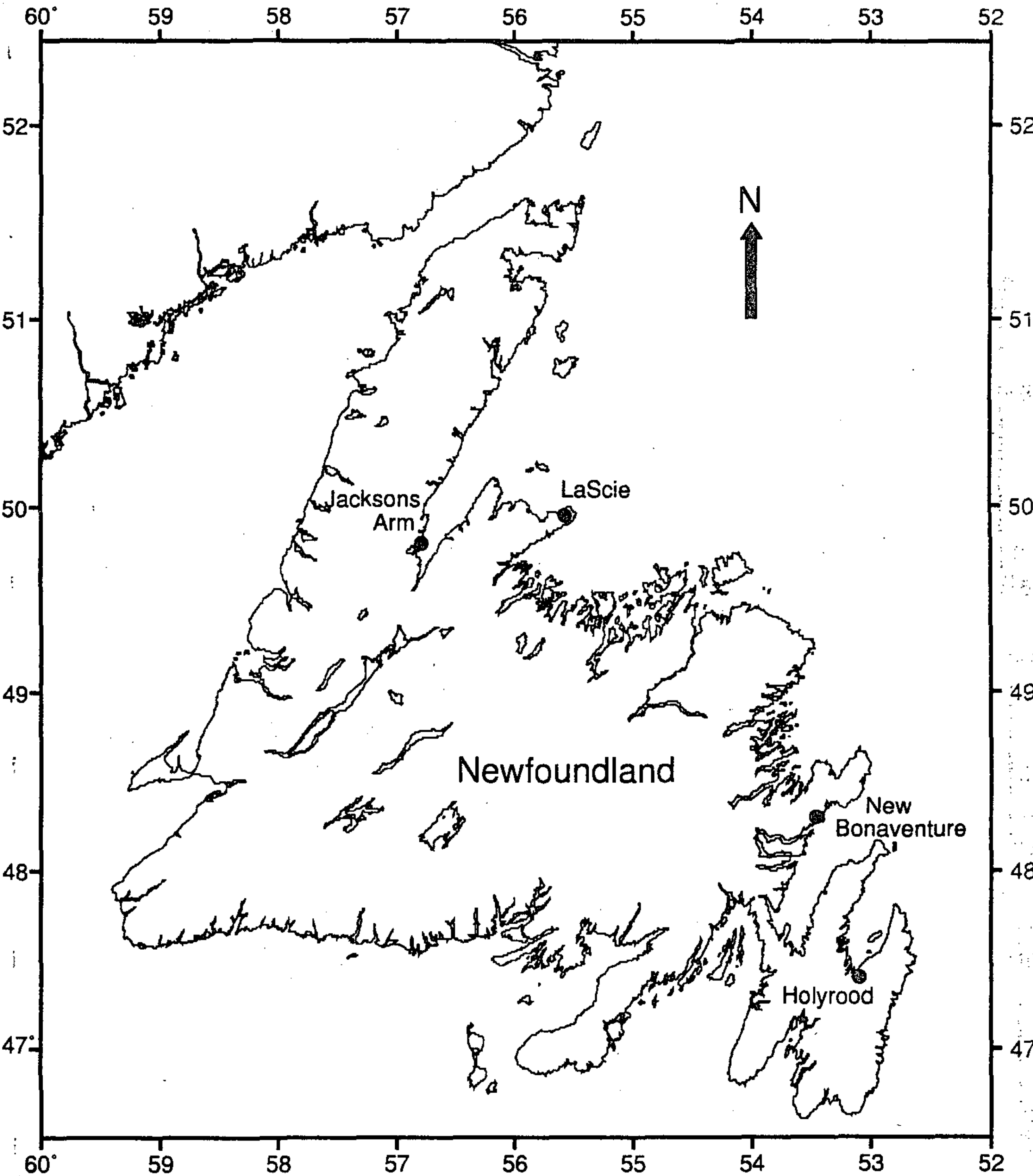


Fig. 1. Location of 1994-1997 squid sampling sites in relation to NAFO Divisions.

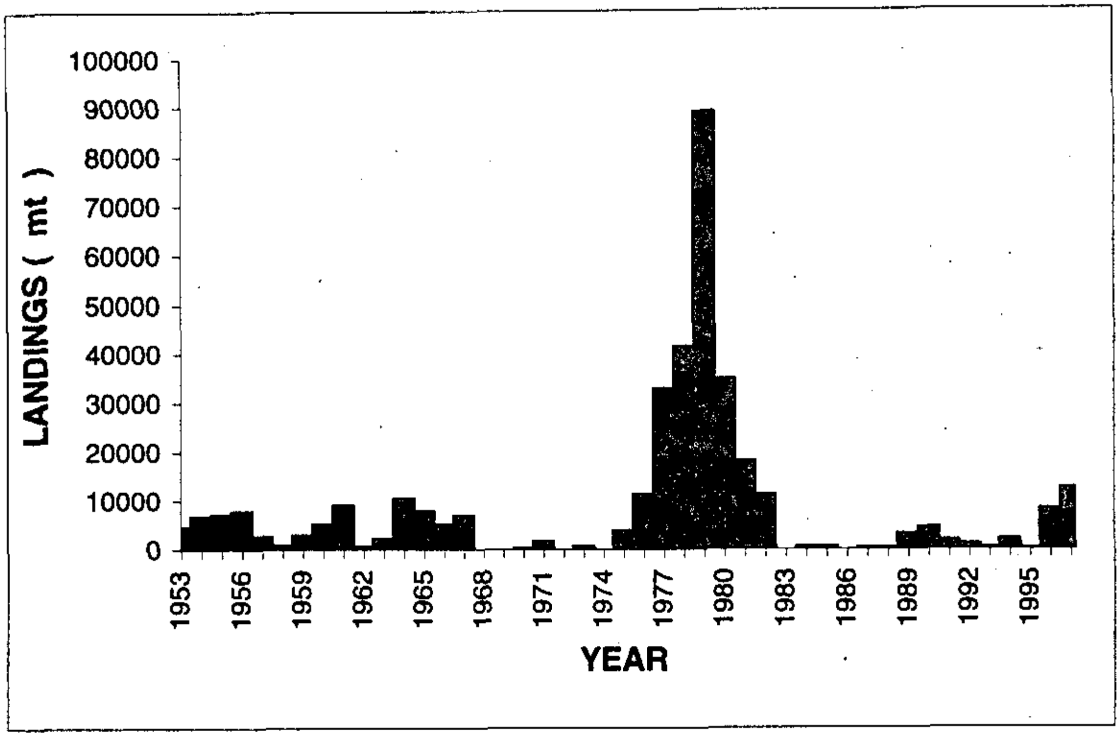


Fig. 2. Annual landings of short-finned squid for NAFO Subarea 3, 1953-97.

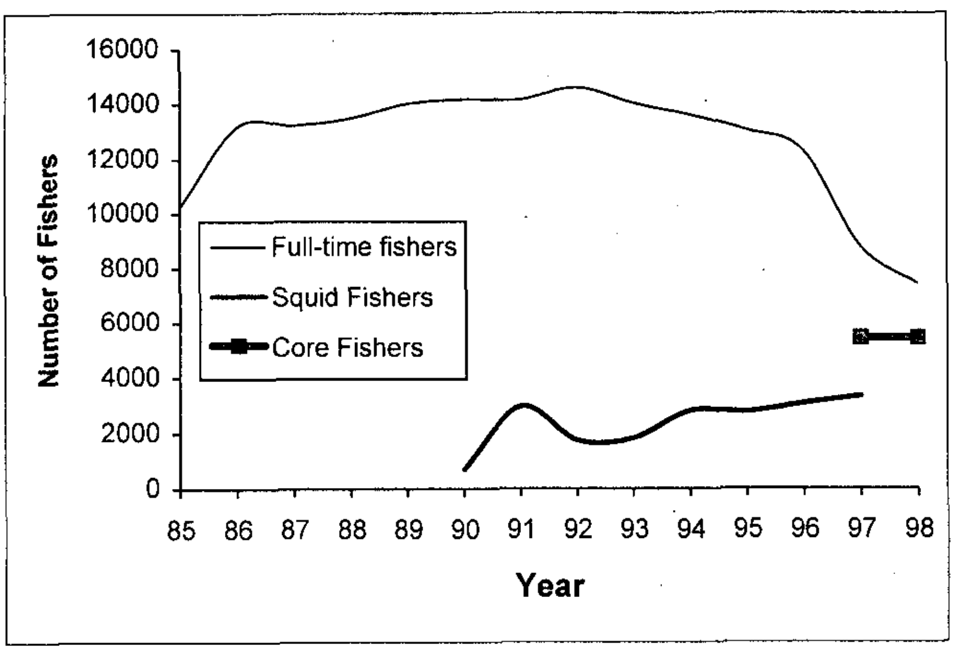


Fig. 3. Yearly change in number of full-time fishers (since 1985) and licenced squid fishers (since 1990).

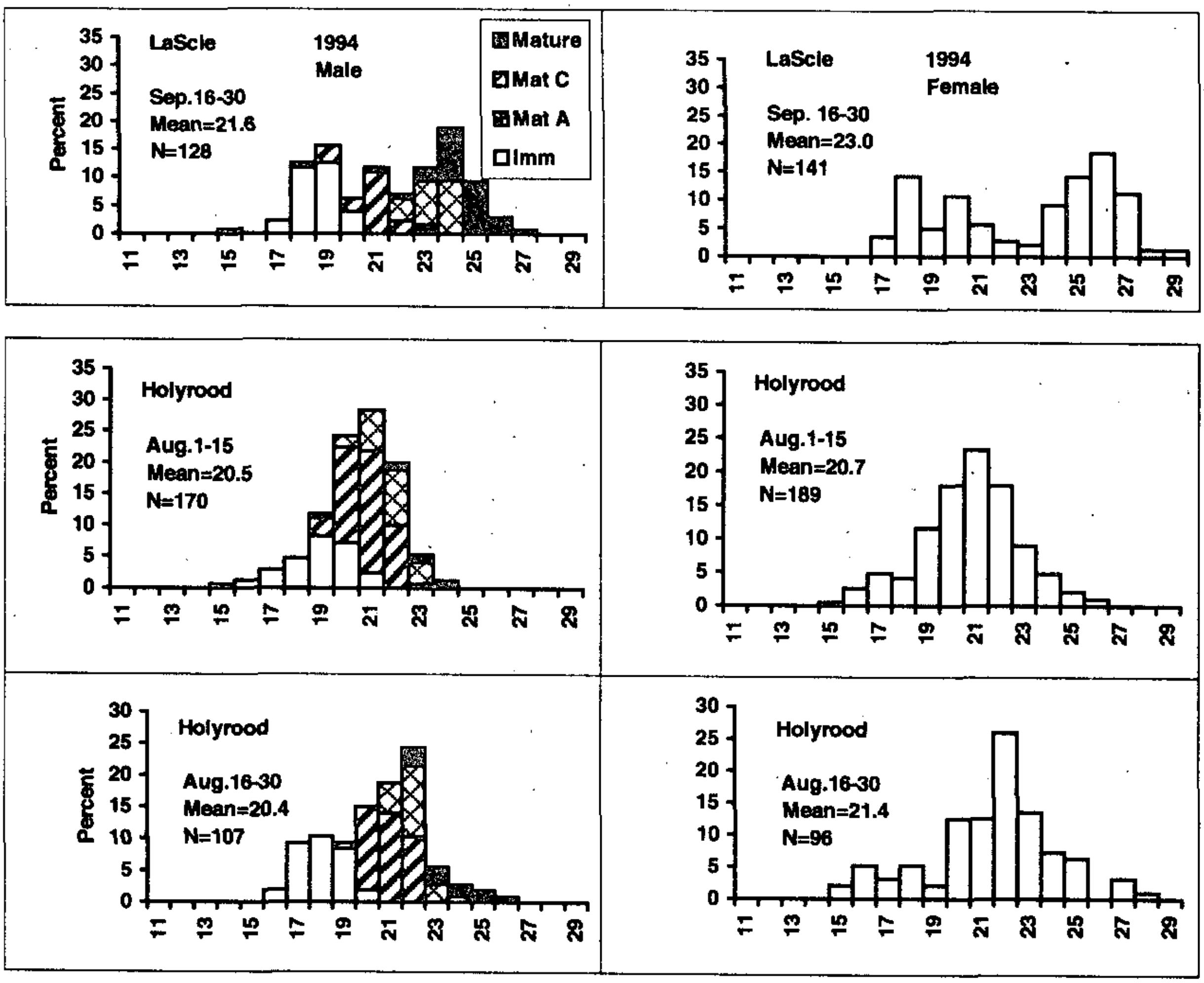
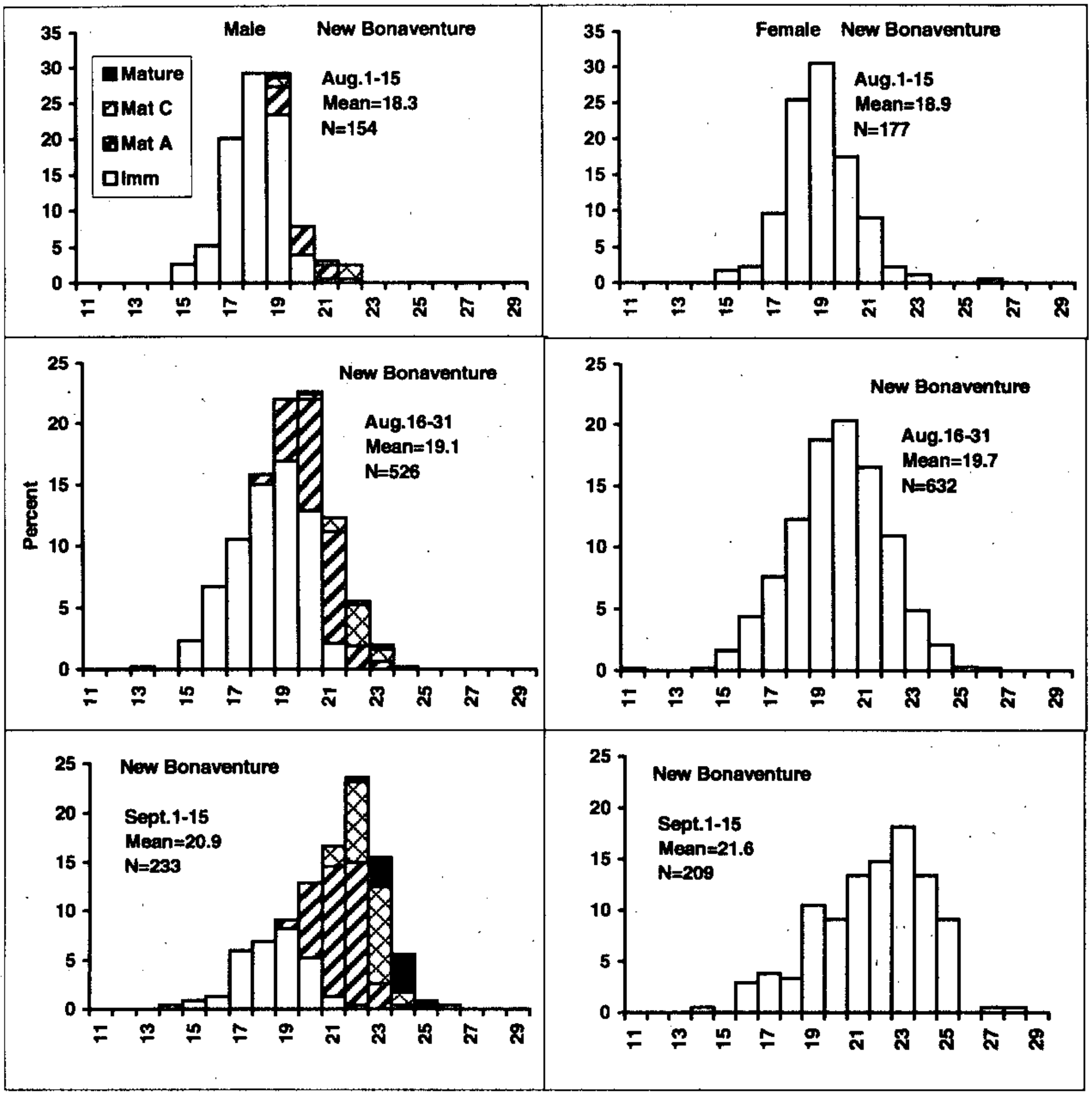


Fig. 4. Length-frequency distributions for males (left, with maturity overlain) and for females (right) by biweekly periods in 1994.



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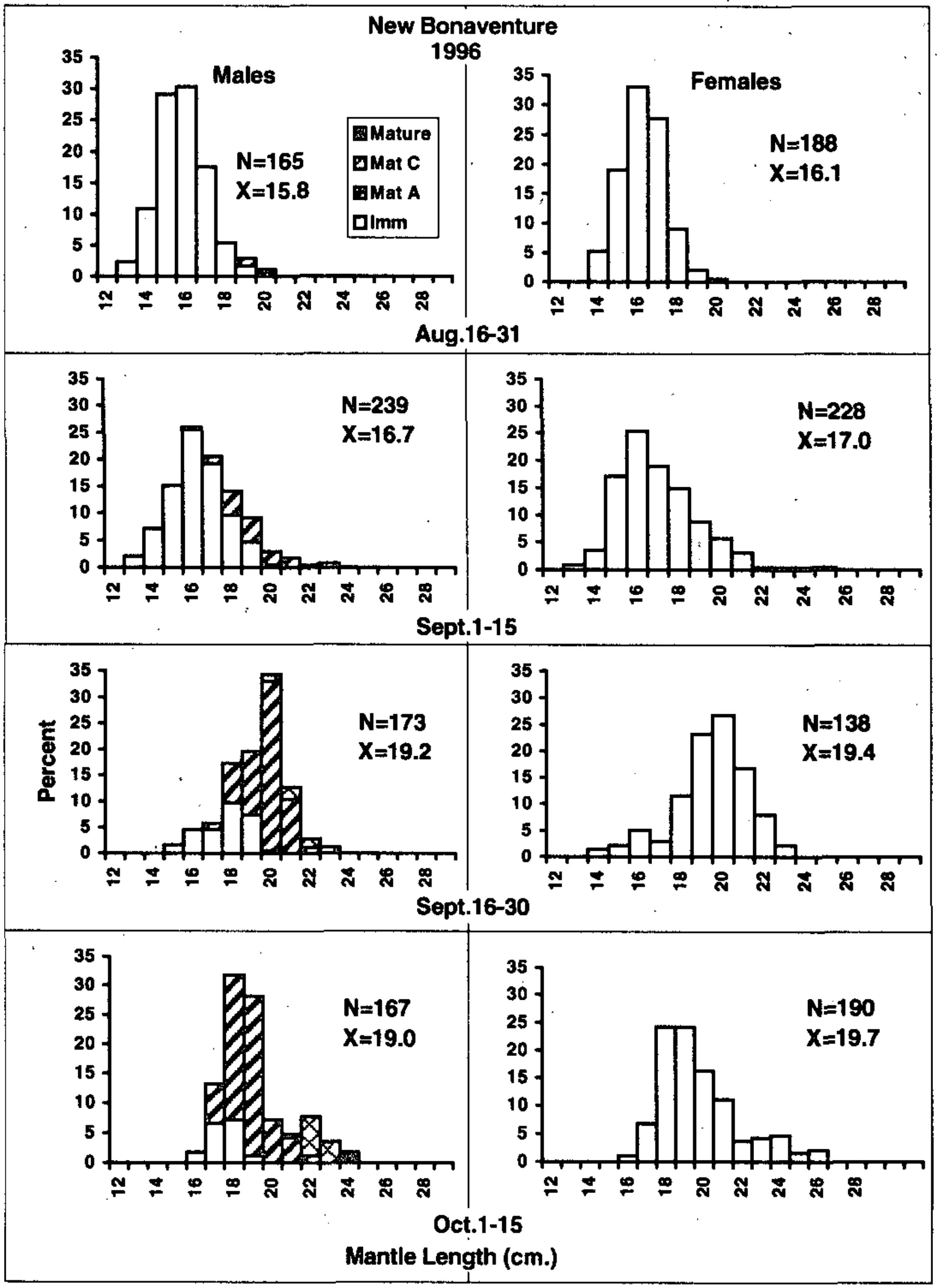
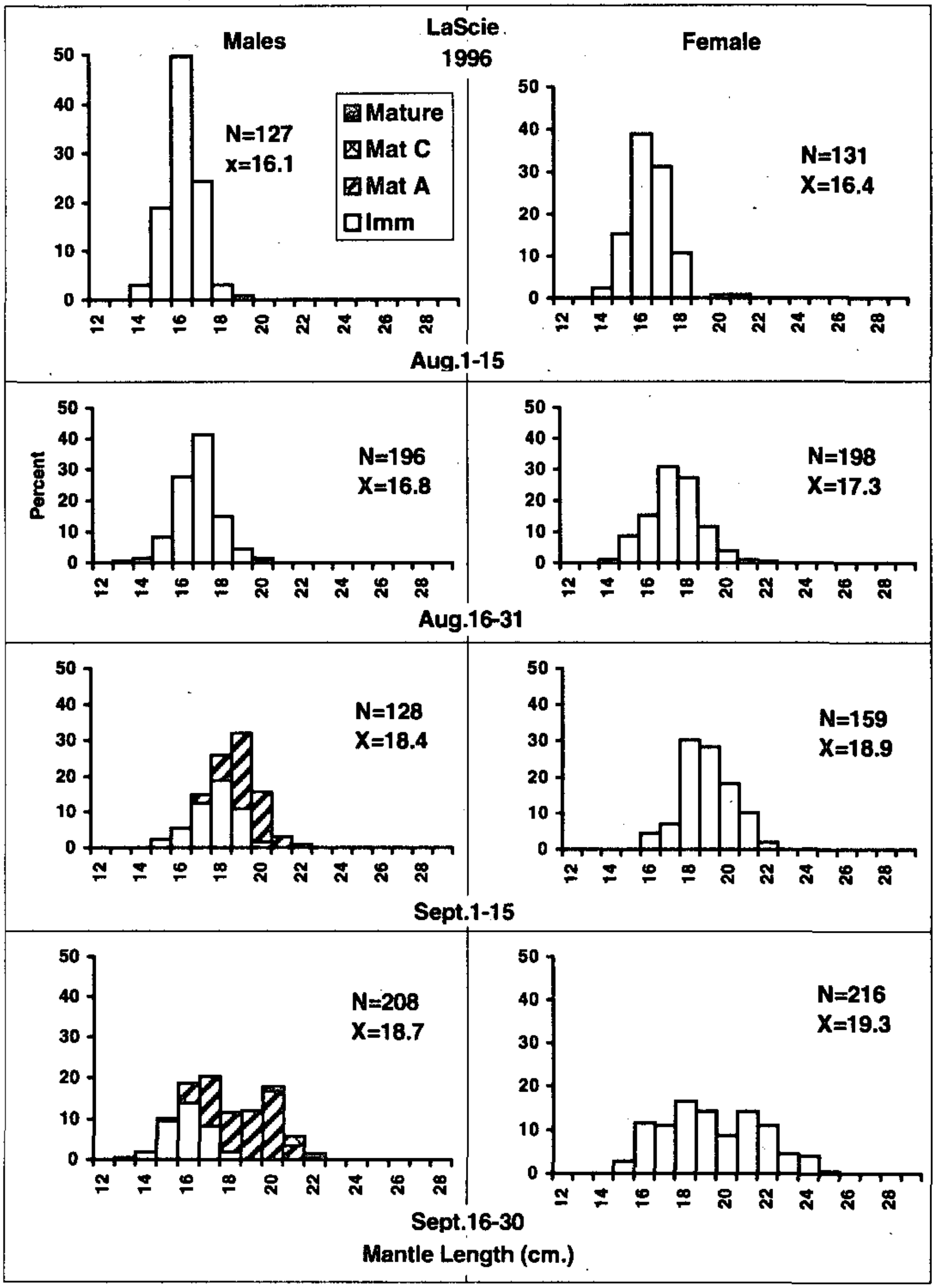


Fig. 5. Length-frequency distributions for males (left, with maturity overlain) and for females (right) by biweekly periods in 1996.



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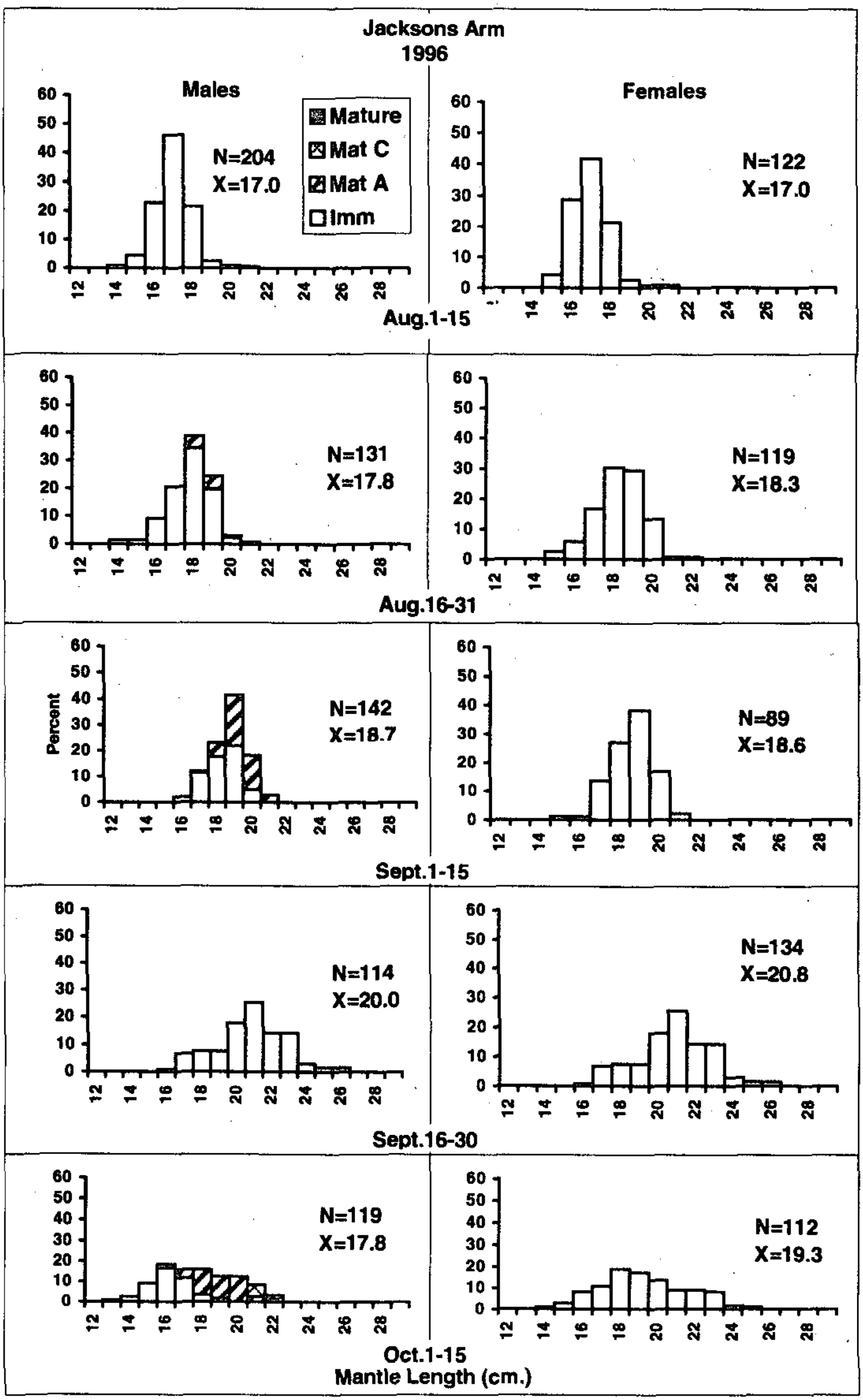

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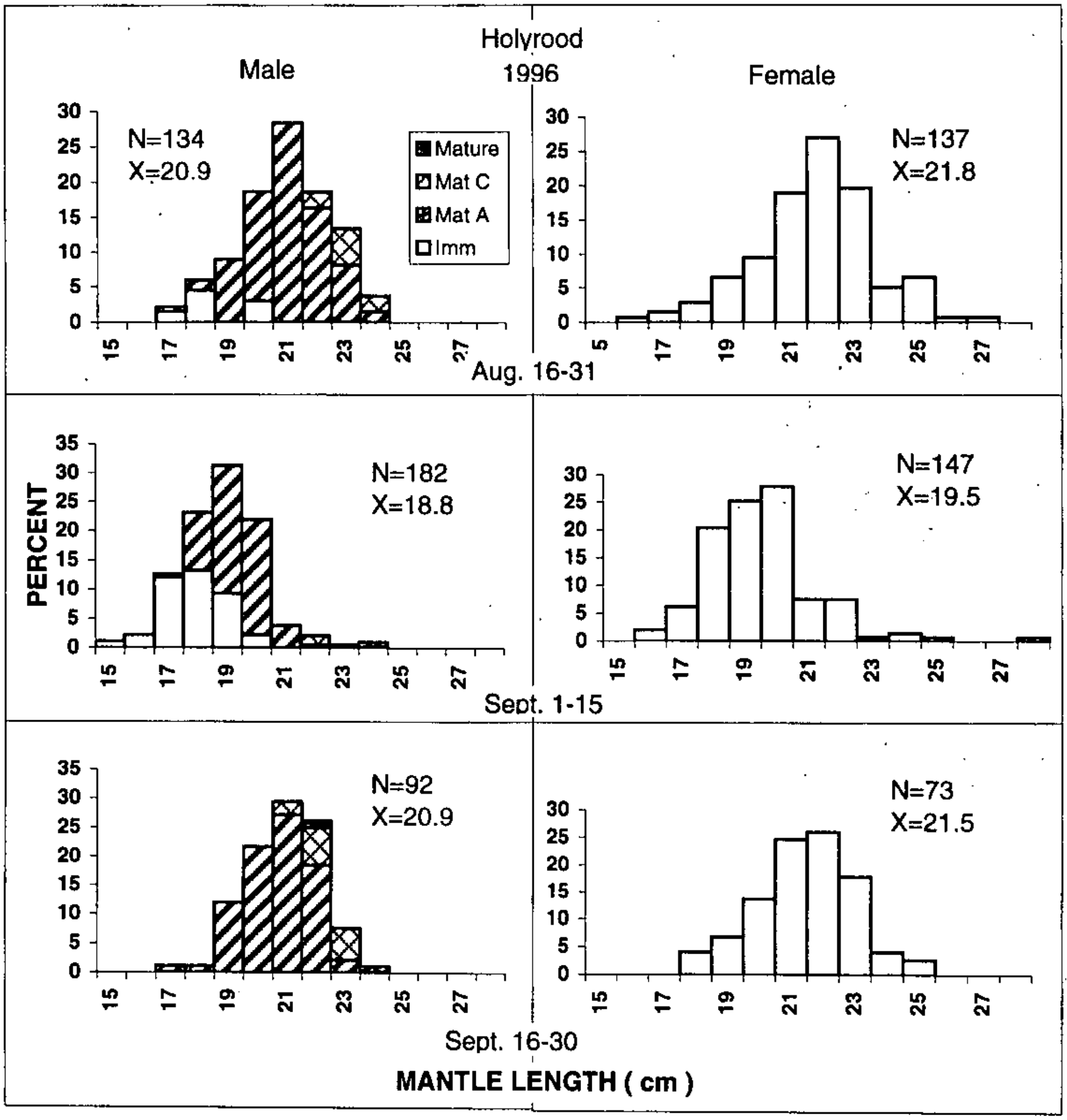

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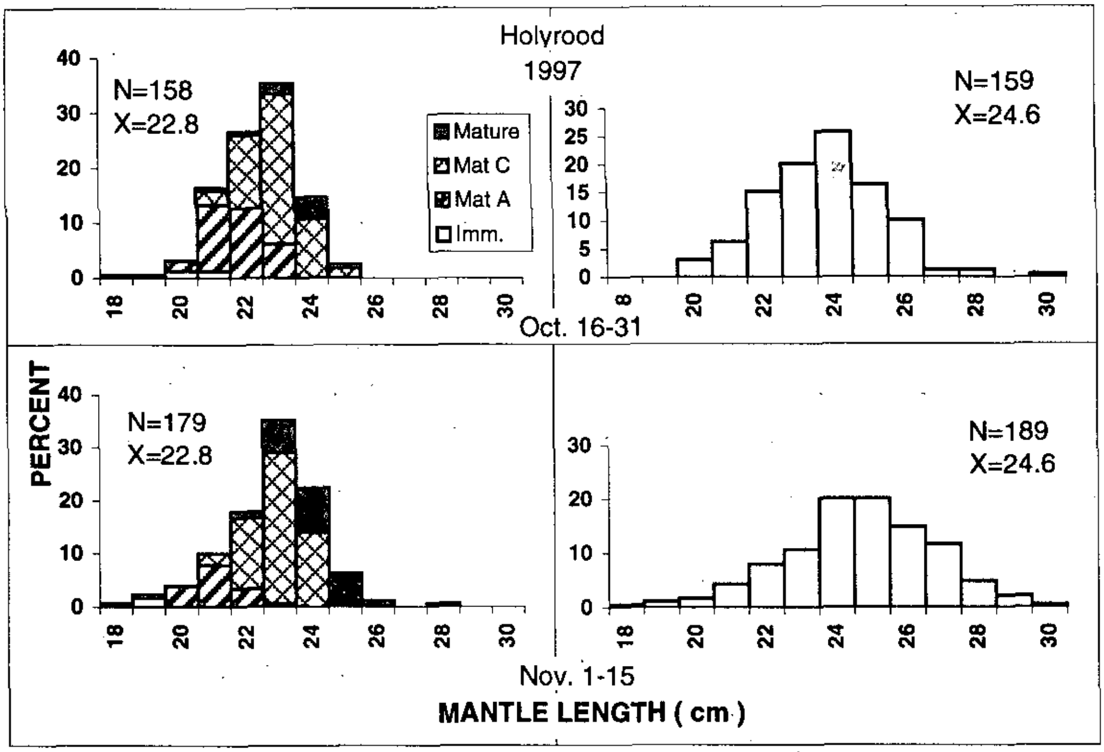

Fig. 6. Length-frequency distributions for males (left, with maturity overlain) and for females (right) by biweekly periods in 1997.

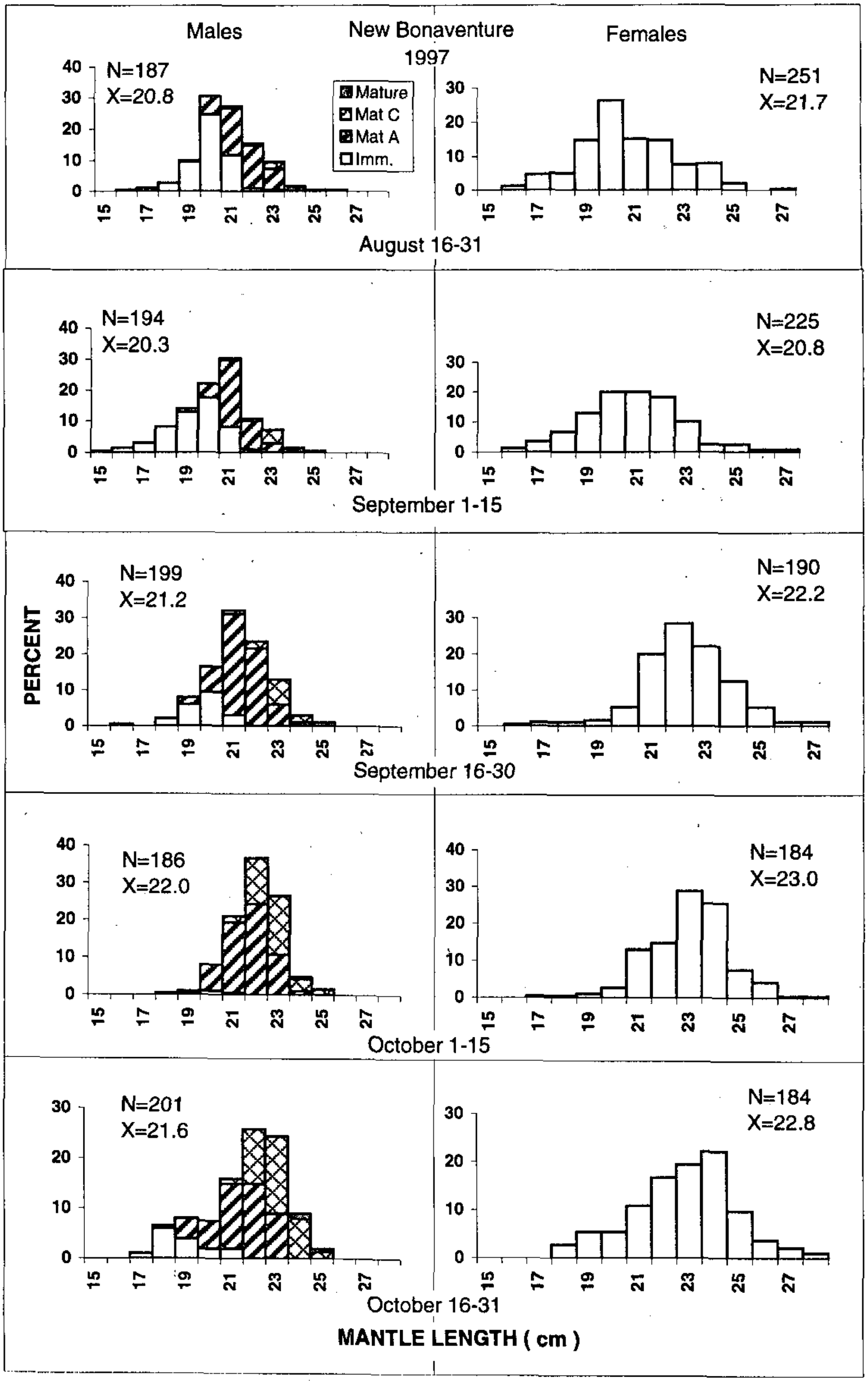

Fig. 6, Continued ...

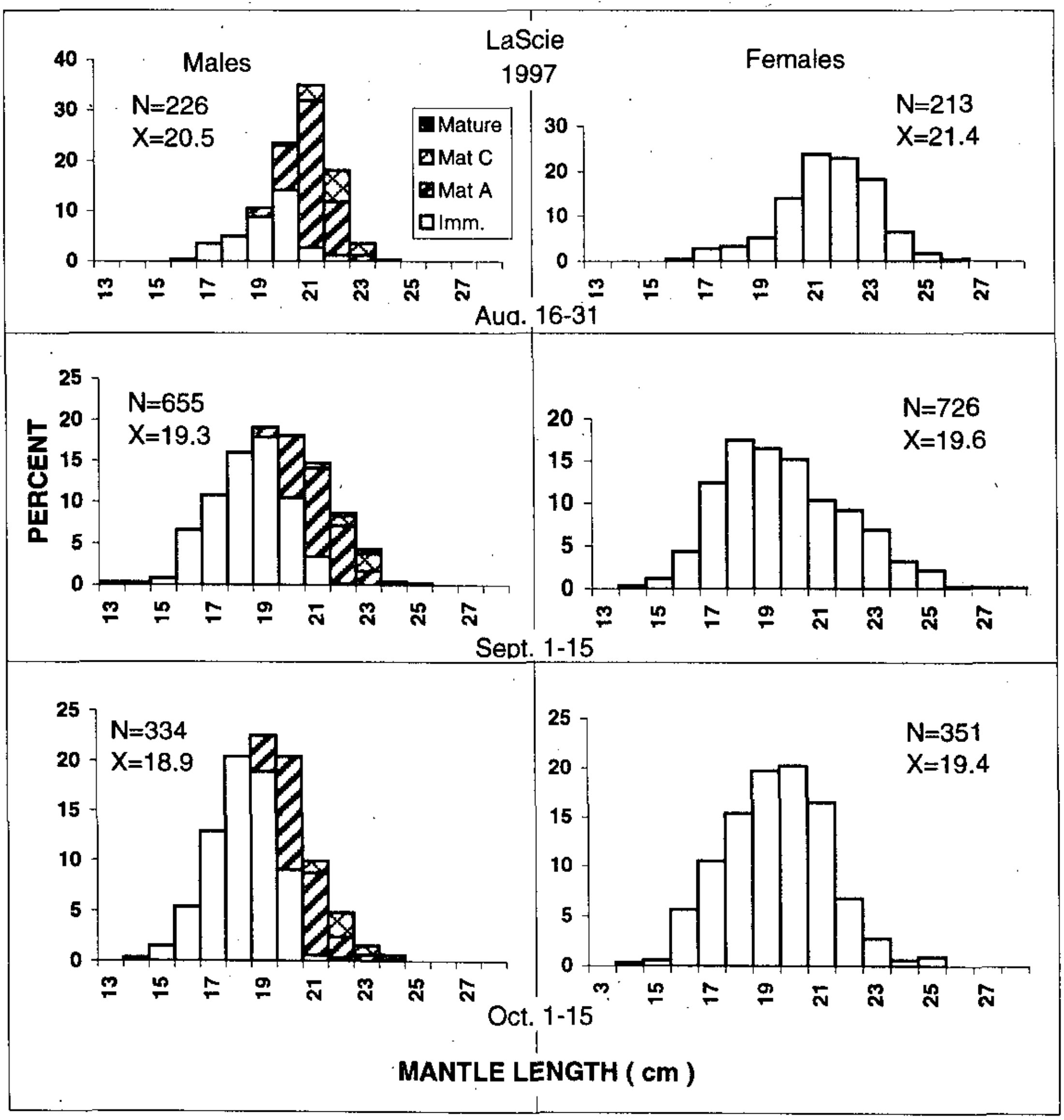

Fig. 6. Continued ...