

A developing interest for Greenland halibut in the
Gulf of St. Lawrence

by

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Landings

There has always been a small interest in Greenland halibut in the Gulf of St. Lawrence at least over the past 10 years or so with landings up to 1974 in the order of 600-1000 tons annually (Table 1). From 1975 to 1978 there has been a dramatic increase in landings from 1540 tons in 1975 to over 4000 tons in 1977 and again in 1978 (Table 1). Most of the landings from this fishery has been by Quebec in ICNAF Division 4S, however, over the past couple of years about 25% of the total catch has been taken by Newfoundland trawlers in ICNAF Division 4R. These landings were the direct result of high catch rates by Newfoundland trawlers as a by-catch in the winter fishery for greyscale in the Esquiman Channel area off St. George's Bay. The catches were profitable enough to cause the trawlers to divert their effort completely from greyscale to Greenland halibut. Judging by the Newfoundland trawler landings in the first quarter of 1979 which is 1800 tons as compared to 1400 tons for all of 1978, a high total landing from the Gulf of St. Lawrence for 1979 can be expected.

Commercial length and age composition of the Newfoundland trawler fishery in ICNAF Division 4R.

Commercial length frequencies were obtained for 1978 and 1979 from Division 4R otter trawl and are plotted in Figure 1. The bulk of the males ranged from 42-56 cm for both 1978 and 1979 with little change in the length composition between the two years. The bulk of the females in 1978 occurred in the 48-58 cm range, however, the 1979 indicated the highest proportion in the 54-64 cm. range. This would probably suggest the catches for both years comprising mainly the same year-classes.

The age composition for these 1978 and 1979 data are presented in Figure 2, however, the 1978 data should be treated with some scepticism particularly the males since the sample is very small. The males ranged from 6-12 years old in 1978 and from 6-11 years old in 1979 with the bulk of the 1978 catch comprised of 8 and 9 year old fish and the 1979 catch made up mainly of 7 and 8 year olds. The discrepancy may be explained partially by the small sample size in 1978 (Fig. 2).

The females for 1978 ranged from 6-15 year old fish with most occurring at 8 and 9 years old. The 1979 females had the same range, however, the main portion of the catch occurred at 9 and 10 years old suggesting that the success of this fishery may depend upon a few strong year-classes such as the 1969 and 1970 year classes shown here (Fig. 2).

Since the only commercial age data of any quantity for the Newfoundland otter trawl fishery in Division 4R is in the first quarter of 1979, the calculated average lengths at age and the percentages caught at age are presented in Table 2. A weighted average length was calculated for both

males and females with $\bar{L} = 49.68$ for males and $\bar{L} = 58.63$ for females. The males comprised 69.3% of this sector of the fishery and the females 30.7%.

A linear regression (Fig. 3) was performed upon these average lengths for males and females separately in order to give some indication of growth rate between the sexes. The regressions were both significant with $r^2 = 0.98$ for females and $r^2 = 0.94$ for males. The females appear to have a faster rate of growth than the males and the divergence begins at about age 6. This is probably the age at which most males reach maturity with maturity in females coming later.

Biomass Surveys

During January of 1978 and 1979, stratified random biomass surveys for groundfish were carried out in ICNAF Division 4R and 4S. In 1978 all strata except Stratum 824 were fished in Division 4R and all strata >100 fathoms were fished in Division 4S (Table 3). In 1979 all strata were fished in Division 4R, however, only 5 strata were fished in Division 4S. These were all greater than 100 fathoms. Strata 820-826 in Division 4R are all in a depth range of 51-100 fathoms and yielded no catch (Table 3). Since all strata in 4S were fished 100 fathoms and greater it can be assumed that these alone would give an estimate of mean trawlable biomass in Division 4S. In Division 4R, the fish in January appear to be concentrated in one area (ie. stratum 802) which is similar to the area in which the commercial trawlers are fishing Greenland halibut. The mean trawlable biomass in 1978 for Division 4R was 15.0 thousand tons and in 1979 was 12.5 thousand tons a decrease of only 17% (Table 3). The estimate for Division 4S in 1978 was 10.8 thousand tons, however, a total estimate

for Division 4S in 1979 could not be obtained. In comparing the 5 strata fished in both years in Division 4S, the biomass for these five strata decreased from 4.8 thousand tons to 1.1 thousand tons. These trends tend to agree somewhat with those of Berdou (1979) except that his estimates were much higher for Division 4S and lower for Division 4R. Since his estimates were in May-June and these were during the spawning season (January approximately) it would seem to indicate that these fish form a spawning migration to Division 4R in the region of Stratum 802. This behaviour would not be uncommon to Greenland halibut.

The total estimate for Divisions 4R and 4S combined for January 1978 is 26 thousand tons and 19 thousand tons for May-June from Berdou (1979). These figures are not all that different considering that a substantial portion due to commercial fishing may have been removed during the time between estimates. Although estimates from both surveys indicate a large reduction in biomass in Division 4S, it is too difficult to compare with any degree of confidence since Division 4S was not adequately surveyed in 1979.

The average numbers of fish caught per set weighted by stratum area is presented in Figure 4. The age composition for both males and females is different from Division 4R and 4S. Division 4S is comprised mainly of younger individuals (up to age 6) while Division 4R are mostly ages 6+, for both sexes (Fig. 4). This would tend to substantiate the possibility of a spawning concentration in the Division 4R region since the older and probably mature fish are more abundant there during the spawning season.

Summary

In general, it would appear that these Greenland halibut form a spawning

concentration in the Esquiman Channel area in early winter much the same as greysole and cod do. It is during this time that the trawlers procecute this fishery. Later in the year, the fish move to the 4S region on the shallower muddy areas when they are taken by gillnetters and as by-catches of the shrimp fishery. With so little information, it is difficult to determine the extent of the exploitation of this stock, however, considering the biomass estimates presented here, the probable spawning stock fished in Division 4R seems to have been fairly stable over the last couple of years. One point does come to mind in dealing with this developing fishery and that is that the increasing interest and increasing catches seem to be following the same pattern as the Greenland halibut off the east coast and Labrador area.

Since recruitment is quite promising and has been so over the last few years for the East Coast-Labrador area and there has not been any large numbers of prerecruits caught in the Gulf area, it is conceivable that recruitment may come from outside the Gulf especially with such an increasing production from inside the Gulf. It is well established that juveniles are easily caught in research gear and yet practically none are caught in research cruises in the Gulf. Although these points are only speculation and there is little evidence to support them, they are certainly food for thought when making a management decision on how to control exploitation of this Greenland halibut stock within the Gulf of St. Lawrence.

Table 1. Nominal catches of Greenland halibut by country
and division 4RST 1970-78

<u>COUNTRY</u> <u>& DIVISION</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Canada (N)									
4R	314	251	117	153	92	167	450	976	1331
4S	31	13	4	8	17	11	41	14	50
<u>4T</u>	<u>2</u>	<u>7</u>	<u>4</u>	<u>3</u>	<u>5</u>	<u>4</u>	<u>26</u>	<u>-</u>	<u>14</u>
<u>TOTAL:</u>	<u>347</u>	<u>271</u>	<u>125</u>	<u>164</u>	<u>114</u>	<u>182</u>	<u>517</u>	<u>990</u>	<u>1395*</u>
Canada (M + Q)									
4R	67	49	69	63	75	22	52	129	30
4S	465	437	375	423	735	1090	1320	2956	2262
<u>4T</u>	<u>233</u>	<u>197</u>	<u>101</u>	<u>7</u>	<u>87</u>	<u>240</u>	<u>105</u>	<u>415</u>	<u>555</u>
<u>TOTAL:</u>	<u>765</u>	<u>683</u>	<u>545</u>	<u>493</u>	<u>897</u>	<u>1352</u>	<u>1477</u>	<u>3500</u>	<u>2847*</u>
OTHERS:									
4R			13			5	15		
4S						1	6		
<u>4T</u>							<u>4</u>		
<u>TOTAL:</u>			<u>13</u>			<u>6</u>	<u>25</u>		
TOTAL- All areas & countries	1112	954	683	657	1101	1540	2019	4490	4242*

* Preliminary

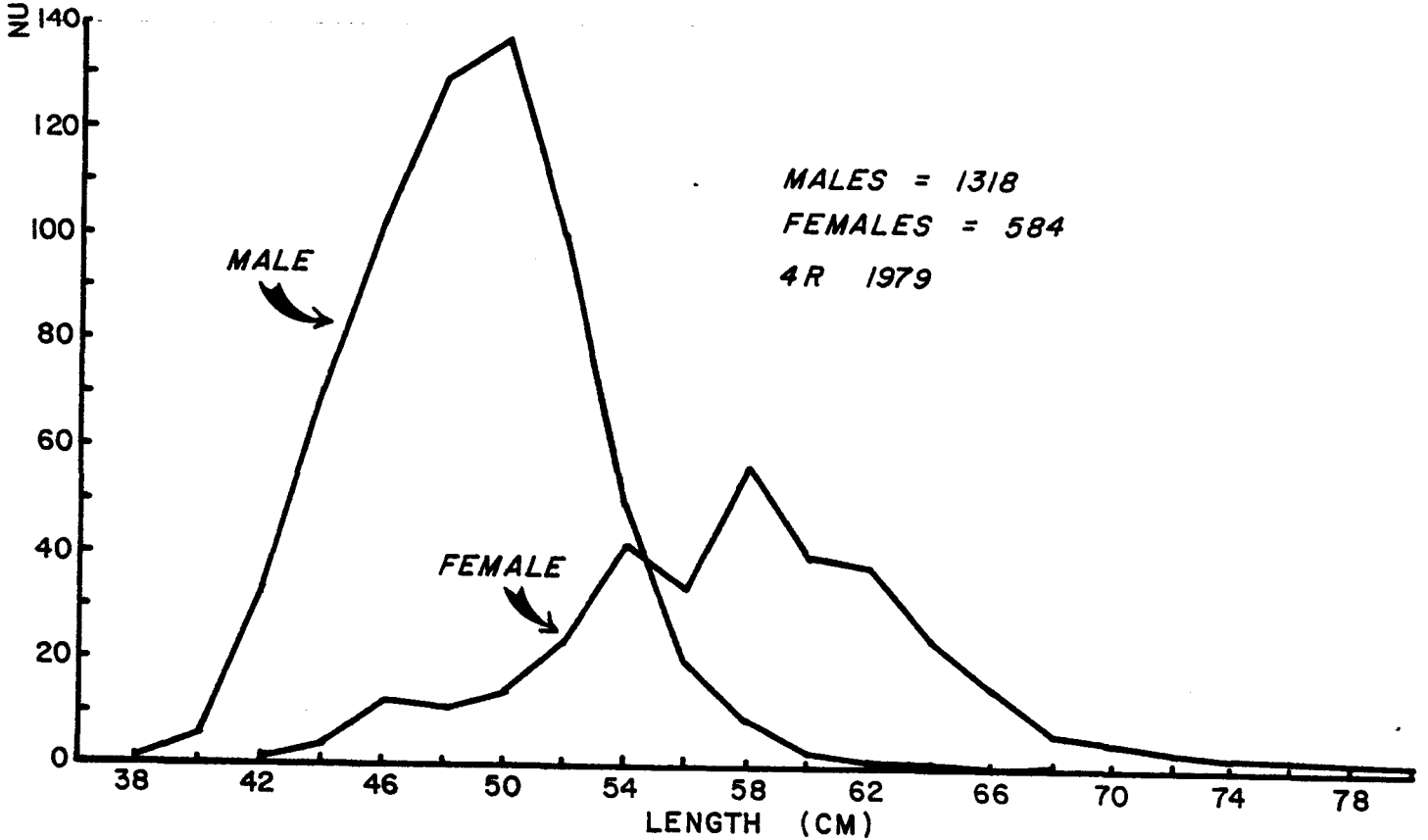
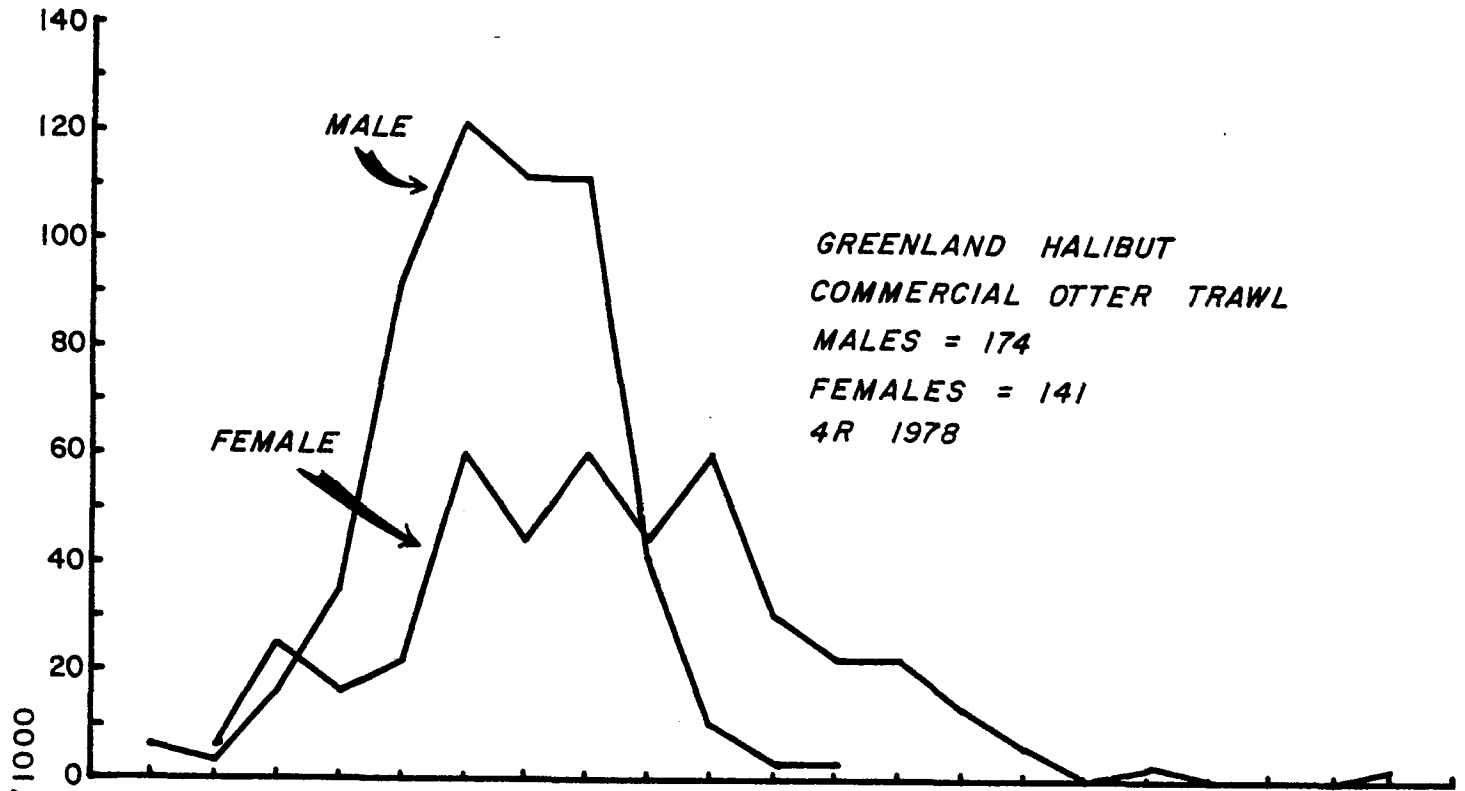


Fig. 1. Length composition of Commercial otter trawl Greenland halibut in ICNAF Division 4R for the first quarter of 1978 and 1979

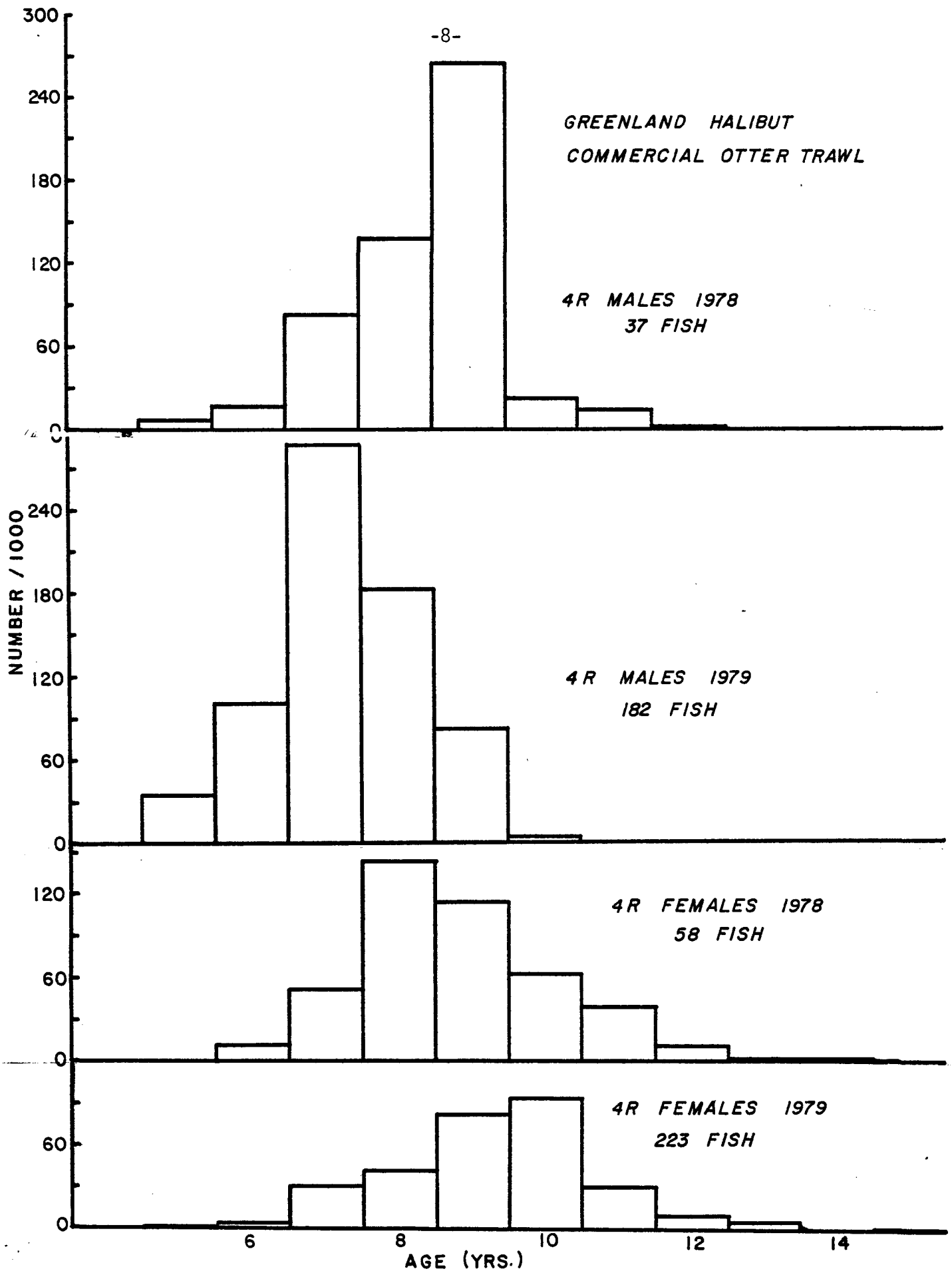


Fig. 2. Age composition of commercial otter trawl Greenland halibut in ICNAF Division 4R for first quarter of 1978 and 1979.

Table 2.

GREENLAND HALIBUT CATCH DATA (OT)
ICNAF DIVISION 4R
1ST QUARTER 1979

<u>Age</u>	<u>MALES</u>		<u>FEMALES</u>	
	<u>Average Length</u>	<u>% Caught at-age</u>	<u>Average Length</u>	<u>% Caught at-age</u>
5	43.00	3.51	44.50	0.16
6	45.50	10.11	45.00	0.49
7	49.90	28.71	49.70	3.10
8	51.40	18.28	53.30	4.21
9	54.10	8.20	57.60	8.31
10	62.20	0.46	60.40	9.51
11			65.60	3.11
12			69.90	1.06
13			79.00	0.58
14			80.50	0.05
15			84.50	0.16

$\bar{L} = 49.68$ $\bar{L} = 58.63$
% Males = 69.3 % Females = 30.7

Table 3. Average number and weight per standard set of Greenland halibut from groundfish biomass surveys in Divisions 4R and 4S, 1978-79

<u>STRATUM 4R</u>	<u>Gadus 4/ 1978</u>		<u>Gadus 16/ 1979</u>	
	<u>AV. NO./SET</u>	<u>AV. WT./SET</u>	<u>AV. NO. /SET</u>	<u>AV. WT./SET</u>
801	17.67	24.97	14.67	14.98
802	257.00	420.18	246.00	368.19
809	2.93	5.15	5.67	9.38
810	29.67	48.88	3.00	5.45
811	0.00	0.00	0.60	0.64
812	5.00	6.22	2.00	3.50
813	1.00	0.91	2.75	2.38
814	1.33	1.44	1.67	2.65
820	0.00	0.00	0.00	0.00
821	0.00	0.00	0.00	0.00
822	0.00	0.00	0.00	0.00
823	0.00	0.00	0.00	0.00
824			0.00	0.00
825	0.00	0.00	0.00	0.00
826				
<u>STRATUM 4S</u>				
803	17.50	21.11		
804	19.33	18.92		
805	12.58	12.72		
806	4.67	5.45		
807	5.33	7.11	2.00	2.95
808	2.33	3.86	2.33	1.79
815	6.67	4.69	1.50	1.02
816	46.40	33.69	10.33	6.51
819	0.50	0.57	0.00	0.00
<u>MEAN TRAWLABLE BIOMASS IN</u>		<u>1978</u>	<u>1979</u>	
Division 4R		14,984	12,477	
Division 4S		10,849	-	
Division 4S (Strata 807,808,815,816)		4,755	1,063	

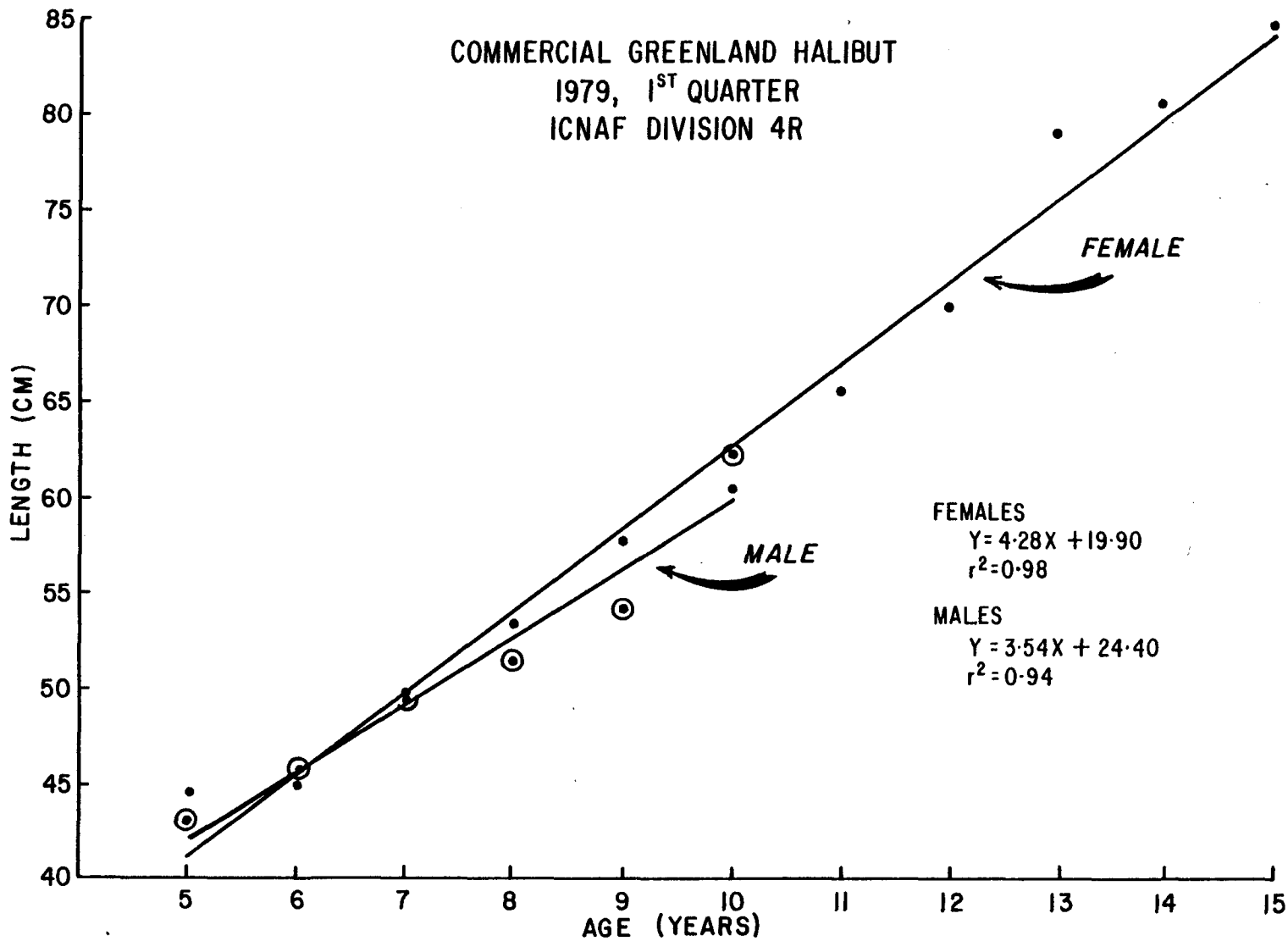


Fig. 3. A regression of length on age for male and female Greenland Halibut in ICNAF Division 4R.

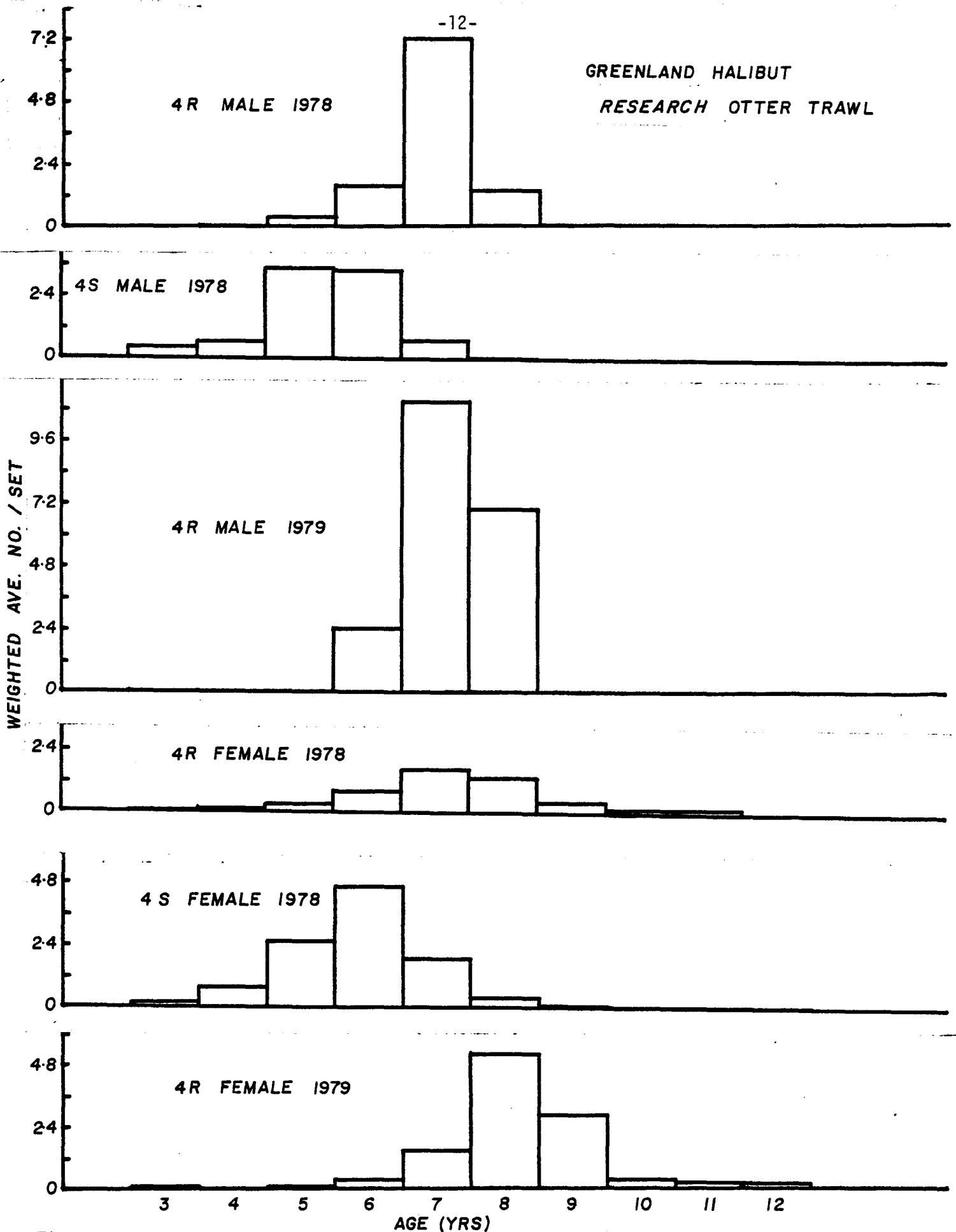


Fig. 4. Age composition of male and female Greenland halibut from research surveys in ICNAF Divisions 4R + 4S during January of 1978 and 1979.