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Some Biological Considerations of Witch Flounder on the Southern Grand Bank (NAFO Divisions 3NO)

by

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Landings

Landings of witch flounder on the southern Grand Bank in the last 10 years ranged from 9200 t in 1972 to 3,100 t in 1979. Catches steadily declined from 1974 to 1981, however, the 1982 preliminary catch report indicates a catch of 3700 t, the highest since 1977 (Fig. 1). Landings prior to 1972 should be treated with some scepticism since they were broken down into species from catches of unspecified flounders.

The main prosecutors of this fishery are the USSR and Canada mostly in the spring and early summer. From 1974 to 1977 the catches by each country were predominantly in Div. 3O however, since that time catches were predominantly in Div. 3N (Table 1) with the 1981 catch almost entirely in Div. 3N. In 1982 on the other hand, almost 80% of the Canadian catch was in Div. 3O.

Catch effort

Catch per unit effort data reported by Canada are shown in Table 2 for 1972-82. These data are based on witch flounder being reported as main species in the catch and not necessarily being more than half the catch. The catch rate was highest in 1972 at 0.716 t/hr based upon 30% of the total catch as main species and subsequently declined to 0.252 t/hr in 1975. Since that time the catch rates have fluctuated generally around the 0.30 t/hr until 1982 when the catch rate was 0.667 t/hr, the highest since 1972. The 1979-81 catch rates should be treated with caution since they are based on such low levels of main species.

Catch at age

Some catch compositions were available from the Canada(N) portion of the fishery since 1975 and are presented in Fig. 2. Until the most recent years most age groups were fairly abundant up to age 20. In 1982 (Div. 3O) there were none beyond age 16 while in 1980 (Div. 3N) there were none beyond age 13. The most noticable points from these data are the distinct shift to the younger age groups in recent years as well as considerable differences between the catch composition between divisions for certain times. This difference may be a result of sampling two separate stocks as indicated by Fairbairn (1981) and Bowering and Misra (1982).

Growth changes

For the samples available the changes in growth patterns were examined according to the regression analysis, length = a+b in age. The growth curves are shown in Fig. 3 and 4 for Div. 3N and 3O respectively. There appears to have been a substantial increase in size at age for the commercially exploitable age groups in recent years and this is evidenced in both divisions regardless of possible overlap in data. A summary of the regression analyses is shown in Table 3. This increase in mean size at age would also explain the shift in the commercial age composition to younger fish since they are larger.

Although no analytical assessment of the stock is possible with the available data, the data presented here would indicate that the stock is probably not declining and there appears to be little evidence for advising a change in the TAC.

References

Bowering, W.R. and R.K. Misra. 1982. Comparisons of witch flounder stocks of the Newfoundland-Labrador area, based upon a new multivariate analysis method for meristic characters. Can. J. Fish. Aquat. Sci: 39: 564-570.

Fairbairn, D.J. 1981. Which witch is which? A study of the stock structure of witch flounder in the Newfoundland Region. Can. J. Fish. Aquat. Sci. 38: 782-794.

Table 1. Landings of witch flounder in Divisions 3N and 30 by Canada and USSR from 1974-1981.

Year	Country	3N	30
1974	Canada	454	2353
	USSR	1765	3470
	Total	2219	5823
1975	Canada	407	730
	USSR	2135	2884
	Total	2542	3614
1976	Canada	1325	1719
	USSR	1103	1888
	Total	2428	3607
1977	Canada	337	2676
	USSR	1768	974
	Total	2105	3650
1978	Canada	378	787
	USSR	2108	167
	Total	2486	954
1979	Canada	559	634
	USSR	1477	391
	Total	2036	1025
1980	Canada	219	206
	USSR	1069	925
	Total	1288	1131
1981	Canada	313	68
	USSR	2034	10
	Total	2347	78

Table 2. Catch effort statistics for witch flounder in Divisions 3NO, 1972-1982 from Canada (N) based trawlers (TC5).

Year	CPUE (t/hr)	Main species catch (t)	Total catch	% Main species
1972	0.716	2751	9177	30
1973	0.502	4080	6691	61
1974	0.337	1015	8045	13
1975	0.252	595	6156	10
1976	0.271	1291	6035	21
1977	0.365	2436	5806	42
1978	0.249	452	3454	13
1979	0.186	25	3051	1
1980	0.267	25	2419	1
1981	0.352	177	2425	7
1982	0.667	601	3725	16

Table 3. Results of regression analyses of length on age (Len=a+b ln Age).

Div.	Year	Month	Sex	Intercept	Reg. Coeff.	R^2	F	Prob. >F
30	1975	April	F	-19.12	24.42	0.89	3835	0.0001
	1976	Feb-Mar	F	11.65	13.34	0.88	6559	0.0001
	1977	Feb	F	-14.87	24.07	0.98	79244	0.0001
	1978	Mar	F	3.25	16.98	0.88	3107	0.0001
	1982	May	F	-29.28	30.76	0.98	31587	0.0001
	1975	April	M	-8.70	19.24	0.92	5032	0.0001
	1976	Feb-Mar	M	13.57	11.79	0.92	9351	0.0001
	1977	Feb	M	-3.69	19.09	0.96	33977	0.0001
	1978	Mar	M	4.93	15.55	0.78	1098	0.0001
	1982	May	M	-16.35	25.00	0.97	28556	0.0001
3N	1976	Mar	F	-3.95	19.16	0.90	4153	0.0001
	1977	May	F	-39.83	32.49	0.99	51448	0.0001
	1978	Mar	F	-23.32	27.18	0.97	20629	0.0001
	1978	Nov	F	-23.86	28.89	0.95	11168	0.0001
	1980	Nov	F	-49.30	41.54	0.98	24002	0.0001
	1976	Mar	M	17.91	10.22	0.67	682	0.0001
	1977	May	M	-25.84	26.55	0.97	10565	0.0001
	1978	Mar	M	-9.58	21.12	0.96	11932	0.0001
	1978	Nov	M	-11.86	23.33	0.98	15028	0.0001
	1980	Nov	M	-32.83	34.00	0.96	6339	0.0001

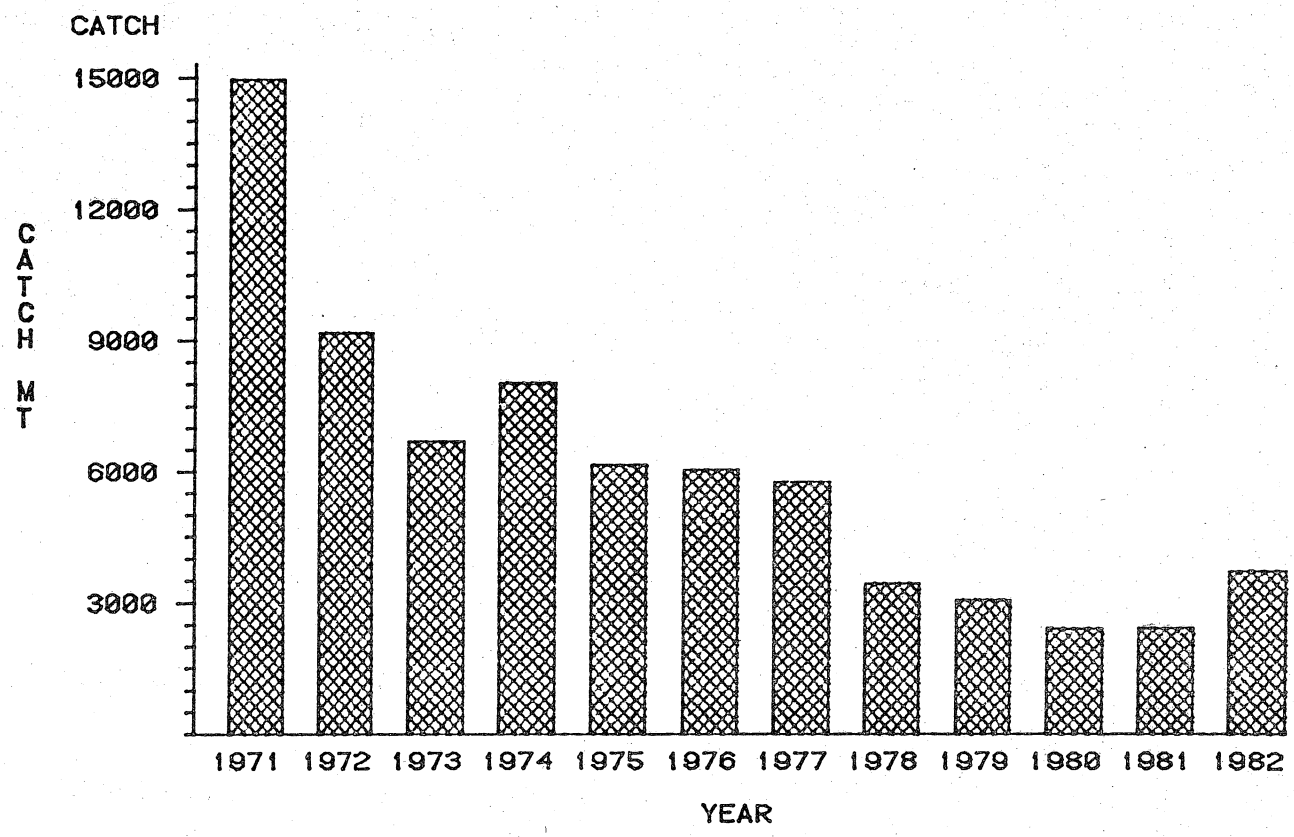

FIG.1: NOMINAL CATCHES OF WITCH FLOUNDER IN NAFO DIV.3NO (1982 IS PROVISIONAL)

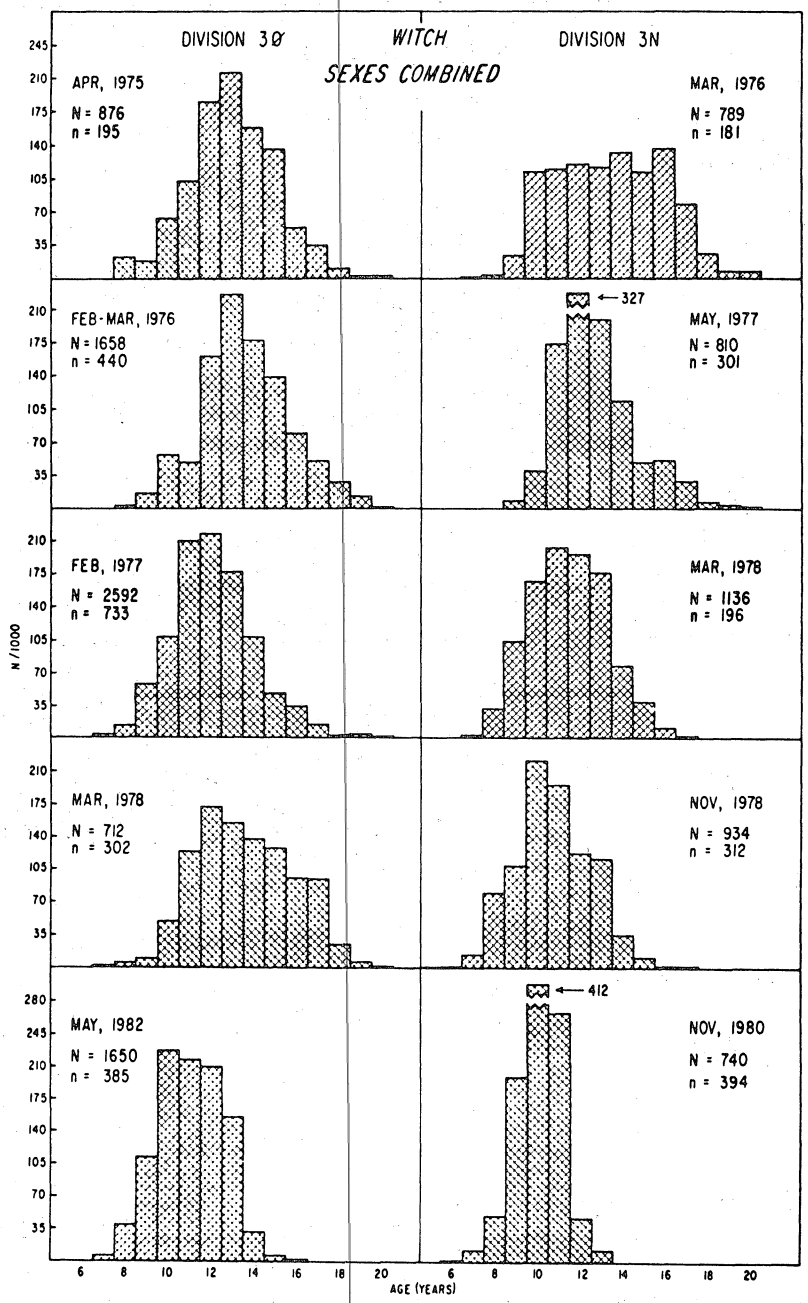

Fig. 2. Age composition of commercial witch in NAFO Division 3NO, 1975-82.

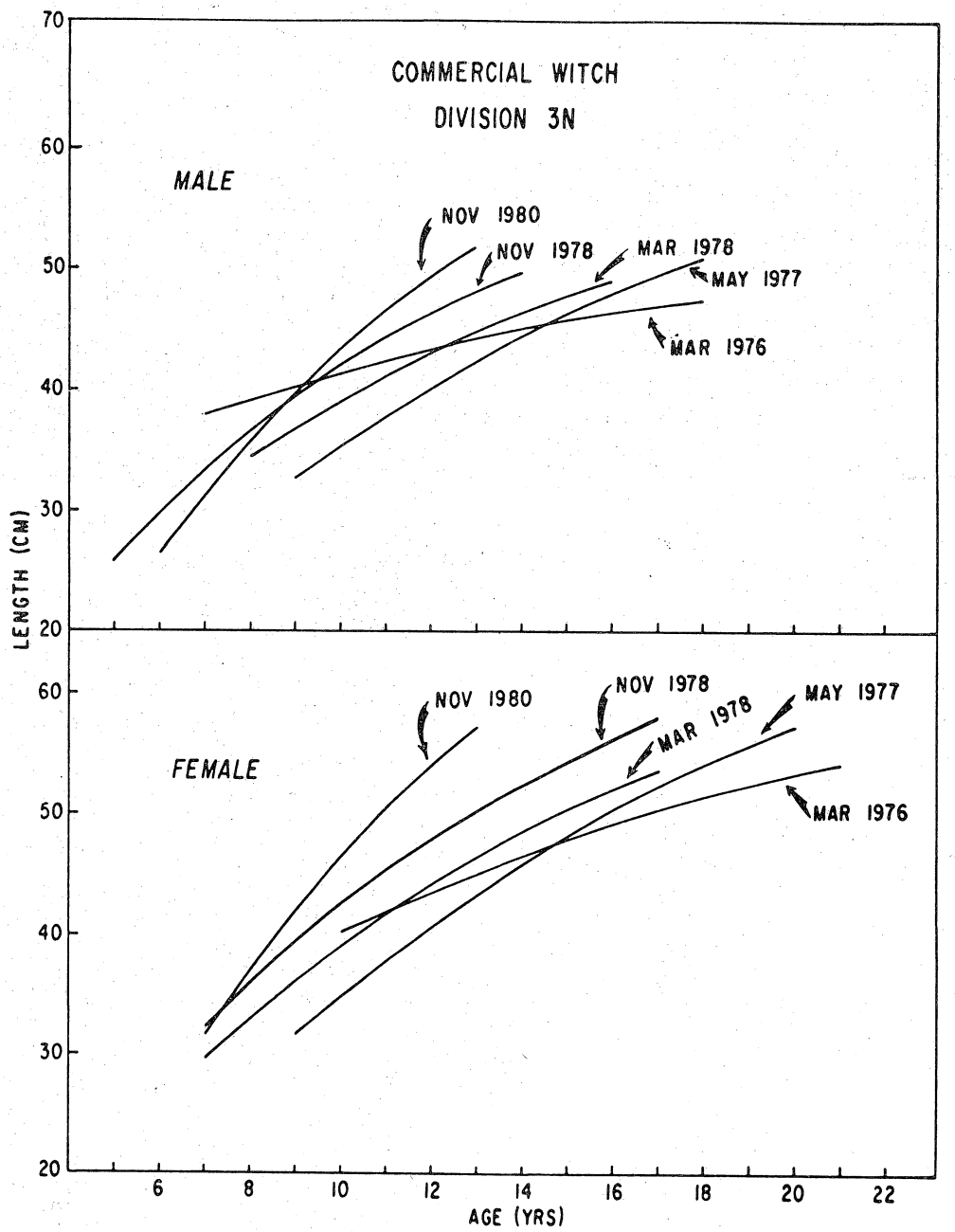

Fig. 3. Growth curves for male and female commercial witch in NAFO Division 3N, 1976-80.

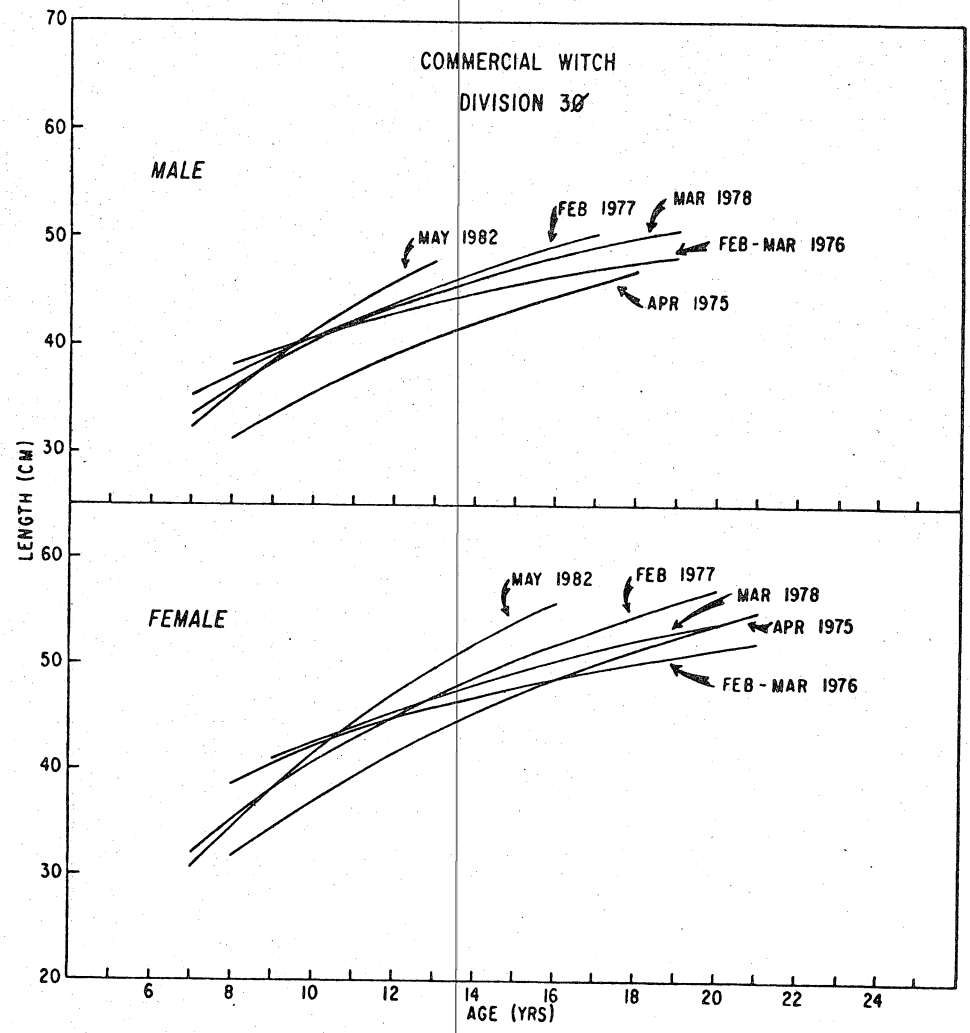

Fig. 4. Growth curves for male and female commercial witch in NAFO Div 30, 1976-82.