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Biological update of the 4S herring stock in 1984

by

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ABSTRACT

In 1984, herring landings in Div. 4S amounted to 960 tons. Purchase slip data were analysed to obtain an abundance index; both spring and fall spawners show an increase in 1984. Eastern and western 4S age conpositions are presented. In eastern 4S, the 1979 year-class dominated the spring and fall spawners. In western 4S the 1975 year-class dominated the spring-spawners catch while the 1978-79-80 year-classes dominated the fall spawners'.

RESUME

En 1984 les débarquements de hareng dans la division 4S ont totalisé 960 tonnes. Les récipissés d'achat ont été analysés afin d'obtenir un indice d'abondance; les pêches de printemps et d'automne montrent une augmentation des prises par unité d'effort en 1984. La composition en âge pour les hareng de l'est et de l'ouest de 4S est présentée. Dans l'est la classe d'âge de 1979 domine les captures de frayeurs de printemps et d'automne. Dans l'ouest la classe d'âge de 1975 domine chez les frayeurs de printemps tandis que les classes d'âge 1978-79-80 dominent chez les frayeurs d'automne.

The 1984 fishery and revision of landings statistics

In 1984, total herring landings in Div. 4S were reported to be 960 t.; 940 t. (98%) were caught by gillnets, the remainder coming from various gears such as shrimp trawls, jiggers or even "Japanese crab pots". Of the Division's total 77% was landed in eastern 4S as in the last 4 years . The eastern fishery went on for only 4 months (May-August) in 1984, due to the lack of market.

Revised landings from Div. 4S (NAFO Table 4) are presented in Table 1. Obviously in 1981 and 1982, there are major differences in what was previously presented (CAFSAC Adv. Doc. 84/18) and the present set of data. A close examination of the different statistical reports that could have been provided to NAFO showed that 1981 and 1982 Table 4 values were wrong. Afterwards, in consultation with the DFO Statistical Division, the following explanation was given: data provided by the Bureau de la Statistique du Quebec (provincial agency) were felt to be incorrectly apportionned between Division, especially for cod catches. Therefore, weekly quota reports were used to separate Quebec catches by NAFO divisions. But in the case of herring the

accuracy of quota reports was overestimated and numbers provided for 4S catches were inadequate. Landings for 1981 and 1982 were then derived from purchase slip data. According to the latter figures, from 1980 to the present, landings in Div. 4S have been fairly stable with a mean catch of 990 t.

Abundance indices

Purchase slip data, for the years 1981-1984, were analysed to obtain mean catch per landing and month (Table 2) in eastern Div. 4S (4Svw). The spring fishery (May) showed a steady increase in the last three years while the fall fishery has been increasing constantly since 1981. This situation parallels the 4T gillnet fishery (Ahrens and Nielson, 1984).

Age composition

Again in 1984, sampling coverage was sparce(Table 3) . The age composition of eastern 4S herring has been calculated for spring and autumn spawners from 1980 to 1984 (Table 4, Fig 1-2-3). In 1984, spring-spawners represent 49% of the total catch, a situation similar to 1982 where they represented 48% of the catch. This proportion has changed dramatically in the last three years: in 1980 and 1981, spring-spawners strongly dominated the catch, with a proportion of 92% and 82% respectively.

In 1984 spring-spawners in eastern 4S were dominated by the 1979 year-class followed by the 1980 and 1977 year-classes. The 1979 year-class was the biggest for a second year running in the fall spawners catch followed by the 11+ age group, a pattern also seen in adjacent stocks (e.g. 4R).

A few samples were obtained from the western fishery in 1984 (Table 5, Fig. 3) . Surprisingly spring-spawners were dominated by the 1975 year-class, but this is probably due to the small number of fish aged (49).The fall spawners were dominated by the 1978, 1979 and 1980 year-classes, representing more than 75% of the total catch.

Discussion and conclusions

In recent years the herring fishery in NAFO Division 4S has been restricted to a small local fishery due mainly to market restrictions and plant capacity. Because of this, the true potential of this fishery has not been assessed. The fishing effort in this Division could increase, however, with the construction of bait depots and by the introduction of purse seiners from the Gulf (4T) who have expressed an interest in fishing this area. With the minimal biological information available for this Division, an increase in fishing effort would be risky at the present time.

With the increased interest in these stocks in mind, a tagging study has been initiated for the 1985 fishing season to investigate the migration patterns of these stocks. Published studies (e.g. Moores and Lilly, 1982) have suggested a possible connection between the herring populations along the north shore of Quebec (unit areas 4Sv and 4Sw) and the west coast of Newfoundland (Division 4R). These papers included the results of tagging studies and the comparison of biological data. Although the tagging studies were far from conclusive, when taken with the biological similarities, spatial distributions from research cruises of herring in the northern Gulf and the close proximity of these two Divisions, further research into possible connections among these stocks seems to be warranted.

To date, the vast majority of the tagging studies conducted in the northern Gulf have been with herring captured on the west coast of Newfoundland. Returns from 4S of fish tagged in 4R would be understandably minimal due to the low fishing effort in this Division. It is proposed, therefore, to capture and mark pre- and post-spawning herring from the summer mixed fishery in unit area 4Sw in the month of July to determine to which Division these fish migrate for spawning in the autumn. The greater fishing effort in the adjacent Division (4R), should increase the probability of capturing herring tagged in 4S then the reverse situation if mixing does occur between these areas.

It is also proposed to have an experimental purse seine fishery in western 4S (unit area 4Sz) during the fall. This fishery would allow us to tag pre and post-spawning herring to determine to what extent fish in this area migrate to Division 4T.

REFERENCES

Ahrens, M. and G. Nielson. 1984. An assessment of the 4T herring stock. CAFSAC Res. Doc. 84/64.

CAFSAC. 1984. Advice on the Management of some Pelagic Stocks in the Gulf of St. Lawrence. CAFSAC Advisory Document 84/18.

Moores, J. and G. Lilly. 1982. Distribution of herring in the northern Gulf of St. Lawrence in winter. CAFSAC Res. Doc. 82/14.

Table 1. Herring landings (t.) in Div. 4S from 1975-1984.

Source	YEARS									
	75	76	77	78	79	80	81	82	83	84
Adv. Doc. 84/18	341	516	300	550	500	600	1000	1025[1]	1075	960[2]
NAFO Table 4.	364	468	321	539	481	892	697[3]	2885[3]	1084	960
Revised landings	364	468	321	539	481	892	1000	1025	1075	960

[1]:was 832 (preliminary data)
[2]:provisional
[3]:doubtful data

Table 2. Monthly CPUEs (t./succ. trip) of herring from eastern Div. 4S from 1981 to 1984.

Month	Years			
	1981	1982	1983	1984
May	.56	.29	.39	.49
June	.12	.36	.39	.35
July	.11	.17	.25	.29
August	.10	.24	.27	.36
September	.26	.26	.05	-
October	1.05	1.05	-	-
Mean	.27	.27	.31	.35

Table 3. Monthly landings (t.) and sampling coverage (no of fish) of herring caugth in Div. 4s in 1984.

Area	Months						
	04	05	06	07	08	09	10
Eastern 4S							
L[1]		177.2	34.9	240.1	221.9	42.6	19.4
S[2]		(24)	(146)	(96)	(0)	(0)	(0)
Western 4S							
L[1]	53.5	64.3	26.7	11.9	53.4	8.9	0.5
S[2]	(0)	(49)	(0)	(0)	(103)	(0)	(0)

[1]:Landings
[2]:Sampling coverage

Table 4. Age composition of herring caught in eastern Div. 4S from 1980-1984.

Spring Spawners

AGE	1980	1981	1982	1984
3	-	0.7	2.2	2.9
4	0.2	3.5	1.6	20.6
5	1.5	1.5	11.0	27.1
6	76.1	12.1	0.5	2.1
7	2.6	67.9	8.7	18.3
8	3.3	2.8	54.4	4.2
9	5.1	1.9	2.1	6.6
10	3.0	2.3	3.9	7.4
11+	8.1	7.3	15.7	10.7

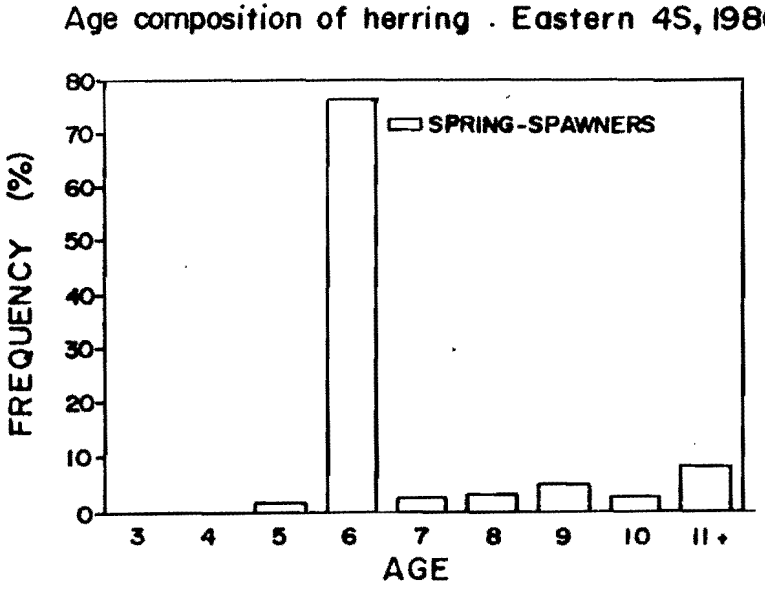
Autumn Spawners

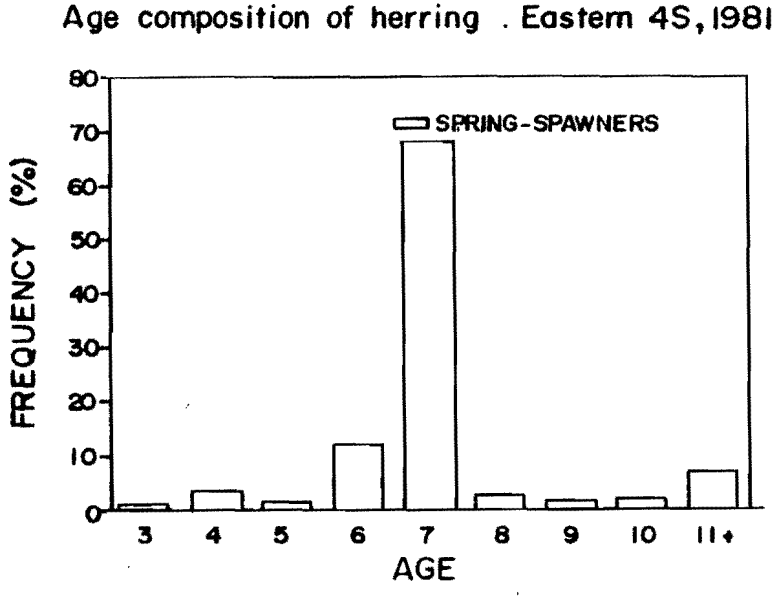
AGE	1980	1981	1982	1983	1984
4	-	7.9	14.6	52.3	8.0
5	0.2	14.2	47.6	15.7	63.7
6	8.4	4.9	5.6	19.0	1.4
7	18.8	9.5	1.7	3.2	5.7
8	4.4	19.8	5.4	1.3	4.2
9	9.2	3.3	7.7	2.8	2.0
10	13.1	5.1	2.7	2.7	5.6
11+	45.8	35.4	14.8	3.0	11.3

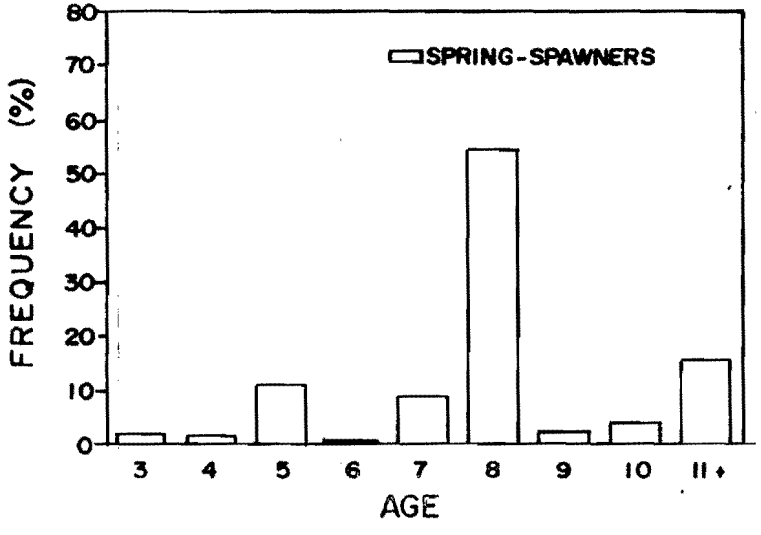
Table 5. Age composition (%) of herring caught in western Div. 4S for 1981 and 1984.

AGE	YEAR		
	1981	1984	
	Spring	S	A
3	0.6	-	-
4	1.9	-	15.5
5	1.7	4.1	25.2
6	3.6	4.1	35.0
7	68.7	10.2	13.6
8	3.6	2.0	2.9
9	5.6	53.1	3.9
10	0.6	14.3	1.0
11+	13.7	12.2	2.9

Fig. 1 Age composition of spring-spawning herring in eastern 4S from 1980-84







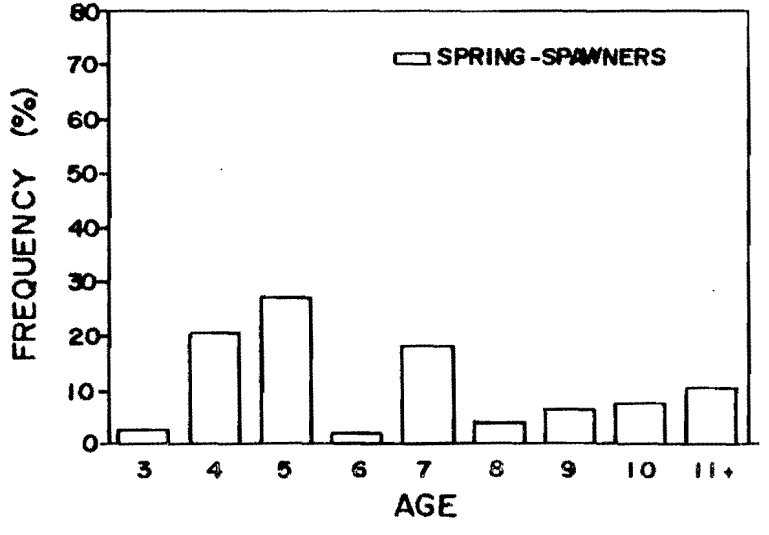
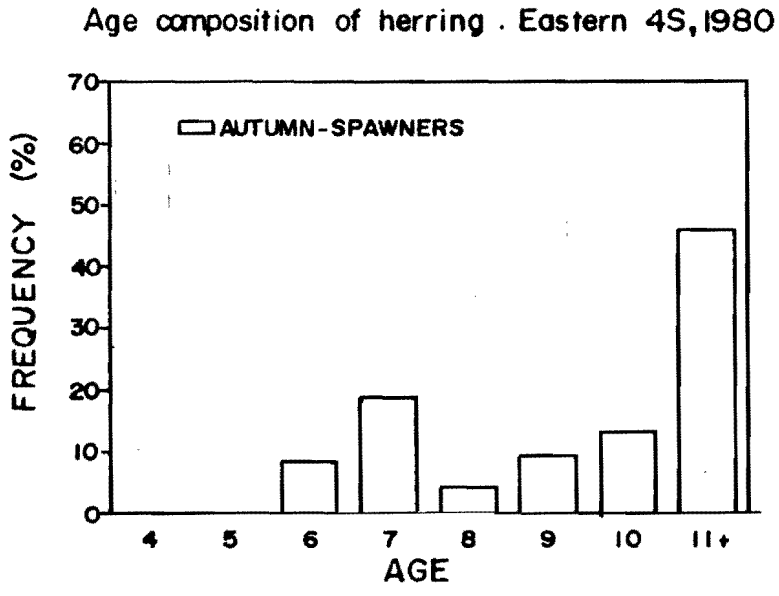
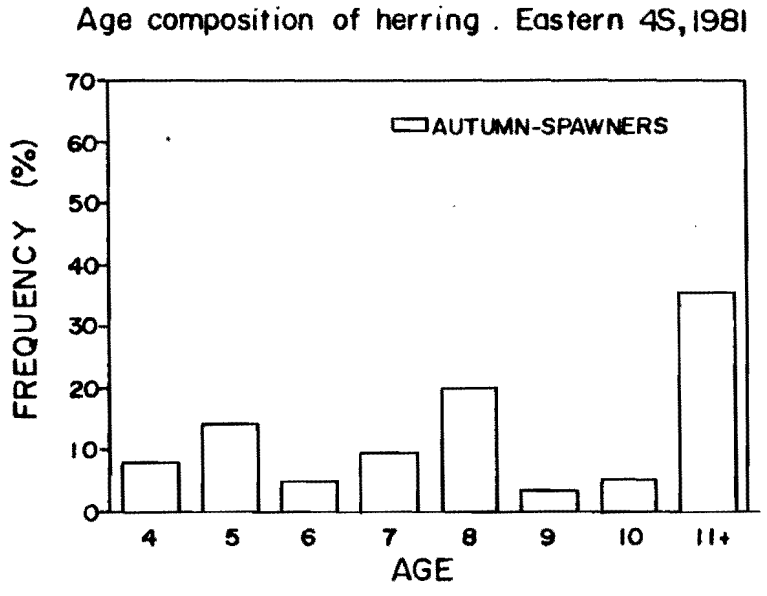
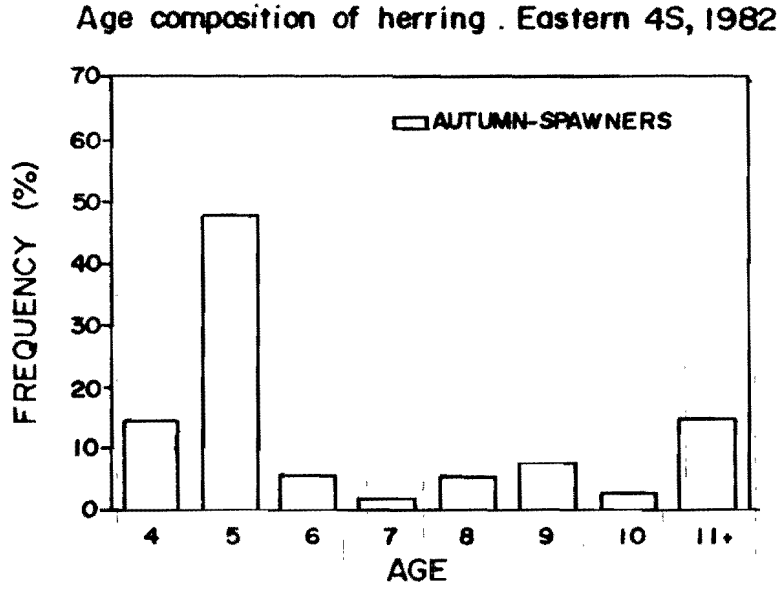


Fig. 2 Age composition of autumn-spawning herring in eastern 4S from 1980-83







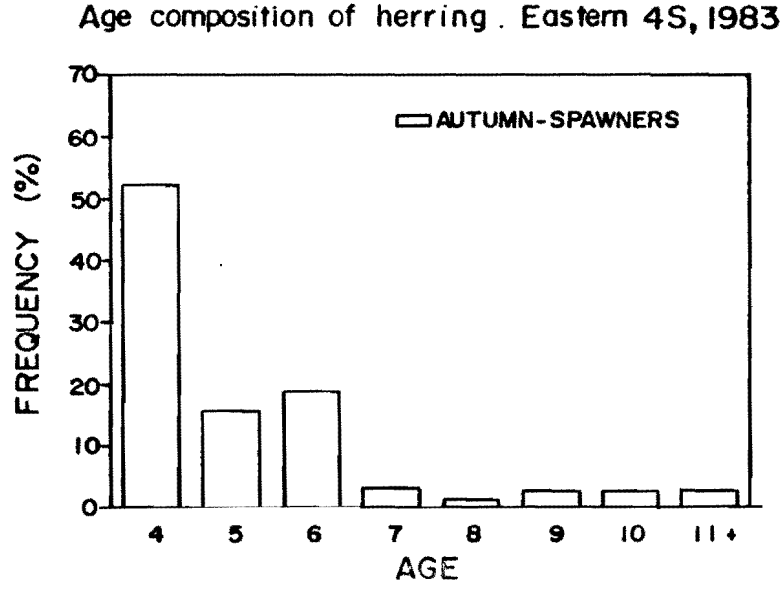


Fig. 3 Age composition of autumn-spawning herring in eastern 4S in 1984 and age composition of herring in western 4S from 1981-84