International Commission for the Northwest Atlantic Fisheries

Serial No. 3161
(D.c.3)

ICNAF Res.Doc.74/15

ANNUAL MEETING - JUNE 1974

Notes on ICNAF Joint Larval Herring Surveys in Georges Bank-Gulf of Maine areas in 1971 and 1972[1]

by

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Results of the Larval Herring Surveys in 1971 and 72 had been summerized as far as possible at the respective times in Res. Doc. 72/123 and 73/115 respectively. In both cases a more thorough look at the complete data appeared desirable. Having analysed the data from both years more intensively, the hope seems to be justified that the Larval Herring Survey program could provide more information than so far derived from it. However, completeness of the 1971 data is not yet reached and this is probably not feasable to the same level as for 1972. Also for the 1972 data more specific interpretation has to coupe with several uncertainties in the result due to probably both sampling and processing of samples. At this state it seems not possible to gaine a more final picture from the data by a comprehensive paper as suggested in Res. Doc. 73/115. However, it might be useful to give some summerizing table and figures indicating possibilities and difficulties and giving a basis for comparisons with results of further surveys.

Comments to tables and figures:

Fig 1: The general distribution of herring larvae in the Georges Bank-Gulf of Maine areas largely corresponds between the years 1971 and 1972. (Distribution charts based on stations with at least 1 larva per m^2)

Fig 2-4: The distribution of larvae is given for different size categories, summerizing the results over the whole sampling period in 1971 and 1972 respectively.

[1]Presented to the Special Commission Meeting, FAO, Rome, January 1974, as Res.Doc. 74/15

Areas where spawning took place are indicated by the distribution of larvae less than 10 mm in length. Only slight changes are given between both years: on Georges Bank for instance the spawning area was somewhat larger in 1971 than 1972.

Differences in the distribution of single size categories indicate no drift in easterly but only in westerly directions on Georges Bank. For the Nantucket Shoals area, drift in both directions appears possible from 1971 data, but in 1972 a westerly drift obviously predominated.

The three main populations of larvae (on Georges Bank including Nantucket Shoals area, coastal Gulf of Maine, south west off Nova Scotia) appear to remain separated, especially with respect to the occurence of large larvae (>25 mm).

Fig 5,6: For length frequency distribution absolute numbers of larvae on Georges Bank and in Nantucket Shoals area are given, separately for each sampling period. The polymodal structure of the length distribution indicate largely separated hatching periods in more or less regular time intervals. Modal lengths differ by about 4-6 mm. According to a mean growth rate of 5 mm per month as reported by Boyar et al. (1973) , this length difference corresponds to a difference in age of about 1 month. Larvae of the oldest hatching group encountered during the first cruise had than hatched in beginning of August.

Fig 7,9: The increase in length of the largest larvae during the sampling period was about 6 mm/month on Georges Bank and about 7 mm/month in Nantucket Shoals area. These values fit into the range of monthly increase of larval length reported by Boyar et al. (4,1 - 7,4 mm).

Fig 8,10: It was tried to combine respective modes of the length distributions from successive cruises according to the expected growth. The correct coordination is not always definitely detectable, especially not in the case of Georges Bank. It appears desirable to get more reliable length frequency distributions. Measuring a subsample of 100 larvae is obviously not sufficient in view of the complex frequency distributions.

Fig 5-10 indicate, that it might be possible to separate hatching groups and follow their growth and mortality during the sampling periods. Results from further surveys may show whether this is feasable.

Fig 11-18 and Table 1,2: Abundance estimates of larvae are given separately for areas time periods and size groups. The values for 1971 were recalculated after some corrections had been made. For Georges Bank the new calculation lead to fairly different abundance estimates compared to the first ones as given in Res. Doc. 72/123 and 73/115. However, the general picture has not changed: The abundance of larvae was significantly higher in Georges Bank than in Nantucket S¢hoals area in 1971 but vice versa in 1972. (Note the differences in scale, when comparing Figures!) In the combined areas larval production was in the same order of magnitude in both years.

In the coastal Gulf of Maine area (Fig 16-19) the abundance of small larvae (<10 mm) did not differ much between 1971 and 72.

However, the values for 1972 seems to be largely underestimated, regarding the comparably high numbers of larger larvae. It may be suggested that more larvae were produced in 1972 than 1971 in that area.

A comparison between the coastal Gulf of Maine and the off shore area is difficult (incomplete time coverage of hatching period in the off shore area, underestimated abundance of small larvae in the coastal area). It may be suggested, however, that in Georges Bank including Nantucket S¢hoals area larval production was in the range of 1/2 to 1 order of magnitude higher than in the coastal Gulf of Maine area.

REFERENCES

Boyar, H.C., R.R. Marak, F.E. Perkins, and R.A. Clifford. 1973. Seasonal distribution and growth of larval herring in the Georges Bank-Gulf of Maine area from 1962 to 1970. *J. Cons.*, 35(1): 36-51.

Estimates of abundance of larval herring (1972)

(based on 505 net)

Area	Period	vessel	larvae : 10^{-9} <10	10- 15	>15	total
Nantucket Shoals (Stat. 1- 35)	2 Oct - 7 Oct	Wieczeno	244	183	23	450
	12 Oct - 17 Oct	Argos	810	166	188	1165
	31 Oct - 3 Nov	Ant. Dohrn	230	174	38	442
	28 Nov - 4 Dec	Albatross IV	3.6	126	36	166
Georges Bank (Stat. 47- 99)	22 Sep - 30 Sep	Argos	131	42	3	176
	10 Oct - 22 Oct	Wieczno	158	245	85	489
	18 Oct - 24 Oct	Argos	34	112	115	261
	5 Nov - 9 Nov	A. Dohrn	50	61	44	154
	6 Dec - 13 Dec	Albatross IV	0.2	5.0	47	52
Nova Scotia (Stat. 100-109, 112-124)	28 Sep - 30 Sep	Argos	0 *)	0 *)	0,1 *)	0.1 *)
	23 Oct - 25 Oct	Wieczno	9.2	54	75	138
	26 Oct - 24 Oct	Argos	0 *)	3.4 *)	3.1 *)	6.5 *)
	10 Nov - 12 Nov	A. Dohrn	6.5	5.0	60	71
	Nov - Nov	E.E. Prince	?	?	?	68(75) **)
	13 Dec - 15 Dec	Albatross IV	0	1.0	34	35
Gulf of Maine (a: along shore b: off shore stations 34, 36-38, 41,42,44-46)			a b	a b	a b	a b
	2 Sep - 6 Sep	Lucille B	22	6.9	0.1	29
	21 Sep - 24 Sep	Albatross IV	55	41	18	116
	8 Oct - 10 Oct	Wieczno	0	2.2	3.6	5.8
	17 Oct - 18 Oct	Argos	0	0.4	8.7	9.1
	18 Oct - 22 Oct	Duchess II	81	74	43	199
	3 Nov - 5 Nov	A. Dohrn	0	0	6.1	6.1
	6 Nov - 12 Nov	Duchess	0.5	26	70	97
	4 Dec - 6 Dec	Albatross IV	0	0.1	7.0	7.1

1 additional

*) largly underestimated as near shore stations not sampled

**) estimate from narrow station grid sampled by Canada

Estimate of abundance of larval herring 1971

(based on 505/(333) nets)

Area	Period	Vessel	larvae . 10^{-9} <10	10 -15	>15	total
Nantucket Shoals	18 Sep-24 Sep	Cryos	-	-	-	-
	1 Oct- 3 Oct	Delaware	-	-	-	-
	21 Oct-25 Oct	Viandra	0.6(0.6)	0.6(1.9)	11.2(11.8)	12.4(14.1)
	10 Nov-12 Nov	W. Herwig	49	?	?	504
	12 Dec-17 Dec	Albatross IV	3.6(0.5)	20 (16)	48 (55)	71 (72)
Georges Bank	11 Sep-18 Sep	Cryos	183*	7.1*	0.6*	192*
	23 Sep-30 Sep	Delaware	260	29	14	303
	4 Oct-20 Oct	Viandra	275 (222)	200 (187)	129 (164)	667 (573)
	3 Nov- 8 Nov	W. Herwig	163	?	?	515
	4 Dec-12 Dec	Albatross IV	0.6(-)	1.8(2.5)	183 (157)	186 (160)
Nova Scotia	11 Sep-15 Sep	Cryos	38*	7.1*	2.3*	47*
	24 Sep-28 Sep	Delaware	74	70	15	159
	10 Oct-15 Oct	Viandra	o.1(-)	o.3(o.3)	0.5(0.3)	0.8(0.6)
	31 Oct-3 Nov	W. Herwig	15.7	?	?	40.5
	3 Dec- 8 Dec	Albatross IV	- (0.2)	31 (31)	34 (38)	65 (69)
Gulf of Maine (along shore cruises)	9 Sep-16 Sep	Roqual	9.5	11	2.5	23
	22 Sep- 1 Oct	"	15	11	13	39
	13 Oct-25 Oct	"	130	22	11	162
	27 Oct- 8 Nov	"	1.7	15	17	34

*)mean from 505 and 333 net

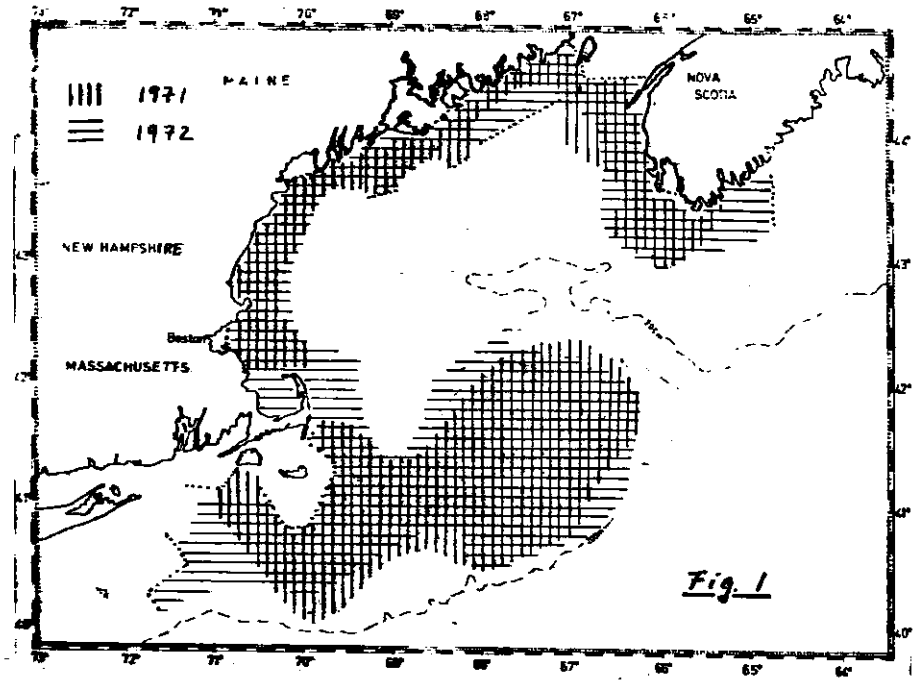

Fig. 1

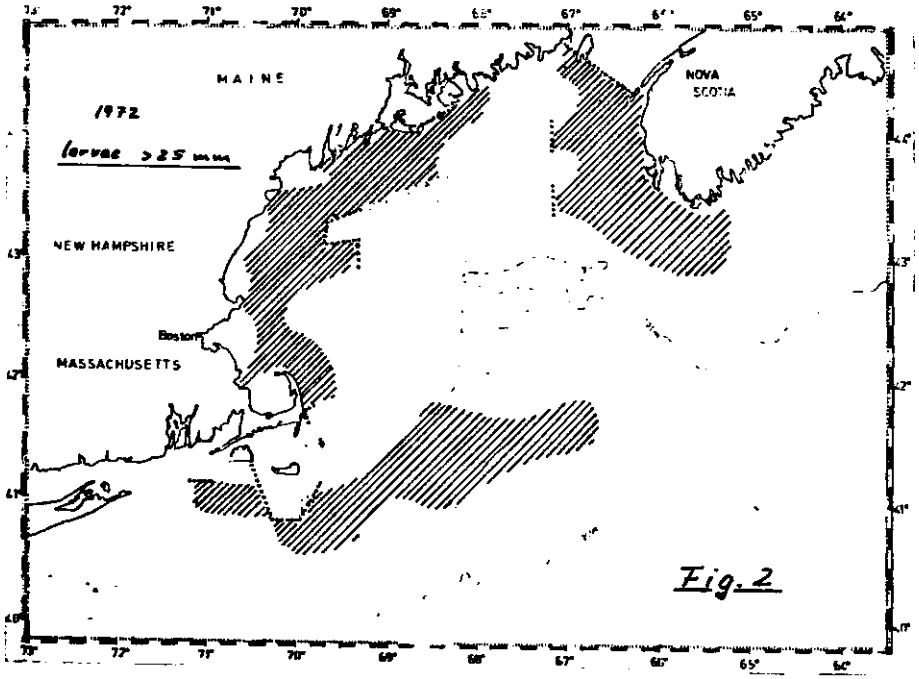

Fig. 2

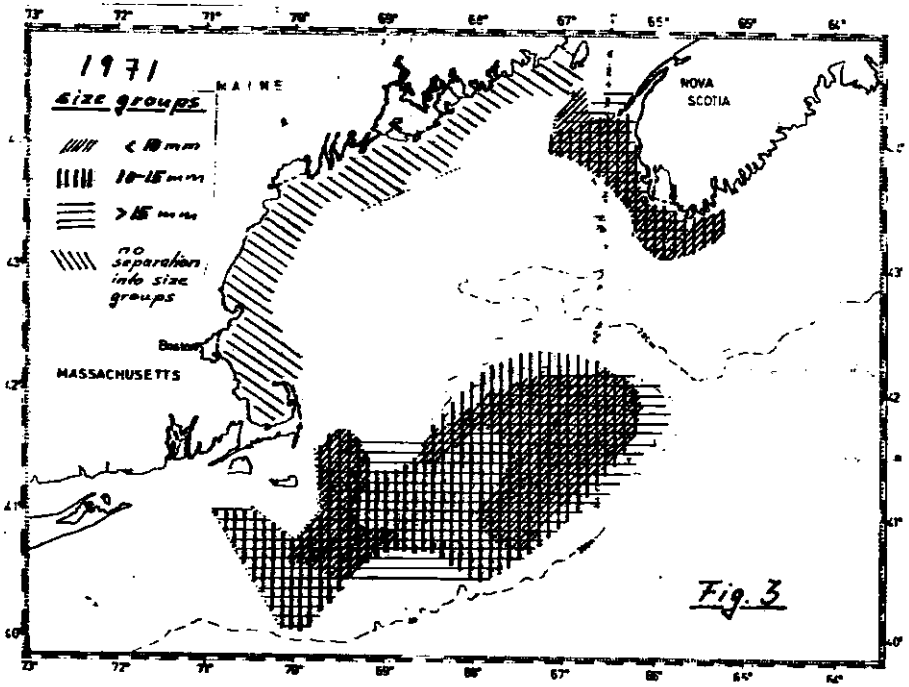

Fig. 3

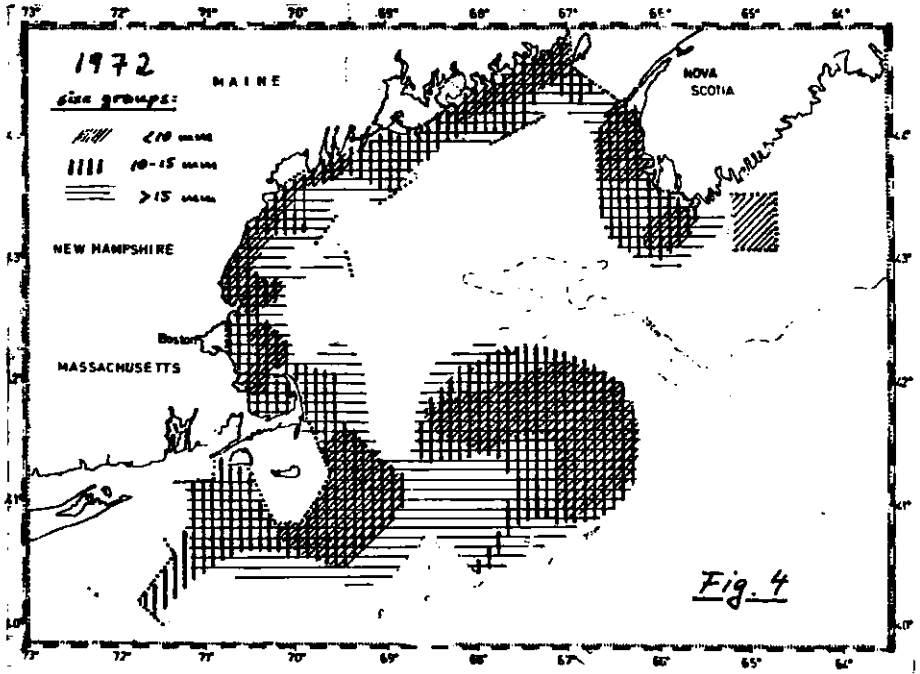

Fig. 4

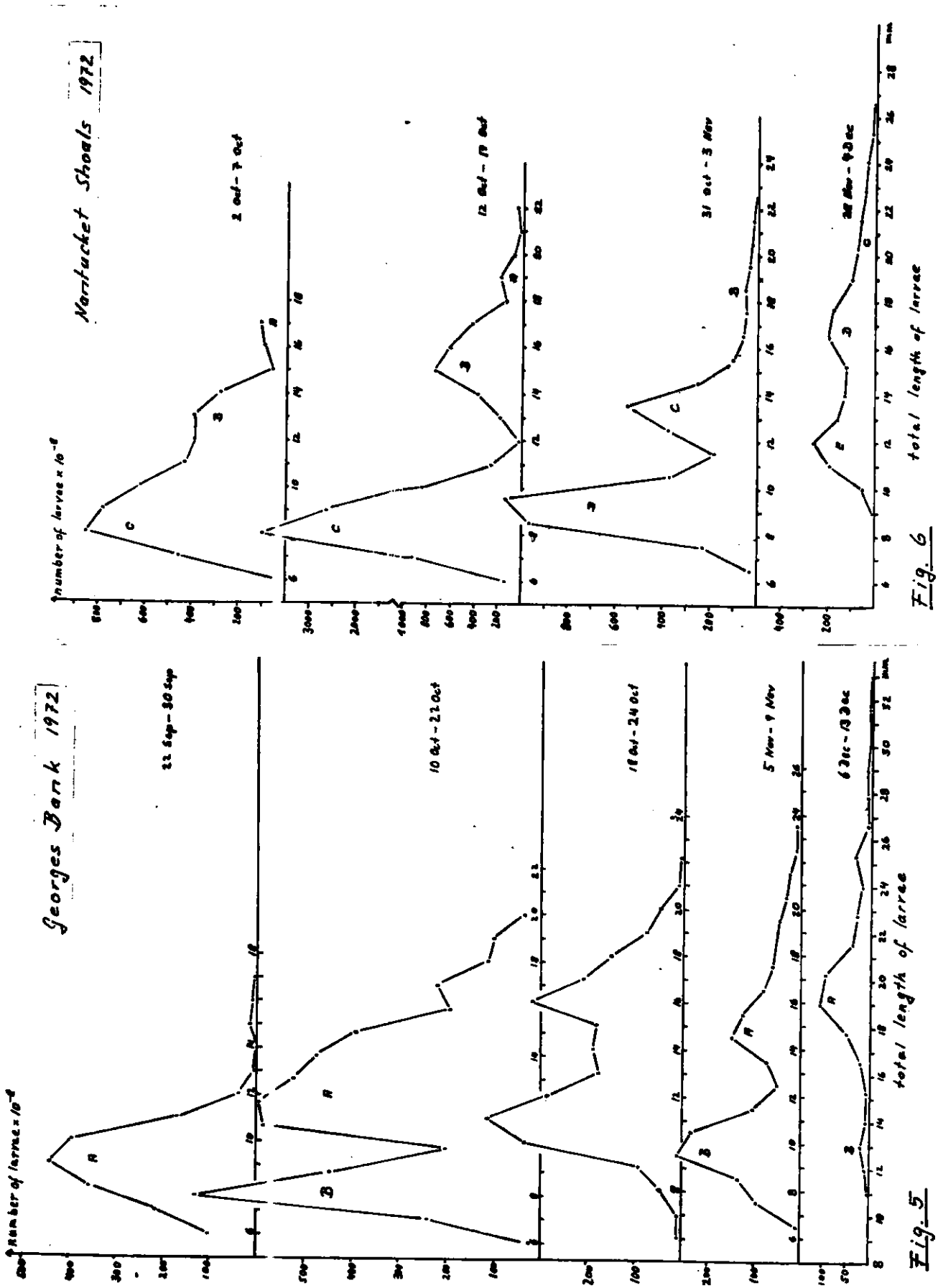
Georges Bank 1972
Nantucket Shoals 1972
number of larvae x 10⁻⁴
total length of larvae
22 Sep - 30 Sep
10 Oct - 22 Oct
18 Oct - 24 Oct
5 Nov - 9 Nov
6 Dec - 13 Dec
1 Oct - 7 Oct
12 Oct - 17 Oct
31 Oct - 3 Nov
28 Nov - 9 Dec

Fig. 5

Fig. 6

Georges Bank 1972

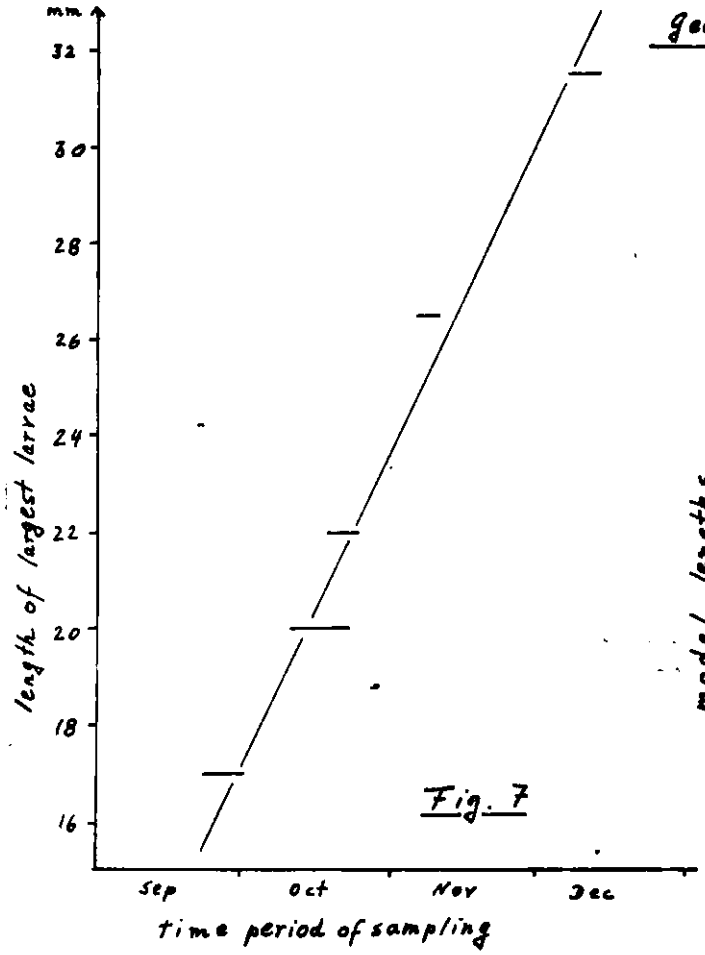

Fig. 7

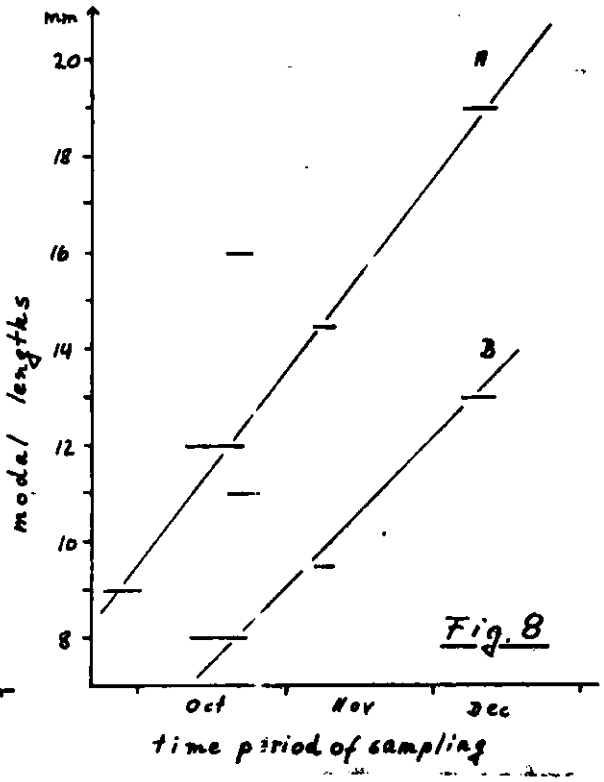

Fig. 8

Nantucket Shoals 1972

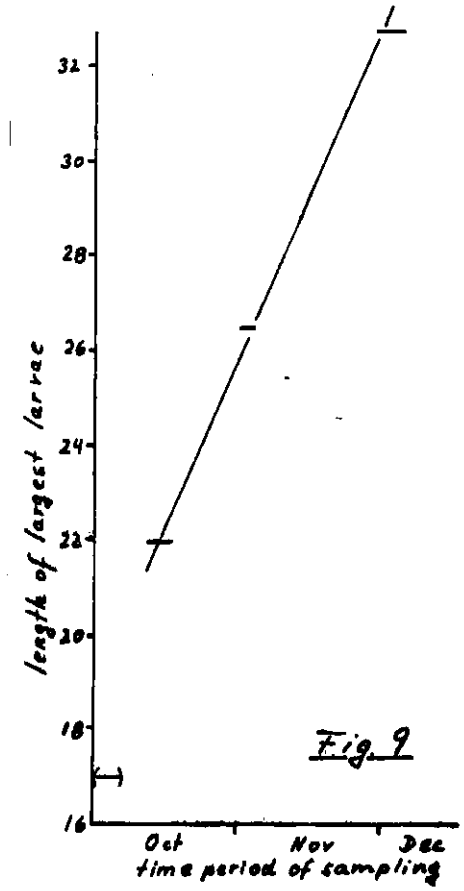

Fig. 9

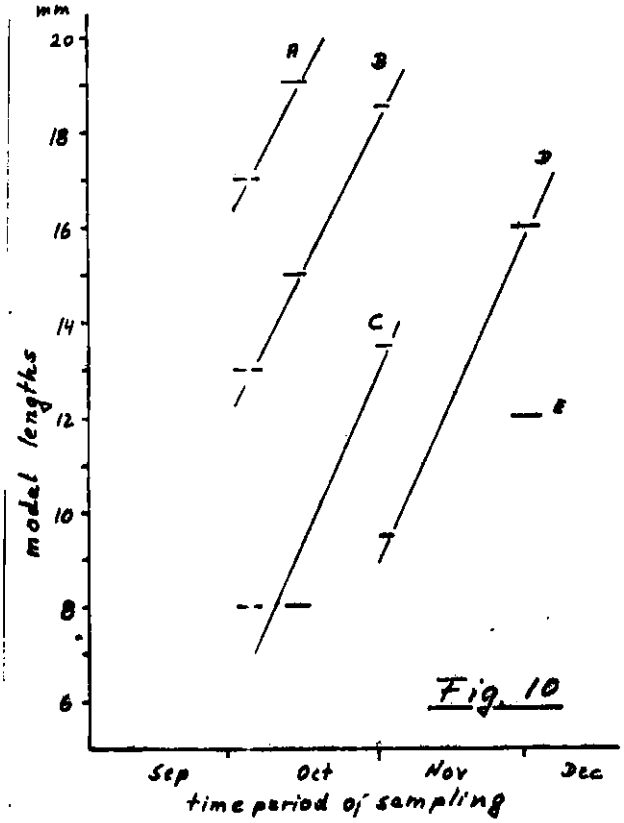

Fig. 10

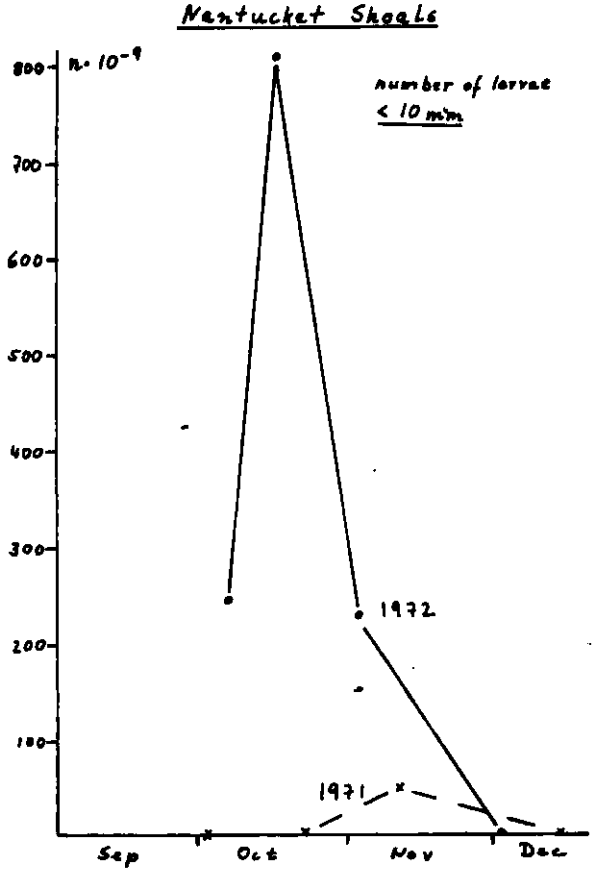

Fig. 11

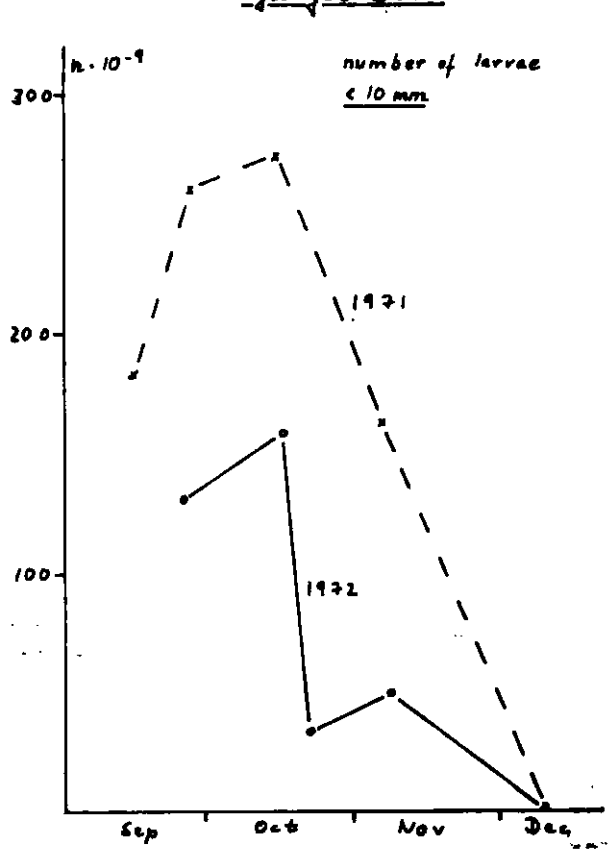

Fig. 12

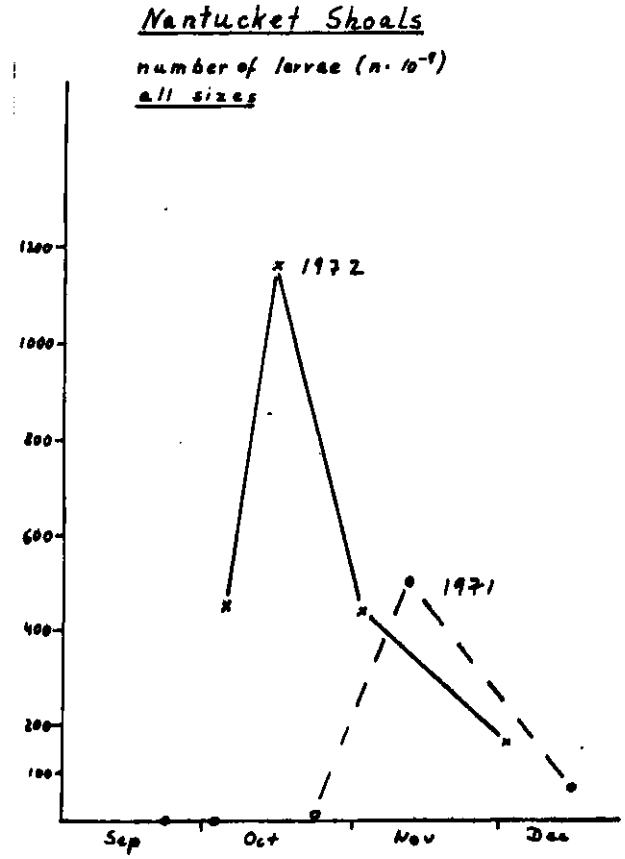

Fig. 13

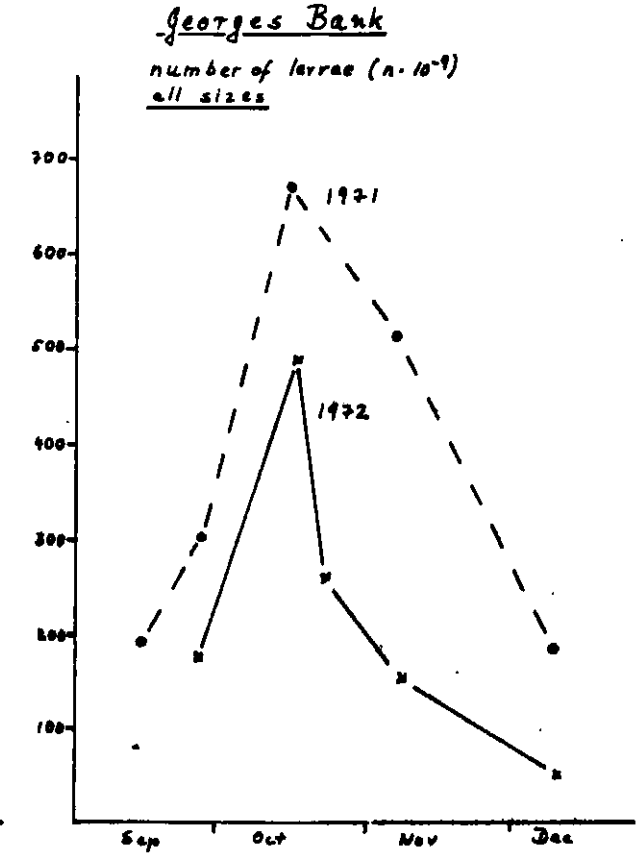

Fig. 14

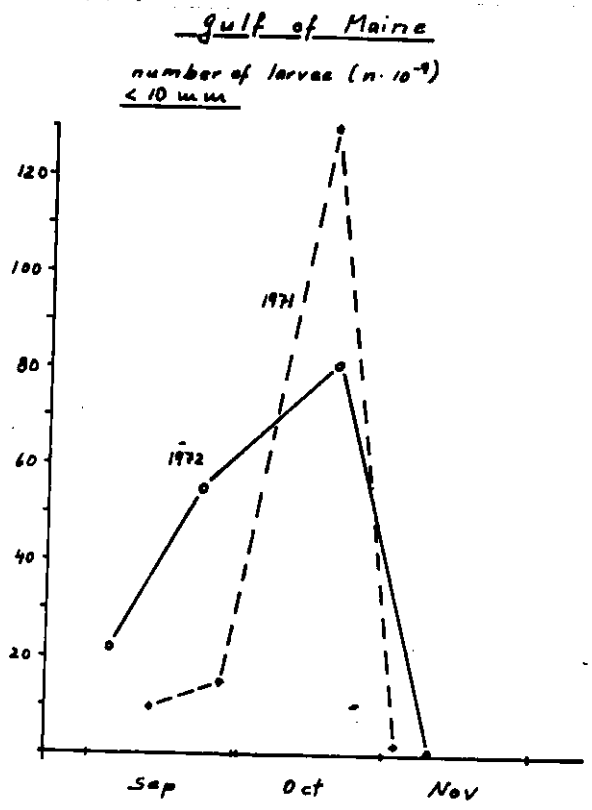

Fig. 15

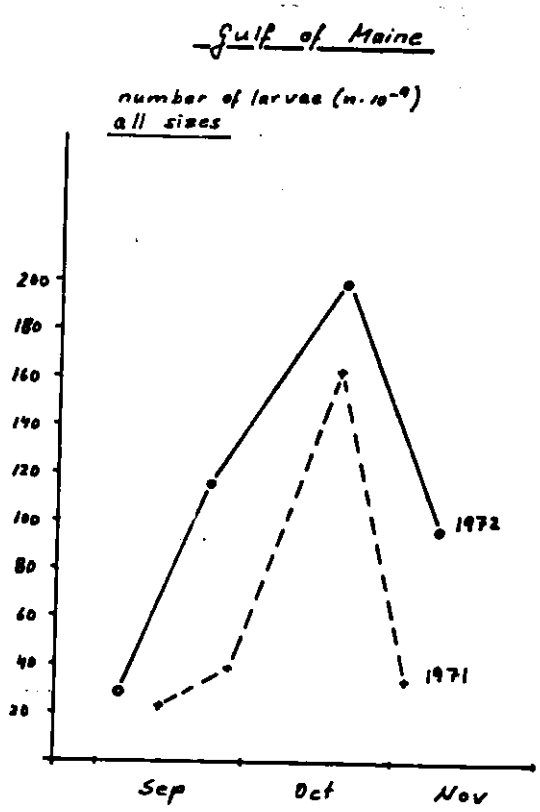

Fig. 16

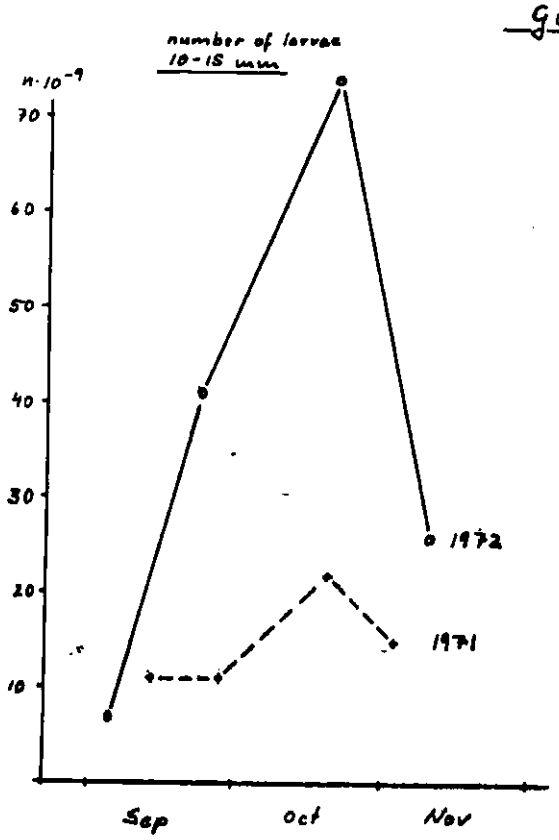

Fig. 17

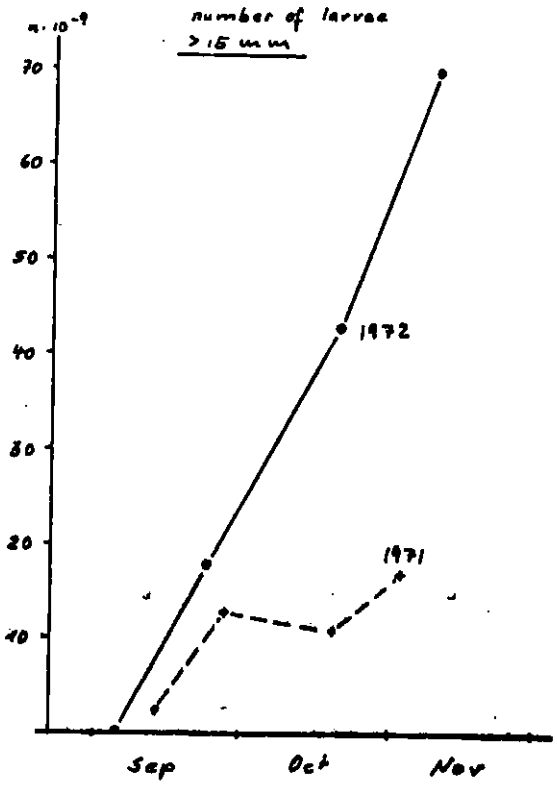

Fig. 18