

# THE SEASONAL ABUNDANCE OF YOUNG FISH

## X. THE YEAR 1948

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(Text-figs. 1-2)

Records of the young fish and plankton of Plymouth off-shore waters taken in  $\frac{1}{2}$  hr. oblique hauls of the 2 m. stramin ring-trawl were continued in 1948. They show an even lower production of young fish than in 1947 and a continued poverty of plankton organisms other than young fish. The dates on which collections were made are given in Table I.

TABLE I. DATES ON WHICH COLLECTIONS WERE MADE, 1948

All 2 miles east of Eddystone, unless otherwise stated

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
6	3	1	12*	19	1	5	4	6	4*	4	6
14	9	11†	14	25	7	12	9	13	7	9	15
20	12*	11*			8*	19	18	20	12	16	20
26	16	15			14	26	23	28	21	22	
		23			21	29*	30		26	29	
							31*		27*	30*	

\* Station E 1.

† Station L 4.

TABLE II. FORTNIGHTLY AVERAGE CATCHES OF ALL YOUNG FISH EXCLUDING CLUPEIDS, 1930-34, 1947 AND 1948

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930-34* (average)	1st fortnight	5	10	27	110	635	299	100	152	48	11	7	2
	2nd fortnight	8	15	89	374	573	78	85	48	9	6	3	2
1947	1st fortnight	n.r.	5	6	5	n.r.	20	10	11	11	2	1	+
	2nd fortnight	0	43	13	10	54	27	5	16	1	0	+	+
1948	1st fortnight	+	3	15	12	n.r.	13	9	9	+	4	0	1
	2nd fortnight	0	16	15	n.r.	65	32	17	5	0	+	+	0

\* Data kindly supplied by Mr F. S. Russell.

n.r., no records. + average of less than 1.

The fortnightly averages of all young fish, excluding clupeids, are now too low to be graphed against the same averages for the period 1930-34 as in Fig. 1 of former reports: they are therefore given numerically in Table II below, with the 1947 averages for comparison. *Callionymus* spp. and *Solea variegata* contributed principally to the highest of these fortnightly averages in the



a level for almost all species that it is considered more informative to show the monthly total catches for species (Table III) rather than the monthly average catches, many of which are now considerably less than one. For comparison with previous records, the sums of the monthly averages for the year are given in the last column of this table, and the monthly averages of (i) total young fish, (ii) total young fish less clupeids, and (iii) total clupeids are also shown (2nd, 4th and 6th lines, in black). The number of hauls per month is included so that the monthly averages for the species are immediately derivable.

A few young plaice, *Pleuronectes platessa*, again occurred this year, in March. A single specimen of *Mugil* spp. was taken on 15 December: in 1947 another single specimen was caught at E 1, on 13 November (this haul was not included in the 1947 data).

A young specimen (33 mm.) of *Phycis* was also taken in the haul of 15 December this year. It very probably belongs to *P. blennioides* as this is the only *Phycis* species occurring in the area. No young stages of this genus have previously been recorded off Plymouth.

As already mentioned, plankton other than young fish was very scarce throughout the year. The maximum haul of *Calanus* (adult and stage V) contained 280 odd specimens (1 June 1948), and only four other catches during the year contained more than 100 *Calanus*. This, when compared with the rich catches of 1930 (Russell, 1933), gives some indication of the present poverty. In 1930, thirty-four of the forty-four hauls taken during the year contained more than 100 *Calanus* and seventeen out of the forty-four had catches of over 1000: the maximum haul contained the very large total of 318,450 specimens (7 May 1930).

*Sagitta setosa* was the dominant *Sagitta* species throughout the year (Figs. 1 and 2). It was, however, considerably less numerous than in 1947: on only two occasions were catches of more than 1000 taken (1 March, 31 August; 1200 odd). As in 1947, it was almost completely absent during the period April-July. The occurrence of *S. elegans* was very intermittent during the year and the numbers caught were extremely small (maximum, ten specimens).

A particularly noticeable feature of the *S. setosa* catches throughout the year was the preponderance of very small immature specimens (Stages I and II; Russell, 1932a). This departure from the normally expected proportions of development Stages (I-III) in the catches would appear to indicate an unusually low survival of individuals reaching maturity. Measurements and counts, comparable with those made by Russell (1932b), are required for verification of this trend. It is, however, felt that it should not remain unrecorded, since it may possibly represent a further aspect of the continued and progressive impoverishment of the macroplankton caught by the 2 m. ring-trawl in this area.

Except during April, *Muggiaea atlantica* was present during all months of

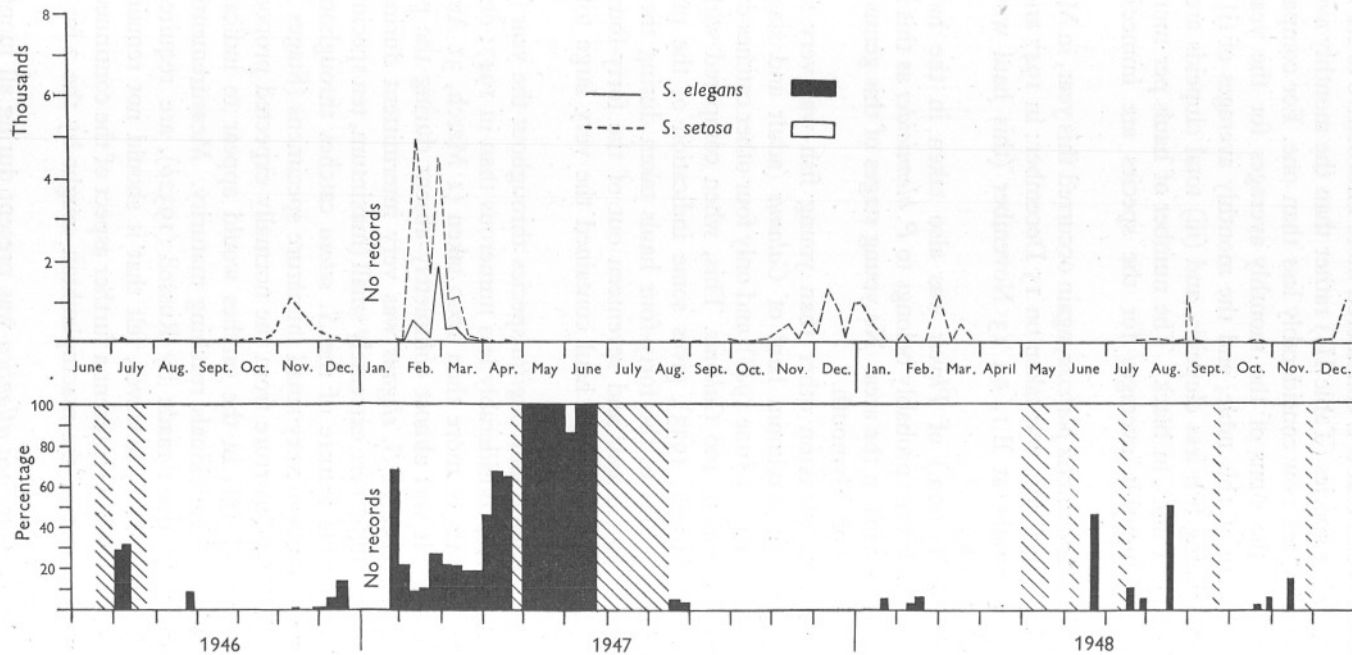


Fig. 1. Above, curves showing the actual abundance of *Sagitta elegans* (—) and *S. setosa* (----) in half-hour oblique hauls with the 2 m. stramin ring-trawl during the period June 1946 to December 1948. Below, percentage composition of the *Sagitta* populations during the same period: *S. elegans*, black; *S. setosa*, white; no *Sagitta*, hatched. (Continued from Corbin, 1948, p. 720, fig. 2.)

the year: it was numerous from the end of July until the end of August and again from the end of September until the end of October.

*M. kochi*, which was present in very small numbers in 1946 (Russell, 1947) but did not occur in 1947 (Corbin, 1948), was also represented in the catches throughout the year except during February and April. It did not generally exceed one-third of the numbers of *M. atlantica*. In the earlier part (January-June) and at the end of the year (November and December), the catches of both *Muggiaea* species were small.

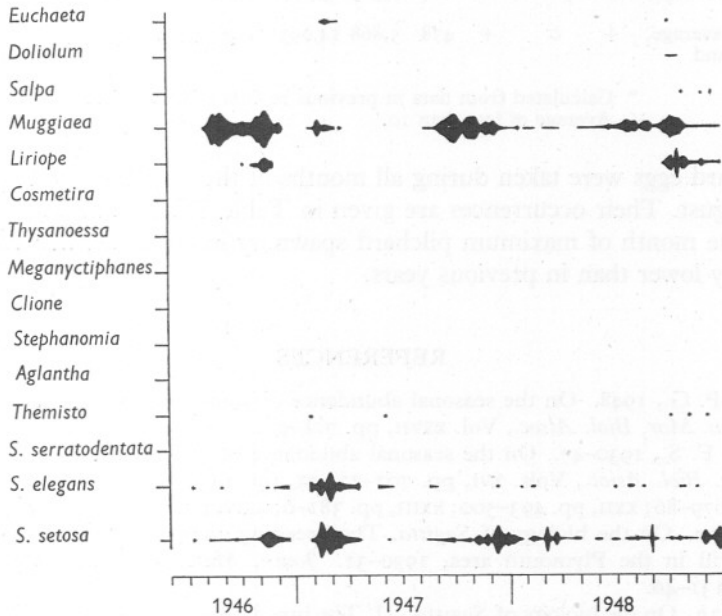


Fig. 2. Diagram showing the occurrence of the various plankton indicators in the collections off Plymouth during the period June 1946 to December 1948. (Continued from Corbin, 1948, p. 721, fig. 3.)

At the end of September (28th), *Liriopse* appeared in considerable numbers. It continued until the end of the year in the catches, although only in small numbers in November and December.

Salps occurred on three occasions (27 October (35), 30 November (1), 15 December (69)), and doliolids were taken twice in October (4th (25), 21st (3)).

Three specimens of *Euchaeta hebes* also occurred in the catch of 4 October, and the hyperiid amphipod, *Themisto* was present in three hauls at the end of the year (4 October (1), 4 November (11), 6 December (1)).

*Beroe* was present during October, November and December, and *Aequorea pensilis* occurred in some numbers during November and December. Mr F. S. Russell kindly identified the *Aequorea* specimens.

TABLE IV. PILCHARD EGG CATCHES, 1948

See Table I for dates of hauls.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	0	0	0	17	3,160	1,860	1,300	0	0	57	1	0
	0	0	0	11	1,450	3,000	5	0	104	6	0	3
	1	0	2			7,980	103	0	14	7	4	1
	0	0	0			6,880	40	0	240	132	0	
			1			2,100	0	0		10	0	
								0		0	4	
Monthly average, 1948	+	0	+	14	2,305	4,364	290	0	89	35	+	+
Monthly average, 1937-9 and 1946-7*	+	0	+	478	5,868	14,093	6,196	385	415	305	398	+

\* Calculated from data in previous reports of this series.

+ Average of less than 10.

Pilchard eggs were taken during all months of the year except in February and August. Their occurrences are given in Table IV. The average catch in June, the month of maximum pilchard spawning in this area, was very considerably lower than in previous years.

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