The Seasonal Abundance and Distribution of the Pelagic Young of Teleostean Fishes Caught in the Ring-Trawl in Offshore Waters in the Plymouth Area.

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With 2 Figures in the Text.

A LARGE number of collections were made with the 2-metre stramin ring-trawl in the years 1924, 1925 and 1926, to study the vertical distribution of young fish. Seeing that all these collections were made in exactly the same way, it was considered that they would form a good basis for a study of the quantitative differences in abundance of the different species at various times of the year. Accordingly, after 1926 the collections were supplemented in 1927, 1928 and 1929 by oblique hauls with the ring-trawl fishing at the same depths as those fished in the serial hauls in the study of the vertical distribution, that is the net was fished successively at the six different depths during half-an-hour's haul for 5 minutes at each depth. The results given in this report are all based on daylight catches.

In Table 3 are brought together the average monthly catches per half-hour's haul for each year for the post-larvæ of the various species. In the case of the 1924, 1925 and 1926 observations, which were based usually on six hauls each of ten-minutes' duration at six different depths, the total number of each species caught at all depths together at any one station is taken and from it the number caught per half-hour estimated. In the later years the oblique hauls were each of one half-hour's duration. In both cases these half-hour catches have been added together for each month in the year and divided by the number of catches per month. In this way an average monthly catch for each year was obtained (Table 3). By adding the averages for any one month and dividing by the number of years in which collections were made in that month, an average monthly catch was obtained for the period of six years covered by the researches (Table 1, p. 712). In Table 2 (p. 717) are given the dates in each year when collections were made, and it can be seen that although the winter months have been very poorly represented the important period of April to September has been fairly well covered.

Figure 1 shows the average monthly catches (as given in Table 1) for

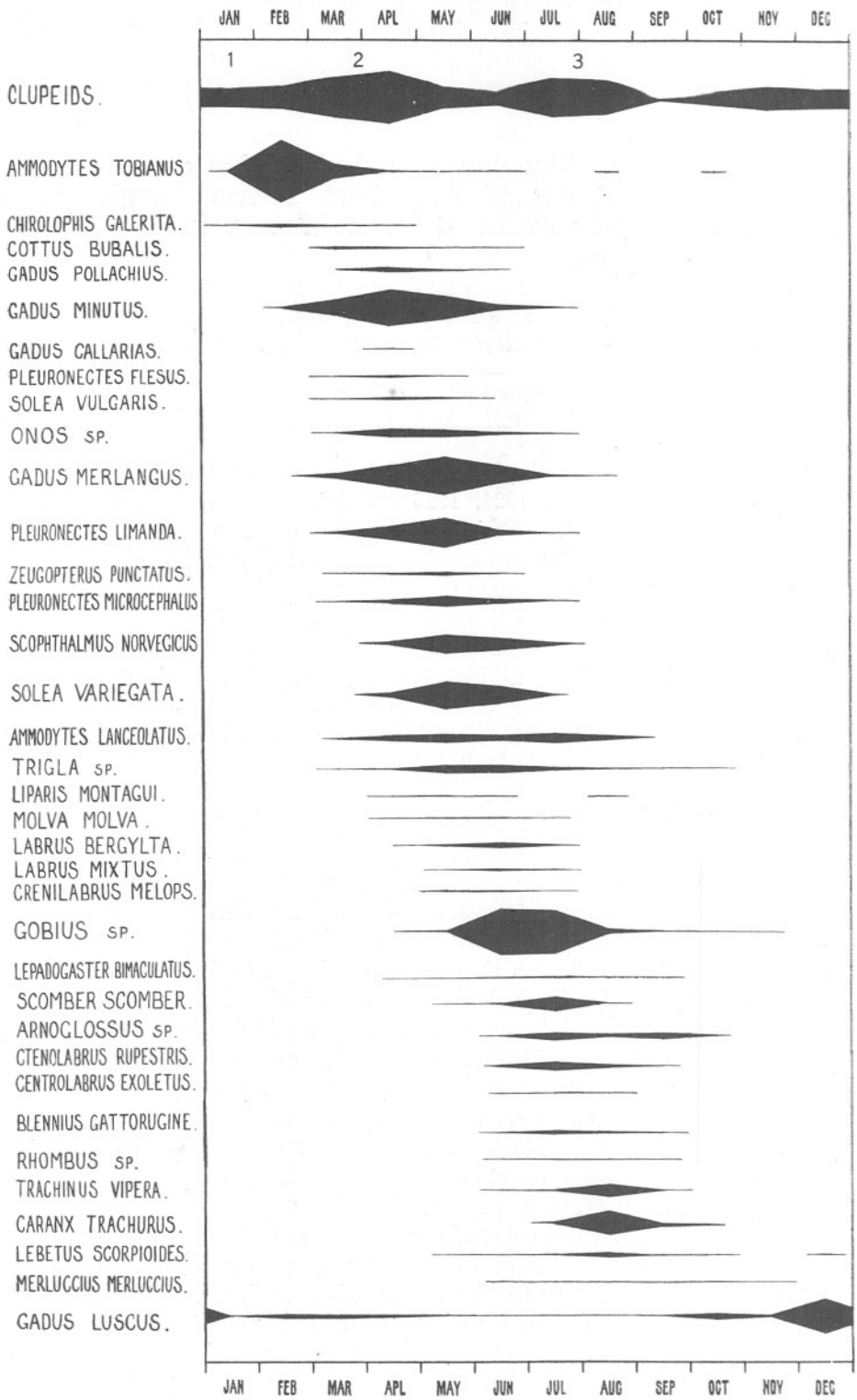

FIG. 1 (description opposite).

each species in graphic form. The abundance curves for each species are drawn to the same scale so that from this figure one can see at a glance the comparative abundance of the post-larvæ of any species of fish at

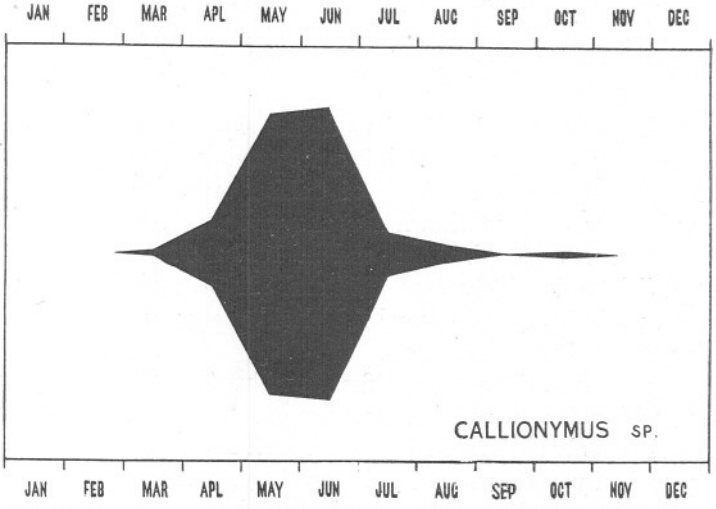

FIG. 2.—Diagram to show in graphic form the seasonal distribution and abundance of the post-larvæ of Callionymus sp., mostly *C. lyra*, in offshore waters off Plymouth. This figure is drawn to the same scale as Figure 1, and shows the marked superiority in the numbers of post-larvæ of this species over all other species, excepting perhaps the Gobies.

any time of the year. (This figure shows only those species whose average number for any month is one per half-hour's haul or more.)

In this publication only those observations made at the International Hydrographic Stations L4 and L6, or at the station two miles east of the Eddystone have been included, and from 1926 onwards practically all the collections were made from the latter position. The results are therefore indicative of the general offshore conditions. They should, if possible, be supplemented by a series of collections quite close inshore when possibly certain species, such perhaps as the wrasses, might appear more abundant.

DESCRIPTION OF FIGURE 1.

FIG. 1.—Diagram to show in a graphic form the results expressed in Table 1. The blackened areas indicate the time of year at which post-larval stages of each species may be expected in the ring-trawl catches in offshore waters off Plymouth; each area is drawn to the same scale and indicates the comparative abundance of the post-larvæ of each species as averaged over the years 1924 to 1929. Only those species whose post-larvæ appear with an average of over one specimen per half-hour's haul are shown here. In the case of the Clupeids the Figures 1, 2 and 3 indicate the periods when the catches may be expected to consist almost entirely of Herrings, Sprats, or Pilchards respectively.

N.B. The results for Gobies should probably be very much larger, these post-larvæ being generally near the bottom in the daytime and below the region sampled by the ring-trawl; the same also may hold for *Gadus minutus*.

A glance at Figure 1 shows how few species compared with the large number occurring in the area can be considered as abundant. The outstanding feature as shown in Figure 2 (drawn to the same scale as Figure 1) is the abundance of Callionymus sp. post-larvae probably mostly *C. lyra*. Ever since researches into the young stages of our fish were first systematically undertaken by Clark (1910) the abundance of this species has been noticeable.

Although the ring-trawl collections do not show the post-larval gobies to have been especially numerous it is quite possible that they are actually even more abundant than those of Callionymus. Catches with the bottom plankton net have shown that they are present in great numbers in the daytime near the bottom, and in 1927 the average catches for June and July respectively were 1354 and 3247 as against 2·1 and 2·1 in collections made by the ring-trawl fished obliquely; this is many times more numerous than Callionymus.

It is thought that these average figures will form a good basis to work on in watching for any violent fluctuations in the future. They are presented here only as data, because until such observations have covered a long period of years it will not be known how great the differences from year to year must be before they can be regarded as significant.

There is an indication that the post-larval stages of certain spring spawners were but poorly represented in the year 1929, as for example, *Gadus minutus*, *Pleuronectes microcephalus*, *Solea variegata*, and Callionymus sp. Such differences will naturally tend to lower the averages given in Table 1. Similarly the year 1926 seems to have been marked by a rather unusual abundance of young mackerel, *Scomber scomber;* never in all the past records given by Clark (1914 and 1920) and Allen (1917) have so many been caught. This may perhaps have meant an easterly extension of their normal spawning-grounds, the abundance of the copepod, *Calanus finmarchicus*, being very great in this region that summer and hence perhaps the adults moving more in this direction. At any rate there is no indication from commercial catches that 1926 was an exceptionally good survival year, as they should probably have been appearing in the catches by now (1929).

The above instances have been cited to emphasize that we do not yet know what differences to look for as being significant. The results of the research on the vertical distribution of the post-larval fishes have shown that for the majority of species oblique daytime hauls with the net fished as deep as possible should give a fair picture of the quantities of young fish present (Russell, 1928, p. 833). In the case of post-larval Clupeids, however, these results do not give a correct impression (Russell, 1930, p. 649), although if they were unusually abundant any one year their increased numbers would perhaps show up in the daytime as well as at

night. In the case of the Gobies, and also possibly *Gadus minutus* (Russell, 1930, p. 650), the hauls probably have not gone deep enough to sample the zone of their maximum abundance.

A comparison of these results with the figures given by Allen (1917) shows that there have not been any marked changes in the composition of the catches since that date, and his averages for the years up to 1914 agree well with those given here. As regards the sizes of the post-larvæ caught, there will be some slight difference for each species as the season advances. When first any species starts to appear in the catches it is natural that the majority should be very young forms, and while a few of the smallest sizes are usually to be taken throughout the season there will be a gradual increase in size of the majority as time goes on, until in the last catches in which they appear the post-larvæ will mostly be in the neighbourhood of the size at which they disappear from the ring-trawl catches either owing to their leaving the plankton or having become strong enough swimmers to evade the net. In Table 3 are given for the commoner species the sizes within which the majority of post-larvæ taken in the ring-trawl lie; larger sizes will of course be caught at times in the case of all species.

A bibliography is given here including all those papers that have been published dealing with the post-larval stages of Teleostean fishes in the Plymouth area (see pp. 720–722).

The months in which the maximum abundance of the post-larvæ of each species may be expected are given below.

MONTHS OF AVERAGE MAXIMAL ABUNDANCE OF POST-LARVÆ.

JANUARY.	FEBRUARY.	MARCH.	APRIL.
	C. harengus	*C. bubalis*	*C. sprattus*
	A. tobianus	*A. cataphractus*	*G. pollachius*
	C. galerita		*G. minutus*
			G. callarias
			P. flesus
			S. vulgaris
			Onos sp.

MAY.	JUNE.	JULY.	AUGUST.
G. merlangus	*M. molva*	*C. pilchardus*	*Zeus faber*
P. limanda	Callionymus sp.	*R. raninus*	Rhombus sp.
Z. punctatus	*L. bergylta*	*Capros aper*	*S. cabrilla*
P. microcephalus	*L. mixtus*	*S. scomber*	*T. vipera*
S. norvegicus	*C. melops*	Arnoglossus sp.	*C. trachurus*
S. variegata	Gobius sp.	*S. lascaris*	*M. surmuletus*
Trigla sp.		*S. lutea*	*C. rubescens*
L. montagui		*A. lanceolatus*	*L. scorpioides*
		C. rupestris	*B. ocellaris*
		C. exoletus	
		B. pholis	
		B. gattorugine	
		L. piscatorius	
		L. bimaculatus	

SEPTEMBER.	OCTOBER.	NOVEMBER.	DECEMBER.
—	*M. merluccus*	—	*G. luscus*

TABLE 1.

AVERAGE MONTHLY CATCHES OF POST-LARVÆ PER HALF-HOUR HAUL WITH 2-METRE RING-TRAWL FISHING AT ALL DEPTHS, 1924–1929.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Clupeid sp.*	23·7	30·3	51·6	70·7	25·0	15·5	48·4	42·6	1·6	16·6	30·0	22·5
Gadus pollachius	–	–	1·2	7·7	1·6	0·1	–	–	–	–	–	–
G. merlangus	–	–	7·8	32·0	55·9	32·8	2·3	0·2	–	–	–	–
G. minutus†	–	3·9	24·0	52·5	33·6	8·8	0·9	–	–	–	–	–
G. luscus	0·9	6·9	5·4	3·8	1·8	0·8	0·1	1·4	0·7	7·1	3·9	49·5
G. callarias	–	–	–	1·1	–	–	–	–	–	–	–	–
Onos sp.	–	–	0·6	14·8	10·4	3·3	0·8	–	–	–	–	–
Molva molva	–	–	–	0·1	3·5	4·6	0·1	–	–	–	–	–
Merluccius merluccius	–	–	–	–	–	0·3	0·2	0·2	0·2	1·6	0·9	–
Raniceps raninus	–	–	–	–	–	0·04	0·2	0·2	–	0·1	–	–
Capros aper	–	–	–	–	–	0·04	0·3	0·3	0·1	–	–	–
Zeus faber	–	–	–	–	–	–	–	0·1	–	–	–	–
Arnoglossus sp.	–	–	–	–	–	0·2	12·4	7·6	10·5	2·0	–	–
Rhombus sp.	–	–	–	–	–	0·2	1·8	2·4	0·6	–	–	–
Scophthalmus norvegicus	–	–	–	5·8	29·8	18·3	6·4	–	–	–	–	–
S. unimaculatus	–	–	–	–	+	+	+	–	–	–	–	–
Zeugopterus punctatus	–	–	0·6	1·2	6·2	0·8	–	–	–	–	–	–
Pleuronectes limanda	–	–	6·6	21·8	45·3	8·8	0·2	–	–	–	–	–
P. flesus	–	–	0·3	4·5	0·7	–	–	–	–	–	–	–
P. microcephalus	–	–	0·3	6·3	16·1	8·4	1·5	–	–	–	–	–
Solea vulgaris	–	–	0·3	4·9	1·0	0·04	–	–	–	–	–	–
S. variegata	–	–	–	5·8	40·5	29·1	3·4	–	–	–	–	–
S. lascaris	–	–	–	–	–	–	0·1	–	–	0·4	–	–
S. lutea	–	–	–	–	–	–	0·1	–	–	–	–	–
Serranus cabrilla	–	–	–	–	–	–	–	0·3	0·1	0·2	–	–
Caranx trachurus	–	–	–	–	–	–	3·9	34·4	3·6	2·0	–	–
Mullus surmuletus	–	–	–	–	–	–	–	0·1	–	–	–	–
Ammodytes tobianus	0·6	90·9	20·7	2·6	0·1	0·2	–	0·2	0·4	0·2	–	–
A. lanceolatus	–	–	2·4	8·6	13·9	9·1	14·8	8·1	–	–	–	–
Cepola rubescens	–	–	–	–	–	0·04	0·1	0·4	–	–	–	

Callionymus sp.	–	–	8·7	89·0	377·6	395·0	59·2	24·1	1·1	9·6	0·9	–
Labrus bergylta	–	–	–	0·1	1·3	9·1	1·2	–	–	–	–	–
L. mixtus	–	–	–	–	0·2	5·9	1·4	–	–	–	–	–
Ctenolabrus rupestris	–	–	–	–	–	2·5	12·0	4·9	0·1	–	–	–
Crenilabrus melops	–	–	–	–	–	2·9	2·5	0·7	–	–	–	–
Centrolabrus exoletus	–	–	–	–	–	1·3	1·9	0·8	–	–	–	–
Trachinus vipera	–	–	–	–	–	0·4	2·6	18·3	1·0	–	–	–
Trachinus draco	–	–	–	–	–	–	–	–	0·1	–	–	–
Scomber scomber ‡	–	–	–	–	0·1	5·8	22·8	0·2	–	–	–	–
Gobius sp.§	–	–	–	0·9	1·8	68·8	62·9	8·0	1·2	0·5	0·9	–
Lebetus scorpioides	–	–	–	–	0·2	0·7	2·7	8·7	1·5	0·3	–	2·1
Blennius ocellaris	–	–	–	–	–	0·2	0·4	0·8	–	–	–	–
B. pholis	–	–	–	–	0·1	0·8	0·8	0·2	–	–	–	–
B. gattorugine	–	–	–	–	–	2·5	6·4	5·2	0·3	–	–	–
Chirolophis galerita	0·3	3·0	2·0	0·3	–	–	–	–	–	–	–	–
Trigla sp.¶	–	–	1·5	3·0	13·4	12·5	5·5	3·5	0·7	0·9	–	–
Cottus bubalis	–	–	4·5	2·6	0·7	0·5	–	–	–	–	–	–
Agonus cataphractus	–	–	0·3	0·1	0·1	–	–	–	–	–	–	–
Liparis montagui	–	–	–	0·3	1·1	0·8	–	0·3	–	–	–	–
Lepadogaster bimaculatus	–	–	–	0·3	0·1	2·4	1·6	1·3	0·3	–	–	–
Lophius piscatorius	–	–	0·3	0·04	–	0·3	0·8	0·1	–	–	–	–
Belone vulgaris+	–	–	–	–	–	–	–	–	0·1	–	–	–

* Includes *Clupea harengus*, *Clupea sprattus*, and *Sardina pilchardus*. Post-larval herring occur mostly in January, February, and March; sprat in March, April, and May, the increase being generally due to larger numbers of recently hatched sprat: from May till end of year the catches are mostly pilchard which spawn intermittently throughout the summer.

† *Gadus minutus* post-larvæ live normally very deep in the water in the daytime, and possibly these averages should be considerably higher to give a true picture.

‡ In calculating these averages for *Scomber scomber*, the mackerel, the results for 1926 have not been included as it is thought that perhaps this may have been an abnormal year (see Table 3).

§ The post-larval gobies live very near the bottom in the daytime, and these averages should probably be very much higher.

¶ Consist of *Trigla gurnardus*, *T. cuculus*, and *T. hirundo* chiefly.

\+ Less than 0·1.

TABLE 2.

DATES ON WHICH COLLECTIONS WERE MADE.

	1924	1925	1926	1927	1928	1929	Total days.
January	—	—	—	—	9th 16th 26th 30th	—	4
February	—	—	—	—	2nd 20th 27th	—	3
March	—	—	—	—	5th 21st 30th	—	3
April	—	2nd 8th 29th	9th 13th (i) 13th (ii) 22nd 26th	4th 14th 26th	4th 11th 12th 23rd	10th 19th 23rd 29th	19
May	29th	19th (i) 19th (ii)	6th 19th	2nd 9th 16th 25th	—	6th 13th 23rd 27th	13
June	25th	4th (i) 4th (ii) 17th 18th 19th	3rd 4th 25th 30th	2nd 9th 29th	—	6th 11th 25th	16
July	1st 15th 16th	1st (i) 1st (ii) 16th 29th	6th 13th 26th	8th 12th 21st 26th	—	3rd 9th 18th 23rd 30th	19
August	—	6th	4th	4th 8th 19th 26th 31st	—	9th 15th 22nd 26th	11
September	—	—	22nd	6th 15th 19th	—	4th 6th 10th 17th 24th	9
October	—	—	—	4th 13th 18th 24th	—	3rd 10th 16th	7
November	—	—	—	1st	—	—	1
December	—	—	—	15th 21st	—	—	2

TABLE 3.

AVERAGE MONTHLY CATCH OF POST-LARVÆ PER 30-MINUTE HAUL WITH RING-TRAWL.

		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Clupeid sp.	1924					42·0	28·5	67·2					
Herring }	1925				47·7	10·8	9·2	6·6	0·9				
Sprat }	1926				95·4	57·9	15·9	63·0	150·0	1·2			
Pilchard }	1927				107·4	7·8	8·1	81·3	14·1	1·2	2·4	30·0	22·5
5–20 mm.	1928	23·7	30·3	51·6	82·5								
	1929				20·7	6·3	15·9	24·0	5·4	2·4	30·7		
Gadus pollachius	1924					–	–	–					
Pollach	1925				10·5	0·3	0·1	–	–				
4·5–12 mm.	1926				3·3	5·7	0·3	–	–	–			
	1927				0·9	1·2	–	–	–	–	–	–	–
	1928	–	–	1·2	21·6								
	1929				2·4	0·6	–	–	–	–	–		
Gadus merlangus	1924					42·0	80·4	2·1					
Whiting	1925				31·2	83·1	23·7	4·5	–				
4–12 mm.	1926				52·5	55·8	36·6	0·9	0·6	–			
	1927				14·4	51·0	8·4	0·6	0·2	–	–	–	–
	1928	–	–	7·8	29·7								
	1929				32·4	47·7	15·0	3·6	–	–	–		
Gadus minutus	1924					33·9	24·9	4·2					
Poor Cod or Bib	1925				42·9	49·8	4·8	–	–				
4–12 mm.	1926				56·1	40·2	12·9	–	–	–			
	1927				17·4	43·2	–	–	–	–	–	–	–
	1928	–	3·9	24·0	135·6								
	1929				10·5	0·9	1·2	0·3	–	–	–		
Gadus luscus	1924					3·0	1·5	–					
Pouting or Pout	1925				2·1	–	0·1	0·2	–				
4–10 mm.	1926				3·9	3·6	1·8	–	2·4	–			
	1927				1·5	2·4	0·3	–	0·6	0·3	2·1	3·9	49·5
	1928	0·9	6·9	5·4	8·4								
	1929				3·0	–	0·3	0·3	2·4	1·8	12·0		
Gadus callarias	1924					–	–	–					
Cod	1925				–	–	–	–	–				
4–10 mm.	1926				2·1	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	–	0·3								
	1929				3·3	–	–	–	–	–	–		
Onos sp.	1924					15·0	3·0	3·0					
Rockling	1925				24·3	8·4	0·9	–	–				
4–10 mm.	1926				17·1	23·7	7·2	–	–	–			
	1927				0·3	3·9	0·9	–	–	–	–	–	–
	1928	–	–	0·6	31·8								
	1929				0·3	0·9	4·5	0·9	–	–	–		
Molva molva	1924					9·9	9·9	–					
Ling	1925				–	0·9	0·6	0·6	–				
5–14 mm.	1926				0·1	4·8	12·3	–	–	–			
	1927				–	1·5	–	–	–	–	–	–	–
	1928	–	–	–	0·3								
	1929				–	0·3	–	–	–	–	–		
Merluccius	1924					–	1·5	–					
merluccius	1925				–	–	–	–	–				
Hake	1926				–	–	0·2	0·9	–	–			
5–10 mm.	1927				–	–	–	0·2	0·6	–	1·5	0·9	–
	1928	–	–	–	–								
	1929				–	–	–	–	0·3	0·6	1·7		
Raniceps raninus	1924					–	–	–					
Lesser Forkbeard	1925				–	–	–	0·2	0·6				
4–6 mm.	1926				–	–	0·2	0·6	–	–			
	1927				–	–	–	0·2	0·2	–	0·3	–	–
	1928	–	–	–	–								
	1929				–	–	–	0·2	–	–	–		

		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Capros aper	1924					–	0·2	–					
Boar-fish	1925				–	–	–	–	–				
3–6 mm.	1926				–	–	–	–	0·5	–			
	1927				–	–	–	0·8	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	0·5	0·3	–		
Zeus faber	Only caught August, 1926. Average 0·5.												
John Dory													
Arnoglossus sp.	1924					–	0·9	4·2					
Scaldbacks	1925				–	–	–	4·8	4·5				
4–20 mm.	1926				–	–	0·1	18·3	9·9	16·8			
	1927				–	–	–	15·0	7·2	3·0	0·9	–	–
	1928	–	–	–	–								
	1929				–	–	–	19·5	8·7	11·7	3·0		
Rhombus sp.	1924					–	0·8	–					
Turbot and Brill	1925				–	–	–	–	–				
4–10 mm.	1926				–	–	0·1	3·2	8·6	0·6			
	1927				–	–	–	3·3	0·8	0·6	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	2·4	0·3	0·6	–		
Scophthalmus norvegicus	1924					32·1	20·4	17·4					
	1925				22·5	92·1	13·8	2·4	–				
Norway Topknot	1926				0·9	15·3	42·6	1·8	–	–			
4–10 mm.	1927				0·9	8·7	3·6	0·9	–	–	–	–	–
	1928	–	–	–	4·8								
	1929				–	0·6	11·1	9·3	–	–	–		
S. unimaculatus	Only 6 caught during the 6 years. E1 17/6/24, 2; A, 1/7/25, 1; 7/5/24, 1; 17–18/7/25, 2 (dusk and dark).												
Zeugopterus punctatus	1924					11·1	–	–					
	1925				1·8	12·6	0·2	–	–				
Topknot	1926				0·9	2·7	3·6	–	–	–			
4–10 mm.	1927				1·2	4·2	–	–	–	–	–	–	–
	1928	–	–	0·6	2·1								
	1929				–	0·6	–	–	–	–	–		
Pleuronectes limanda	1924					24·0	15·9	0·9					
	1925				26·4	69·6	3·9	0·3	–				
Dab	1926				24·3	50·1	9·3	–	–	–			
5–12 mm.	1927				6·6	68·4	2·1	–	–	–	–	–	–
	1928	–	–	6·6	37·2								
	1929				14·7	14·4	12·6	–	–	–	–		
Pleuronectes flesus	1924					–	–	–					
Flounder	1925				1·2	2·7	–	–	–				
4–9 mm.	1926				6·0	0·6	–	–	–	–			
	1927				3·9	0·2	–	–	–	–	–	–	–
	1928	–	–	0·3	10·8								
	1929				0·6	–	–	–	–	–	–		
Pleuronectes microcephalus	1924					21·9	21·6	4·5					
	1925				8·7	24·6	3·9	0·9	–				
Merrysole or	1926				3·6	27·6	13·2	1·2	–	–			
Lemon Dab	1927				1·5	6·0	0·6	–	–	–	–	–	–
4–13 mm.	1928	–	–	0·3	17·7								
	1929				–	0·6	2·7	0·9	–	–	–		
Solea vulgaris	1924					–	–	–					
Common Sole	1925				2·4	1·2	–	–	–				
4–9 mm.	1926				6·0	1·8	0·2	–	–	–			
	1927				6·3	1·2	–	–	–	–	–	–	–
	1928	–	–	0·3	3·3								
	1929				6·3	0·6	–	–	–	–	–		
Solea variegata	1924					20·1	111·0	6·1					
Thickback	1925				9·9	101·4	6·3	0·9	–				
4–11 mm.	1926				5·7	49·8	25·5	3·9	–	–			
	1927				2·1	29·4	0·3	3·6	–	–	–	–	–
	1928	–	–	–	10·2								
	1929				0·9	1·8	2·4	2·7	–	–	–		
Solea lascaris	1924					–	–	–					
Sand Sole	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	0·3	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	0·4	–	–	0·7		

		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Solea lutea	1924					–	–	–					
Solenette	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	0·6	–	–	–		
Serranus cabrilla	1924					–	–	–					
Sea Perch	1925				–	–	–	–	–				
	1926				–	–	–	–	1·0	0·3			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	–	0·3	–	–
Caranx trachurus	1924					–	–	6·3					
Horse Mackerel	1925				–	–	–	–	–				
or Scad	1926				–	–	–	1·8	107·1	4·8			
4–15 mm.	1927				–	–	–	9·9	9·3	0·3	0·3	–	–
	1928	–	–	–	–								
	1929				–	–	–	0·6	21·3	5·7	3·7		
Mullus surmuletus	1924					–	–	–					
Red Mullet	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	0·4	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	–	–		
Ammodytes tobianus	1924					–	–	–					
Lesser Sandeel	1925				0·2	–	0·1	–	–				
4–20 mm.	1926				2·4	0·3	0·5	–	–	1·2			
	1927				7·8	–	0·3	–	0·6	–	–	–	–
	1928	0·6	90·9	20·7	0·9								
	1929				1·5	–	–	–	0·3	–	0·3		–
Ammodytes	1924					12·0	16·5	35·1					
lanceolatus	1925				11·1	37·5	7·5	18·9	5·1				
Greater Sandeel	1926				1·5	12·6	10·8	13·5	22·5	–			
5–20 mm.	1927				8·7	6·9	5·4	3·6	0·9	–	–	–	–
	1928	–	–	2·4	21·0								
	1929				0·9	0·6	5·1	2·7	3·9	–	–		
Cepola rubescens	1924					–	–	–					
Red Band Fish	1925				–	–	–	–	–				
	1926				–	–	–	0·2	–	–			
	1927				–	–	–	–	–	0·7	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	0·5	–	–		
Callionymus sp.	1924					347·1	1102·5	95·1					
Dragonets	1925				55·8	442·8	144·9	80·7	3·6				
3–8 mm.	1926				99·6	507·6	648·0	39·3	70·5	–			
	1927				24·0	533·7	24·3	11·4	7·8	1·8	18·9	0·9	–
	1928	–	–	8·7	212·1								
	1929				53·4	57·0	55·2	69·3	14·4	1·5	0·3		
Labrus bergylta	1924					0·9	24·0	4·5					
Ballan Wrasse	1925				0·2	1·8	1·2	0·3	–				
4–9 mm.	1926				0·2	3·0	12·6	0·2	–	–			
	1927				–	0·6	6·9	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	0·6	1·2	–	–	–		
Labrus mixtus	1924					–	22·5	5·4					
Cuckoo Wrasse	1925				–	0·3	0·2	–	–				
4–9 mm.	1926				–	0·6	6·0	1·2	–	–			
	1927				–	–	0·9	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	0·6	–	–	–		
Ctenolabrus rupestris	1924					–	1·5	5·7					
	1925				–	–	0·3	1·2	0·6				
4–9 mm.	1926				–	–	9·9	39·6	8·4	–			
	1927				–	–	0·6	6·0	4·5	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	7·5	6·0	0·3	–		
Crenilabrus melops	1924					–	6·6	11·7					
	1925				–	–	–	0·3	2·4				
4–7 mm.	1926				–	–	5·4	0·3	–	–			
	1927				–	–	2·4	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	0·3	–	–		

		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Centrolabrus exoletus 4·7 mm.	1924					–	0·9	5·7					
	1925				–	–	0·1	0·6	2·4				
	1926				–	–	1·8	2·1	–	–			
	1927				–	–	3·0	0·2	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	0·6	0·9	0·6	–	–		
Trachinus vipera Lesser Weever 3–11 mm.	1924					–	–	0·6					
	1925				–	–	–	3·3	3·6				
	1926				–	–	0·6	4·2	57·0	–			
	1927				–	–	1·2	2·4	3·9	0·3	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	2·4	8·7	2·7	–		
Trachinus draco Greater Weever	1924					–	–	–					
	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	0·2	–		
Scomber scomber Mackerel 4–12 mm.	1924					–	15·0	8·1					
	1925				–	–	6·0	2·4	–				
	1926				–	–	18·9	178·5	146·4	–			
	1927				–	0·6	1·2	23·4	0·9	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	1·2	57·3	–	–	–		
Gobius sp. Gobies 3–10 mm.	1924					6·9	278·4	170·4					
	1925				–	0·3	5·7	12·9	11·4				
	1926				2·1	–	41·4	68·1	5·4	–			
	1927				0·3	0·9	2·1	2·1	6·0	0·9	0·6	0·9	–
	1928	–	–	–	2·1								
	1929				–	–	16·2	60·9	9·3	2·7	0·3		
Lebetus scorpioides 3–6 mm.	1924					–	0·9	0·9					
	1925				–	–	0·1	0·9	5·1				
	1926				–	0·9	2·4	8·4	25·5	1·8			
	1927				–	0·2	0·3	1·2	1·5	0·3	0·3	–	2·1
	1928	–	–	–	–								
	1929				–	–	–	2·1	2·7	2·4	0·3		
Blennius ocellaris Butterfly Blenny	1924					–	0·9	0·6					
	1925				–	–	–	0·2	1·5				
	1926				–	–	–	1·2	0·9	–			
	1927				–	–	–	–	0·6	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	–	–		
Blennius pholis Shanny	1924					–	0·9	1·2					
	1925				–	0·3	0·2	1·2	0·6				
	1926				–	–	2·4	0·9	–	–			
	1927				–	0·2	0·3	0·9	0·2	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	–	–		
Blennius gattorugine Tompot 5–10 mm.	1924					–	3·6	6·0					
	1925				–	–	0·9	5·4	2·1				
	1926				–	–	7·2	12·6	8·4	–			
	1927				–	–	0·9	2·1	3·6	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	5·7	6·6	0·9	–		
Chirolophis galerita Yarrell's Blenny 4–7 mm.	1924					–	–	–					
	1925				0·6	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	0·3	3·0	2·0	–								
	1929				0·8	–	–	–	–	–	–		
Agonus cataphractus Pogge	1924					–	–	–					
	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	0·3	0·3								
	1929				0·3	0·3	–	–	–	–	–		
Trigla sp. Grey and Red Gurnards, and Tub 4–12 mm.	1924					9·9	45·0	9·9					
	1925				1·5	38·4	3·3	5·4	0·6				
	1926				6·0	5·7	7·8	2·4	5·1	0·6			
	1927				–	7·5	3·9	6·0	1·5	–	–	–	–
	1928	–	–	1·5	0·3								
	1929				7·2	5·7	2·7	3·6	6·6	1·5	1·7		

		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cottus bubalis	1924					0·9	1·5	–					
Father Lasher	1925				0·3	0·6	0·1	–	–				
5–8 mm.	1926				1·5	–	0·3	–	–	–			
	1927				1·5	0·9	–	–	–	–	–	–	–
	1928	–	–	4·5	6·0								
	1929				3·6	0·9	0·6	–	–	–	–		
Liparis montagui	1924					–	3·6	–					
Montague's Sucker	1925				0·2	1·2	–	–	1·0				
7–10 mm.	1926				0·3	–	–	–	–	–			
	1927				–	3·0	–	–	–	–	–	–	–
	1928	–	–	–	0·8								
	1929				0·3	–	0·3	–	–	–	–		
Lepadogaster	1924					–	7·5	3·6					
bimaculatus	1925				–	0·3	0·2	1·5	0·9				
Doubly Spotted	1926				–	0·3	2·4	0·6	2·1	–			
Sucker	1927				1·5	–	–	–	0·2	–	–	–	–
5–10 mm.	1928	–	–	–	–								
	1929				–	–	2·1	2·1	2·1	0·9	–		
Lophius piscatorius	1924					–	–	1·5					
Angler	1925				–	–	–	–	–				
5–9 mm.	1926				0·2	–	0·6	1·8	–	–			
	1927				–	–	0·3	0·3	0·2	–	–	–	–
	1928	–	–	0·3	–								
	1929				–	–	0·6	0·3	–	–	–		
Belone vulgaris	1924					–	–	–					
Garfish	1925				–	–	–	–	–				
	1926				–	–	–	–	–	–			
	1927				–	–	–	–	–	–	–	–	–
	1928	–	–	–	–								
	1929				–	–	–	–	–	0·2			

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