

THE FISHES OF THE FLEET WITH PARTICULAR REFERENCE TO THE
YOUNG STAGES OF THE BASS (DICENTRARCHUS LABRAX L.)

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Introduction

This paper is based chiefly on work carried out by the scientists of the Freshwater Biological Association's River Laboratory on behalf of the Dorset County Council. It was the first scientific study of the ichthyofauna of the Fleet and details of the methodology and results are presented in a report prepared for D.C.C. by Bass, Beaumont, Ladle & Mann (1983). The objectives of the work were to determine whether bass (Dicentrarchus labrax L.) spawned within the Fleet as had been reported or whether eggs, larvae or post-larvae were present in the plankton which drifts in or out of the Fleet with each tide. Further, attempts were made to establish the distribution, age structure and relative growth rates of young bass within the lagoon and to collect incidental information on other species of fish.

Sampling was at intervals of about two weeks between May and the end of August with a final visit in October 1983. Six sites were sampled in all and the techniques used included plankton sampling at Smallmouth and the operation of seine nets, hand nets, push nets and gill nets at all stations according to the objectives. Samples were preserved in formalin and fish eggs, larvae and post-larvae were identified using Russell (1976).

No fish of any kind were caught on the two occasions that the gill nets were set. Hand operated pond nets captured only post-larval sandmelts (Atherina presbyter Val.) and gobies (Pomatoschistus spp). All bass caught, up to and including 13 July, were 1-group fish in their second year of life (spawned in 1982), but three bass caught on 12 August were 0-group fish (young of the year). Sampling effort was subsequently concentrated on catching these 0-group fish. No bass greater than 150mm was captured during the study.

Plankton net samples (Table 1) failed to record the presence of the young stages of bass in the tidal stream passing through Smallmouth, either because the intensity of sampling was too low or because the small fish actively avoided the nets. Many other species of fish were, however, recorded. The larvae and post-larvae of gobies were very numerous. Many crustacean larvae were also present, particularly on the flood tides. Plankton netting ceased after mid-August when bass post-larvae were already present within the Fleet.

A total of 191 juvenile bass were caught by seine netting (Table 2) from three sites at Pirates Lane, Moonfleet and Langton Hive (Fig. 1). The distribution of bass within the Fleet is extensive but localised shoaling of the fish caused fluctuations in catches which made it difficult to estimate the numbers of bass which use the Fleet as a nursery. The netting results indicate that bass were present throughout the study and, in view of the results of work in the Severn estuary, they may well be present throughout the year (Claridge & Potter, 1983).

The first catches of post-larval bass were made later than anticipated (12 August). Other reports of post-larvae have suggested June and July as the normal time (Russell, 1980) but late appearance has precedents and, in S. Devon and Cornwall Dando, P.R. and Kelley D.F. (pers. comm.) report such an occurrence in 1983.

Seasonal growth of bass will vary from year to year and may also differ between localities. Fast growth and good survival have been reported in warmer-than-average years (Kelley, 1979). Restricted tidal exchange in the Fleet (Robinson, 1981) renders it liable to particularly high summer temperatures compared to many other estuaries.

Differences in the food of young bass (determined from gut contents) reflect, to some extent, seasonal changes in availability and size of potential prey organisms. There are also clear differences in the choice of prey by bass of different sizes (Table 3). The food of both 0-group and 1-group bass was dominated by various crustaceans and there was a total absence of the, extremely numerous, post-larvae of sand smelts from the diet. Kennedy & Fitzmaurice (1972) found a similar dominance of small crustaceans in 1-group bass from a tidal lagoon on the south coast of Ireland.

Occurrence of Other Fish in the Fleet

Large shoals of small grey mullet were frequently observed in the Fleet and commercial catches are taken with gill nets by some local fishermen. Anglers regard them as a desirable but hard-to-catch quarry. Mullet were frequently captured in the 40m seine and the age structure of the fish retained has not been analysed. For the major part of the study, mid-May to mid-August, no post-larvae were recorded, but many were taken in the micro-mesh seine on 24 October. Difficulties were experienced in separating mullet species, particularly with young fish, as at least two species (Crenimugil labrosus and Liza aurata) were present and possibly also L. ramada.

The sandsmelt (Atherina presbyter) was the second most abundant fish captured (after gobies) in the Fleet. The large numbers of sandsmelt post-larvae presented difficulties in the search for bass, as they were superficially similar and this entailed time-consuming checks - reducing the total number of 0-group bass that could be processed. Sandsmelt eggs, which have rarely been observed in other British waters, were recovered on the ebb tide from the plankton at the end of May. They were attached to fragments of a finely-branched green alga, indicating that they are essentially benthic in occurrence and not planktonic, which is in agreement with Bamber, Henderson & Turnpenny (1982). Post-larvae were recorded from mid-June onward and occurred at all sampling sites throughout the summer. Adult (60-140mm) fish, taken in the 40m seine, declined in numbers later in the study. This may be attributed to emigration from the Fleet. Staff from the Marine Biology Unit, Fawley (C.E.G.B.), are in the process of analysing the copious sandsmelt data to compare with their population studies in Southampton water.

Plankton samples collected on the flood tide in mid-May contained flounder (Pleuronectes flesus) post-larvae. Larger fish were taken in seine nets and covered a wide range of sizes. Low overall catches prevented any clear conclusions as to their importance in the Fleet.

Not many eels were caught, despite the presence of a thriving eel fishery. This discrepancy was probably due to sampling being confined to shallow, intertidal regions of the lagoon.

Conclusions

The study provided no evidence to support the possibility of bass spawning within the Fleet. It is now generally believed that these fish spawn chiefly in offshore situations and that the larvae migrate inshore, often to shallow brackish water. The status of the Fleet as a nursery area was confirmed by regular recovery of young fish from a number of sites but it was not possible to estimate the size of the population except to say that it was substantial. The young fish were relatively quick growing for a species nearing the northern limits of its geographical distribution.

The absence of evidence of bass spawning within the Fleet supports the observations of Demestre *et al.* (1977) for brackish lagoons on the coast of Spain.

Acknowledgements

The major work carried out since the first compilation was supported by Dorset County Council and carried out by scientists of the Freshwater Biological Association's River Laboratory. Assistance, equipment and advice was given by Dr M.G. Pawson (M.A.F.F. Lowestoft), Dr T.E. Langford (C.E.G.B. Fawley), Dr P.R. Dando (M.B.A. Plymouth), Mr D.F. Kelley and Mr J. Churchouse.

Table 1. Families of fish recorded in plankton samples from the Smallmouth in 1983 (eggs, larvae and post-larvae).

		Number recorded	
		Flood	Ebb
Dragonet	Callionymidae	-	-
Flounder	Pleuronectidae	10	-
Rockling	Gadidae	4	-
Sandeel	Ammodytidae	9	2
Goby	Gobiidae	>239	>162
Blenny	Blenniidae	4	-
Wrasse	Labridae	4	1
Sandsmelt	Atherinidae	2	9
Pouting	Gadidae	1	-
Stickleback	Gasterosteidae	-	>18
Herring	Clupeidae	2	-
Pipefish	Syngnathidae	-	>0

Table 2. Species of fish caught in seine and other nets, 1983.

		Number
Bass	<u>Dicentrarchus labrax</u>	- 191
Mulletts	<u>Liza aurata</u>) <u>Crenimugil labrosus</u>)	>180
Sandsmelt	<u>Atherina presbyter</u>	- >183
Goby	<u>Pomatoschistus microps</u>	- >139
3 spined stickleback	<u>Gasterosteus aculeatus</u>	- >56
Flounder		- >41
Pipefish	<u>Syngnathus</u>	- >2
Wrasse	<u>Crenilabrus melops</u>	- >2
Eel	<u>Anguilla anguilla</u>	- >5
Sandeel	<u>Ammodytes sp</u>	- 1

Table 3. The food of young bass from the Fleet at Langton Hive. Items present in more than 20% of stomachs are indicated.

	0+	1+
Mysidaceae	40	5
Gammaridae	27	9
<u>Idotea</u> sp	21	14
Polychaeta	4	-
<u>Diptera</u>	3	6
<u>Corophium</u> spp	2	51
<u>Jassa</u> sp	-	5
Others	3	10