

this percentage had fallen to 44. A complete drying of the pond after three months did not reveal the existence of any small snails. The fact that some big *Physopsis* specimens survived was probably in relation with the small size of the fish ( $\pm 14$  cm.). In a spawning pond with big breeders all snails had disappeared. Since this fish does not feed exclusively on snails, the complete disappearance of the latter does not harm his growth. Insect larvæ, crustaceans, other fishes, tadpoles, worms, etc., are eaten in different proportions.

In our ponds *Serranochromis* has already successfully spawned and we have many data about breeding habits, growth, resistance to manipulation, etc. We hope to have enough fingerlings before the end of the year to start distribution.

It may be added that this fish is a good sporting-fish and very palatable.

A few other species of fishes feeding on snails and mussels were studied at the same time. Among other siluroids we should like to mention *Chrysichtys mabusi* which, in its natural environment, feeds on molluscs. Curiously enough, even the thin shells of *Mutela* remain unbroken all through the digestive tract. *Chrysichtys mabusi* seems to be important for mollusc control in large permanent waters.

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<sup>1</sup> Mozley, A., "The Snail Hosts of Bilharzia in Africa" (H. K. Lewis, London, 1951).

<sup>2</sup> De Bont, A. F., "2<sup>e</sup> Rapport annuel de l'IRSAC, 1949" (1950).

<sup>3</sup> Hasler, A. D., *Trans. Wisc. Acad. Sci.*, 39, 97 (1949).

<sup>4</sup> Pilsbry, H. A., and Bequaert, J., *Bull. Amer. Mus. Nat. Hist.*, 53 (1927).

<sup>5</sup> East. Afr. Fish Res. Org. 1950 Annual Report.

### Change in the Composition of the Bottom Fauna of the Dogger Bank Area

F. M. DAVIS<sup>1</sup> has shown that, during the quantitative bottom investigations carried out with the Petersen grab over the Dogger Bank area of the North Sea during 1921-23, there was a pronounced dominance of the bivalves *Spisula subtruncata* (da Costa) and *Macra corallina* (L.).

The Danish Commission for Fishery and Sea Investigations in May 1950 and 1951 undertook a similar investigation in the area with the research vessel *Dana*, comprising about two hundred samples taken with the 0.2 sq. m. van Veen and Petersen grabs. It was found that the above-mentioned species had decreased considerably in number as compared with the previous investigations. It also appeared that most other species recorded by Davis had increased in number.

Below, the finds made by Davis during voyage 48 (60 sq. m. of samples with the 0.2 sq. m. Petersen grab in October 1922), covering the central and western parts of the bank, are compared with the samples taken in May 1951 in the same area (11 sq. m. of samples with the 0.2 sq. m. van Veen and Petersen grabs). The difference in season of the year between the two investigations may be of some importance. However, during Davis's investigations the general aspect of the composition of the fauna did not change markedly with the seasons. The number per sq. m. of animals of different systematic groups is shown in the accompanying table.

	No. per sq. m.	
	Davis (Oct. 1922)	<i>Dana</i> (May 1951)
<i>Spisula subtruncata</i>	272	5
<i>Macra corallina</i>	11	1
Other species of bivalves	4	43
<i>Polychæta</i>	4	70
<i>Echinoderma</i>	4	28
Other groups	8	65
Total	303	212
excl. <i>S. subtr.</i> and <i>M. cor.</i>	20	206

The total number of animals per sq. m. has decreased by one-third, though species other than *Spisula subtruncata* and *Macra corallina* have, on an average, increased their numbers about ten times. This may be due to the presence of a greater amount of O-group animals of summer-spawning species in the autumn investigation than in the spring investigation. (No marked difference in the efficiency of the two kinds of grabs was found.)

In 1951 the following five species were the most numerous in the area (unbracketed: number per sq. m. in 1951; bracketed: number per sq. m. in 1922):

<i>Tellina fabula</i> Gmelin	22 (0.5)
<i>Ophelia limacina</i> Rathke	14 (0.3)
<i>Ophiura albida</i> Forbes	11 (0.8)
<i>Echinocardium cordatum</i> Pennant	8 (1)
<i>Eone nordmanni</i> Malmgren	7 (0)
( <i>Amphipoda</i> not yet determined).	

*Eone nordmanni* was not recorded by Davis, but may have been confused with *Goniada maculata* Ørsted (Davis's voy. No. 48: 0.3; pres. inv. 2.9 per sq. m.). However, some other species, which are now present in fairly large quantities, were not found during Davis's voyage 48:

<i>Echinocyamus pusillus</i> (O. F. Müller)	6
<i>Myriochele heeri</i> Malmgren	5
<i>Cerianthus lloydii</i> Gosse	3

Since *S. subtruncata* and *M. corallina*, which have decreased in number, represent a southern faunal element of the North Sea, the unusually cold winters of 1940-42 and especially 1947 may have influenced their occurrence. However, the catastrophic effect of severe winters on stocks of marine animals with a pelagic larval development will normally soon be counteracted by a heavy spat-fall of the same species, since the amount of larvæ produced by the reduced parental stock is sufficient for a quick renewal of the population<sup>2</sup>. In 1950 and 1951 the greater part of the specimens of *S. subtruncata* and *M. corallina* were obviously very old. This indicates a failure of spat-fall during the later years, showing an interfering of factors other than the effect of severe winters.

What brought about the changed composition of the fauna is still an unsolved question because we know very little of the stability of marine animal communities. In fact, it is not known whether the difference observed between the composition of the fauna during the two periods of investigation is indicative of a fairly constant change from one state of balance to another, or whether it merely indicates the degree of fluctuation in the said area under relatively stable conditions of environment.

It is intended to continue the investigations. Later, a detailed report will be published elsewhere.

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<sup>1</sup> Davis, F. M., *Min. Agric. Fish., Fishery Invest.*, Ser. 2, 6, No. 2 (1923).

<sup>2</sup> Smidt, E. L. B., *Fol. Geogr. Dan.*, 2, No. 3 (1944).