Growth of grey triggerfish, *Balistes capriscus*, based on growth checks of the dorsal spine

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Introduction

During the first large bottom trawling survey on the continental shelf off Ghana conducted in 1966, apparent biomasses of the triggerfish *Balistes capriscus* (Gmelin) were rarely greater than 10 kg ha^{-1} (Williams 1968). However, there is evidence that suggests a tremendous increase of standing stock. For example, during the FIOLENT survey, Robertson (1977) estimated biomasses of 3,081 kg ha^{-1} and 1,355 kg ha^{-1} east of Cape Three Points and off Accra, respectively (Fig. 1). Recently, lower values have been reported e.g., of 43 kg ha^{-1} (Koranteng 1984).

A number of suggestions have been advanced to account for these changes of population sizes along the coast of West Africa (Cavérivière et al. 1981; FAO/CECAF 1983). Biological information on *B. capriscus* is scarce; the species was not important until recently, and still tends to be thrown overboard by the crews of trawlers. The present contribution presents an estimation of growth parameters, as needed to provide a background for mortality estimates and life history studies.

Materials and Methods

Samples of triggerfish were caught with a bottom trawl net off Keta, Tema, Accra, Winneba, Cape Coast and Axim (Fig. 1) during a survey mounted by the Research and Utilization Branch of the Fisheries Department, Tema, Ghana, from January to October 1980. Growth rings in the dorsal spine were studied for fish ranging from 14 to 34 cm fork length. Sections (400 μ thick) of the spines were cut using a low-speed ISOMET 11-1180 Buehler microtome at the Centre de Recherches Océanographiques de Dakar-Thiaroye (C.R.O.D.T.), Dakar, Sénégal.

Dry sections were studied under a high power light. The number of dark zones from the "porous" center ("nucleus") to the edge were taken as the number of growth periods, presumed to be annual.

The number of annuli were plotted against fork length and a smooth curve drawn by age. The mean lengths derived from the eye-fitted curve were used to construct a Ford-Walford plot from which the von Bertalanffy's growth parameters K and L_∞ were estimated, as suggested in Beverton and Holt (1957).

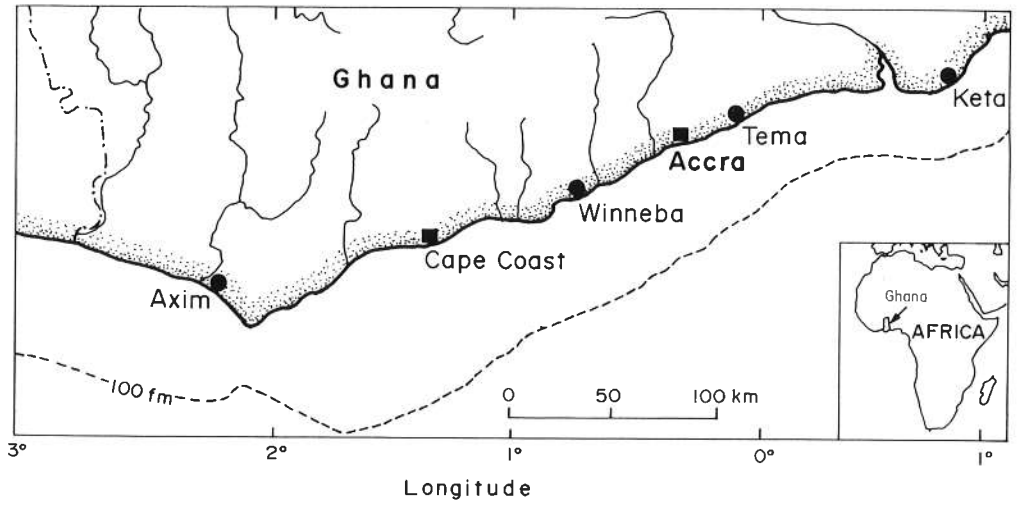

Fig. 1. Map of the coast of Ghana showing localities mentioned in the text.

Results

Fig. 2 shows the distribution of observed length at age of *B. capriscus*, along with the means and the age-fitted growth curve, from which mean lengths-at-age of 14.4 cm, 23.6 cm, 29.2 and 33.0 cm for age groups I, II, III, and IV were read off. From these, estimates of L_∞ = 40.8 cm and K = 0.43 year^{-1} were obtained (Fig. 3).

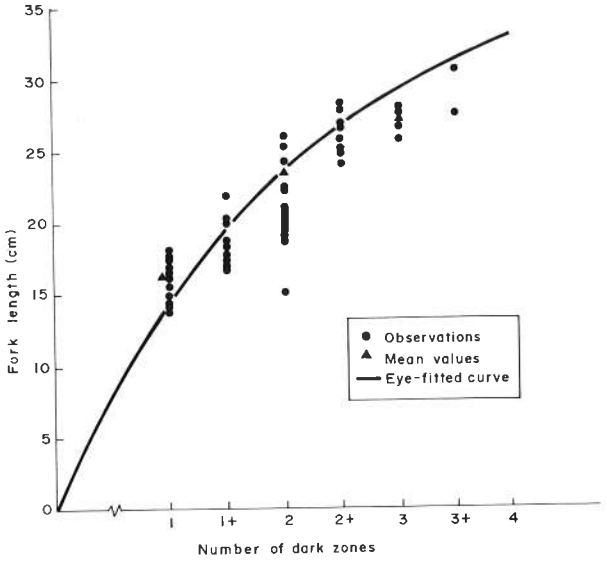

Fig. 2. Growth in length and annual length increment (mm) of triggerfish *B. capriscus* from studies of dorsal spine sections.

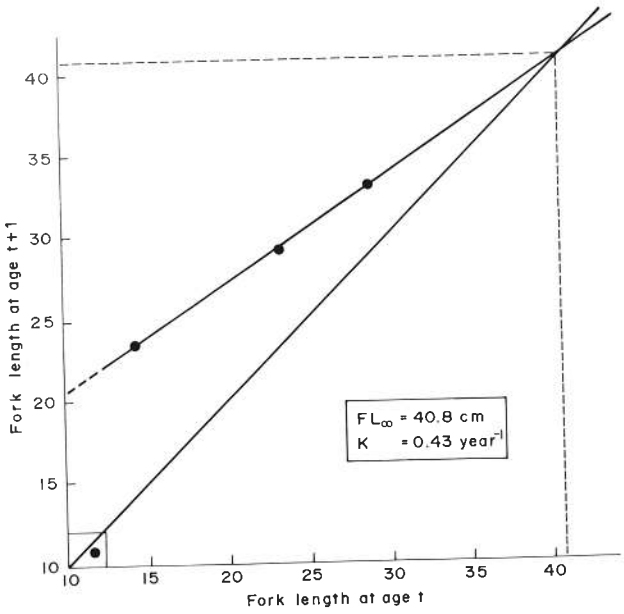

Fig. 3. Ford-Walford plot for the triggerfish B. capriscus caught off the Ghanaian coast in 1980. Asymptotic length (L_∞) was obtained from the intercept with the 45° slope line.

Discussion

First time spawners of *B. capriscus* have been observed to be one year of age (Ofori-Danson 1981; M. Kulbicki, pers. comm.). Their estimated fork length would be about 14-15 cm, only slightly above the values of 13-14 cm reported by Gerlotto et al. (1979) for triggerfish from Senegalese and Guineean waters. These authors further suggest length of 17 cm at about 1-1/2 years and 21 cm at the beginning of the third year of life. The differences between these values and those reported here could be real, considering that their samples and those used in studies here belong to different populations, reflecting perhaps different environmental conditions at two habitats.

The estimate of L_∞ = 41 cm obtained here is markedly smaller than the maximum size of 60 cm reported from Caribbean waters (Moore 1967). The smaller maximum size of the Ghanaian population may be attributable to its specific environment, although the strong fishing pressure off Ghana could also be a contributing factor.

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