



## Dynamics of *Ethmalosa fimbriata* in Southern Senegal

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### Abstract

The Bonga *Ethmalosa fimbriata* (Bowdich, 1825) is the most third small pelagic exploited in the Senegalese waters and is commonly consumed locally. Studies were conducted on the dynamics population of *E. fimbriata*. Monthly catches by landing sites of the Senegalese artisanal fisheries from 1996 to 2013 are provided by the CRODT. They are structured according to the fishing gear, per month and landing sites along the South Senegalese coast (between 14°36N to 13°36N and of 13°40N to 12°20 N). Growth parameters were determined using the length-frequency distribution per month over the period 2014-2015: the asymptotic length " $L_{\infty}$ "=38.2 cm total length, the asymptotic body weight  $W_{\infty}$ = 956 g, the rate by which  $L_{\infty}$  is approached  $K=0.48$  and the theoretical age at zero length  $t_0=-0.3$ ; which are used to estimate the optimum length ( $L_{opt}$ ) of a cohort and its fecundity are maximum at 28.9 cm for an age  $t_{opt}=2.8$  years. We estimate the total mortality,  $Z=1.8$  per year, natural mortality,  $M=0.4$  per year and fishing mortality,  $F=1.4$ . The current rate of exploitation ( $E$ ) was found at 0.32 and the yield per recruit ( $Y/R$ ) was estimated at 0.32, indicating that *E. fimbriata* stock is not fully exploited. We report a seasonal variability in the recruitment and biomass of the Senegalese part of the stock, with a clear trend downward in the analysis period. The seasonal signal shows three phases: between 1996 and 2001, recruitments are higher (50%) and took place from November to March. Over the period 2002 to 2008 (27%), the maximum values are observed May to September; and finally between 2009 and 2013 (23%), the recruitment of *E. fimbriata* peak is observed in the same time of the first phase (November to March). *E. fimbriata* is not fully exploited, that suggest a reallocation of the fishing effort on this species to decrease fishing effort on other species highly exploited as *Sardinella aurita* and so contribute to a better fisheries management of small scale activities in this area. Moreover that will



allow to fit to the theoretical maximum yield per recruit ( $Y_{pot}$ ) for different species targeted by the same fishermen can prevent stock collapse.

**Keywords:** pelagic, optimum size at first capture, population dynamics, yield per recruit, virtual population analysis, West Africa.



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