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Preliminary observation on sexual maturity of black anglerfish (*Lophius budegassa*) in north-eastern Atlantic waters

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ABSTRACT

The reproduction of black anglerfish (*Lophius budegassa*) was studied from samples collected during 5 years, from January 2006 to December 2010, in Celtic Sea, West and South of Ireland (ICES Div. VIIb–k) and Northern Spanish Atlantic waters (ICES Div. VIIIc–IXa). A total of 1167 specimens (4–99 cm) were sampled. The sex ratio, the spawning period and the maturity ogives by length were studied. The sex ratio in both areas studied varied with length, and it was close to 1:1 (male:female), 1:1.22 (54.90% of females) in Div. VIIb–k, and 1:1.01 (50.30% of females) in Div. VIIIc–IXa. A seasonal variation in sex ratio by length was observed at first time in Div VIIIc–IXa, with a very low proportion of intermediate sized females (40–60 cm) in the second semester. A seasonal reproductive migratory behavior is discussed. The spawning period was between December and July in Div. VIIIc–IXa. Spawning males were found throughout the year, but fewer spawning females, as in previous studies. The L50 values were estimated in Div. VIIIc–IXa: 38.2 cm for combined sexes, 36.0 cm for males and 53.0 cm for females. These values of sex ratio and L50 are similar to those obtained in closed areas studied.

1. Introduction

Black anglerfish (*Lophius budegassa* Spinola, 1807) is an important bottom living species in European fisheries, having a depth range between around 50 m and 800 m (Dardignac, 1988; Azevedo and Pereda, 1994). It is distributed in Mediterranean and Eastern North Atlantic from British Isles to Senegal, but there is considerable overlap with the other European anglerfish, white anglerfish (*Lophius piscatorius*). Black anglerfish, as its European congener, is a determinate spawner (Quincoces, 2002). The process of oocytes maturation is similar to that in other teleosts, although the morphology of ovaries differs markedly at a cellular level, from that of most other teleosts. A gelatinous matrix is produced inside the ovaries, the oocytes are arranged in clusters and, within each oocytes cluster, there is a gradation in the size of oocytes. As the ovaries develop, one group of oocytes becomes clearly demarcated from the others (Afonso-Dias and Hislop, 1996). The eggs seem to be shed in a single batch and the egg ribbons are far too long and wide to be a result of only one of several batches (Afonso-Dias and Hislop, 1996; Quincoces, 2002). Although an individual female may spawn only once a year, the spawning period of *L. piscatorius* seems to be of long duration (Afonso-Dias and Hislop, 1996).

The reproductive aspects relevant to the stock assessment of black anglerfish have been studied in several European Atlantic areas: Shetland Islands, West of Scotland and Rockall Bank (Laurenson et al., 2008b), Northern Bay of Biscay (Quincoces et al., 1998; Quincoces, 2002) and Atlantic Iberian waters (Azevedo, 1996; Duarte et al., 2001). The spawning period seems to be from October to July in North Atlantic waters (Azevedo, 1996; Duarte et al., 2001; Quincoces, 2002). Spawning males of both European anglerfish have been found in almost every month of the year (Afonso-Dias and Hislop, 1996; Duarte et al., 2001; Quincoces, 2002). The spawning grounds in the northern Bay of Biscay are located in the continental shelf and the upper continental slope, around 100 and 400 m (Azevedo, 1996; Quincoces, 2002).

Maturity stage is an important biological parameter that is used for the calculation of maturity ogives (and therefore of spawning stock biomass), for the definition of the spawning season of a species, for the monitoring of long-term changes in the spawning cycle, for the establishment of management technical measures (as the minimum landing size), and for other research needs regarding the biology of fish (ICES, 2007). The studies of black anglerfish in North Atlantic waters have estimated L50 maturities of between 37 and 49 cm for males and between 53 and 70 cm for females (Azevedo, 1996; Duarte et al., 2001; Quincoces, 2002; Laurenson et al., 2008b).

The European institutes cover sampling of maturity and sex ratio of this species through Data Collection Regulation (DCR)

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