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ORIGINAL PAPER

Life history traits of a poorly known pelagic fish, *Aethotaxis mitopteryx* (Perciformes, Notothenioidei) from the Weddell Sea

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Abstract
Amongst the notothenid subfamily Pleuragramminae, *Aethotaxis mitopteryx* is an infrequently collected high Antarctic species with an array of morphological and physiological adaptations supporting an evolutionarily derived benthopelagic lifestyle. The present study deals with some poorly known life history traits of this species, counting on 79 specimens collected in the Weddell Sea during 2014 and 2015 austral summer. Annulation pattern in sagittal otoliths were used to assess population age structure and growth rate, while macroscopic and histological analyses of gonads were performed to estimate reproductive status and features of gametogenesis. The sex ratio of the sampled population was close to parity, with females significantly larger than males. Based on the von Bertalanffy growth model, females attained a larger maximum size (40 vs. 27 cm) at a lower rate (0.05 vs. 0.12 years^{-1}) than males. Individual longevity was remarkable in both sexes, females and males attaining 62 and 32 years of age, respectively. Females showed group synchronous oocyte development and presumed high reproductive effort, as indicated by the large size of residual hydrated oocytes in regressing individuals (4.6–4.8 mm). Body sizes at sexual maturity were 33 and 19 cm in females and males, corresponding to 32 and 11 years of age, respectively. All specimens were caught far from the reproductive season. From an evolutionary perspective, it appears that the process of pelagization similarly influenced the life strategies of the species within the clade Pleuragramminae, which shared high reproductive effort linked to early sexual maturity, slow somatic growth and long life span.

Keywords Life strategies · Age and growth · Reproduction · Notothenid · Weddell sea

Introduction

The modern fish fauna inhabiting the Antarctic continental shelf is largely dominated by a single endemic perciform suborder, the Notothenioidei (Kock 1992). In the early Miocene, a series of tectonic and oceanographic events progressively isolated the Antarctic Continent, altering the local faunal composition. Loss of habitat, low temperature regimes and changes in the trophic structure of the ecosystem probably led to the extinction of the Eocene components of the fish fauna (Eastman 2005). Since then, in filling habitats newly devoid of competitors, the notothenioids underwent an adaptive radiation exhibiting a remarkable morphological and ecological diversification. Although notothenioids shared a benthic, bladderless ancestor (Eastman 1993), some species evolved an array of morphological and physiological characters to utilize unfilled niches in the water column, an evolutionary process sometimes referred to as pelagization (Klingenberg and Ekau 1996). Despite lacking swim bladders, some lineages of Notothenidae, most notably the Pleuragramminae, adapted to a pelagic lifestyle by evolving towards neutral buoyancy through a combination of reduced skeletal mineralization and intramuscular lipid deposition (Eastman 1993).

Based on morphological characters and molecular data, the "pelagic" clade was found to be monophyletic and basal amongst the Nototheniidae, including four genera (*Aethotaxis*, *Dissostichus*, *Gvozdarus* and *Pleuragramma*) within the subfamily Pleuragramminae (Andersen 1984) or Pleuragrammatinae (Balushkin 2000; Sanchez et al. 2007). Except for *Dissostichus*, which includes two large species with

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