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Research Article

Reproductive Pattern and Length at First Sexual Maturity of The Whiting (*Merlangius merlangus*, Nordmann, 1840) in The Black Sea

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Abstract: Samples of whiting (*M. merlangus*) (n = 1545) were collected using bottom trawl in the southern Black Sea during 2017–2018 and were subjected to reproductive biology assessments. These assessments included the gonadosomatic index, macroscopic and microscopic gonad phases, oocyte diameter distributions, batch fecundity, microscopic analysis of oocytes, and histology. The assessment results revealed a significant difference in sex ratio the samples (female: 877, male: 668). Analyses of the gonadosomatic index (GSI), along with macroscopic and microscopic phase evaluations, indicated that the most intense reproductive periods occurred in May and November, with two peaks observed during the studied year. Examination of oocyte structures and diameter distributions in histological sections taken from the ovaries each month showed that the whiting in the southern Black Sea exhibited multi-spawning behavior and had determinate fecundity. Additionally, the monthly batch fecundity (FB) and relative batch fecundity (FBR) of spawning whiting were calculated throughout the year. The average FB was $17823 \pm 21,353$ hydrated oocytes, while the FBR was 243 ± 143 hydrated eggs per gram. The length at first maturity for males and females were 12.80 cm and 13.72 cm, respectively. In light of the study's results, it is recommended to develop a new fisheries management strategy aimed at contributing to the sustainability of whiting stocks in the Black sea. This strategy should consider the most efficient spawning periods identified in this study, as well as other reproductive strategies, and focus on preserving larger individuals that can enhance egg production within the stocks.

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1. Introduction

Recent reports on the sustainability of global fisheries are concerning. As global fisheries production continues at maximum levels, the recovery of aquatic resources may soon become nearly impossible, with stocks at risk of collapse due to current fishing activity. International organizations emphasize the need to maintain fish stocks at optimal sustainable levels and ensure that depleted stocks are restored to exploitable levels. To achieve these global targets, the institutions and organizations responsible for fisheries management must establish and implement effective strategies and policies based on the current status of fish stocks (Mora et al., 2009; FAO, 2021).