MORTALITY OF *PAGELLUS ERYTHRINUS* OFF MONTENEGRIN COAST (SOUTH ADRIATIC)

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Abstract

Estimates of total and natural instantaneous mortality rates of *Pagellus erythrinus* are presented, with emphasis on the differences in mortality rates between two areas (exploited open sea; Boka Kotorska Bay where trawling is forbidden). Results obtained were also compared with previous data from a period when the surveyed area was almost unexploited.

Key words: Pagellus erythrinus, Trawling, Mortality, Montenegrin coast

Introduction

Red pandora, *Pagellus erythrinus*, is the only previously investigated (1, 2) species at the Montenegrin shelf. Until 1990 only one trawler with a 132 kW engine power operated in this region with mean annual fishing effort of 70 days. Since 1991 the number of trawlers increased, reaching 37 boats in 1998. Their number and fishing effort decreased since 1999 but a decline of biomass from 1998 to 2000 was observed (3). We estimated the total and natural instantaneous mortality rates of *P. erythrinus* and the results were compared with earlier data for the same area (2) and from Middle Adriatic (4).

Material and methods

Samples were collected from May 1997 to May 1999, with commercial trawlers. Ten hauls were performed in Boka Kotorska Bay and 20 in the open sea. The length and weight of 3201 individuals were measured. The linearized length converted catch curve (5) and the von Bertalanffy growth parameters of the species (6) were used to estimate total instantaneous mortality rates (Z). Natural mortality (M) was estimated from two empirical formulas (7,8).

Results and discussion

The estimated Z values (Figs. 1 and 2) were: Z = 0.518 ($P_{0.05} < 0.001$) in Boka Kotorska Bay, and Z = 0.806 ($P_{0.05} < 0.001$) on the open sea, while the mean values of M were 0.510 and 0.525. The slopes of the two regression lines differed significant (P<0.005).
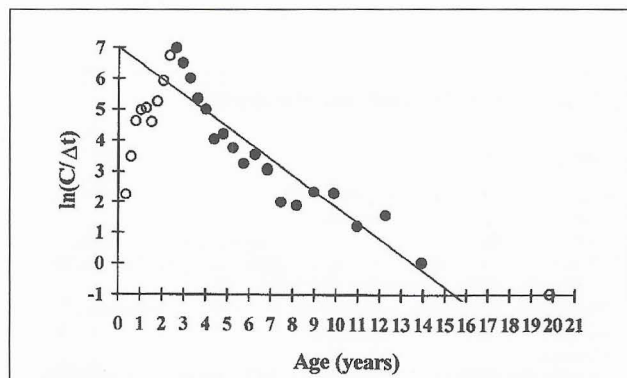

Fig. 1. Linearized length converted catch curve for Boka Kotorska Bay.

The estimated values showed that Z was about 30% grater in the open sea than in the Bay. Estimates of Z (2), obtained for the years 1964 and 1965, were: Z = 0.641 for Bay and Z = 0.591 for the open sea. It is obvious that such differences in mortality rates between the two areas were insignificant. This might be explained by the very low fishing effort in the open sea in that period (3). For Middle Adriatic channels, Z was 1.57 (4). Such a large value can be attributed to intensive trawl fishing.

The significantly higher value of Z in open sea than in the Bay may be explained by the increase in fishing effort in open sea from 1991 on.

Trawling is still forbidden in the Bay. This is one possible reason that Z did not change significantly since previous studies (2). Thus, *Pagellus erythrinus* was influenced mostly by natural mortality M, since estimated values of Z and M were almost identical. Insignificantly higher value of Z, when compared with M in the Bay, may be accounted for relatively low fishing effort with artisanal and sport gears. Exploitation rate (E), which is only 0.189, confirms this.

The exploitation rate in open sea, 0.356, was <0.5, a value indicating overfishing. Our results probably show that *Pagellus erythrinus* is not yet overfished. This might be related to existence of refugees near the coast being therefore unreachable to trawlers.
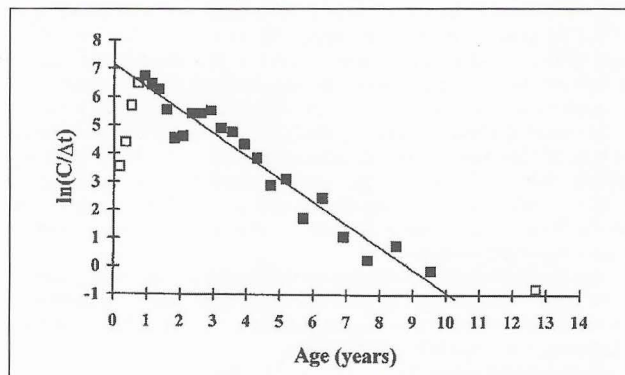

Fig. 2. Linearized length converted catch curve for open sea.

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