

PRELIMINARY RESULTS FROM MONITORING OF SELECTED SPARIDAE SPECIES CAUGHT BY RECREATIONAL AND SPORTS ANGLERS ALONG THE MALTESE COAST.

Sandra Agius Darmanin ^{1*} and Adriana Vella ¹

¹ Conservation Biology Research Group, Department of Biology, University of Malta - sandra.agius@um.edu.mt

Abstract

Conservation research to monitor the catches of *Diplodus annularis*, *Diplodus vulgaris*, *Diplodus sargus*, *Oblada melanura* and *Lithognathus mormyrus* with the cooperation of Maltese hobby and sport shore fishermen. Catches were scientifically measured between July 2012 and December 2013. This year-round scientific research allows assessment of demographic, distribution, habitat selection, diet and reproductive patterns for these species. Catches from 701 hobby and sports anglers were recorded to analyse the exploitation rate. Preliminary results indicate that these species are frequently targeted by these fishermen with no previous records of the catches and effects of these activities on respective coastal populations. This research may fill the gap in knowledge aiding conservation measures for these species.

Keywords: *Mediterranean Sea, Conservation, Fisheries, Monitoring*

The sustainability of recreational fishing needs to be assessed side by side with considerations of its impact on the coastal fish species monitored. *Diplodus annularis*, *Lithognathus mormyrus*, *Diplodus vulgaris*, *Oblada melanura* and *Diplodus sargus* are economically important littoral fish occurring in the Mediterranean [1], [2] and have a reasonably high commercial and recreational value [3]. Although local commercial available landing data still need to be refined for these species. From this ongoing research on recreational and sports fishing in Malta (Figure 1), *Diplodus annularis* was found to make up 13.4% (2012 - 0.03 fish angler⁻¹h⁻¹; 2013 - 0.01 fish angler⁻¹h⁻¹) of sport fishing catches and 9.3% of recreational fishing catches while *Diplodus vulgaris* comprised 11.5% (2012 - 0.02 fish angler⁻¹h⁻¹; 2013 - 0.01 fish angler⁻¹h⁻¹) and 4.6% respectively. Recreational anglers also targeted the more highly prized *D. sargus* (2.3%), *L. mormyrus* (3.8%) and *O. melanura* (1.2%) for consumption. These 3 species were also observed in the sport fishing catches (1%, 0.2% and 3%, respectively). Such figures show differences in the targeted species by recreational and sport fishermen. When comparing with commercial catches, *D. sargus* and *O. melanura* are the most fished with a yearly mean catch of 8.6 (±1.61) tonnes and 8.4 (±5.42) tonnes respectively. The other 3 remaining species were caught to a lesser extent with 1.13 (±0.71) tonnes for *D. vulgaris*, 1.91 (±0.71) tonnes for *D. annularis* and no recorded landings for *L. mormyrus*. The former are more commercially important fish and can reach a much larger size than *D. annularis* so are preferred species for consumption. Nonetheless, figures from sport and hobby fishermen need to be included with the commercial catches so as to obtain the total yearly catch.

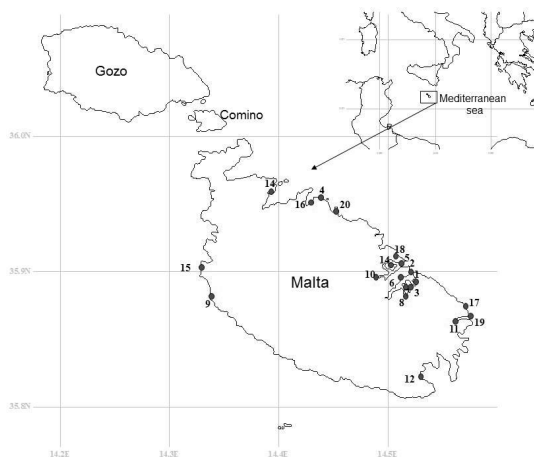


Fig. 1. Map showing sampling locations.

Overall, in this study, the annular sea bream had a maximum size of 22.1cm, the two banded sea bream 30.5cm, the white sea bream 33.4cm, the saddled sea

bream 31.3cm and the striped sea bream 22.4cm (Table 1). Around the Maltese Islands, the population of the all the 3 *Diplodus* species and *O. melanura* was dominated by females. *L. mormyrus* exhibited a male dominance however this may be due to the small sample size collected so far. The inequality in the sex-ratio of the *Diplodus* and *Oblada* species can be connected to the sexual patterns of these species which were observed to be hermaphrodites. In this study, through both macroscopic and microscopic analysis, *D. annularis* in the Maltese Islands exhibits protandric hermaphroditism with a spawning period extending from July to November. Work is currently ongoing for the remaining species. All three *Diplodus* species were also observed to be in very good condition while *O. melanura* and *L. mormyrus* show poorer condition values especially the latter (Table 1). Local monitoring of these 2 species is recommended to establish if conservation measures are also required.

Tab. 1. Ratios and values for each species

Species	Observations	Gender ratio (M:F)	Length range	Condition factor (K)
<i>D. annularis</i>	568	1:1.65	6.5 - 22.1	M=1.80; F=1.77
<i>D. vulgaris</i>	358	1:2.07	7.5 - 30.5	M=1.49; F=1.60
<i>D. sargus</i>	58	1:1.33	6.0 - 33.4	M=1.80; F=1.73
<i>O. melanura</i>	85	1:2.5	4.5 - 31.3	M=1.38; F=1.28
<i>L. mormyrus</i>	33	2:1	5.9 - 22.4	M=1.16; F=1.16

Raising angler awareness and knowledge about the status and maturity size of the stocks, and the survival of released fish may contribute to reduce fish mortality. The use of minimum hook sizes together with more enforcement of the minimum legal sizes and fostering of a catch and release practice amongst hobby and sports anglers possibly through an educational campaign should help to reduce the catch and harvesting of undersized fish. However, other measures including the use of periodic site closures during the reproductive period e.g. in marine protected areas, daily bag limits and a licence or fishing ticket is being suggested to census the number of recreational anglers and limit excess catches.

References

- 1 - Morales-Nin B., Moranta J., García C., Tugores M. P., Grau A. M., Riera F., and Cerdà M., 2005. The recreational fishery off Majorca Island (western Mediterranean): some implications for coastal resource management, *ICES Journal of Marine Science: Journal du Conseil*, 62(4):727–739.
- 2 - Veiga P., Ribeiro J., Gonçalves J. M. S., and Erzini K., 2010. Quantifying recreational shore angling catch and harvest in southern Portugal (north east Atlantic Ocean): implications for conservation and integrated fisheries management, *Journal of Fish Biology*, 76(9):2216–2237.
- 3 - Monteiro P., Bentes L., Coelho R., Correia C., Erzini K., Lino P. G., Ribeiro J., and Gonçalves J. M. S., 2010. Age and growth, mortality and reproduction of the striped sea bream, *Lithognathus mormyrus* Linnaeus 1758, from the south coast of Portugal (Algarve), *Marine Biology Research*, 6(1):53–65.