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UNCOVERING THE ECOLOGY AND FISHERY OF *PAGELLUS BOGARAVEO* (BRÜNNICH, 1768) (OSTEICTHYES: SPARIDAE) IN THE MINOR ISLANDS OF SICILY THROUGH LOCAL ECOLOGICAL KNOWLEDGE

SVELARE L'ECOLOGIA E LA PESCA DI PAGELLUS BOGARAVEO *(BRÜNNICH, 1768) (OSTEICHTHYES: SPARIDAE) NELLE ISOLE MINORI DELLA SICILIA ATTRAVERSO LA CONOSCENZA ECOLOGICA LOCALE*

Abstract *- The purpose of the study was to address the lack of information on the ecology and fishery of blackspot seabream* Pagellus bogaraveo *(Brünnich, 1768) in the minor islands of Sicily. Historical data on fishing practices, spatial distribution of fishing areas and gears were collected using Local Ecological Knowledge (LEK) questionnaires. The results indicate that blackspot seabream is mainly caught using handlines (54.5%) and longlines (45.5%) in depths ranging from 50 to 350 meters on rocky bottoms. The number of fishing boats that targeted blackspot seabream with handlines and longline recorded a similar pattern with a peak in the 1980s and a progressive decline in the years until 2020/2021. The catch has been decreasing since the 1970s, with current values only slightly more than one-third of the catch recorded in the 1970s. The valuable insights obtained on fishing practices and ecology of blackspot seabream highlights the importance of incorporating LEK into scientific research.*

Key-words*:* Pagellus boraveo*, fishing, Local Ecological Knowledge, ecology, conservation.*

Introduction – Blackspot seabream, *Pagellus bogaraveo* (Brünnich, 1768), belongs to the demersal fish family Sparidae. This species is commonly found in the western Mediterranean and the eastern Atlantic, with its distribution ranging from Norway to Cape Blanco, Morocco, Madeira, the Canaries, and the Azores. One notable characteristic of this fish is its preference for various bottom types, including rocks, sand, and mud. It thrives at depths of up to 400 meters in the Mediterranean and 700 meters in the Atlantic (Spedicato *et al.,* 2002).

Despite its wide distribution, blackspot seabream plays a crucial role in local fisheries within the minor islands of Sicily. Nevertheless, there is a dearth of comprehensive information concerning its ecology and fishery in this specific region. To bridge this knowledge gap, the current study employed Local Ecological Knowledge (LEK) questionnaires, which were distributed among professional and recreational fishers. Our primary aim was to gather historical data on fishing practices, spatial distribution of fishing activities, and types of gears used to exploit blackspot seabream in the minor islands of Sicily. By integrating LEK, our study provides invaluable insights into the local understanding of this species and enhances our understanding of its ecology and fishery in the region.

One noteworthy biological characteristic of *P. bogaraveo* is its protandrous hermaphroditism, where males transition into females as they mature (Krug, 1990). This biological trait makes the species particularly susceptible to fishing pressure, underscoring the urgency of gaining a better understanding of its biology and population dynamics (Morato *et al.,* 2001; Lorance, 2011).

Past studies on blackspot seabream have predominantly focused on topics such as age and growth, reproduction, genetics, distribution, population structure, feeding habits, aquaculture, and fisheries in different areas of the eastern Atlantic and Mediterranean (Sousa *et al.,* 1999; Lorance, 2011). However, there is a general lack of comprehensive data regarding its ecology and fishery in the minor islands of Sicily. Furthermore, the species' vulnerability, complex life strategies, such as the segregation of juveniles and adults, and protandrous hermaphroditism, combined with the uncertain status of the stock in the study area, stress the need for a comprehensive understanding of various aspects related to its biology, ecology and exploitation (Mytilineou & Machias, 2007).

Materials and Methods - The study was conducted in the waters around the archipelagos of Eolie and Egadi, and the islands of Ustica, Pantelleria and Lampedusa (Fig. 1).

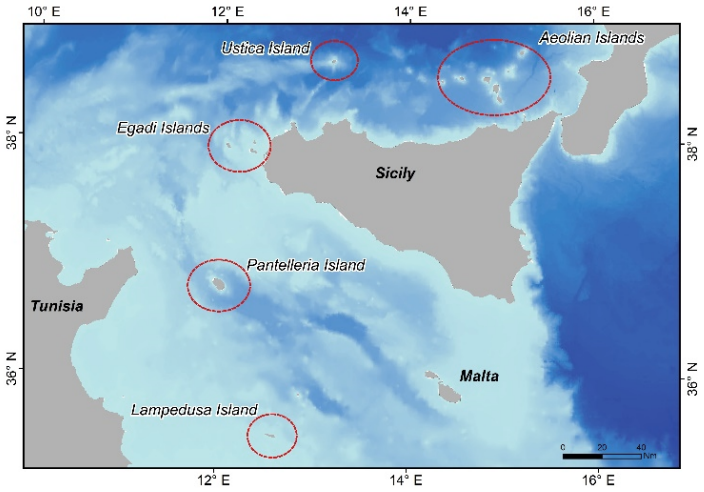

Fig. 1 - Study Area.
Area di Studio.

These islands provided an ideal setting for investigating the ecology and fishery of blackspot seabream. The study area encompassed diverse fishing grounds and coastal areas where local fishers target blackspot seabream. Dedicated questionnaires were distributed among professional and recreational fishers.
These questionnaires were designed to gather comprehensive information on various aspects, including fishing practices, socioeconomic factors, and ecological elements related to blackspot seabream. They were developed based on previous research and expert knowledge in the field, ensuring the incorporation of relevant variables and indicators. Respondents were selected among experienced individuals with substantial knowledge of blackspot seabream. The questionnaires were compiled in person, facilitating direct interaction with fishers to clarify any potential uncertainties and ensure the accuracy of data collection. Respondents were guaranteed the confidentiality and anonymity of their responses. The collected data were processed through statistical analysis to address the research objectives, with descriptive statistics such as percentages, frequencies, and measures of central tendency being calculated to summarize the data and identify patterns in fishing practices, ecological factors, and socioeconomic aspects related to blackspot seabream.

Results - This study provides valuable insights into blackspot seabream ecology and fishery in the minor islands of Sicily, including socio-economic aspects. The findings are based on Local Ecological Knowledge (LEK), by means of dedicated questionnaires submitted to 11 experienced professional fishers. Fishing practices reveal that handlines (54.5%) and longlines (45.5%) are the primary fishing gears used. The number of

fishing vessels utilizing handlines peaked in the 1980s, followed by a gradual decline (Fig. 2).

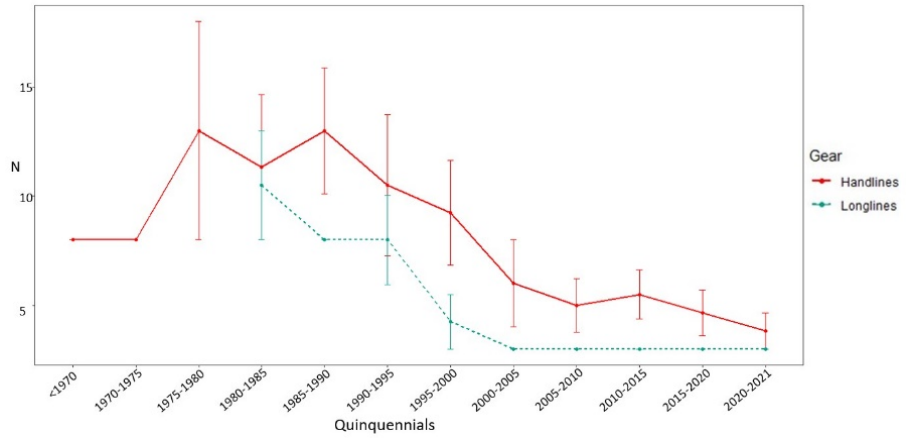

Fig. 2 - Number of fishing vessels engaged in *P. bogaraveo* fisheries.
Numero di pescherecci che praticano la pesca a P. bogaraveo.

The fishing boat lengths range from less than 6 meters to 15 meters, with most fishers using vessels between 8 and 10 meters. From Figure 3, it is evident that fishers concentrate their efforts on blackspot seabream for approximately 50 to 60 days each year, primarily during the spring and summer seasons. Furthermore, the catch trends depicted in the figure clearly illustrate a substantial decrease dating back to the 1970s. Current catch levels now stand at roughly one-third of their historical levels, showing a notable decline in the abundance of blackspot seabream.

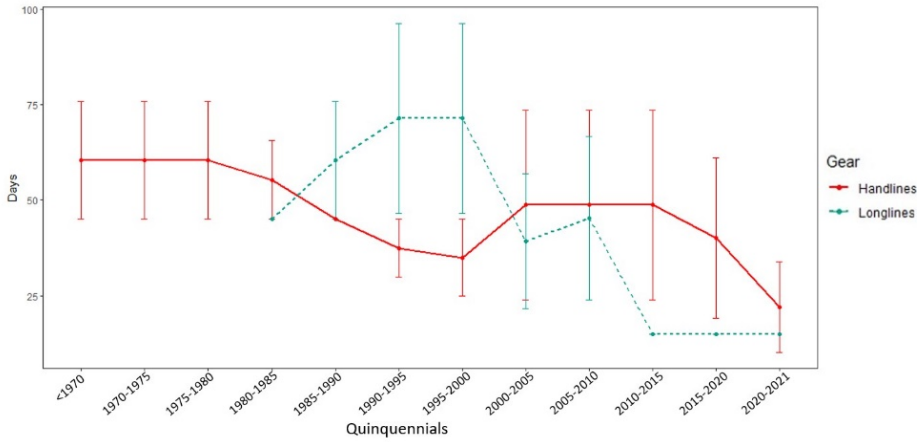

Fig. 3 - Number of fishing days per five-year period.
Numero di giorni di pesca per quinquennio.

As concerns socio-economic aspects, fishers' ages range from 36 to 83 years, with all respondents being male. Fishing crews typically consist of 1 to 2 members (73%). Commercial categorization is not common among fishers (81.8%). The answers concerning price changes show contrasting results: in most of the cases, the respondents report increasing trends (54.5%), while stable trends and decreasing trends are reported by the 27.3% and 18.2% of the fishers, respectively. Prices are reported to be affected by market demand, catch levels, and average fish size. Fishers report several costs for crew, fuel, and maintenance. The plot in Figure 4 illustrates a

decreasing trend in the number of fishing days targeting blackspot seabream. Fishers employing handlines primarily fish from February to June, peaking in June.

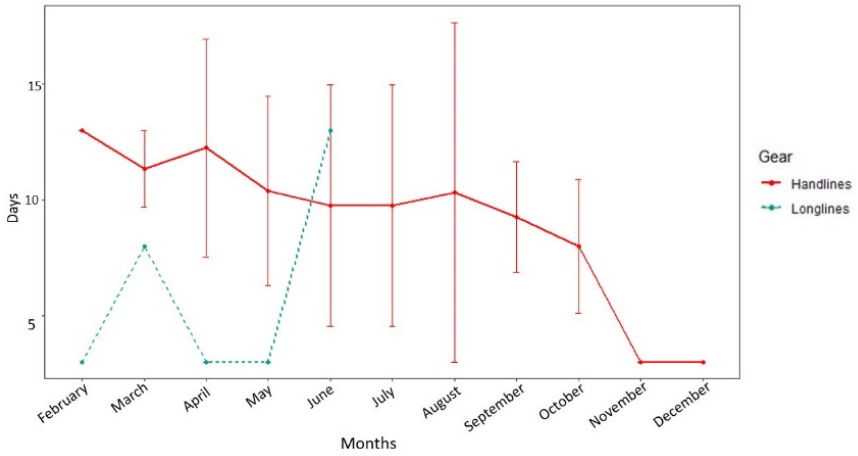

Fig. 4 - Number of fishing days per month in 2021/2022.
Numero di giorni di pesca per mese durante l'anno 2021/2022.

Blackspot seabream fishing predominantly occurs on rocky bottoms (90.9%), located more than 12 nautical miles from the coastline (63.6%). Fishers conduct fishing activities primarily at dawn and dusk (54.5%) to optimize their catch.

Conclusions - Integrating local ecological knowledge into scientific research has proven to be a valuable approach for gaining insights into fishery resources and marine ecosystems. By incorporating the knowledge and experiences of local fishers, a more holistic understanding can be obtained, enhancing the effectiveness of management and conservation strategies. This study provides for the first time local ecological, socio-economic, and fisheries knowledge on the blackspot seabream around the minor islands of Sicily, and can hel establishing a scientific baseline for further investigation. It is worth emphasizing the gradual decline of fishing fleets in the examined areas, which is related to the decrease in catches obtained using gears that have the potential to harm mega-spawners.

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References

KRUG H.M. (1990) - The Azorean blackspot seabream, *Pagellus bogaraveo* (Brunnich, 1768) (Teleostei, Sparidae). Reproductive cycle, hermaphrodism, maturity and fecundity. *Cybium*, **14** (2): 151-159.

LORANCE P. (2011) - History and dynamics of the overexploitation of the blackspot sea bream (*Pagellus bogaraveo*) in the Bay of Biscay. *ICES J. Mar. Sci.*, **68** (2): 290-301.

MORATO T., AFONSO P., LOURINHO P., BARREIROS J., SANTOS R., NASH R. (2001) Length–weight relationships for 21 coastal fish species of the Azores, north-eastern Atlantic. *Fish. Res.*, **50** (3): 297-302.

MYTILINEOU CH., MACHIAS A. (2007) - Deep-water fisheries resources in the Hellenic Seas. In: Papaconstantinou C., Zenetos A., Vassilopoulou V., Tserpes G. (eds), *State of Hellenic Fisheries*. HCMR Publ., Athens: 213-222.

SOUSA F., ISIDRO E., ERZINI K. (1999) - Semi-pelagic longline selectivity for two demersal species from the Azores: the black spot sea bream (*Pagellus bogaraveo*) and the bluemouth rockfish (*Helicolenus dactylopterus dactylopterus*). *Fish. Res.*, **41** (1): 25-35.

SPEDICATO M.T., GRECO S., SOPHRONIDIS K., LEMBO G., GIORDANO D., ARGYRI A. (2002) Geographical distribution, abundance and some population characteristics of the species of the genus *Pagellus* (Osteichthyes: Percirformes) in different areas of the Mediterranean. *Sci. Mar.*, **66**. S2: 65-82.