Argentina sphyraena and Glossanodon leioglossus : partially niche-overlapping species

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ABSTRACT: A three-year trawlsurvey carried out off Tuscany coast gives a large amount of data upon argentinids CPUE and depth distribution. The geographical occurrence and respective abundance suggest a typical example of competition between two species.

Recently, these Argentinidae have been matter of study in the Tyrrhenian Sea both for their possible commercial exploitation and their biological interest. Along a ground-fish trawl survey carried out in 1985-1987, the whole area between Elba Island and La Spezia was sampled by means of 150 randomized tows: total yield of argentinids raised over 200 kg and 19,000 individuals.

Species presence was observed between 80 and 460 m depth for Argentina sphyraena and into a weakly reduced range (120-430 m) for Glossanodon leioglossus. Even if the depth range of presence is approximately the same, fish abundance and individual size are quite dissimilar: G. leioglossus is mainly concentrated between 100 and 250 m depth with catch rates up to 26 Kg/tow and uniform medium size (10 g); on the other hand, A. sphyraena gives lower CPUE (up to 7 Kg/tow) but on a wider area, ranging between 150 and 350 m (fig.1), and it shows a size increase with the depth from 15 to 25 g.

Further species differences are due to spatial distribution: biomass indices (μ) and related variance (σ^2) show a larger population homogeneity in the A. sphiraena (μ=85, σ=12) than in G. leioglossus (μ=58, σ=22). The immediate meaning of such a large differences is a typical clumped distribution in G. leioglossus and a relatively more uniform one in A. sphyraena (see the evidence in fig 2).

Along the 200 m isobath, G. leioglossus overwhelm A. sphyraena even if also the A. sphyraena maximum concentration site locates in the same points; elsewhere is always the opposite.

These abundance differences cannot find a reason neither in depth tolerances of the species (both live between 100 and 450 m) nor in the predation (it is very unlikely an hake, a withing or an angler fish able to distinguish the two species and selectively catch one or the other).

The only possibility is a partially overlapping niche which came out in total agreement with the Lotka-Volterra competition theory. Along the 200 m depth G. leioglossus has a higher live-efficiency: it is a more specialized species. As soon as the depth changes, A. sphyraena shows its stronger fitness with different environments and it results more abundant than the other species. Food habits may represent the original reason, since preliminary analyses of stomach content show a larger occurrence of ophiuroids in A. sphyraena than in G. leioglossus, while in both species crustaceans are the dominant food.

Further diet studies and life-history investigations can validate and better support the competition hypothesis even if no other likely reason has been yet found to explain the distribution pattern of the two species.

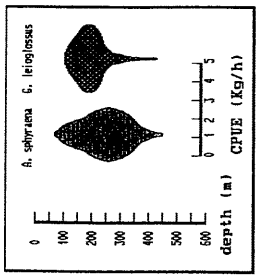

Fig.1

Fig.2:Spatial distribution and average catch per tow of A.sphyraena (left) and G.leioglossus (right).

An investigation on the deep sea (bathyal) Fishes of Gökova Bay, Aegean Sea

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SUMMARY

In the August of 1987, three beam-trawl hauls were performed in the deep waters of Gökova Bay, Aegean Sea and 10 fish species were obtained. Of these, the following species; Nezumia sclerorhynchus, Hymenocephalus italicus, Gadiculus argenteus, Phycis blennoides, Hoplostethus mediterraneus, Microichthys coccoi and Lepidorhombus whiffiagonis, are reported for the first time from Turkish seas.

MATERIAL AND METHODS

This study is realised by means of the research vessel, R/V K. Piri Reis, utilizing a Hydrobios beam-trawl with a mesh size of 10 mm. The hauls were performed at the three stations chosen in Gökova Bay (Fig. 1).

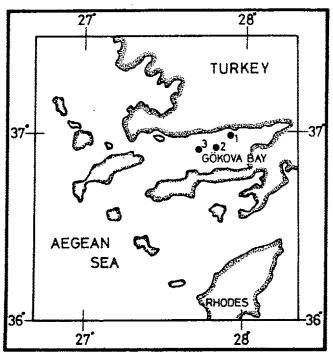

Fig. 1: Stations in Gökova Bay samples were collected

To prevent the beam-trawl net from filling-up with mud and bursting the hauls were made in short periods of 10-15 minutes and the obtained species were fixed in 5 % formalin and then kept in 70 % ethanol.

RESULTS

The results of our investigation is summarized in following Table 1.

SPECIES (n)	STATION NUMBER	GEOGRAPHIC LOCATION	DEPTHS in (m)	TYPE OF BOTTOM
(1) Capros aper (Linn, 1758)	1	36°59'N 27°50'E	300	Sand
(3) Lesueurigobius friesii (Malm, 1874)				
(2) Hymenocephalus italicus (Giglioli, 1884)	2	36°53'N 27°44'E	430	Mud
(3) Gadiculus argenteus (Guichenot, 1850)				
(1) Micromesistius poutassou (Risso, 1826)				
(1) Phycis blennoides (Brünnich, 1768)				
(3) Lepidorhombus boscii (Risso, 1810)				
(2) Hymenocephalus italicus (Giglioli, 1884)	3	36°53'N 27°39'E	600	Mud
(2) Nezumia sclerorhynchus (Valenciennes, 1838)				
(1) Hoplostethus mediterraneus (Cuvier, 1829)				
(1) Microichthys coccoi (Rippel, 1852)				
(3) Lepidorhombus boscii (Risso, 1810)				
(2) Lepidorhombus whiffiagonis (Walbaum, 1792)				

Table 1: The species obtained from three beam-trawl hauls in Gökova Bay and their distribution to the stations.

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