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CAPTURES OF COMMON ANGELSHARKS *SQUATINA* *SQUATINA* (SQUATINIDAE) FROM THE ALGERIAN COAST (SOUTHWESTERN MEDITERRANEAN SEA)

SUMMARY

The authors report in the present paper the captures of two specimens of common angelshark *Squatina squatina* (Linnaeus, 1758) from the eastern region of the Algerian coast. Both specimens were adult females, they measured 1270 and 1320 mm in total length, their total body weights probably reached more than 15 kg. The specimens are described and comments on their distribution indicate that probably a viable population exists in the Algerian marine waters. However, a management should be implemented to avoid a decline of the species in the area.

INTRODUCTION

Angel shark, *Squatina squatina* (Linnaeus, 1758) occurs in the eastern Atlantic, off the British Isles, the North Sea (EBERT and STEHMANN, 2013) and south the Strait of Gibraltar from Morocco, Mauritania and around the Canary Islands (ROUX, 1984).

Squatina squatina previously caught in abundance in northern areas, progressively disappeared from fishery landings, such as the Languedocian coast (CAPAPÉ *et al.*, 2000) and the Balearic Islands (MASSUTI and MORANTA, 2003; MOREYS *et al.*, 2019). *Squatina squatina* is nowadays sporadically caught and considered as critically endangered by the IUCN Red List of threatened species, due to a drastic decline of captures (MOREYS *et al.*, 2019; KABASAKAL, 2021).

Squatina squatina is reported off the Maghreb shore, from Morocco (LLO-RIS and RUCABADO, 1998) to Tunisia (CAPAPÉ *et al.*, 1990; BRADAÏ *et al.*, 2002).

The species was targeted from the latter area due to its commercial value, but faced an overfishing. and progressively the number of captures decreased from fish landings (RAFRAFI-NOUIRA, 2016). However, investigations conducted in deep bottoms located in the northern Tunisian areas allowed to capture several specimens indicating that a viable population probably exists in the area (RAFRAFI-NOUIRA *et al.*, 2023).

DIEUZEIDE *et al.* (1953) firstly recorded *S. squatina* from the Algerian marine waters based on a single specimen. They did not report other captures but noted that the species is commonly caught by trawl and longline in the area. Observations regularly conducted throughout the Algerian coast, at fish landings and fish markets for two decades (2000-2020) showed that *S. squatina* occurs in the area. Some specimens of *S. squatina* has been observed at the great fish market of Algiers, two of them are herein described, with some comments about the distribution of the common angel shark in the local area and the Mediterranean Sea.

MATERIAL AND METHODS

On 16 September 2018, a lot of common angel sharks were observed at the great fish market of Algiers, caught by trawl at a depth not exceeding 50 m, on soft bottoms. The captures occurred off Annaba, town located in the oriental region of the Algerian coast at 37°06'10" N and 7°51'02" E, together with rajid and teleost species (Fig. 1). Only two specimens have been examined and photographed. Their total lengths were measured, and their total body weights estimated by fish mongers. However, it was not possible to carry out morphometric measurements since the specimens were rapidly sliced and sold for local consumption.

The specimens were carefully examined and identified with the help of field guides and ichthyological fauna, such as (TORTONESE, 1956), ROUX (1977, 1986), CAPAPÉ and ROUX (1980), COMPAGNO (1984), EBERT and STEHMANN (2013) and KABASAKAL and KABASAKAL (2014).

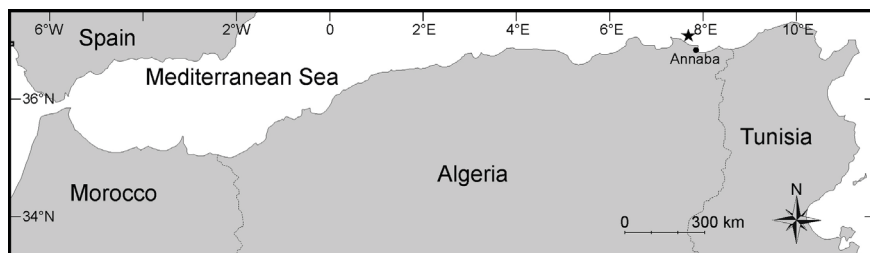


Fig. 1 - Map of the Algerian coast indicating the capture site of *Squatina squatina*, off Annaba (black star).

RESULTS AND DISCUSSION

Both specimens were adult females, they measured 1320 mm (Fig. 2) and 1270 mm (Fig. 3) in total length. Their total body weights were not provided by fishmongers, but they probably reached more than 15 kg referring to previous papers (CAPAPÉ *et al.*, 1990; RAFRAFI-NOUIRA *et al.*, 2023).

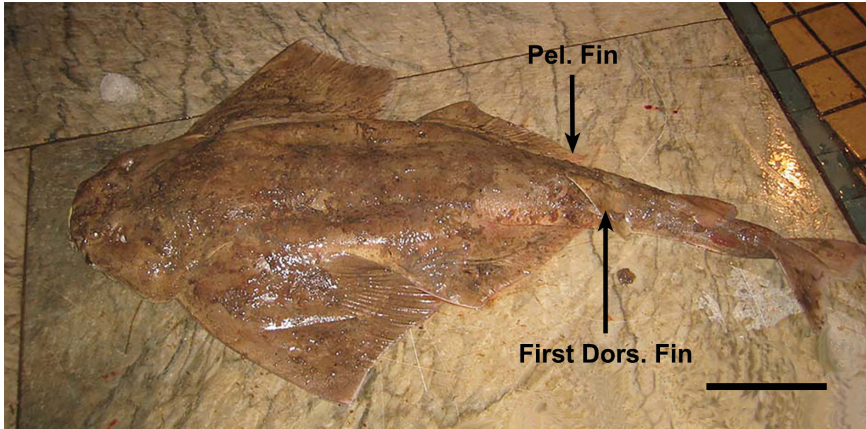


Fig. 2 - Dorsal surface of *Squatina squatina* showing lateral and posterior view of hind tips of pelvic fins (Pel fin) reaching level of first dorsal fin origin (First dors fin), scale bar 200 mm (photo Farid Hemida).

The two specimens were identified as *Squatina squatina* following main morphological characters: trunk very broad, eye diameter smaller than spiracle length; external nasal flap with two barbels bordering a median indented lobe; dermal folds on sides of head with a single triangular frontal lobe (see Fig. 3); pectoral fins very high and broad, rounded rear tips; small spines present on midline of back and tail from head to dorsal fins and between the fin bases; dorsal surface rough; color greenish-brown with some dark spots, and belly beige.

These captures indicate that *S. squatina* still exists from the Algerian coast, since DIEUZEIDE *et al.* (1953). To date, the three squatinid species known in the Mediterranean Sea (ROUX, 1984) are present in the study area, due the recent discoveries of the smoothback angelshark *Squatina oculata* Bonaparte, 1840 by CAPAPÉ *et al.* (2023) and the sawback angelshark *S. aculeata* Cuvier, 1829 by HEMIDA *et al.* (2024).

The three congeneric species are generally well identified by the fishermen and fishmongers present in the landing sites and fish markets located along the Algerian coast. and similarly, to our observations, among them *S. squatina* appears to be the most caught. Therefore, a viable population of the species occurs in the area, and in the close northern Tunisian marine wa-

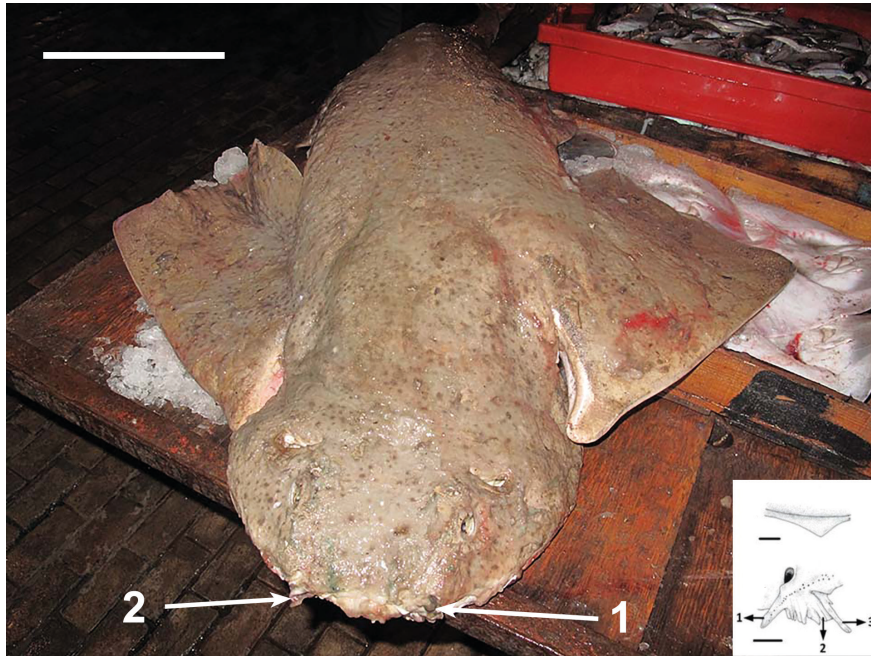


Fig. 3 - Frontal margin of the head of *Squatina squatina* showing triangular front lobe (1) and external nasal flap (2), scalabar = 200 mm (photo Farid Hemida). Insert fitted by hand re-drawing from Akyol *et al.* (2015): above: triangular frontal lobe, scale bar = 10 mm; below: external nasal flap, showing external nasal flap with two barbels (1,3) bordering a median indented lobe (2), scale bar = 5 mm.

ters where the capture of several specimens was reported by RAFFAÏ-NOUIRA *et al.* (2023). The Maghreb shore probably constitutes a potential hotspot for *S. squatina* in the southwestern Mediterranean and migrations towards northern areas remains a suitable hypothesis.

Squatina squatina formerly captured in relative abundance from the Mediterranean coast of France, completely disappeared from the area. Conversely, some specimens of the species were sighted by LAPINSKY and GIOVOS (2019) off the Corsica Island. Similarly, BOUSQUET *et al.* (2021) via Local Ecological Knowledge (LEK) and fishery data and FAURE *et al.* (2023) using environmental DNA assay confirm the occurrence of a population in the waters surrounding the same island.

SOLDO and LIPEJ (2022) noted that *S. squatina* was abundantly caught in the Adriatic Sea during the 19th century and off the Croatian coast the species was historically targeted due to its economic value, however, in the 1960s the species collapsed and became economically extinct. Nowadays, SOLDO and LIPEJ (2022) consider that the common angelshark as very rare and critically endangered within the entire Adriatic area. Recent investiga-

tions indicated that *S. squatina* specimens reappeared in the catches of fishermen according to FORTIBUONI *et al.* (2016), HOLCER & LAZAR (2017), GAZIĆ (2022) and BONAMONI *et al.* (2023). Conversely, the species is not present off the coast of Montenegro (ČETKOVIĆ *et al.*, 2024). Considering the ecological characteristics of this species, the existence of the Adriatic population is presumed Listed in Annex I of Regulation (EU) 2019/1241 and it is strictly a protected species in Croatian waters (SOLDO and LIPEJ, 2022).

To the eastern Mediterranean, GIOVOS *et al.* (2022) reported from diverse source data the occurrence of 24 specimens at least in a study area located at the northeastern part of the Mediterranean Sea, including also northern Levant Sea and Marmara Sea. AKYOL *et al.* (2015) recorded the capture of a mature female carrying at least six embryos in Turkish waters and KABASAKAL (2021) noted that such finding is important, indicating also that pregnant females still occur in the same region.

Squatina squatina is not totally extinct from some areas of the Mediterranean Sea, and strong populations of the species still exist in this sea. The present findings reported from the Algerian coast confirm this opinion. RAF-RAFI-NOUIRA *et al.* (2023) noted the commercial interest of the species for the Tunisian fisheries. Nevertheless, due to its *k*-selected characteristics (*sensu* MELLINGER, 1989), measures need to be carried out to preserve the stocks of the species and avoid its drastic decline. Corroborating the opinion of KABASAKAL (2021) and GAZIĆ (2022), some measures should be implemented with the assistance of local fishermen who need to be informed of the substantial role they could play concerning a long-term conservation of *Squatina squatina*.

REFERENCES

- AKYOL O., ÜNAL V., CAPAPÉ C., 2015 - Occurrence and biological observations on angel shark *Squatina squatina* (Chondrichthyes: Squatinidae) from the Turkish waters (Eastern Mediterranean). *Turkish Journal of Fisheries and Aquatic Sciences*, **15**(6): 651-655.
- BONANOMI S., ANNIBALE O., LUCCHETTI A., BOTTARO M., 2023- Extinct but not entirely: a new occurrence of the critically endangered *Squatina squatina* (Linnaeus, 1758) stresses the urgency of its conservation in the Adriatic Sea. *Estuarine Coastal and Shelf Sciences*, **287**: 1-6.
- BOUSQUET C., MOURIER J., GIOVOS I., MEYERS E. K., DIJOUX J., DURIEUX E.D.H. 2021 - Local Ecological Knowledge and fishery data provide important information on the distribution and seasonal dynamic of critically endangered angel sharks in Corsica (Mediterranean Sea, France).. <https://ssrn.com/abstract=4872813> [Downloaded on 15 February 2025]
- BRADAI M.N., SAÏDI B., GHORBEL M., BOUAÏN A., GUÉLORGET O., CAPAPÉ C., 2002 - Observations sur les requins du golfe de Gabès (Tunisie méridionale, Méditerranée centrale). *Mésogée*, **60**: 61-77.

- CAPAPÉ C., ROUX C., 1980 - Etude anatomique des ptérygiopodes des Squatinidae (Pisces, Pleurotremata) des côtes tunisiennes. *Bulletin du Muséum National d'Histoire naturelle de Paris*, 4 ème série, 2ème section A, **4**: 1161-1180.
- CAPAPÉ C., TOMASINI J.A., QUIGNARD J.-P. 2000 - Les Elasmobranches Pleurotrèmes de la côte du Languedoc (France méridionale, Méditerranée septentrionale). Observations biologiques et démographiques. *Vie et Milieu*, **50**(2): 123-133.
- CAPAPÉ C., REYNAUD C., HEMIDA F., 2023 - The first substantiated records of smoothback angelshark *Squatina oculata* (Squatinidae) from the Algerian coast (southwestern Mediterranean Sea). *Annales, Series Historia Naturalis*, **32**(2): 143-150.
- COMPAGNO L.J.V., 1984 - FAO Species Catalogue, vol. 4, Sharks of the World. An Annotated and Illustrated Catalogue of Shark Species known to Date. FAO Fisheries Synopsis, 125, vol. 4, part 1 (non carcharhinoids): viii+1-250 pp.
- DIEUZEIDE, R., NOVELLA M., ROLAND J., 1953 - Catalogue des poissons des côtes algériennes, Volume I. *Bulletin de la Station d'Aquiculture et de Pêche de Castiglione, nouvelle. Série. I*: 1-274.
- EBERT D.A., STEHMANN M.F.W., 2013 - Sharks batoids and Chimaeras of the North Atlantic. FAO species Catalogue for Fisheries Purposes, n° 7, Rome, FAO, 523 pp.
- FAURE N., MANEL S., MACÉ B., ARNAL V., GUELLATI N., HOLON F., BARROIL A., PICHOT F., RIUTORT J.-J., INSACCO G., ZAVA B., MOUILLOT D., DETER J., 2023 - An environmental DNA assay for the detection of Critically Endangered angel sharks (*Squatina* spp.). *Aquatic Conservation of Marine and Freshwater Ecosystems*: 1-10, Doi.org/10.1002/aqc.3954 [Downloaded on 28 August 2024]
- FORTIBUONI T., BORME D., FRANCESCHINI G., GIOVANNARDI O., RAICEVICH S., 2016 - Common, rare or extirpated? Shifting baselines for common angelshark, *Squatina squatina* (Elasmobranchii: Squatinidae), in the northern Adriatic Sea (Mediterranean Sea). *Hydrobiologia*, 772: 247-259.
- GAJIĆ, A.A., 2022 - New hope for the critically endangered common angel shark *Squatina squatina* in the Adriatic Sea. *Croatian Journal of Fisheries*, 80: 1-6.
- HEMIDA F., REYNAUD C., CAPAPÉ C., 2024 - First records of sawback angelsharks *Squatina aculeata* (Squatinidae) from the Algerian Coast (Southwestern Mediterranean Sea). *Annales, Series Historia Naturalis*, **33**(1): 21-26.
- HOLCER D., LAZAR B., 2017 - New data on the occurrence of the critically endangered common angelshark, *Squatina squatina*, in the Croatian Adriatic Sea. *Natura Croatica*, **26**(2): 313-320. Doi: 10.20302/NC.2017.26.33
- KABASAKAL, H. 2021 - Chapters from life history of common angel shark *Squatina squatina*, from Turkish waters: a historical, ethnoichthyological and contemporary approach to a little-known shark species. *Journal of the Black Sea/ Mediterranean Environment*, **27**(3), 317-341.
- KABASAKAL H., KABASAKAL E., 2014 - Sharks captured by commercial fishing vessels off the coasts of Turkey in the Northern Aegean Sea., *Annales, Series Historia Naturalis*, **14**(2): 171-180.
- LAPINSKI M., GIOVOS I. 2019 - New records of the critically endangered *Squatina squatina* (Linnaeus, 1758) from Corsica, France. *Acta Adriatica*, **60**(2): 205-209.
- MASSUTI E., MORANTA J. 2003 - Demersal assemblages and depth distribution of elasmobranchs from the continental shelf and slope off the Balearic Islands (western Mediterranean). *ICES Journal of Marine Sciences*, 60: 753-766.

- MELLINGER J. 1989 - Reproduction et développement des Chondrichtyens. Océanis, 15, 283-303.
- MOREY G., BARKER J., HOOD A., GORDON C., BARTOLÍ A., MEYERS E.K.M., ELLIS J., SHARP R., JIMENEZ-ALVARADO D., POLLOM R. 2019 - *Squatina squatina*. The IUCN Red List of Threatened Species 2019: e.T39332A117498371. Doi.10.2305/IUCN.UK.20191.RLTS.T39332A117498371.en. [Downloaded on 09 February 2025]
- RAFRAFI-NOUIRA S. 2016 - Catalogue raisonné des espèces de poissons capturées devant Ras Jebel et autres régions marines de Tunisie septentrionale : aspects morphologiques, biométriques et bio-écologiques. PhD Thesis, Faculty of Sciences of Bizerte, University of Carthage (Tunisia), 509 pp.
- RAFRAFI-NOUIRA S., CHÉRIF M., REYNAUD C., CAPAPÉ C. 2023 - Captures of common angelshark *Squatina squatina* (Squatinidae) from the northern Tunisian coast (Central Mediterranean Sea). *Cahiers de Biologie Marine*, **64**(3): 203-207.
- ROUX C. 1977 - Les anges de mer (Squatinidae) de l'Atlantique et de la Méditerranée. Bulletin de l'Office national des Pêches de Tunisie, **1**(2): 159-167.
- ROUX C. 1984 - Squatinidae. In: Fishes of the north-eastern Atlantic and the Mediterranean. Whitehead P.J.P., M.-L. Bauchot, J.-C. Hureau, J. Nielsen and E. Tortonese, (eds.), Paris, UNESCO pp.83-88.
- TORTONESE E. 1956 - Fauna d'Italia, Vol. II. Leptocardia, Ciclostomata, Selachii., Calderini, Bologna, Italy. [In Italian.], 332 p.

