

**FISHERIES OF THE NARROW-BARRED SPANISH MACKEREL
(*SCOMBEROMORUS COMMERSION*, LACÉPÈDE, 1800)
IN THE PALESTINIAN AREA
(SOUTHEASTERN MEDITERRANEAN SEA)**

J. Salah¹, M. Aboutair², B. Zava³⁴, A. Di Natale⁵

SUMMARY

*The presence of the narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the Palestinian area is known since 1935, but detailed fishery data for the past are not available. Taking into account the importance of this species for the local communities, recent fishery data and size frequencies are here provided, in agreement with the ICCAT recommendations for this species.*

RÉSUMÉ

*La présence du thazard rayé Indo-Pacifique (*Scomberomorus commerson*) dans la région palestinienne est connue depuis 1935, mais on ne dispose pas de données de pêche détaillées avant cette date. Compte tenu de l'importance de cette espèce pour les communautés locales, des données de pêche récentes et des fréquences de taille sont fournies ici, conformément aux recommandations de l'ICCAT concernant cette espèce.*

RESUMEN

*La presencia del carite estriado indo-pacífico (*Scomberomorus commerson*) en la zona de Palestina se conoce desde 1935, pero no se dispone de datos pesqueros detallados del pasado. Teniendo en cuenta la importancia de esta especie para las comunidades locales, se facilitan aquí datos de pesca recientes y frecuencias de tallas, de acuerdo con las Recomendaciones de la ICCAT para esta especie.*

KEYWORDS

*Narrow-barred Spanish mackerel, *Scomberomorus commerson*, Lessepsian species, non-indigenous species, fisheries, distribution, catches, fishery statistics, gillnets, purse-seines, longlines, Gaza Strip, Palestine, Levantine Sea, Mediterranean Sea.*

¹ Directorate General of Fisheries, Gaza City, Palestine, Jehadsal@hotmail.com

² Directorate General of Fisheries, Al-rasheed St., Gaza City, Palestine, aboutair@hotmail.com

³ Wilderness Studi Ambientali, Via Cruillas 27, 90146 Palermo, Italy. wildernessbz@hotmail.com

⁴ Museo Civico di Storia Naturale di Comiso, Via degli Studi 9, 97013 Comiso (Rg) Italy.

⁵ Aquastudio Research Institute, Via Trapani 6, 98121 Messina, Italy. adinatale@costaedutainment.it

1. Introduction

The narrow-barred Spanish mackerel (*Scomberomorus commerson*, Lacépède, 1800) is an Indo-Pacific species, distributed throughout most of the Pacific Ocean and the Indian Ocean, including the Persian Gulf and the Red Sea (Collette and Graves, 2019). As concerns the ICCAT Convention area, a suspicious record exists from St. Helena in the Southeast Atlantic (Collette and Nawen, 1983; Froese and Pauly, 2019), while its presence in other areas in the Atlantic Ocean is not documented.

This immigrant species entered the Mediterranean Sea from the Suez Canal that was opened in 1869, as a Lessepsian migrant (Por, 1978). But the very first record in the Mediterranean Sea was in the Ligurian Sea (Italy) as *Cymbium commersoni* (Bonaparte, 1846), implying that the specimen entered the Mediterranean Sea from the Strait of Gibraltar, because the Suez Canal was opened 23 years later. This record is most likely a misidentification as the species has an Indo-Pacific distribution, even if Tortonese (1975, 1987), who also reported the species from the Ligurian Sea (Italy), later confirmed the Bonaparte's record.

According to Di Natale *et al.* (2009, 2020), the narrow-barred Spanish mackerel is now widely distributed in the eastern and southern Mediterranean Sea, having a documented presence in Italy, Tunisia, Libya, Egypt, Palestine, Israel, Lebanon, Syria, Turkey, Cyprus and Greece.

It is nowadays considered very successful in the southern and eastern part of the Mediterranean Sea (Srouf and Di Natale, 2008; Di Natale *et al.*, 2009, 2020; Zenetos *et al.*, 2010, Psomadakis *et al.*, 2012, Azzurro *et al.*, 2019, Al Mabrouk *et al.*, 2021).

ICCAT (which is the RFMO responsible for the management of all tunas and tuna-like species in the Atlantic Ocean and the adjacent seas), after the SCRS Recommendation to include the narrow-barred Spanish mackerel among the small tunas under its management (Anonymous, 2021), decided to have also this species on its Manual (Anonymous, 2022). The ICCAT Secretariat recently updated the Task 1 statistics, adding *Scomberomorus commerson* (Anonymous, 2023) and the data are now included in the catch statistics available on its web page. **Figure 1** shows the cumulative available landings of narrow-barred Spanish mackerel in the Mediterranean Sea, including all data sources (GFCM, FAO, ICCAT and scientific papers).

2. The presence of *Scomberomorus commerson* in Palestine

The first documented record was made from the coast of Palestine as *Scomberomorus* sp. (Hornell, 1935). After this first record in 1935, information from Palestine was missing for decades, even if the narrow-barred Spanish mackerel was always present in its coastal area and regularly fished at least since 1984⁶. Abu Hamra (2018) reported the presence of narrow-barred Spanish mackerel in the Gaza Strip, its importance for the market and the consumers, but without providing any catch data. Anonymous (2020) provided a World Bank study for the Palestinian fisheries, including 3-year landing data for some gear types on *Scomberomorus* sp. in the Gaza Strip. Al Mabrouk *et al.* (2021) reported about recent catches in Palestine (including also large individuals caught by recreational and professional fishermen). Hussein *et al.* (2022) included this species among those important for the local fishery and consumption. Abd Rabou *et al.* (2023) referred about the presence of this species in Gaza, its importance for the local consumers and the high market price.

Scomberomorus commerson is fished in the Gaza Strip by several gear types (gillnets, driftnets, large purse seines, purse seines with outboard engine, bottom trawls and sometimes longlines and spearguns), both as target and by-catch species. For this reason, it is useful to provide a short description of the various characteristics of the fishing activity in Gaza, updating the information previously reported by Abudaya *et al.* (2013).

2.1 The fishing zone

The fishing zone is one of the basic factors in fishing operations in terms of the opportunities for the fishing fleet activity, production (quantities and variety of species), for the cumulated fishing effort and for its impact on the single species and the marine environment. In the marine coastal zone of the Gaza Strip (Palestine) (**Figure 2**), the fishing zone has been exogenously determined by Israel and has been varied during its existence. Designated fishing grounds in the Mediterranean were outlined in the 1995 Oslo Agreement between Palestine and Israel (Anonymous, 1995), spanning some 1150 km² out to 20 nm from the coast of Gaza. Two areas bordering the northern and southern border were also marked as prohibited fishing areas (Error! Reference source not found.3; regions K and M).

⁶ The regular presence of *Scomberomorus commerson* in the coastal Gaza area since 1984 was reported by an old Palestinian fisherman, Mr. Abd al-Salam Subuh al-Hassi, during an interview carried out by the Directorate General of Fisheries.

The current fishing zone comprises four distinct areas of different characteristics:

- ZONE 1 - Sandy bottom area, extending 1 nautical mile (nm) from shore, approximately 20 m in depth, with some rocks and sand bars mostly present between Gaza Valley (Wadi Gaza) and Rafah. This area is largely targeted by smaller fishing vessels and divers using spear guns.
- ZONE 2 - Largely a muddy area, stretching from 1-6 nm from Zone 1, approximately 20-50 m in depth. Some artificial reef structures built by fishermen in 1981 exist between 2 and 4 nm. Here, fishing activities include larger purse seine, driftnets and trawl vessels targeting pelagic species.
- ZONE 3 - Rock covered area, 7-12 nm from shore, descending to depths of 100 m. Some passages or small spaces free of rocks exist. This zone is described as a spawning area and juvenile aggregation area for several demersal fish. Mostly targeted by longline and larger purse seine boats, though trawls may operate on the zone periphery or within passages.
- ZONE 4 - Deep mud and rock bottom area, 12-20 nm offshore, reaching depths of up to 750 m. Here, large purse seine vessels and trawlers operate, targeting also tuna species, swordfish and manta rays.

2.2 Port and landing sites

The Gaza Strip has only one port (Gaza) and five additional landing sites: the Northern landing area, Deir Al-Balah, An Nuseirat, Khan Yunis, and Rafah (Error! Reference source not found.⁴). Gaza Port, the most important site, has about 1,800 fishermen and total cumulated landings for all species were 2,951 tons in 2020 (about 63% of total landings in Palestine in the same year).

Due to the spread distribution of the vessels, the monitoring of catches and landings is not easy.

2.3 The fishing fleet

The fishing fleet in the Gaza Strip has 1744 operating vessels, of which 965 vessels are currently licensed to fish, while the remaining 779 are small boats without license (i.e., small boats without engines). Error! Reference source not found.¹ reports the number and types of vessels registered to Gaza's five main ports. Vessels are categorised as trawlers, purse seiners, vessels with outboard engines, "flucas" (support vessels that assist the main fishing vessel), and small oar boats ("has akas"). Within the 'vessels with outboard engines' category, there are three further subcategories: 165 small purse seiners ('hasaka shanshula'), 616 driftnet vessels ('mallatch' and 'zida') and 80 longline vessels ('hasaka sinar').

3. Fishery data on *Scomberomorus commerson* from the Gaza Strip

A recent internal report of the Directorate General of Fisheries in the Gaza Strip (Palestine) includes interesting information for better understanding the presence of *Scomberomorus commerson* in the different fisheries. In 2020, the official recorded landings of the species were 62 tons, plus additional 6 tons provided by non-professional (not licensed) fishermen and longliners, providing a total of 68 tons. This quantity represents 1.45% of the total landing of halieutic species in Palestine in 2020.

Narrow barred Spanish mackerel is present in various statistics by gear type in 2022: 6.8 tons were landed by large and medium size purse seines (representing 0.38% of the landings for PS in the same year); 7 tons were landed by small size out-bord engine purse seines (representing 0.46% of the landings for small OB PS in the same year); 7 tons were landed by driftnetters (representing 1% of the landings for GILL in the same year); the highest quantity of this species, 41.1 tons, was landed by trawlers (representing 6.55% of the landings for TRAW in the same year).

Landings of *Scomberomorus commerson*, within the last 28 years, ranged from a minimum of 9.063 tons in 2011 to a maximum of 154.45 tons in 2009. The average landings for this species by year are about 56.49 tons. The graph in **Figure 5** shows the landing data of *Scomberomorus commerson* in the Gaza Strip (Palestine) over the period from 1995 to 2022. It is very clear that the variability between years is important, but further details will be necessary for better understanding if it is linked to changes in fishing gears, in fishing effort or to other exogenous factors or a combination of factors. The detailed values of the annual landing data will be provided in separate to the ICCAT Secretariat. The ICCAT Task 1 database for *Scomberomorus commerson* (FAO and ICCAT code: COM) does not include so far any data from Palestine. Therefore, these are the first Task 1 data about the fishery of narrow-barred Spanish mackerel in that area, covering the period from 1995 to 2022.

4. Size frequencies

According to the internal report of the Direction General of Fisheries in the Gaza Strip, usually the size of *Scomberomorus commerson* in landings ranges from 20 to 120 cm, therefore from YOY⁷ to medium-size adults.

Figure 6 shows the monthly size frequencies in 2021. It is very evident that smaller fish are present in most of the months, while larger fish are in summer. This discrepancy is due to the gear types included in the statistics: July is showing the few landings obtained by the longlines, while August includes both a majority of catches from all gear combined and few larger fish caught by the longlines. All other monthly statistics include landings from all gears combined. Therefore, it is supposed that the presence of larger fish is induced by a different gear selectivity. **Figure 7** shows the cumulated size frequencies in 2020 and 2021, taking into account that the size data for 2020 are including landings for five months only (May, August, September, October and November). The percentage of small fish is clearly largely predominant. **Figures 8 and 9** show individuals clearly caught by gillnets, while **Figure 10** shows the species on the market.

The detailed size frequency data (by 1 mm) were duly provided in excel files to the ICCAT Secretariat as Task 2 for Palestine.

5. Conclusion

The presence of the narrow-barred Spanish mackerel (*Scomberomorus commerson*, Lacépède, 1800) in Palestine has been documented since 1935, and Lessepsian immigrants from the Red Sea/Indian Ocean through the Suez Canal initially originated it. It is supposed that now this species is resident in the Southeastern Mediterranean Sea and particularly in the Levantine Sea, spawning also in the area, even if migratory components might be still present. The presence of very young individuals in the landings supports the complete life cycle evidence of the species also along the Gaza Strip. Fishery is mostly related to the small-scale activities, even if catches also occur in pelagic longlines targeting other large pelagic species and purse seines. Its socio-economic relevance and its importance for the local subsistence and markets are very clear.

Following the observations provided by Al Mabruk *et al.* (2021), the catch statistics provided in the present work are improving the Task 1 data for this species and for Palestine. The discrepancies between the statistics provided in the present paper and those provided by Hussein *et al.* (2022), which are related to the years between 2018 and 2020, were deeply examined at the Direction General for Fisheries in Gaza. According to this further check, the data reported by Hussein *et al.* (2022) were provisional data and they were not checked again before being published. Therefore, in both cases the source of the original data being the Direction General for Fishery, the data provided by the present paper shall be retained as the official ones.

The total catches in the Mediterranean Sea remain only partly reported and they are still missing for some countries where this species is present and commonly marketed, undermining the possibility to understand the status of the Mediterranean stock. According to the last available IUCN assessment for the narrow-barred Spanish mackerel (Collette *et al.*, 2011), the species is globally considered Near Threatened (NT).

⁷ YOY = young of the year

Bibliography

- Abd Rabou A.F.N., Elkahlout K.E., Elnabris K.J., Attallah A.J., Salah J.Y., Aboutair M.A., Thabit W.M., Serri S.K., Abu Hatab H.G., Awadallah S.M., Saqallah W.M., Alhawajri M.S., Al-Sammak T.K., Jarayseh B.S., Ababsa S.A., Al-Hali D.I., Rafeea A.A., Ghattas D.S., Abu Amra H.E., Jaber I.M., Fayyad N.A., Shafei A.A., Abd Rabou I.A., Abd Rabou O.A., Abd Rabou M.A., Abualtayef M.T., Mohammed R. Al-Agha M.A., Ibrahim Y.K., Rimel M. Benmessaoud R.M., Cherif M.M., Madkour H.A., 2023. An inventory of some relatively large marine Mammals, Reptiles, and Fishes sighted, caught, by-caught, or stranded in the Mediterranean coast of the Gaza Strip - Palestine. *Open Journal of Ecology*, 13: 119-153. <https://www.scirp.org/journal/oje>
- Abudaya M., Harper S., Ulman A., Zeller D., 2013. Correcting mis- and under-reported marine fisheries catches from the Gaza Strip: 1950-2010. *Acta Adriatica*, 54 (2): 241-252.
- Abu Hamra H.E., 2018. A survey of marine bony fishes of the Gaza Strip, Palestine. Thesis, Master of Science, Biological Sciences Master Programme, Faculty of Science, The Islamic University of Gaza: 1-110.
- Al Mabruk S.A.A., Di Natale A., Zava B., 2021. Additional data on the narrow-barred Spanish mackerel (*Scomberomorus commerson*, Lacépède, 1800) in Libya and Palestine. *SCRS/2020/077*, Collect. Vol. Sci. Pap., ICCAT, 78 (6): 59-66.
- Anonymous, 1995. Israeli-Palestinian Interim Agreement on the West Bank and the Gaza Strip (a.k.a. "Oslo II"). <https://www.un.org/unispal/document/auto-insert-185434/>
- Anonymous, 2020. Rapid Fishery and Aquaculture Sector Diagnosis Using Fishery Performance Indicators in the Gaza Strip. *Problue*, The World Bank IBRD-IDA: 1-79.
- Anonymous, 2021. 2020 SCRS Advice to the Commission. Report for the Biennial Period, 2020-2021, Part 1 (2020). Vol. 2, SCRS, ICCAT: 1-359.
- Anonymous, 2022. Report for biennial period, 2020-2021, Part II (2021). Vol. 2, SCRS, ICCAT: 1-256.
- Anonymous, 2023. Report for biennial period, 2022-2023, Part I (2022). Vol. 2, SCRS, ICCAT: 1-356.
- Azzurro E., Sbragaglia V., Cerri J., Bariche M., Bolognini L., Ben Souissi J., Busoni G., Coco S., Antoniadou C., Fanelli E., Ghanem R., Garrabou J., Gianni F., Grati F., Kolitari J., Guglielmo L., Lovrenc L., Mazzoldi C., Milone N., Pannacciulli F., Pešić A., Samuel-Rhoads Y., Saponari L., Tomanic J., Topcu N.E., Vargiu G., Moschella P., 2019. Climate change, biological invasions, and the shifting distribution of Mediterranean fishes: a large-scale survey based on local ecological knowledge. *Glob. Chang. Biol.* 25 (8), 2779–2792. <https://doi.org/10.1111/gcb.14670>
- Collette B.B., Nauen C.E., 1983. *FAO species catalogue*. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. *FAO Fish. Synop.*, 125 (2): 1-137.
- Collette B.B., Graves J., 2019. *Tunas and Billfishes of the World*. Johns Hopkins University Press, Baltimore (USA): 1-352.
- Collette B., Chang S.-K., Di Natale A., Fox W., Juan Jorda M., Miyabe N., Nelson R., 2011. *Scomberomorus commerson*, Narrow-barred Spanish mackerel. The IUCN Red List of Threatened Species 2011: e.T170316A6745396. <http://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T170316A6745396.en>
- Di Natale A., Srouf A., Hattour A., Keskin Ç., Idrissi M., Orsi Relini L., 2009. Regional study on small tunas in the Mediterranean including the Black Sea. *GFCM-FAO, Studies and Reviews*, 85: 1-150.

- Di Natale A., Bariche L., Lahoud I., El Aweet A.E.A., 2020. Fisheries of narrow-barred Spanish mackerel (*Scomberomorus commerson*, Lacepède, 1800) in the southern and eastern Mediterranean and relevance of this species for ICCAT. SCRS/2020/062, Coll. Vol. Sci.Pap, ICCAT, 77 (9): 85-99.
- Hornell J. 1935. Report on the Fisheries of Palestine. Government of Palestine. Crown Agent for the Colonies, London: 1-106.
- Hussein D.M.A., Lucchetti M.C., Zaqoot H.A., Penca J., Hussein M.A., 2022. Status of Fisheries in Gaza Strip: Past trends and Challenges. IJEMS, 15 (2): 179-216. <https://emuni.si/ISSN/2232-6022/15.179-216.pdf>
- Por F.D., 1978. Lessepsian migration. Springer Verlag, Berlin, Heidelberg, New York: 1-228.
- Psomadakis P.N., Giustino S., Vacchi M., 2012. Mediterranean fish biodiversity: an updated inventory with focus on the Ligurian and Tyrrhenian seas. Zootaxa 326: 1–46. <https://doi.org/10.11646/zootaxa.3263.1.1>
- Srour A., Di Natale A., 2008. Synopsis of the GFCM study on small tunas in the Mediterranean including the Black Sea. SCRS/2007/164, ICCAT Coll. Vol. Sci. Pap., 62(5), 2008: 1559-1561.
- Tortonese E., 1975, Fauna d'Italia. Osteichthyes – Pesci Ossei. Ed. Calderini, Bologna, vol. IX: 350-356, 365-368, 369-370.
- Tortonese E., 1987. I Pesci del Mediterraneo. Recenti studi intorno alla sistematica e distribuzione. Quad. Ist. Idrobiol. Acquac. Brunelli, Sabaudia: 1-111.
- Zenetos A., Gofas S., Verlaque M., Inar M.E., García Raso J.E., Bianchi C.N., Morri C., Azzurro E., Bilecenoglu M., Frogia C., Siokou I., Violanti D., Sfriso A., San Martín G., Giangrande A., Katağan T., Ballesteros E., Ramos-Esplá A., Mastrototaro F., Ocaña O., Zingone A., Gambi M.C., Streftaris N., 2010. Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part I. Spatial distribution. Medit. Mar. Sci., 11 (2): 381-493.

Table 1. Distribution of the fishing fleet by vessel category/licence in the Gaza Strip (Palestine) in 2022 (source: Direction General of Fisheries, Gaza).

Port	Trawlers	Purse seiners	Vessels with outboard engine	Support vessels "Fluca"	Small oar boats	Total
North area	0	0	32	0	126	158
Gaza City port	15	45	453	7	173	692
Deir Al-Balah	0	1	149	1	231	382
Khan Yunis	0	5	109	14	156	284
Rafah	0	6	118	11	93	228
Total	15	57	861	33	779	1744

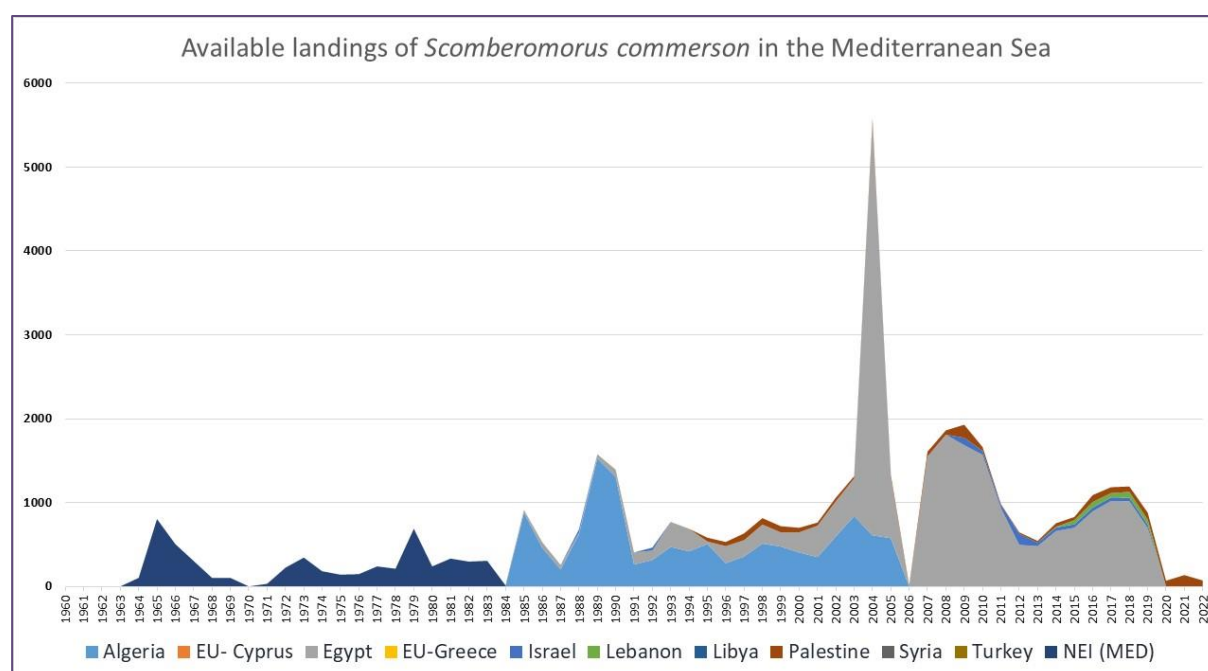


Figure 1. Cumulative annual catches of the narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the Mediterranean Sea, from 1960 to 2022 (including data from all available sources) (from Di Natale *et al.*, 2020, modified and updated).



Figure 2. Geographic position of Gaza Strip (Palestine) in the Southeastern Mediterranean area, in the Levantine Sea.

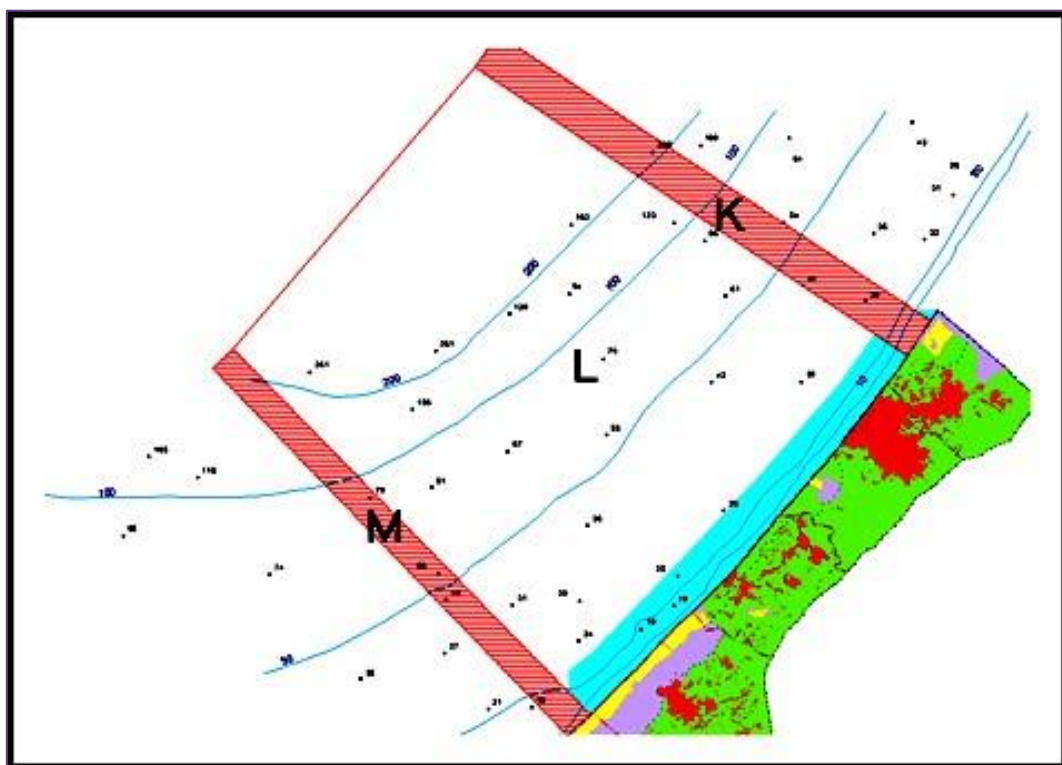


Figure 3. The fishing area of Gaza Strip, as defined by the Oslo Agreement in 1995. Fishery is forbidden in areas K and M, while it is allowed in area L (Anonymous, 1995).

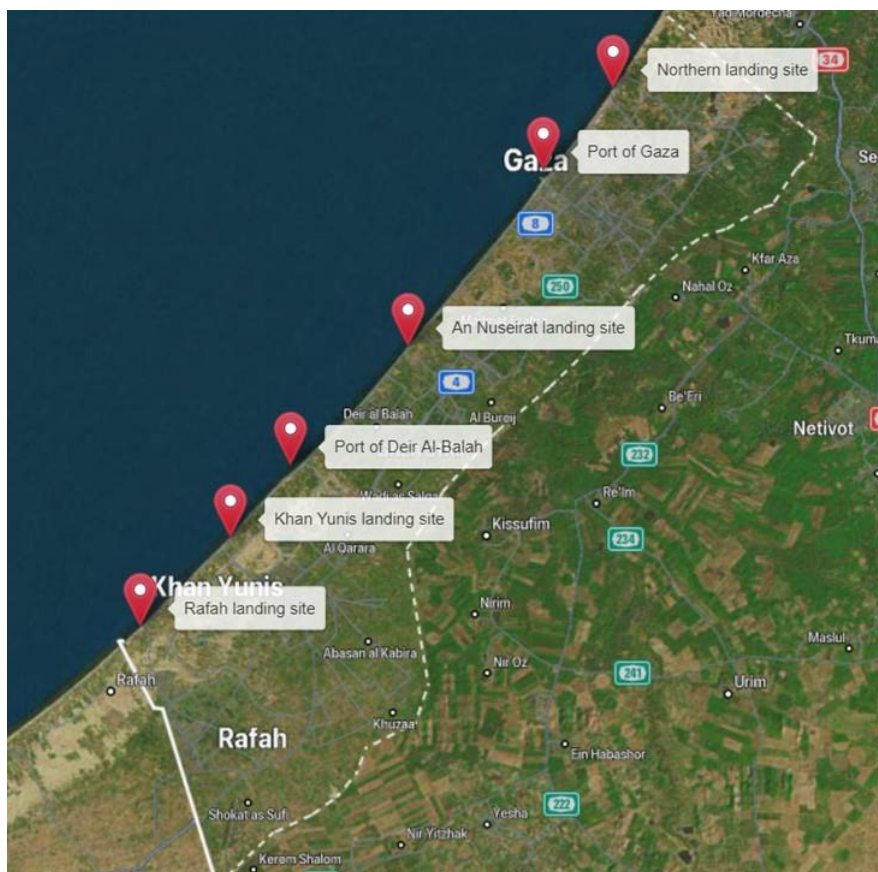


Figure 4. Distribution of ports and landing sites in the Gaza Strip (Palestine) (source: Direction General of Fisheries, Gaza).

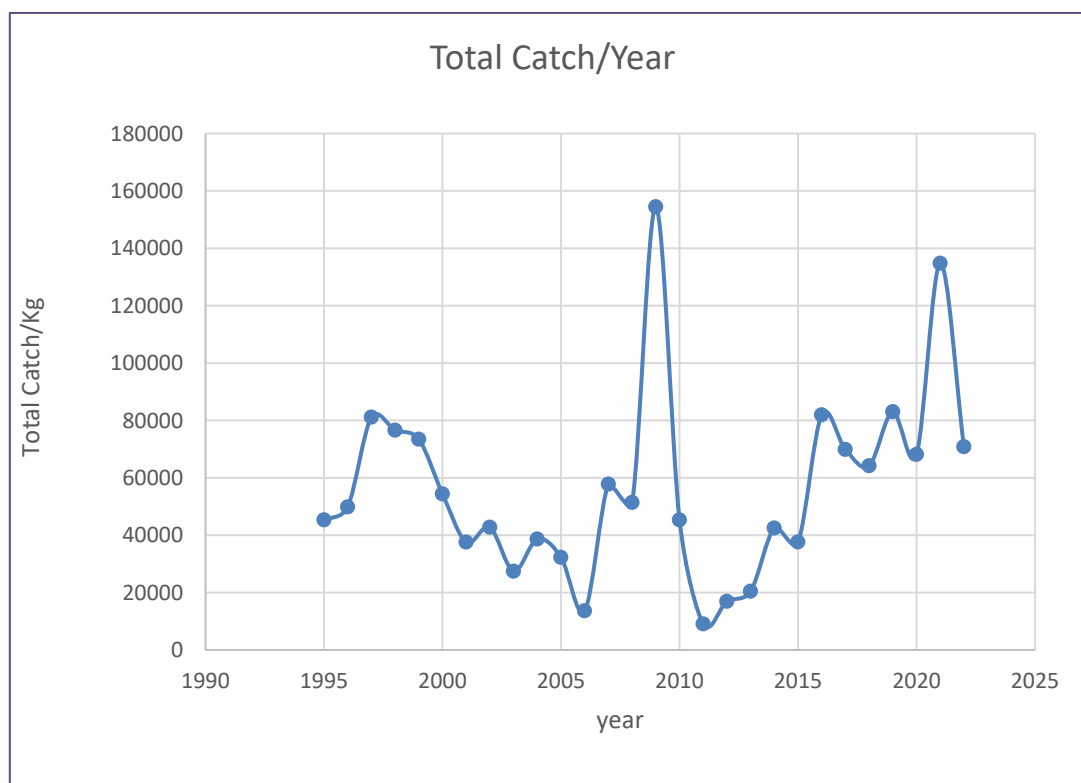


Figure 5. Yearly landings of *Scomberomorus commerson* from 1995 to 2022 in the Gaza Strip (Palestine) (source: Direction General of Fisheries, Gaza).

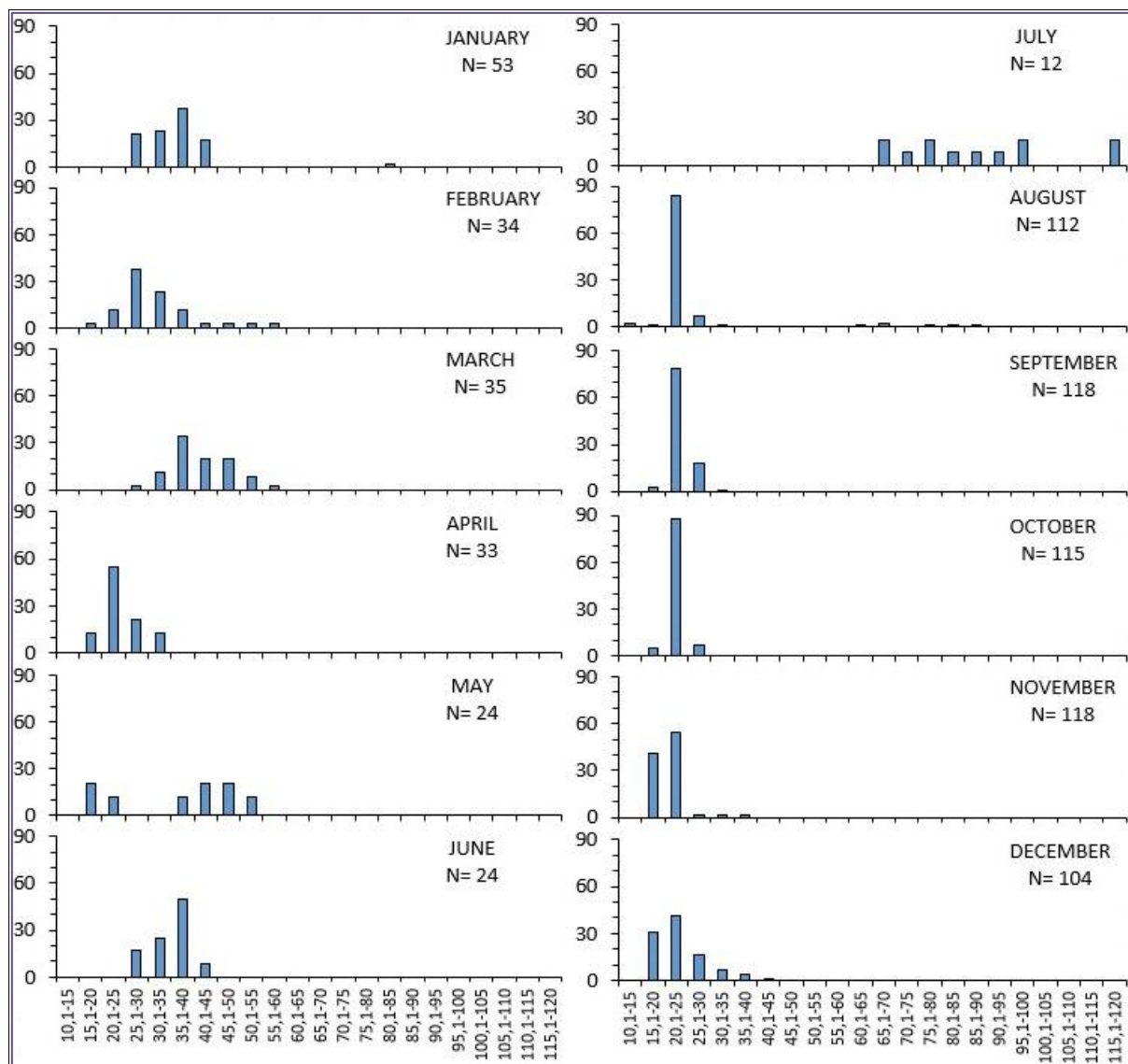


Figure 6. Monthly size frequencies (by 5 cm classes) of *Scomberomorus commerson* in 2021 from the Gaza Strip (Palestine); the frequencies in July are for longlines only, while the other months include all **gears** combined (source: Direction General of Fisheries, Gaza).

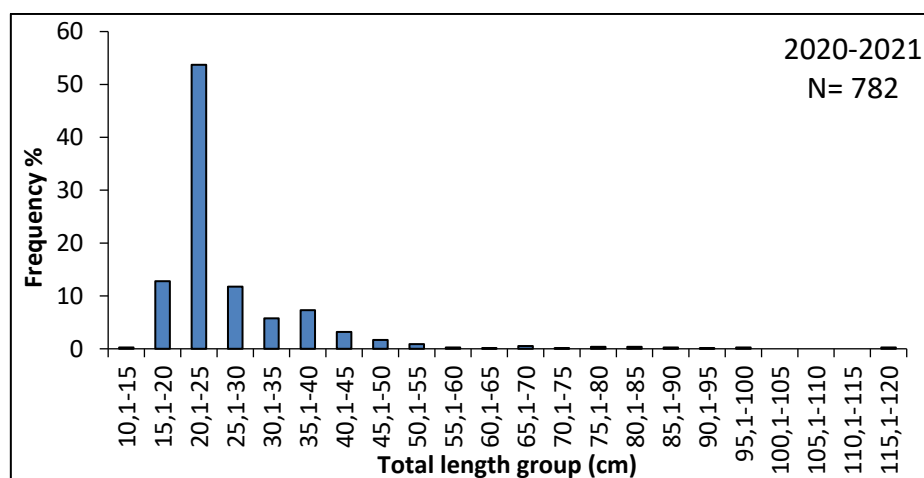


Figure 7. Cumulated size frequencies (by 5 cm classes) of *Scomberomorus commerson* in 2020 (5 months) and 2021 (12 months) from the Gaza Strip (Palestine) (source: Direction General of Fisheries, Gaza).



Figures 8 and 9. Catches by gillnets of *Scomberomorus commerson* in the Gaza Strip (Palestine) (source: Direction General of Fisheries, Gaza).

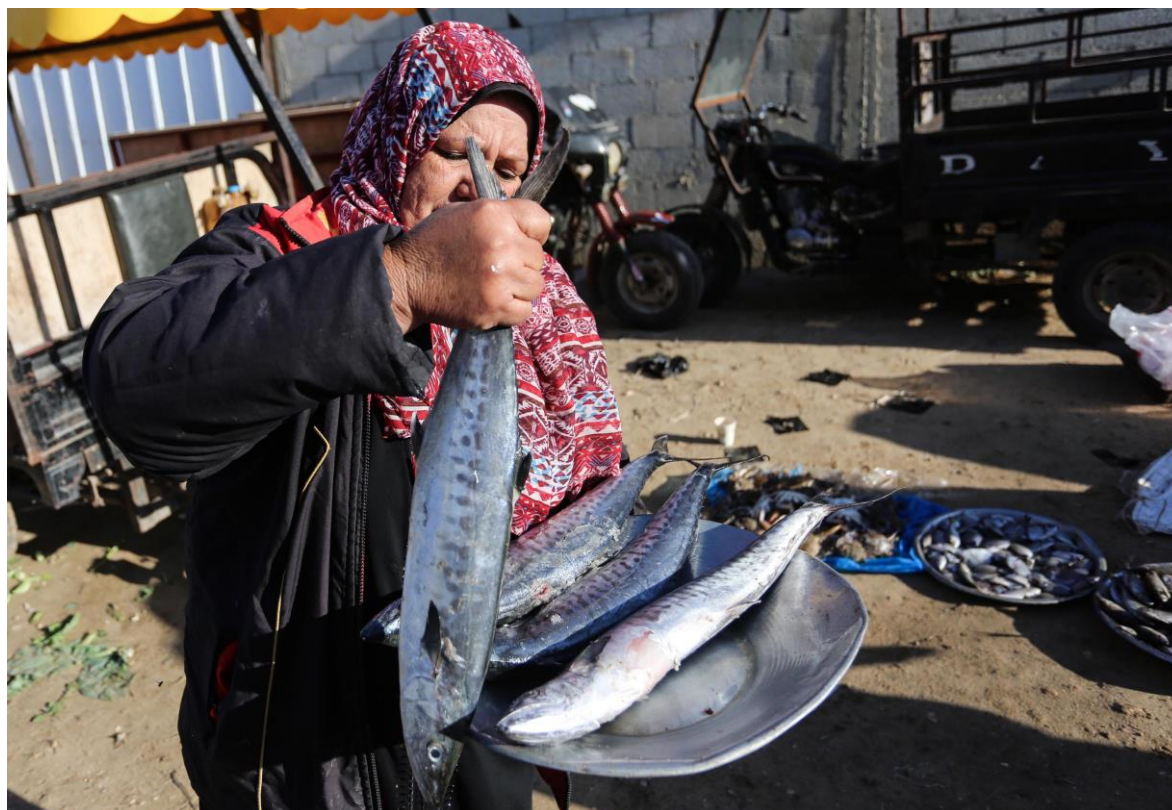


Figure 10. *Scomberomorus commerson* on the fish market in Deir al Balah, Gaza Strip (Palestine), 3rd December, 2019 (courtesy Ashraf Amra APA).