MOLLUSCA FROM THE STOMACH OF SPARUS AURATUS FISHED IN THE LAGOON OF BARDAWIL

by
AL. BARASH and Z. DANIN
Dept. Zool., Tel-Aviv Univ., Tel-Aviv

The food of Sparus auratus (Linnaeus, 1758), an Atlanto-Mediterranean fish species, consists mainly of molluscs. It prefers them to other invertebrates.

From Dr. A. Ben-Tuvia (Sea Fisheries Research Station, Haifa) we received the contents of the stomachs of 12 fishes, belonging to this species, for identification of the molluscs. The fishes were captured on the 16th of December, 1969, in the lagoon of Bardawil, Northern Sinai.

The shells of the molluscs withdrawn from the stomachs were generally broken. In some cases only fragments of shells were found, while in others remnants of the soft body adhered to the fragments.

We also had an opportunity to identify the mollusca inhabiting the lagoon of Bardawil from a sample dredged near Buaz el Husseni. This sample was taken on the 2nd of February, 1970, at the inlet to the lagoon on its northern part at a depth of 1-2 m.

LIST OF SPECIES RECORDED

Gastropoda

Pirenella cailliaudi (Potiez & Michaud, 1838)
Pirenella conica (de Blainville, 1826)
Cerithium (Thericium) scabridum Philippi, 1848

Bivalvia

Modiola (Arcuatula) arcuatula (Hanley, 1844)
Modiola (Arcuatula) glaberrima (Reeve, 1858)
Brachidontes (Hormomya) variabilis (Krauss, 1848)
Ostrea-species
Cerastoderma glaucum (Bruguière, 1789) = Cardium (Cerastoderma) edule Linnaeus, 1758 (in part)

Venerupis aurea catenifera (Lamarck, 1818)
Mactra corallina (Linnaeus, 1758)

NOTES ON THE SPECIES

Gastropoda

Family Potamididae

Pirenella cailliaudi (Potiez & Michaud, 1838)

The three fragments found in the stomachs of Sparus auratus are very small and consist of only the first 5-6 whorls. No remnants of the soft body were found.

In the dredged sample from the bottom of the lagoon of Bardawil this species was represented by about 150 specimens, in some of which the soft body was still in the shell.

This species, quite rare in the northern part of the Mediterranean along the coast of Israel, is becoming more common towards the south, particularly near El Arish. Shells were found in dredgings from Haifa Bay and between Ashdod and Bat Yam at a depth of 12-45 m. In addition to Israel P. cailliaudi is also known from the Mediterranean near Egypt and Syria.

In the Suez Canal area it is found at Port Said, Menzaleh Lake, Timsah Lake, the Bitter Lakes, and in all lagoons with abnormal salinity (Moazzo, 1939: 175).

Pirenella cailliaudi is an Indo-Pacific species: Gulf of Suez, Gulf of Aqaba, Red Sea, Madagascar.

Pirenella conica (de Blainville, 1826)

Only one fragment of the apical part of the shell, devoid of any sign of the soft body, was found.

The quantitative representation of this species in the sample dredged in the lagoon of Bardawil is similar to that of the former species.

Along the Mediterranean coast of Israel mainly worn shells are common. Living specimens have been collected in large quantities in the salt pans near Atlit and the saltwater fishponds, near the shore at Dor (=Tantura). Shells were dredged offshore between Atlit and Dor, and off Ashdod at a depth of 4-46 m.

In the Suez Canal they are found in the same places in which P. cailliaudi occurs.

General distribution: Mediterranean (Adriatic and Agean Sea), Gulf of Suez, Red Sea and Persian Gulf.

Family Cerithiidae

Cerithium (Thericium) scabridum Philippi, 1848

Fragments of 16 shells without soft parts were found in the stomachs. The apical parts were more numerous than basal parts.

Cerithium scabridum is the most common species in the lagoon of Bardawil. In the bottom sample over 400 specimens were found, some of them with soft parts inside.

Snails of this species occur commonly along the Mediterranean shore of Israel from Akhziv to Palmachim. They were also collected by dredgings in Haifa Bay, Atlit and Dor, at a depth of 28-38 m.

In the Suez Canal zone they are common in the Great Bitter Lake, Timsah Lake and in the Canal proper along its whole length up to Port Said.

It is an Indo-Pacific species known from the Gulf of Suez, the Red Sea and the Persian Gulf.

Bivalvia

Family Mytilidae

Modiola (Arcuatula) arcuatula (Hanley, 1844)

We have found in the stomachs of the fishes mainly broken valves connected by the ligament. One specimens contained remains of the soft body.

Valves of this species were collected on the beaches of Akko, Haifa, Atlit and Tel-Aviv. A complete specimen was collected in 1960 on the beach of northern Tel-Aviv (Tel Baruch). This is the first time that we have succeeded to find the shell with the soft body as well.

There is no information concerning the occurrence of this species in the Suez Canal.

General distribution: Aden, Jeddah and Djibouti.

Modiola (Arcuatula) glaberrima (Reeve, 1858)

During the examination of the contents of the stomachs we found 12 cracked shells with remains of the soft body.

In the Mediterranean waters of Israel a few live specimens were

found off Caesarea and between Bat Yam and Ashdod at a depth of 9-46 m on sandy-muddy bottoms. The mussels are attached by means of a byssus in clusters to shell fragments of Mollusca and to sand grains which are cemented together by mud.

In the Suez Canal this species is known from the Great Bitter and Timsah Lakes, and from the salt marshes of Port Said.

Distribution: Gulf of Suez, Red Sea.

Brachidontes (Hormomya) variabilis (Krauss, 1848)

Small fragments of shells without the soft parts were found in the stomachs.

In the Mediterranean along the Israeli coast this species is fairly distributed in the midlittoral and infralittoral from Akhziv to Ashdod. The mussels are attached by a byssus to rocks, stones, jetties and other structures. They are aggregated in dense clusters in the high tide zone.

In the Suez Canal this is one of the most common species.

General distribution: Gulf of Suez, Gulf of Aqaba, Red Sea, East coast of Africa, Madagascar, Seychelles.

Family Ostreidae

Ostrea species

The few fragments examined were too minute to permit identification of the species.

Family Cardiidae

Cerastoderma glaucum (Bruguière, 1789)

= Cardium (Cerastoderma) edule Linnaeus, 1758 (in part)

We found 24 small fragments of valves. The shells are small, their length up to 10 mm, and their colour white or brown. Possibly this is the infraspecies Cerastoderma glaucum mareotica (Pallary, 1912), one of the variations, characteristic of lagoons with a high salt content.

Among the bivalves collected in the dredged sample from the bottom of the lagoon there was a large number of specimens of this infraspecies, in which the soft body was preserved.

The species C. glaucum is euryhaline and most variable. Living specimens were found in the salt pans of Haifa Port, Atlit, salty

fishponds in Dor and in Bardawil. Shells are common on the beach along the whole Mediterranean coast of Israel and they have been dredged off Haifa Bay, Dor and Atlit.

In the Suez Canal zone this species is found in the Menzaleh Lake, Timsah Lake, Great and Small Bitter Lakes, in the salt marshes near Port Said and in the Canal proper in the vicinity of Port Said.

General distribution: Mediterranean, Black Sea, Caspian Sea and Gulf of Suez.

Note: The distinction between Cerastoderma edule and C. glaucum is due to Mars (1951), who divided the Cardium edule-complex into 2 groups: C. edule, found mainly in the Atlantic and less in the Mediterranean, and C. glaucum, which is mainly common in the Mediterranean and less common in the Atlantic.

Family Veneridae

Venerupis aurea catenifera (Lamarck, 1818)

Only 3 fragments of this species were taken from the stomachs of Sparus auratus.

In the sample from the bottom of the lagoon a very few valves were found too.

Along the Mediterranean coast of Israel some shells were collected from the mouth of the Kishon river to Tel-Aviv (Tel Baruch). In Tel Baruch a live specimen was also found on the beach.

General distribution: Mediterranean, Agean and Adriatic Sea, Black Sea, and the Atlantic Ocean from Great Britain to Marocco.

Family Mactridae

Mactra corallina (Linnaeus, 1758)

Entire valves and also fragments were found in the stomachs. The shells are thin and small, their length does not exceed 6 mm. The specimens living along the Mediterranean coast of Israel are generally longer: up to 30-40 mm, with quite thick walls.

This species is very common along the Israeli coast. Shells were collected from Akhziv to Khan Yunis. Live specimens are frequently cast ashore after storms. Living specimens and loose valves were dredged off Dor, Ashdod and Khan Yunis, at a depth of 9-77 m from

sandy, muddy and sand-muddy bottoms.

In the Suez Canal area it is found in the Timsah Lake, Great and Small Bitter Lakes and Port Said.

General distribution: Mediterranean, Black Sea, and the Lusitanian region of the Atlantic Ocean.

SUMMARY

1. In the stomachs of specimens of Sparus auratus, the contents of which was examined, 3 species of gastropods and 7 species of bivalves were found.

2. Among the bivalves two species of Modiola and Brachidontes variabilis are able to attach themselves to rocks and other hard substrates by means of a byssus. Likewise the Ostrea species attaches itself to hard substrates, however by means of one valve. The remaining species: Cerastoderma glaucum, Venerupis aurea catenifera and Mactra corallina are inhabiting sandy and muddy bottoms.

3. The soft bodies of Modiola glaberrima and M. arcuatula remained indigested although they have resided for some time in the fish's stomach. There probably exist an aversion (in respect to digestion) to certain species, or else the fishes, having been captured a short while after swallowing their prey, did not have sufficient time for digestion.

4. Three species are known as euryhaline: the two species of Pirenella and Cerastoderma glaucum.

5. From the zoogeographical point of view 5 species are of Indo-Pacific origin: Pirenella cailliaudi, Cerithium scabridum, Brachidontes variabilis, Modiola glaberrima and Modiola arcuatula. Mediterranean species, also found in the Red Sea, are: Pirenella conica and Cerastoderma glaucum.

BIBLIOGRAPHY

Ben-Tuvia, A., 1953. Mediterranean fishes of Israel. Bull. Sea Fish. Res. Stn., Haifa, 8: 1-40.

Barash, Al., & Z. Danin, 1965. Field guide to the common Mediterranean Mollusca of Israel. 1-168. Tel-Aviv (In Hebrew).

Bucquoy, E., Ph. Dautzenberg, & G. Dollfus, 1882-1886. Les Mollusque marins du Roussillon, 1. Gastropodes. 1-570, 66 plts. Paris.

----------,----------,----------, 1887-1898. Les Mollusques marins du Roussillon, 2. Pélécypodes. 1-884, 99 plts. Paris.

Carus, J.V., 1889-1893.Prodromus Faunae Mediterraneae, II. 1-854. Stuttgart.

Haas, G., 1937. Mollusca Marina. In Bodenheimer:Prodromus Faunae Palestinae. Mém. Inst. Egypte, 33: 275-280.

--------,1948. Sur l'immigration de Mollusques Indo-Pacifiques dans les eaux cotiéres de la Palestine. J. de Conchyl., 88: 141-144.

--------,1951. Preliminary report on the molluscs of the Palestine coastal shelf. Bull. Sea Fish. Res. Stn., Jerusalem, 1: 1-20.

Kira, T., 1955. Coloured illustrations of the shells of Japan. 1-204. Osaka.

Lamy, E., 1919. Les Moules et les Modioles de la Mer Rouge (d'après les matériaux recueillis par M. le Dr. Jousseaume). Bull. Mus. Hist. Nat., (1-3): 40-45, 109-114, 174-178.

Mars, P., 1951. Essai d'interprétation des formes généralement groupées sous le nom de Cardium edule Linné. Bull. Mus. Hist. Nat. Marseille, 21: 1-31.

Nicklès, M., 1950. Mollusques testacés marins de la côte occidentale d'Afrique. 1-269. Paris.

Nordsieck, F., 1968. Die europäischen Meeres-Gehäuseschnecken (Prosobranchia). 1-273. Stuttgart.

--------,1969. Die europäischen Meeresmuscheln (Bivalvia). 1-256. Stuttgart.

Pallary, P., 1912. Catalogue des mollusques du littoral méditerranéen de l'Egypte. Mém. Inst. Egypte, 7 (3): 69-205.

--------,1926. Explication des planches de J.C. Savigny. Mém. Ins. Egypte, 11: 1-138.

--------,1938. Les mollusques marins de la Syrie. J. de Conchyl., 82 (1): 5-58.

Por, F.D., 1969. One hundred years of Suez Canal. A century of Lessepsian migration. Biota of the Red Sea and the Eastern Mediterranean: 99-118.

Steuer, A., 1939. Die Fischereigründe vor Alexandrien. XIX. Mollusca. Thalassia, 3 (4): 46-54.

Thiele, J., 1929. Handbuch der systematischen Weichtierkunde, 1 (1): 1-376. Jena.

-------, 1931. Handbuch der systematischen Weichtierkunde, 1 (2): 377-778. Jena.

-------, 1935. Handbuch der systematischen Weichtierkunde, 2 : 779-1154. Jena.