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TWO NEW SUBSPECIES OF THE *DIAMYSIS BAHIRENSIS* SARS SPECIES GROUP (CRUSTACEA: MYSIDACEA) FROM EXTREME SALINITY ENVIRONMENTS ON THE ISRAEL AND SINAI COASTS

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ABSTRACT

Two new subspecies of the species group *Diamysis bahirensis* Sars are described: *D. bahirensis sirbonica* from the metahaline waters of the Bardawil Lagoon on the Mediterranean shore of Sinai and *D. bahirensis hebraica* from Nahal Taninim, an oligohaline coastal stream in Israel. The two subspecies are living in extremely different environments and can easily be separated by the structure of the appendix masculina and the statolith and a series of meristic differences of the telson and body appendages.

INTRODUCTION

Mysis bahirensis was described by G.O. Sars (1877) from the "Lake" of Tunis, El Bahira (marine salinity). In 1882, Czerniavsky designated it as the type species of the new genus *Diamysis*. At present, the following species of *Diamysis* are on record: *Diamysis bahirensis* (Sars, 1877), *D. pusilla* (Sars, 1877) from the Caspian Sea, *D. pengoi* (Czerniavsky, 1882) from Black Sea rivers, *D. frontieri* Nouvel, 1965 from Nossi Bé (Malagasy) and the Gulf of Elat (Băcescu, 1973). *D. assimilis* W. Tattersall from the River Ganges has recently been removed to the genus *Gangemysis* Tattersall et Tattersall, and *D. americana* W. Tattersall to the genus *Antromysis* Creaser.

The distribution of *Diamysis bahirensis* is confined to the Mediterranean and Black seas. Various subspecies have been described, indicating the large degree of variability of this species: *D. b. mecznikowi* Czerniavsky, 1898 from the Black Sea lagoons, *D. b. lacustris* Spandl, 1926, from Lake Scutari and "*D. b.* ssp." by Ariani (1966, 1981 and in press) from various localities on the Italian Adriatic coast. The typical subspecies has been reported by Băcescu (1941) from Levalduc near Banyuls, by Holmquist (1955) from the Yugoslav and Italian Adriatic coasts and by Genovese (1956) from Messina. All the reports came from lagoons and estuaries with salinities ranging from sea water salinity to fresh water.

Diamysis bahirensis was recorded by Tattersall (1927) from the eastern Mediterranean – from the Qishon estuary near Haifa and Port Said and Lake Manzala (Egypt)

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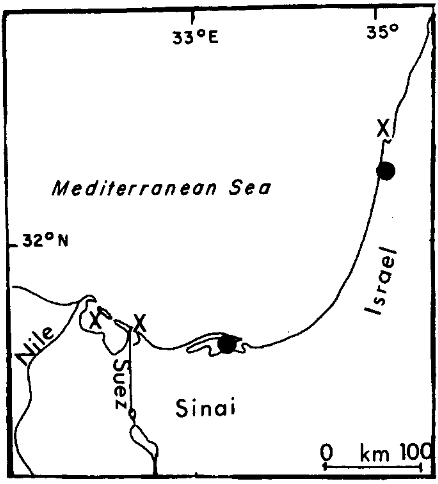


Fig. 1. Map of the eastern Mediterranean records of *Diamysis bahirensis*. X – localities recorded by Tattersall (1927). ● – present records.

(Fig. 1). However, no data on morphology or salinity were indicated. The Qishon population should be considered as having since disappeared, owing to the heavy pollution of this estuary.

Two new records of *Diamysis bahirensis* from the Levantine coasts are discussed here. Fairly high densities of this mysid have been found at two sites: Nahal Taninim, an oligohaline coastal stream in Israel, south of Haifa (Almeida Prado-Por et al., 1981), and the large metahaline lagoon Sabkhat el Bardawil (Sirbonian Lagoon) on the Mediterranean shore of Sinai (Fig. 1). The massive presence of this mysid in the Bardawil Lagoon was first reported, without identification, by Por (1971). *Diamysis* plays a very important role in this lagoon, as food for the young stages of the commercially important sea-bream *Sparus aurata* (Por & Ben-Tuvia, 1981).

Based on a comparative morphological study of the two newly reported populations and available descriptions of the other subspecies of this species, two new subspecies of *Diamysis bahirensis* are proposed. The problem of the *bahirensis* species group is also briefly discussed.

MATERIALS AND METHODS

Samples collected by the Hebrew University–Smithsonian Institution program "Biota of the Red Sea and Eastern Mediterranean" (SLM samples) and by the Inland Water Ecological Service of the Hebrew University and the Israel Nature Reserves Authority (IES samples) provided the material.

A) Bardawil Lagoon is a large waterbody, 650 km^2, with salinities normally ranging from 41 to 70‰ (Por & Ben-Tuvia, 1981). Specimens were obtained from meiobenthos samples taken with a hand net or an Ockelman sledge (mesh size 200 μ) during 1967–1969 from the whole extent of the lagoon and the whole range of salinities (SLM 1–8, 11 & 17–21, VII.1967; SLM 566, VI.1968; SLM 3208, IX.1969; SLM 3724, XII.1969).

B) Nahal Taninim. Specimens were collected at various sites along this coastal stream and its different springs, at salinities which varied from 0.7 to 1.1‰ in the springs and between 1.37 and 1.83‰ in the stream itself (IES 1004, 1712, 1713 and 1715, I.1980; IES 1455, II.1980). The samples were collected with a 200 μ mesh hand net.

Measurements of the specimens are from tip of rostrum to end of last abdominal segment.

DESCRIPTIONS

Diamysis bahirensis Sars ssp. ***sirbonica*** n. ssp.

Figs. 2A–15A

Material

Holotype. Female, HUJ Cr. 60.

Paratype. Male, HUJ Cr. 61.

Type locality. Bardawil Lagoon.

Description

Size: females average 4.0 mm (5 specimens); males average 3.5 mm (5 specimens).

Body slender, exoskeleton hard. Rostrum slightly produced into a wide angle. Frontal edge of carapace with two lateral spines directed forwards. Eyes – cornea about half the length of stalk.

Antennular peduncle – first segment slightly longer than second and third segments together. The three segments of the antennular peduncle exceed 2/3 of antennal scale. Male lobe digitiform, scarcely setose, conspicuously bent ventrally and pointing backwards.

Antennal scale setose all round, long, narrowly lanceolate and with distal suture. Outer-distal angle of the basipodite with lateral spine. Mandibular palp variable, second joint sometimes subdivided. Maxillula and maxilla typical for the genus. Maxillary palp with an average of 10 spines on outer edge.

Carpo-propodus of pereiopods 3, 5, 6, 7 and 8 are biarticulate in all the examined specimens. Pereiopod 4 with bi- or triarticulate carpo-propodite.

Fourth pleopod of male typical for the genus. Exopodite biarticulate, ending in a long plumose seta. Distal end of first segment with one long and bare seta.

Telson with cleft with 9–15 lamellar processes. Lateral margins straight, bearing 7–10 spines. Average body/telson length ratio is 0.95.

Uropod setose all round. Endopodite shorter than exopodite, equal to 3/4 of exopodite length. Spine on inner margin, near statocyst. Statolith with numerous relatively large holes, situated below the ambitus. Structure macrocrystalline.

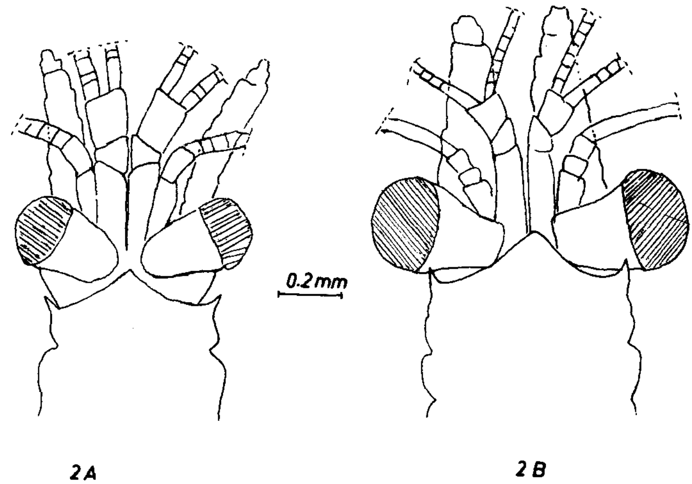


Fig. 2. Dorsal view of head of female. A. *Diamysis bahirensis sirbonica*. B. *D. b. hebraica*.

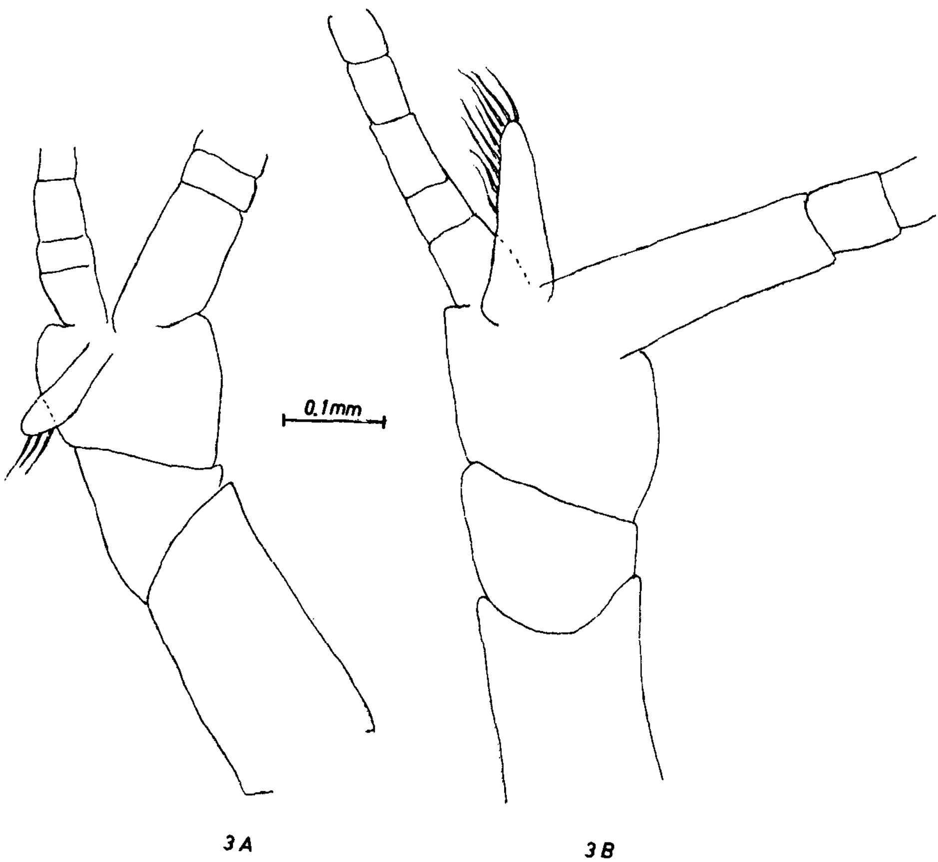


Fig. 3. Antennular peduncle with processus masculinus. A. *D. b. sirbonica*. B. *D. b. hebraica*.

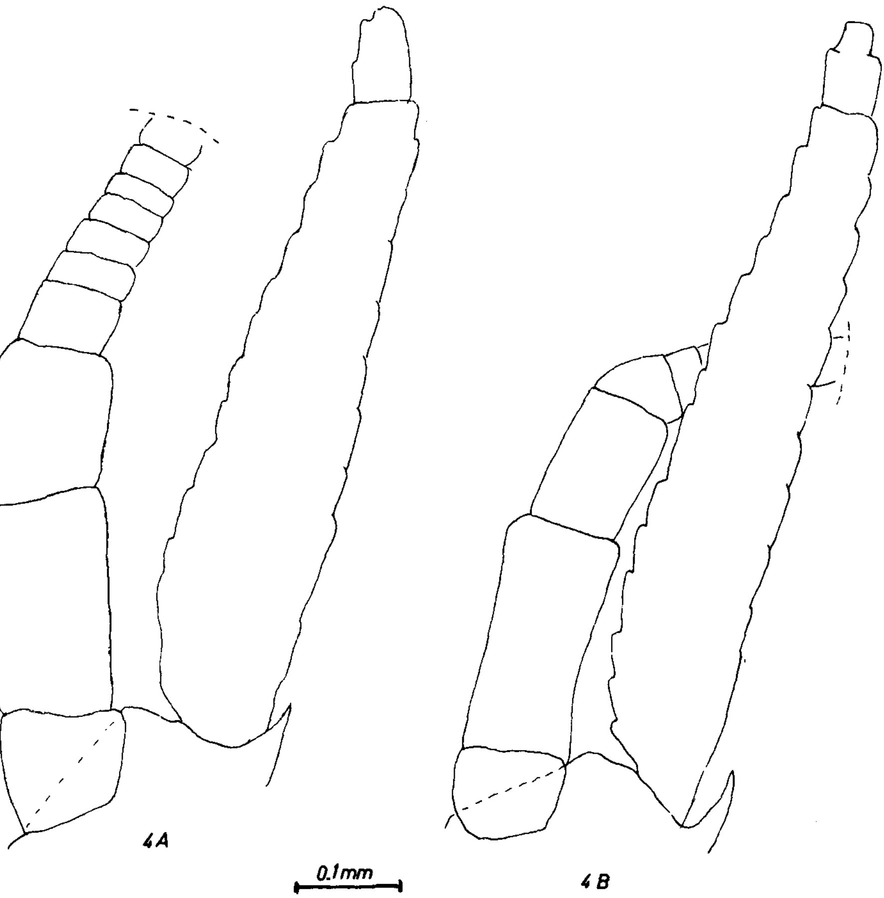


Fig. 4. Antennular scale. A. *D. b. sirbonica*. B. *D. b. hebraica*.

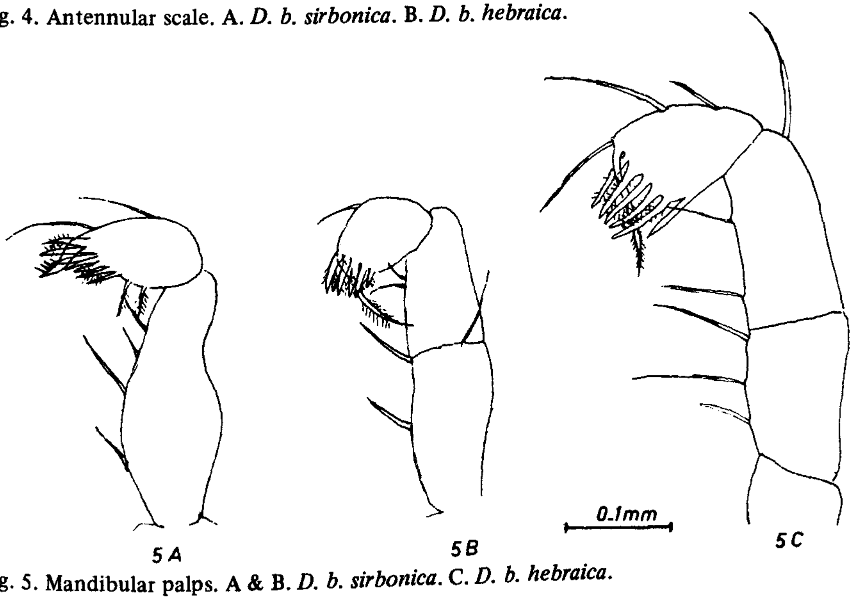


Fig. 5. Mandibular palps. A & B. *D. b. sirbonica*. C. *D. b. hebraica*.

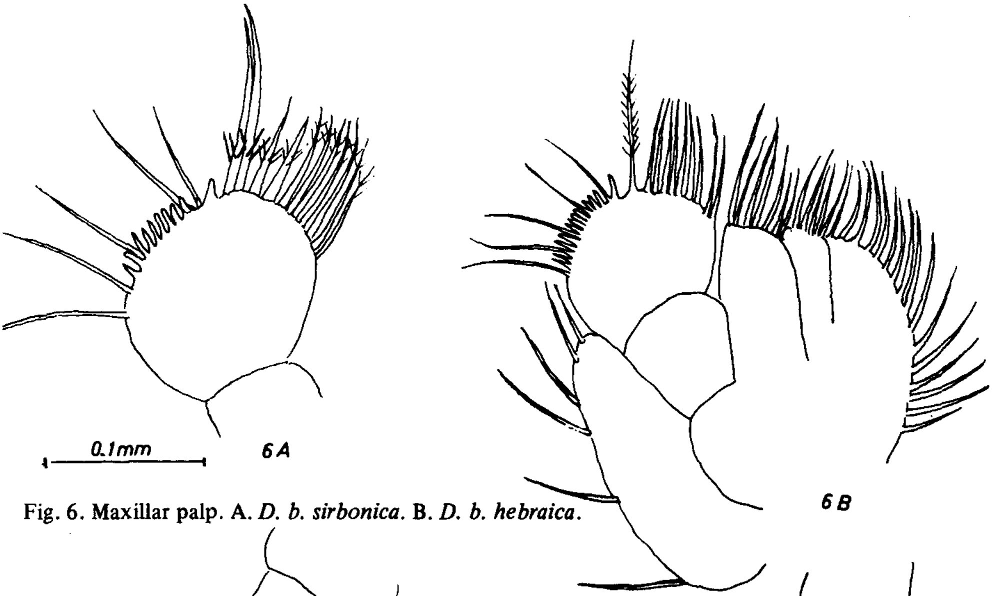


Fig. 6. Maxillar palp. A. *D. b. sirbonica*. B. *D. b. hebraica*.

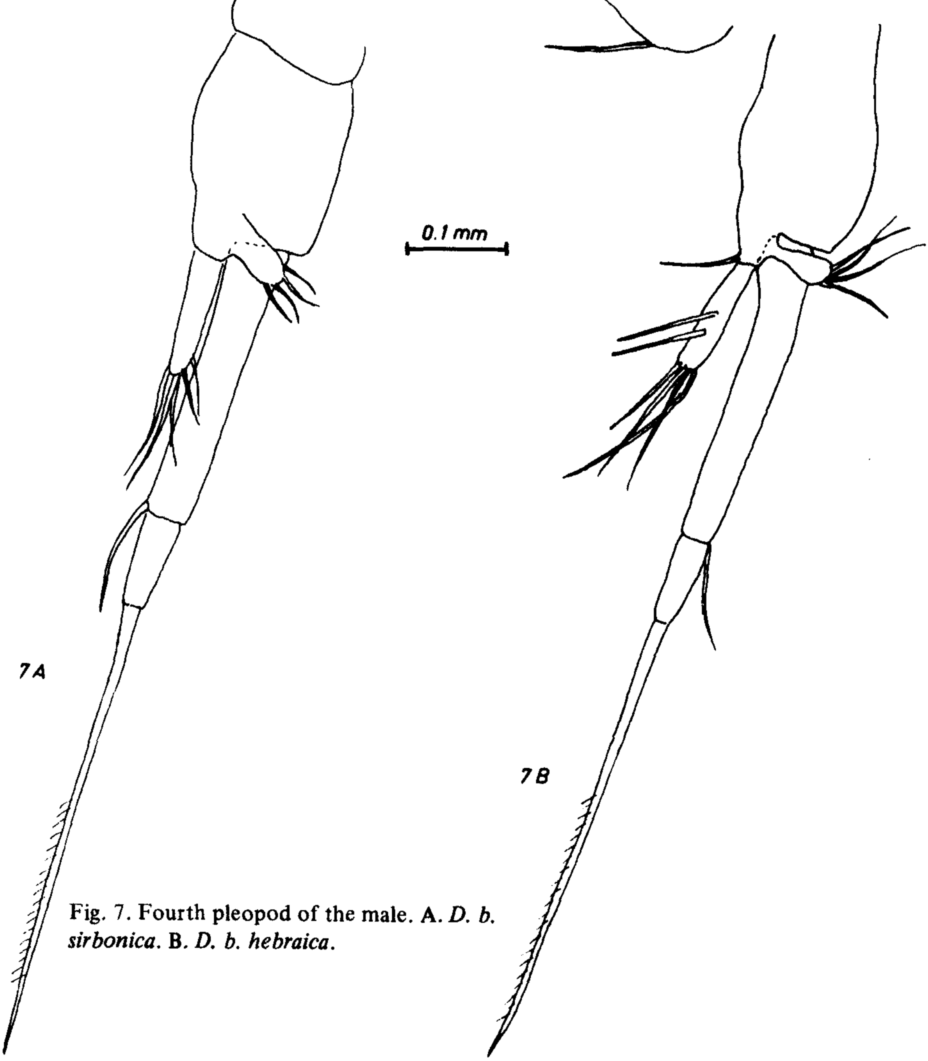


Fig. 7. Fourth pleopod of the male. A. *D. b. sirbonica*. B. *D. b. hebraica*.

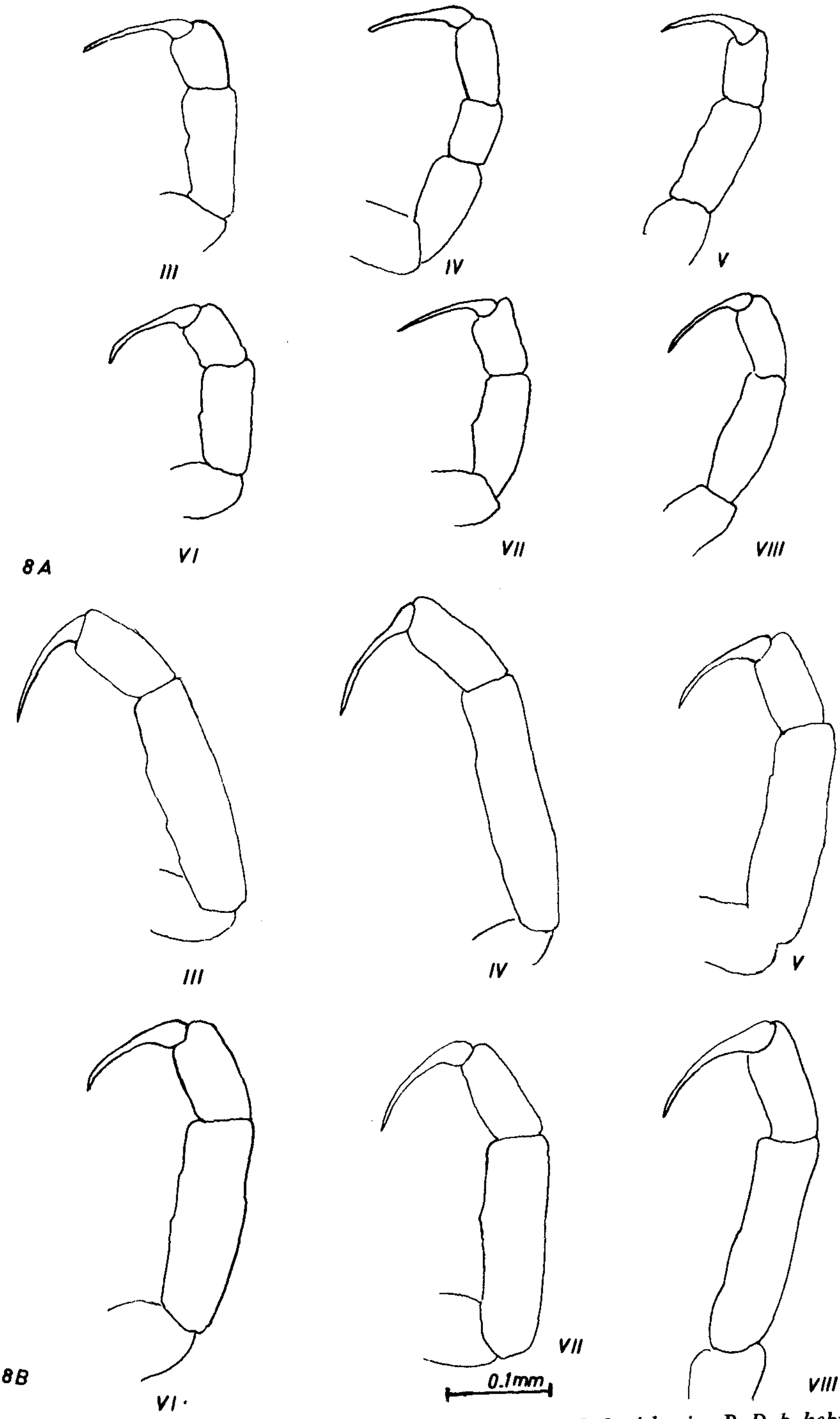


Fig. 8. Distal ends of pereiopods III, IV, V, VI, VII, and VIII. A. *D. b. sirbonica*. B. *D. b. hebraica*.

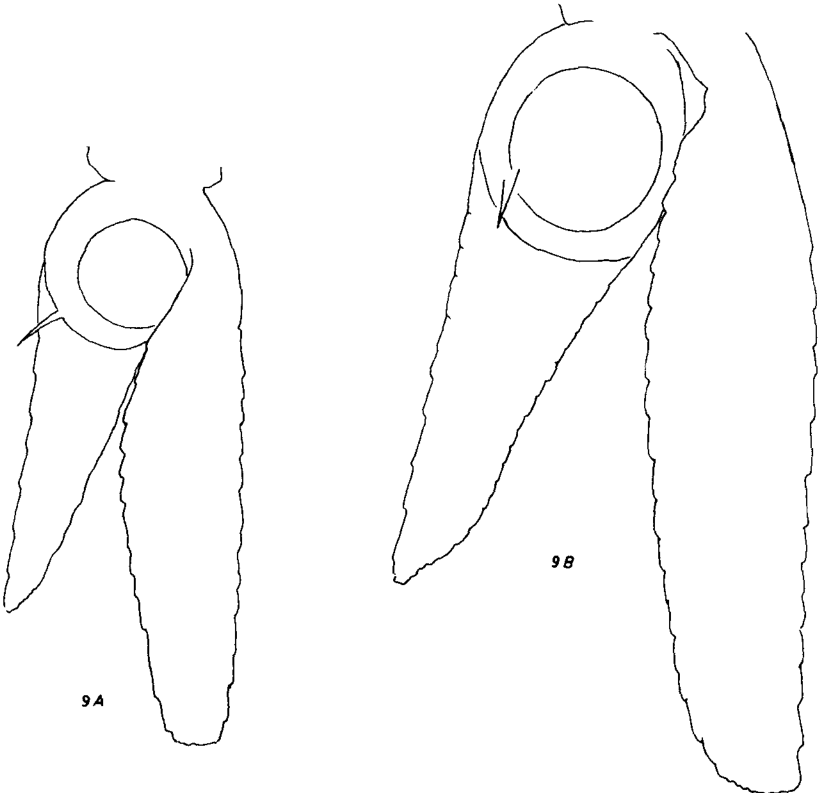


Fig. 9. Uropod. A. *D. b. sirbonica*. B. *D. b. hebraica*.

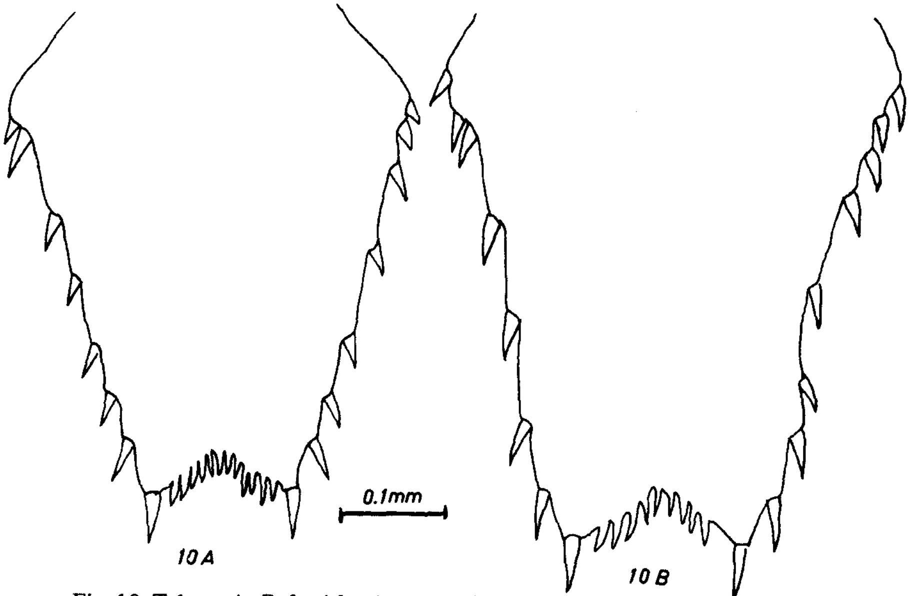
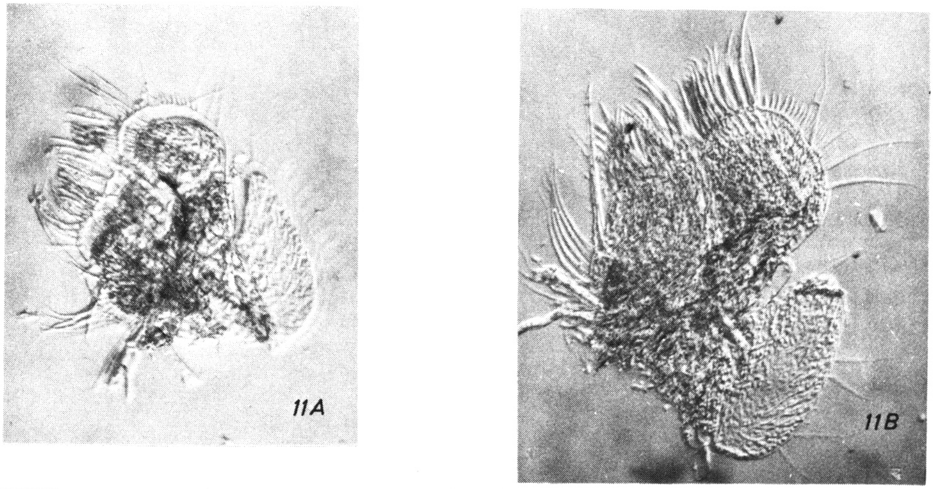


Fig. 10. Telson. A. *D. b. sirbonica*. B. *D. b. hebraica*.



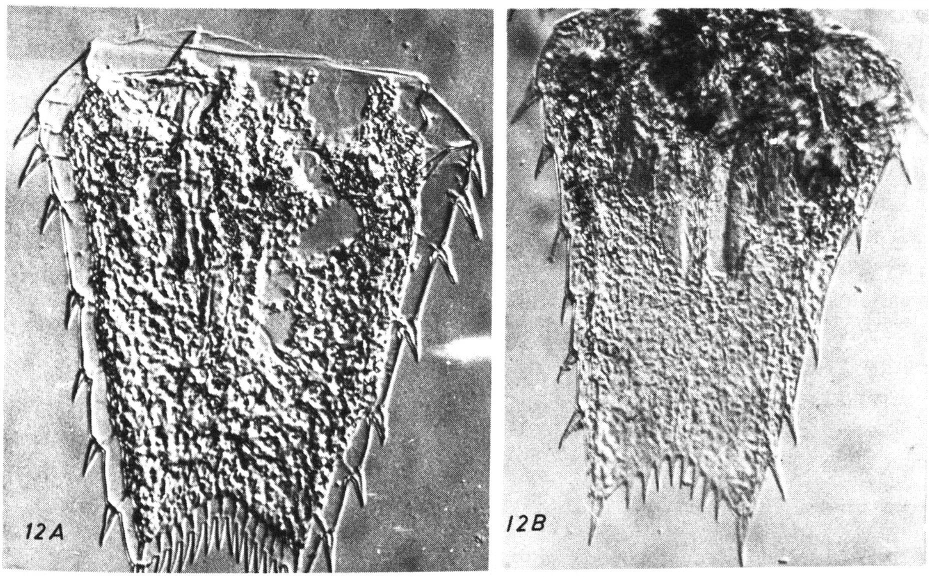


Fig. 11. Maxilla. A. *D. b. sirbonica*. B. *D. b. hebraica*.

Fig. 12. Telson. A. *D. b. sirbonica*. B. *D. b. hebraica*.

Diamysis bahirensis Sars ssp. ***hebraica*** n. ssp.

Figs. 2B–15B

Material

Holotype. Female, HUJ Cr. 62.

Paratype. Male, HUJ Cr. 63

Type locality. Nahal Taninim.

Description

Size: females average 4.5 mm (10 specimens); males average 3.9 mm (10 specimens).

Body slender, exoskeleton soft. Rostrum slightly produced into a wide angle. Frontal edge of carapace with two lateral spines directed forwards. Eyes – cornea nearly same length as stalk.

Antennular peduncle – first segment about same length as second and third segments together. The three segments of the antennular peduncle as long as 2/3 of the antennal scale. Male lobe setose, well developed and pointing forwards.

Antennal scale setose all round, long, narrowly lanceolate and with inconspicuous distal suture. Outer distal angle of basipodite with lateral spine. Mandibular palp with second segment subdivided in some cases. Maxillula and maxilla typical for the genus, maxillary palp with an average of 12 spines on outer edge.

Carpo-propodus of pereiopods 3, 5, 6, 7 and 8 always biarticulate. Pereiopod 4 with bi- or triarticulate carpo-propodite.

Fourth pleopod of male typical for the genus. Exopodite biarticulate, ending in a long, setose spine. Distal end of first segment with one long plumose seta.

Telson with cleft with 8–13 lamellar processes. Lateral margins slightly rounded, bearing 7–10 spines.

Uropod setose all round. Endopodite shorter than exopodite, equal to 3/4 of length of exopodite. Spine on inner margin near statocyst. Statolith with few relatively small holes, situated along the ambitus. Structure microcrystalline.

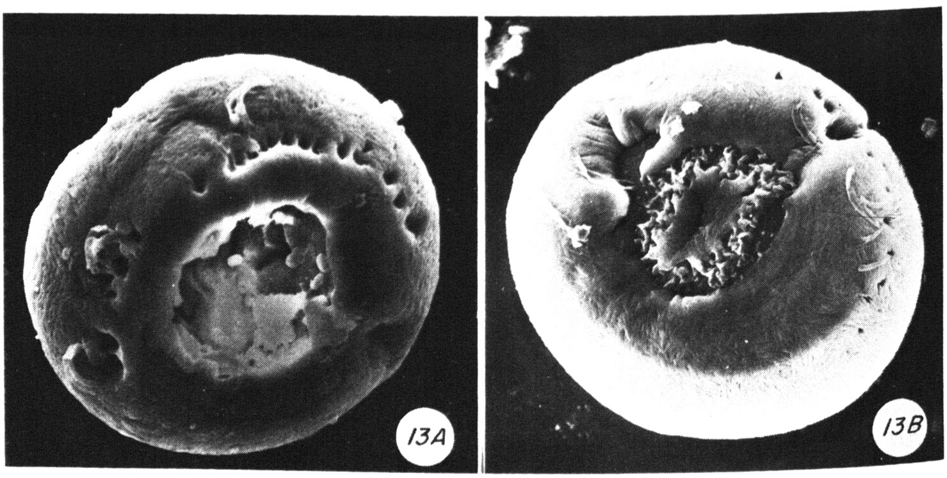


Fig. 13. SEM photograph of statolith (× 442). A. *D. b. sirbonica*. B. *D. b. hebraica*.

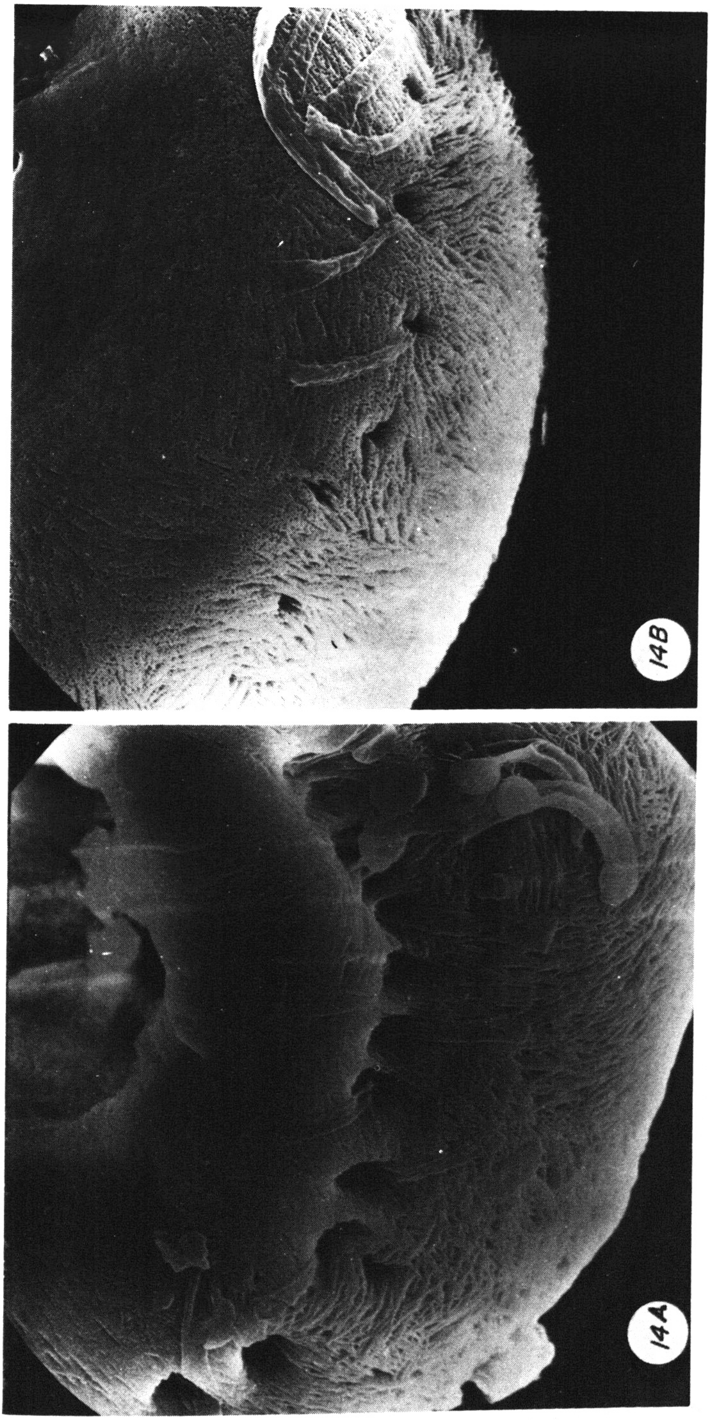


Fig. 14. SEM photograph of statolith, detail (× 1800). A. *D. b. sirbonica*. B. *D. b. hebraica*.

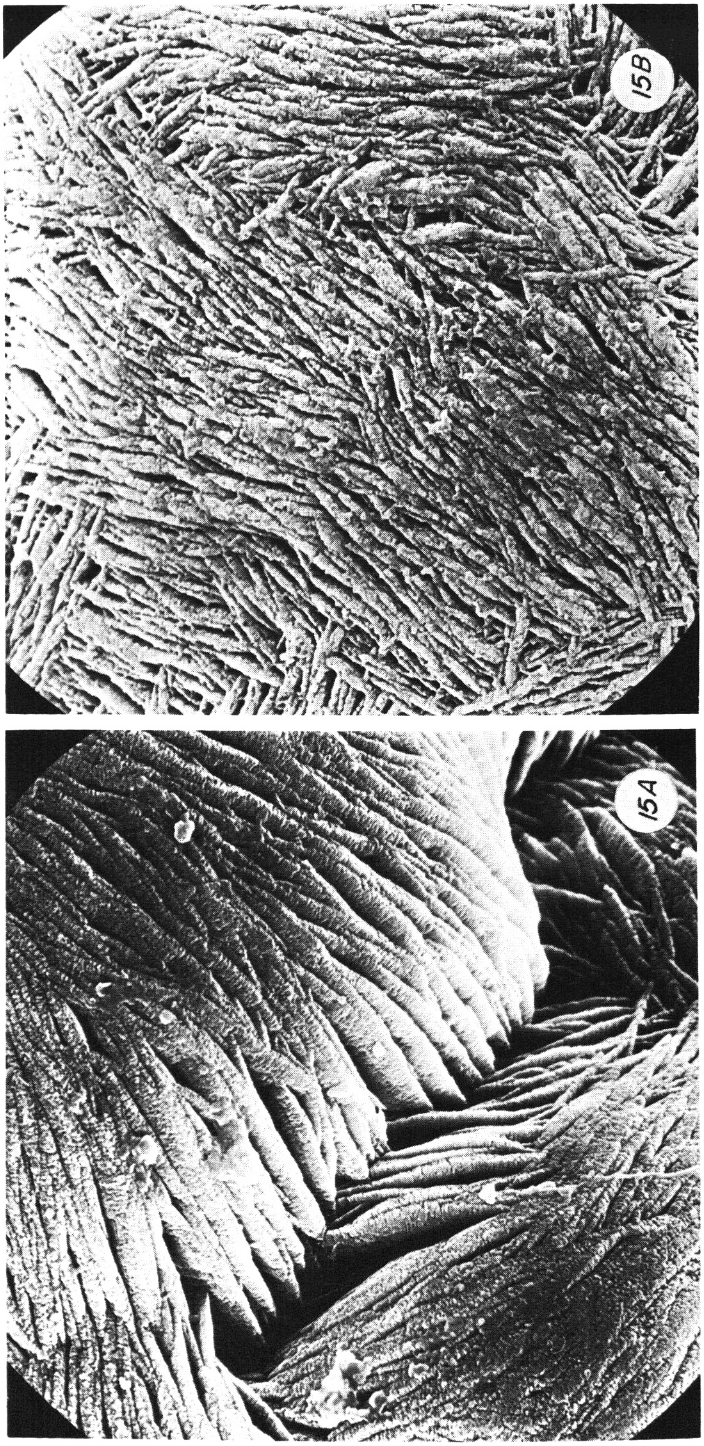


Fig. 15. SEM photograph of microcrystalline structure of statolith (× 3600). A. *D. b. sirbonica*. B. *D. b. hebraica*.

TABLE I

Comparison between best known *Diamysis* forms

	Diamysis bahirensis sirbonica n. ssp.	*Diamysis bahirensis hebraica* n. ssp.	*Diamysis bahirensis bahirensis* G.O. Sars	*Diamysis bahirensis* (Holmquist, 1955)	*Diamysis bahirensis* (Genovese, 1956)	*Diamysis bahirensis* ssp. (Ariani, 1966 etc.)	*Diamysis bahirensis mecznikovi* Czern. (Băcescu, 1954)	*Diamysis pengoi* Czern. (Băcescu, 1954)
Locality	Bardawil Lagoon	Nahal Taninim	Al Bahira ("Lake" of Tunis)	Yugoslav Adriatic shore	Lake Ganzirri, Sicily	Italian Adriatic shore	Black Sea	Black Sea rivers
Size (mm)	3.5–4.0	3.7–5.0	8.0	7.0–9.5	average 6	4.2–8	7.0–11.5	7.5–13
Carpopropodite formula	2.(2–3).2.2.2.2	2.(2–3).2.2.2.2	3.2.2.2.2.2	3.3.3.(2–3).(2–3).3	3.3.2.2.2.2	–.3.–.–.3.–	–	3.(2–3).(2–3).2.2.2
Lateral furcal spines	7–10	7–10	11–12	8–13	8–12	–	9–13	6–9
Lamellar processes	9–15	8–13	14	18–32	13	13–35	18–30	20–31
Max. telson width/min. telson width	2.66–2.80	2.30–2.50	2.80	1.6–1.8	2.2	2.0	2.0	2.0
Salinity of localities	Metahaline (39–70‰)	Slightly oligohaline (1–2‰)	Marine (38‰)	Oligohaline to fresh (?)	29‰	12.5–32‰	2.5–45‰	Fresh water

DISCUSSION

Comparison between D. bahirensis sirbonica and D. b. hebraica

The two subspecies can easily be separated, although except for the differently-built telson and the differently-built and oriented male lobes, all the differences are meristic and quantitative.

The exoskeleton is harder in *D. b. sirbonica* than in *D. b. hebraica*. The cornea/eye-stalk ratio is different. The antennular peduncle is longer in *sirbonica* than in *hebraica*. The outer margin of the maxillary palp averages 12 spines in *sirbonica* and 10 in *hebraica*. The shape of the telson is significantly different: the outer margin is straight-trapezoid in *sirbonica* and proximally rounded-sinusoid in *hebraica*. In the telson cleft there are more lamellar processes (9–15) in *sirbonica* than in *hebraica* (8–13). In addition, the statoliths reveal considerable differences under the scanning electron microscope.

The considerable ecological difference must be emphasized too: *D. b. hebraica* lives under oligohaline to freshwater conditions, whereas *D. b. sirbonica* is found at extremely high metahaline salinities, up to 70‰, values from which mysids have not previously been reported. Ariani (1979) considers the brackish Adriatic populations as belonging to a separate subspecies.

Position within the bahirensis Species Group

The differences between the various peri-mediterranean populations are also chiefly meristic and quantitative (Table I). Since the populations are reported from widely diverse environments, physiological differences are also probably considerable. According to the hybridization experiments of Ariani (1981), the populations originating from geographically distant localities, characterized also by different salinities, are intersterile.

Both new Levantine subspecies have the smallest sizes recorded among populations of *D. bahirensis*. The type-specimens of Sars have 18 maxillary palp spines, whereas the two new subspecies average 10 and 12 spines. The number of carpo-propodite segments, similar in the two Levantine subspecies, differs from that in all the other described taxa. It appears that these two subspecies are set apart from the northern and western populations of *bahirensis*. However, the peculiar structure and orientation of the male lobe in *D. b. sirbonica*, seems to be a unique feature.

The variability in the Mediterranean *D. bahirensis* populations (Table I) makes it difficult to define the taxonomic status of the Levantine populations. A subspecies status seems to be the best temporary solution. Hybridization experiments and population statistics should be carried out on a large scale, around the Mediterranean, before deciding the real taxonomic status of the various types.

REFERENCES

Almeida Prado-Por, M.S., R. Ortal and F.D. Por. 1981. *Diamysis* from the brackish river Nahal Taninim in Israel and its associated fauna. Comm. Int. Mer Medit. 27: 181–182.

Ariani, A.P. 1966. Su una forma di *Diamysis bahirensis* (G.O. Sars) rinvenuta in territorio pugliese. Boll. Zool. 33: 227–228.

Ariani, A.P. 1979. Contribution à l'étude ecotaxonomique et biogeographique des *Diamysis* d'eaux saumatres de la Meditérranée. Comm. Int. Mer Médit. 25–26: 159–160.

Ariani, A.P. 1981. Experiences d'hybridization entre populations meditérranéennes du genre *Diamysis*. Comm. Int. Mer Medit. 27: 177–180.

Ariani, A.P. 1981. Systématique du genre *Diamysis* et palaeogeographie de la Meditérranée. Comm. Int. Mer Medit. (in press).

Băcescu, M. 1941. Les Mysidacees des eaux meditérranéennes de la France (especialement de Banyuls) et des eaux de Monaco. Bull. Inst. Oceanogr. Monaco 795: 1–46.

Băcescu, M. 1954. Mysidacea. Fauna Republicii Populare Romine. Rumanian Academy, Bucharest. 4 (3): 126 pp.

Băcescu, M. 1973. Contribution à la connaissance des Mysides benthiques de la mer Rouge. Comm. Int. Mer Medit. 21: 643–646.

Czerniavsky, V. 1882. Monographia Mysidarum imprimis imperii Rossici. Fasc. II. Trav. Soc. Imper. Nat. St. Petersburg 13: 1–85.

Genovese, S. 1956. Su due Misidacei dei laghi di Ganzirri e di Faro. Boll. Zool. 23: 177–197.

Holmquist, C. 1955. Die "*Mysis relicta*" aus dem Mittelmeergebiet (= *Diamysis bahirensis* (G.O. Sars, 1877) und *Paramysis helleri* (G.O. Sars, 1877)). Zool. Anz. 154: 277–287.

Nouvel, H. 1965. Mysidaces recoltes par S. Frontier a Nosy Be. II. Description de deux Mysini appartenant aux genres *Diamysis* et *Acanthomysis*. Bull. Soc. Hist. Nat. Toulouse 100: 451–466.

Por, F.D. 1971. The zoobenthos of the Sirbonian lagoons. Rapp. Comm. Int. Mer Medit. 20: 247–249.

Por, F.D. and A. Ben-Tuvia. 1981. The Bardawil Lagoon (Sirbonian Lagoon) of North Sinai – a summing up. Comm. Int. Mer Medit. 27: 101–107.

Sars, G.O. 1877. Nye bidrag til Kundskaben om Middelhavets Invertebrat fauna. I. Middelhavets Mysider. Arch. Naturv. Christiania 2: 10–119.

Spandl, H. 1926. Beiträge zur Kenntnis der im Süsswasser Europas vorkommenden Mysidaceen. Int. Rev. Ges. Hydrobiol. 15: 358–375.

Tattersall, W.M. 1927. The Cambridge Expedition to the Suez Canal. Report on the Crustacea Mysidacea. Trans. Zool. Soc. London 22: 185–199.