

Conference Paper

New records of *Albunea carabus* (L.) from Spanish waters (Decapoda Anomura, Hippidea)

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Three specimens of *Albunea carabus* (L.) found near Arenys de Mar, prov. Barcelona, Spain, during 1971 and 1972 are reported in this paper. Also discussed are data concerning the geographical distribution of this species in the Mediterranean Sea. In an addendum the first record of this species for Tunisia is given.

On June 14, 1971 a male specimen of *Albunea carabus* (L.) was collected near the town of Arenys de Mar, prov. Barcelona, on the Mediterranean coast of Spain. A year later, (June 23, 1972), two more specimens (a male and a female) were collected near the same locality, at Canet de Mar, prov. Barcelona. All were obtained by dredge from a sandy bottom at a depth of about 3—7 m, in a habitat which also yielded *Thia scutellata* (Fabr.).

Notwithstanding the fact that the occurrence of this species in the Mediterranean was first reported as early as 1758 by Linnaeus, it is still considered rare and finds of specimens remain of great interest. It is the only species of Hippidea represented in the Mediterranean.

Albunea carabus (Linnaeus)

Cancer Carabus Linnaeus¹, 1758: 632; Linnaeus², 1767: 1052; Houttuyn³, 1769: 417; De Villers⁴, 1789: 156.

Cancer carabus — Stadius Müller⁵, 1775: 1026.

Cancer (Pagurus) Carabus — Gmelin⁶, 1790: 2984.

Cancer (Astacus) Carabus — Herbst⁷, 1792: 67.

Albunea symnista — Rafinesque⁸, 1814: 20; Lucas⁹, 1846: 27, pl. 3, fig. 2, 2a; Heller¹⁰, 1863: 153; Bolivar¹¹, 1892: 128; De Miranda y Rivera¹², 1933: 22; De Miranda y Rivera¹³, 1933: 1 (not *Cancer symnista* Linnaeus, 1764).

Albunea Guerinii Lucas¹⁴, 1853: 47, pl. 1, fig. 9, 9a—d; Bolivar¹⁵, 1875: 20; Carus¹⁶, 1885: 496; Buen¹⁷, 1887: 425; Buen¹⁸, 1916: 359; Bolivar¹⁹, 1916: 251.

Albunea — Bolivar²⁰, 1874: 46; Barceló y Combis²¹, 1875: 63.

Albunea guerinii — Miers²², 1878: 327; Aharoni²³, 1937: 1136; Aharoni²⁴, 1944: 41.

Albunea carabus — Ortmann²⁵, 1896: 224; Gordon²⁶, 1938: 186, fig. 3b; Bouvier²⁷, 1940: 179, figs. 132, 133; Piguet²⁸, 1955: 14; Monod²⁹, 1956: 40, figs. 10—14; Holthuis and Gottlieb³⁰, 1958: 77; Zariquiey Alvarez³¹, 1961: 103, figs. 1—3; Zariquiey Alvarez³², 1968: 294, fig. 104; Moncharmont³³, 1969: 434, figs. 1—3.

Albunea barbara (Lucas MS) Ortmann²⁵, 1896: 224.

Albunea Guerini — A. Milne Edwards & Bouvier³⁴, 1900: 275; Ferrer y Galdiano³⁵, 1918: 413.

Description. Although there are relatively few records of the species, it has been well described and illustrated on several occasions. Probably its rarity and its peculiar form have induced authors to describe and draw it extensively and give more attention to it than to the more common species. Linnaeus's description of *Cancer carabus* already is far more extensive than most of the specific descriptions given by the Father of Systematic Zoology. Lucas⁹ gave a good colour description of the living form and a coloured figure of the animal in toto (pl. 3, fig. 2), as well as a detailed drawing (pl. 3, fig. 2a) of the distal part of the abdomen. Later, Lucas¹⁴ gave a description of the species enumerating its differences from *A. symmysta* and drew the front (pl. 1, fig. 9), the male (pl. 1, fig. 9a) and female (pl. 1, fig. 9b) abdomina, and the dactyli of the second (pl. 1, fig. 9c) and third (pl. 1, fig. 9b, err. for d) pereopods. Miers²² gave a short diagnosis, while Ortmann²⁵ provided a key to the genera of Albuneidae and to the species of *Albunea*. Gordon²⁶ (fig. 3b) drew the eye of the species. Bouvier²⁷, basing himself on Algerian specimens, described the species and gave detailed drawings of the eye and the front of the carapace (fig. 132A), the cheliped (fig. 132B), the last pereopod (fig. 132E), the dactyli of the third pereopod (fig. 132C), that of the fourth pereopod (his fig. 132D, which unfortunately is labelled as being of the third pereopod), the male and female telson (fig. 132F and G respectively) and the first maxilliped (fig. 133). Zariquiey Alvarez³¹ gave an extensive description of the species with a toto drawing (fig. 1) of a specimen from Melilla in dorsal view, and detailed drawings of the eyes, (fig. 2c), mouthparts (figs. 2a, b, d), legs (figs. 2e, f, g, 3a—c, f), and male and female telson (fig. 3d, e) of specimens from Castellón. Monod²⁹ provided a toto drawing (fig. 10) and detailed drawings of the front and the eyes (fig. 11, 12), the telson (fig. 14) and the dactyli of the second to the fourth pereopods (fig. 13) of female specimens from Ghana. Zariquiey Alvarez³² (fig. 104) republished his toto drawing of 1961 (fig. 1). Moncharmont³³ also provided an extensive description of his specimens, photographs of a male (fig. 1) and female (fig. 2) in dorsal and ventral views, and line drawings of the dactyli of the second to the fourth pereopods (fig. 3a—c) and the female telson (fig. 3d) of his *Formia* specimens.

Our specimens agree well with these descriptions.

Size. Linnaeus¹ gave the size of his specimen as »Testa magnitudine extimi pollicis« (as long as the last joint of the thumb; this probably means that the total length was about 35 mm, corresponding to a carapace length of about 17 mm). Lucas⁹ gave his figure as »grandeur naturelle«, which makes the carapace length 18 mm. Later Lucas¹⁴ gave the [total] length of the males as 30 to 33 mm, and that of the female as 40 mm, figures which were copied by Miers²². They correspond with a carapace length of about 16 mm for the males and about 19 mm for the females. The specimen cited by Aharoni^{23, 24}, Gordon²⁶ and Holthuis and Gottlieb³⁰ was a female with a carapace length of 17 mm. The carapace lengths of Monod's²⁹ Ghana females were 13 and 17 mm. Zariquiey Alvarez³² gave the carapace length as 18.5 mm. Moncharmont³³ gave the fol-

lowing measurements: for the male, carapace length 16.5—19 mm, total length 35—40 mm, and for the female these values were respectively 22.5 and 48 mm. The present males have a carapace length of 20 and 18 mm; in the female it is 24 mm.

Colour. Lucas⁹ noted that the carapace »est teintée de brunâtre, à reflet violacé; les antennes sont jaunâtres, annelées de brun violet, à l'exception cependant du premier article, qui est entièrement violet. Les pattes, hérissées de poils d'un jaune foncé, sont violacées et légèrement teintées de blanc; l'abdomen est d'une belle couleur violette, à l'exception cependant du quatrième segment, qui est entièrement blanc. Tout le dessous du corps ainsi que les appendices caudaux et les organes de la bouche sont d'un blanc légèrement jaunâtre«. Zariquiey Alvarez³¹ gave the color of his specimens, which had been in formaldehyde for several weeks, as follows »caparazón violáceo pálido; abdomen blanco violáceo con el 6.º segmento, el telson y urópodos casi blancos; pedúnculo de anténulas y antenas, violáceo; flagelos blanco amarillento; primer par de patas con la cara externa del propodio y carpo, violáceo, pasando a blanco; cara inferior del animal, inferior de las patas y pleópodos, blanco; pilosidad, amarillenta dorada.«

The present specimens are of a darker colour than in Lucas's description and drawing. The carapace is dark purple with brownish areas. Also, the parts of the legs and abdomen that are visible in dorsal view are dark purple. The flagella are ringed by purple and yellowish brown. The inside of the chela is whitish.

Habitat. Like all species of this genus, this is a typical inhabitant of sandy substrata. It burrows into the sand and the antennae serve as a kind of breathing tube. It has been found a short distance offshore at depths from 3 to about 30—40 m. Sometimes, *e. g.* after heavy storms or after a mortality, it may be washed ashore in large quantities. Aharoni^{23, 24} described it from the »estuaire du Nahr Rubin«. In this connection it is interesting to note that Pigué²⁸ reported that numerous dead specimens were washed ashore »mi-avril au moment des inondations de l'Harrach«; about a hundred specimens were collected at that occasion. Pigué supposed that the animals were killed by the large amount of freshwater carried by the Harrach river to Algiers Bay and that they subsequently were thrown upon the beach by a storm which followed. Here too the specimens were found near a river estuary. It is possible that the animals prefer areas near the mouth of rivers, but evidently can not stand too low a salinity. Lucas¹⁴ reported his specimens (from eastern Algeria) to be taken from a depth of 30 to 40 m on a sandy bottom. Monod's²⁹ West African material was collected at depths of 9 and 11 m. Those from Castellón, reported by Zariquiey³¹, were found on the beach after a violent storm. Moncharmont's³³ specimens were taken at a depth of 3 to 4 m from a sandy bottom from which *Sipunculus nudus* (L.) was also collected. The specimens from Arenys de Mar and Canet de Mar were taken from depths of 3 and 5—7 m from a sandy bottom. Here the species was found with *Thia scutellata* (Fabr.).

Distribution. The type of locality of *Cancer Carabus* is given by Linnaeus¹ in the sentence »Habitat in M. Mediterraneo. E. Brander.« Erik Brander (1722—1814) was stationed in Algiers from 1753 to 1766, first as Secretary to the Swedish Consul, later as Acting Consul and finally as full Consul (see

Dance³⁶, 74—84, 2 figs). During his stay in Algiers, Brander regularly sent natural history objects to Linnaeus. Therefore we can safely accept Algiers as the type of locality of *Cancer Carabus*.

Linnaeus' description of *Cancer Carabus* was cited, copied or translated by a few subsequent authors²⁻⁷, but no new information was added, apart from a fabricated Dutch name («Leeuw-Krab») by Houttuyn, and German names («Kahn Krabbe» by Stadius Müller and «Löwenkrebs» by Herbst). The more important authors, like Fabricius, Latreille, H. Milne Edwards, *etc.*, evidently could not place the species solely from Linnaeus' description, and completely ignored it. It was not until 1875 that Linnaeus' name was again brought to daylight.

In 1814 Rafinesque⁸ reported the second find of the species, this time from Sicily. When talking about his «nombreuses découvertes en Sicile», Rafinesque mentioned rather casually »des espèces très rares et exotiques, comme par exemple l'*Albunea symnista* de Fabricius«. What he evidently had was the present species and not *Albunea symmysta* (Linnaeus, 1764), an Indo-West Pacific species, which was usually incorrectly spelled *symnista*.

The third record of the species was by Lucas⁹, who, like Rafinesque, thought his material to be *Albunea symmysta*. Lucas' material came practically from the type of locality of *Cancer Carabus*, he obtained it namely from »la rade d'Alger, particulièrement les environs du cap Matifou; je me la suis procurée en juillet, sur le marché de cette ville«.

During a second visit to Algiers Lucas¹⁴ collected a dozen additional specimens of the species at about the same locality («la rade d'Alger, entre le cap Matifou et le fort de l'Eau») as his previous material. After studying these specimens he found them to be different from the Indo-West Pacific species and described them as new under the name *Albunea Guérinii*. Thus Algiers also is the type of locality of the latter species.

The fifth time that a find of this species was mentioned was by Bolivar²⁰, who, through Dr. D. Angel Larrinúa y Azcona³⁷, presented a specimen of *Albunea* taken at Menorca, Baleares Islands, Spain, at the session of 6 May 1874 of the Sociedad Española de Historia Natural. He was inclined to consider it a new species. The next year Bolivar¹⁵ more extensively dealt with this specimen and then assigned it to the *Albunea Guerinii* of Lucas. It is also to the merit of Bolivar¹⁵ to have brought Linnaeus's *Cancer Carabus* again to daylight. Bolivar considered Linnaeus's species to be identical with the *Albunea paretii* of Guérin, which he thought to be a second Mediterranean species. Guérin's species, however, does not, so far as we know, occur in the Mediterranean, and is restricted to the Atlantic coasts of tropical America and Africa. Numerous later records of the present species in Spanish carcinological literature^{11, 17-19, 21} all are based on the Menorca specimen and add nothing to our knowledge of the species.

Miers²², in his revision of the Hippidea, although he used still the name *A. guerinii* for the present species, pointed out that it probably was the same as *Cancer Carabus* L. Ortmann²⁵, in his review of the group, definitely restored the Linnean name and indicated the species as *Albunea carabus*, a name which is still considered the valid one. Neither Miers nor Ortmann were aware of records other than those by Linnaeus and Lucas.

In 1900 A. Milne Edwards and Bouvier³⁴ again reported the species from Algeria, this time from Oran. It is interesting to see that the »Travailleur« naturalists obtained their two specimens in 1881 from M. Deshayes, who also procured for Lucas⁹ 4 of his 5 specimens. The western part of the northcoast of Africa proved the most productive in *Albunea*: in 1918 Ferrer y Galdiano³⁵ reported the species from Melilla, Spanish Morocco; in 1955 Piguët²⁸ mentioned abundant material from Algiers (the beach of Fort-de-l'Eau); and in 1961 and 1968 Zariquiey Alvarez^{31,32} mentioned and figured a specimen from Mar Chico, Melilla, Spanish Morocco.

The second find of a specimen in Spain was reported by Miranda y Rivera^{12, 13} who dealt with material taken at Playa de Malagueta, Malaga. Zariquiey Alvarez^{31, 32} reported a male and female from the sandy beach at Castellón, prov. Castellón, Spain.

In the meantime Aharoni^{23, 24} and Gordon²⁶ mentioned a specimen collected at Nabi Rubin, Israel, which was also reported upon by Holthuis and Gottlieb³⁰. This find shows that the species also occurs in the eastern Mediterranean, although so far it is the only known specimen from that eastern basin (including the Adriatic).

Finally Moncharmont³³ reported the first find of the species on the Italian mainland, viz. a male and 3 females from the coast of the province Latium near Formia (45° 15' N, 13° 36' E) on the west coast of Italy.

Outside the Mediterranean the species has been reported from the west coast of Africa, Madeira, the Azores, and St. Helena, but since a confusion with the *Albunea paretii* of Guérin is possible, the only certain record of the species there is from Ghana (Monod²⁹).

Summarizing we can say that *Albunea carabus* occurs throughout the Mediterranean and goes down the West African coast at least as far south as Ghana. The distribution of the records from the Mediterranean is most peculiar: the species has been reported from the Mediterranean coast of N. W. Africa (Algiers and Spanish Morocco) no less than 7 times^{1, 9, 14, 28, 31, 34, 35} in more than 100 specimens; from the eastcoast of Spain 4 times^{12, 20, 31} (and present record) in at least 7 specimens; from Italy (westcoast and Sicily) twice^{8, 33} in at least 5 specimens; and from Israel once²³ in 1 specimen. The species seems to be rare, but probably is only seemingly so as its habitat is either difficultly accessible or little explored.

Habits. Very little is known about the biology of this species except that it burrows into the sand. Lucas⁹ remarked that »La démarche de ce crustacé est assez lente, et, lorsqu'il fait agir les organes de la locomotion, ses antennes sont souvent en mouvement«, but no other observations on the living animal are known to us. It would be extremely interesting to know more about the habits and life history of this peculiar crustacean. Lucas¹⁴ remarked of the species »Rencontré, pendant les mois de juin et de juillet seulement«; this agrees with Lucas⁹ earlier record from July, but other authors reported the species from many more months: February³¹ (Castellón), April^{28, 29} (Algiers and Ghana), May³¹ (Melilla), August and September³³ (Formia).

ADDENDUM

After the manuscript of the present paper was submitted at the Rovinj Colloquium, Dr. Holthuis had the privilege to visit Tunisia (30 September - 14 October 1972) where he enjoyed the hospitality of Dr. and Mrs. Raymond B. Manning. During a collecting trip to Raouad beach on the coast of the Bay of Tunis N. of Tunis, about 20 km N.W. of La Marsa, on October 10, 1972, Drs. Manning and Holthuis found two carapaces and one cheliped of *Albunea carabus* (L.) among shells and other objects washed ashore on the sandy beach. This constitutes the first record of the occurrence of the species in Tunisian waters.

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IZVOD

Novi nalazi vrste *Albunea carabus* (L.) u španjolskim vodama

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Anomurna vrsta *Albunea carabus* (L.) relativno se rijetko susreće na obalama Sredozemlja. U radu se detaljno razmatraju geografsko rasprostranjenje, kao i svi dosadašnji nalazi ove vrste na Sredozemlju od Linnéa do danas. Povod je bio nalaz triju primjeraka ove vrste kod grada Arenys de Mar u provinciji Barcelone. U dodatku se navodi još jedan novi nalaz ove vrste uz obalu Tunisa.