

# First record of the genus *Berosus* (Coleoptera: Hydrophilidae) in Crete island, Greece

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## ABSTRACT

The first record of the genus *Berosus* Leach, 1817 (Coleoptera: Hydrophilidae) for Crete (Greece) is given. Adults of the collected specimens were identified as *Berosus affinis* Brullé, 1835. Photographs of the adults and larvae of the species and its habitat are presented, while some notes on its ecology and feeding behavior are provided.

KEYWORDS: Coleoptera, Hydrophilidae, *Berosus*, Crete.

## Introduction

The Hydrophilidae is a large Coleopteran family, represented in all parts of the world and consists of about 2500 known species (Hansen 1999, Short and Hebauer 2006). Hydrophilidae are usually found in most kinds of stagnant waters, but may also commonly inhabit streams, rivers and seepage habitats. The family also has terrestrial representatives that inhabit mostly leaf litter and other kinds of decaying organic material habitats. Larvae are predaceous, preying on various smaller invertebrates while adults are mostly saprophagous, feeding on different kinds of decaying organic matter.

The genus *Berosus* Leach, 1817 is represented in all major zoogeographical regions. Currently, 260 species of the genus are known from all over the world (Hansen 1999, Löbl and Smetana 2004). In Europe, 13 species have been recorded and belong to two subgenera: *Berosus* Leach, 1817 and *Enophurus* Hope, 1838 (Löbl and Smetana 2004). In Greece, *Berosus* is represented by 7 species (Schödl 1993); *Berosus* (s. str.)

*affinis* Brulle, 1922, *B. (E) bispina* Reiche & Saulcy, 1856, *B. (s. str.) byzantinus* Ganglbauer, 1904, *B. (s. str.) hispanicus* Küster, 1847, *B. (E) jaechi* Schödl, 1991, *B. (s. str.) signaticollis* (Charpentier, 1825), and *B. (E) spinosus* Steven, 1808.

As with other insect groups, the Coleoptera fauna of Crete and other Aegean Islands is largely unknown. Based on the records of Fauna Europaea (<http://www.faunaeur.org>, accessed on 20/09/2011) the genus *Berosus* has not been previously reported from Crete Island, Greece. This paper presents the first data on the recording of the genus *Berosus* and of *B. affinis* in Crete and it contributes to the knowledge of the *Berosus* distribution in Greece.

## Materials and Methods

Adults and larvae were collected from a temporary Mediterranean pond in Falasarna, Crete Island (Fig. 1). Insects were collected using a rectangular hand net of 25 cm x 25 cm with a mesh size of 500 µm nytex screen and were preserved in 96% alcohol. Adults

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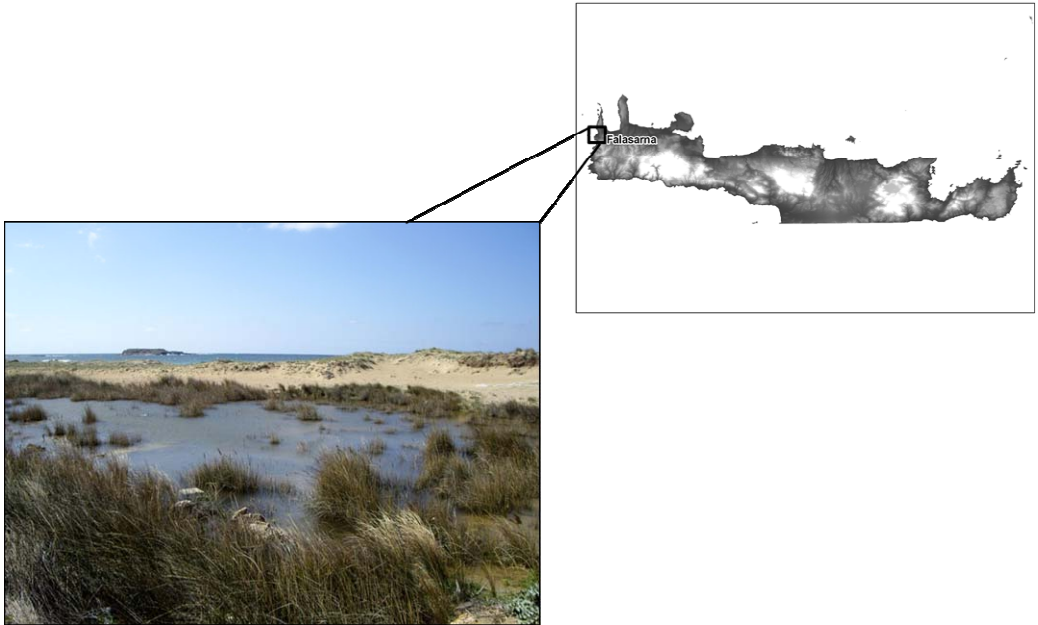


FIG. 1. The Mediterranean temporary pond in Falasarna, Crete where *Berosus affinis* was collected.

were identified with the taxonomic keys of Schödl (1993) and Incekara et al. (2011).

Adults and larvae are deposited in the collection of the Institute of Inland Waters, Hellenic Centre for Marine Research, Anavissos, Greece.

## Results

Genus: *Berosus* Leach, 1817.

Subgenera: *Berosus* Leach, 1817.

Species: *Berosus affinis* Brulle, 1922.

### *Material examined*

Crete Island, Greece, Falasarna, N 35° 48' 12'' E 23° 57' 61'', 3 m a.s.l., 1 ♂ and 2 ♀, 12 3<sup>rd</sup> instar larvae, 26.05.2007, leg. I. Karaouzas.

### *Description of the adult*

The body is 4.5 mm in length. The head is dark, with metallic green reflections. The pronotum is yellow to brown, with two large

spots in shape of wide stripes with metallic green reflections (Fig. 2A). The elytra are often with some obsolete, slightly darker spots (Fig. 2B). Elytral interspaces are flat comparing the similar species *B. luridus*. Mesosternal keel is very low, generally very fine dentated. *Berosus affinis* is similar to *B. luridus* externally, but easily distinguishable by its very low mesosternal keel and longer aedeagus.

### *Description of the third instar larva*

The length of the larvae is 8 – 10 mm and the width 1.7 to 1.9 mm. Its color is whitish, sclerotized parts light brown. The head capsule is quadrangular, the pronotum well developed, light brown. Abdomen with 4 pairs of tracheal gills (Fig. 2C, 2D). The tracheal gills are very long and slender. On segments 1-3 the tracheal gills are reduced to small protuberances.



(A)



(B)



(C)

(D)

FIG. 2. Dorsal view of adult *Berosus affinis* (A), lateral view (B), ventral view of larvae (C) and dorsal view of larvae (D).

### **Biology**

*Berosus affinis* has a biological cycle that depends on water availability. In temporary

ponds is univoltine while it is bivoltine in permanent freshwaters or brackish waters (Aouad 1988). Larvae were observed in

spring, especially in the months April and May. Adults were present throughout the year but their numbers diminished during spring. During drought, adults burrow in soil and remain quiescent until their habitat is flooded again.

Larvae are predatory and feed on small invertebrates. Most known Hydrophilidae larvae have a hyperprognathous head, which helps to direct the pre-digested fluids into the pre-oral cavity and to avoid dilution of the fluids. Although hyperprognathous, *Berosus* larvae, do not raise their head while feeding, but instead they roll their body upwards when catching the prey and press it against the dorsal side of the abdomen, in an attempt to immobilize it (Archangelsky 2008). They pierce the integument of the prey, and then insert one or both mandibles (Archangelsky 2008). Larvae are apneustic, obtaining oxygen from water by the use of tracheal gills and thus can live in mud at the bottoms of ponds.

Adults are very active and good swimmers, possessing long setae on their legs, and can be found in a variety of habitats both in lotic and lentic situations. They usually feed on algae and smaller invertebrates.

### **Ecology**

It is found in temporary and permanent stagnant or slow moving waters, shallow pools or ponds, with grassy bottom, often associated with marginal areas of streams or rivers. Larval habitat is benthic and usually associated with standing waters. Adults commonly found on phytal microhabitats (i.e. algae, mosses and macrophytes).

### **Distribution**

The species has been noted in Albania, Algeria, Bosnia-Herzegovina, Britain, Bulgaria, Croatia, Cyprus, Egypt, France, Greece, Iran, Israel, Italy, FYROM, Morocco, Netherlands, Poland, Portugal,

Spain, Syria, Tunisia, Turkey and Yugoslavia (Hansen 1999, Incekara et al. 2003).

## **Discussion**

Species of the genus *Berosus* are mostly medium-sized beetles, brownish and may have darkened spots or maculae on their pronotum or elytra. They are elongated and strongly convex, making them relatively distinctive among the Hydrophilidae family. They are strong swimmers equipped with long setae on their legs. *Berosus affinis* is univoltine in temporary ponds and bivoltine in fresh or brackish permanent waters (Aouad 1998) and it can be found in various altitudes ranging from 3 to 800 meters (Valadares et al. 1990). This record contributes significantly to the knowledge of the entomofauna of Greece and especially Crete, an island with great endemism.

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**Πρώτη καταγραφή του γένους  
*Berosus* (Coleoptera: Hydrophilidae) στην Κρήτη**

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**ΠΕΡΙΛΗΨΗ**

Στην παρούσα εργασία καταγράφεται για πρώτη φορά το υδρόβιο Κολεόπτερο του γένους *Berosus* Leach, 1817 (Coleoptera: Hydrophilidae) για την Κρήτη. Ακμαία άτομα που συλλέχθηκαν, αναγνωρίστηκαν ως *Berosus affinis* Brullé, 1835. Δίδονται φωτογραφίες της προνύμφης, του ακμαίου και του βιοτόπου τους, καθώς και σύντομη αναφορά της οικολογίας του και των τροφικών του συνηθειών.