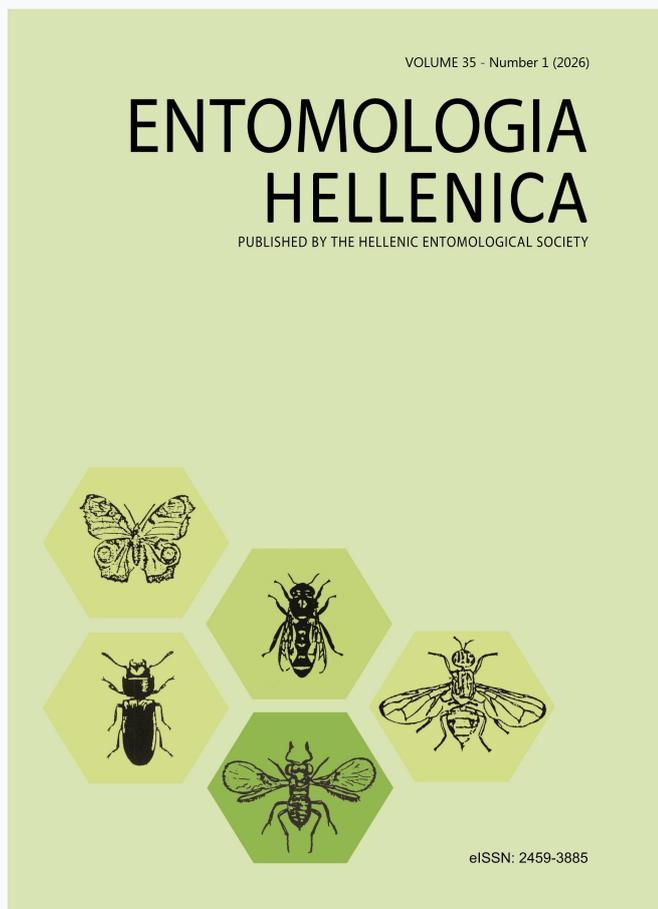


# ENTOMOLOGIA HELLENICA

Vol 35, No 1 (2026)

Entomologia hellenica 35(1)



**First record of *Megasternum concinnum* (Marshall, 1802) – a minute coprophagous water-scavenger beetle (Coleoptera: Hydrophilidae) from the dung of the water buffalo (*Bubalus bubalis*) (Mammalia: Bovidae) in the Hula Valley, Israel**

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doi: [10.12681/eh.42324](https://doi.org/10.12681/eh.42324)

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## To cite this article:

Friedman, A.-L.-L., & Furth, D. G. (2026). First record of *Megasternum concinnum* (Marshall, 1802) – a minute coprophagous water-scavenger beetle (Coleoptera: Hydrophilidae) from the dung of the water buffalo (*Bubalus bubalis*) (Mammalia: Bovidae) in the Hula Valley, Israel. *ENTOMOLOGIA HELLENICA*, 35(1), 21–25.  
<https://doi.org/10.12681/eh.42324>

## SHORT COMMUNICATION

**First record of *Megasternum concinnum* (Marsham, 1802) – a minute coprophagous water-scavenger beetle (Coleoptera: Hydrophilidae) from the dung of the water buffalo (*Bubalus bubalis*) (Mammalia: Bovidae) in the Hula Valley, Israel****ARIEL-LEIB-LEONID FRIEDMAN<sup>1</sup>, DAVID G. FURTH<sup>1,2</sup>**<sup>1</sup>*The Steinhardt Museum of Natural History, Tel Aviv University, Israel*<sup>2</sup>*Department of Entomology, Smithsonian Institution, Washington, D.C., USA***ABSTRACT**

A minute coprophagous water-scavenger beetle *Megasternum concinnum* was found in the Hula Valley (the northernmost part of the Great Rift Valley), Israel, in the dung of the semi-domesticated water buffalo (*Bubalus bubalis*). The water buffalo is not an original component of the Israeli fauna, but the exact time of its introduction dims out in antiquity. This is the first record of *M. concinnum* in Southern Levant, and the first report of the beetle fauna of water buffalo dung in Israel.

**KEY WORDS:** Water-scavenger beetles, Hydrophilidae, coprophagous beetles, coprophilous beetles, Hula Lake, Hula Nature Reserve, Israel, Levant, Near East.

The Hula Valley (33°09'N 35°36'E, 25 × 6–8 km) is situated at the very northernmost point of the Jordan Valley, the northern part of the Great Rift Valley, near the foothills of Mt Hermon (the southernmost part of the Anti-Lebanon mountain range) and is characterized by an exceptionally warm (above 35°C in summer) and relatively humid (~40%) climate. Before the 1950s, the greatest part of the area was covered by the Hula Lake (5.3 × 4.4 km), expanding and contracting seasonally, including both shallow water (2.5 m on average, but not deeper than 4 m) and exposed swampy areas, covered by thick vegetation (Karmon 1956; Dimentman et al. 1992), that strongly resemble swamps of tropical Africa or Asia. The Hula Valley was a biodiversity hotspot, home to a variety of aquatic and semi-aquatic plants, invertebrates, and vertebrates, some of which were endemic species. Between 1951 and 1958, Hula Lake was intensively drained to release

land for agriculture and destroy the breeding grounds of *Anopheles* mosquitoes, the vectors of malaria (Dimentman et al. 1992). This resulted in severe aridification and degradation of the area, including significant biodiversity loss and the apparent extinction of numerous species, including local endemics. Only small areas of the Hula Valley still retain remnants of the original biota, including the Hula Nature Reserve in the southern part of the valley (Fig. 1), the restored wetland area of Agmon haHula, and several micro-reserves around natural springs (e.g. 'En Awazim, 'En Bedolah, 'En Te'o, etc).

One of the important components of the biota and the largest vertebrate of the Hula Valley is the Indian water buffalo (*Bubalus bubalis* L.) (Bovidae). However, the water buffalo is not indigenous to the Hula Valley, having been introduced there by humans, but the period of the introduction remains uncertain. Most probably, *B. bubalis* has been in-



FIG. 1: Hula Lake, the Hula Nature Reserve (photo by LF).

troduced in Israel some 2,000 years ago (a period of significant Persian influence on the cultural life and economy of the Land of Israel). The water buffalo was either not mentioned in the Bible or mentioned by an unrecognizable name (e.g. "meri"), although it was mentioned in Mishnah (I-V centuries) and in the later rabbinical literature, referred to as "koy" and described as a semi-domesticated artiodactylous ruminant of unclear identity (Kislev 1997). The word "koy" comes most probably from the middle Persian "gao" or the Sanskrit "go", meaning "cow" (Kislev 1997); therefore, presumably these water buffaloes arrived to the Hula Valley from Southern Asia via India and Persia. The water buffalo inhabits tropical and subtropical regions and spends most of its life in or near water bodies or wallowing in mud. Such habitats are scarce in Israel, which is otherwise characterized by semi-arid Mediterranean or arid eremic climates. The Hula Valley is one of those rare wet places, which served as a large, natural, isolated location (a kind of natural corral) for these animals, in the past, as well as today. The earliest evidence of the occurrence of the half-domesticated *B. bubalis* in the Hula Valley appears already in the book of the Saxon pilgrim Willibald (St. Willibal-

du), who travelled to the Holy Land in approximately 724 A.D. (Talbot 1954). In the 1930s, most of the local 5,000 buffaloes lived in the Hula Valley (Bodenheimer 1935). During recent times however, the herd of water buffaloes is kept inside a fenced area, a kind of a large "corral" in the Hula Nature Reserve in the southern part of the Hula Valley (Figs 2–3).

On April 8th, 2025, the authors visited the Hula Nature Reserve (33°04'27"N 35°36'07"E). One of the sampling sites was in the buffaloes' corral. Later in the morning, the buffaloes were grazing in the distant northwestern part of the corral, whereas they spent the night hours until sunrise, in the southern part, leaving many large piles of fresh manure, covered with blowflies, that attracted our attention (Fig. 4a). We enjoyed greatly digging into the buffalo dung and collecting numerous beetles. As far as we know, this was the first time that coprophilous beetles have been sampled from the buffalo dung in Israel, and, more broadly, the Levant. This statement is based on the fact that the National Insect collection, at the Steinhardt Museum of Natural History at Tel Aviv University, which is rich in dung (Scarabaeidae) and other coprophilous beetles collected from the dung



FIGS 2, 3: Water buffaloes near the Hula Lake (photo by Ido Shaked, Nature Reserves and National Parks Authority of Israel).

of various mammals by H. Bytinski-Salz (Rivnay 1969; Kugler 1986), contains no records of beetles collected from buffalo manure. This sampling event was unplanned and lasted less than one hour. However, it still produced 22 species belonging to six families of Coleoptera, i.e., Anthicidae (1 sp.), Carabidae (1 sp.), Histeridae (1 sp.), Hydrophilidae (4 spp.), Scarabaeidae (6 spp.) and Staphylinidae (9 spp.), totaling 47 specimens. Among the other dung-dwelling beetles, numerous tiny, unfamiliar-looking, semispherical Hydrophilidae, present in the buffalo dung attracted our attention. They were small, rapidly moving and difficult to catch, and only seven specimens were later found in the killing jar. The beetles were identified using the key in Lompe (2002). These tiny, water scavenger beetles (Figs 4b,c) proved to be *Megasternum concinnum*

(Marshall, 1802) (Hydrophilidae), a species widely distributed in the Palaearctic Region: Europe, North Africa and in the Palaearctic part of Asia, but recorded from the Near East only as far south as Western Turkey (Lompe 2002; Anlaş et al. 2008; Lillig 2022; Przewoźny 2022), living in decaying plant matter, dung and fungi (Lompe 2002; Lillig 2022). It is not surprising that this species has been found in Israel. It is more surprising that it was not found earlier, even though the coprophilous Hydrophilidae fauna of Israel is well-sampled and recorded (Hebauer 1994).

The association of *M. concinnum* with the water buffalo dung, has only once been recorded from buffaloes introduced in West Pomerania, Germany (Reike & Enge 2012). We were unable to find any records of water scavenger beetles being associated with

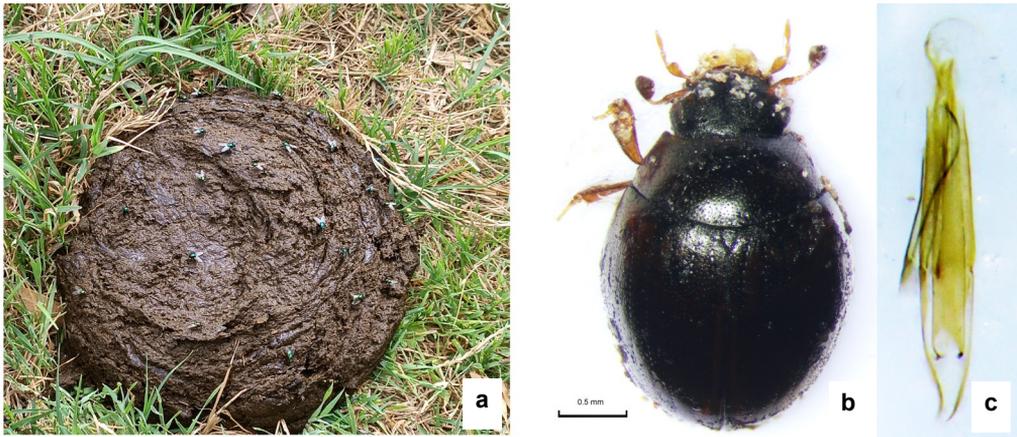


FIG. 4: a. Water buffalo dung in Hula Nature Reserve. b. *Megasternum concinnum*, dorsal view. c. *Megasternum concinnum*, male genitalia (photos by LF).

buffalo manure in their natural habitats in South Asia. Unlike the coprophagous dung beetles (Scarabaeidae), the Hydrophilidae develop in various decaying organic matter including dung (Archangelsky et al. 2005) and there is no clear evidence that they specialize on a particular type of food source. The herein reported preference for buffalo dung by *M. concinnum* may be the first record of such a specialization.

Therefore, several questions remain unsolved:

- 1) Is *M. concinnum* indeed more specifically associated with the dung of *B. bubalis* than expected?
- 2) Is the distribution of *M. concinnum* in Israel restricted to the Hula Valley, or has its presence in other locations in the region been overlooked?
- 3) Does the Israeli population of *M. concinnum* have a special attraction to buffalo dung?
- 4) Does the relatively high biodiversity of coprophagous beetles in buffalo dung hint at an early appearance of *B. bubalis* in Israeli fauna?

### Acknowledgements

We thank cordially Mr. Ido Shaked, the director of Hula Nature Reserve, and his assistant Mr. Dudu Zaguri (Nature Reserves and National Parks Authority of Israel) for their help in our work in the Hula Nature

Reserve; in particular, we thank Mr. Ido Shaked for contributing the fascinating photographs of water buffalos. We thank cordially Dr Mike Mostovski (The Steinhard Museum of Natural History, Tel Aviv University, Israel) and the anonymous reviewers for correction the manuscript and numerous advice.

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