

New distribution records of *Herophydrus musicus* (Klug, 1834) (Coleoptera: Dytiscidae)

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Abstract

Herophydrus musicus (Klug, 1834) is the only species of the genus *Herophydrus* (Sharp, 1882) occurring on the European mainland and is restricted to a few countries in the south. Here the first records of Croatia, Bulgaria and the Greek island of Peloponnese are presented. These new distribution records expand the known range of the species in Europe northwards. A map of its distribution in the Palearctic region and the north of Africa is given and the biogeographical history of the species in Europe is discussed.

Keywords: Hydradeptera, Croatia, Bulgaria, Peloponnese, Greece, first record, biogeographical history.

Samenvatting

Herophydrus musicus (Klug, 1834) is de enige soort van het genus *Herophydrus* (Sharp, 1882) die voorkomt op het Europese vaste land en is gekend van slechts enkele landen in het zuiden van Europa. Hier wordt de soort voor het eerst gemeld van Kroatië en Bulgarije en het Griekse eiland de Peloponnesos. Deze nieuwe vondsten vergroten het gekende Europese areaal van de soort naar het noorden toe. In dit artikel wordt het areaal en de verspreiding in de Palearctische regio en noord Afrika in kaart gebracht en de biogeografische geschiedenis van de soort in Europa besproken.

Résumé

Herophydrus musicus (Klug, 1834) est la seule espèce du genre *Herophydrus* (Sharp, 1882) sur le continent européen et n'est connue que de quelques pays de l'Europe méridionale. Elle est rapportée pour la première fois de la Croatie, de la Bulgarie et du Péloponnèse et ces nouvelles données élargissent sa distribution vers le nord. Sa distribution dans la région paléarctique et en Afrique du nord est donnée, de plus, l'histoire biogéographique en Europe des autres espèces de *Herophydrus* est discutée.

Introduction

Herophydrus (Sharp, 1882) is a mainly Afro-tropical genus of Hygrotini and was recently revised by BISTRÖM & NILSSON (2002). Of the 39 known species, two species occur in Europe: *Herophydrus guineensis* (Aubé, 1838) occurs on Malta, Sicily, Sardinia and Corsica (BISTRÖM & NILSSON, 2002; FRANCISCOLO, 1979) and *H. musicus* (Klug, 1834) occurs in continental Europe. According to NILSSON (2010) *H. musicus* is known in Europe only from Spain, Italy, Greece, Malta, Ukraine, Armenia, Azerbaijan and the South European Territory of Russia and is also present on the Canary Islands. The distribution of *H. musicus* is given in Fig. 1.

According to GUIGNOT (1961) and MACHADO (1987) *H. musicus* is a desert species. Most authors mention small, exposed, sparsely or only partly vegetated bodies of water on heavy soils such as loam and clay (BALKE *et al.*, 1990; RIBEIRA *et al.*, 1996, ALARIE *et al.*, 2001). BISTRÖM & NILSSON (2002) mention an additional observation from the Canary Islands of larvae from a shallow, exposed

floodzone of an irrigation pond, with substrate of sand and clay and with *Juncus* sp. and *Typha angustifolia* growth. On the Greek island Chios the species was common in the large brickpond at Keramia and in an artificial pond at Armolia (FOSTER & TAYLOR, 2006). The localities at the Canary Islands and Chios correspond with the habitat as described above.

In August 2014 the species was found in a small temporary pond in the Dubrovnik–Neretva County in Croatia. Furthermore there is one specimen present in the collection of the author from Bulgaria and several from the Greek island of Peloponnese.

New records and biogeographical history of the species in Europe

Herophydrus musicus was not known from Europe until 1982 when the species was discovered on Sicily (Italy) (ROMANO, 1982). Five years later BURMEISTER *et al.* (1987) reported the species from Sardinia. In 1989 the species was recorded for the first time from continental Europe when it was found abundant in the Segura river basin (south-east Spain) during a survey of aquatic Coleoptera (MILLÁN & SOLER, 1990; MILLÁN *et al.*, 1993). In the same year *H. musicus* also turned up on the mainland of Greece (MAZZOLDI & TOLEDO, 1992) and in the European part of the USSR (NADVORNYI & GRAMMA, 1990). ROCCHI & SCHEMBRI (1992) mention the species also for Malta. DARILMAZ & KIYAK (2010) confirm the presence of the species for Turkey.

In his catalogue of Palearctic Dytiscidae NILSSON (2010) includes the following European countries: Azerbaijan, Armenia, Georgia, Greece, Italy, Malta, Russia (South European Territory), Spain and Ukraine. FOSTER & TAYLOR (2006) give the European distribution as listed in LÖBL & SMETANA (2003) but erroneously include Albania instead of Azerbaijan. This species does not occur on the Albanian checklist (PRZEWOŹNY *et al.*, 2009) and Albania is not mentioned in the distribution as given by NILSSON (2010).

In August 2014 the species was found in a small temporary pond in the Dubrovnik–Neretva County in Croatia. Furthermore there are thirteen specimens of Peloponnese (Greece) and one specimen of Bulgaria present in the collection of the author.

MATERIAL EXAMINED. Greece, Elos, Lakonia, Peloponnese, 22.VI.2006, 13 ind. captured on light. Leg. Struyve T., det. Scheers K. - Bulgaria, Peshtera, Plovdiv, 15.VII.2006. 1 ind. captured on light. Leg. Struyve T., det. Scheers K. - Croatia, Mihanići, Dubrovačko-neretvanska, 12.VIII.2014 (42,553; 18,317). 1 ind. in exposed, shallow semi-permanent pond with loamy bottom and sparse vegetation of grasses. Leg. & det. Scheers K.

The European and north African records are presented in Fig. 2, where the new records are indicated by the asterisk.

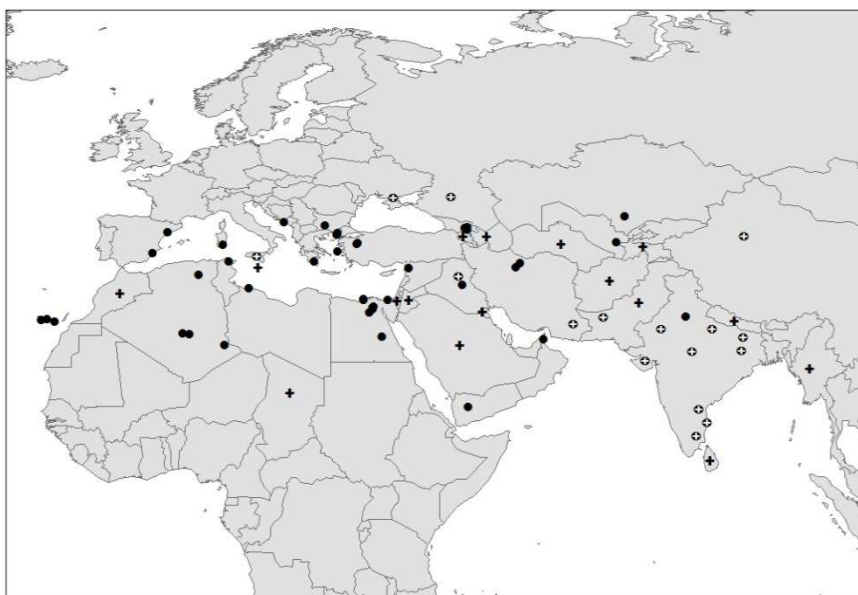


Fig. 1. Total known distribution map of *Herophydrus musicus* (Klug, 1834). Black dots indicate records with exact locality, dots with a white cross regional records and black crosses are national records with exact location unknown (the records on this map are not exhaustive, there may be other records in literature or collections).



Fig. 2. Detailed distribution in European and North African records of *Herophydrus musicus* (Klug, 1834). Black dots indicate exact records, black dots with a white cross are regional records without exact locality and asterisks indicate the new records.

Discussion

These new records expand the known distribution in Europe northwards considerably. The presence of this species in Portugal, Montenegro, Albania, on the Italian mainland and maybe also in Serbia, Romania and even France is to be expected.

Because of the presence of *H. musicus* in isolated bodies of water in the desert, in newly formed bodies of water like the brickponds (FOSTER & TAYLOR, 2006) and remote islands like the Canary Islands, Malta, Sicily and Sardinia (keeping in mind that these last islands were most probably colonized from Africa) we can assume that the species has a high dispersal ability. Probably this species can fly great distances as the distance between the African mainland and Sicily or Sardinia is over 150 kilometre over sea.

It seems likely that *H. musicus* has only recently colonized the European mainland and is expanding its range to the north. This theory is supported by the facts that 1) although *H. musicus* was well known by some important European entomologists (Guignot, Sharp, Balfour-Browne, Guéorguiev, etc.), this distinct species was not known from Europe until 1982, 2) since the discovery of this species in Spain in 1989 the species has increased significantly and is now known from over 50 locations (MILLÁN *et al.*, 2014). This expansion is most likely related to raising temperatures and therefore more suitable climatic conditions for this species in some Southern European areas.

If the expansion of the range of *H. musicus* is indeed related on increasing temperatures in Europe, some other species that have their main distribution in Africa could be expected to expand their range also. Some of these are already present in Europe like *Methles cribratellus* (Fairmaire, 1880), *Herophydrus guineensis* (Aube, 1838), *Eretes griseus* Fabricius, 1781, *E. sticticus* (Linnaeus, 1767) and *Cybister tripunctatus africanus* Laporte, 1835. Some other African species have been recorded in Europe in the past but seem to have disappeared again time ago: *Canthydrus diophthalmus* (Reiche & Saulcy, 1855), *Cybister senegalensis* Aubé, 1838 and *Cybister vulneratus* Klug, 1834.

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