

New distributional data of genus *Hydrophilus* Leach, 1815 in Sardinia (Coleoptera, Hydrophiloidea, Hydrophilidae)

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Abstract. New distributional data summary is here presented for *Hydrophilus piceus* Linnaeus, 1758 and *Hydrophilus pistaceus* (Castelnau, 1840) in Sardinia. The first was found in few locality widespread in the island meanwhile the second is largely present. A strong decline of number of adult in know locality that is attributed mainly to the increasing presence of aliens predators, habitat modification, and is recalled the urgency to put these species under protection.

Keywords: *Hydrophilus*, Sardinia, Italy.

INTRODUCTION

The superfamily Hydrophiloidea include for Italy six families (Georissidae, Helophoridae, Hydrochidae, Hydrophilidae, Spercheidae and Sphaeridiidae) with species mainly inhabitants freshwater environments for the larger part of their live cycles (Rocchi, 2011).

The genus *Hydrophilus* Leach, 1815 in the Hydrophilidae family have in Italy 3 species (Chiesa, 1959; Porta, 1929; Pirisinu, 1981) with *Hydrophilus piceus* Linnaeus, 1758 widespread along the peninsula and main islands, *Hydrophilus pistaceus* (Castelnau, 1840) (Figure 1 and 2) with similar distribution and *Hydrophilus aterrimus* (Eschscholtz, 1822) actually know only for northern part of the peninsula and not for Sardinia, although a citation in Oristano by Krausse (1910), but refute in Rocchi (2011), as is supposed to be one of the others species.

In the recent revision of the Sardinian data on the family (Rocchi, 2011), *Hydrophilus piceus* Linnaeus, 1758 and *Hydrophilus pistaceus* (Castelnau, 1840) seems to have a particular distribution as *H. piceus* is know just for one or few localities in Medio Campidano, Oristano and Sassari, whereas *H. pistaceus* is more widespread in the island (Rocchi, 2011).

Actually are still few the information regarding taxa of the family in Sardinia, both for the scarceness of local specialists and the necessity of particular methods to collect in waters, and the distribution scenario deserve to grow. The aim of the paper is to integrate the distributional information available with new data coming from public and private collections to improve the knowledge for the island.

MATERIALS AND METHODS

Mostly of specimens were collected by Authors with usual techniques in use for Palpicornia beetles as water hand nets (Chiesa, 1970) but also by use of lights and white panel during the night as for moth. Different freshwater environments were checked both in static (as pools, artificial lakes, marshes and also drinking troughs) or running waters (channels, creeks and rivers) during all the seasons.

All the specimens were directly checked and for the determination and ecological consideration were used the following literature: Audisio et al. (1995), Boukal et al. (2007), Chiesa (1959, 1970), Hansen (1999, 2004), Korbelt (1992), Krausse (1910), Pirisinu (1981), Pisano et al. (2003), Porta (1929), Rocchi (2005, 2007, 2011) e Vigna Taglianti et al. (1993, 1999). Chorotypes were defined on the base of Rocchi (2007) and the general distribution cited in Hansen (2004) following the criteria of Vigna Taglianti et al. (1993, 1999). When possible the localities were cited from north to south and from west to east of Sardinia.

Acronyms

CDC = coll. D. Cillo, Cagliari; CEB = coll. E. Bazzato, Quartu S. Elena; CFR = coll. F. Rattu, Cagliari; CAR = coll. A. Rattu, Cagliari; CAL = coll. A. Lecis, Cagliari; CMA = coll. M.G. Atzori, Cagliari; CAS = coll. A. Spiga, Quartu S. Elena; CFF = coll. F. Fois, Cagliari; CFS = coll. F. Sanna, Elmas; CEPS = coll. Sezione Entomologia Agraria, Dipartimento per la Protezione delle Piante Università di Sassari, Sassari; CWMA = coll. Oasi WWF di Monte Arcosu, Uta, Cagliari.

RESULTS

The 2 species are equally well distributed around in the island but *Hydrophilus piceus* is known for few localities and mainly with more dated information. Here the list of all the data available for each beetle species.

***Hydrophilus piceus* Linnaeus, 1758 [Chorotype: Asiatic-European].**

Sassari province

Porto Torres, 27.VIII.1966, 1 ♀ (CEPS). Sassari, 10.VI.1959, 1 ex. (CEPS).

Oristano province

Oristano, 29.VI.1963, 1 ♀ (CEPS).

Nuoro province

Siniscola, La Caletta, 6.III.1972, 1 ♀ (CEPS). Siniscola, La Caletta, 7.I.1973, 1 ♀ (CEPS). Siniscola, La Caletta, 24.IV.1973, 1 ♀ (CEPS).

Cagliari province

Decimo, VIII.1936, U. Lostia leg., 1 ex. (CEPS). Maracalagonis, Cave Is Cireddus, 12.II.2001, A. Spiga leg., 1 ♀ (CAS). Maracalagonis, Cave Is Cireddus, 12.V.2002, A. Spiga leg., 2 ♂♂ (CAS). Maracalagonis, Cave Is Cireddus, 24.V.2002, A. Spiga leg., 1 ♂ (CAS). Maracalagonis, Cave Is Cireddus, IV.2008, D. Cillo leg., 2 ♂♂ (CDC). Giorgino, V.1970, M. Vargiu leg., 1 ♂ (CFR).

***Hydrophilus pistaceus* (Castelnau, 1840)** [Chorotype: W-Mediterranean]

Olbia-Tempio province

Tempio, 20.IV.1967, 1 ♂ (CEPS). Tempio, 30.VII.1968, 1 ♀ (CEPS). Tempio, 4.V.1969, 1 ♂ (CEPS). Tempio, 13.IX.1972, 1 ♂ (CEPS).

Sassari province

Porto Torres, 10.VI.1961, 1 ex. (CEPS). Ottava, 4.X.1962, 1 ex. (CEPS). Sassari, 28.VII.1956, 1 ex. (CEPS). Sassari, 2.II.1961, 1 ex. (CEPS). Sassari, 29.VIII.1966, 1 ♂ 1 ♀ (CEPS). Mascari, 18.V.1948, A. Sarvadei leg., 1 ex. (CEPS). Ploaghe, 5.VIII.1963, 1 ex. (CEPS). Ozieri, 12.VII.1956, 1 ex. (CEPS). Alghero, 4.VI.1964, 1 ex. (CEPS). Giave, 1.II.1965, 1 ♀ (CEPS). Bono, VIII.1958, 1 ex. (CEPS).

Oristano province

Cabras, 30.IV.1959, 1 ex. (CEPS). Oristano, 10.VII.1955, 1 ex. (CEPS). Oristano, 15.VII.1961, 1 ex. (CEPS). Oristano, 28.VI.1963, 1 ex. (CEPS). Santa Giusta, 3.I.1961, 1 ex. (CEPS).

Provincia di Nuoro province

Siniscola, 14.V.1971, 1 ♂ (CEPS). Siniscola, 4.I.1973, 1 ♂ (CEPS). Siniscola, 30.VI-II.1973, 1 ♂ (CEPS). Siniscola, 25.II.1974, 1 ♂ (CEPS). Ottana, 12.VI.1975, 2 ♀♀ (CEPS). Ottana, 27.IX.1975, 1 ♂ 1 ♀ (CEPS). Ottana, 15.XI.1975, 1 ♂ 1 ♀ (CEPS). Ottana, 12.IV.1976, 2 ♀♀ (CEPS). Ottana, 14.V.1976, 1 ♂ (CEPS). Ottana, 30.VI.1976, 1 ♂ 2 ♀♀ (CEPS). Ottana, 10.VIII.1976, 1 ♂ 2 ♀♀ (CEPS). Ottana, 6.IX.1976, 1 ♂ 1 ♀ (CEPS). Gadoni, Funtana Raminosa, 10.IX.1994, A. Lecis leg., 1 ♂ 1 ♀ (CDC).

Ogliastra province

Talana, Sa Serra, IV.2007, D. Cillo leg., 2 ♂♂ 1 ♀ (CDC). Talana, Sa Serra, IV.2009, D. Cillo leg., 1 ♂ (CDC). Talana, Sa Serra, 24.IV.2010, D. Cillo leg., 1 ♂ (CDC). Cardedu, 25.VII.1993, A. Lecis leg., 1 ♂ (CDC). Perdasdefogu, 16.III.2001, A. Lecis leg., 1 ♀ (CDC).

Medio Campidano province

Tuili, Giara, Mitza Salamessi, 1.XII.2013, D. Cillo leg., 2 ♀♀ (CDC) (CAL). Arbus, Ingurtosu, VI.1999, L. Serra leg., 1 ♀ (CEB). Arbus, Ingurtosu, 7.V.2013, D. Cillo leg., 1 ♂ 2 ♀♀ (CDC).

Carbonia-Iglesias province

Fluminimaggiore, 25.X.2001, D. Cillo leg., 1 ♀ (CDC). Buggerru, 25.II.2002, D. Cillo leg., 1 ♂ (CDC). Villamassargia, Riu Begas de Pittau, 6.VII.1997, A. Lecis leg., 1 ♂ 1 ♀ (CDC). Sant'Antioco, 7.III.1961, 1 ex. (CEPS).

Cagliari province

Monastir, IV.1937, U. Lostia leg., 1 ex. (CEPS). San Vito, Riu Ollastu, 12.XII.2001, D. Cillo leg., 3 ♂♂ (CDC). San Vito, Riu Ollastu, 13.XII.2001, A. Spiga leg., 5 ♂♂ 4 ♀♀ (CAS). San Vito, Riu Ollastu, 5.IV.2002, D. Cillo leg., 2 ♂♂ 3 ♀♀ (CDC). San Vito, Riu Ollastu, VI.2007, D. Cillo leg., 2 ♀♀ (CDC). San Vito, Riu Ollastu, V.2009, D. Cillo leg., 1 ♂ (CDC). Muravera, Riu Flumendosa, 23.VI.1990, A. Rattu leg., 3 ♀♀ (CAR) (CFR). San Priamo, Riu Ollastu, 21.VII.1991, A. Lecis leg., 1 ♀ (CDC). Burcei, Riu Picocca, 7.IX.1997, A. Lecis leg., 1 ♀ (CDC). Burcei, 24.VII.1999, D. Cillo leg., 1 ♂ (CDC). Burcei, 25.IV.2001, D. Cillo leg., 1 ♀ (CDC). Sinnai, Tuviois, IX.2009, A.



Fig. 1 – *Hydrophilus piceus* Linnaeus, 1758 (left) e *Hydrophilus pistaceus* (Castelnau, 1840) (right). Photo by E. Bazzato.

Rattu leg., 1 ♀ (CDC). Sinnai, Tuviois, 19 IX.2009, A. Rattu leg., 1 ♀ (CAR). Sinnai, Tuviois, 23.VIII.2008, D. Cillo leg., 1 ♀ 1 ♂ (CDC). Sinnai, Maidopis, 5.V.2002, D. Cillo leg., 1 ♀ (CAS). Sinnai, Lago di Corongiu, 10.V.2001, D. Cillo leg., 1 ♂ (CDC). Sinnai, Lago di Corongiu, 20.IV.2002, D. Cillo leg., 2 ♂♂ 1 ♀ (CDC). Sinnai, Lago di Corongiu, 5.V.2002, D. Cillo leg., 1 ♀ (CDC). Maracalagonis, Cave is Cireddus, 18.IV.2002, D. Cillo leg., 1 ♂ (CDC). Maracalagonis, Cave Is Cireddus, 7.V.2002, D. Cillo leg., 1 ♂ (CAS). Maracalagonis, Cave Is Cireddus, 7.V.2002, D. Cillo leg., 15 ♂♂ 9 ♀♀ (CDC). Maracalagonis, Cave Is Cireddus, 12.V.2002, A. Spiga leg., 12 ♂♂ 10 ♀♀ (CAS). Maracalagonis, Cave Is Cireddus, IV.2008, D. Cillo leg., 2 ♂♂ (CDC). Quartu Sant'Elena, Lago Simbirizzi, 10.V.2002, D. Cillo leg., 1 ♂ (CDC). Quartu Sant'Elena, Flumini, 19.IV.1999, D. Cillo leg., 1 ♀ (CDC). Quartu Sant'Elena, Flumini, 18-25. IV.2002, D. Cillo leg., 8 ♂♂ 4 ♀♀ (CDC). Quartu Sant'Elena, Flumini, 30.IX.2009, F. Fanni leg., 1 ♂ (CAR). Quartu Sant'Elena, Geremeas, 10.V.1997, D. Cillo leg., 1 ♀ (CDC). Stagno di Molentargius, 13.X.2009, A. Rattu leg., 1 ♂ (CDC). Villasimius, Foxi, IX.2008, D. Cillo leg., 1 ♂ (CFF) 1 ♂ (CWMA). Sarroch, Riu Is Cioffus, 17.XI.2013, D. Cillo leg., 2 ♀♀ (CDC) (CAL). Pula, Santa Margherita, 30.V.1967, 1 ♂ 1 ♀ (CEPS). Teulada, 12.V.2008, R. Pinna leg., 1 ♀ (CEB).

Thanks to this collection of information, a more clear scenario for Sardinia is now presented. Anyway for *H. piceus* on 12 data collected just 7 localities are actually known, 2 for

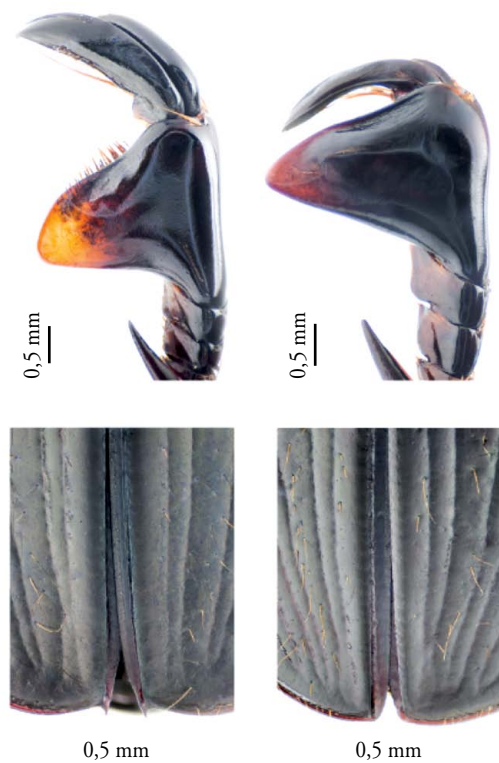


Fig. 2 – Specific characters for *H. piceus* (left) e *H. pistaceus* right. **A:** *H. piceus*, last tarsus segment of first leg with rounded edge. **B:** *H. pistaceus*, the same article but with sharpened edge; **C:** *H. piceus*, little spine on elytra internal margin. **D:** *H. pistaceus*, no spines. Photo by E. Bazzato.

Sassari, 1 for Oristano, 1 for Nuoro and 3 for Cagliari provinces. Considering the date of collection, 67% of data have to be considered old with more than 30 years.

Better is the knowledge for *H. pistaceus* with 43 localities on the whole 79 data, 1 in Olbia Tempio, 9 in Sassari, 3 in Oristano, 2 in Nuoro, 3 in Ogliastra, 2 in Medio Campidano, 4 in Carbonia-Iglesias and 18 in Cagliari provinces. For this species 54% of the data were collected in the last 3 decades.

Both the species were collected in all the periods around the year with April, May and July the months with the larger number of specimens.

DISCUSSION

After many years of researches on freshwater beetles in Sardinia is clear how the anthropic high pressure on many environments have a very strong negative impact on the invertebrate communities. In all the habitats close to towns and village, creeks and swamps are now become manholes to provide parking areas or enlarge roads, destroying all the possibilities to survive for Hydroadephaga and Palpicornia. These waterproofing of the land also increase the risk of flooding and become the worst management for Mediterranean landscapes. Luckily in

many humid areas far in the countryside is still possible to find in Sardinia very well preserved habitats that need immediately protection for the locally high biodiversity. Effectively all the recent researches reveal a substantial decrease in the number of Hydrophilidae all around in Sardinia directly correlated to different causes, as intensive use of water, pollution in urban and agricultural area and habitat changes. In particular in Cagliari's surrounding, as in the humid areas of Simbirizzi, Maracalagonis, Molentargius, San Vito, Villaputzu and Quirra, the problems come for the diffusion of alloctonous species as the predators *Procambarus clarkii* (Girard, 1852) (Malacostraca, Decapoda, Cambaridae), *Micropterus salmoides* Lacépède, 1802 (Actinopterygii, Perciformes, Centrarchidae) and *Ameiurus melas* (Rafinesque, 1820) (Actinopterygii, Siluriformes, Ictaluridae). The strong impact on all the ecological niches by these aliens seems to be also strong on *Hydrophilus* as well as on the large Dytiscidae such as taxa in the genus *Dytiscus* and *Cybister*, found in the stomachs of large *Micropterus* (Authors, pers. obs.). Also the artificial lights along roads and close to buildings results to be very attractive and disorientating the flying adult during the dry season. For all these reason and their role as bioindicators of complex and well preserved freshwater invertebrate community is clear the necessity to put these beetles among the endangered lists of taxa as recently done for example in Czech Republic (Boukal et al., 2007; Korbek, 1992).

Acknowledgements. We want to thanks all fronds and colleagues that helps in the researches and that communicate the data from their collections and in particular: Adriana Lecis, Andrea Rattu, Antonio Spiga, Daniele Sechi, Francesco Rattu, Francesco Sanna, Jan Matějček, Maria Grazia Atzori. Also thanks to Morena Priori for linguistic revision.

RIASSUNTO

Nuovi dati geonemici sul genere *Hydrophilus* Leach, 1815 in Sardegna (Coleoptera, Hydrophiloidea, Hydrophilidae)

Il presente lavoro riassume i dati distributivi per *Hydrophilus piceus* Linnaeus, 1758 e *Hydrophilus pistaceus* (Castelnau, 1840) in Sardegna. Il primo risulta localizzato con poche stazioni in tutta l'isola mentre il secondo può ancora contare su un maggior numero di localizzazioni in diverse parti della Sardegna. Si ribadisce l'evidente calo degli effettivi nei siti monitorati negli ultimi anni soprattutto per l'aumento di predatori di specie aliene e alle modifiche ambientali, richiamando alla necessità di porre le specie nelle liste di protezione.

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