

## The Hydraenidae (Insecta: Coleoptera) of the Maltese Archipelago (Central Mediterranean)

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### Abstract

The Hydraenidae of the Maltese Archipelago are reviewed, based on literature records and examination of historical and recently collected specimens. A total of eleven species is included of which *Hydraena* (s.str.) *subimpressa* REY, *Ochthebius* (s.str.) *fossulatus* MULSANT, *O.* (s.str.) *punctatus* STEPHENS, and *O.* (s.str.) *viridis* PEYRON (species complex) are recorded from the Maltese Islands for the first time. The records of the following four species by CAMERON & CARUANA GATTO (1907) are based on misidentifications: *Hydraena* (s.str.) *nigrita* GERMAR (= *H.* (s.str.) *subimpressa* REY), *Ochthebius* (s.str.) *foveolatus* GERMAR (= *O.* (s.str.) *eyrei* JÄCH, and *O.* (s.str.) *fossulatus* MULSANT), *O.* (s.str.) *lanuginosus* REICHE & SAULCY (= *O.* (s.str.) *punctatus* STEPHENS), and *O.* (s.str.) *subinteger* MULSANT & REY (= *O.* (s.str.) *celatus* JÄCH).

### Zusammenfassung

Die Hydraenidae des Malta Archipels werden anhand von Literaturmeldungen sowie Untersuchung von historischem und rezentem Material zusammengefasst. Insgesamt werden 11 Arten gemeldet, von denen *Hydraena* (s.str.) *subimpressa* REY, *Ochthebius* (s.str.) *fossulatus* MULSANT, *O.* (s.str.) *punctatus* STEPHENS und *O.* (s.str.) *viridis* PEYRON (Artenkomplex) hier erstmals für Malta gemeldet werden. Die von CAMERON & CARUANA GATTO (1907) irrtümlich gemeldeten Arten *Hydraena* (s.str.) *nigrita* GERMAR, *Ochthebius* (s.str.) *foveolatus* GERMAR, *O.* (s.str.) *lanuginosus* REICHE & SAULCY und *O.* (s.str.) *subinteger* MULSANT & REY sind aus der Liste der maltesischen Käfer zu streichen.

**Key words:** Coleoptera, Hydraenidae, Malta, distribution, checklist, risk assessment.

### Introduction

The Maltese Archipelago consists of Malta, Gozo and Comino together with some minor islands. With 245.7 km<sup>2</sup> Malta is the largest of these islands. The total land mass of the Maltese Archipelago is about 316 km<sup>2</sup>, and the coastline is approximately 190 km long. The resident population is approaching 400,000. The islands are aligned in a NW-SE direction and they are located in the Sicilian Channel in the central Mediterranean Sea. Malta represents thus one of the smallest countries of the world and has one of the highest population densities (> 1,100 pers./km<sup>2</sup>) not counting the over one million tourists annually. Despite the intense human impacts, the Maltese Islands still harbour a com-

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paratively diverse array of habitats which host a characteristic fauna and flora. The Maltese Islands are to be regarded as semi-arid, the average annual precipitation being about 530 mm.

All Maltese species of Hydraenidae are associated with aquatic environments and therefore a brief overview of the aquatic biotopes that are still to be found in the Maltese Islands is presented below. The commonest type of freshwater habitats in the Maltese Islands are periodical streams or Wadis [in Maltese language: "wied" (singular) or "widien" (plural)], which are geomorphologically dry valleys, which support some freshwater during the wet season but are usually dry from May till September. Examples of such valleys include Chadwick Lakes (= Wied il-Qlejgha) (see Fig. 1), Ghajn Rihana (see Fig. 2), Wied il-Luq, Wied il-Ghasel, Wied tal-Isqof and Sara Valley. However, some of these valleys drain springs originating from the perched aquifers and may retain some water even during the dry season. Some of these valleys have dams and their water is often used for irrigation.

Another periodical habitat type is rainwater accumulating in natural depressions and deep hollows on coralline limestone to form temporary rainwater pools. Most of these are relatively small and rapidly dry up, whereas deeper ones may persist for longer periods of time.

Permanent freshwater springs are very scarce in the Maltese Islands, mainly confined to the Rabat-Dingli Plateau (e.g. the Rini/Bahrija Valley system, Bingemma Valley, San Martin, Gnejna Valley and the valleys draining the Mtaheb and Gircanti areas). In Gozo, the most important perennial spring habitats are found in the Kercem end of Lunzjata Valley (SCHEMBRI & al. 1999).

Permanent rainwater pools are also very rare in the Maltese Islands. Often, these systems receive additional water from springs. The most important of these permanent pools are found at Il-Qattara (near Dwejra) (see Fig. 4) and L-Ghadira ta' Sarraflu (between Dwejra and Xlendi Bay), both of which are located on the island of Gozo.

Another freshwater habitat, about which very little is locally known, are the subterranean waters. A large underground freshwater pool is situated in the cavern known as Harq il-Hamiem near Pembroke.

A few coastal wetlands appear to be transitional between freshwater and brackish water. Such wetlands are formed when rainwater collects in depressions close to the sea. During the dry period, these pools will receive a substantial amount of seawater which is carried by wind and wave action and brackish water content often increases. This habitat type may thus support different species at different periods of the year. Such wetlands include Ghadira s-Safra and the Qammieh pools (both on Malta).

Two other habitat types include coastal rock pools and saline marshlands. Coastal rock pools form transient habitats where salt concentrations often become very high. Maltese coastal marshes are characterized by a muddy substratum on which brackish water collects in the wet season and becomes progressively more brackish as the dry season approaches. Water finally disappears completely, leaving the marsh dry until the following wet season. Saline marshlands are very vulnerable in the Maltese Islands. About 15 saline marshlands have either disappeared completely or only their vestiges



Fig. 1: Periodical stream, Chadwick Lakes (Malta), locality of *Hydraena subimpressa* and *Ochthebius dilatatus* [photograph by E. Lanfranco].



Fig. 2: Periodical stream, Ghajn Rihana (Malta), locality of *Ochthebius dilatatus* and *O. viridis* (species complex) [photograph by E. Lanfranco].

remain. The saline marshes left (e.g. Il-Magħluq at Marsaskala (see Fig. 3), Il-Ballut at Marsaxlokk and Salina) are often heavily degraded mainly due to development works; other threats include dumping, trampling, and in some cases pollution and vandalism.

### Historical review

The first mention of Hydraenidae from the Maltese Islands is to be found in the list of Coleoptera published by CAMERON & CARUANA GATTO (1907), which is the only comprehensive list on Maltese Coleoptera published until today. In that list, eight species of Hydraenidae were included (under "Hydrophilidae"). LUIGIONI (1929), in his work on the Italian Coleoptera, repeated the records of CAMERON & CARUANA GATTO (1907).

In the numerous revisions of the Palearctic species of the genus *Ochthebius* LEACH, material collected from the Maltese Islands was recorded in the following works: JÄCH (1989, 1990a, 1990b, 1993). Finally, URBANELLI & al. (1996) while carrying out molecular studies on the *Ochthebius* (*Calobius*) species from the Mediterranean and Macaronesian Regions, collected and studied material of *Ochthebius* (*Calobius*) *quadricollis* MULSANT from coastal rock pools at Cirkewwa in Malta.

CILIA (1989) published an annotated checklist of endemic, rare, threatened and/or scientifically interesting beetles in the Red Data Book for the Maltese Islands. However, regarding hydraenids this list is based entirely on information provided by CAMERON & CARUANA GATTO (1907).

### Material and methods

Material was examined from the following institutions and private collections:

BMNH	The Natural History Museum, London, UK
CMM	Coll. Mifsud, Malta
CSA	Coll. Schuh, Austria
NMW	Naturhistorisches Museum, Wien, Austria

Most of the historical specimens of Hydraenidae recorded from the Maltese Islands by early authors were examined by the second author. Material (presumably) collected by Malcom Cameron and/or Alfredo Caruana Gatto at the beginning of the 20<sup>th</sup> century is still conserved to a substantial amount in the BMNH and labeled as "Cameron Coll. B.M. 1936-555". These specimens formed the basis of a list of Coleoptera of the Maltese Islands published by CAMERON & CARUANA GATTO (1907). 67 specimens of Hydraenidae from these collections were now examined. The individual label numbers correspond to numbers in Cameron's private notes and refer to the following information: date of collection, name of species, name of person who identified this species, locality name and ecological data. In the present work, this information is added in square brackets after the label number. Material collected in Malta between 1874-6 by Commander James John Walker, is also conserved in the BMNH and is labeled as "G.C. Champion Coll. B.M. 1927-409". From this material, 75 specimens of Hydraenidae were also examined for this study. This material was almost exclusively collected between the months of October and March of the three mentioned years. In CAMERON



Fig. 3: Saltmarsh at Il-Magħluq in Marsaskala (Malta), locality of *Ochthebius dilatatus*, *O. eyrei* and *O. fossulatus* [photograph by A. Zammit].



Fig. 4: Permanent rainwater pool at Il-Qattara, near Dwejra (Gozo), locality of *Aulacochthebius exaratus*, *Ochthebius crenulatus*, *O. dilatatus*, *O. maculatus*, *O. eyrei* and *O. viridis* (species complex) [photograph by R. Schuh].

& CARUANA GATTO (1907), species names which were directly examined from this material are either indicated by an asterisk or especially noted as "Coll. J.J.W." or "teste J.J.W.". Except for the name Malta, there is no other precise locality or habitat information. Additional specimens (more than 900 exs.) of Hydraenidae were collected from the Maltese Islands mainly by the first author between 1989 and 2003.

For each species, earlier citations, material examined, global distribution and additional notes (where relevant) are included. Secondary citations which were copied from earlier works, e.g. LUIGIONI (1929) and CILIA (1989), are not included.

### Checklist of Maltese Hydraenidae

- Aulacochthebius exaratus* (MULSANT, 1885)  
*Hydraena* (s.str.) *subimpressa* REY, 1885  
*Ochthebius* (*Asiobates*) *crenulatus* MULSANT & REY, 1850  
*Ochthebius* (*Asiobates*) *dilatatus* STEPHENS, 1829  
*Ochthebius* (*Asiobates*) *maculatus* REICHE, 1869  
*Ochthebius* (*Calobius*) *quadricollis* MULSANT, 1844  
*Ochthebius* (s.str.) *celatus* JÄCH, 1989  
*Ochthebius* (s.str.) *eyrei* JÄCH, 1990  
*Ochthebius* (s.str.) *fossulatus* MULSANT, 1844  
*Ochthebius* (s.str.) *punctatus* STEPHENS, 1829  
*Ochthebius* (s.str.) *viridis* PEYRON, 1858 (species complex)

### Annotated species list

#### *Aulacochthebius exaratus* (MULSANT, 1885)

"*Ochthebius exaratus* MULS."; CAMERON & CARUANA GATTO 1907: 390.

**Material examined:** **Malta:** vi.1902, 1 ex., M.C., M. Cameron Coll. B.M. 1936-555, 7409 [= June 1902, *Ochthebius*, Jniena (Gnejna)] (BMNH); vi.1903, 1 ex., M.C., M. Cameron Coll. B.M. 1936-555 (BMNH). **Gozo:** Dwejra, Il-Qattara, 30.iii.2002, 2 exs., leg. R. Schuh & D. Mifsud (CMM, NMW).

**Global distribution:** *Aulacochthebius exaratus* occurs in Algeria, Belgium, Britain, Croatia, France, Italy (incl. Sicily), Malta, The Netherlands, Portugal, Slovenia, and Spain. Records from the Afrotropical Region probably refer to a different taxon (AGUILERA & al. 1998).

**Comments:** *Aulacochthebius exaratus* was previously recorded from Gnejna (CAMERON & CARUANA GATTO 1907). In the Red Data Book for the Maltese Islands, CILIA (1989) regarded this taxon as rare with a restricted distribution in the Maltese Islands. The inclusion of this taxon in the Red Data Book was entirely based on the fact

that CAMERON & CARUANA GATTO (1907) indicated the presence of this species in Malta as rare. AGUILERA & al. (1998) specify that in the Iberian Peninsula this species is regularly found in fresh, stagnant or slowly flowing water.

***Hydraena (s.str.) subimpressa* REY, 1885**

"*Hydraena nigrita* GERM."; CAMERON & CARUANA GATTO 1907: 390.

**Material examined:** **Malta:** x.1901, 1 ex., M.C., M. Cameron Coll. B.M. 1936-555, 5829 [= 5 Oct. 1901, *Hydraena nigrita*, Wied el Klija (Wied il-Qlejgħa)] (BMNH); xi.1901, 2 exs., M.C., M. Cameron Coll. B.M. 1936-555, 6164 [= Nov. 1901, *Hydraena nigrita*, E.R. (identified by E. Reitter), Ta' Baldu] (BMNH); Buskett, Wied il-Luq, 15.v.2003, 2 exs., in small freshwater pools surrounded by *Arundo donax* L., leg. D. Mifsud (CMM), 70 exs., same data except 18.v.2003 (CMM, NMW).

**Global distribution:** Belgium, Czech Rep., France, Germany, Italy (incl. Sicily), Luxembourg, Malta, Spain, and Switzerland.

**Comments:** The record of *Hydraena nigrita* GERMAR by CAMERON & CARUANA GATTO (1907) refers to *H. subimpressa*. CAMERON & CARUANA GATTO (1907) recorded this species only from Ta' Baldu, even though the record from Wied il-Qlejgħa was in their possession. In the Red Data Book for the Maltese Islands, CILIA (1989) listed *Hydraena nigrita* (following CAMERON & CARUANA GATTO 1907) and indicated the abundance of this taxon as rare (?) and with a restricted distribution in the Maltese Islands. Indeed, *Hydraena subimpressa* seems to have a very restricted distribution in the Maltese Islands, being recently found in only one location.

***Ochthebius (Asiobates) crenulatus* MULSANT & REY, 1850**

"*Ochthebius impressicollis* LAP."; CAMERON & CARUANA GATTO 1907: 390.

*Ochthebius (Asiobates) crenulatus* MULSANT & REY; JÄCH 1990b: 56.

**Material examined:** **Malta:** vi.1902, 2 exs., M.C., M. Cameron Coll. B.M. 1936-555, 7411 [= June 1902, *Ochthebius impressicollis bicolon*, E.R. (identified by E. Reitter), Jniena (Gnejna), = 7474] (BMNH); 1903, 1 ex., M.C., M. Cameron Coll. B.M. 1936-555, 7474 [= 17 June 1902, *Ochthebius*, Boschetto (Buskett), = 7411] (BMNH); Buskett, Wied il-Luq, 18.v.2003, 50 exs., leg. D. Mifsud (CMM, NMW). **Gozo:** Dwejra, Il-Qattara, 25.iv.2003, 1 ex., leg. D. Mifsud (CMM).

**Global distribution:** Austria, northern Croatia, southeastern France, Italy (incl. Sicily), Malta, and Switzerland.

**Comments:** Based on historical specimens, *Ochthebius crenulatus* was recorded from Malta by JÄCH (1990b). This species seems to be relatively common and widely distributed in the Maltese Islands.

***Ochthebius (Asiobates) dilatatus* STEPHENS, 1829**

"*Ochthebius impressicollis* LAP. v. *imperfectus* KUW."; CAMERON & CARUANA GATTO 1907: 390.

*Ochthebius (Asiobates) dilatatus* STEPHENS; JÄCH 1990b: 59.

**Material examined:** **Malta:** 64 exs., G.C. Champion Coll. B.M. 1927-409 (BMNH; CMM); x.1901, 13 exs., M.C., M. Cameron Coll. B.M. 1936-555, 5814 [= 1 Oct. 1901, *Ochthebius impressicollis (bicolon)*, Ta' Baldu, Id. Gatto] (BMNH, CMM); vi.1902,

1 ex., M.C., M. Cameron Coll. B.M. 1936-555, 7410 [= June 1902, *Ochthebius impressicollis*, Jniena (Gnejna)] (BMNH); vi.1902, 1 ex., M.C., M. Cameron Coll. B.M. 1936-555, 7493 [= 14 July 1902, *Ochthebius impressicollis* v. *imperfectus*, E.R. (identified by E. Reitter), Bosketto (Buskett)] (BMNH); Wied il-Ghasel, 21.xi.1989, 1 ex., leg. D. Mifsud (CMM); Girgenti Valley, 17.iii.1990, 3 exs., leg. D. Mifsud (CMM); Rabat, Tal-Virtu, 14.iii.1990, 2 exs., leg. D. Mifsud (CMM); Zejtun, 13.v.1989, 1 ex., leg. D. Mifsud, same data but 20.iv.1998, 1 ex. (CMM); Wied tal-Isqof, 11.iv.1990, 6 exs., leg. D. Mifsud (CMM); Wied tal-Bahrija, 27.vi.1993, 1 ex., leg. D. Mifsud (CMM); St. Thomas Bay, Tal-Munxar, 18.iii.1996, 1 ex., leg. D. Mifsud (CMM), same data but 15.ii.1998, 1 ex. (CMM); Mtaħleb, 7.iv.1996, 1 ex., leg. D. Mifsud (CMM); Fiddien, 19.iii.1996, 1 ex., leg. D. Mifsud (CMM), same data but 19.v.2003, 30 exs. (CMM, NMW); Migra Ferħa, 1.v.1997, 1 ex., leg. D. Mifsud (CMM); Bidnija, 20.ii.1998, 12 exs., leg. D. Mifsud (CMM); Chadwick Lakes, 19.v.2003, 48 exs., leg. D. Mifsud (CMM, NMW); Buskett, Wied il-Luq, 18.v.2003, 33 exs., leg. D. Mifsud (CMM); Il-Qattara, near Ta' Baldu, 19.v.2003, 4 exs., leg. D. Mifsud (CMM); Marsaskala, Il-Magħluq, 9.viii.2003, 8 exs., leg. D. Mifsud (CMM). **Gozo:** Marsalforn Valley, 20.iv.1990, 1 ex., leg. D. Mifsud (CMM); Ramla, 8.vi.1990, 1 ex., leg. D. Mifsud (CMM); Sara Valley, 18.iv.1990, 1 ex., leg. D. Mifsud (CMM), same data but 3.xi.1996, 4 exs. (CMM); Xaħhra, 25.xi.1994, 3 exs., leg. C. Farrugia (CMM); Ġħasri, Wied tal-Ġħajn, 28.vi.1995, 1 ex., leg. C. Farrugia (CMM); Dwejra, Il-Qattara, 10.v.1996, 1 ex., leg. D. Mifsud (CMM), same locality and collector, but 25.iv.2003, 35 exs. (CMM); same locality, but 30.iii.2002, 10 exs., leg. R. Schuh & D. Mifsud (CMM, CSA).

**Global distribution:** A widespread Atlanto-Mediterranean species.

**Comments:** *Ochthebius dilatatus* was recorded from the following localities in Malta: Ta' Baldu, Buskett (CAMERON & CARUANA GATTO 1907), Wied is-Sewda, Chadwick Lakes and Bahrija (JÄCH 1990b). In the Red Data Book for the Maltese Islands, CILIA (1989) listed this taxon as "*Ochthebius impressicollis* Lav. v. *imperfectus* Kuw." (following CAMERON & CARUANA GATTO 1907) and regarded this taxon as rare (?) with a restricted distribution in the Maltese Islands. CILIA (1989) pointed out to the fact that only the "variety *imperfectus*" was recorded as rare by CAMERON & CARUANA GATTO (1907) whereas the nominal form was reported as common. In fact, *Ochthebius dilatatus* is the most common and most widespread species of Hydraenidae in the freshwater habitats of the Maltese Islands.

***Ochthebius (Asiobates) maculatus* REICHE, 1869**

"*Ochthebius maculatus* REICHE"; CAMERON & CARUANA GATTO 1907: 390.

**Material examined: Malta:** 11 exs., G.C. Champion Coll. B.M. 1927-409 (BMNH; CMM); Zejtun, 22.vi.1989, 1 ex., under stone in decaying vegetation, leg. D. Mifsud (CMM); Bahrija Valley, 7.iv.1990, 1 ex., leg. D. Mifsud (CMM). **Gozo:** Dwejra, Il-Qattara, 30.iii.2002, 7 exs., leg. R. Schuh & D. Mifsud (CMM, CSA).

**Global distribution:** Relictary Mediterranean.

**Comments:** *Ochthebius maculatus* sensu auct. represents a complex of closely related species. A taxonomic revision is dearly needed. The Maltese populations can be found in both semi-permanent valley systems and permanent freshwater pools.



***Ochthebius (Calobius) quadricollis* MULSANT, 1844**

"*Ochthebius quadricollis* MULS."; CAMERON & CARUANA GATTO 1907: 390.

*Ochthebius (Calobius) quadricollis* MULSANT; JÄCH 1993: 41, URBANELLI & al. 1996: 624.

**Material examined:** **Malta:** vi.1903, 30 exs., M.C., M. Cameron Coll. B.M. 1936-555, 8137 [= May 1903, *Ochthebius quadricollis*, M.R. (identified by M. Régimbart), Mtaħleb, in salt pools in rock] (BMNH, CMM); Wied tal-Isqof, 16.iv.1990, 3 exs., leg. D. Mifsud (CMM); Baħar ic-Ċagħaq, 16.ix.1992, 7 exs., in coastal rock pools, leg. D. Mifsud (CMM); St. Thomas Bay, Tal-Munxar, 23.v.1998, 1 ex., leg. D. Mifsud (CMM); Il-Gzira (limits of St. Thomas Bay), 9.ix.2003, ca. 40 exs., leg. D. Mifsud (CMM). **Gozo:** Dwejra Bay, 25.xii.1998, 1 ex., leg. D. Mifsud (CMM); Dwejra Bay, 30.iii.2002, 7 exs., leg. R. Schuh & D. Mifsud (CSA); Qbajjar, around Qolla l-Bajda, 18.i.1999, 21 exs., in coastal rock pools, leg. D. Mifsud (CMM).

**Global distribution:** Western Mediterranean.

**Comments:** *Ochthebius quadricollis* was previously recorded from Mtaħleb (CAMERON & CARUANA GATTO 1907), Sliema, Ras il-Mignuna (JÄCH 1993) and Cirkewwa (URBANELLI & al. 1996). Locally, this species is very common. It lives exclusively in coastal rock pools. Adults of this species are usually found in large numbers after the first rain-falls, indicating that adults manage to survive the hot summer months in sheltered areas.

***Ochthebius (s.str.) celatus* JÄCH 1989**

"*Ochthebius subinteger* MULS."; CAMERON & CARUANA GATTO 1907: 390.

*Ochthebius (s.str.) celatus* JÄCH; JÄCH 1989: 43.

**Material examined:** **Malta:** vi.1903, 3 exs., M.C., M. Cameron Coll. B.M. 1936-555, 8138 [= 1903, *Ochthebius subinteger* (Muls.), M.R. (identified by M. Régimbart), Mtaħleb, in salt pools in rock] (BMNH, CMM); Xorb il-Għagin, Ras il-Fenek, 23. xii.1989, 8 exs., in coastal rock pools, leg. D. Mifsud (CMM), same data but 1.i.1998, 14 exs. (CMM); Zurrieq, Għar Lapsi, 6.i.2002, 4 exs., in coastal rock pools, leg. D. Mifsud (CMM).

**Global distribution:** Mediterranean, so far recorded only from Croatia, France, Greece, Israel, Italy (Sicily only), and Malta.

**Comments:** Following CAMERON & CARUANA GATTO (1907), CILIA (1989) listed *Ochthebius subinteger* as rare (?). This taxon was previously recorded from Mtaħleb (CAMERON & CARUANA GATTO 1907) and Ras il-Mignuna (JÄCH 1989). *Ochthebius celatus* seems to be comparatively common in the Maltese Islands where it is restricted to coastal rock pools.

***Ochthebius (s.str.) eyrei* JÄCH, 1990**

"*Ochthebius foveolatus* GERM." (partim); CAMERON & CARUANA GATTO 1907: 390, CARUANA GATTO 1925: 164.

*Ochthebius (s.str.) eyrei* JÄCH; JÄCH 1990a: 33.

**Material examined:** **Malta:** viii.1901, 4 exs., M.C., M. Cameron Coll. B.M. 1936-555, 5491 [= 17 August 1901, *Ochthebius foveolatus* (Germ.), Id. by E.A.N. (identified by E.A. Newbery), Marsaskala, saltmarsh] (BMNH); Marsaskala, Il-Magħluq, 20.iv.1990, 1 ex., under stone near brackish water pool, leg. D. Mifsud (CMM); Zejtun, 26.x.1989,

3 exs., in a small freshwater pool in private garden, leg. D. Mifsud (CMM). **Gozo:** Dwejra, Il-Qattara, 30.iii.2002, 1 ex., leg. R. Schuh & D. Mifsud (NMW).

**Global distribution:** Italy (Sicily only), Malta, and Tunisia (JÄCH 1990a).

**Comments:** The recent findings suggest that this species can live in saline and freshwater habitats. *Ochthebius eyrei* is relatively rare in the Maltese Islands.

***Ochthebius* (s.str.) *fossulatus* MULSANT, 1844**

"*Ochthebius foveolatus* GERM." (partim); CAMERON & CARUANA GATTO 1907: 390, CARUANA GATTO 1925: 164.

**Material examined: Malta:** viii.1901, 6 exs., M.C., M. Cameron Coll. B.M. 1936-555, 5491 [= 17 August 1901, *Ochthebius foveolatus* (Germ.), Id. by E.A.N. (identified by E.A. Newbery), Marsaskala, saltmarsh] (BMNH, CMM); Marsaskala, Il-Maghluq, 9.viii.2003, ca. 500 exs., leg. D. Mifsud (CMM, CSA, NMW).

**Global distribution:** Morocco to Tunisia, Italy (Sicily only) (JÄCH 1990a), and Malta.

**Comments:** First record for the Maltese Islands. This species seems to have a very restricted distribution in the Maltese Islands. Although this species was found in very large numbers at Marsaskala, all specimens were concentrated in an area of less than 30 m<sup>2</sup> dominated by a very rare sea rush (*Juncus maritimus*). Repeated search in other similar habitats, e.g. Għadira, Il-Ballut saltmarsh near Marsaxlokk, and Salina remained fruitless.

***Ochthebius* (s.str.) *punctatus* STEPHENS, 1829**

(?) "*Ochthebius lanuginosus* REICHE"; CAMERON & CARUANA GATTO 1907: 390.

**Material examined: Malta:** 190 [!], 1 ex., M.C., M. Cameron Coll. B.M. 1936-555 (BMNH).

**Global distribution:** Atlanto-Westmediterranean.

**Comments:** First record for the Maltese Islands. The record of "*Ochthebius lanuginosus*" by CAMERON & CARUANA GATTO (1907) most probably refers to this species, since the single Maltese specimen of *O. punctatus* in the Cameron collection is not provided with label number and locality data, which corresponds with the record of a single specimen of "*Ochthebius lanuginosus*" by CAMERON & CARUANA GATTO (1907). No recent material of this species was collected from the Maltese Islands, where it may be assumed to be rare or extinct.

***Ochthebius* (s.str.) *viridis* PEYRON, 1858 (species complex) [= *O. viridis* 2 (sensu JÄCH 1992)]**

**Material examined: Malta:** Għajn Rihana, 20.viii.1989, 1 ex., leg. D. Mifsud (CMM), same data but 25.viii.1989, 1 ex., leg. S. Schembri (CMM). **Gozo:** Dwejra, Il-Qattara, 30.iii.2002, 6 exs., leg. R. Schuh & D. Mifsud (CMM, CSA).

**Global distribution:** "*Ochthebius viridis* sp. 2" (sensu JÄCH 1992) is confined to North Africa, southern France, Italy, Malta, Spain and southern Israel.

**Comments:** First record for the Maltese Islands. According to JÄCH (1992) *Ochthebius viridis* consists of a complex of at least two different species.

## Discussion

Zoogeographically, the Maltese hydraenids show a very strong affinity to the Italian fauna. All 11 species are known to occur in Sicily, whereas only eight of them occur in North Africa. There are no endemic species of Hydraenidae in the Maltese Archipelago.

CARUANA GATTO (1925) presented evidence of how the entomofauna in a number of coastal bays and saltmarshes has decreased in the first quarter of the 20<sup>th</sup> century.

Of the 11 species of Hydraenidae recorded from the Maltese Archipelago, four can still be regarded as common, at least locally: *Ochthebius dilatatus*, *O. crenulatus*, *O. quadricollis*, *O. celatus*; three species are comparatively rare, being known only from two or three localities: *Ochthebius maculatus*, *O. eyrei*, and *O. viridis*; three species are currently known from only one locality: *Aulacochthebius exaratus*, *Hydraena subimpres-sa*, and *Ochthebius fossulatus*; the remaining species, *Ochthebius punctatus* has not been collected in Malta since about 100 years.

In the Red List of Maltese Hydraenidae, *Ochthebius punctatus* should be assessed as Regionally Extinct (RE), *Aulacochthebius exaratus*, *Hydraena subimpres-sa*, and *Ochthebius fossulatus* should be treated as Critically Endangered (CR), *Ochthebius maculatus*, *O. eyrei*, and *O. viridis* should be regarded as Vulnerable (VU), *Ochthebius crenulatus*, *O. quadricollis*, and *O. celatus* are Near Threatened (NT), and *Ochthebius dilatatus* seems to be the only Maltese hydraenid species which is of Least Concern (LC).

It is recommended that special measurements should be taken to protect the habitats of *Aulacochthebius exaratus*, *Hydraena subimpres-sa*, and *Ochthebius fossulatus*, i.e. freshwater pools at Buskett, Wied il-Luq (Malta), saltmarsh at Il-Maghluq in Marsaskala (Malta) (see Fig. 3), and rainwater pool at Il-Qattara, near Dwejra (Gozo) (see Fig. 4). The latter locality deserves special attention because it harbours a total of six hydraenid species and other rare beetles (e.g. *Augyles maritimus* GUÉRIN-MÉNEVILLE, 1844), which are restricted to this locality in the Maltese Archipelago!

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