Click beetles from the Maltese Islands (Coleoptera, Elateridae)

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ABSTRACT. Eleven species of click beetles are reported for the Maltese Islands. Of these, two species represent new records for this territory and include *Melanotus dichrous* and *Conoderus posticus.* The latter is an invasive species of Neotropical origin. Two species seem to be endemic to these islands and are represented by *Haterumelater schembrii*, so far known only from the holotype collected in 1979 and the rather common *Cardiophorus belonis*.

KEY WORDS. Mediterranean, new records, invasive species, endemic.

INTRODUCTION

The Elateridae is a family of beetles with some 400 genera and more than 10,000 described species. The family is distributed worldwide but the highest species diversity is to be found in the tropics (Johnson, 2002). The adults can be recognized by the characteristic shape of their pronotum and overall elongated body. Most of these beetles are capable of righting themselves from an overturned position by arching their body and then instantaneously straightening out, a process which hurls the insect into the air, hence their common name of click beetles. Adults may be found in diverse habitat types such as in leaf litter, dead wood, under stones and on flower heads. Their larvae, commonly called wireworms, live in the soil, leaf litter, sand, or rotten wood. They mainly feed on plant material especially roots and tubers but some are also predaceous on other small insects.

Most likely the very first record of a click beetle from Malta was the description of *Cardiophorus maculicrus* var. *belonis* by Desbrochers des Loges (1870). After this work, five species were included under the mentioned family in a list of Coleoptera of the Maltese Islands (Cameron & Caruana Gatto, 1907) and in this mentioned work, another species was included under the family name of Cebrionidae. Luigioni (1929), in his work on the Italian Coleoptera, repeated these records. Platia (1985) described a new species for Malta, confirmed the presence of four species which were previously reported for Malta, and included a new record for these islands. Basing himself on published records, Cilia (1989) provided the local status of five species. Cate (2004) included six species of Elateridae as occurring in Malta in the Fauna Europaea database, whereas eight species were listed in the Catalogue of Palaearctic Coleoptera (Löbl & Smetana, 2007). Platia (2008) recorded the presence of *Cardiophorus exaratus* from the island of Gozo. Original collecting data for click beetles from Malta is only available in Cameron & Caruana Gatto (1907) and Platia (1985; 2008). In the present work, all available information on click beetles from Malta was included and both historical and recently collected material was included for this study so as to provide a better base on which further studies can take place.

Most of the recent material was collected by David Mifsud - DM, Henry Borg Barthet - HBB, Paul Sammut - PS and Anthony Seguna - AS. In case of other collectors, names are written in full. The

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depository of specimens not in the authors' collections is indicated in parenthesis, thus BMNH - The Natural History Museum, London, UK and NMNH - National Museum of Natural History, Mdina, Malta. Nomenclature follows Löbl & Smetana (2007).

Family Elateridae Leach, 1815

Subfamily Cebrioninae Latreille, 1802

Cebrio cf. *fiorii* Leoni, 1906
(Fig. 1)

Material examined. MALTA: 1 ♂, G.C. Champion coll., B.M. 1927-409 (BMHN); Siggiewi, 2.xi.1995, 5 ♂♂, M. Schembri; Baħrija, 27.x.1991, 1 ♂, DM; Qrendi, 14.xi.2003, 11 ♂♂, DM.

Notes. Species included in the genus *Cebrio* A. G. Olivier, 1790 are in need of taxonomic revision. Almost 200 species and subspecies of *Cebrio* are reported from the Palaearctic Region with most species reported from North Africa and the Iberian Peninsula. The Maltese material seems to fit well with the description of *C. fiorii* Leoni, 1906 a species so far reported only from Italy. This species was previously reported from Malta as *Cebrio gigas* (Fabricius, 1787) by Cameron & Caruana Gatto (1907) but this citation was overlooked by both the Fauna Europaea project and the Catalogue of Palaearctic Coleoptera.

Subfamily Agrypninae Candèze, 1857

Lacon punctatus (Herbst, 1779)
(Fig. 2)

Material examined. MALTA: Wied Moqbol, 19.iii.1990, 1 ex., DM; Zejtun, 4.iv.2012, 1 ex. on roof of private house, DM.

Notes. This species was first reported from Malta by Platia (1985) and based on this, it was also reported as occurring in the mentioned country in both the Fauna Europaea project and the Catalogue of Palaearctic Coleoptera. *Lacon punctatus* is represented by two subspecies, *L. punctatus punctatus*, to which the Maltese material belongs and which is widespread in central-southern and eastern Europe, the Caucasus, the Near East and Morocco (Platia, 1994), and *L. punctatus oblongus* Della Beffa, 1931 so far reported only from Kashmir. This species is rather common through most of its distribution range, but in Malta the species seems to be rare. Adults are mostly nocturnal and can be found mainly under the bark of partly decayed tree trunks, and in stumps of various tree species including conifers (*Pinus* spp.) with larvae being zoosaprophagous (Platia, 1994). The adults show a cryptic coloration pattern rendering them invisible on logs and stumps burnt by fire, places where this species often can be found.

Drasterius bimaculatus (Rossi, 1790)
(Fig. 3)

Material examined. MALTA: 11 exs., G.C. Champion coll., B.M. 1927-409 (BMHN); 1901, 1 ex., MC [Malcom Cameron], 5330 [= *Cryptophonus bimaculatus* (Rossi), 14.viii.1901, Marsa, identified by Mr. Gatto], M. Cameron Coll., B.M. 1936-555 (BMNH); ix.1901, 2 exs., MC [Malcom Cameron], 5795 [= *Drasterius bimaculatus* (Rossi), Marsa, identified by Mr. Gatto], M. Cameron Coll., B.M. 1936-555 (BMNH); Marsa, Għammieri, 7/9.xii.1993, 17 exs.,

under bark of *Eucalyptus*, DM; Siggiewi, 10.v.1998/5.x.2001, 5 exs., DM; Rabat, 23.vi.2002/1.vii.2002/9.viii.2003, 3 exs., PS (NMNH); Il-Għadira, 26.vi.1989, 1 ex., DM; Mellieħa, around Għadira reserve, 2.vi.2002, 2 exs., DM; Mellieħa, near Mellieha holiday centre, 5.xii.2004, 4 exs., HBB (NMNH); Wied tal-Isqof, 2.viii.2002, 1 ex., DM. **GOZO:** Marsalforn valley, 20.iv.1990, 2 exs., in sand dune habitat, DM; Marsalforn,, 6.vi.1990, 4 exs., DM; Ramla, 9.viii.2002/25.iv.2003, 2 exs., DM.

Notes. *Drasterius bimaculatus* was reported from Marsa in Malta during the months of October and November by Cameron & Caruana Gatto (1907). They reported its local abundance as common. Platia (1985) did not examine material of this taxon from Malta. The presence of this species in Malta was omitted by the Fauna Europaea project but was reported in the Catalogue of Palaearctic Coleoptera. This species is widespread throughout the whole of Europe, North Africa, Asia Minor, the Caucasus, the Middle East, Iran and central Asia (Platia, 1994). It is an extremely common species and can be found almost all year round in all habitats, usually actively roaming on the ground (Platia, 1994).

Conoderus posticus (Eschscholtz, 1829)

(Fig. 4)

Material examined. MALTA: Naxxar, 2.viii.2001, 1 ex., Actinic moth trap, AS.

Notes. *Conoderus posticus* is native to the Neotropical Region but has been established for a long time in the Azores Islands. More recently this species was also reported from Spain (Andalusia, 2010) and Italy (Sicily, Sardinia, 2012) (Platia & Ruzzante, 2012). *Conoderus posticus* is being considered as an invasive species with the potential to spread easily and with already established populations in Portugal and the Azores (Denux & Zagatti, 2010). Although known as phytophagous, recent studies reveal a possible predatory character, when adults were observed feeding on egg masses of the noctuid moth *Spodoptera frugiperda* in maize fields in Brazil (Menezes-Netto *et al*., 2012). As *Conoderus* larvae occur in soil, an importation of potted live plants is the most probable source of introduction.

Subfamily Elaterinae Leach, 1815

Haterumelater schembrii (Platia, 1985)

(Fig. 5)

Notes. *Haterumelater schembrii* is so far known from the holotype collected from Wied Babu in Malta on 7.vii.1979 and seems to be an endemic species to Malta. It may serve as an icon for the ever dwindling number of old tree hollows in Europe in general, and on the Maltese Islands in particular where conservation efforts of such habitat trees are in high need of realization.

Isidus moreli Mulsant & Rey, 1875

(Fig. 6)

Material examined. MALTA: 1 ♂, Dr Cameron, 7499 [= *Isidus moreli*, June 1902, Mellieħa, ER], M. Cameron Coll., B.M. 1936-555 (BMNH). **GOZO:** Ramla, 20.vi. 2004, 1 ♀, DM.

Notes. *Isidus moreli* was recorded from Mellieħa in Malta by Cameron & Caruana Gatto (1907) and they reported its local abundance as rare. Its presence in Malta was also reported in the Fauna

Europaea database and in the Catalogue of Palaearctic Coleoptera. The species is strictly associated with coastal sand dunes where it is often found under logs where its larvae develop in rotten wood. It is a typical Mediterranean species with records from France, Italy, Spain, Cyprus, Turkey, south European territory of Russia, Morocco, Algeria, Egypt and Tunisia. Its strong sexual dimorphism is remarkable; the short-antennaed female may sometimes be mistaken for a separate species.

Subfamily Melanotinae Candèze, 1859 (1856)

***Melanotus dichrous* (Erichson, 1841)**
(Fig. 7)

Material examined. MALTA: B'Kara, 17.vi.1993, 1 ex., attracted to light, DM; Wied tal-Isqof, 16.vii.2002, 13 exs., attracted to light, DM; Buskett, 15.viii.2004, 1 ex., PS; Rabat, 20/22.vi.2003/4, 3 exs., PS (NMNH); Wied tal-Isqof, 28.vi.2002/2.viii.2002/25.vii.2007, 9 exs., PS (NMNH); Mellieħa, Kortin, 22-28.vii.2004, 3 exs., UV light trap, HBB (NMNH).

Notes. *Melanotus dichrous* represent a new record for Malta. It is a widespread species in southern Europe, Asia Minor, North Africa and it was also introduced to North America and the Azores Islands. It is generally commonly found in most habitats especially in July and August. Adults are particularly attracted by light sources, and larvae live in the ground (Platia, 1994). An occasional infestation of potato crop by wireworms was observed in the Wied tal-Isqof area in Malta (DM, *personal observations*, 2002) and most likely it was due to *M. dichrous*.

Subfamily Denticollinae Stein & J. Weise 1877 (1856)

***Harminius spiniger* (Candèze, 1860)**
(Fig. 8)

Material examined. MALTA: Bingemma, 10.ix.2001, 3 exs., attracted to light, DM; B'Kara, private gardens of Dar tal-Kleru, 21.ix.1989, 1 ex., on flowers of cruciferous plants, DM; Kalkara, 15.ix.1993, 1 ex., DM; Rabat, 20.viii.2002, 1 ex., DM; Rabat, 28.ix.2000/14.xii.2002/15.ix.2003/3.x.2003, 12 exs., PS (NMNH); Mellieħa, Kortin, 15-25.ix.2004/2-7.x.2004/10-13.ix.2005/9.x.2005/25.viii.2006, 15 exs., all collected with UV light traps, HBB (NMNH); Wied Babu, 15.ix.1995, 1 ex., DM; Zejtun, 7.x.1993/20.ix.1997, 2 exs., DM.

Notes. *Harminius spiniger* was recorded by Cameron & Caruana Gatto (1907) under its synonym, *Athous castaneus* Fairmaire, 1851. They recorded the species in September and November from Attard, Gbir and Salina. Platia (1985) confirmed the presence of this species in Malta and it was reported as occurring in Malta in both the Fauna Europaea database and in the Catalogue of Palaearctic Coleoptera. The distribution of this species is confined to Italy, Malta and Algeria.

Subfamily Cardiophorinae Candèze, 1860

***Cardiophorus belonis* Desbrochers des Loges, 1870**
(Fig. 9)

Material examined. MALTA: 56 exs., G.C. Champion coll., B.M. 1927-409 (BMHN); Bidnija, 1.iv.2002, 1 ex., DM; Blata l-Bajda, 30.iii.1990, 1 ex., in disturbed ground at Marija Regina Junior Lyceum School near wood, DM; St. Thomas Bay, Tal-Munxar, 30.i.1990/20.

iv.1991/20.iv.1996, 6 exs., DM; M'Xlokk, 26.iii.1994, 1 ex., near saltmarsh vegetation, DM; Mdina, 29.iii.2002, 1 ex., DM ; Baħrija, 20.iv.2002, DM, 1 ex.; Zurrieq, Wied Babu, 26.iii.2010, 1 ex., DM.

Notes. *Cardiophorus belonis* was recorded by Cameron & Caruana Gatto (1907) from Gozo. Its presence in Malta was reported by both the Fauna Europaea database and the Catalogue of Palaearctic Coleoptera. The female genitalia of this species was studied by Dr Giuseppe Platia (G. Platia, *personal communication*, 2012) who confirmed the validity of this species which is closely related to *Cardiophorus vestigialis* Erichson, 1840. The species seems to be found in diverse habitat types and is endemic to the Maltese Islands.

Cardiophorus exaratus Erichson, 1840
(Fig. 10)

Material examined. MALTA: Mellieħa, 16.iii.1992, 5 exs., leg. Messutat (coll. Messutat and Wurst); Mellieħa Bay, near Mellieħa Holiday centre, 26.iii.2004, 2 exs., HBB (NMNH). **GOZO:** Ramla, 15.iv.1994/3.v.1997/26.iii.2012, 9 exs., in coastal sand dunes, DM.

Notes. *Cardiophorus exaratus* was reported from the Maltese Islands by Platia (2008). This species is to be found in less disturbed coastal sand dunes of the Mediterranean area from where it is reported from France, Greece, Italy, Portugal, Spain, Algeria and Tunisia. Two subspecies are known, the nominal one to which the Maltese material belongs and *C. exaratus tenueseriatus* Cobos, 1958, which is so far reported only from Morocco.

Cardiophorus ulcerosus Gené, 1836
(Fig. 11)

Material examined. MALTA: Baħrija, 20.iv.2002, 2 exs., DM; Bidnija, 1.i.1996/30.ix.1997/1.iv.2002, 9 exs., DM; Buskett, Wied il-Luq, 18.v.2003, 1 ex., DM; Rabat, 5.iv.1990, 1 ex., in disturbed grounds at gardens of St. Paul's Missionary College, DM; Lija, Mosta road, 3.vi.2005, 1 ex., HBB (NMNH); Landrijiet, 9.v.2004, 1 ex., HBB (NMNH); Rabat, 19.v.2003, 1 ex., PS (NMNH) ; St. Thomas Bay, Tal-Munxar, 20.iv.1991/28.iv.2002, 3 exs., DM; Mellieħa, Gnien Ingraw, 1.v.2004, 1 ex., HBB (NMNH); Mellieħa, Kortin, 16.v.2004/20.vi.2005, 2 exs., HBB (NMNH); Zejtun, 15.v.1989/7.v.1990/1.v.1998, 3 exs., DM; Zejtun, 13.iv.2002, 1 ex., sifting leaf litter under *Ceratonia siliqua*, DM. **GOZO:** Mgarr ix-Xini Valley, 19.iv.1990, 1 ex., DM; Ramla, 30.iii.2002, 1 ex., DM; Wied tax-Xlendi, 17.iv.1990, 1 ex., DM.

Notes. The presence of *C. ulcerosus* in Malta was reported by both the Fauna Europaea database and the Catalogue of Palaearctic Coleoptera. This species was previously reported from Malta as *C. argiolus* (Gené, 1836) (Cameron & Caruana Gatto, 1907; Platia, 1985) but these records should all refer to *C. ulcerosus*. The record of *C. argiolus* in the Catalogue of Palaearctic Coleoptera is also incorrect as already pointed out by Platia (2011). *Cardiophorus ulcerosus* is known from Sardinia, Corsica, southern Italy, Sicily, Malta and Tunisia, whereas its presence in Algeria and Morocco requires validation (Platia, 1994).

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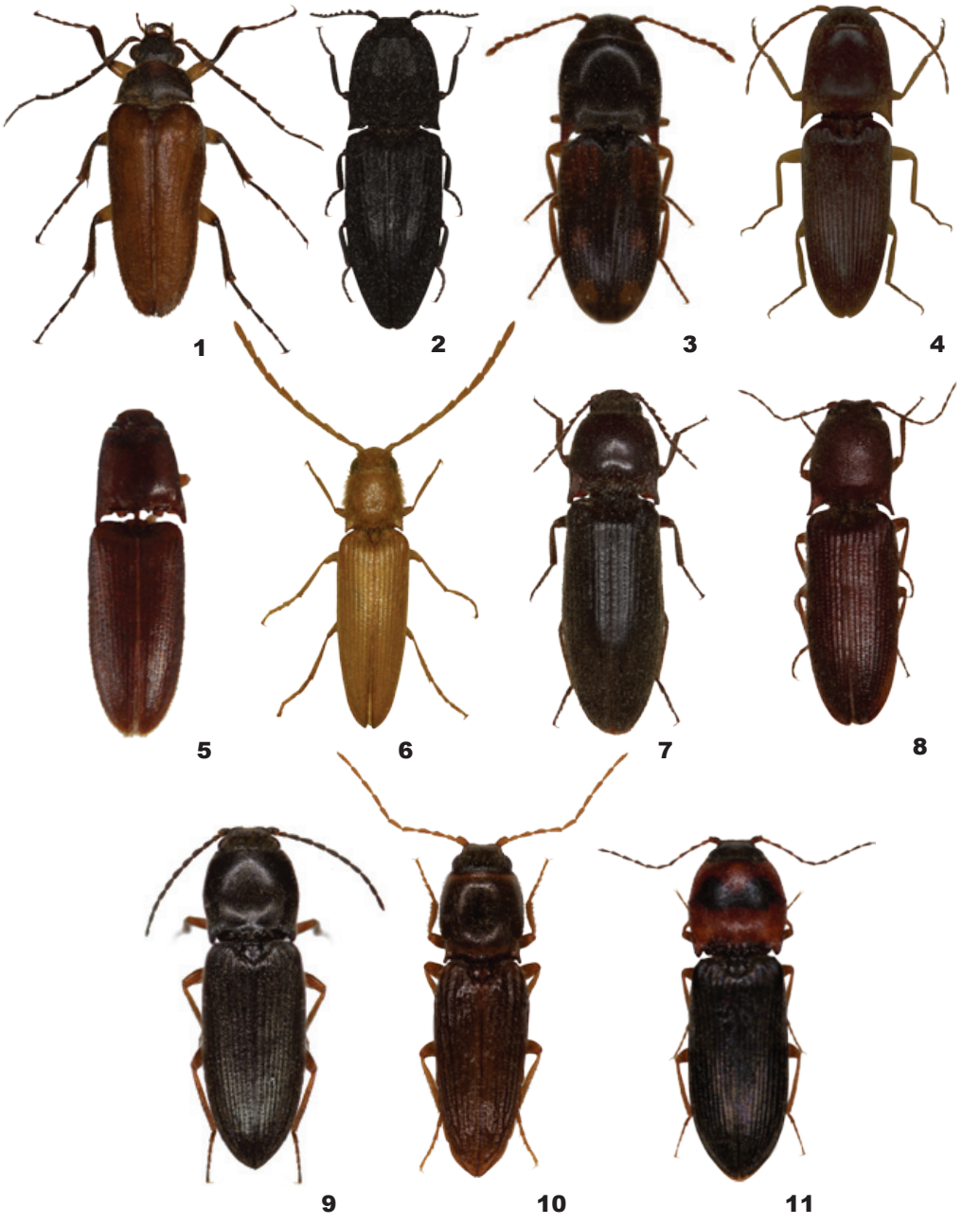

Figure 1: *Cebrio* cf. *fiorii*; **Figure 2**: *Lacon punctatus*; **Figure 3**: *Drasterius bimaculatus*; **Figure 4**: *Conoderus posticus*; **Figure 5**: *Haterumelater schembrii* (Holotype); **Figure 6**: *Isidus moreli*; **Figure 7**: *Melanotus dichrous*; **Figure 8**: *Harminius spiniger*; **Figure 9**: *Cardiophorus belonis*; **Figure 10**: *Cardiophorus exaratus*; **Figure 11**: *Cardiophorus ulcerosus*.

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