The Brentidae of Israel (Coleoptera: Curculionoidea)

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This contribution is published to honor Prof. Vladimir Chikatunov, a scientist, a colleague and a friend, on the occasion of his 80th birthday.

The Brentidae of Israel (Coleoptera: Curculionoidea)

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ABSTRACT

The six species of Brentidae occurring in Israel are reviewed, and an identification key and distributional maps are provided. Three species—*Amorphocephala excantator* (Damoiseau, 1964), *Amorphocephala sulcata* (Calabresi, 1920) and *Eremoxenus chan* Semenow, 1892—are newly recorded from Israel. *Amorphocephala arabica* Damoiseau, 1964 is considered a junior synonym of *Amorphocephala sulcata* (Calabresi, 1920).

KEYWORDS: Biodiversity, Brentidae, beetles, straight-snouted weevils, Middle East, Palearctic, fauna, identification key, new records, synonymy.

INTRODUCTION

The Brentidae, or straight-snouted weevils, is a small family of Curculionoidea beetles containing about 1800 species (Sforzi & Bartolozzi 2004; Sforzi *et al.* 2014), predominantly occurring in tropical and subtropical regions. Brentids are characterized by a long narrow body, non-geniculated and usually 11-segmented antennae, and by the absence of the labrum and the maxillary and labial palps. The eyes are rounded, not granulate, but rather with a very smooth, crystalline-like coating. Members of some tribes exhibit a strong sexual dimorphism, mainly in the shape of the rostrum: males have a broad rostrum with large mandibles, whereas females have a long and slender rostrum with pincer-shaped mandibles, used for boring holes deep in the wood of dead or decaying trees for laying eggs. The length of most species ranges from 4–20 mm, with some Indo-Pacific brentids reaching 80 mm. Adults feed on fungi and sap exuding from trees, whereas species of the tribe Eremoxenini are myrmecophilous.

The phylogenetic status of the Brentidae within the Curculionoidea has always been highly debatable. Since the first ever checklist published on the Brentidae (Schoenfeldt 1908), attempts were made to widen the family concept and to consolidate Brentidae with their sister families Apionidae and Nanophyidae (e.g. Morimoto 1962; Kuschel 1995; Thompson 1992). In the last decades, the Brentidae are treated in the wide sense, including as subfamilies, besides the Brentinae s. str., several sister-groups of primitive weevils: those with a long trochanter, some of them originally treated as separate families (e.g. Apioninae, Nanophyinae), others

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usually considered within the Brentidae s. str. (e.g. Cyladynae, Eurychinae), and those with a short trochanter (Ithycerinae) (Alonso-Zarazaga *et al.* 2017; Bouchard *et al.* 2011; Oberprieler *et al.* 2007; Oberprieler 2014). This view is also supported by the recent molecular data (e.g. Gunter *et al.* 2015; McKenna *et al.* 2009; Winter *et al.* 2017). However, the debates concern the taxonomic rank of the Brentidae s. str., and not their monophyly. Therefore, in this work, I prefer to follow the classification of the Brentidae s. str. proposed by Sforzi and Bartolozzi (2004), where a detailed historical overview of the classification of the family and morphological analysis can be found.

Although several researchers collected in the Middle East (including Palestine) in the 19th and early 20th centuries, very few records of Brentidae exist in publications dealing with the fauna of Israel. Bedel (1878) recorded *Eupsalis reichei* (Fairmaire, 1859) (later placed in the genus *Orfilaia* Haedo Rossi, 1955). Bodenheimer (1937) mentioned *Symmorphocerus piochardi* (Bedel, 1878) (placed now in the genus *Amorphocephala* Damoiseau, 1966) and *Eupsalis reichei*, most likely based on the collection of the Department of Agriculture in Jerusalem (the collection was later partly delivered to the Hebrew University of Jerusalem, and then to the Tel Aviv University, and partly to the Ministry of Agriculture, Bet Dagan; the appropriate specimens were probably lost). Bytinski-Salz and Sternlicht (1967) recorded *Amorphocephala coronata* (Germar, 1817) and *Eupsalis reichei* as associated with oak in Israel. Schedl (1970), in his papers on the West Palearctic region, first recorded only *Eupsalis reichei* from Israel, and later (Schedl 1975*a*) added a second species, *Amorphocephala coronata*. These two species were subsequently recorded from Israel by Sforzi and Bartolozzi (2004) and by Sforzi (2011). Most recently, updated records of Brentidae from Israel were provided by Alonso-Zarazaga *et al.* (2017), who notes three species, *Orfilaia reichei*, *Amorphocephala coronata* and *Amorphocephala piochardi*.

The objective of the present paper is to summarize information on all records of brentids collected in Israel and provide an identification key to facilitate future research.

MATERIALS AND METHODS

Most of the studied material is deposited in the National Collection of Insects, the Steinhardt Museum of Natural History, National Research Center, Tel Aviv University, Israel (SMNHTAU). Otherwise, the examined specimes are deposited in the following collections:

BMZC – Beit Margolin Zoological Collection, Oranim Academic College, Israel;
BOC – Benjamin Orbach collection, Haifa, Israel;
EOC – Eylon Orbach collection, Qiryat Tiv'on, Israel;
MZUF – Zoological Museum of the University of Florence, Italy;
PPIS – Plant Protection and Inspection Services, Ministry of Agriculture, Bet Dagan, Israel.

Distribution maps are based on the *Fauna Palaestina Committee* map of the Israel and Sinai regions. Transliterated names of localities in Israel follow the *Israel Touring Map and List of settlements* published by the Survey of Israel (2009). Where names of localities have changed, the most recent transliterated Hebrew names are given followed by the old names in brackets, e.g. Sha'ar haGay [Bab elWad]. Erroneous or alternative spellings are also included in brackets following the correct spelling. Classification and nomenclature used in this paper follow Sforzi and Bartolozzi (2004) and Alonso-Zarazaga *et al.* (2017). Distribution of species follows Alonso-Zarazaga *et al.* (2017), with countries being listed in the alphabetical order. A full-annotated synonymy is given for each taxon.

TAXONOMY

Key to the Brentidae of Israel

1 Tarsomere 3 depressed, bilobed, distinctly wider than segment 2 ..... *Orfilaia reichei* (Fairmaire)
– Tarsomere 3 more or less laterally compressed and not bilobed 2
2 Pronotum cordiform ..... *Eremoxenus chan* Semenow
– Pronotum not cordiform 3
3 Mesorostral plate dorsally with narrow median vertical ridge, which extends over and partially fused with metarostrum ..... *Amorphocephala piochardi* (Bedel)
– Mesorostral plate without such ridge, metarostrum deeply excavated 4
4 Pronotum with median basal groove, antennal articles 2–10 sharply truncate distally ..... *Amorphocephala sulcata* (Calabresi)
– Pronotum without median basal groove, antennal articles 2–10 not truncate distally 5
5 Mandibles short, strongly curved with left one overlapping the right one in male, mesorostral plate subsquare, antennomeres 4–8 moniliform ..... *Amorphocephala coronata* (Germar)
– Mandibles long in male, mesorostral plate wider than long, antennomeres 4–8 subsquare ..... *Amorphocephala excantator* (Damoiseau)

Subfamily Brentinae Billberg, 1820
Tribe Arrhenodini Lacordaire, 1866
Genus *Orfilaia* Haedo Rossi, 1955
Orfilaia reichei (Fairmaire, 1859)

(Figs 1, 2, 15)

Arrhenodes reichei Fairmaire, 1859: 164.

Eupsalis reichei: Lacordaire 1866: 430; Bedel 1878: 185; Power 1879: 495; Schönfeldt 1910: 23 (catalog); Kleine 1917: 99 (redescription, key), 1938*b*: 94 (catalog); Bodenheimer 1937: 150; de Muizon 1960: 183; Bytinski-Salz & Sterlicht 1967: 135; Schedl 1970: 101 (drawings).

Orfilaia reichei: Haedo Rossi 1955: 63; Damoiseau 1967: 366 (redescription); Sforzi & Bartolozzi 2004: 233; Sforzi 2011: 143; Alonso-Zarazaga *et al*. 2017: 95.

Material examined: Israel: *Har Hermon*: 1♀ Mt. Hermon, 28.vii.1970, A. Freidberg. *Upper Galilee*: Elon, 1♀ 4.ix.1941, H. Bytinski-Salz; 1♂ iv.1944, H. Bytinski-Salz, ex *Camponotus fellah* nest. *Jordan Valley and Southern Golan*: 1♂ 'En Gev, v.1960 (BMZC). *Carmel Ridge*: Zikhron Ya'aqov, 1♂ 10.v.1953, J. Kugler; 1♀ 10.v.1956. *Yizre'el Valley*: 1♀ Bet haShitta, 13.vi.1954; *Samaria*: 1♀ Nahal Tirza (Wadi Faria), 6.iii.1974, D. Furth. *Central Coastal Plain*: Hadera, 1♀ 14.vii.1956, J. Wahrman; 1♀ 28.iv.1979, D. Furth; 2♂ 1♀ Mikhmoret, 6.vi.1981, Q. Argaman; 1♂ Kefar Vitkin, 15.vi.1954 (BMZC); Avihayil, 1♂ 1♀ 21.iii.1960, Tami; 1♀ 4.iv.1969; 1♀ 20.vi.1960 (PPIS); Netanya, 1♂ 6.x.1950, J. Wahrman;

Figs 1–4: (1) *Orfilaia reichei* male, habitus; (2) *Orfilaia reichei* female, head and pronotum; (3) *Amorphocephala coronata* male, head and pronotum, Syria; (4) *Amorphocephala coronata* female, head and pronotum, Turkey.

1♂ 17.v.1984, J. Halperin, *Delonix regia*; Herzliyya, Nof Yam, 1♂ 6.viii.1956; 1♀ 12.vii.1958; Herzliyya, 2♂ 15.viii.1978; 1♂ 17.viii.1978; 1♂ 1♀ 28.vi.1984, A. Freidberg; 2♀ Zofit, 19.viii.1980, Katznelson; Kefar Sava, 1♂ 30.v.1955, J. Halperin (EOC); 1♀ 6.vii.2001, Y. Malihi; 1♂ Tel Aviv, Ramat Aviv, 1.v.2001, V. Chikatunov, light trap; 2♀ Tel Aviv Univ., 10.vii.2001, Y. Malihi; Tel Aviv Univ., Botanical Garden, 1♂ 20.vii.2006, W. Kuslitzky; 1♂ 1.v.2007, W. Kuslitzky, light trap; 3♀ 20.iv.2007, W. Kuslitzky, light trap; 1♂ 19.vii.2007, W. Kuslitzky, light trap; Tel Aviv, 1♀ 7.viii.1940; 1♂ 4.vi.1946; 1♀ 5.vii.1946; 1♂ 11.viii.1948; 1♂ 4.viii.19[??], H. Bytinski-Salz; 1♀ 23.vi.1952, J. Krystal; 1♂ 5.iv.1958; 1♀ 18.iv.1958, J. Krystal; 1♀ 28.viii.1959, J. Kugler; 1♂ 5.vi.1961; 1♂ 7.vi.1961; 1♂ 2♀ 10.vi.1962, H. Bytinski-Salz; 1♂ 10.v.1967, J. Kugler; 1♂ 2–3.vii.1967, D. Eisikovitsh, light trap; 2♀ 19.x.1969, D. Gerling; 1♂ 25.iii.1971, D. Gerling; 1♂ 2♀ 4.v.1971, D. Gerling, light trap; 1♀ 7.vi.1971, light trap, 1♀ 30.vi.1971, Adam; 1♂ 10.vi.1974, Z. Feler; 1♂ 2♀ 28.viii.1977; 1♂ 6.vii.1978, A. Freidberg; 1♂ 17.vi.1984, J. Halperin, *Delonix regia*; 1♂ 25.viii.1985; 1♀ 19.v.1987, A. Shlagman; 1♀ 7.v.1989, G. Tchetchik (EOC); 1♀ 3.vii.1991, D. Rauscher; 1♂ 6.vi.1995, A. Freidberg; 1♂ 10.vi.1995, V. Chikatunov; 2♀ 2.x.2002, V. Kravchenko, V. Chikatunov, light trap; 2♂ 3♀ 12.xi.2002, V. Kravchenko, V. Chikatunov; 1♂ Bene Beraq, 20.v.1975, M. Kaplan; 1♂ Giv'atayyim, 14.iv.1960, Z. Shoham; 1♂ 7.vi.1991, B. Orbach (BOC); 1♂ 1♀ Ramat Gan, 10.viii.1956, L. Fishelsohn; 1♀ 26.iv.1965, J. Kugler; 1♂ Petah Tiqwa, 15.v.1961, J. Halperin; 1♂ 3.vii.1968, Nitman; 2♂ Savyon, 2.viii.1982, Y. Zvik. *Southern Coastal Plain*: 1♂ Miqwé Yisra'él, 18.viii.1970, D. Gerling; Lod, 1♂ 2♀ 3.vi.1997, V. Chikatunov; 1♂ 20.vi.1997, V. Chikatunov; 1♀ Rishon leZiyyon, 17.vi.19[??], Y. Aronsohn; Rehovot, 1♂ vii.1940, Bytinski-Salz; 1♂ 10.v.1954, J. Halperin; 1♂ 20.v.1954, J. Halperin; 1♀ 30.v.1954, J. Halperin; 1♀ iv.1957; 1♀ ix.2016, W. Kuslitzky, ex *Ricinus communis*; 1♂ 10.xi.2016, W. Kuslitzky, ex *Ricinus communis* stem, 23.xi.2016; 1♀ 18.xii.2016; 1♀ Giv'at Brenner, 4.vii.1976, D. Furth; 3♂ 3♀ Yavne, 11.vii.1981, Q. Argaman; 1♀ Nizzanim, 28.v.1996, M. Varon; 1♀ 2.iv.2001, V. Chikatunov, light trap; 1♂ 4.vi.2002, L. Friedman; 3♂ 6♀ 30.viii.2002, V. Kravchenko, V. Chikatunov; 3♂ 4♀ 5.x.2002, V. Kravchenko, V. Chikatunov, light trap; 1♂ 8.vi.2004, I. Zonstein; 1♀ 6.vi.2006, I. Peled; 1♂ 20.vi.2019, UV light, E. Orbach (EOC). *Foothills of Judea*: Rosh ha'Ayin, Migdal Afeq [Migdal Zedek], 1♀ 5.viii.1985, I. Nussbaum; 1♂ 15.x.1994, V. Chikatunov; 1♂ Be'erot Yizhaq, 12.vi.1971, Z. Shoham; 1♀ Sha'ar haGay [Bab elWad], 12.ix.1946, Bytinski-Salz; 1♀ Horbat Bet Natif, 21.iv.1962, J. Wahrman. *Judean Hills*: 1♂ 1♀ Yerushalayim [Jerusalem], A. Boucard (MZUF); 1♂ Yerushalayim, 20.vi.1991, J. Halperin. *Dead Sea Area*: 'En Gedi, 1♂ 26.iii.1957, A. Shulov; 1♂ v.1960; 1♀ 21.v.1966, H. Bytinski-Salz; 1♀ 9.vii.1968; 1♂ 29.vii.1968; 1♀ 16.viii.1968, M. Samocha; 3♂ 4♀ 10.iv–9.ix.1977, J. Halperin, ex *Moringa peregrina* (EOC); 1♀ 14.v.1995, D. Furth, at light; 2♀ 1–20.v.2002, V. Kravchenko; 1♂ 23.vii.2002, V. Kravchenko, light trap; 4♂ 9♀ viii.2002, V. Kravchenko; 1♀ 30.viii.2002, Kravchenko, V. Chikatunov; 1♀ 25.ix.2002, M. Weinstein; 2♂ 5.x.2002, Kravchenko, V. Chikatunov; 7♂ 8♀ 15.x–15.xi.2002, V. Kravchenko, light trap; 1♀ 15.iv.2016, T. Eshkoly. *Northern Negev*: 1♀ Ruhama, 1.vi.1995, I. Kovatch (EOC); Negba, 1♂ 10.vii.1970; 1♀ 17.viii.1970, Z. Shoham. *'Arava Valley*: 1♂ 1♀ 'En Yahav, 3.ix.1967, P. Amitai. *Unknown locality*: 1♂ Wadi Machrali, 23.i.1958, A. Shulov.

Distribution: Cyprus, Greece (Crete), Israel, Spain, Syria, Tunisia, Turkey.

Comments: About 60 adults emerged from *Moringa peregrina* cut between June 1976 and January 1977 in 'En Gedi (J. Halperin, pers. comm., 1981).

Tribe Eremoxenini Semenow, 1892
Genus *Amorphocephala* Damoiseau, 1966
Amorphocephala coronata (Germar, 1817)

(Figs 3, 4)

Brentus coronatus Germar, 1817: 247.
Brentus italicus Guérin-Méneville, [1833]: pl. 36, [1844]: 139 (syn.).
Arrhenodes coronatus: Gyllenhal 1833: 330.
Amorphocephalus coronatus: Gyllenhal 1840: 487; Bytinski-Salz & Sterlicht 1967: 135.
Amorphocephala coronata: Damoiseau 1966: 307; Schedl 1975*a*: 31; Sforzi & Bartolozzi 2004: 288; Sforzi 2011: 143; Alonso-Zarazaga *et al.* 2017: 95.

Distribution: Albania, Algeria, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, France, Greece, Italy (incl. Sardinia and Sicily), Iran, Israel (?), Lebanon, Montenegro, Morocco, North Macedonia, Portugal, Spain, Syria, Turkey.

Biology: Myrmecophilous.

Comments: *Amorphocephala coronata* was recorded for the first time from Israel by Bytinski-Salz and Sternlicht (1967). Schedl (1975*a*) mentioned *A. coronata* as occurring in Israel, and all subsequent published records of this species in Israel were most likely based on the above citations.

I have found no representatives of this species collected in Israel in any collection in Israeli or European institutions, and it is possible that records of *A. coronata* from Israel were based on misidentifications.

However, we cannot exclude this species from the checklist, until more material collected in Israel in the past is recovered. Moreover, reporting of *A. coronata* in Lebanon for the first time recently (Bartolozzi *et al.* 2012) widens its distribution, and encounter of this species in Israel is possible in future.

Therefore, *Amorphocepala coronata* is kept—although with some doubts—in the list of Brentidae occurring in Israel for the time being.

Amorphocephala excantator (Damoiseau, 1964)

(Figs 5, 6, 15)

Amorphocephalus excantator Damoiseau, 1964: 425.
Amorphocephala excantator: Damoiseau 1979: 9 (key, catalog); Sforzi & Bartolozzi 2004: 290.

Material examined: Israel: *Har Hermon*: 1♂ Har Hermon, 1600 m, 14.v.1996, V. Chikatunov. *Golan Heights*: 2♂ Buq'ata, 1.viii.2002, V. Kravchenko, V. Chikatunov; 2♂ Ya'ar Odem, 400 m, 10–14.v.1996, G. Magnani (EOC); 1♂ Merom Golan, 15.ii.1987, G. Gisis; 1♀ Nahal Mezar Nature Reserve, 7.viii.2008, E. Orbach (EOC). *Lower Galilee*: 2♂ Allonim, 7.ix & 11.ix, H. Bytinski-Salz; 1♂ Qiryat Tiv'on (Ramat Hadassa), ix.1953; 2♀ Qiryat Tiv'on (Oranim), 9.vi.1960 & 6.v.1962, Ch. Sandler (BMZC); 5♂ 7♀ Qiryat Tiv'on, 18.v.1958, M. Sternlicht (1♂ 1♀, PPIS), 8.i.1962, J. Halperin (1♀, EOC), 1♂ 6.vi.1964, J. Halperin, 1♀ 30.viii.1985, 1♂ 6.viii.1986, 1♀ 4.ix.1988, 1♂ 24.iv.1989, 1♀ 5.v.1989, 1♀ 12.vi.1994, 1♀ 7.viii.1994, 1♂ 25.ix.1995, E. Orbach (EOC); 1♂ 1♀ Sha'ar ha'Amaqim, 9.viii.2000, B. Orbach (1♀, BOC), 9.viii.2000, E. Orbach (1♂, EOC); 4♂ 5♀ Allonim Hills, 19.vii.2000 (1♂), 10.vii.2001 (1♀), 23.vii.2001 (2♂), 8.viii.2001 (1♂), B. Orbach (BOC), 8.viii.2001, E. Orbach (4♀, EOC). *Carmel Ridge*: 2♀ Har haCarmel, 17.vi.1946, H. Bytinski-Salz.

Distribution: Israel (new record), Jordan.

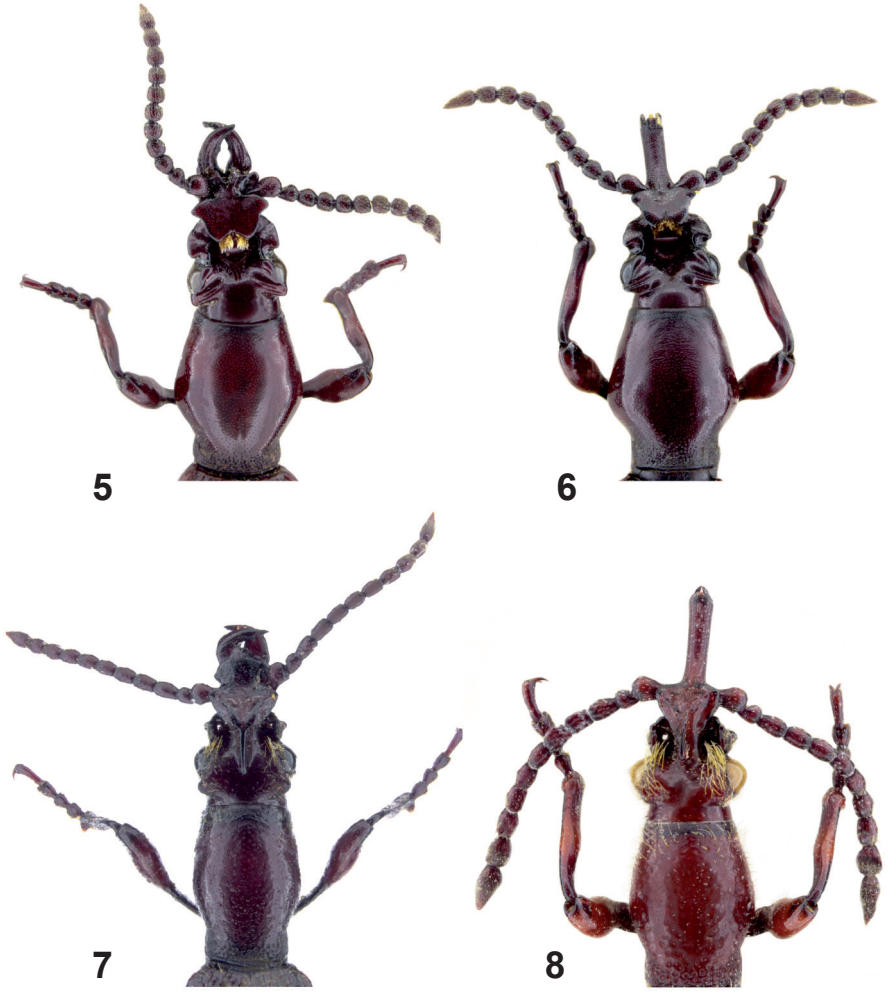
Biology: Myrmecophilous.

Comments: While comparing a series of *Amorphocephala coronata* recently collected in Syria, and additional specimens from Turkey, Iran, Italy and Greece with specimens from Israel, it became clear to me that those collected in Israel were actually a different species. I compared the female specimens from Israel with the paratype female of *Amorphocephala excantator*, deposited in the Hungarian Natural History Museum in Budapest, described and known so far only from Jordan, and I verified that the specimens were identical. Therefore, all the material from Israel checked by me and incorrectly attributed to as *A. coronata* is actually *A. excantator*.

Amorphocephala piochardi (Bedel, 1878)

(Figs 7, 8, 16)

Amorphocephalus piochardi Bedel, 1878: 184 (description of female); Mantilleri 2012: 402 (n. comb.); Alonso-Zarazaga *et al.* 2017: 95.
Symmorphocerus piochardi: Power 1879: 488; Schönfeldt 1910: 19 (catalog); Bodenheimer 1937: 150; Kleine 1938*b*: 77 (catalog); Schedl 1970: 102; Damoiseau 1979: 4; Sforzi & Bartolozzi 2004: 320.
Amorphocephalus (Symmorphocerus?) piochardi: Baudi 1894: 10 (description of male).
Amorphocephalus piliger Desbrochers des Loges, 1895: 99; Pic 1905: 280 (syn.).
Symmorphocerus saalasi Sahlberg, 1913*a*: 61; Schedl 1970: 102 (syn.).



Figs 5–8: Head and pronotum: (5, 6) *Amorphocephala excantator* male (5) and female (6); (7, 8) *Amorphocephala piochardi* male (7) and female (8).

Amorphocephalus unionis Sahlberg, 1913*b*: 201; Schedl 1970: 102 (syn.).
Amorphocephalus muchei Hertel, 1961: 117 (drawings), 1964: 167; Schedl 1970: 102 (syn.).
Amorphocephalus muchei cretensis Hertel, 1964: 167; Schedl 1970: 102 (syn.).

Material examined: Israel: *Har Hermon*: 2♂ Har Hermon, 1600 m, 14.v.1996, V. Chikatunov. *Golan Heights*: 1♂ Nahal Meshushim, 22.v.2000, E. Orbach (EOC); 1♂ Panyas [Banias], 30.vii.2002, V. Kravchenko, V. Chikatunov. *Lower Galilee*: 1♂ Qiryat Tiv'on (Oranim), 15.viii.1958, Ch. Sandler (BMZC); 4♂ 1♀ Qiryat Tiv'on, 30.viii.1985 (1♀), 5.vi.1986 (1♂), 13.iv.1989 (1♂), 4.viii.1994 (1♂), 30.viii.2019 (1♂), E. Orbach (EOC); 2♂ 1♀ Allonim Hills, 19.vii.2000, B. Orbach (1♂ 1♀, BOC), 10.vii.2001, E. Orbach (1♂, EOC).

Distribution: Cyprus, Greece (Crete), Israel, Jordan, Lebanon, Sudan (?), Syria, Turkey.

Biology: Myrmecophilous.

Amorphocephala sulcata (Calabresi, 1920)

(Figs 9, 10, 16)

Amorphocephalus sulcatus Calabresi, 1920: 64; Kleine 1938*a*: 16 (key), 1938*b*: 86 (catalog); Gridelli 1939: 454; de Muizon 1950: 212, 1960: 165; Schedl 1970: 97.
Amorphocephala sulcata: Damoiseau 1967: 427, 1979: 9 (key, catalog); Schedl 1975*a*: 33 (drawings); Sforzi & Bartolozzi 2004: 292.
Amorphocephalus arabicus Damoiseau, 1964: 428.
*Amorphocephal*a *arabica*: Damoiseau 1979: 9 (key, catalog); Sforzi & Bartolozzi 2004: 287. **n. syn.**

Material examined: Israel: *'Arava Valley*: 'Iddan, 4♂ 6♀ 18.iv.1999; 1♀ 17.v.1999; 1♀ 12.viii.1999; 1♂ 4.vi.2000, I. Yarom, V. Kravchenko; 1♂ 2♀ 16.v.2000, V. Kravchenko; Nahal Shezaf Natural Reserve, 1♂ 1♀ 18.v.1999; 1♀ 8.vi.1999; 1♀ 10.viii.1999; 1♂ 4♀ 12.ix.1999, I. Yarom, V. Kravchenko; 1♂ 9.v.2000, V. Kravchenko; Hazeva, 2♀ 2.ix.1976, D. Simon; 1♂ 18.x.1981, B. Shalmon; 1♀ 12.iv.1999; 1♂ 21.v.1999; 2♂ 6.vi.2000; 1♂ 1♀ 3.ix.2000; 1♀ 19.x.2000; 1♂ 1♀ 20.x.2000; 2♀ 20.iv.2001; 5♂ 7♀ 2.vi.2001; 3♂ 1♀ 10.vi.2001, I. Yarom, V. Kravchenko; Hazeva Field School, 30°46.70' N 35°14.25' E, 2♂ 1♀ 16.vii.1999; 2♀ 19.vii.1999; 1♂ 14.viii.1999; 2♀ 17.x.1999, I. Yarom, V. Kravchenko; Nahal Neqarot, 2♂ 5♀ 20.v.1999; 1♂ 10.ix.1999, I. Yarom, V. Kravchenko; 1♂ Nahal haShitta, Hwy 90, km 82, 18.vi.1999, I. Yarom, V. Kravchenko; 1♀ Gerofit, 5.xi.2002, V. Kravchenko, V. Chikatunov; Yotvata, 1♂ 1♀ 9.vi.1984, A. Venezian; 3♂ 2♀ 16.viii.1999, I. Yarom, V. Kravchenko; 1♂ Samar, 3.vi.2007, N. Ketner, light trap; 3♂ 3♀ Timna', 2.vii.2002 (1♂ 1♀), 10.viii.2002 (1♂ 1♀), 15.xi.2002 (1♂ 1♀), V. Kravchenko, V. Chikatunov. **Egypt:** *Central Sinai Foothills*: 1♂ W E'Tamaoui, 29.x.1969, G. Tsabar; 1♂ Mitmatni, 25.vi.1981, D. Simon.

Distribution: Egypt (Sinai), Eritrea, Ethiopia, Israel (new record), Libya, Niger (Aïr), Saudi-Arabia, Sudan.

Biology: Myrmecophilous.

Comments: Damoiseau (1964) described *Amorphocephala arabica* based on a single male specimen from Saudi Arabia. Calabresi (1920) described *Amorphocephala sulcata*, based on two specimens: a male from Eritrea and a female from Sudan. Sforzi and Bartolozzi (2004) selected the male as the lectotype and the female as paralectotype.

Schedl (1975*a*) synonymized *A. arabica* with *A. sulcata*. However, Damoiseau (1979: 10, footnote) stated that the synonymy was possible, but not certain, thus giving again a species status to *A. arabica*. Sforzi and Bartolozzi (2004: 287, 292) followed Damoiseau's opinion and left the two species as separate in their monograph of the Brentidae of the world.

Figs 9, 10: *Amorphocephala sulcata*, head and pronotum, male (9) and female (10).

During a survey of insects of the 'Arava Valley in 1999–2001, series of *Amorphocephala* were collected. While determining the material, I compared two males with the male holotype of *Amorphocephala arabica* deposited in the Hungarian Natural History Museum in Budapest, and found out that external details and the male genitalia were identical. I also compared females from the 'Arava Valley with the paralectotype female deposited in the Zoological Museum of the University of Florence, and they proved to be identical as well. During a visit at the Natural History Museum in Genoa (Italy), Luca Bartolozzi kindly compared for me the lectotype male of *Amorphocephala sulcata* with a male specimen of *Amorphocephala* from the 'Arava Valley identified by me as *A. arabica*, and confirmed their identity (L. Bartolozzi, pers. comm., 2005).

Therefore, *Amorphocephala arabica* (Damoiseau, 1964) is hereby considered as a junior synonym of *Amorphocephala sulcata* (Calabresi, 1920).

Genus *Eremoxenus* Semenow, 1892
Eremoxenus chan Semenow, 1892
(Figs 11–14, 16)

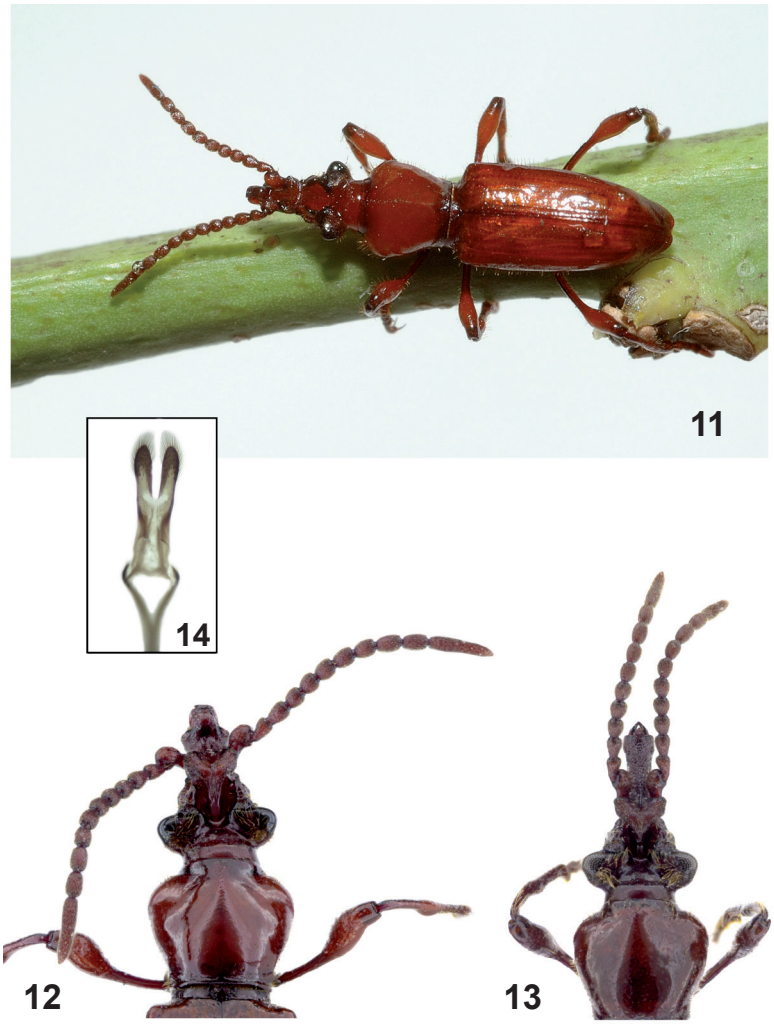
Eremoxenus chan Semenow, 1892: 440; Schedl 1975*b*: 84, 85 (redescription, drawings); Sforzi & Bartolozzi 2004: 300.

Material examined: Israel: *Southern Coastal Plain*: 1♂ Holot Nizzanim Nature Reserve, 19.vi.2008, E. Orbach, MV light trap (EOC).

Distribution: Iran, Israel (new record), Kazakhstan, Turkmenistan, Uzbekistan.

Biology: Myrmecophilous.

Comments: Schedl (1975*b*: 83, 87) regarded this species "as a Caspian faunal element sensu de Lattin (1967)", and according to the habitat collecting data as



Figs 11–14: (11) *Eremoxenus chan* male, photo Oz Rittner; (12) *Eremoxenus chan* male, head and pronotum; (13) *Eremoxenus chan* female, head and pronotum, Uzbekistan; (14) *Eremoxenus chan* male tegmen, photo Oz Rittner.

"distributed in low steppe habitats". However, the single specimen from Israel was collected in the area of sand dunes at an elevation of about 20 m.

Its occurrence in Israel is rather surprising, given a substantial distance from its known distribution. Further collecting in northwestward adjacent countries might fill the distributional gap for this species.

While studying the holotype of *Eremoxenus algirus* (Bartolozzi, 1988) described from Algeria (Natural History Museum of Denmark, University of Copenhagen),

a paratype of *Eremoxenus maroccanus* Mantilleri, 2012 described from Morocco (MZUF), a syntype of *E. chan* Semenow, 1892 described from "Transcaspian Prov." (Zoological Institute, St. Petersburg) and the specimen collected in Israel, I found some very slight morphological differences between the last one and the typical *E. chan*, differences that nevertheless appear not of specific rank.

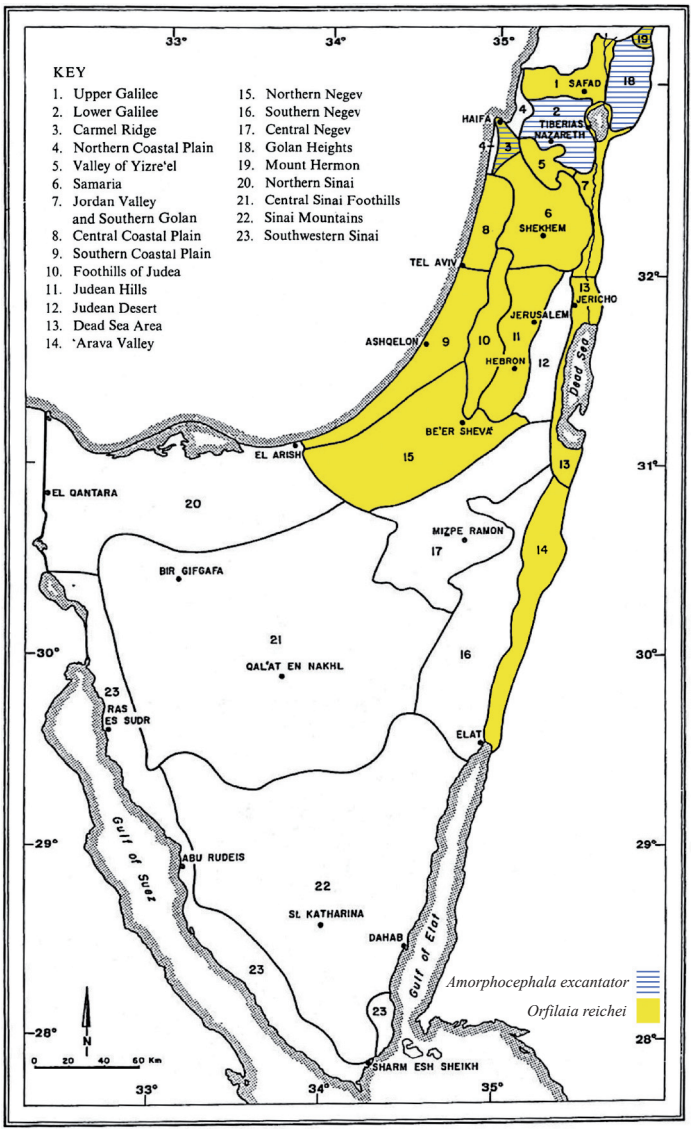


Fig. 15: Distribution map of *Orfilaia reichei* and *Amorphocephala excantator* in Israel.

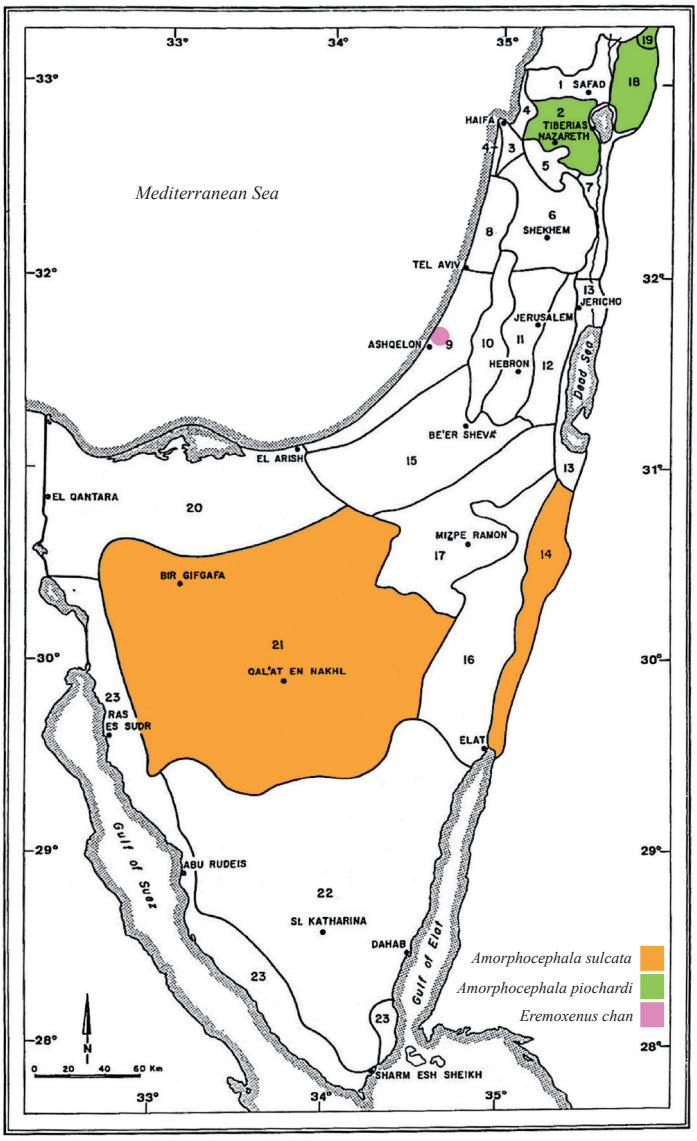


Fig. 16: Distribution map of *Amorphocephala piochardi*, *Amorphocephala sulcata* and *Eremoxenus chan* in Israel.

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REFERENCES

Alonso-Zarazaga, M.A., Barrios, H., Borovec, R., Bouchard, P., Caldara, R., Colonnelli, E., Gültekin, L., Hlaváč, P., Korotyaev, B., Lyal, C.H.C., Machado, A., Meregalli, M., Pierotti, H., Ren, L., Sáncez-Ruiz, M., Sforzi, A., Silfverberg, H., Skuhrovec, J., Trýzna, M., Velázquez de Castro, A.J. & Yunakov, N.N. 2017. Cooperative catalogue of Palaearctic Coleoptera Curculionoidea. *Monografías electrónicas de la Sociedad Entomológica Aragonesa* **8**: 1–729.
http://sea-entomologia.org/monoelec.html

Bartolozzi, L. 1988 [1987]. Descrizione di un Nuovo Brentide dell'Algeria (Coleoptera). *Bollettino della Società Entomologica Italiana* **119** (3): 155–158.

Bartolozzi, L., Drumont, A. & Kairouz, A. 2012. *Amorphocephala coronata* (Germar, 1817), espèce nouvelle pour le Liban (Coleoptera, Curculionoidea, Brentidae). *Revue de l'Association Roussillonaise d'Entomologie* **21** (2): 76–77.

Baudi, F. 1894. Viaggio del Dr. E. Festa in Palestina, nel Libano e regioni vicine. VIII. Coleotteri. *Bollettino dei Musei di Zoologia ed Anatomia comparata della Reale Universitá di Torino* **9** (173): 1–13.

Bedel, L. 1878 [1877]. [untitled]. *Bulletin de séances de la Société Entomologique de France, Annales de la Société Entomologique de France* (5) **7**: clxxxiv–clxxxv.
https://www.biodiversitylibrary.org/item/34148#page/628

Billberg, G.J. 1820. *Enumeratio insectorum in museo Gust. Joh. Billberg*. Typis Gadelianis, Stockholm, [2] + 138 pp.

Bodenheimer, F.S. 1937. Prodromus faunae Palestinae. Essai sur les élements zoogéographiques et historiques du sud-ouest du sous-régne paléarctique. *Mémoires de l'Institut d'Égypte* **33**: 1–286 + 4 figs.

Bouchard, P., Bousquet, Y., Davies, A.E., Alonso-Zarazaga, M.A., Lawrence, J.F., Lyal, C.H.C., Newton, A.F., Reid, C.A.M., Schmitt, M., Ślipiński, S.A. & Smith, A.B.T. 2011. Family-group names in Coleoptera (Insecta). *ZooKeys* **88**: 1–972.
https://doi.org/10.3897/zookeys.88.807

Bytinski-Salz, H. & Sternlicht, M. 1967. Insects associated with oaks (*Quercus*) in Israel. *Israel Journal of Entomology* **2**: 107–143.
http://doi.org/10.5281/zenodo.884134

Calabresi, E. 1920. Descrizione di due nuovi Amorfocefalini (Brentidi) dell'Africa. *Bullettino della Società Entomologica Italiana* **52**: 64–67.
https://www.biodiversitylibrary.org/item/235277#page/344

Damoiseau, R. 1964. Contribution à la connaissance des Brentidae (Coleoptera - Phytophagoidea) 17. Amorphocephalini nouveaux. *Bulletin et Annales de la Société Royale d`Entomologie de Belgique* **100** (32): 419–429.

———1966. La collection des Brentidae du Musée de Moravie á Brno (Coleoptera – Curculionoidea). *Acta Musei Moraviae* **51**: 301–312.

———1967. Monographie des Coléoptères Brentidae du Continent Africain. *Annales du Musée Royal de l'Afrique centrale, Série in - 8°, (Sciences Zoologiques)* **160**: 1–507 + I–VII pls.

———1979. Les Amorphocephalini (Coleoptera - Brentidae). 1.- *Amorphocephala* Schoenherr et sa parentèle. *Bulletin de l'Institut Royal des Sciences naturelles de Belgique* **51** (10): 1–35.

Desbrochers des Loges, J. 1895. Description d'un brenthide nouveau d'Asie-Mineure. *In*: Espèces inédites de Curculionides de l'Ancien Monde. *Le Frélon* **4** (7): 57–100.

Fairmaire, L. 1859. Diagnoses de quelques Coléoptères nouveaux. *Bulletins Trimestriels de la Société Entomologique de France, Annales de la Société Entomologique de France* (3) **7**: clxiii–clxv.
https://www.biodiversitylibrary.org/item/101295#page/845

Germar, E.F. 1817. *Reise nach Dalmatien und in das Gebiet von Ragusa*. Mit 9 illum. Kupfern und 2 charten. F.A. Brockhaus ed., Leipzig & Altenburg, pp. I–XII + 1–323.

Gridelli, E. 1939. Coleotteri del Fezzan e dei Tassili d'Aggèr (Missione Scortecci 1936). *Atti della Società italiana di Scienze naturali e del Museo Civico di Storia Naturale di Milano* **88** (4): 385–456.
https://www.biodiversitylibrary.org/item/265302#page/9

Guérin-Méneville, F.E. [1833]. *Iconographie du Règne Animal de G. Cuvier, ou représentation d'après Nature de l'une des espèces les plus remarquables, et souvent non encore figurées, de chaque genre d'animaux. Avec un texte descriptif mis au courant de la science. Ouvrage pouvant servir d'atlas à tous les traités de zoologie. Vol. 7, Insectes*. [1829–1838]. Baillière, Paris, 110 pls.

———[1844]. *Iconographie du Règne Animal de G. Cuvier, ou représentation d'après Nature de l'une des espèces les plus remarquables, et souvent non encore figurées, de chaque genre d'animaux. Avec un texte descriptif mis au courant de la science. Ouvrage pouvant servir d'atlas à tous les traités de zoologie. Insectes*. Baillière, Paris, 576 pp.

Gunter, N.L., Oberprieler, R.G. & Cameron, S.L. 2015. Molecular phylogenetics of Australian weevils (Coleoptera: Curculionoidea): exploring relationships in a hyperdiverse lineage through comparison of independent analyses. *Austral Entomology* **55** (2): 217–233.
https://doi.org/10.1111/aen.12173

Gyllenhal, L. 1833. [*A<rrhenodes>. coronatus*]. *In*: Schoenherr, C.J., *Genera et species curculionidum, cum synonymia hujus familiae. Species novae aut hactenus minus cognitae, descriptionibus a Dom. Leonardo Gyllenhal, C.H. Boheman, et entomologiis aliis illustratae*. Tomus primus. Pars prima. Roret, Paris, pp. 330–331.
https://www.biodiversitylibrary.org/item/24766#page/348

———1840. [*A<morphocephalus>. coronatus*]. *In*: Schoenherr, C.J., *Genera et species curculionidum, cum synonymia hujus familiae. Species novae aut hactenus minus cognitae, descriptionibus Dom. L. Gyllenhal, C.H. Boheman, O.J. Fahraeus et entomologiis aliis illustratae*. Tomus quintus. Pars secunda. Supplementum continens. Roret, Paris; Fleischer, Lipsiae, p. 487.
https://www.biodiversitylibrary.org/item/24768#page/499

Haedo Rossi, J.A. 1955. Notas Brentidológicas I. (Coleopt.). *Neotropica* **1** (4): 61–64.

Hertel, R. 1961. Eine neue *Amorphocephalus*-Art aus Kleinasien (Coleopt. Brenthidae). *Entomologische Abhandlungen und Berichte aus dem Staatliches Museum für Tierkunde in Dresden* **26** (14): 117–119.

———1964. *Amorphocephalus muchei cretensis* n. ssp. (Coleoptera, Brenthidae). *Reichenbachia* **4** (20): 167–170.

Kleine, R. 1917 [1916]. Die Gattung *Eupsalis* und ihr Verwandtschaftskreis. *Archiv für Naturgeschichte* A**82** (4): 55–150.
https://www.zobodat.at/pdf/Archiv-Naturgeschichte_82A_4_0055-0150.pdf

———1938*a*. Bestimmungstabelle der Brenthidae. *Entomologisches Nachrichtenblatt* **12** (1): 1–16.

———1938*b*. Coleoptera. Fam. Brenthidae, (Revision). *Genera insectorum* **207**: 1–197 + 6 pls.

Kuschel, G. 1995. A phylogenetic classification of Curculionoidea to families and subfamilies. *Memoirs of the Entomological Society of Washington* **14**: 5–33.

Lacordaire, J.T. 1866 [1865]. *Histoire naturelle des insectes. Genera des coléopères ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes. Tome septième contenant les familles des curculionides (suite), scolytides, brenthides, anthribides et bruchides*. Librairie Roret, Paris, 620 pp.

Lattin, G. de. 1967. *Grundriss der Zoogeographie*. G. Fischer Verlag, Jena, 602 pp.

Mantilleri, A. 2012. Les Eremoxenini oust-paléarctiques: une taxonomie et unediversité méconnues (Coleoptera, Brentidae). *Bulletin de la Société entomologique de France* **117** (4):

401–409.
https://www.persee.fr/doc/bsef_0037-928x_2012_num_117_4_3064

McKenna, D.D., Sequeira, A.S., Marvaldi, A.E. & Farrell, B.D. 2009. Temporal lags and overlap in the diversification of weevils and flowering plants. *Proceedings of the National Academy of Sciences of the United States of America* **106** (17): 7083–7088.
https://doi.org/10.1073/pnas.0810618106

Morimoto, K. 1962. Key to the families, subfamilies, tribes and genera of the superfamily Curculionoidea of Japan, excluding Scolytidae, Platypodidae and Cossonidae. *Journal of the Faculty of Agriculture, Kyûshû* **12** (1): 21–66.
https://catalog.lib.kyushu-u.ac.jp/opac_download_md/22693/p021.pdf

Muizon, J. de. 1950. Contribution à l'étude de l'Aïr (Mission L. Chopard et A. Villiers). Coléoptères Brenthidae. *Mémoires de l'Institut Français d'Afrique Noire* **10**: 212.

———1960. Faune des Brenthides d'Afrique. *Mémoires de l'Institut Français d'Afrique Noire* **59**: 1–256.

Oberprieler, R.G. 2014. 3.6. Brentidae Billberg, 1820. *In*: Leschen, R.A.B. & Beutel, R.G. (Eds.), *Arthropoda: Insecta: Coleoptera, Beetles, Volume 3: Morphology and systematics (Phytophaga)*. De Gruyter, Berlin, Boston, pp. 363–364.

Oberprieler, R.G., Marvaldi, A.E. & Anderson, R.S. 2007. Weevils, weevils, weevils everywhere*. *Zootaxa* **1668** (1): 491–520.
https://doi.org/10.11646/zootaxa.1668.1.24

Pic, M. 1905. Notes entomologiques diverses (Col.). *Bulletin de la Société entomologique de France* **10** (19): 279–281.
https://www.biodiversitylibrary.org/item/34157#page/297

Power, G. 1879 [1878]. Notes pour servir à la Monographie des Brenthidae. *Annales de la Société Entomologique de France* (5) **8**: 477–496.
https://www.biodiversitylibrary.org/item/34130#page/483

Sahlberg, J. 1913*a*. Coleoptera mediterranea et rosso-asiatica nova et minus cognita maxima ex parte itineribus annis 1895–1896, 1898–1899 et 1903–1904 collecta. IV. *Öfversigt af Finska vetenskaps-societetens förhandlingar* (A) **55** (8): 1–88.
https://www.biodiversitylibrary.org/item/50780#page/193

———1913*b*. Coleoptera mediterranea orientalia, quae in Aegypto, Palaestina, Syria, Caramania atque in Anatolia occidentali anno 1904 collegerunt John Sahlberg et Unio Saalas. *Öfversigt af Finska vetenskaps-societetens förhandlingar* (A) **55** (19): 1–158.
https://www.biodiversitylibrary.org/item/50782#page/453

Schedl, W. 1970. Die Brenthiden der Westpalaearktis (Coleoptera: Rhynchophora). *Beiträge zur Entomologie* **20** (1–2): 97–110.
https://doi.org/10.21248/contrib.entomol.20.1-2.97-110

———1975*a*. Neues zur Kenntnis der Brenthiden der Westpalaearktis (Coleoptera: Rhychophora, Brenthidae). *Entomologische Blätter* **71** (1): 29–38.

———1975*b*. Zur Kenntnis der Eidonomie und Verbreitung von *Eremoxenus chan* Semenow, 1892 (Insecta: Coleoptera, Brenthidae). *Berichte des Naturwissenschaftlich-medizinischen Vereins in Innsbruck* **62**: 83–88.
https://www.zobodat.at/pdf/BERI_62_0083-0088.pdf

Schönfeldt, H. von. 1908. Coleoptera. Fam. Brenthidae. *Genera Insectorum* **65**: 1–88.
https://www.biodiversitylibrary.org/item/105244#page/15

———1910. *Coleopterorum Catalogus auspiciis et auxilio W. Junk editus a S Schenkling.* Pars 7: Brenthidae. Junk, Berlin, 57 pp.

Semenow, A. 1892. De Brenthidarum genere novo palaearctico. *Horae Societatis Entomologicae Rossicae* **26** (3–4): 438–443.
https://www.biodiversitylibrary.org/item/46110#page/1002

Sforzi, A. 2011. Brentidae. *In*: Löbl, I. & Smetana, A. (Eds.), *Catalogue of Palaearctic Coleoptera*. Vol. 7. Stentrup, Apollo Books, pp. 142–148.

Sforzi, A. & Bartolozzi, L. (Eds). 2004. Brentidae of the world (Coleoptera, Curculionoidea). *Monografie Museo Regionale di Scienze Naturali, Torino* **39**: 1–976.

Sforzi, A., Bartolozzi, L. & Leschen, R.A.B. 2014. 3.6.2. Brentidae Billberg, 1820. *In*: Leschen, R.A.B. & Beutel, R.G. (Eds.), *Arthropoda: Insecta: Coleoptera, Beetles, Volume 3: Morphology and systematics (Phytophaga)*. De Gruyter, Berlin, Boston, pp. 384–395.

Survey of Israel. 2009. *Israel – Touring map. North & South sheets. List of settlements, antiquity sites and road distances*. Scale 1:250,000. The Survey of Israel, Tel Aviv.

Thompson, R.T. 1992. Obsevations on the morphology and classification of weevils (Coleoptera, Curculionoidea) with a key to major groups. *Journal of Natural History* **26** (4): 835–891. https://doi.org/10.1080/00222939200770511

Winter, S., Friedman, A.L.L., Astrin, J.J., Gottsberger, B. & Letsch, H. 2017. Timing and host plant associations in the evolution of the weevil tribe Apionini (Apioninae, Brentidae, Curculionoidea, Coleoptera) indicate an ancient co-diversification pattern of beetles and flowering plants. *Molecular Phylogenetics and Evolution* **107**: 179–190. https://doi.org/10.1016/j.ympev.2016.10.015