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AN ANNOTATED CHECKLIST OF SCIRTOIDEA (COLEOPTERA) OF IRAN

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Klausnitzer B., Ghahari H. – An annotated checklist of Scirtoidea (Coleoptera) of Iran.

The fauna of Iranian Scirtoidea (Coleoptera) is summarized in this paper. In total, three species of Clambidae (within the genus *Clambus* Fischer von Waldheim, 1821), one species of Eucinetidae (within single genus *Bisaya* Reitter, 1884), and 23 species of Scirtidae (within the genera *Contacyphon* Gozis, 1886, *Elodes* Latreille, 1797, *Hydrocyphon* Redtenbacher, 1858, *Microcara* C. G. Thomson, 1859, and *Scirtes* Illiger, 1807) are listed as members of the Iranian fauna.

KEY WORDS: Elateriformia, Clambidae, Eucinetidae, Scirtidae, distribution, new record, Iran.

INTRODUCTION

The superfamily Scirtoidea Fleming, 1821 (former Eucinetoidae) includes four families, Clambidae Fischer von Waldheim, 1821 (incl. Calyptomeridae), Decliniidae Nikitsky, Lawrence, Kirejtshuk & Gratshev, 1994, Eucinetidae Lacordaire, 1857, and Scirtidae Fleming, 1821 (= Cyphonidae, Helodidae, Elodidae) (LAWRENCE & NEWTON, 1995). Except for Decliniidae, the other families are represented in the fauna of Iran.

The family Clambidae (Minute Beetles) comprises about 150 species in five genera worldwide (LESCHEN, 2016). They vary in size from 0.7-2.0 mm, are convex and contractile, capable of deflecting their head and pronotum into a seed-like form (YOUNG, 2002b). Metacoxal plates enlarged and legs partly concealed; tarsi 4-4-4 or rarely 3-3-3; abdomen with five or six free ventrites; functional spiracles present on segment VIII (LESCHEN, 2016). They are found throughout the world on all continents (except for the Antarctic) and on many scattered and isolated islands in the Pacific and Indian Oceans (YOUNG, 2002b; MAJKA & LANGOR, 2009). Most adults are collected from decaying vegetation, leaf litter and rotten wood, and sometimes flying at dusk (YOUNG, 2002b). Most species are known to feed on microfungi or spores and hyphae on larger fruiting bodies of Ascomycetes, Myxomycetes, Basidiomycetes and Zygomycetes (LAWRENCE & NEWTON, 1980; WHEELER & HOEBEKE, 1984; LAWRENCE, 1991).

The family Eucinetidae (Plate-thigh Beetles) comprises eight genera and more than 40 valid species worldwide (VIT, 1999, 2000). Distinguishing features of adult Eucinetidae include a streamlined elliptical body and the ability to jump using their modified hind legs (KRYZHANOVSKIY, 1989; MIFSUD, 2001; MAJKA, 2010; WEBSTER *et al.*, 2012). The development of the two stages, the adults and the larvae, is strongly connected with the mould fungi, as the adults could be found also under bark or in wood of decayed trees (NIKITSKY, 1989; VIT, 2000). Little is known about the biology of these beetles, but most records result from collections made in leaf litter. In some

cases it has been asserted that these insects feed on spores of slime moulds [Myxomycetes (=Mycetozoa)] or on the fruiting bodies of basidiomycete fungi (Agaricaceae, Bolitaceae, and Coniophoraceae) (WHEELER & HOEBEKE, 1984; YOUNG, 2002a; GUÉORGUEV, 2004).

To date over than 1800 species of the family Scirtidae (Marsh Beetles) have been described. However, a total of at least 3000 species in all zoogeographic regions can be expected (KLAUSNITZER, 2016a, 2017). Important features for the specific identification of the adults (when examined externally) are: length ratios and form of the 1st-4th antennal segment, punctures of head and pronotum, shape of the pronotum, shape and hairiness of the 7th sternite, colouring (in some genera). Features which require special preparation: shape and fine structure of the 8th and 9th tergite and sternite, tegmen, penis (male), sclerites in bursa (prehensor and bursal sclerite) and the 8th sternite (female). For most species a genital preparation is necessary. Larvae are generally aquatic and frequent stagnant and flowing waters such as streams, lakes, ponds, swamps and sphagnum bogs (YOUNG, 2002c; WEBSTER *et al.*, 2012), tolerating significant fluctuations of the water level, where they gather algae and other small particles from liquid substrates (MARINONI *et al.*, 2001; YOUNG, 2002c). Sometimes larvae of some species develop in groundwater as deep as 10 meters (KLAUSNITZER & POSPISIL, 1991). Adults of some species can occur in many dry localities, including even arid places in deserts (KIREJTSHUK & NEL, 2013). Adults of some species can be predators, living under the vegetation and feeding on microinvertebrates (KLAUSNITZER, 2009b), and a few species are associated with decaying animal matter (PEREIRA FARIAS *et al.*, 2013). Regarding the Iranian fauna, KLAUSNITZER (2016b, c) listed 18 species of Scirtidae for Iran including two new species.

Iran occupies a large part of the Iranian plateau, and covers an area of 1,623,779 km². Climatologically, Iran is a predominantly arid and semi-arid country, but the northern slopes of the Alburz ranges and the Caspian lowland receive 800 to 2000 mm annual rainfall, making them the most humid parts of the country. The Dasht-e Kavir and Dasht-e

Lut deserts are the driest areas with an annual precipitation of less than 150 mm. The highlands receive between 250 and 800 mm (ZEHZAD *et al.*, 2002).

MATERIAL AND METHODS

The published data on distribution of the families Clambidae, Eucinetidae and Scirtidae (Coleoptera: Scirtoidea) in Iran are summarized by province. Genera and species are listed alphabetically. The following data are included in the catalogue for each species: (1) valid name, (2) junior synonym(s) used in literature about Iran, (3) published Iranian records arranged by province (classified by alphabetical order of Iranian province names) and the relevant references (classified by chronological order), (4) synoptic information on general distribution on a world scale and feeding habits. Data about classification, nomenclature and distribution are according to LÖBL & LÖBL (2016 for Clambidae and Eucinetidae) and KLAUSNITZER (2016a for Scirtidae); in other situations, the related references are given. When accurate data about local distribution in Iran are lacking in a quoted reference, the mention "Iran (no locality cited)" is used. Additionally, the name "Persia" (as well as its equivalent German name "Persien") has been retained

because this is traditional synonym for Iran. The provinces of Iran are represented in figure 1.

RESULTS

Totally 27 species of Scirtoidea (Clambidae: 3 species from one genus, Eucinetidae: one species, Scirtidae: 23 species from 5 genera) are represented in the Iranian fauna. *Clambus pilosellus* Reitter, 1876 (Clambidae) and *Contacyphon buceros* Nyholm, 1949 (Scirtidae) are new records for the fauna of Iran. The list of species is given below with distribution data.

Series Scirtiformia Fleming, 1821
Superfamily Scirtoidea Fleming, 1821
Family Clambidae Fischer von Waldheim, 1821
Subfamily Clambinae Fischer von Waldheim, 1821
Genus *Clambus* Fischer von Waldheim, 1821

Clambus caucasicus Endrödy-Younga, 1960
Distribution in Iran: Qazvin (SAKENIN *et al.*, 2018).

General distribution: Azerbaijan, Caucasus, Italy, Turkey.

Fig. 1 – Map of Iran with provincial boundaries.

***Clambus dux xerxes* Endrödy-Younga, 1960**

Distribution in Iran: "Persien" (Endrödy-Younga 1960), Iran (no locality cited) (KLAUSNITZER & MERK, 1987; LÖBL & LÖBL, 2016).

General distribution: Caucasus, Iran, Israel, Pakistan.

***Clambus pilosellus* Reitter, 1876 (Fig. II)**

Material examined. East Azarbaijan province, Azarshahr, 20 km E Nadiloo, 37°43'N 45°54'E, 117 m, 1 ex, 10.viii.2004. *New record for Iran.*

General distribution: Austria, Azerbaijan, Bulgaria, Croatia, Georgia, Hungary, Italy, Nepal, Romania, Slovakia, Taiwan, Turkey.

Family Eucinetidae Lacordaire, 1857

Genus *Bisaya* Reitter, 1884

***Bisaya nossidiiformis* Reitter, 1884**

Distribution in Iran: Iran (no locality cited) (LÖBL & LÖBL 2016).

General distribution: Azerbaijan, Iran.

Family Scirtidae Fleming, 1821

Genus *Contacyphon* Gozis, 1886

Comments: All the below species have been recorded from Iran under *Cyphon* spp.

***Contacyphon algenib* (Klausnitzer, 2003)**

Synonym: *Cyphon simulans* Klausnitzer, 1990: 160.

Distribution in Iran: Guilan (Klausnitzer 1990 as *C. simulans*; KLAUSNITZER 2003), Mazandaran (KLAUSNITZER, 2012b).

General distribution: Endemic to Iran.

***Contacyphon arietizans* (Nyholm, 1970)**

Distribution in Iran: Iran (no locality cited) (KLAUSNITZER, 2009b).

General distribution: Armenia, Georgia, Iran, Turkey.

***Contacyphon buceros* (Nyholm, 1949) (Fig. II)**

Material examined: Guilan province, Astara (in bogs of Mordab-Astara River), 38°20'N 48°46'E, 3 ex, 14.viii.2001. *New record for Iran.*

General distribution: Armenia, Azerbaijan, Georgia, Russia (South European Territory), Turkey.

***Contacyphon caspicus* (Klausnitzer, 1975)**

Distribution in Iran: Iran (no locality cited) (KLAUSNITZER, 2006).

General distribution: Azerbaijan (KLAUSNITZER, 1975a, 1976), Iran (KLAUSNITZER, 2006).

Comments: Occurrence of *C. caspicus* in Iran is likely, although it has not been recorded so far from any precise locality.

***Contacyphon laevipennis* (Tournier, 1868)**

Synonym: *Cyphon phragmiteticola* Nyholm, 1955.

Distribution in Iran: East Azarbaijan, Mazandaran (Klausnitzer, 1990 as *C. phragmiteticola*; KLAUSNITZER, 2012b), Guilan (Klausnitzer, 1981 as *C. phragmiteticola*; KLAUSNITZER, 2012b), Iran (no locality cited) (KLAUSNITZER, 2009b).

General distribution: Afghanistan, Albania, Armenia, Austria, Azerbaijan, Bulgaria, Byelorussia, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iran, Iraq, Israel, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Moldavia, Mongolia, Morocco, Netherlands, North Korea, Norway, Poland, Russia (Central European Territory, East Siberia,

Fig. II – a: *Clambus pilosellus* Reitter, 1876: Penis (lateral and dorsal view). b-d: *Contacyphon buceros* Nyholm, 1949 (b: Penis, c: Preensor, d: Tegmen).

North European Territory, South European Territory), Saudi Arabia, Slovakia, Spain, Sweden, Switzerland, Syria, Tadzhikistan, Tunisia, Turkey, Turkmenistan, Ukraine.

Contacyphon lepidulus (Nyholm, 1968)

Distribution in Iran: Guilan, Kordestan (KLAUSNITZER, 1990, 2012b), Iran (no locality cited) (KLAUSNITZER, 2009b; ZWICK *et al.*, 2013).

General distribution: Azerbaijan, Cyprus, Greece, Iran, Iraq, Syria, Turkey.

Contacyphon longiusculus (Nyholm, 1970)

Distribution in Iran: Mazandaran (KLAUSNITZER, 2012b), Iran (no locality cited) (KLAUSNITZER, 2009b).

General distribution: Azerbaijan, Georgia, Greece, Iran, Israel, Turkey.

Contacyphon ochraceus ochraceus (Stephens, 1830)

Distribution in Iran: Iran (no locality cited) (SHAVRIN *et al.*, 2015).

General distribution: Austria, Byelorussia, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Iran, Ireland, Italy, Kazakhstan, Latvia, Lichtenstein, Luxembourg, Netherlands, Norway, Poland, Russia (Central European Territory, North European Territory, South European Territory), Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine.

Contacyphon palustris (C. G. Thomson, 1855)

Distribution in Iran: East Azarbaijan, Golestan, Kordestan (KLAUSNITZER, 1990, 2012b, c).

General distribution: Albania, Algeria, Austria, Azerbaijan, Bulgaria, Byelorussia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Iran, Ireland, Israel, Italy, Kazakhstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Netherlands, North Korea, Norway, Poland, Romania, Russia (Central European Territory, Far East, North European Territory, South European Territory), Slovakia, Spain, Sweden, Switzerland, Syria, Turkey, Ukraine.

Contacyphon pareuoplus (Klausnitzer, 2012)

Distribution in Iran: Mazandaran (KLAUSNITZER, 2012b), Iran (no locality cited) (ZWICK *et al.*, 2013).

General distribution: Endemic to Iran.

Contacyphon perses (Nyholm, 1976)

Distribution in Iran: Guilan (Assalem - Holotype) (NYHOLM, 1976; KLAUSNITZER, 1990), Mazandaran (KLAUSNITZER, 1990, 2012b, c), Iran (no locality cited) (ZWICK *et al.*, 2013).

General distribution: Endemic to Iran.

Contacyphon reitteri (Klausnitzer, 1976)

Distribution in Iran: Iran (no locality cited) (KLAUSNITZER, 2006).

General distribution: Azerbaijan (Lerik) (KLAUSNITZER, 1976), Iran (KLAUSNITZER, 2006).

Comments: Lerik is located near the Iranian border in southern Azerbaijan, between the tall mountains of the Talysh Mountains and the agricultural plain of the Lankaran Lowland.

Contacyphon simplex (Klausnitzer, 1981)

Distribution in Iran: Hamadan, Kermanshah, Kordestan, Mazandaran (KLAUSNITZER, 1990, 2012b, c), Tehran (Emameh - Holotype) (KLAUSNITZER, 1981), Iran (no locality cited) (ZWICK *et al.*, 2013).

General distribution: Endemic to Iran.

***Contacyphon* sp.**

Distribution in Iran: Fars (OSTOVAN & NIAKAN, 2005, 2006).

Genus *Elodes* Latreille, 1797

Elodes eberti Klausnitzer, 1970

Distribution in Iran: Fars, Zanjan (KLAUSNITZER, 1970, 1972, 2009b), Tehran (KLAUSNITZER, 1990, 2000, 2009b, 2012b), Iran (no locality cited) (KLAUSNITZER, 2001, 2009a, 2012a, 2016a).

General distribution: Azerbaijan, Iran, Turkey, Ukraine.

Elodes frenzeli Klausnitzer, 2016

Distribution in Iran: Isfahan (Quamsar, 10 km SW, Kamoo) (KLAUSNITZER, 2016c).

General distribution: Endemic to Iran.

Elodes orientalis Iablokoff-Khnzorian, 1973

Distribution in Iran: Hamadan (KLAUSNITZER, 2012b, c).

General distribution: Iran, Tadzhikistan.

Elodes persicus Klausnitzer, 1975

Distribution in Iran: Golestan (Gole Lovae) (KLAUSNITZER, 1975b, 2000, 2009a, 2012a, b), Semnan (KLAUSNITZER, 2012b, c), Iran (no locality cited) (KLAUSNITZER, 2001, 2016a).

General distribution: Endemic to Iran.

Elodes unicolor Klausnitzer, 2012

Distribution in Iran: Kerman, Yazd (KLAUSNITZER, 2012b).

General distribution: Endemic to Iran.

***Elodes* sp.**

Distribution in Iran: Qazvin (Klausnitzer 1990 as *Helodes* sp.).

Genus *Hydrocyphon* Redtenbacher, 1858

Hydrocyphon consolatorius Klausnitzer, 1990

Distribution in Iran: Fars (KLAUSNITZER, 1990, 2012b), Iran (no locality cited) (YOSHITOMI & KLAUSNITZER, 2003; YOSHITOMI, 2012; KLAUSNITZER, 2016a).

General distribution: Endemic to Iran.

***Hydrocyphon keili* Klausnitzer, 2016**

Distribution in Iran: Hormozgan (Sikhoran) (KLAUSNITZER, 2016b).

General distribution: Endemic to Iran.

***Hydrocyphon segrex* Nyholm, 1972**

Distribution in Iran: Lorestan (KLAUSNITZER, 1981, 2009b, 2012b), Iran (no locality cited) (YOSHITOMI & KLAUSNITZER, 2003; YOSHITOMI, 2012; KLAUSNITZER, 2016a).

General distribution: Caspian Sea (YOSHITOMI, 2012), Greece, Azerbaijan, Iran, Turkey (YOSHITOMI & KLAUSNITZER, 2003; KLAUSNITZER, 2016a).

Genus *Microcara* C. G. Thomson, 1859***Microcara luteicornis* Reitter, 1888**

Distribution in Iran: Mazandaran (KLAUSNITZER, 2012b, c).

General distribution: Azerbaijan, Georgia, Iran, Russia (South European Territory), Turkey.

Genus *Scirtes* Illiger, 1807***Scirtes orbicularis* Panzer, 1793**

Distribution in Iran: Guilan (KLAUSNITZER, 2012b, c).

General distribution: Austria, Azerbaijan, Belgium, Byelorussia, Czech Republic, Denmark, France, Georgia, Germany, Great Britain, Hungary, Ireland, Italy, Latvia, Netherlands, Poland, Russia (Central European Territory, South European Territory), Slovakia, Sweden, Switzerland, Turkey, Ukraine.

DISCUSSION

This checklist comprises 27 species within seven genera among which the genus *Contacyphon* with 13 recorded species is the most species-rich in Iran. Thus, of the 410 recorded species within 29 genera of Scirtoidea in the Palaearctic Region (LÖBL & LÖBL 2016; KLAUSNITZER, 2016a), just ~6.6% have so far been recorded from Iran. Also, nine species are endemic to Iran. Iran comprises 31 provinces and Scirtoidea have been collected from just 17 of them. The highest diversity is found in the provinces Mazandaran and Guilan with seven and six species, respectively (Fig. 1). No species are known from other 14 provinces lack of sampling. The exact localities of six species are unknown (Iran - no locality cited). The checklist indicates that most species have been recorded from northern parts of Iran (Guilan and Mazandaran provinces), comprising various aquatic ecosystems. Additionally, samplings on Iranian Scirtoidea, allowing a probably better knowledge of the regional fauna, have not been so far organized systematically. Among the neighbouring countries of Iran, the fauna of Turkey, with 54 recorded species has been studied better than others, followed by Russia (Central European Territory, East Siberia, Far East, North European Territory, South European Territory, West Siberia) and Azerbaijan with 49 and 14 species, respectively (LÖBL & LÖBL, 2016; KLAUSNITZER, 2016a) (Fig. 1). Additionally, Turkey and Azerbaijan both with 14 species, share the highest number of species with Iran than any other countries, followed by Russia (6), Armenia (3), Iraq (2), Afghanistan (1), Pakistan (1), Saudi Arabia (1), and Turkmenistan (1). However, since Iran is a large country with highly heterogeneous geographical regions and climates, surely

there remain many further species to be discovered. Upon the several samplings and the fauna of areas adjacent Iran and other Palaearctic regions, this list is far from being complete. It is likely that the actual number of species of Scirtoidea occurring in Iran would probably exceed 50 species; further faunistic surveys systematically organized in several provinces of the country are strongly needed, as well as a more complete study of the available unidentified material deposited in different museums.

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