

## New data on distribution of checkered beetles from Kurdistan Region of Iraq (Coleoptera, Cleridae)

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**Riassunto** Vengono segnalate 10 specie di coleotteri Cleridae per la Regione del Kurdistan dell'Iraq. Quattro specie: *Trichodes ephippiger* Chevrolat, 1874, *Trichodes olivieri* (Chevrolat, 1843), *Winklerius grandis* (Stierlin, 1868) e *Necrobia rufipes* (De Geer, 1775) sono già note per l'Iraq mentre sei *Clerus mutillaroides* Reitter, 1894, *Trichodes ganglbaueri* Escherich, 1894, *Trichodes inermis* Reitter, 1894, *Trichodes ganglbaueri* Escherich, 1894, *Trichodes inermis* Reitter, 1894, *Trichodes longissimus* (Abeille de Perrin, 1881), *Trichodes pulcherrimus* Escherich, 1892 e *Trichodes reichei* (Mulsant & Rey, 1863) risultano nuove. Per ogni specie sono riportati gli eventuali sinonimi, i dati di raccolta, l'areale di distribuzione, informazioni sulla biologia ed è fornita una fotografia per una più agevole identificazione.

**Abstract** Ten species of checkered beetles (Coleoptera, Cleridae) from Kurdistan Region of Iraq are listed in this paper. Four species: *Trichodes ephippiger* Chevrolat, 1874, *Trichodes olivieri* (Chevrolat, 1843), *Winklerius grandis* (Stierlin, 1868) and *Necrobia rufipes* (De Geer, 1775) were already known from Iraq while six *Clerus mutillaroides* Reitter, 1894, *Trichodes ganglbaueri* Escherich, 1894, *Trichodes inermis* Reitter, 1894, *Trichodes longissimus* (Abeille de Perrin, 1881), *Trichodes pulcherrimus* Escherich, 1892 and *Trichodes reichei* (Mulsant & Rey, 1863) are recorded from Iraq for the first time. Synonymies and distribution data are given. All the species are pictured for easy identification.

Key words: Coleoptera, Cleridae, checkered beetle, new record, Kurdistan Region, Iraq.

## Introduction

Cleridae is a small family of Coleoptera, also known as checkered beetles, occupying various habitats, and some species are of economic importance. Most species are predators and feed on other insects in the adult and larval stages. As larvae, they feed on xylophagous insects in their tunnels, immature Hymenoptera in nests or hives, and a range of invertebrate eggs and pupae. Adults are agile hunters of beetles and other insects under bark, on felled timber, on on foliage or flowers. carrion and Additionally, some members of this family are pests of stored product (Mamaev 1977; Gerstmeier et al. 1999; Gerstmeier 2000; Opitz 2002; Gunter et al. 2013). The family is distributed worldwide but species are more

numerous in tropical and sub tropical areas. Following Gerstmeier (2000) there are approximately 3600 species assigned to just over 300 genera worldwide of them approximately 350 species occur in the Palaearctic Region. There is very little information about Cleridae from Iraq and only seven species are listed from this country (Löbl & Smetana 2007) while almost nothing is known about the Cleridae present in the Kurdistan Region of Iraq.

The objective of this paper is to improve the knowledge of Cleridae from Kurdistan Region of Iraq using the material stored in the Insect Museum of Erbil and recently collected.

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## Geography

The Kurdistan Region (Area: 40,643 km<sup>2</sup>) is an autonomous region in Federal Iraq. It comprises the three governorates of Erbil (the capital), Sulaymaniyah and Duhok. It borders Syria to the west, Iran to the east and Turkey to the north, where fertile plains meet the Zagros Mountains (Figure 1). The mountains of the Kurdistan Region have an average height of about 2,400 metres, rising to 3,000–3,300 metres in places. The highest peak is Cheekha Dar (3,611 meters) on the border with Iran. The highest mountain ridges contain the only forestland in the region. The western and southern parts of the region are not as mountainous as the east. Instead, it is rolling hills and plains vegetated by sclerophyll scrubland. The Tigris, Greater Zab and Lesser Zab rivers traverse the region. The largest lake in the region is Dukan Lake. The climate of the Kurdistan Region is semi-arid continental: very hot and dry in summer, and cold and wet in winter. Annual rainfall contrasts in the region, with some places seeing rainfall as low as 300 millimetres to as high as 1000 millimetres.

## Material and methods

The study is based on examination of specimens preserved in the collections of Directorate of Agriculture Research - Insect Museum of Erbil (Kurdistan Region, Iraq), of British Museum of Natural History (London, United Kingdom), and on the material collected by Guido Sabatinelli (Natural History Museum, Geneva, Switzerland), Stefano Ziani (GeoL@b APS, Faenza, Italy) and the second author during their 2017-2019 surveys in Kurdistan Region of Iraq and preserved in the collection of the first author.

Morphological observations were undertaken using Meiji EMZ 13 stereo microscope, with an ocular micrometer for measurements. The length of specimens is the distance measured from the apical clypeal margin to the elytral apices.

Data about nomenclature and distribution are mainly based on Löbl & Smetana (2007), and in other situations the related references are given. The governorates of Kurdistan Region of Iraq are represented in the Figure 1.

Information additional to that on labels is enclosed in square brackets.

Synonymies were taken from the Coleopterorum Catalogus (Corporaal 1950) and from the Catalogue of Palaearctic Coleoptera (Löbl & Smetana 2007). We also studied many other publications that concern the fauna of Cleridae, including many primary taxonomic revisions or reviews that include descriptions of new species or new records.



Figure 1. Map of Kurdistan Region of Iraq

The following abbreviations are used in the text:

BMNH = British Museum of Natural History, London, United Kingdom

dist. = district

gov. = governorate

EMIC = Collection of Directorate of Agriculture Research - Erbil -Insect Museum of Erbil, Kurdistan Region, Iraq

ft. = feet

IZCI = Iuri Zappi Collection, Casalecchio di Reno, Bologna, Italy





## Results

In this study, a total of 10 species of Cleridae were identified from Kurdistan Region of Iraq:

- 1. Clerus mutillaroides Reitter, 1894
- 2. Trichodes ephippiger Chevrolat, 1874
- 3. Trichodes ganglbaueri Escherich, 1894
- 4. Trichodes inermis Reitter, 1894
- 5. *Trichodes longissimus* (Abeille de Perrin, 1881)
- 6. Trichodes olivieri (Chevrolat, 1843)
- 7. Trichodes pulcherrimus Escherich, 1892
- 8. Trichodes reichei (Mulsant & Rey, 1863)
- 9. Winklerius grandis (Stierlin, 1868)
- 10. Necrobia rufipes (De Geer, 1775)

Of these only four were already known from Iraq: *Trichodes ephippiger* Chevrolat, 1874, *Trichodes olivieri* (Chevrolat, 1843), *Winklerius grandis* (Stierlin, 1868) and *Necrobia rufipes* (De Geer, 1775) (Löbl & Smetana 2007; Abdul-Rassoul *et al.* 2010) while six species *Clerus mutillaroides* Reitter, 1894, *Trichodes ganglbaueri* Escherich, 1894, *Trichodes inermis* Reitter, 1894, *Trichodes longissimus* (Abeille de Perrin, 1881), *Trichodes pulcherrimus* Escherich, 1892 and *Trichodes reichei* (Mulsant & Rey, 1863) are recorded here for the first time. Four additional species: *Trichodes alberi* Escherich, 1894, *Trichodes flavotarsis* Gerstmeier, 1985, *Trichodes heydeni* Escherich, 1892 and *Trichodes laminatus* Chevrolat, 1843 (Löbl & Smetana 2007), were already reported from Iraq bringing to a total of 14 the Cleridae species known from Iraq.

## Family Cleridae Latreille, 1802 Subfamily Clerinae Latreille, 1802 Genus *Clerus* Geoffroy, 1762

#### *Clerus mutillaroides* Reitter, 1894 →Plate1

Pseudoclerops mendax Kuwert, 1894.

Material examined: Iraq, Erbil gov., Choman dist., Bardabook [mountain], 3.VII.2000, R. T. Koshnaw leg. (1 ex. ♂) EMIC.

General distribution: Armenia, Azerbaijan, East Turkey, Iran (Zappi & Ghahari 2016).

New record for Iraq.

### Genus Trichodes Herbst, 1792

Trichodes ephippiger Chevrolat, 1874

 $\rightarrow$ Plate 2

Trichodes theophilei Chevrolat, 1876; Trichodes

*ephippiger* var. *jactans* Reitter, 1899; *Trichodes ephippiger* var. *leucippus* Reitter, 1899.

Material examined: Iraq, Kurdistan, Erbil gov., Shaqlawa, VI.2013, M. I. Hamad leg. (1 ex.  $\bigcirc$ ) IZCI; Iraq, Kurdistan, Erbil gov., Hiran, 815 m, 36°17'N 44°30'E, on *Anemone* sp., 15.IV.2017, G. Sabatinelli leg. (7 exx.  $\bigcirc \bigcirc + 2$ exx.  $\bigcirc \bigcirc$ ) IZCI; idem, S. Ziani leg. (2 exx.  $\bigcirc \bigcirc$ ) IZCI.

General distribution: Armenia, Iran, Iraq, Israel, Syria, Turkey (Löbl & Smetana 2007).

Note: The presence of this species in Kurdistan Region of Iraq has recently been reported by Mawlood *et al.* (2017).

# *Trichodes ganglbaueri* Escherich, 1894 → Plate 3

Trichodes israelicus Winkler, 1963; Trichodes israelicus

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#### ssp. *turcicus* Winkler & Žirovnický, 1980.

Material examined: Iraq, Erbil gov., Shaqlawa dist., Mawaran vill., 7.VI.2004, R. T. Koshnaw leg. (1 ex. 3) EMIC.

General distribution: Cyprus, Iran, Israel, Turkey (Löbl & Smetana 2007).

New record for Iraq.

## *Trichodes inermis* Reitter, 1894 →Plate 4

*Trichodes inermis* ssp. *imitator* Reitter, 1899; *Clerus inermis* var. *femininus* Champenois, 1900; *Trichodes akbesianus* Reitter, 1915.

Material examined: Iraq, Erbil gov., Harir dist., Zybarwk vill., 12.VI.2004, A. S. Belbas leg. (1 ex.  $\bigcirc$ ) EMIC; Iraq, Kurdistan, Sulaymaniya gov., Dukan, 35°59'N 44°56'E, 586 m, 4.VI.2017, G. Sabatinelli leg. (1 ex.  $\bigcirc$ ) IZCI.

General distribution: Caucasus, Iran, Israel, Russia, Turkey (Zappi & Ghahari 2016).

New record for Iraq.

Note: The male specimen has a very wide pale dorsal spot so extend that it can be mistaken at first glance with Trichodes heydeni Escherich, 1892. The dark green abdomen, the hind tibiae distally not lamellate, the hind femora thickened distally (club-like), the hind angles of pygidium protruding tip-like and each tip having a tuft of yellow hairs, the metasternum covered with dense hairs and the aedeagus allow the specimen to be attributed to Trichodes inermis Reitter, 1894. This aberation, even if with a slightly less dorsal spot, was described as var. femininus Champenois, 1900. The female specimen (Plate 4) has a very singular elytral pattern with an extremely extensive dorsal spot so as to be joined to the median spot. Only the examination of a greater number of specimens will allow to better understand the variability of the elytral pattern in the whole area of this species.

#### *Trichodes longissimus* (Abeille de Perrin, 1881) →Plate 5

*Clerus angustifrons* Abeille de Perrin, 1881; *Clerus longissimus* var. *discendens* Champenois, 1900; *Trichodes longissimus* ab. *humerosus* Corporaal et Vári, 1946.

Material examined: Iraq, Erbil gov., Pirmam

dist., Darbandi Gomaspan vill., 24.VII.2003, R. T. Koshnaw leg. (1 ex.  $\bigcirc$ ) EMIC; Iraq, Erbil gov., Sidakan dist., 19.VI.2002, R. T. Koshnaw leg. (1 ex.  $\bigcirc$ ) EMIC.

General distribution: Armenia, Azerbaijan, Cyprus, Egypt, Iran, Syria, Turkey (Zappi & Ghahari 2016).

New record for Iraq.

## Trichodes olivieri (Chevrolat, 1843)

#### →Plate 6

*Trichodes olivieri* var. *doriae* Baudi di Selve, 1874; *Trichodes bipunctatus* Reitter, 1894.

Material examined: Iraq, Erbil gov., Qushtapa dist., Murtka vill. [about 5 km N of Qushtapa], 26.V.2004, A. S. Belbas leg. (1 ex.  $\bigcirc$ ) EMIC.

General distribution: Iran, Iraq (Löbl & Smetana 2007).

# *Trichodes pulcherrimus* Escherich, 1892 → Plate 7

Material examined: Iraq, Erbil gov., Harir dist., Garawan vill., 29.V.2002, A. S. Belbas leg. (1 ex.  $\bigcirc$ ) EMIC; Iraq, Erbil gov., Shaqlawa dist., 2000 m, 30.V.2002, A. S. Belbas leg. (1 ex.  $\bigcirc$ ) EMIC; Iraq, Kurdistan, Erbil gov., Al Tun Copri, 35°52'N 44°04'E, 342 m, on *Anemone* sp., 14.IV.2017, G. Sabatinelli leg. (1 ex.  $\bigcirc$ ) IZCI; Iraq, Kurdistan, Erbil gov., Hiran, 815 m, 36°17'N 44°30'E, on *Anemone* sp., 15.IV.2017, G. Sabatinelli leg. (1 ex.  $\bigcirc$ ) IZCI; idem, S. Ziani leg. (1 ex.  $\bigcirc$ ) IZCI; Iraq, Kurdistan, Duhok [gov.], Sarsank [dist.], 13.V.2018, M. I. Hamad leg. (1 ex.  $\bigcirc$ ) IZCI.

General distribution: Armenia, Iran, Turkey (Gerstmeier 1998).

New record for Iraq.

#### *Trichodes reichei* (Mulsant & Rey, 1863) →Plate 8

*Trichodes olivierii* Klug, 1842; *Trichodes klugii* Kraatz, 1873; *Trichodes conjunctus* Escherich, 1892; *Trichodes maximus* Escherich, 1892; *Trichodes klugii* var. *imitator* Reitter, 1894; *Trichodes minimus* Kraatz, 1894; *Trichodes reichei* var. *biinterruptus* Pic, 1945.

Material examined: Iraq, Erbil gov., Harir dist., Bawyan vill., 30.V.2002, R. T. Koshnaw leg. (1 ex. ♂) EMIC; Iraq, Kurdistan, Sulaymaniya gov., Dukan, 35°59'N 44°56'E, 586 m, 4.VI.2017, G. Sabatinelli leg. (5 exx.

#### ්් + 4 exx. ♀♀) IZCI.

General distribution: Armenia, Iran, Palestine, Syria, Turkey (Löbl & Smetana 2007).

New record for Iraq.

#### Genus Winklerius Menier, 1986

*Winklerius grandis* (Stierlin, 1868) →Plate 9

*Opilo albonotatus* Pic, 1901.

Material examined: Kurdistan, Sulaymanyah, 23-24.VI.1928, 2800 ft., N. Scott [leg.] (1 ex. ♀) BMNH.

General distribution: Iran, Iraq, Saudi Arabia (Löbl & Smetana 2007).

Note: This record was reported for the first time by Menier (1986).

## Subfamily Korynetinae Laporte, 1838 Genus *Necrobia* Olivier, 1795

## Necrobia rufipes (De Geer, 1775)

 $\rightarrow$ Plate 10

Tenebrio dermestoides Piller & Mitterpacher, 1783; Corynetes glaber Jurine, 1814; Necrobia mumiarum Hope, 1834; Necrobia amethystina Stephens, 1835; Corynetes flavipes Klug, 1842; Corynetes reticulatus Klug, 1842; Necrobia aspera Walker, 1858; Necrobia pilifera Reitter, 1894; Necrobia foveicollis Schenkling, 1900; Necrobia rufipes var. aeneipennis Csiki, 1900; Necrobia pilifera var. cupreonitens Lauffer, 1905.

Material examined: Iraq, Kurdistan, Duhok gov., Akre,  $36^{\circ}44'N$   $43^{\circ}53'E$ , 600 m, 15.IX.2018, G. Sabatinelli leg. (2 exx.  $3^{\circ}3^{\circ}$ ) IZCI.

General distribution: Cosmopolitan (Corporaal 1950).

Note: The presence of this species in Iraq has been reported by Abdul-Rassoul *et al.* (2010).

## Biology

With the exception of some European or North American species, little is known about the reproduction, developmental stages, food or behaviour of checkered beetles.

As for the species of Cleridae found in Kurdistan Region of Iraq, the following information was taken from Gerstmeier (1998), Kolibáč *et al.* (2005), Opitz (2002), Zappi & Ghahari (2016) and from field observations.

*Clerus mutillaroides* Reitter, 1894 is a predator, both as larvae and as adult, on other arthropods (mainly insects) associated with woody plants. The adults can be found on stacks of wood.

The species of the genus *Trichodes* have larvae which develop in the cells of wild and captive honey bees and are also known to feed on grasshopper eggs. While the adults are flower visitors, where they feed primarily on pollen, they are also known to prey on insects that are also attracted to the flowers. They most likely assume an important role as pollinators.

Almost nothing is known about the biology of *Winklerius grandis* (Stierlin, 1868). Probably it is a predator like the species belonging to the genera *Opilo* Latreille, 1802 and *Thanasimodes* Murray, 1867. A specimen from Iran was bred from *Ficus* sp. (Zappi & Ghahari 2016).

*Necrobia rufipes* (De Geer, 1775) mainly feed on larvae of other carrion visitors or occur on animal skin, fat, egg powder, dried smoked meat and fish, cheese, bone meal, dried fruits nuts, seeds with high oil content (copra, soya beans), stored in warehouses. This species can be collected en masse also on old bones and other decomposed animal material.

## Discussion

Of the 14 species of Cleridae found in Iraq, 10 have been collected in the Kurdistan Region. This is a very small number of species considering that neighboring Iran and Turkey have 50 and 42 species respectively (Löbl & Smetana 2007; Zappi & Ghahari 2016; Samin *et al.* 2016; Kaplan & Özgen 2018). It is therefore obvious that many more species will be found in future and this work is only a first step for the knowledge of the fauna of Cleridae of these territories and should be an incentive to increase efforts to carry out research in the field.

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Plate 1 Clerus mutillaroides Reitter, 1894, male Length = 15.0 mm



Plate 2 Trichodes ephippiger Plate 3 Trichodes ganglbaueri Chevrolat, 1874, male Length = 8.8 mm



Escherich, 1894, male Length = 7.2 mm



Plate 4 Trichodes inermis Reitter, 1894, female Length = 9.9 mm



Plate 5 Trichodes longissimus (Abeille de Perrin, 1881), male Length = 22.1 mm



Plate 6 Trichodes olivieri (Chevrolat, 1843), male Length = 16.1 mm



Plate 7 Trichodes pulcherrimus Escherich, 1892, male Length = 10.0 mm



Plate 8 Trichodes reichei (Mulsant & Rey, 1863), male Length = 22.1 mm



Plate 9 Winklerius grandis (Stierlin, 1868), female (BMNH) Length = 15.0 mm



Plate 10 Necrobia rufipes (De Geer, 1775), male Length = 5.7 mm