Published October 10, 2014 Klapalekiana, **50**: 1–6, 2014
ISSN 1210-6100

New records of Palaearctic species of the genus *Metoecus* (Coleoptera: Ripiphoridae), with remarks on their variability

Nové nálezy palearktických druhů vějířníků rodu *Metoecus* (Coleoptera: Ripiphoridae), s poznámkami k jejich variabilitě

Jan BATELKA[1)] & Lida FEKRAT[2)]

[1)] Nad Vodovodem 16, CZ-100 00 Praha 10, Czech Republic; e-mail: janbat@centrum.cz
[2)] Department of Plant Protection, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran; e-mail: fekrat@ferdowsi.um.ac.ir

Taxonomy, distribution, colour variability, sexual variability, Coleoptera, Ripiphoridae, *Metoecus*, Palaearctic Region, Afghanistan, China, Iran, Italy, Turkey

Abstract. New faunistic records of some *Metoecus* Dejean, 1834 species from the Palaearctic Region are presented: *M. satanas* Schilder, 1924 is recorded from Yunnan province (China) for the first time; *M. morawitzi* (Semenov, 1891) is recorded from Iran for the first time along with the first reliable records from Afghanistan; the first reliable records of *M. paradoxus* (Linnaeus, 1760) are given from Sardinia (Italy) and Turkey. An unidentified specimen of *Metoecus* is reported from Sichuan province (China). Characters distinguishing *M. morawitzi* from *M. paradoxus* are briefly discussed.

INTRODUCTION

The taxonomy and distribution of *Metoecus* Dejean, 1834 is insufficiently known, although this genus is popular among entomologists because of its European flagship-species *M. paradoxus* (Linnaeus, 1760) and its parasitic development in the nests of some eusocial Vespidae (Hymenoptera) (Carl & Wagner 1982, Švácha 1994, Batelka 2003). The genus is poor in species, with only five described species (four in the Palaearctic Region and one in the south-east of the Oriental Region (Batelka 2003, 2007a)) and a possible one or two undescribed species from Central and Eastern Asia (see Results). Material from this undersampled area is especially poorly represented in collections; only singletons are available, and thus the colour and morphological variability of these species is unknown, hampering reliable comparison with described taxa.

In spite of available keys (Schilder 1924, Yablokov-Khnzoryan 1976), problems with the identification of known species may arise, because species share an almost uniform body-shape and very similar colouration. This is also true for separation of *M. morawitzi* (Semenov, 1891) from *M. paradoxus*, although the validity of *M. morawitzi* is so far not doubted (see Schilder 1924, Yablokov-Khnzoryan 1976) and the distribution ranges of the two species are considered to be clearly separated. However, voucher specimens discussed in this paper show that the two species may not be so widely separated as has been previously supposed.

The aim of this paper is to add new faunistic records for continental Palaearctic species, and to highlight and discuss some imaginal characters within the range of their inter- and intra-specific variability.

MATERIAL AND METHODS

Label data are cited verbatim; lines are indicated by a slash (/), different labels are separated by a double slash (//). Comments are placed in square brackets; p – printed label, hw – hand written label.

Images were taken using a Canon EOS 550D digital camera with an MP-E 65 mm macrolens. Partially focused images were completed using Zerene photo stacker software (Zerene systems LLC, Richland, USA).

Acronyms of collections housing *Metoecus* specimens examined for this study are as follows:

BMNH	Natural History Museum, London, United Kingdom (Maxwell V. L. Barclay);
JBCP	Jan Batelka Collection, Praha, Czech Republic;
MNHN	Muséum National d'Histoire Naturelle, Paris, France (†Nicole Berti, Antoine Mantilleri);
SMFD	Forschunginstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany (Damir Kovac);
ZIN	Zoological Institute Russian Academy of Science, St.-Petersburg, Russia (Mark G. Volkovitsh);
ZMHB	Museum für Naturkunde, Berlin, Germany (Manfred Uhlig, Bernd Jaeger).

Taxonomic remarks and discussions presented here reflect the opinions of the first author, and the second author should not be automatically assumed to share them.

RESULTS

Metoecus Dejean, 1834

Metoecus morawitzi (Semenov, 1891)
(Figs 1–3)

Material examined. Afghanistan: 1 ♀ (damaged, head and almost all legs are missing), (BMNH): "Mountain slope / 6,200ft [p] // AFGHANISTAN: [p] / Shat Khama / 25.xi.1958 [hw] / M. J. Tyler. / B.M.1960-725 [p] // M. Tyler / Ref 3(d) [hw] // Metoecus / paradoxus / (Linnaeus, 1760) / Det. ZHFalin 08 [p]"; 1 ♂ (JBCP, ex coll. David Král, Praha): "Afgh. 1970 [Czech climbing expedition "Hindúkuš 1970", D. Král, pers. comm.] / [K.] Krecbach [lgt.] [hw, J. Batelka det. 1991]". **China:** 1 ♂ (ZMHB): "China, Xinjang / Kulja, 12.10.1991 // leg. W. Mey [p, J. Batelka det. 2002]"; 1 ♀ (ZMHB): "Chin. Turkestan / Uss. Lusch, Jarkand / 1600 m. 4.-6.8.90 [1890] / Conradt S. [lgt.] [p, J. Batelka det. 2002]". **Iran:** 1 ♀ (JBCP): "Mashhad / Khorasan / Iran // July 2001 [Lida Fekrat lgt., hw], [labels were not attached to the beetle and have been replaced with one printed label]". **"Turkestan":** 2 ♀♀ (ZMHB), 1 ♀ (JBCP): "Turkestan / T. Thiele [p, J. Batelka det. 2002]".

Yablokov-Khnzoryan (1976) mentioned that he had failed to locate the types of this species. The senior author of this study has examined seven syntypes of *M. morawitzi* from ZIN in 2003, to ensure the identity of the species. According to a photograph taken by Jiří Hájek in the ZIN Ripiphoridae collection in 2008, there are a total of 20 syntypes of this species from various localities deposited there.

Comments on label data. The exact locality of the male collected by K. Krecbach is unknown. A short description of the Czech climbing expedition "Hindúkuš 1970" with names of some places visited in Afghanistan, can be found in Lachout (1979).

Specimens collected by "T. Thiele" should probably be attributed to Hermann Thiele (1841–1918), a German lepidopterist who collected in Turkestan at the end of the 19th century, and whose general collection of insects is preserved in ZMHB (Horn et al. 1990: 391).

Distribution. *Metoecus morawitzi* was originally described in the genus *Rhipiphorus* Fabricius, 1792 [nec *Ripiphorus* Bosc, 1791] (i.e. including species of all three genera of the subfamily Ripiphorinae: *Macrosiagon* Hentz, 1830, *Metoecus* and *Ripiphorus* Bosc, 1791)

based on abundant female material (type localities: “Turkestan chinens.: fl. Jarkend-darja (24. VIII.1890) nec non King-schiver (3-4.X.1890)”) (Semenov 1891). Because of the apparent scarcity of voucher specimens in other collections, Schilder (1924) and Yablokov-Khnzoryan (1976) in their reviews of the genus did not add any new records for this species. Subsequently, only Batelka (2007a) mentioned *M. morawitzi* from Afghanistan and China (Xinjiang) without any data based on part of the material listed above. New record for Iran. First reliable records from Afghanistan.

Metoecus paradoxus (Linnaeus, 1760)
(Figs 4–8)

Material examined. Italy: 1 ♀ (damaged, antennae are missing), (BMNH): “SARDINIA: / Aritzo / 17.ix.1964. c. 1,000m / K.M. Guichard / B.M.1965-475 // Metoecus / paradoxus / (Linnaeus, 1760) / Det. ZHFalin 08 [p]”. **Turkey:** 1 ♂ (damaged, antennae and almost all legs missing), (BMNH): “M. Enstitü [= “Institute”, probably not a local name] / 2.X. [19]39 [hw] // Pres. by / Com. Inst. Ent. / B.M.1948-529 // Turkey / F.S. Bodenheimer [p] // Metoecus / paradoxus L. [hw] / det. K.G. Blair. [p]”.

An additional 140 specimens from the Czech Republic in JBCP were examined to study their variability discussed below.

Distribution. European species reaching the westernmost part of Asia. The species has been recorded from Turkey without any details (see comments in Batelka (2007a)). First reliable records from Sardinia (Italy) and Turkey.

Metoecus satanas Schilder, 1924
(Fig. 9)

Material examined. China: 1 ♂ (JBCP): “China – Yunnan prov. / Zhongdien [Zhongdian] env. / 6.-8.8.1995 / J. Schneider lgt. [p]”.

Remarks. Completely black specimen with characteristic shape of the median furrow on the pronotal disc as it was described in Schilder (1924) and Yablokov-Khnzoryan (1976). Median lobe of the pronotal disc is acute and not spatulately widened as it is in *M. morawitzi* and *M. paradoxus*.

Distribution. East Palaearctic species. Described based on a single female from “East Tibet: Kuku-noor” (= Qinghai Hu, 36°50´N 100°20´E, Qinghai prov., China) (Schilder 1924), both sexes reported from Kuril Islands (Shikotan Island) by Yablokov-Khnzoryan (1976), and reported from South Sakhalin Island (Russia) without further data by Lafer (1992). Kôno (1936) recorded several findings in Japan from Honshu and Hokkaido islands. First record for Yunnan province (China).

Metoecus sp. 1

Metoecus satanas: Schawaller (1987).

Material examined. Nepal: 1 ♀ (SMFD): “Gonkha Dist., Chuling / Khola, Djinshi Khanka 4/5. / Aug. [19]83 3400 m Abies /Almen / Martens & Schawaller leg. [p] // Nepal-Expeditionen / Jochen Martens [p] // Senckenberg - / Museum / Frankfurt/Main [p] // Metoecus /satanas Schilder. 1924 [hw] / det. Schawaller [p]”.

Remarks. Schawaller (1987) identified this specimen as *M. satanas*. However, in this female the pronotal disc has similar colouration to typical females of *M. paradoxus*, unlike known specimens of *M. satanas* in which the pronotal disc is completely black (Schilder 1924, Yablokov-Khnzoryan 1976). Also, the median furrow of this specimen (Schawaller 1987: fig. 1) is quite distinct from that of *M. satanas* (Fig. 9) and thus this female most probably represents an undescribed species.

Metoecus sp. 2

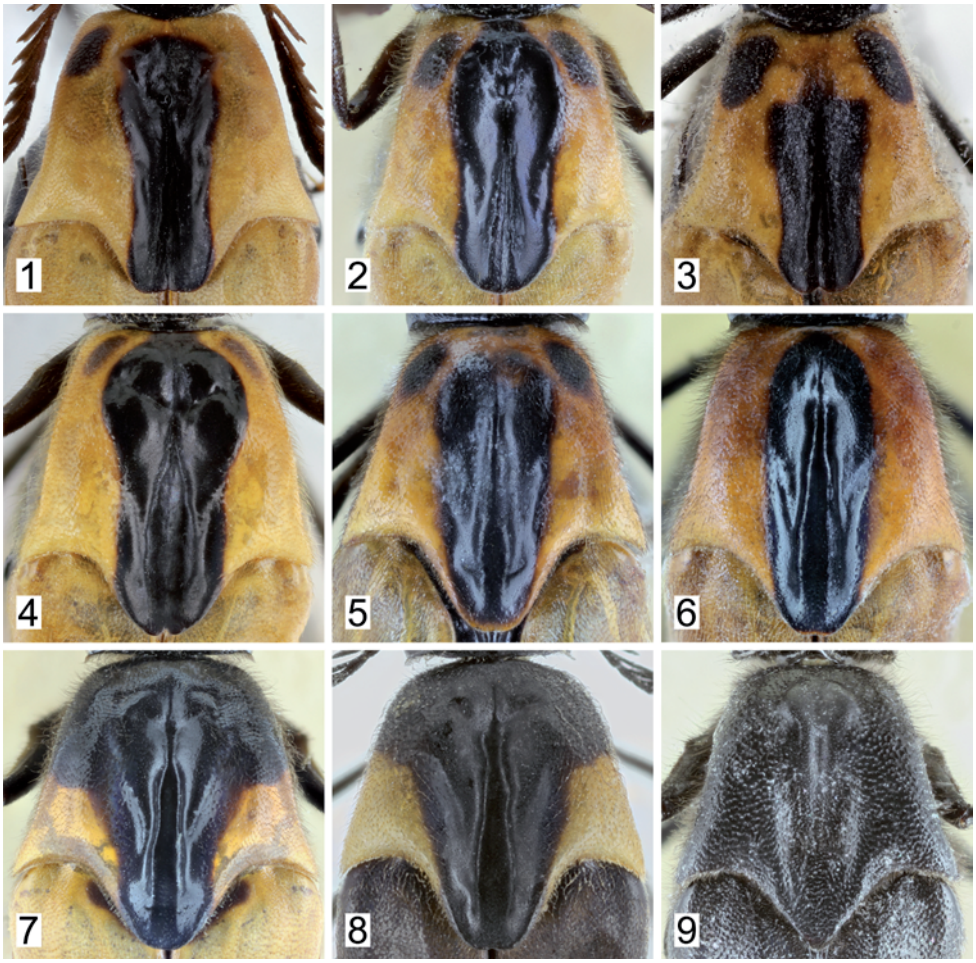
Material examined. China: 1 ♀ (MNHN): "Su-Tchuen [= Sichuan province] / Chass. Thibétains / 1897 [p] // Muséum Paris / 1952 / Coll. Oberthur [p, yellow label] // Metoecus n. sp. (?) / (cf. M. satanas Schilder, 1924) / Jan Batelka det. 2003 [p]".
Remarks. Because of almost absolute absence of specimens of *M. satanas* in European public collections, it was impossible to reliably compare this specimen with other identified material. Giving the existing variability in some *Metoecus* species (see below for comparison of *M. morawitzi* and *M. paradoxus*), more voucher specimens of both sexes from various populations of Chinese *Metoecus* are necessary for decision about the specific status of the female.

DISCUSSION

Variability of *M. morawitzi* and *M. paradoxus*. The taxonomic status of *M. morawitzi* is not entirely clear. So far, it has been well characterized by the colouration of pronotal disc in both sexes, and by the pale colouration of the body and elytra in both sexes. Typically, the pronotal disc in *M. morawitzi* is light yellow with a black median furrow and one black elliptical isolated spot on each side of the furrow close to the anterior edge of the pronotal disc (Figs 1–3). Conversely, the typical colouration of the pronotal disc in *M. paradoxus* is black with 2/3 to 1/3 of outer angles orange/yellow posteriad (Figs 7, 8). Colouration of elytra in males is the same in both species, while typical females of *M. paradoxus* have completely black elytra (Batelka 2007b), but all studied females of *M. morawitzi* have elytra yellow with a black stripe along the posterior half of the outer margin including the whole elytral tip. However, while the typical pronotum colouration of both male and female *M. paradoxus* does not occur in any examined specimens of *M. morawitzi*, the characteristic pronotal spots of *M. morawitzi* are occasionally present in *M. paradoxus* (Figs 4, 5). This colour form of *M. paradoxus* was already described by Schilder (1924) based on one female, as 'variety *decipiens*'. Also, the typical colouration of elytra in *M. morawitzi* females rarely occurs in females of *M. paradoxus*, interestingly usually in combination with the above-mentioned pronotal spots, but the black elytra typical for *M. paradoxus* females have never been observed in *M. morawitzi*. The study of colour variability in *M. javanus* (Batelka 2003) has showed, despite many similarities between *M. javanus* and other species, that overall 'diversity of combinations' of this colour variability may be species-specific.

Schilder (1924) introduced in his key to *Metoecus* species a ratio between metatarsomere I (MT I) and the remaining three metatarsomeres II–IV combined (MTS II–IV) as a good species character, reliably delimiting *M. paradoxus* from *M. morawitzi*. Yablokov-Khnzoryan (1976) suggested, that the ratio between MT I and MTS II–IV is the same in *M. satanas* and *M. paradoxus*, but indeed different for *M. morawitzi*. Based on the measurements of the above listed specimens, the following rule can be postulated: the ratio between MT I and MTS II–IV

is 1.0 : 1.0–1.1 (rarely up to 1.18) in females and 1.0 : 1.2–1.3 in males in all three species. This shows that males of Palaearctic *Metoecus* have relatively longer MTS II–IV combined than females, and the length ratio of MTS is thus considered here as a sexual instead of species-specific character.



Figs 1–9. Pronotal discs of *Metoecus* species. 1–3. *M. morawitzi* (Semenov, 1891): 1 – female ("Turkestan"); 2 – male (Afghanistan); 3 – female (Iran); 4–8. *M. paradoxus* (Linnaeus, 1760); 4 – atypical colour form, female (Czech Republic, Klecánky); 5–6 atypical colour form, males (Czech Republic, Vyžlovka); 7 – typical colour form, male (Czech Republic, Plzeň); 8 – typical colour form, female (Czech Republic, Vyžlovka); 9. Male of *M. satanas* Schilder, 1924 (China, Yunnan). All specimens JBCP.

Obr. 1–9. Štíty druhů rodu *Metoecus*. 1–3. *M. morawitzi* (Semenov, 1891): 1 – samice („Turkestán"); 2 – samec (Afghánistán); 3 – samice (Írán); 4–8. *Metoecus paradoxus* (Linnaeus, 1760); 4 – atypická barevná forma, samice (Česká republika, Klecánky); 5–6 atypické barevné formy, samci (Česká republika, Vyžlovka); 7 – typická barevná forma, samec (Česká republika, Plzeň); 8 – typická barevná forma (Česká republika, Vyžlovka); 9. Samec *M. satanas* Schilder, 1924 (Čína, Yunnan). Všechny exempláře JBCP.

Metoecus morawitzi and *M. paradoxus* are undoubtedly closely related taxa, but more material from the Near East, the western and eastern limits of their respective distribution, is necessary to resolve their taxonomic status.

ACKNOWLEDGEMENTS. The first author is obliged to David Král (Charles University, Praha) and Jiří Hájek (Národní muzeum, Praha) for the information they provided. Thanks are also due to all curators who make the specimens in their charge available for study. We also wish to thank Jakub Straka (Charles University, Prague) for access to equipment used for microphotography of voucher specimens.

REFERENCES

BATELKA J. 2003: New synonym and notes on the distribution of Metoecus javanus (Coleoptera: Ripiphoridae). (Nové synonymum a poznámky k rozšíření druhu Metoecus javanus (Coleoptera: Ripiphoridae)). *Klapalekiana* **39**: 199–203 (in English, Czech summary).

BATELKA J. 2007a: Ripiphoridae (Coleoptera) of Greece and Turkey with notes on their distribution in the Eastern Mediterranean and some neighbouring countries. *Acta Musei Moraviae, Scientiae Biologicae* **92**: 155–175.

BATELKA J. 2007b: Coleoptera: Ripiphoridae. Pp. 1–7. In: KABOUREK V. (ed.): *Icones Insectorum Europae Centralis*. *Folia Heyrovskyana*, Series B, **7**, 8 pp. (in Czech and English).

CARL K. P. & WAGNER A. 1982: *Investigations on Sphecophaga vesparum Curtis (Ichneumonidae) and Metoecus paradoxus L. (Rhipiphoridae) for the biological control of Vespula germanica F. (Vespidae) in New Zealand*. *Working Report.* Commonwealth Institute of Biological control, Silwood Park, UK, 15 pp., 4 figs.

HORN W., KAHLE I., FRIESE G. & GAEDIKE R. 1990: *Collectiones entomologicae. Eine Kompendium über den Verbleib entomologischer Sammlungen der Welt bis 1960*. *Teil 1. A bis K., Teil 2. L bis Z.* Akademie der Landwirtschaftswissenschaften der DDR, Berlin, 573 pp.

KÔNO H. 1936: Family Rhipiphoridae. Family Meloidae. Class Insecta. Coleopteroidea-Coleoptera. *Fauna Nipponica* **10(8)**: 1–87 (in Japanese).

LACHOUT V. 1979: "Expedice Hindúkuš 1970" [Hindukush Expedition 1970]. http://www.hkvysehrad.cz/hindukus70.html (accessed 21 March 2014) (in Czech).

LAFER G. S. 1992: Rhipiphoridae – Veeronoscy [Rhipiphoridae]. Pp. 526–531. In: LER P. A. (ed.): *Opredelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomach*. *Tom 3*. *Zhestokrylye ili zhuki*. *Chast' 2*. [*A key to the insects of the Far East of the USSR in six volumes*. *Vol 3*. *Coleoptera or beetles*. *Part 2*]. Nauka, Sankt-Peterburg, 704 pp. (in Russian).

SCHAWALLER W. 1987: Rhipiphoridae aus dem Nepal-Himalaya (Insecta: Coleoptera). *Courier Forschungsinstitut Senckenberg* **93**: 477–479.

SCHILDER F. A. 1924: Rhipiphoriden – Studien. VI. Revision des genus Metoecus Dej. (1833) [sic!]. *Deutsche Entomologische Zeitschrift* **1924**: 237–244.

SEMENOW [sic!] A. 1891: Diagnoses Coleopterorum novorum ex Asia Centrali et Orientali. *Horae Societatis Entomologicae Rossicae* **25**: 262–382.

ŠVÁCHA P. 1994: Bionomics, behaviour and immature stages of Pelecotoma fennica (Paykull) (Coleoptera: Rhipiphoridae). *Journal of Natural History* **28**: 585–618.

YABLOKOV-KHNZORYAN S. M. 1976: Zhuki-veeronostsy (Coleoptera, Rhipiphoridae) fauny SSSR. II. (Beetles of the family Rhipiphoridae (Coleoptera) of the fauna of the SSSR. II.). *Entomologicheskoe Obozrenie* **55**: 410–424 (in Russian, English title). [English translation: *Entomological Review* (Washington), **55(2)**: 104–113.]

SOUHRN

V práci jsou uvedeny nové nálezy několika druhů palearktických vějířníků rodu *Metoecus* Dejean, 1834: první nález druhu *M. morawitzi* (Semenov, 1891) je uveden z Íránu spolu s prvními podrobnými údaji z Afghánistánu; první doložené údaje pro druh *M. paradoxus* (Linnaeus, 1760) jsou citovány ze Sardinie (Itálie) a Turecka. *M. satanas* Schilder, 1924 je poprvé uveden z provincie Jün-nan (Čína) a neurčený exemplář vějířníka téhož rodu je zaznamenán z provincie Sečuán (Čína). Kritické poznámky k rozlišení druhů *M. morawitzi* a *M. paradoxus*, včetně obrazové dokumentace, jsou připojeny.