ACTA ENTOMOLOGICA MUSEI NATIONALIS PRAGAE
Published 30.xii.2014 Volume 54 (supplementum), pp. 429–439 ISSN 0374-1036
http://zoobank.org/urn:lsid:zoobank.org:pub:25F88DD3-FA46-46CD-B4ED-7DF3466D7CD5

New synonymy of *Oplodontha minuta* (Diptera: Stratiomyidae) with its first record from Socotra Island

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Abstract. *Oplodontha minuta* (Fabricius, 1794), a species being previously recorded only from India and Sri Lanka, is here documented from Socotra Island. Consequently, we re-examined some material of *Oplodontha* from Egypt and Afghanistan known as *O. oasina* (Lindner, 1925) and from Israel and the United Arab Emirates published under the name of *O. pulchriceps* (Loew, 1858). We found that the types of *O. oasina* are conspecific with *O. minuta*, so *O. oasina* represents a new synonym of this species. All examined specimens of *O. pulchriceps* (sensu Lindner 1975, Lindner & Freidberg 1978 and Hauser 2007) actually also belong to *O. minuta*. The known distribution of *O. minuta* is therefore extended to the Afrotropical as well as the Palaearctic Region. Our re-examination of the type material of *Odontomyia ochracea* Brunetti, 1907 and *Odontomyia submutica* Brunetti, 1907 confirmed the known synonymy with *O. minuta*. In addition, new records and a distribution map of the previously known stratiomyid species from Socotra Island, *Adoxomyia socotrae* Hauser, 2002 is provided.

Key words. Diptera, Stratiomyidae, *Oplodontha*, new synonymy, new records, distribution, Afghanistan, Egypt, Israel, United Arab Emirates, Yemen, Socotra

Introduction

Socotra is the largest island of the Socotra Archipelago, located in the Arabian Sea 240 km east of Horn of Africa and 380 km south of the Arabian Peninsula. Its area is slightly more than 3,600 km^2 and politically it belongs to Yemen. Socotra Island has a continental origin

HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago II. *Acta Entomologica Musei Nationalis Pragae* **54 (supplementum):** i–vi + 1–440.

and its flora and fauna are characterized by many endemic species. The natural conditions of Socotra (geological history, geographic position, geomorphology, climatic conditions, plant diversity) and main threats to the fragile Socotran ecosystem were summarized by Batelka (2012), who presented the results of the Socotran invertebrate biodiversity research and an annotated list of 40 insect genera and subgenera endemic to the Socotra Archipelago.

The only stratiomyid recorded from Socotra Island was *Adoxomyia socotrae* Hauser, 2002, described as an endemic species. Recently we found some specimens of *Oplodontha* Rondani, 1863 from the same island. Woodley (2001), in *A World Catalog of the Stratiomyidae*, recorded 20 species of *Oplodontha* from the Afrotropical, Palaearctic and Oriental Regions. Subsequently, three new species were described from China (Zhang et al. 2009) and one additional Afrotropical species was added to the genus recently (Woodley 2011).

The common Palaearctic species *O. viridula* (Fabricius, 1775) is distributed from Europe and Israel, Afghanistan, Iraq, Kazakhstan, Kyrgyzstan, and Mongolia to the Pacific shore of Russia and China. Lindner (1925) described a second Palaearctic species – *Oplodontha oasina* Lindner, 1925 from Egypt, and material collected later in Israel he identified as *O. pulchriceps* (Loew, 1858) described originally from South Africa (Cape of Good Hope) (cf. Lindner 1975 and Lindner & Freidberg 1978). Rozkošný (1982b) recorded *O. oasina* from Afghanistan. Hauser (2007) recorded *O. pulchriceps* from the United Arab Emirates, and proposed *O. oasina* as a potential synonym of *O. pulchriceps*.

During our study of *Oplodontha* specimens from Socotra, we have also studied the type material of *O. oasina* and compared it with the type of *O. minuta* and reliably identified specimens of this species from India, as well as with specimens identified as *O. pulchriceps* from the western Palaearctic. This study resulted in synonymy of *O. oasina* with *O. minuta*, and new distributional records of this species, which we present in this paper. A list of the known localities of *Adoxomyia socotrae* is extended by some new records and its distribution on Socotra Island is summarized in a map.

Material and methods

The photographs were taken using a Canon MP-E 65 mm macro lens attached to a Canon EOS 600D camera and stacked from multiple layers using Helicon Focus 5.1 Pro software. The morphology follows the terminology of Cumming & Wood (2009).

Exact label data are cited for all type specimens; a double slash (//) divides data on different labels and a single slash (/) divides data on different lines. Other comments and remarks are placed in square brackets: [p] – preceding data are printed, and [hw] – preceding data are handwritten.

The following abbreviations are used for institutional collections housing types and other comparative material:

BMNH The Natural History Museum, London, United Kingdom (Erica McAlister);
CSCA California State Collection of Arthropods, Sacramento, USA (Martin Hauser);
FSMU Faculty of Science, Masaryk University, Brno, Czech Republic (Rudolf Rozkošný);
HNHM Hungarian Natural History Museum, Budapest, Hungary (Zoltán Soltész);
MMBC Moravské zemské muzeum, Brno, Czech Republic (Igor Malenovský);
NMPC Národní muzeum, Prague, Czech Republic (Michal Tkoč);
NHRS Naturhistoriska Riksmuseet, Stockholm, Sweden (Yngve Brodin);

SMNS Staatliches Museum für Naturkunde, Stuttgart, Germany (Hans-Peter Tschorsnig);
ZMUC Zoological Museum, University of Copenhagen, Copenhagen, Denmark (Thomas Pape).

Taxonomy

Earlier authors often embraced the species of *Oplodontha* in the genus *Odontomyia* Meigen, 1803. Species of *Oplodontha* in the present sense (Rozkošný 1982a) are usually smaller (5.0–9.0 mm) and have a remarkably small discal cell, vein R_{2+3} is fused with R_1, R_4 and M_3 are missing and M_1 is distinct at most only at its base.

Oplodontha minuta (Fabricius, 1794)

(Figs 1–14)

Stratiomys minuta Fabricius, 1794: 268.
Oxycera indica Brunetti, 1907:119.
Odontomyia ochracea Brunetti, 1907: 129.
Odontomyia submutica Brunetti, 1907: 130.
Eulalia oasina Lindner, 1925: 150, **syn. nov.**

Type localities. *Stratiomys minuta*: India, Tranquebar [=Tharangambadi]. *Oxycera indica*: India, Kolkata. *Odontomyia ochracea*: India, Kolkata. *Odontomyia submutica*: India, Kolkata. *Eulalia oasina*: Egypt, Khârgha Oasis.
Type material examined. *Stratiomys minuta*: Syntype: 1 ♀, labelled: 'p.86·32 [hw] // minuta [hw]' (ZMUC, only the head of this specimen is preserved, see Figs 12, 13).

Eulalia oasina: Syntype: 1 ♀, labelled: 'Cotype [hw] // Min. Agr. Egypt / Khârgha Oasis. / 9.v. [hw] 1918 [p] / Coll. [p] Storey [hw] // Eulalia / oasina / Lind. [hw]' (SMNS).

Odontomyia ochracea: Paratypes: 1 ♂, labelled: 'Type [p, round label with red edge] // Odonto / ochracea / n. s. ♂ 28 / type [hw] // Pres.by / E.Brunetti. / Brit.Mus. / 1927–184. [p] // BRUNETTI / Calcutta / environs [p] / 26.vii.[hw]190[p]4[hw] // BRUNETTI / COLLECTION [p] // PARATYPE / (HOLOTYPE?) / Odontomyia ochracea Brunetti / det. J.E.CHAINEY 1982 [hw] // BMNH(E) / 1237759 [p]' (BMNH); 1 ♂, labelled: 'BRUNETTI / Calcutta / environs [p] / 26.vii.[hw]190[p]4[hw] // Pres.by / Brunetti. / B.M. 1927–184 [p] // BRUNETTI / COLLECTION [p] // PARATYPE / Odontomyia ochracea Brunetti / det. J.E.CHAINEY 1982 [hw] // BMNH(E) / 1237763 [p]' (BMNH).

Odontomyia submutica: Syntypes: 1 ♀, labelled: 'Type [p, round label with red edge] // O. submutica / mihi[?] sp. non / type exemp [hw] // Pres.by / E.Brunetti. / Brit.Mus. / 1927–184. [p] // India / Calcutta / 1. 2. '07. [hw] // Calc / 1.II.07 [hw] // SYNTYPE / Odontomyia / submutica Brunetti / det. J.E.CHAINEY 1982 [hw] // BMNH(E) / 1237760 [p]' (BMNH). 1 ♀, labelled: 'India / Calcutta / E. Brunetti / 5. III. '05. [hw] // Calc / 5.III.05 [hw] // Pres. by / E.Brunetti. / Brit.Mus. / 1927–184. [p] // BMNH(E) / 1237761 [p] // SYNTYPE / Odontomyia / submutica Brunetti / det. J.E.CHAINEY 1982 [hw]' (BMNH).

Additional material examined. **AFGHANISTAN:** 1 ♂, East Afghanistan, Jalalabad, Kunartal, 30.iii.1953, J. Klapperich lgt. (HNHM); 2 ♂♂ 3 ♀♀, Jalalabad, 580 m, 13.iv.1966, D. Povolný & F. Tenora lgt. (MMBC); 1 ♀, Jalalabad, 580 m, 17.iv.1966, D. Povolný & F. Tenora lgt. (MMBC); 1 ♀, Jalalabad, park, 560 m, 17.iv.1974, L. Papp (HNHM, published as *O. oasina* by Rozkošný (1982b)). **EGYPT:** 1 ♂, Khârgha Oasis, 12.vi.1926, coll. Efflatoun (SMNS). **INDIA:** 4 ♀♀, Andra Pradesh, Hyderabad, 29.x.1971, A. C. Pont lgt.; 1 ♀, same locality, 4.xi.1971, A. C. Pont lgt.; 4 ♀♀, Tamil Nadu, Dohnavur, Tinnevelly [= Tirunelveli], 28.ix.1938, B.M.-C.M. Expedition; 1 ♂ 1 ♀, same locality, 7.iii.1936, B.M.-C.M. Expedition; 1 ♀, Gujarat, Banaskantha, Deesa, 1.vii.1901, C. G. Nurse lgt.; 1 ♂, Madhya Pradesh, Jabalpur distr., Jubbulpore [= Jabalpur], 1.ix.1907, C. G. Nurse lgt.; 1 ♀, West Bengal, Kolkata distr., Calcutta [= Kolkata], 15.viii.1907; 1 ♀, same locality, 26.vii.1904; 1 ♀, same locality, 28.v.1907; 1 ♂, same locality, 17.viii.1907; 1 ♂, same locality, 31.x.1907 (all Indian material from BMNH). **ISRAEL:** 1 ♂, 35 km N Elat Iddan, 30°47′N, 35°17′ E, Malaise trap, 8.v.1996, M. Hauser leg. et det. (CSCA); 1 ♂, Jericho, 19.vii.1976, A. Freidberg lgt. (SMNS); 1 ♀, Shivta, 23. vi. 1976, M. Kaplan lgt. (SMNS). **SRI LANKA:** 1 ♀, Trincomalee distr., Trincomali [= Trincomalee], 29.xii.1891, Lt. Col. Yerbury lgt. (BMNH); 1 ♀, Periakulam [= Periyakulam], 1.iii.1891,

Lt. Col. Yerbury lgt. (BMNH). **UNITED ARAB EMIRATES:** 1 ♂, Khor al-Khwairi, 25°57′N, 56°03′E, light trap, 2.–13.v.2007; 1 ♀, Al-Ajban, 24°36′N, 55°01′E, Malaise trap, 17.–24.iv.2006; 1 ♂, same locality, 15.–22.v.2006, all van Harten leg., M. Hauser det. (CSCA); 1 ♀, Wadi Maidaq, 25°31′N, 56°13′E, 11.–19.iii.2009, Schmid-Egger lgt., M. Hauser det. (CSCA). (All UAE material published as *O. pulchriceps* by Hauser (2007)). **YEMEN:** 1 ♀, Socotra Island, Homhil, 330 m a.s.l., 12.587°N, 54.302°E, 20.–21.xi.2000, V. Bejček & K. Šťastný lgt. (NMPC); 1 ♀, Socotra Island, Wadi Faar, 69 m a.s.l., 12.433°N, 54.195°E, 1.iv.2001, V. Bejček & K. Šťastný lgt. (NMPC); 6 ♀♀, Socotra Island, Dixam plateau, wadi Zerig, 655 m a.s.l., 12°29.6′N, 53°59.5′E, *Juncus* marsh, open *Dracaena cinnabari* woodland, 13.–14.vi.2012, I. Malenovský, P. Kment, J. Bezděk, J. Hájek, V. Hula, J. Niedobová & L. Purchart lgt. (1 ♀ in NMPC, 5 ♀♀ in MMBC); 1 ♂, wadi Zerig, 650–670 m a.s.l., 12°29′35″N, 53°59′28″E, 30.vi.2010, L. Purchart lgt. (NMPC); 1 ♀, Socotra Island, Scant area, 1300–1500 m a.s.l., 12°34′33″N, 54°01′31″E, 31.i.–2.ii.2010, L. Purchart lgt. (NMPC).

Diagnosis. A small species with hyaline wings and ivory white to yellow (or greenish) pattern on head, thorax and abdomen. Eyes with microtrichia, scutellar spines slender but distinct. Discal cell fused with Rs along a short upper part. At least middle third of all femora and hind tibia darkened. Male terminalia species-specific, gonostylus pointed apically and posteromedial process of genital capsule relatively low and trapezoid-shaped.

Redescription. ***Male.*** Body length (without antennae): 3.5–6.2 mm, wing 3.4–5.0 mm.

Head almost hemispherical, somewhat swollen at middle of face. Postocular area narrow, visible only in lower fourth of head in profile. Antenna brown (3 apical flagellomeres often more darkened), about 0.7 times length of head, basal antennal segments subequal, scape

Figs 1–2. *Oplodontha minuta* (Fabricius, 1794), female from Socotra Island: 1 – habitus in dorsal view; 2 – habitus in lateral view.

slightly longer than pedicel; flagellum spindle-shaped, consisting of 6 flagellomeres, two apical flagellomeres form short style. Flagellomere V very short, apical flagellomere barely longer than broad, rounded apically. Proboscis relatively long (as in other species visiting flowers), with black labella. Setae on head usually pale greyish to white, short and inconspicuous on upper frons but dense and partly appressed on face, longer on lower postocular area and beyond ocellar triangle.

Thorax black in ground colour, with pale ivory spots, minimally on postpronotal lobe, anterior and posterior parts of anepisternum and anepimeron. Thorax completely covered with dense greyish setae. Setae on scutum often more brown, mostly erect, about as long as antennal pedicel and partly appressed along notopleura and above wing base. Setae on pleura usually paler, long and partly curled, often covering ivory spots. Scutellum blackish basally and usually with broadly ivory distal margin, scutellar spines ivory, barely as long as erect setae on scutum.

Wing hyaline, stronger veins yellowish, medial and cubital veins often indistinct or lacking, upper part of discal cell fused to Rs. Calypter white, with sparse whitish fringe, halter white with basally darkened stem.

Legs pale yellow (ivory) in ground colour but all coxae and broad median rings on all femora and hind tibia blackish.

Abdomen (Fig. 4) rounded, rarely more oval, ivory. Dorsal side with black pattern consisting of middle row of transverse black spots which may be confluent in different ways. Venter usually ivory. Abdominal pilosity usually white and inconspicuous, only on posterior margin of tergite IV + V longer and mostly erect, setae on black spots partly darkened.

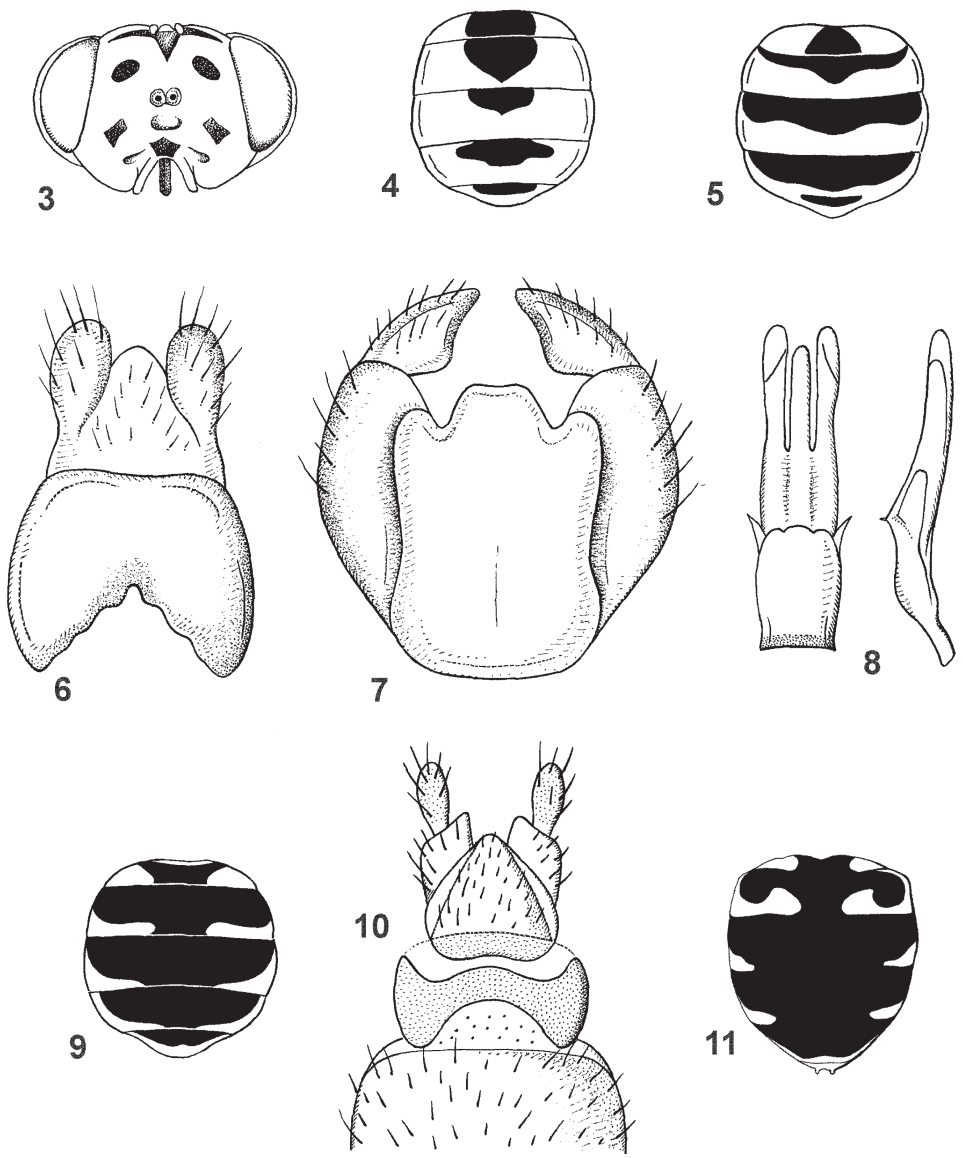
Male terminalia (Figs 6–8). Genital capsule rounded proximally, gonostylus pointed apically. Posteromedial process of genital capsule trapezoidal (Fig. 7).

Female. Body length (without antennae): 4.2–6.6 mm, wing 3.8–5.8 mm.

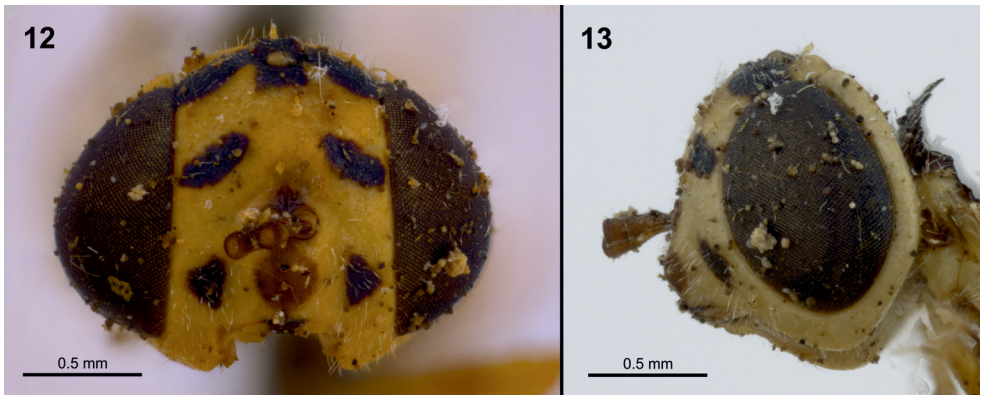
Head (Figs 1–3, 12–14) semi-globular but eyes much smaller than in male, with pilosity sparser and shorter. Postocular area as broad as length of pedicel and broadly separated by wide frons. Ground colour of head bright ivory with black pattern. Occiput entirely black as well as transverse band at level of ocellar triangle on frons, pair of frontal spots and pair of facial spots; facial medial tubercle black at apex, as well as narrow anterior margin of swollen oral opening. Antenna usually somewhat longer and darker than in male, predominantly dark brown, at most scape somewhat paler. Slender and long proboscis entirely black. Head pilosity mostly inconspicuous and short, pale.

Thorax (Figs 1–2) black in ground colour, ivory spots conspicuous and shining, extended on to postpronotal lobe, propleura, anterior third of anepisternum, narrow subnotopleural stripe, broad spot along posterior margin of anepisternum, spots on upper corner of katepisternum and on anepimeron (Fig. 2). Thoracic pilosity usually less distinct than in male, also pale and dense, at least partly appressed. Scutellum usually ivory with semicircular, narrow, basal black spot. *Wing* and *legs* as in male.

Abdomen (Figs 1, 5, 9, 11) usually somewhat longer than in male and darker dorsally. Colour pattern very variable, consisting of transverse black stripes on tergites but often reduced, especially on tergites I and II, and along posterior and lateral margins of tergites (Figs 5, 9, 11). Venter pale ivory.



Figs 3–11. *Oplodontha minuta* (Fabricius, 1794). 3 – frontal view of female head showing the black facial colouration (specimen from Afghanistan); 4 – dorsal view of male abdomen; 5 – dorsal view of female abdomen showing colouration (Afghanistan); 6 – dorsal part of male genitalia; 7 – ventral part of male genitalia; 8 – aedeagal complex in dorsal and lateral view; 9 – dorsal view of female abdomen showing colouration (Afghanistan); 10 – female terminalia in dorsal view; 11 – dorsal view of female abdomen showing colouration (Socotra Island).



Figs 12–13. Head of syntype female of *Stratiomys minuta* Fabricius, 1794, from India: 12 – frontal view; 13 – lateral view. Photos by M. H. Post.

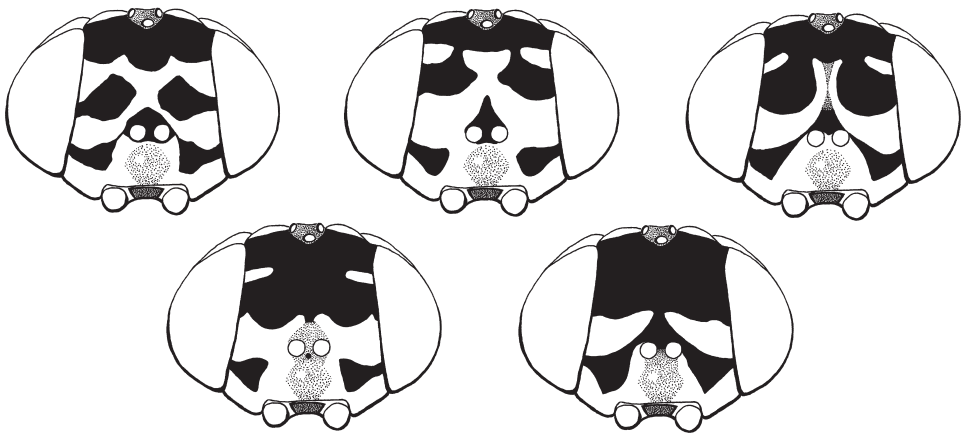


Fig. 14. Female heads of *Oplodontha minuta* (Fabricius, 1794) from Socotra Island. Variability of black colour pattern of five different specimens.

Female terminalia (Fig. 10). Posterior corners of tergite IX pointed, apical segment of female cerci oval, twice as long as broad.

Variability. Colour characters in this species are remarkably variable as in the other Stratiomyidae with aquatic larvae. The antennae range from brownish to predominantly yellow with darkened tip of flagellum. The ivory ground colour of the face may be considerably reduced in both sexes. Medial dark spots on the facial tubercle and the anterior margin of the oral cavity of males may be extended and ivory parts reduced to ivory spots along eye margins. The variable pattern is even more striking on the female frons and face (Figs 3, 12–14). The ivory pleural spots may serve as an important species-specific character (Fig. 2). They are mostly shining and striking but covered by dense pale setae in some specimens and thus

often overlooked. The scutellum is mostly ivory with a narrow black basal part but sometimes almost entirely black with only a narrowly ivory posterior margin. The extensive black rings on all femora and the hind tibia are usually well developed but sometimes only pale or partly reduced. The dark pattern on the ivory abdomen is fairly stable in males (Fig. 4), consisting of blackish medial spots on tergites that may be separated or fused. On the contrary, the abdominal pattern in females may be extremely variable within the same population (Figs 5, 9, 11). The vestiture of the thorax is usually longer and denser in males and sparser in females but some females with relatively dense pilosity were examined as well.

Comparison with *O. viridula*. The common Palaearctic species *O. viridula* (Fabricius, 1775) is distributed from Europe and Israel, Afghanistan, Iraq, Kazakhstan, Kyrgyzstan, and Mongolia to the Pacific shore of Russia and China (Woodley 2001). Its detailed redescription and a discussion of extensive variability is given by Rozkošný (1982a). The distinguishing characters of *O. minuta* and *O. viridula* are summarized in Tab. 1. Females may be easily separated by their different head, pleural and abdominal colour pattern, but distinguishing of males may be difficult in some cases when ivory facial and pleural spots are only weakly distinct. Such a case is demonstrated by papers of Lindner (1974) and Lindner & Freiberg (1978). In the first paper, three males from Israel were identified as *O. viridula* and in the second the identification was corrected to '*O. pulchriceps*' [= *O. minuta* in present sense] as a result of the 'augmented extension of the black pattern of the head, the nearly black scutellum and abdomen, with remainders of narrow light stripes on the posterior borders of the tergites' (Lindner & Freiberg 1978: 55).

Distribution. Palaearctic, Afrotropical and Oriental Region (Fig. 15). According to the material we studied: Afghanistan, Egypt, India, Sri Lanka, United Arab Emirates, Yemen: Socotra Island. **First record from Socotra Island.**

Tab. 1. Distinguishing characters of *Oplodontha minuta* (Fabricius, 1794) and *O. viridula* (Fabricius, 1775).

Character	***O. minuta***	***O. viridula***
Head	with ivory pattern	entirely black
Eyes	with microtrichia	bare
Scutellum	more or less ivory	black except for spines
Pleura	with several ivory spots	entirely black
Position of discal cell	upper part fused with Rs for a short distance	touching Rs at one point or connected with it by a short crossvein r-m
All femora and metatibia	with black central part	entirely yellow (ivory)
Male terminalia	genital capsule more rounded proximally (Fig. 6)	genital capsule more tapered proximally (see Rozkošný 1982a: 304)
Gonostylus	more pointed and not inwardly curved apically (Fig. 7)	less pointed and inwardly curved apically
Posteromedial process of genital capsule	trapezoidal (Fig. 7)	triangular
Posterior corners of female tergite IX	pointed (Fig. 10)	rounded
Apical segment of female cercus	oval, twice as long as broad (Fig. 10)	short and conical, barely as long as broad at base

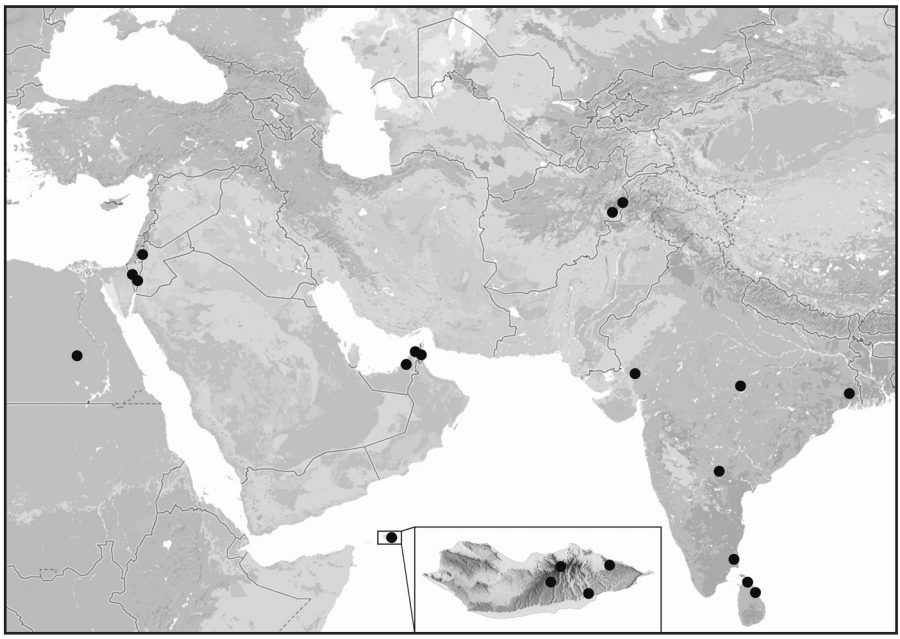


Fig. 15. Distribution of *Oplodontha minuta* (Fabricius, 1794) based on material studied herein and detailed distribution on Socotra Island.

Fig. 16. Distribution of *Adoxomyia socotrae* Hauser, 2002 on Socotra Island (white circle: type locality).

Adoxomyia socotrae Hauser, 2002

Adoxomyia socotrae Hauser, 2002: 464.

Material examined. YEMEN: 1 ♀, Socotra Island, Hadiboh, 10 m a.s.l., 12.652°N, 54.024°E, 11.–23.xi.2000, V. Bejček, K. Šťastný & B. Pražan lgt.; 1 ♀, Wadi Faar, 69 m a.s.l., 12.433°N, 54.195°E, 1.iv.2001, V. Bejček & K. Šťastný lgt; 1 ♂, Zemrion [=Zemhon], 270–300 m a.s.l., 12°30.58′N, 54°6.39′E, 16.–17.vi.2010, V. Hula & J. Niedobová lgt.; 1 ♀, Dixam Plateau, Firmihin, *Dracaena* forest, 490 m a.s.l., 12°28.6′N, 54°01.1′E, 15.–16.xi.2010, J. Bezděk lgt.; 2 ♀♀, Qualentiah env., slopes 5 km SE from Quaysoh, 12°39.691′N, 53°26.658′E, 4.–5.vi.2011, V. Hula & J. Niedobová lgt.; 1 ♀, Aloove village env., *Jatropha unicostata* shrubland with *Boswellia elongata* trees, 1450

m a.s.l., 12°31.2′N, 54°1.5′E, 16.–18.vi.2012, J. Bezděk, J. Hájek, V. Hula, P. Kment, I. Malenovský, J. Niedobová & L. Purchart lgt.; 1 ♀, same locality, 19.–20.vi.2012. All specimens deposited in NMPC.

Distribution. Endemic to Socotra Island; eight specimens were found at five localities ranging from 10 m to 1450 m a.s.l. (Fig. 16).

Discussion

It is possible that *O. minuta*, here documented on Socotra Island, is actually more widespread in the Afrotropical Region, especially along the eastern coast of Africa. We did not study the types of *O. pulchriceps*, but the original description (Loew 1858) fits very well to *O. minuta*, and it is very likely that these two species are conspecific, but a revision of the African species of *Oplodontha* is beyond the scope of this paper. Because *O. minuta* is the older name, it would be the correct name of the African specimens if the two species are conspecific.

Acknowledgements

Our thanks are due to the colleagues who provided material for our study, loaned types, or made some rare literature sources available: Yngve Brodin (NHRS, Stockholm), Martin Hauser (CSCA, Sacramento), Erica McAlister (BMNH, London), Thomas Pape and Mikkel Høegh Post (ZMUC, Copenhagen), Zoltán Soltész (HNHM, Budapest), Hans-Peter Tschorsnig (SMNS, Stuttgart) and Norman E. Woodley (USNM, Washington). This study was financially supported by Ministry of Culture of the Czech Republic (DKRVO 2014/13, National Museum, 0002327201) and by Institutional Research Support grant No. SVV 260 087/2014 (to Department of Zoology, Faculty of Science, Charles University in Prague).

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