

RESEARCH PAPER

The *Nitidula carnaria* complex, with description of a new species from Central Asia, and a key to world species of the genus (Coleoptera: Nitidulidae)

Andrzej LASOŃ¹⁾, Jiří HÁJEK²⁾ & Josef JELÍNEK²⁾

¹⁾ ul. Wiejska 4B/85, 15-352 Białystok, Poland; e-mail: haptos@interia.pl

²⁾ Department of Entomology, National Museum, Cirkusová 1740, CZ-193 00 Horní Počernice, Czech Republic; e-mails: jiri.hajek@nm.cz, jj.nitidula@seznam.cz

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Abstract. The *Nitidula carnaria* complex is defined to comprise three Palearctic species: the widely distributed *Nitidula carnaria* (Schaller, 1783), *N. maculosa* Fairmaire, 1866 occurring in the eremial of North Africa and the Middle East, and a newly described *N. obenbergeri* sp. nov. from northern China, Mongolia and neighbouring territories of Kazakhstan and Russia. First records are given for *Nitidula carnaria* from Georgia, Pakistan and Tajikistan; *N. flavomaculata* Rossi, 1790 from Azerbaijan, Kazakhstan and Kyrgyzstan; and for *N. rufipes* (Linnaeus, 1767) from Georgia, Kyrgyzstan, China (Shaanxi) and Russian Eastern Siberia. A lectotype of *Nitidula latiplaga* Solsky, 1876 is designated to fix its synonymy with *N. flavomaculata* Rossi, 1790 established by JELÍNEK & AUDISIO (2007). Habitus photographs of all species and an identification key are provided to facilitate identification of world *Nitidula* species. Finally, comments on the classification of four Neotropical taxa previously classified in the genus *Nitidula* are offered and the following changes are proposed: *Mystrops bourgeoisi* (Grouvelle, 1914), comb. nov., = *M. gigas* Kirejtshuk & Couturier, 2009, syn. nov.; and *Catonura complanata* (Germain, 1855), comb. nov., = *Catonura ruficollis* (Reitter, 1873), syn. nov., = *Catonura rufithorax* Reitter, 1883, syn. nov.

Key words. Coleoptera, Nitidulidae, identification key, lectotype designation, new combination, new species, new synonymy, new record, taxonomy, Holarctic Region

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Introduction

The genus *Nitidula* Fabricius, 1775 is the type genus of the eponymous family Nitidulidae. It comprises nine species distributed only in Nearctic and Palearctic Regions. Like their closest relatives from the genus *Omosita* Erichson, 1843, species of *Nitidula* are saprophagans, primarily developing on carcasses of animals, especially in later stages of decay as well as on bones and skins. They have been recorded from human corpses and may be of forensic importance (ADAIR & KONDRATIEFF 1996, MATUSZEWSKI et al. 2013, ORTLOFF et al. 2014). Eight Holarctic species currently included in this genus were described in the eighteenth and nineteenth centuries. Only one species, *Nitidula nigra* Schaeffer, 1911 was described more recently. A key to all species of the Palearctic Region

was published by AUDISIO (1993). Recent regional faunas were published for Poland (NUNBERG 1976) and the Far East of Russia (KIREJTSHUK 1992). Key to the species from Nearctic Region was published by PARSONS (1943).

In the present paper, we describe a new species of *Nitidula* from the eastern Palearctic Region, which belongs to the complex of species related to *Nitidula carnaria* (Schaller, 1783) and comprising *N. carnaria* and *N. maculosa* Fairmaire, 1866. *Nitidula carnaria* is a species widely distributed in the Palearctic Region (JELÍNEK & AUDISIO 2007). It was likely introduced in North America (PARSONS 1943) in the 1890's and more recently in Argentina (ZANETTI et al. 2013) and Chile (ORTLOFF et al. 2014). *Nitidula maculosa* occurs in the eremial of North Africa and the Middle East and was considered a synonym



of the sympatric *Nitidula eremita* Audisio, 1990 (= *Nitidula ciliata* Erichson, 1843; non Olivier, 1811) until AUDISIO (1988) corroborated its validity. Further, we provide several first country records for Palaearctic *Nitidula* species. To facilitate the determination of *Nitidula* species, we provide a dichotomous identification key, and the habitus photographs of all species. Finally, we append comments to the classification of four species from South America listed within *Nitidula* by GROUVELLE (1913).

Material and methods

Examination, dissection and measurements were completed with the use of a Leica M125 and Olympus SZX7 stereomicroscopes with an ocular micrometer. Body length was measured from anterior margin of clypeus to the apex of pygidium, body width as the maximum width of elytra combined.

The following acronyms are used for morphological terms:

ANCL	length of antennal club;
ANCW	width of antennal club;
ANLE	length of antenna;
LELY	length of elytra from the tip of scutellar shield to the tip of elytra;
LEPR	length of pronotum along median axis;
WELY	maximum width of elytra combined;
WPR1	width of pronotum between posterior angles;
WPR2	maximum width of pronotum;
WPR3	width of pronotum between anterior angles.

Habitus photographs were taken using a Canon EOS 550D digital camera with an attached Canon MP-E65mm f/2.8 1–5× macro lens as numerous separate images at different focal planes and subsequently combined using Helicon Focus 6.3.0 software. The male genitalia were studied and illustrated in temporary glycerine mounts using an Olympus BX41 transmitted light microscope with Canon DS126291 attachment; they were subsequently washed in distilled water and mounted in Euparal on the same card as the beetle.

The paper is based on specimens from the following collections:

ALCB	Andrzej Lasoní collection, Białystok, Poland;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
MNHN	Muséum national d'Histoire naturelle, Paris, France;
NHMW	Naturhistorisches Museum in Wien, Vienna, Austria;
NMPC	National Museum, Prague, Czech Republic;
PACR	Paolo Audisio collection, Rome, Italy;
USMB	Upper Silesian Museum, Bytom, Poland;
ZMUM	Zoological Museum of the Moscow State University, Moscow, Russia.

Exact label data are cited for primary type specimens. Individual labels are separated by a double slash (//), different rows by simple slash (/). Additional comments and/or explanatory notes are given in square brackets and the following abbreviations are used: hw – handwritten; p – printed.

The following material of *Nitidula* species was studied and photographed for comparison (all NMPC):

Nitidula bipunctata (Linnaeus, 1758): 1 spec., Czech Republic, Bohemia occ., Plzeň, ZOO, 1.iv.2012, J. Krošlák leg.

Nitidula eremita Audisio, 1990: 1 spec., Tunisia, south of Kebili, Al Blidet, Bargu, 8.–11.xii.1999, J. Batelka leg.

Nitidula flavomaculata Rossi, 1790: 1 spec., Portugal, Faro Reg., Vila-moura, beach – *Larus* sp. cadaver, 1.xi.2004, M. Mantič leg.

Nitidula fusula Gebler, 1833: 1 spec., Mongolia, Chentey aimak, 150 km ENE of Öndörchaan, 10 km S of Kerulen, 1000 m, 30.–31.vii.1965, Exp. Dr. Z. Kaszab, 1965.

Nitidula nigra Schaeffer, 1911: 1 spec., Canada, Alberta, Edmonton, 7.viii.1919, F. S. Carr leg.

Nitidula rufipes (Linnaeus, 1767): 1 spec., Greece, Limnos, 2 km S Kalliopi, 39°54.3'N, 25°20.6'E, ca. 5 m, 23.–24.iv.2007, J. Hájek leg.

Nitidula ziczac Say, 1825: 1 spec., USA, Arizona, S. W. Res. Sta. Portal, 14.iv.1956, H. & A. Howden leg.

Taxonomy

Nitidula carnaria species complex

Diagnosis. Species of this complex are characterized by generally smaller (body length: 2.0–4.4 mm), oblong-oval and subparallel-sided body, subtruncate anterior margin of pronotum with non-prominent anterior pronotal angles, rather elongate elytral fimbriae and a pattern of light maculations on the elytra.

Nitidula carnaria (Schaller, 1783)

(Figs 1, 4, 7, 10)

Silpha carnaria Schaller, 1783: 257 (Germany).

Nitidula quadripustulata Fabricius, 1792: 255 (Germany).

Nitidula guttalis Herbst, 1793: 247 (locality unknown).

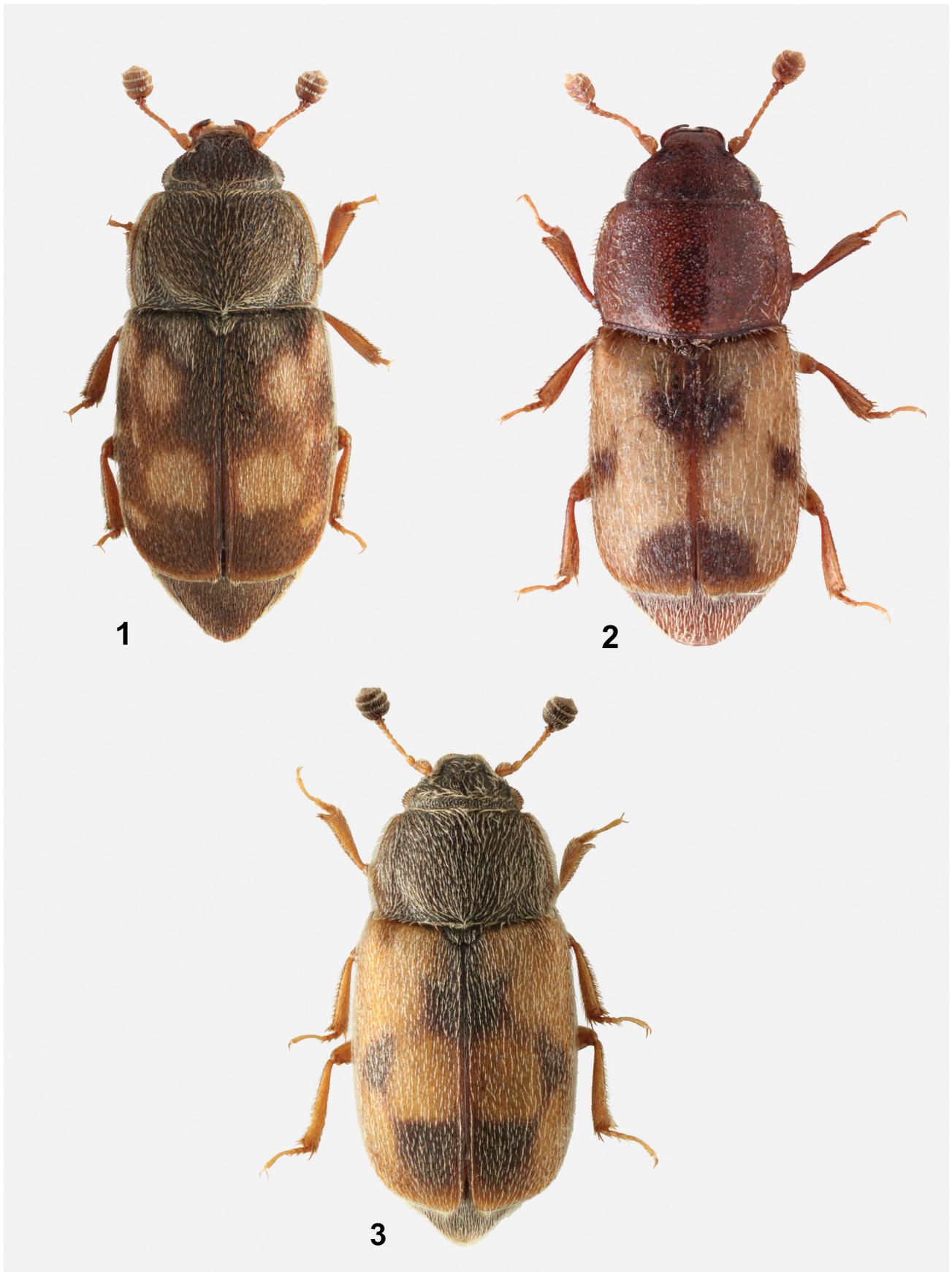
Nitidula variata Stephens, 1830: 36 (locality unknown, presumably Great Britain).

Nitidula flavipennis Heer, 1841: 400 (Switzerland).

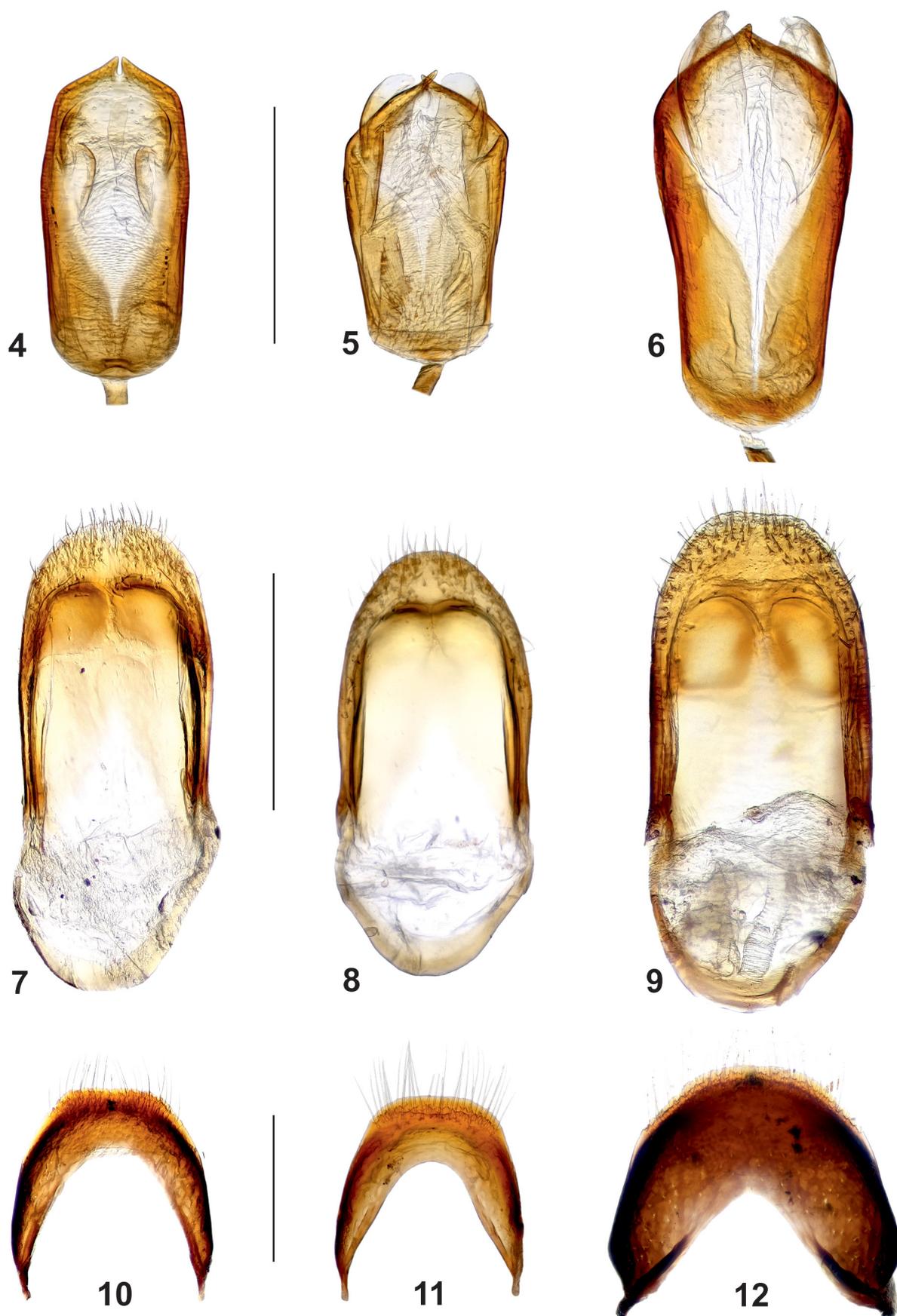
Material studied. We have studied over 450 specimens across the area of distribution (all NMPC). Here we provide precise data for new country records only: **GEORGIA:** 1 spec., Kakheti, Vashlovani National Park, Kaklis Kure Ranger Station, 41°17'06"N, 46°43'47"E, 166 m, on drying goat skin, 15.vi.2021, A. Lasoní leg. (ALCB). **PAKISTAN:** 1 ♂, Northern Area, Aliabad, 2190 m, 36.3152N, 74.6483E, 4.vi.2007, G. M. Carpaneto leg. (PACR). **TAJIKISTAN:** 1 spec., Babatak Mts. (Dushanbe), 18.iv.1980, J. Hladil leg. (NMPC).

Diagnosis. Body length: 2.0–4.4 mm. Body subparallel-sided, anterior margin of pronotum subtruncate, lateral margins of pronotum not explanate. Habitus similar to *N. obenbergeri* sp. nov., from which it differs in comparatively longer pronotum (ratio WPR2/LEPR = 1.41–1.57) and genitalia (cf. Figs 4, 7, 10 and 6, 9, 12). Spots on elytra less brightly coloured, pale yellow, pubescence of elytra either blackish or whitish yellow according to background (Fig. 1). Antennae shorter than the width of head across eyes, antennomeres IV and V as a rule as long as wide. Apical margin of prosternal process broadly V-shaped. Male genitalia: Median lobe of aedeagus more than twice as long as wide, widest before its midlength and moderately narrowed both anteriorly and posteriorly, lateral margins in apical portion abruptly curved towards apex (Fig. 4). Tegmen subparallel-sided, ca 1.5× longer than wide, broadly rounded apically (Fig. 7). Tergite VIII subtruncate apically (Fig. 10).

Distribution. Widely distributed Palaearctic species; introduced to North and South America. **First record from Georgia, Pakistan and Tajikistan.**



Figs 1–3. Habitus of *Nitidula carnaria* species complex. 1 – *Nitidula carnaria* (Schaller, 1783) (Czech Republic, body length: 3.3 mm); 2 – *N. maculosa* Fairmaire, 1866 (Algeria; 2.8 mm); 3 – *N. obenbergeri* sp. nov. (paratype; China: Qinghai; 3.8 mm).



Figs 4–12. Male genitalia of *Nitidula* species. 4, 7, 10 – *Nitidula carnaria* (Schaller, 1783) (Czech Republic); 5, 8, 11 – *N. maculosa* Fairmaire, 1866 (Algeria); 6, 9, 12 – *N. obenbergeri* sp. nov. (holotype; China: Qinghai). 4–6 – median lobe of aedeagus; 7–9 – tegmen; 10–12 – tergite VIII. Scale bar = 0.25 mm.



Figs 13–16. Habitat of *Nitidula obenbergeri* sp. nov. in China (Qinghai): 13–14 – general view of the habitat; 15 – pasture with sheep (*Ovis* sp.); 16 – Jan Růžička collecting on hare (*Lepus* sp.) carcass at the locality. Photos David Král.

Nitidula maculosa Fairmaire, 1866

(Figs 2, 5, 8, 11)

Nitidula maculosa Fairmaire, 1866 in FAIRMAIRE & COQUEREL (1866): 19 (Algeria).

Nitidula mollicella Reitter, 1873: 44 (northern Africa).

Material studied. **ALGERIA:** 4 spec., Sahara, Bou Saada, 15.x.1980, A. Olexa leg. (NMPC); 2 spec., Hammam Rhira, ex coll. J. Hlisnikowski (NMPC). **ISRAEL:** 1 ♂ 1 ♀, Palestine, Jerusalem, 1931, F. S. Bodenheimer leg. (PACR), 1 spec., Palestina, Jerusalem, 24.x.1942, Houška leg. (NMPC). **LIBYA:** 1 ♂, Apollonia, ix.1941 (PACR).

Diagnosis. Body length: 2.3–4.1 mm. Body subparallel-sided. Antennae almost as long as width of head across eyes, antennomeres IV and V longer than wide. Anterior margin of pronotum subtruncate. Apical margin of prosternal process truncate. Pale pigmentation extended over most of elytra, black pigmentation limited to common arcuate spot behind scutellum, common spot at apex of elytra and one elongate spot behind midlength of each lateral margin (Fig. 2). Male genitalia: Median lobe of aedeagus ca. 1.8× longer than wide, widest at apical fourth, there lateral margins abruptly (angulately) curved towards apex (Fig. 5). Tegmen similar to that of *N. carnaria*, but more strongly narrowed apically (Fig. 8). Tergite VIII flatly rounded apically (Fig. 11).

Distribution. Northern Africa (Algeria, Libya, Egypt) and the Middle East (Iraq, Israel, Jordan).

Nitidula obenbergeri sp. nov.

(Figs 3, 6, 9, 12)

Nitidula carnaria: JELÍNEK (1965): 144 (new records, Mongolia); JELÍNEK (1974): 184 (new records, Mongolia).

Type material. HOLOTYPE: ♂ (NMPC), labelled: 'CHINA: Qinghai province / HAIBU env., 3100–3270 m / 36°48.4–49.8'N 100°45.5–49.7'E (GPS), 13.–15.VII. / 2005, J. Hájek, D. Král & / J. Růžička leg. (Ch18) [p] // individually on carrion / (several remnants of *Ovis* / and *Capra*); loamy soil / not far from the bank of / the Qinghai Hu lake [p] // HOLOTYPE ♂ / *NITIDULA obenbergeri* sp. nov. / Lasoň, Hájek & Jelínek det. 2021 [red label, p]'. PARATYPES: **CHINA: QINGHAI:** 7 ♂♂ 26 ♀♀, same label data as holotype (ALCB, NMPC); 3 spec., 'CHINA: Qinghai province, HAIBU env., 3190–3270 m, 36°48.4–49.8'N, 100°45.4–49.7'E, 13.–15.VII.2005, J. Hájek, D. Král & J. Růžička leg.', 'individually under stones, in excrements and on vegetation, loamy soil not far from the bank of the Qinghai Hu lake (NMPC, ALCB). **KAZAKHSTAN:** 4 spec., 'Kazakhstan, Tsharyn valley, 25 km NE Zhalanash, 43°15'N, 78°48'E, 1200 m, 21.v.1993, lgt.?' (ALCB, NMPC). **MONGOLIA:** 2 spec., 'Nordl. Mongolei, Changai, Leder' (HNHM); 1 spec., 'MONGOLIA: Central aimak, Bajanzurch sum, 1300 m, 30 km O v. Ulan Baator, Exp.Dr.Z.KASZAB, 1963', 'Nr.1., 16.VI.63' (HNHM); 1 spec., 'MONGOLIA: Ostgobi aimak 13 km SSO v. Chara-Eireg, 1100 m, Exp.Dr.Z.KASZAB, 1963', 'Nr.56., 29.VI.63' (HNHM); 5 spec., 'MONGOLIA: Suchebaator aimak, Ongon elis, 10 km S von Somon Chongor, 900 m, Exp.Dr.Z.KASZAB, 1965', 'Nr.355, 3.–5.VIII.1965' (HNHM); 3 spec., 'MONGOLIA: Suchebaator aimak, Somon Dariganga, 1150 m, Exp.Dr.Z.KASZAB, 1965', 'Nr.364, 5.VIII.1965' (HNHM); 8 spec., 'MONGOLIA: Suchebaator aimak, Molzog elis, 2km S von Somon Dariganga, 1150 m, Exp.Dr.Z.KASZAB, 1965', 'Nr.366, 6.–7.VIII.1965' (HNHM); 4 spec., 'MONGOLIA: Baajanchongor aimak,

Changaj Gebirge, Ulaan čolon, 18 km S vom Pass Egijn davaa, 2300 m, Exp.Dr.Z.KASZAB,1966', 'Nr.711, 18.-19.VII.1966' (HNHM); 1 spec., 'MONGOLIA: Central aimak, Cagan Dirschin chodag, im Tal des Tola, 24 km von Somon Tariat, 1180 m, Exp.Dr.Z.KASZAB,1966', 'Nr.741, 24.VII.1966' (HNHM); 17 spec., 'MONGOLIA: Central aimak, Chentej Gbg., 15 km von. Ulaan Baator, Waldgrenze, 16.v.1971, leg.Zs.Peregi' (HNHM); 1 spec., 'MONGOLIA: Central aimak, Chentej Gbg., 15 km N von Ulaan Baator, 12.VI.1971, leg.Zs.Peregi' (HNHM); 6 spec., 'MONGOLIA: Uvs aimak, Senke des Sees Ačit nuur, Flusstal Altan gadasin chev gol, 20-25 km NO von Somon Bčohmčrčn, 1600 m, Exp. Dr.Z.KASZAB,1968', 'Nr. 1040, 29.VI.1968' (HNHM); 6 spec., 'MONGOLIA: Bajan-Olgij aimak am Pass Schine davaa, 27 km S von Somon Cagannuur, 2690 m, Exp.Dr.Z.KASZAB,1968', 'Nr. 1045, 30.VI.1968' (HNHM); 1 spec., 'MONGOLIA: Uvs aimak, am Fluss Baruunturuun gol neben Somon Baruunturuun, 1280 m, Exp.Dr.Z.KASZAB,1968', 'Nr. 1012, 25.VI.1968' (HNHM); 2 spec., 'MONGOLIA: Bulgan aimak, 11 km W von Somon Bajannuur am See Bajan nuur, 1000 m, Exp. Dr.Z.KASZAB,1968', 'Nr. 958, 14.VI.-24.VII.1968' (HNHM). **RUSSIA:** 4 spec., 'Tschita, Transbaikalien, Hermann Frieb' (HNHM, NMPC); 1 spec., 'Ostsibirien, Werchne-Udinsk, leg. F. Ziegler, 1914-18' (PACR); 1 spec., 'RUSSIA: S Tuva, 36°31'N, 95°35'E, Khorumung - Tayga Mt. Range, Ular-Khem Riv., 23.V.2000, leg. Vashchenko S.' (ALCB); 6 spec., 'RUSSIA: SW Tuva, S slopes of W Tanu-Ola Mts. near Soglyi vill., 2000-2800 m, 13.V.-1.VI. 2003, leg. Vashchenko S.' (ALCB); 4 spec., 'RUSSIA: SW Tuva, 2000 m, SW Tannu-Ola Mt., Sogly vill., 1-5.VII.2003, leg. Vashchenko S.' (ALCB, USMB).

Description. Male (holotype). Body oblong oval, moderately convex. Head and pronotum densely punctate, dull, elytra moderately shining. Black, each elytron with two orange spots: very large basal one, occupying most of the area between scutellum and lateral margin, embracing humeral bulge; and smaller round spot situated posterior to midlength of each elytron; lateral and apical margins with orange border. Legs and antennae yellow-brown, antennal club black. Pubescence long, dense, recumbent, yellow, lateral margins of both pronotum and elytra fringed with dense long yellow setae (Fig. 3). Body length 3.8 mm, width 1.5 mm.

Head little narrower than anterior pronotal margin. Frons flatly convex with pair of shallow impressions between antennal insertions. Punctures of somewhat variable size, almost equal in size to eye-facets, almost contiguous, separated by very narrow, at places somewhat raised interspaces. Punctures on clypeus somewhat granular, anterior margin of clypeus subtruncate, not bordered. Eyes setose. Submentum concave, punctures equal in size to eye-facets, separated by less than one diameter. Antennal furrows deep, well-defined, converging posteriad, not exceeding posterior margin of eye. Antennae almost as long as width of head across eyes; antennomere III as long as IV + V, each of IV and V longer than wide, VI and VII as long as wide, VIII transverse; antennal club occupying less than third of antenna length (ratio ANLE/ANCL = 3.58), broadly oval (ratio ANCL/ANCW = 1.15).

Pronotum transverse (ratio WPR2/LEPR = 1.69), widest posterior to midlength, more strongly rounded anterior than posteriad (ratio WPR1/WPR3 = 1.20). Anterior margin of pronotum truncate, anterior angles obtuse, not prominent. Lateral margins not explanate, flatly arcuate in anterior half, strongly curved posterior to midlength, feebly concave besides posterior angles. Basal margin distinctly bordered, very shallowly concave besides posterior angles,

those obtuse to subrectangular. Pronotal disc moderately convex, obliquely shallowly impressed besides posterior angles, densely punctate like frons; size of individual punctures variable, larger punctures sometimes rasp-like.

Scutellar shield small, subtriangular, densely punctate with narrow impunctate border.

Elytra widest at apical fourth, separately rounded apically reaching their maximum length between longitudinal axis and suture. Ratio LELY/WELY = 1.18. Lateral margins not explanate, in basal half almost rectilinear, in posterior half regularly arcuate. Surface of elytra flatly convex along suture, strongly convex laterally, lateral margins hardly visible simultaneously from above in their entirety. Punctures somewhat smaller than eye-facets, separated by one diameter or less, interspaces with traces of reticulation, moderately shining. Sutural lines distinct in apical fourth.

Pygidium subtriangular with rounded apex, densely rugosely punctate, punctures of variable size.

Legs. Ratio distances between pro-, meso- and metacoxae as 1.0 : 2.0 : 3.6. Pro-, meso- and metafemora simple, oval, ratio length/width = 2.64, 2.66 and 2.81, respectively. Anterior tibia 3.3× longer than wide, outer subapical angle sharp, prominent. Protarsomeres I–III bilobed, ca. half the width of protibia, tarsal claws simple. Mesotibia 4.3× longer than wide, outer subapical angle prominent, outer margin bearing long dense setae. Metatibia 5.8× longer than wide, outer subapical angle blunt, feebly prominent.

Ventral side. Prosternum moderately convex in middle, shallowly concave laterally, punctate like submentum; anterior margin markedly bordered. Notosternal sutures distinct. Hypomera flat, densely shallowly punctate, punctures somewhat larger than eye-facets, separated by less than one diameter, sometimes almost contiguous. Prosternal process dilated posterior to procoxae, flatly arcuate apically with long acute lateral angles. Mesoventrite moderately convex, densely rugosely punctate. Metaventrite somewhat flattened posterior to midlength, discrimen developed as impunctate medio-longitudinal strip in posterior half of metaventrite. Punctures almost equal in size to eye-facets or smaller, shallow, separated by one diameter or less, becoming closer and larger laterally; interspaces moderately shining in middle, reticulate and dull laterally. Punctuation of abdominal ventrite I as on metaventrite, but somewhat closer, punctuation of following ventrites similar, but somewhat finer. Posterior intercoxal margin arcuately emarginate.

Male genitalia. Median lobe of aedeagus almost twice as long as wide, widest in distal half, lateral margins broadly arcuate (Fig. 6). Tegmen ca. 1.4× longer than wide, subparallel-sided in basal half, in distal half gradually narrowed towards flatly rounded apex (Fig. 9). Tergite VIII broadly rounded apically (Fig. 12).

Female similar to male, but elytra nearly simultaneously rounded apically, reaching their maximum length at suture, sutural angles accentuated by longer yellow setae. Punctuation of pronotum as a rule more heterogeneous, intermixed with large rasp-like punctures. Protarsomeres I–III not bilobed, ca. one third of tibia width.

Variation. Background colour of dorsal surface varying from brown to black, elytra often lighter than head and pronotum. Shape and size of elytral spots somewhat variable, sometimes both spots on one elytron confluent.

Measurements. Body length 2.7–4.2 mm, width 1.0–1.8 mm. Ratio ANLE/ANCL = 3.27–3.40, ANCL/ANCW = 1.12–1.22, WPR2/LEPR = 1.51–1.70; WPR1/WPR3 = 1.22–1.44, LELY/WELY = 1.18–1.23.

Differential diagnosis. *Nitidula obenbergeri* sp. nov. resembles closely related Palearctic *N. carnaria*, from which it differs in more transverse pronotum (ratio WPR2/LEPR = 1.51–1.70, in *N. carnaria* 1.41–1.57), antennomeres IV and V as a rule longer than wide (as long as wide in *N. carnaria*) and different male genitalia (cf. Figs 4, 7, 10 and 6, 9, 12 respectively). *Nitidula obenbergeri* sp. nov. differs from *N. maculosa* in subtruncate anterior margin of pronotum and flatly rounded apex of prosternal process (anterior margin of pronotum shallowly concave anteriorly and prosternal process truncate apically in *N. maculosa*).

Collection circumstances. In China, the new species was collected on *Capra*, *Lepus* and *Ovis* carcasses, in the steppe/pasture surrounded with sand dunes at one side, and the bank of the Qinghai Hu lake at the other side (Figs 13–16).

Etymology. The new species is dedicated to the late Czech entomologist, Professor Jan Obenberger, who was the first to establish it as a distinct taxon, having labelled the specimens from Tschita in NMPC as aberrations of *Nitidula carnaria*. The specific epithet is a noun in the genitive case.

Distribution. Northern China (Qinghai Province), south-eastern Kazakhstan, Mongolia and Russian East Siberia (Tuva and Zabaykalsky Krai).

New records

Nitidula flavomaculata Rossi, 1790

Material examined. AZERBAIJAN: Baku env., Sanqaçal, 16.v.2007, K. Orszulik leg., 2 spec. (NMPC). KAZAKHSTAN: Ūrzar rayon, 5 km N of Taskesken, 47°15'N, 80°47'E, 15.vi.2017, M. Bidas leg., 1 spec. (ALCB). KYRGYZSTAN: Chüy prov., Kirgizskiy Mts., 1060 m, 23.vi.2000, V. Gurko leg., 2 spec. (ALCB).

Distribution. A species widely distributed in the Western Palearctic, except for the northernmost parts; easterly it reaches the Russian Central Asia. Introduced to North America (PARSONS 1943, ADAIR & KONDRATIEFF 1996, SIMS & FOTHERGILL 2014). **First record from Azerbaijan, Kazakhstan and Kyrgyzstan.**

Nitidula rufipes (Linnaeus, 1767)

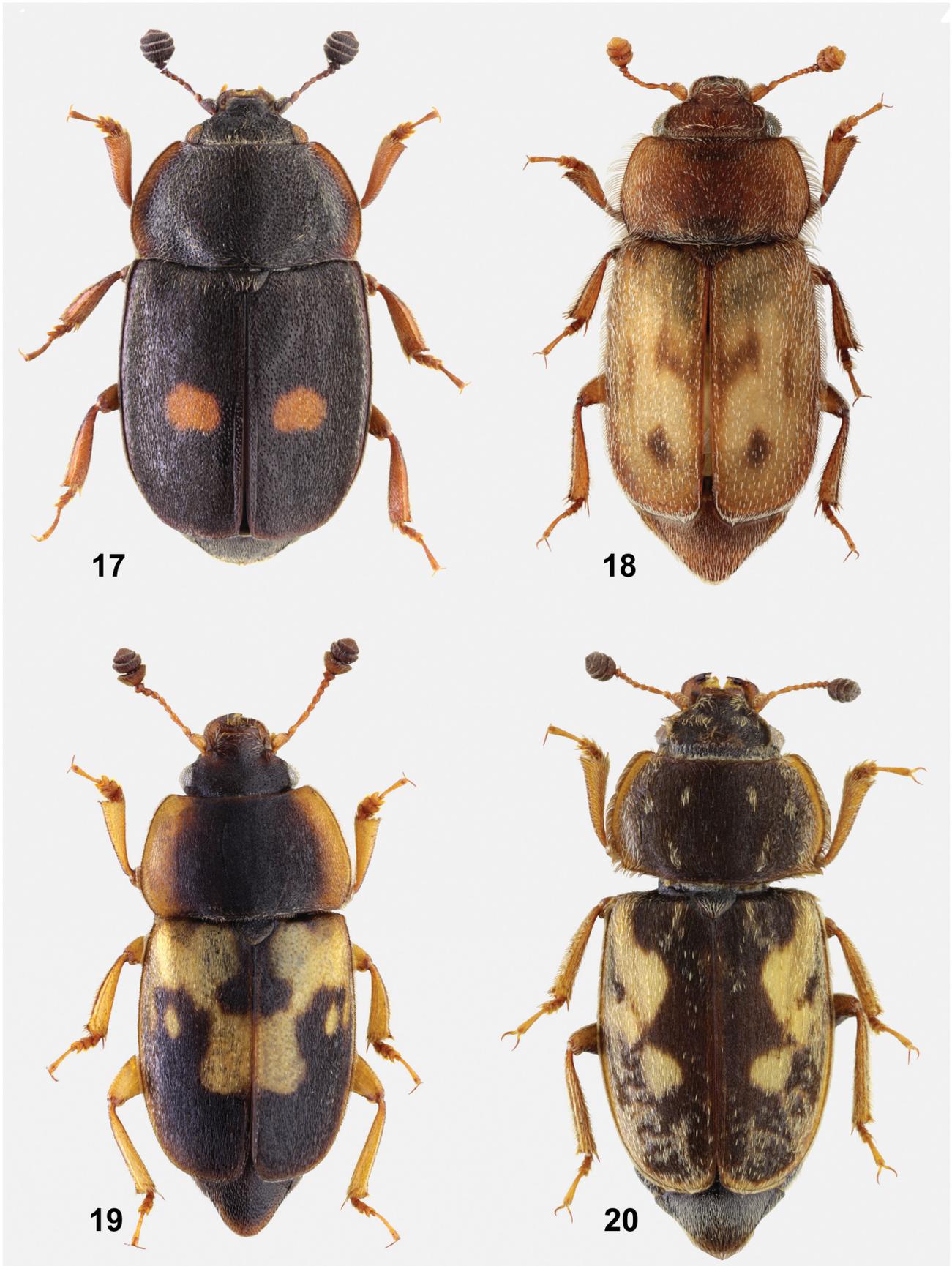
Material examined. CHINA: SHAANXI: Yongji, 8.–12.v.2010, E. Kučera leg., 5 spec. (NMPC). GEORGIA: Suchumi, Cebelda, 13.viii.1976, J. Pradáč leg., 1 spec. (NMPC). KYRGYZSTAN: Chüy prov., Kirgizskiy Mts., 1060 m, 23.vi.2000, V. Gurko leg., 1 spec. (ALCB). RUSSIA: EAST SIBERIA: Zabaykalsky Krai, Tschita, H. Friebe leg., 2 spec. (NMPC).

Distribution. Holarctic species; first record from Japan by HISAMATSU (2012). **First record from China (Shaanxi), Georgia, Kyrgyzstan and Russian Eastern Siberia.**

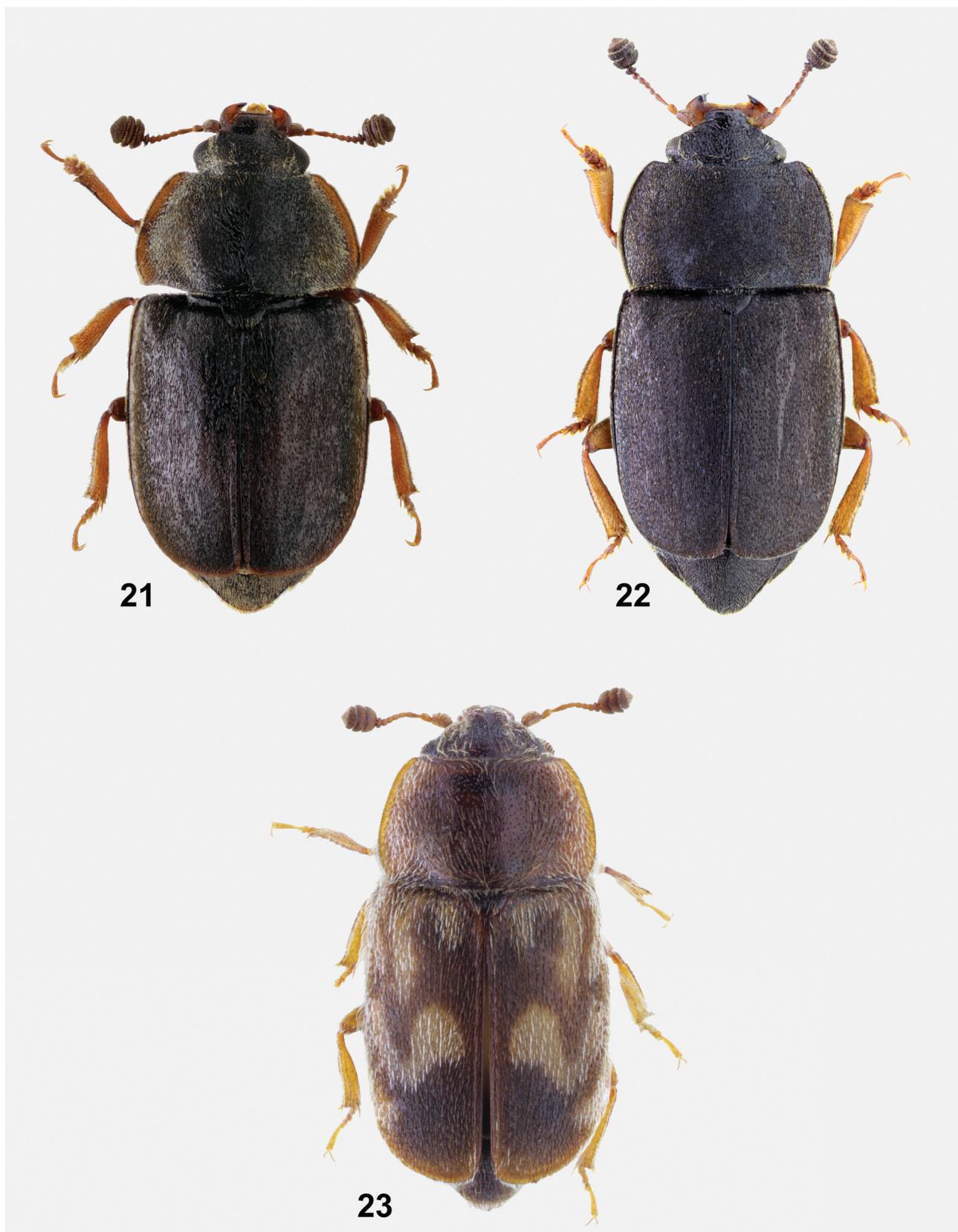
Key to the species of the genus *Nitidula*

- 1 (4) Lateral portions of pronotum with honey-comb like sculpture consisting of very large and dense flat punctures separated by very narrow raised interspaces. Anterior margin of pronotum concave, with prominent anterior angles. Setose fringe of lateral margins of both pronotum and elytra short, inconspicuous (individual recurrent setae as long as width of pedicel, but width of fringe half of width of antennal flagellum); elytra separately rounded apically, with maximum length at longitudinal axis.
- 2 (3) Black-brown, legs and antennae red-brown, explanate sides of pronotum, hypomera and epipleura more or less reddish. Each elytron with orange round spot posterior to midlength (Fig. 17). Male: punctures of pronotal disc similar to female, but distinctly closer, somewhat rugulose, surface duller. Female: punctures of pronotal disc umbilicate, equal in size to or larger than eye-facets and separated by 1.0–1.5 diameter; interspaces shining with intermixed simple fine punctures (number and density variable). Body length: 3.4–5.3 mm. Holarctic species. *N. bipunctata* (Linnaeus, 1758)
- 3 (2) Brown-black, legs and epipleura red-brown, explanate sides of pronotum and elytra sometimes dark reddish translucent; elytra without median orange spot (Fig. 21). Male: Punctures of pronotal disc similar to female, but somewhat closer, intermixed small punctures separated mostly by less than one diameter, surface feebly shining. Female: umbilicate punctures on pronotal disc smaller and sparser than in preceding species, mostly separated by several diameters, interspaces shining, intermixed fine punctures separated by about 1.0 diameter. Body length: 3.5–5.0 mm. Nearctic species occurring in the northern part of North America from Alaska to Iowa. *N. nigra* Schaeffer, 1911
- 4 (1) Punctures of pronotum becoming closer and coarser laterally, but never developing into honeycomb-shaped sculpture.
- 5 (6) Black, legs and antennae (except for black club) red-brown (Fig. 22). Anterior pronotal angles prominent, obtusely angulate. Punctures of elytra rather large, mostly separated by more than one diameter, spaces between them reticulate. Lateral margins of pronotum and elytra fringed with short dense recurrent setae, width of fringe less than width of antennal flagellum. Male: Pronotal punctures equal in size to eye-facets or smaller, separated by 0.5–1.5 diameters, interspaces ocellate-reticulate, dull. Elytra separately rounded apically. Female: umbilicate pronotal punctures larger than eye-facets, separated by less than one diameter, interspaces smooth and shining, with sparse intermixed fine simple punctures. Elytra simultaneously rounded apically. Body length: 2.4–5.1 mm. Holarctic species. *N. rufipes* (Linnaeus, 1767)
- 6 (5) Body bicoloured, elytra with light pattern.

- 7 (12) Anterior margin of pronotum shallowly concave, anterior pronotal angles bluntly angulate.
- 8 (9) Punctures of pronotal disc fine and simple, smaller than eye-facets and separated by 1.0–1.5 diameters, intermixed with larger ones; interspaces smooth and shining. Brown-black, legs and antennae (excepting dark club) yellow-brown, all pronotal and elytral margins dark reddish, each elytron with undulate yellow transverse bar at its midlength and with elongate, sometimes more or less reduced, yellow spot on humeral bulge (Fig. 23). Body length: 2.8–5.0 mm. Nearctic species occurring from Canada to Mexico. ...
..... *N. ziczac* Say, 1825
- 9 (8) Pronotal punctation and colour-pattern of dorsum different.
- 10 (11) Brown-black, legs, antennae (excepting dark club) and explanate sides of pronotum brown-yellow, each elytron typically with yellow quadrangular spot reaching suture at its midlength and interconnected with yellow base of elytra; yellow coloration variable, median spot may be separated from basal one, which again may be subdivided in more or less separated periscutellar and humeral spots (Fig. 19). Elytra with dispersed punctures nearly equal in size to larger pronotal punctures and separated by several diameters; interspaces microscopically punctulate. Male: punctures of pronotum smaller than eye-facets, separated by one diameter or less, sparsely intermixed with somewhat larger granular punctures. Female: pronotal punctation markedly sparser than in male, surface smooth and shining with widely spaced fine simple punctures intermixed with somewhat larger umbilicate punctures. Body length: 2.6–6.7 mm. Western Palearctic species reaching easterly to Central Asia; absent in the northernmost part of the region. Introduced in North America.
..... *N. flavomaculata* Rossi, 1790
- 11 (10) Brown-black, legs, antennae and sides of pronotum brown-yellow, vertex and suture dark red-brown, pronotal disc with six small yellow spots, elytra with extensive yellow pattern situated at outer side of each elytron and widely separated along dark suture (Fig. 20). Pronotal punctation in both sexes fine, simple, almost uniform, separated by one diameter or less in males and one diameter in females, elytra punctate like pronotum. Body length: 4.4–6.6 mm. A species known from Southern territory of European Russia, Kazakhstan, Turkmenia, Russian Siberia and Mongolia.
..... *N. fusula* Gebler, 1833
- 12 (7) Anterior margin of pronotum subtruncate, anterior angles not prominent.
- 13 (14) Pronotum about 1.75 times wider than long. Head and pronotum brown, elytra brown-yellow with vaguely delimited yellow pattern and small black median preapical spot (Fig. 18). Male: pronotal disc finely densely punctulate with intermixed larger punctures; density of both kinds of punctures considerably variable, larger punctures sometimes almost absent. Female: pronotum with large umbilicate punctures separated by one diameter or less, and intermixed with sparse simple punctures, more shining than in male. Body length 3.6–7.0 mm. Species from North Africa and the eremial zone of the Middle East.
..... *N. eremita* Audisio, 1990
- 14 (13) Pronotum less transverse. Elytra as a rule with more contrasting pattern.
- 15 (16) Anterior pronotal margin shallowly, but distinctly, concave. Pronotum comparatively longer (ratio WPR2/LEPR = 1.44–1.50), almost equally narrowed both anteriorly and posteriorly (ratio WPR1/WPR3 = 1.16–1.23). Fringe of setae at pronotal sides longer and sparser, width of the fringe (not length of setae) \approx length of antennomere III. Elytra moderately convex also at sides, lateral margins visible simultaneously from above in their entirety. Prosternal process truncate apically. Most of elytra yellow, leaving triangular area at basal half of suture (sometimes reduced to a common lunular spot before midlength of elytra), outer lateral elongate spot at midlength and sutural apical corners black. Body length 2.3–4.1 mm. Species from North Africa and the Middle East, eastwards to Iraq, Israel and Jordan.
..... *N. maculosa* Fairmaire, 1866
- 16 (15) Anterior pronotal margin subtruncate. Proportions of pronotum variable, but it is always more strongly narrowed anteriorly, ratio WPR1/WPR3 = 1.21–1.44. Sides of elytra strongly transversely convex, lateral margins not visible simultaneously from above in their entirety. Prosternal process flatly rounded apically. Colour pattern as a rule different.
- 17 (18) Pronotum more strongly transverse, ratio WPR2/LEPR = 1.51–1.70. Antennae as long as the width of head across eyes, antennomeres IV and V as a rule (safe very small specimens) distinctly longer than wide. Brown to black, each elytron with large basal spot embracing humeral bulge, one smaller round spot at midlength as well as lateral and apical borders orange, both elytral spots sometimes confluent. Long recumbent setae on elytra yellow. Body length: 2.7–4.2 mm. Species known from SE Kazakhstan, China (Qinghai province), Mongolia, Russian East Siberia.
..... *N. obenbergeri* sp. nov.
- 18 (17) Pronotum comparatively longer, ratio WPR2/LEPR = 1.41–1.57. Antennae shorter than the width of head across eyes, antennomeres IV and V as long as wide. Colour pattern similar to the preceding species, spots on elytra as a rule smaller and pale yellow, basal spot as well as lateral border sometimes dissolved into several smaller spots. Long recumbent setae on elytra bicoloured, yellow on pale spots, black on dark spaces between them. Body length: 2.0–4.4 mm. Palearctic species introduced to North and South America. *N. carnaria* (Schaller, 1783)



Figs 17–20. Habitus of *Nitidula* species. 17 – *Nitidula bipunctata* (Linnaeus, 1758) (body length: 4.7 mm); 18 – *N. eremita* Audisio, 1990 (2.8 mm); 19 – *N. flavomaculata* Rossi, 1790 (4.8 mm); 20 – *N. fusula* Gebler, 1833 (5.9 mm).



Figs 21–23. Habitus of *Nitidula* species. 21 – *Nitidula nigra* Schaeffer, 1911 (body length: 4.6 mm); 22 – *N. rufipes* (Linnaeus, 1767) (4.3 mm); 23 – *N. ziczac* Say, 1825 (3.2 mm).



Figs 24–27. Habitus of Neotropical species previously classified in the genus *Nitidula* Fabricius, 1775. 24 – *Mystrops bourgeoisi* (Grouvelle, 1914) (syntype; Ecuador; 5.5 mm); 25 – *Cryptarcha chilensis* (Germain, 1855) (Chile, 2.8 mm); 26 – *Catonura complanata* (Germain, 1855) (Chile, 3.7 mm); *Mystrops rufidens* (Reitter, 1873) (syntype; Venezuela; 2.4 mm).

Lectotype designation of *Nitidula latiplaga* Solsky, 1876

Nitidula latiplaga Solsky, 1876: 248 ('Turkestan').

Type material. LECTOTYPE (by present designation): ♂ (ZMUM), labelled: '7. [p] // 71. [old, hw] // Syntypus [red label, hw Nikitsky] // Nitidula / latiplaga / Solsky [red label, hw Nikitsky] // Lectotypus ♂ / Nitidula / latiplaga / Solsky / Jelínek det. 2006 [red label, hw and p] // Nitidula / flavomaculata / (Rossi) / det. J. Jelínek 2006 [hw and p]'. PARALECTOTYPES: 6 spec., the same labels as lectotype, but with the respective paralectotype label; 1 spec. labelled: '14. // 71'; 1 spec. labelled: '28.' (all ZMUM).

Comments to classification. *Nitidula latiplaga* was described by SOLSKY (1876) and was listed as a distinct species by GROUVELLE (1913). Its synonymy with *Nitidula flavomaculata* was established by revision of syntypes from the Zoological Museum of the Moscow State University, Moscow (JELÍNEK & AUDISIO 2007). To fix the abovementioned synonymy, the lectotype designation is herein formalized.

Comments on Neotropical species previously classified within the genus *Nitidula*

Apart from the Holarctic species dealt with above, four Neotropical species are still placed in *Nitidula* and their status has not yet been satisfactorily elucidated. Taxonomic position of these species is discussed below.

***Mystrops bourgeoisi* (Grouvelle, 1914), comb. nov.**

(Fig. 24)

Nitidula bourgeoisi Grouvelle, 1914: 47.

Mystrops gigas Kirejtshuk & Couturier, 2009: 62; **syn. nov.**

Material examined. SYNTYPES: 2 spec., not sexed (MNHN), labelled: 'MUSEUM PARIS / ÉQUATEUR / EL PELADO / 4150 M. D'ALT. / P. RIVET 1903 [grey label, p] // JANVIER [p] // Nitidula / Bourgeoisi / Grouv. [hw Grouvelle]'. Notes. The specimens are labelled as holotype and paratype of '*Mystrops gigas*' by Kirejtshuk.

Comments to classification. According to GROUVELLE (1914), *Nitidula bourgeoisi* was described after six specimens from Ecuador. Through the kindness of Ms. Taghavian we were able to study photos of two syntype specimens from the MNHN. Ventral view of one specimen clearly displays the characteristic form of the metacoxal line on abdominal ventrite I, which allows placement of the beetle within the genus *Mystrops* Murray, 1864.

Mystrops gigas from Ecuador was described by KIREJTSHUK & COUTURIER (2009) without mentioning *Nitidula bourgeoisi*, and the types of the latter, labelled by Kirejtshuk as holotype and paratype of *Mystrops gigas* respectively, were not included in the type material in the original species description. Although we did not study the type material of *M. gigas*, it is evident from its original description, that both taxa are conspecific. Even though the types of *Nitidula bourgeoisi* were omitted from the type material of *Mystrops gigas* and cannot be therefore considered types of the latter, the name *bourgeoisi* Grouvelle, 1914 has priority over *gigas* Kirejtshuk & Couturier, 2009 and therefore, it is here considered as junior subjective synonym of *Mystrops bourgeoisi* (Grouvelle, 1914), comb. nov.

***Cryptarcha chilensis* (Germain, 1855)**

(Fig. 25)

Nitidula chilensis Germain, 1855: 396.

Cryptarcha chiliensis [lapsus calami]: GROUVELLE (1906: 25).

Material examined. 8 spec. (2 specimens at a time on the same card): Chili; in one pair moreover: *Nitidula chilensis* coll. Fairm. Genn [hw Grouvelle] (MNHN); 1 spec., Chile, VIIIr., Las Trancas, 36°54.731–71°28.739, 1000 m, 15.–17.ii.2005, S. Bílý leg. (NMPC).

Comments to classification. This species was erroneously listed in GROUVELLE (1913) both in *Nitidula* and *Cryptarcha*, even though it had been classified as *Cryptarcha* already by GROUVELLE (1906). Specimens in MNHN belong undoubtedly to the subfamily Cryptarchinae. Currently, the combination *Cryptarcha chilensis* (Germain, 1855) according to GROUVELLE (1906) is available as tentative, but the true generic combination should be re-examined, as well as the relation between *Cryptarcha chilensis* and *Cryptarcha elongata* (Eschscholtz, 1822).

***Catonura complanata* (Germain, 1855), comb. nov.**

(Fig. 26)

Nitidula complanata Germain, 1855: 396.

Eपुरaea ruficollis Reitter, 1873: 29; **syn. nov.**

Catonura ruficollis: REITTER (1875: 61).

Catonura rufithorax Reitter, 1883: 74 (unnecessary replacement name); **syn. nov.**

Material examined. 1 spec., Chili, ex. Fairm., *Eपुरaea ruficollis* Sol. (MNHN); 2 spec., Chili, *ruficollis* Sol. Reitt. (MNHN); 12 spec., Chile, VII. R., Alto Vilches, 35°35.949–71°02.947, 1400–1800 m, 14.–16.i.2005, S. Bílý leg. (NMPC).

Comments to classification. The brief but accurate original description of *Nitidula complanata* fits perfectly to *Catonura ruficollis* (Reitter, 1873). The latter species was described by REITTER (1873: 29) as '*Eपुरaea ruficollis* Sol. i.litt. [=] *E. chilensis* Germain i.litt.'. REITTER (1873) was evidently not aware that both nominal taxa were already described as *Nitidula ruficollis* Solier, 1849 (SOLIER 1849) and *Nitidula chilensis* Germain, 1855 (see above) respectively. Later REITTER (1883) realized his error and proposed replacement name *Catonura rufithorax* Reitter, 1883 for his presumed junior homonym. Nevertheless, whatever the current status of *Nitidula ruficollis* Solier, 1849 may be, it has never been combined either with *Eपुरaea* Erichson, 1843 or with *Catonura* Reitter, 1875 and it has never been catalogued in Nitidulidae (GROUVELLE 1913, BLACKWELDER 1945). Thus, it could not be senior homonym of *Eपुरaea ruficollis* Reitter, 1873, and *Catonura rufithorax* Reitter, 1883 remains an unnecessary replacement name. The genus *Catonura* was placed by KIREJTSHUK (2008) as *Cratonura* [incorrect subsequent spelling] in Nitidulinae: Nitidulini, *Perilopsis*-complex along with genera *Eपुरaeopsis* Reitter, 1875, *Perilopsis* Reitter, 1875 and *Testudoraea* Kirejtshuk, 1986 (raised to generic status by LAWRENCE 2019).

The type material of *Nitidula complanata* could not be found in the Paris museum neither during the visit of JJ in 1983, nor recently by Ms. Taghavian and the type is probably lost. Unfortunately, also the type of *Eपुरaea*

ruficollis could not be undoubtedly identified within the Grouvelle's collection in MNHN. However, the identity of *Catonura ruficollis* has never been questioned and we have no doubts about its conspecificity with *Nitidula complanata*. Therefore, we establish here their formal synonymy: *Catonura complanata* (Germain, 1855), comb. nov. = *Catonura ruficollis* (Reitter, 1873), syn. nov. = *Catonura rufithorax* Reitter, 1883, syn. nov.

Mystrops rufidens (Reitter, 1873)

(Fig. 27)

Nitidula rufidens Reitter, 1873: 44.

Mystrops rufidens: KIREJTSHUK & COUTURIER (2010: 372).

Material examined. SYNTYPES: 1 spec., sex unknown, genitalia lost (NHMW), labelled: '740 [hw] // Dr. Moritz / 1858 / Venezuela [p] // Nitidula / rufidens / Reitt. [hw] // Lectotypus [p] 1997 / Nitidula / rufidens Reitter [hw] / design. [hw] Kirejtshuk [hw, red label] // Rufidens / Columb. Reitt [hw] // Cryptoraea / (or Paramystrops Jel.) rufidens Reitter [hw] / det. A. Kirejtshuk 1997 [p]'; 2 ♂♂ 1 ♀ (NHMW), labelled: '740 [hw] // Dr. Moritz / 1858 / Venezuela [hw] // Nitidula / rufidens / Reitt. [hw] // Paralectotypus [p] / Nitidula / rufidens Reitter [hw] / design. [p] Kirejtshuk 1997 [p] [red label]'.

Comments to classification. As suggested by the absence of paragenae, shape of the mouth parts (deeply bilobed labrum, falcate mandibles with acute tips and retinaculum, long and slender maxillary palpomeres) and metacoxal lines on abdominal ventrite I running from inner end of metacoxa posterolaterad to posterior margin of the ventrite, the species belongs to the genus *Mystrops* (*Cryptoraea* Reitter, 1873 was synonymised with *Mystrops* by KIREJTSHUK (2008)). It is a species apparently closely related to *M. bourgeoisi*, from which it differs in fluently convex lateral margins of pronotum (concave besides posterior angles in *M. bourgeoisi*) and orange antennae, legs and pygidium (both appendages and pygidium dark, black-brown in *M. bourgeoisi*). The new combination *Mystrops rufidens* (Reitter, 1873) was published by KIREJTSHUK & COUTURIER (2010) in the diagnosis of *Mystrops atrata* Kirejtshuk & Couturier, 2010 and in the review of the classification of *Mystrops* in the same paper, in both cases without any comments on the original combination or formal publication of the proposed lectotype designation.

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