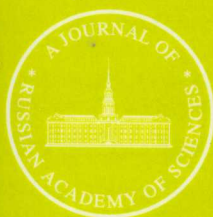


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A Revision of Digging Wasps of the Genus *Oxybelomorpha* (Hymenoptera, Crabronidae, Oxybelini):

1. The *O. kohlii* Species-group

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Abstract—The genus *Oxybelomorpha* Brauns, 1897 is resurrected as a separate taxon of digging wasps of the tribe Oxybelini. The diagnosis of the genus is given together with the analysis of the morphology, distribution, and biology of the genus. The first part of the revision considers representatives of the South African *O. kohlii* species-group including the type species of the genus. Female of *O. rufiventris* (Arnold, 1936) is described for the first time.

Digging wasps of the tribe Oxybelini are frequent members of the fauna of arid regions virtually in all zoogeographical regions, except for the Australian region, wherefrom they were not recorded till now. In my opinion, all the genera of the tribe Oxybelini form 3 natural groups. The first group includes genera with unmodified metasomal segments and without strongly developed posterolateral prominences (squamae) of the metanotum and dorsal prominence of the propodeum (mucro): *Belomicroides* Kohl, 1899, *Minimicroides* Antropov, 2000, and *Pseudomicroides* Antropov, 2001. The second group includes genera with unmodified metasomal segments, but with developed squamae and, in most cases, with the mucro: *Brimocellus* Arnold, 1927, *Enchemicrum* Pate, 1929, *Gessus* Antropov, 2001, and *Oxybelus* Latreille, 1796. Finally, the third group comprises genera with distinct lateral parts of all the metasomal segments, separated by carinae and strongly bent laterally, concealing more or less flattened sternites laterally, and also possessing developed squamae and, usually, the mucro: *Belomicrinus* Antropov, 2000, *Belomicrus* A. Costa, 1871 (s. lat.), and *Wojus* Antropov, 2000. Among three latter genera, the genus *Belomicrus*, comprising more than 120 described species, is the second in the tribe Oxybelini in the number of species (next to the genus *Oxybelus*), being, at the same time, most morphologically variable, because all species of Oxybelini with modified metasomal tergites were related to this genus until the end of the 20th century.

The generic name *Oxybelomorpha* was suggested by Brauns (1897) for the South African *O. kohlii*, described by him; this genus belongs to the third group of species mentioned above. Brauns pointed to the

presence of a separated basal lobe on the lower side of the mandible as a diagnostic character of the new genus; for some time, the generic name *Oxybelomorpha* was attributed to all species of Oxybelini, possessing this character (Ashmead, 1899; Baker, 1909). Later, however, following Kohl (1923), who had described several species with lower mandibular lobes, but strongly differing in other characters, the majority of authors used the name *Oxybelomorpha* as a subgeneric name of the genus *Belomicrus*, including into this subgenus representatives of various species-groups (Schulthess, 1926, 1926a; Arnold, 1930, 1936; Pate, 1931, 1937, 1938). In his early publications, Arnold (1927, 1929) also used the name "*Oxybelomorpha*" for the designation of an original group of species virtually ranked as a subgenus. However, Pate's (1940, 1940a) studies of representatives of the genus *Belomicrus* demonstrated that a single character, related to the mandible structure, was insufficient as a criterion determining the generic rank. It should be noted, however, that Pate examined the American fauna of the tribe in detail, but, at the same time, could study only several Old World species, related to *Oxybelomorpha* by other authors; in most cases, he based his conclusions on insufficiently detailed descriptions. In particular, only 9 out of 29 species of the genus *Belomicrus* (s. lat.) from the Old World were examined by him; in the present work, only 2 of them are treated as belonging to *Oxybelomorpha*. Therefore, it is not surprising that frequently he erroneously interpreted distinguishing characters of *Oxybelomorpha*, believing that some species of *Belomicrus* (s. str.) belong to this group. And although Pate (1940a) gave rather reliable reasons for the synonymy of *Belomicrus* (*Pseudoxybelus*) Gussakovskij, 1933 and *Oxybelomorpha*, his con-

clusion on the synonymy of *Oxybelomorpha* and *Belomicrus*, based mainly on exaggerated significance of such variable characters, as the shape of the squamae and mucro, could hardly be treated as well argued. Evidently, that was the reason why some later authors still used the name *Oxybelomorpha* as the subgeneric one (a propos, usually also incorrectly, blindly following Brauns's approach) (Gussakovskij, 1952; Kazenas, 1972; Tsuneki, 1972), although mainly it was used as a junior synonym of the name *Belomicrus* (Beaumont, 1950, 1957; Pulawski, 1964; Bohart and Menke, 1976; Krombein, 1979; Gayubo and Sanza, 1986; Pagliano and Scaramozzino, 1990; Guichard, 1991; Gayubo *et al.*, 1998).

Indeed, more or less distinct ventral lobes are present on the mandibles of many species of Oxybelini, belonging to different genera and differently related to each other (*Belomicroides*, part of species-groups of *Belomicrus*, species of *Brimocelus* and *Gessus*, or males of *Enchemicrum*). However, a complex of species significant in number and mainly African in distribution could be clearly distinguished among representatives of the genus *Belomicrus* (s. lat.); the most significant distinguishing characters of this group include a specific structure of sides of the mesopleuron, rather than the presence of a characteristic lower lobe on the mandibles. These mesopleura are contoured along anterior, lower, and posterior margins, by a sharp ridge, formed of fused postspiracular carina, omaulus, sternaulus, and precoxal carina. This ridge was not found in the state mentioned in any other representative of the tribe. Already Kohl (1923), Pate (1940a), and de Beaumont (1950, 1957) paid attention to this peculiarity; but, however, neither they, no subsequent authors treated it as a significant character (Bohart and Menke, 1976; Guichard, 1991; Gayubo *et al.*, 1998). Among Oxybelini of the Old World, similar ridges on the mesopleura are found only in representatives of the genera lacking lateral carinae on the metasomal tergites. In particular, only the short sternaulus is present in *Gessus*, and in *Oxybelus*, the postspiracular carina, omaulus, and precoxal carina. At the same time, these ridges are absent in all other Oxybelini of the Old World with modified metasomal tergites, still related to the subgenus *Belomicrus* (s. lat.). Thus, such a structure of mesopleura should be treated as a unique one. Besides, virtually all the species of the complex mentioned possess several additional common characters: their inner eye orbits distinctly adjoin each other in the lower part of the frons; vertex tubercles are absent; psammophores on the temples, mandibles, and

fore legs are developed (at least in females). Lateral parts of the transverse costa of the pronotal carina are also frequently distinct (in the tribe, this character is typical only of the genera *Enchemicrum* and *Oxybelus*). Males of some species also possess lower depressions on the fore tarsi (characteristic of representatives of the genus *Belomicroides*). It should be noted, however, that a similar situation is typical of species of the genus *Belomicrus* (s. lat.) of the New World: the mesopleural costae are developed in the small *B. vanyume* species group, whereas males of the *B. cladothricis* species-group possess modified procoxae (Pate, 1940; Bohart, 1994). However, detailed comparison demonstrates parallel and independent origin of these characters in representatives of New and Old Worlds, at least, in the first group; establishing of the taxonomic position of this group needs a separate study.

In my opinion, the South African distribution of the species-complex described is one of its most important characters. Among 24 species revealed by me, only 3, 2, 2, and 1 species were recorded from southwestern Africa, southeastern Mediterranean, Central Asia, and southwestern Europe, respectively. By contrast, the overwhelming majority of species of the genus *Belomicrus* (s. str.) of the Old World are spread in Europe, northern Africa, and, especially, in Asia, and only some species are found in central Africa [three South African species significantly differ from all other *Belomicrus* (s. str.) and, in my opinion, need special investigation for establishing of their generic status]. A propos, a similar character of distribution was previously noted in a pair of other undoubtedly closely related genera of Oxybelini (*Belomicroides* and *Pseudomicroides*).

Finally, one more fact testifying to an isolated position of the above species complex, concerns its biology. For example, in several known cases, the prey of the species of *Belomicroides* (s. str.) includes either adult soft-wing flower beetles (Melyridae) [*B. fransiscus* Pate, 1931 feed on *Trichochrous* sp. (Williams, 1936) and *Amerocerus cervicalis* Blaisdell (Bohart and Menke, 1976), and *B. borealis* Forsius, 1923, on *Dasytis niger* (L.) (Valkeila, 1963)], or nymphs and adults of caspid bugs (Miridae) [*B. forbesii* (Robertson, 1889) feed on *Orectoderus obliquus* Uhler (Evans, 1969, 1970), and *B. penuti* Pate, 1940 and *B. coloratus* Baker, 1909, on nymphs of Miridae (Bohart and Menke, 1976)]. At the same time, according to the first original data, females of *Oxybelomorpha* hunt for adults of small lepidopterans (*O. kohlii* feed on Bibi-

onidae); in the tribe Oxybelini, it is typical only of representatives of the genera *Enchemicrum* and *Oxybelus*.

Thus, among representatives of the genus *Belomicrus* (sensu Kohl, 1923; Pate, 1940, 1940a; Bohart and Menke, 1976), a large complex of species is distinguished in the Old World; this complex is characterized by a unique combination of morphological characters and also possesses an isolated range and specific biology. In my opinion, these facts are sufficient for separation of the above species complex of Oxybelini as an independent taxon of the generic rank. This genus is a sister group in relation to the genera *Belomicrus* (s. str.), *Wojus* and, probably, *Belomicrinus* combined. As far as *O. kohlii* belongs to this complex, the name *Oxybelomorpha* Brauns, 1897 should be resurrected as the generic name of the separated taxon, and *O. kohlii* should be retained as the type species of this genus.

TAXONOMY

On the whole, in the revision of the genus *Oxybelomorpha* proposed, its species are united into 10 groups; differences between groups include mainly structural features of the pronotal carina, mesoscutum, scutellum and metanotum (first of all, shape of its squamae), dorsal part of metapleuron, the male fore tarsus, apex of the hind femur and 1st segment of the hind tarsus, and also spine of the propodeum (mucro) and metasomal tergite I. Besides, some significant differences between South African and Palaearctic groups of species should be noted. In particular, African representatives of *Oxybelomorpha* possess a deeply medially depressed mesoscutum (usually, scutellum also), always distinctly developed posterolateral lobes of scutellum, and usually well-developed precoxal tooth of mesopleura; in some species, the metapleura possess more or less developed dorsal ridge, occasionally dilated as a lobe. By contrast, Palaearctic species are characterized by absence of the mesoscutal depression; they usually possess a semicircular scutellum with weak lateral fringes but without developed posterolateral lobes and a weak precoxal tooth. The developed dorsal ridge is absent in these species.

The first part of the revision of the genus *Oxybelomorpha* given below treats the South African *O. kohlii* species-group, to which its type species belong.

The material from the following museum and private collections, kindly provided for examination by

their curators and owners, were used in the revision: Albany Museum Collection, Grahamstown, South Africa (AMC); The Natural History Museum, London, UK (BMHN); California Academy of Sciences, San Francisco, California, USA (CAS); Durban Natural Sciences Museum, Durban, South Africa (DNSM); Institut für Pflanzenwissenschaften, Entomologische Sammlung, Zurich, Switzerland (IPZ); Dr. Josef Gusenleiter, Linz/Donau, Austria (JG); Landesmuseum, Biologiezentrum, Linz Austria (LM); Museo Nacional de Ciencias Naturales, Madrid, Spain (MNCN); Museum für Naturkunde, Humboldt Universität zu Berlin, Berlin, Germany (MNHU); Dr. Maximilian Schwarz, Ansfelden, Austria (MS); Musée de Zoologie, Lausanne, Switzerland (MZL); Naturhistorisches Museum Wien, Vienna, Austria (NHMW); National Museum of Namibia, Windhoek, Namibia (NM); University of Oxford, University Museum, Oxford, UK (OUM); South African Museum, Cape Town, South Africa (SAM); Tel Aviv University, Tel Aviv, Israel (TAU); Transvaal Museum, Pretoria, South Africa (TM); United States National Museum, Washington DC, USA (USNM); Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP); Zoological Museum, Moscow State University, Moscow, Russia (ZMMU).

Hereinafter, the following abbreviations are used: *IOD*, ratio of distances between inner eye orbits at level of median ocellus and at level of antennal sockets; *OOD* : *OF* : *POD*, ratio of distances between inner eye orbit and lateral ocellus, diameter of lateral ocellus, and distance between lateral ocelli; *d*, distance between punctures; \emptyset , diameter of punctures. All measurements were made under $\times 50$ magnification.

Oxybelomorpha Brauns, 1879, status revictus

Type species *Oxybelomorpha kohlii* Brauns, 1897, by monotypy.

Oxybelomorpha Brauns in Kohl, 1897: 475. Type species *Oxybelomorpha kohlii* Brauns, 1897, by monotypy.

Belomicrus (*Oxybelomorpha*): Kohl, 1923 : 7; von Schulthess, 1926 : 158; Arnold, 1930 : 14; 1936 : 31; Pate, 1931 : 113; Gussakovskij, 1952 : 260, 262; Kazenas, 1972 : 181; Tsuneki, 1972 : 171.

Belomicrus (*Pseudoxybelus*) Gussakovskij, 1933 : 286. Type species *Belomicrus persa* Gussakovskij, 1933, by monotypy. Pate, 1940a : 240.

Belomicrus (*Oxybelomorpha* species-group): Arnold, 1927 : 61, 70; 1929 : 411.

Belomicrus: Pate, 1940 : 12; 1940a : 221; de Beaumont, 1950 : 422; 1957 : 157, 159; Pulawski, 1964 : 151; Bohart, Menke, 1976 : 46; Krombein, 1979 : 1651; Gayubo, Sanza, 1986 : 56; Pagliano, Scaramozzino, 1990 : 145; Guichard, 1991 : 126; Gayubo *et al.*, 1998 : 16.

Diagnosis of the genus. Body stumpy, from small to medium (3.5–8.5 mm). Frons behind scape more or less depressed, flat-convex dorsally; inner eye orbits usually converging downward; lateral plates of vertex more or less developed in both sexes, occasionally indistinct in small species and part of males; lateral tubercles of vertex absent; median lobe of female clypeus without prominence or, rarely, with basal prominence; female gena without prominences; mandible with distinct ventral lobe at base, pointed apically, without tooth on inner margin, or with obtuse-angled basal tooth, occasionally also with small distal emargination; psammophores developed on lower side of mandible in both sexes and on temple in females; in male, occasionally indistinct on temple; antenna usually with unmodified segments. Pronotal carina short, with more or less developed lateral angles or spines, with median depression dorsally, sharp transverse ridge (or without this ridge) laterally, and narrow transparent fringe in posterior part; humeral calli with vertical ridge or without it; mesoscutum with deep median depression or uniformly convex; admedian lines connivent, occasionally indistinct; parapsidal grooves and adlateral lines usually indistinct or concealed by coarse sculpture, less frequently distinct; prescutellar groove fine, without costae; scutellum convex, frequently entirely or only in posterior part widely depressed medially, with developed lateral ridges; in most species, scutellum with more or less distinct pointed or rounded apically posterolateral lobes; metanotum convex, flat, or depressed medially, rarely with median costa, always bearing developed squamae of various shape; sides of mesopleura bordered by postspiracular carina, omaulus, sternaulus, and precoxal carina, united in common complex; acetabular carina absent; episternal suture developed, usually fine; hypersternaulus developed, usually complete; precoxal tubercle looking like triangular or rounded flat tooth, occasionally weak or indistinct; metapleura with more or less widened dorsal lobe or without lobe. Male fore coxa unmodified, less frequently with deep oblique-transverse depression; in

female, psammophores on fore trochanter and fore femur usually distinct; in male, psammophores frequently noticeably weaker or absent; digging comb on female fore tarsus usually well-developed; in male this comb frequently weak or absent; apical tarsal segments not enlarged; hind femur unmodified or narrowed before apex and dilated apically, with more or less developed dorsal ridge or lobe. Marginal cell of fore wing narrowly truncated apically; in small species, marginal cell rounded; accessory cell more or less distinct; cu-a antefurcal; hind wings with closed cells and developed jugal lobe. Propodeum with completely developed lateral carinae and dorsal mucro of various shape; dorsal field separated by more or less developed ridges or not separated; posterior surface usually with wide median pit, occasionally not closed apically. All metasomal tergites convex, with developed lateral ridges; tergite I with more or less deep, single-piece or bifurcated dorsal pit or without this pit; tergites II–IV usually with distinct transverse basal depressions; in male, these tergites without pubescent pits; pygidial field flat, limited by lateral carinae, triangular or oval-triangular in female and trapezoid in male; metasomal sternites flat, weakly pubescent or (in male) with dense erect hairs; female apical sternite unmodified.

Distribution. Species of *Oxybelomorpha* are mainly known from South Africa and, to a significantly lesser extent, from the southern Palaearctic Region, where they are found mainly in the Mediterranean; only 2 species were reported from Central Asia.

Biology. Biology is not studied in detail; nesting places are similar to those in *Belomicrus*, but *Oxybelomorpha* feed on adults of small dipterans (Bibionidae are reliably known for *O. kohlii*).

The O. kohlii Species-group

The *O. kohlii* species-group is characterized by the following characters: presence of narrow pronotal carina with distinct lateral angles and more or less distinct transverse ridges laterally, mesoscutum with median depression, scutellum widely depressed in posterior part and bearing apically rounded posterolateral lobes, depressed metanotum with median ridge, squamae of metanotum with blunt apical angle and distinct inner angle, directed to median line, small rounded emargination present between squamae of metanotum, metapleura with weak dorsal ridge, male

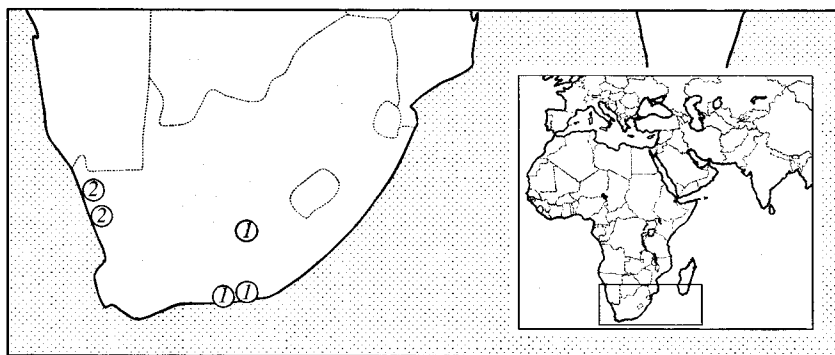


Fig. 1. Distribution of species of the *O. kohlii* group: (1) *O. kohlii*; (2) *O. rufiventris*.

fore coxa without ventral depression, hind femur unmodified apically, mucro usually fine and pointed apically, metasomal tergite I with indistinct dorsal depression, and metasomal tergites strongly red.

I include into this group 2 closely related South African species from the Cape Province of South Africa (Fig. 1): *O. kohlii* Brauns, 1897 and *O. rufiventris* (Arnold, 1936).

***Oxybelomorpha kohlii* Brauns, 1897**

Oxybelomorpha kohlii Brauns in Kohl, 1897 : 476. ♀: South Africa, Cape Province (TM). Holotype examined.

Belomicrus (Oxybelomorpha) kohlii: Kohl, 1923 : 21, 184;

Belomicrus (Oxybelomorpha species-group) kohlii: Arnold, 1927 : 68;

Belomicrus (Oxybelomorpha) Kohli: Arnold, 1930 : 14;

Belomicrus kohlii: Pate, 1940a : 223; Bohart, Menke, 1976 : 363.

Material. Holotype ♀, specimen with the following labels: "TYPE H127 *Belomicrus kohlii* ♀ Brauns," "Type, ♀, Br.," "Port Elizabeth, Cape Colony, 20.9.1896 (Dr. Brauns)," "*Oxybelomorpha Kohlii*, ♀, Brauns," "*Oxybelomorpha*, ♀, Type. Brauns" [TM]. Paratype, ♀, specimen with the following labels: "Port Elizabeth, Cape Colony, 24.IX.1896 (Dr. Brauns)," "*Oxybelomorpha Kohli*, m., ♀, cotype," "SOUTH AFRICAN MUSEUM ex NATIONAL MUSEUM BULAWAYO, 1981," "SAMHYM-AO13325" [SAM]. Other material: 1 ♀: "Alger Bay Capland (Dr. Brauns)," "*Oxybelomorpha Gregi* Brauns Type," "*Oxybelomorpha kohlii* Brauns (det. Maidl. teste),

Type," "Paratypus" [NHMW]; 1 ♀: "S. Africa, Cape Province, Montagu, 1–21.Oct.1924 (R.E. Turner—Brit. Mus. 1924–466)" [BMNH] (Fig. 2, 11c); 1 ♀: "CAPE PROVINCE, Clanwilliam District, Klgin Alexandershoek, 32°20'20"S, 18°46'E, 6.X.1988 (D.W. Gess)," (Fig. 2, 11f); 1 ♀: "CAPE PROVINCE, Clanwilliam District, Klgin Alexandershoek, 32°20'20"S, 18°46'E, 6.X.1988 (F.W. & S.K. Gess). In flowers of *Wahlenbergia* sp. (Campanulaceae)" (Fig. 2, 11a); 1 ♀: "CAPE PROVINCE, Clanwilliam District, Witelskloof, 32°20'35"S, 18°48'E, 1–2.X.1990 (F.W. & S.K. Gess)" (Fig. 2, 11d); 2 ♀: "CAPE PROVINCE, 11 km W of Clanwilliam, on road to Graafwater, 2–8.X.1990 (F.W. & S.K. Gess)" (Figs. 2, 11b, 11e)" [AMC]. 2 ♀: "R.S.A., W CAPE, 60 km N Cape Town, coast, 6.X.1999 (M. Halada)" [LM].

Description. Female. Head (Fig. 2, 1a) rounded in front view, noticeably wider than long; lower part of frons with 2 smooth depressions behind appressed scape, with shining flat tubercle in middle; upper part of frons flatly convex, without distinct median depression; $IOD = 68 : 52$; vertex plates depressed, oval, with distinct borders and matte bottom (Fig. 2, 1b); $OOD : OF : POD = 19 : 9 : 30$; temples rounded at posterior margin (Fig. 2, 1c); median lobe of clypeus oval, projecting forward, limited by blunt lateral angles; distance between these angles nearly twice as long as distance between angle and antennal socket; median lobe with glabrous shining flatly convex triangular field in middle, this field not fringed by ridges; apical fringe separated by shallow grooves laterally; antennal segments, except for 1st and apical ones, transverse. Pronotal carina (Fig. 2, 3) short, with median depression, complete posterior fringe, with pointed lateral spines near humeral calli; humeral calli with fine sharp ridges passing into blunted carinae, nearly reaching median depression of pronotum;

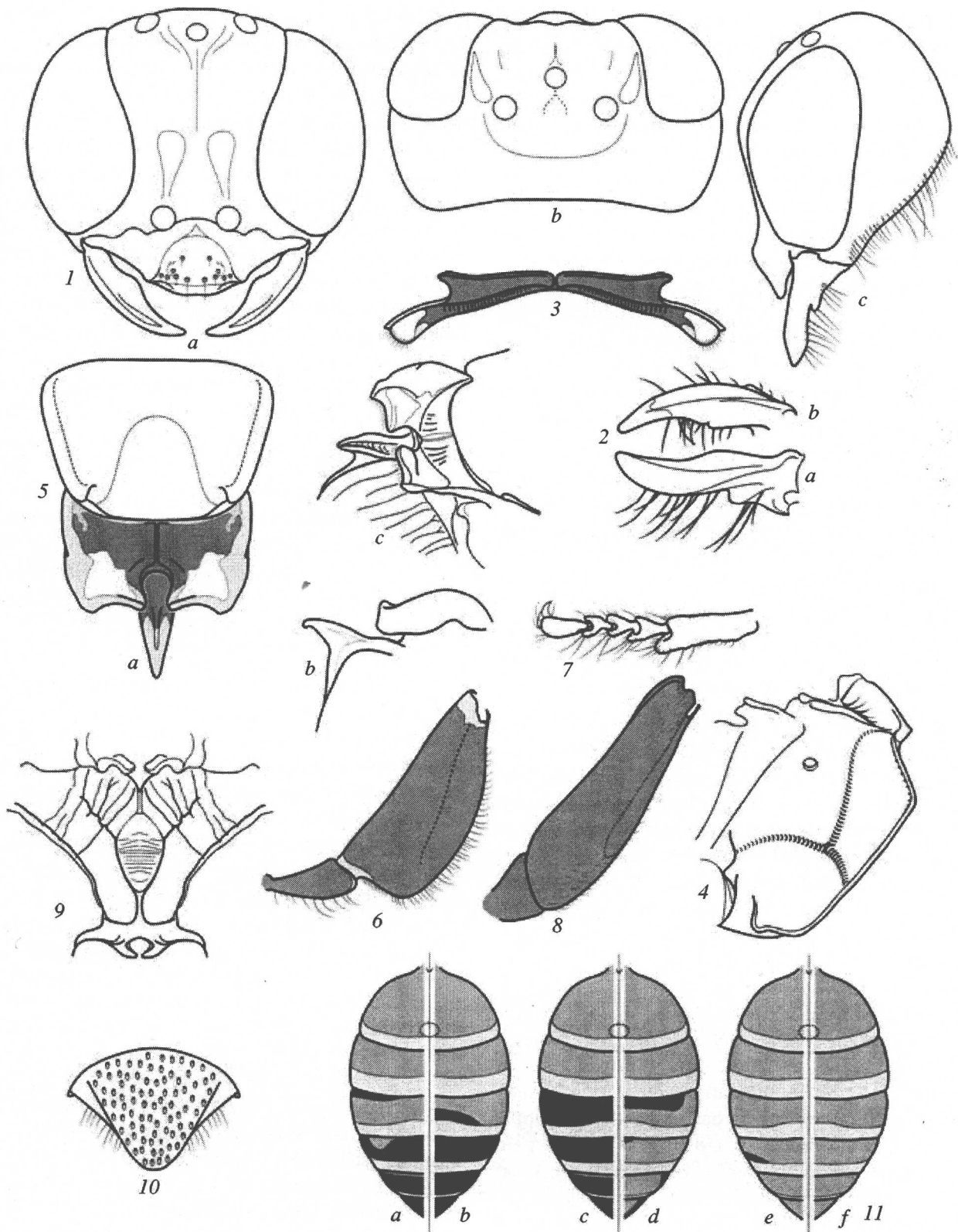


Fig. 2. *Oxybelomorpha kohlii*, female: (1) head [(a) front, (b) dorsal, and (c) lateral view]; (2) mandibles [(a) dorsal and (b) frontal view]; (3) pronotal carina, dorsal view; (4) mesothorax, lateral view; (5) scutellum, metanotum, and mucro of propodeum [(a) dorsal and (b) lateral view]; (6) fore trochanter and fore femur, ventral view; (7) fore tarsus, dorsal view; (8) hind femur, dorsal view; (9) propodeum, caudal view; (10) metasomal tergite VI, dorsal view; (11) metasomal tergites, variants of coloration [(a-f) specimens, see Material].

mesoscutum convex; admedian lines fine, strongly connivent, noticeably depressed till middle of mesoscutum; parapsidal and adlateral lines indistinct; scutellum flat, trapezoid or rectangular, widely oval and slightly depressed in posterior part; scutellum with fine, but distinct lateral ridges terminating as rounded lobes; metanotum (Fig. 2, 5a) flatly depressed in median part of base, with fine median costa and small rounded emargination between lateral squamae; squamae of metanotum rounded laterally, blunt-angular postero-laterally, with acute inner apical angle, directed toward median line; mesopleura convex; precoxal tooth small, triangular; metapleural ridge weakly developed, narrow (Fig. 2, 4); fore femur rounded along anterior margin dorsally, without sharp ridge (Fig. 2, 6); hind femur not depressed dorsally before apex, not dilating apically, with fine dorsal ridge (Fig. 2, 8). Propodeum with fine mucro; mucro narrower than emargination between squamae of metanotum, its posterior part roundly pointed, slightly bent, without emargination (Figs. 2, 5a–5c); lateral carinae of propodeum directed toward its apex (Fig. 2, 9). Metasomal tergite I without median groove and distinct dorsal pit, only slightly depressed in middle (Fig. 2, 11); tergites II and III depressed at bases; apical fringes of tergites distinctly separated.

Body sculpture rather moderate, looking like punctate, mainly with shining intervals between punctures. Lower part of frons very finely punctate ($d = \emptyset$), upper part of frons punctate relatively finer in middle ($d < \emptyset$) and larger at sides ($d = \emptyset$), with sparse punctation in upper part near inner eye orbits ($d = 2-4\emptyset$); vertex with very dense fusing punctures, forming irregular radial grooves, behind median ocellus; postero-laterally to lateral ocelli, vertex with rounded shining fields and sparse punctures ($d > 4\emptyset$); temple with elongate punctures, finer than punctures on vertex; these punctures form vertical grooves, divided by fine folds; median triangular field of median lobe of clypeus shining, not punctate, only with pair of large punctures near grooves separating apical fringe. Punctures on mesoscutum somewhat larger than in upper part of frons, uniform ($d = \emptyset$), denser in anterior part, along median line and posterior margin ($d < \emptyset$); laterally and in posterior part, punctures form longitudinal grooves; scutellum with similarly large, but less regular punctures, elongated longitudinally, arranged along median line and in posterior part ($d \approx \emptyset$) and laterally ($d = 2-3\emptyset$); metanotum and its squamae without punctures and folds; mesopleura with punctures similar to that on mesoscutum; punctures form weak longitudinal

grooves ($d = \emptyset$) near episternal suture; median part above hypersternaulus with rounded punctures ($d = 1-2\emptyset$); lower part under sternaulus with regular punctures ($d = 1-1.5\emptyset$); lower part of mesosoma finely and densely punctate, similarly to lower part of frons ($d = \emptyset$); metapleura with uniform, dense, and fine costae. Fore femur with shining longitudinal stripe dorsally. Propodeum dorsally with radial rugulae, with regular folds near lateral carinae; upper surface microcellular, semi-matte; sides of propodeum irregularly and largely cellular-folded, surface mainly microcellular. Metasomal tergites rather uniformly and densely punctate; tergite I with rather large punctures, $d = \emptyset$ in middle, $d = 1-3\emptyset$ laterally; tergites II–V with smaller punctures; in middle of tergites II and III $d \geq \emptyset$; tergite V with densest punctures ($d = \emptyset$); apical fringes smooth only along very margin, finely micro-punctate at base ($d = \emptyset$); only tergite V with entirely smooth fringe; pygidial field with largest punctures elongated longitudinally ($d < \emptyset$) (Fig. 1, 10); metasomal sternites with smoothed sculpture, smooth, with micro-punctures at bases of semierect hairs; punctures more visible on tergite IV; punctures rather large, but flat on tergite V. Sternite VI with dense punctures only at sides before apex.

Pubescence rather short, mainly pale, mostly appressed; on vertex, in middle of pronotum, and on scutellum, pubescence erect; hairs on vertex approximately as long as diameter of lateral ocellus or slightly longer; on other body parts, hairs shorter than diameter of lateral ocellus; median lobe of clypeus and lower part of frons near eye orbits and antennal sockets with dense, appressed silvery pubescence concealing sculpture; other body parts with sparse pubescence, not concealing sculpture. On temple, setae of psammophore (Fig. 2, 1c) rather short (base of mandible approximately 0.67 times as long as each seta); on mandible, these setae as long as mandibular base or slightly longer; on fore trochanter, psammophore consists of long, slightly bent forward setae, approximately as long as width of trochanter or slightly longer; on fore femur, psammophore consists of uniform setae of same length, approximately as long as maximum width of 1st segment of fore tarsus (Fig. 2, 6); digging comb on 1st segment of fore tarsus consists of 4–5 external erect setae; maximum width of segment slightly longer than setae of comb (Fig. 2, 7).

Head and mesosoma mainly black. Mandible at base and apex dark brown, reddish in middle; antenna dark brown, scape with weal rufous apical ring. Humeral calli yellowish white externally; apical fringes along

sides of scutellum and metanotum with narrow whitish stripes; outer parts of squamae of metanotum hyaline, brown, with whitish inner spot before apex. Fore tarsus reddish brown, middle and hind tarsi dark brown; fore tibia brown dorsally, rufous ventrally, with whitish spot at base, occasionally rufescent white ventrally; middle tibia mainly dark brown, with small whitish spot at base; hind tibia dark brown, with longitudinal whitish stripe dorsally. Fore femur dark brown, reddish at base and apex (Fig. 2, 6); middle femur black, only apex slightly rufous; hind femur entirely black (Fig. 2, 8). Tegula hyaline, brownish rufous; wing plate dark brown at base, rufous along margins; wing veins brown. Mucro of propodeum hyaline and brownish at apex. Metasoma rather varying in color (Fig. 2, 11), but always with distinct red parts, at least on tergites I and II, frequently also on tergites III and IV; usually, tergites III–V and base of tergite VI, or space from middle of tergite III to base of tergite IV, or from middle of tergite IV to base of tergite VI black. Apex of pygidial field always reddish brown, less frequently, metasoma entirely red; metasomal sternites mainly dark brown; when metasoma entirely red, sternite II occasionally with pair of large brown spots.

Body length 8.2 mm.

Male unknown.

Differential diagnosis. *Oxybelomorpha kohlii* differs from the other species of the group, *O. rufiventris*, in the median lobe of the clypeus, which is flat and not bordered laterally; the mucro, distinctly dilated at base; coarser and denser punctation of the head and mesosoma (especially of the mesopleura); darker legs (mainly, in the black femora and black spots on the middle and hind tibiae); and usually black metasomal segments III–V or IV–V in females.

Notes. I examined 2 specimens that evidently served as the material for description of *O. kohlii*. The exact number of types is not mentioned in the description, but one of these specimens is labeled as the type, and the second, as the cotype. I think that the first specimen should be considered the holotype, and the second one, the paratype. At the same time, geographical label from a specimen, later designated by Maidl as the type, does not correspond to the description and could not be included into the type series.

Biology. At present, *Oxybelomorpha kohlii* is the only species of the genus with known prey and nesting conditions. According to personal communication of

Dr. F.W. Gess (Albany Museum, Grahamstown, South Africa), females dig nests in rather dry dense soil and fill its cells with adults of small dipterans. A single cell contained 9 males and 1 female of Bibionidae (Diptera), determined by Dr. N.P. Krivosheina (Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow) as *Bibio turneri* Edwards, 1925.

Oxybelomorpha rufiventris (Arnold, 1936)

Belomicrus (*Oxybelomorpha*) *rufiventris* Arnold, 1936 : 30. ♂: South Africa, Cape Province [TM]. Holotype examined.

Belomicrus rufiventris: Bohart, Menke, 1976 : 364.

Material. Holotype ♂, specimen with the following labels: "TYPE H128 *Belomicrus rufiventris*, ♂, Arnold," "TYPE, ♂, *Belomicrus rufiventris* G. Arnold," "v. Rhynsdorp [South Africa: Western Cape Province: Van Rhynsdorp], July–Aug.'27 (G. v. Son)" [TM] (Fig. 4, 6a). Other material: 1 ♂, "v. Rhynsdorp, July–Aug.'27 (G. v. Son)," "*Belomicrus rufiventris* Arn. ♂," "SOUTH AFRICAN MUSEUM ex NATIONAL MUSEUM BULAWAYO, 1981," "SAMHYM-AO13326" (Fig. 4, 6b); 1 ♀: 1.VIII.27, Dr. Brauns, van Rhynsdorp, Cape," "var. of B. Kohli (det. G. Arnold)," "SOUTH AFRICAN MUSEUM ex NATIONAL MUSEUM BULAWAYO, 1981," "SAMHYM-AO13324" [SAM]; 1 ♀: "92/93/19," "On yellow fls of *Othonna cylindrical* (Lam.) DC. (Asteraceae)," "CAPE PROVINCE. Namaqualand, Springbok, Goe-gap Nature Res. (plains), 7.IX.1992 (F.W. & S.K. Gess)," "Albany Museum Collection," "*Belomicrus* sp. 8, ♂ (det. F.W. Gess)" [AMC].

Description. Female (described for the first time). Head (Fig. 3, 1a) rounded in front view, slightly wider than long; lower part of frons flatly concave; upper part of frons flatly convex, with weak median groove; $IOD = 52 : 39$; vertex distinctly convex between lateral ocelli; vertex plates, oval, large, reaching inner eye orbits, slightly bordered and without sculpture, moderately shining (Fig. 3, 1b); $OOD : OF : POD = 9 : 7 : 23$; temples uniformly convex (Fig. 3, 1c); median lobe of clypeus oval in anterior part, bordered by straight lateral teeth; in middle, median lobe flat, bordered by distinct bends laterally. Pronotal carina (Fig. 3, 2) with distinct median depression and pointed lateral teeth, without sharp transverse ridges; mesoscutum uniformly convex, distinctly depressed along 0.75 of median line; admedian lines fine, reaching middle

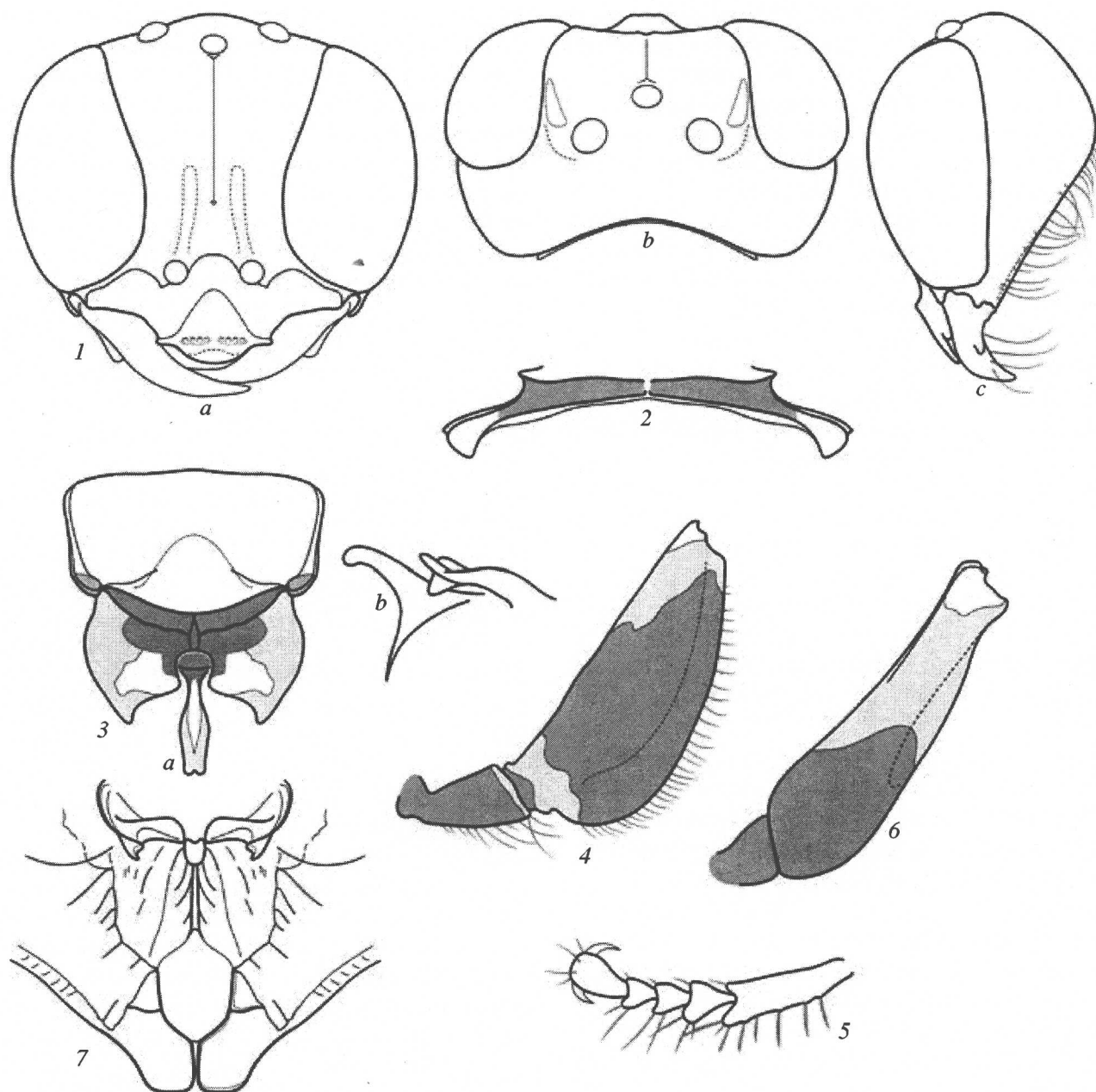


Fig. 3. *Oxybelomorpha rufiventris*, female: (1) head [(a) frontal, (b) dorsal, and (c) lateral view]; (2) pronotal carina, dorsal view; (3) scutellum, metanotum, and mucro of propodeum [(a) dorsal and (b) lateral view]; (4) fore trochanter and fore femur, ventral view; (5) fore tarsus, dorsal view; (6) hind femur, dorsal view; (7) propodeum, caudal view.

of mesoscutum; parapsidial lines indistinct; adlateral lines looking like shallow pits slightly distinct at background of main punctation; scutellum nearly flat, widely depressed in posterior part, with distinct lateral ridges terminating as rounded lobes (Fig. 3, 3a); posterior part of metanotum uniformly depressed, with fine median costa; squamae flat, rounded, with apical angle and rounded tooth on inner side; this tooth directed toward median line, bordering rounded median emargination; mesopleura uniformly and moderately con-

vex at sides; precoxal tooth small, triangular; metapleuron with small dorsal ridge, dilated in posterior part and clearly visible because of whitish yellow ridge; fore femur rounded along anterior margin dorsally, without sharp ridge (Fig. 3, 4); hind femur without strong depression and without separated lobe (Fig. 3, 5). Mucro of propodeum nearly parallel-sided, narrowed toward apex, slightly bent backwards, nearly not projecting beyond upper border of squamae (Fig. 3, 3a, 3b); lateral carinae of propodeum com-

plete, directed toward its apex, of nearly equal height along entire length (Fig. 3, 7). Metasomal tergite I slightly medially depressed before apex, without distinct dorsal pit; apical fringes of tergites I–V depressed.

Body covered with rather large punctures, mainly with shining intervals between punctures. Lower part of frons very finely punctate ($d \geq \emptyset$), with shining vertical stripes behind appressed scapes; upper part of frons and vertex with large punctures ($d \leq \emptyset$), with sparse punctation near inner eye orbits ($d = 2-3\emptyset$); median lobe of clypeus with shining, smooth, and somewhat depressed triangular field. Mesoscutum with punctation similar to that on upper part of frons, but punctures form longitudinal grooves; finest punctures situated in middle of mesoscutum and along anterior and posterior margins ($d \leq \emptyset$); scutellum with similar large punctures, also forming longitudinal grooves ($d = 1-2\emptyset$); median part of metanotum and squamae shining, without sculpture; sides of mesopleura with punctation sparser than on mesoscutum ($d = 1-4\emptyset$); metapleura with regular dense longitudinal costae. Surface of propodeum mainly semi-matte, upper part of propodeum with radial costae, with indistinct shagreened sculpture in posterior part; sides of propodeum with rather coarse irregular costae. Metasomal tergites distinctly punctate in main part; on tergites I and II, $d = 1-3\emptyset$, on tergites III–V, $d = 1-4\emptyset$; punctures gradually decreasing in size from tergite I to tergite V; apical fringes finely and weakly punctate, especially on tergite V; pygidial field mostly scarcely punctate, punctures elongated longitudinally, forming several curved grooves; uniformly and densely, but finely punctate at bases of semierect and erect hairs.

Body pubescence mainly weak, silvery; on frons, vertex, mesoscutum, and scutellum, pubescence erect; on other body parts, mainly semi-erect or erect. The densest short appressed silvery hairs developed on lower part of frons and lateral lobes of clypeus, concealing sculpture. Upper part of frons and vertex with longest erect hairs, as long as diameter of anterior ocellus or slightly longer. Erect hairs of mesoscutum and scutellum half as long as diameter of anterior ocellus. Tergites I–V with weakly visible lateral apical fields of appressed silvery hairs; pygidium with semi-erect short pale hairs. On temple, setae of psammophore rather short, becoming longer from posterior angle of temple to base of mandible; at base, these hairs as long as base of mandible (Fig. 3, 1c); mandible with longer hairs, 1.0–1.2 times as long as base of

mandible; lower part of trochanter with erect and bent forward setae, similar in length to mandibular setae (Fig. 3, 4). Fore femur with row of short erect setae, half as long as setae on trochanter, along lower margin of femur; digging comb on 1st segment of fore tarsus consists of 6 or 7 dorsal erect setae, 1.2 times as long, as segment (Fig. 3, 6).

Head and mesosoma mainly black. Apical margin of median lobe of clypeus semitransparent, rufous. Mandible yellow in basal two thirds, reddish brown at apex; antenna entirely black. Humeral calli white (Fig. 3, 2); lateral apical stripes of scutellum and metanotum, spots of irregular shape in middle of squamae, dorsal ridge of metapleura, and mucro medially whitish yellow. Margins of squamae of metanotum and mucro of propodeum hyaline, yellowish. Tegula hyaline, rufous; wing scales without dark spots, rufous, with yellowish white spot in upper part; wing veins brown; wing membrane hyaline, with yellowish tint. Fore tarsus rufous, middle and hind tarsi brownish rufous; fore tibia mainly rufous, yellowish white at base; middle and hind tibiae mainly rufous, yellowish white in basal third; fore femur mainly dark brown, half rufous in apical anterior part, rufous in posterior part, with moderate white apical spot (Fig. 3, 4). Middle femur half dark brown, rufous before apex, with small yellowish white spot posteriorly at apex. Hind femur half dark brown from base, yellow dorsally at apex; rest of hind femur rufous (Fig. 3, 5). Metasomal tergites red-rufous, rarely tergites III–IV with small brown basal spots; sternites entirely brown.

Body length 6.1 mm.

Male similar to female in appearance, except for characters associated with sex. $IOD = 50 : 36$; $OOD : OF : POD = 9 : 6 : 20$; temple pits smaller, bordered, shining, without sculpture (Fig. 4, 1b); median lobe of clypeus with weaker separated nearly not depressed triangular field (Fig. 4, 1a). Antennal segments mainly transverse, apical segment shorter than 2 subapical segments combined (Fig. 4, 3). Mucro of propodeum parallel-sided, roundly pointed at apex (Fig. 4, 4a, 4b). Metasomal tergite I with shallow, but distinct dorsal pit (Fig. 4, 6).

Sculpture and pubescence, as in female, only frons with denser punctation and densest punctures near median groove ($d \leq \emptyset$). Psammophore of temples short, rather sparse setae no longer than diameter of anterior ocellus (Fig. 4, 1c); setae on mandible no longer than its basal width. Trochanter with separate

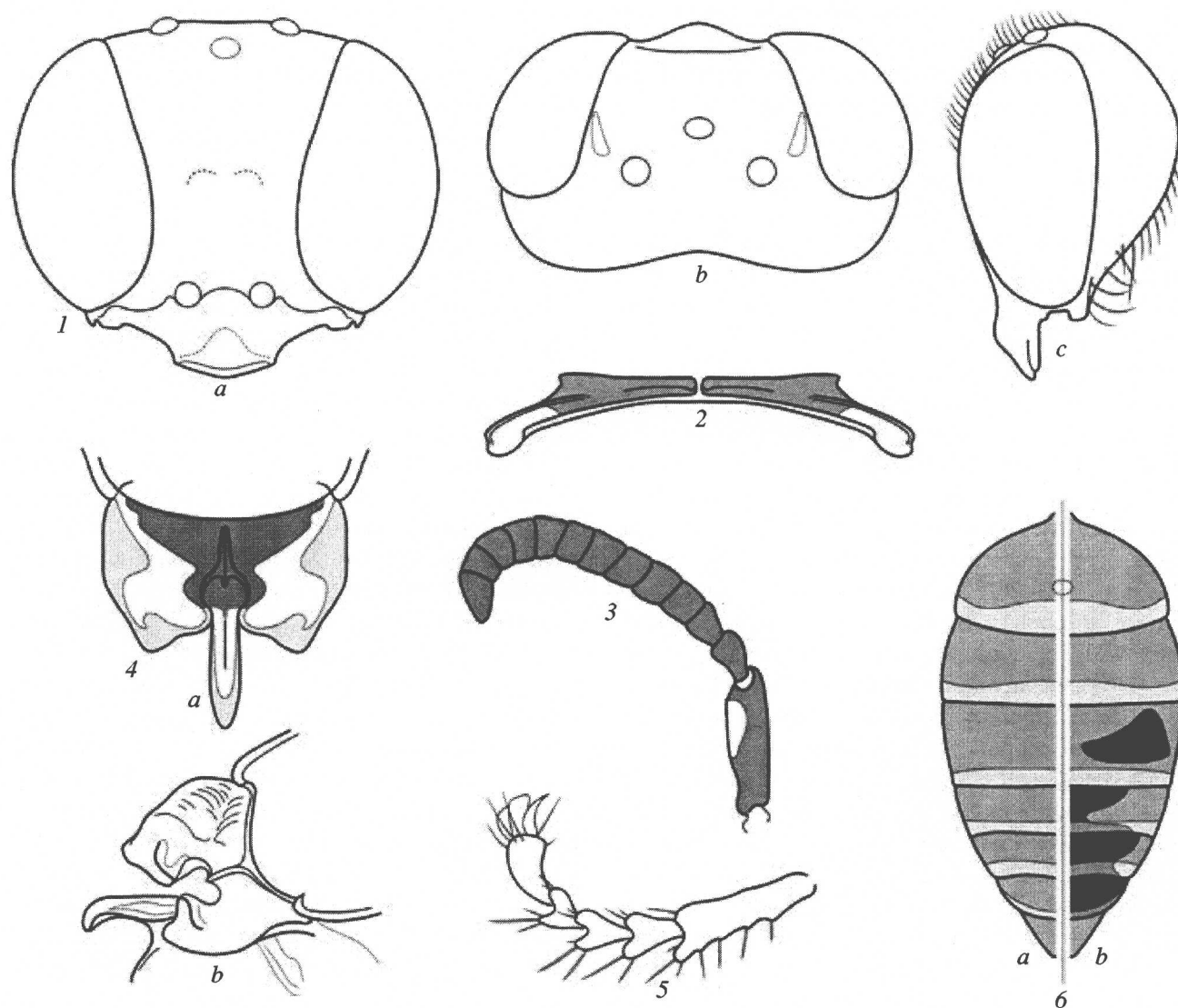


Fig. 4. *Oxybelomorpha rufiventris*, male: (1) head [(a) frontal, (b) dorsal, and (c) lateral view]; (2) pronotal carina, dorsal view; (3) antenna, front view; (4) scutellum, metanotum, and mucro of propodeum [(a) dorsal and (b) dorsolateral view]; (5) fore tarsus, dorsal view; (6) metasomal tergites, variants of coloration [(a, b) specimens, see Material].

erect setae, not forming bundle; psammophore of fore femur undeveloped; digging comb on 1st segment of fore tarsus consists of 5 or 6 very fine dorsal erect setae no longer than segment (Fig. 4, 5).

Median lobe of clypeus dark brown, including apical margin. Mandible half brown at base, yellow-rufous in middle, reddish brown at apex; scape with yellowish white ventral spot; flagellum black dorsally, 5 apical segments rufous-brown ventrally. Humeral calli white (Fig. 4, 2). Fore tarsus rufous, middle and hind tarsi brown; fore tibia mainly rufous, with yellowish white dorsal strip reaching apex; middle and hind tibiae nearly entirely yellowish white dorsally; middle tibia rufous at sides with small brown spot

ventrally; hind tibia nearly entirely black ventrally. Fore femur mainly dark brown, with ventral apical yellowish white spot, stretching as far as one third of femur. Middle femur mainly dark brown, with small yellowish white apical spot posteriorly. Hind femur entirely black. Metasomal tergites entirely red-rufous, with more or less developed brown spots on tergites I–IV or I–V (Fig. 4, 6a, 6b).

Body length 6.0 mm.

Differential diagnosis. The female of *Oxybelomorpha rufiventris* differs from that of *O. kohlii* in the following characters: median lobe of clypeus distinctly flattened, depressed in anterior part, and bordered

laterally; punctation of head and mesosoma (especially on mesopleura) finer and sparser; legs paler (black spots on middle and hind tibiae absent, and femora black only in basal 0.5–0.75); wing scales without black spots; and metasoma entirely red.

Notes. Three specimens served as the material for the description of *B. rufiventris*; however, Arnold mentioned only a single specimen from the collection deposited at the Transvaal Museum. This specimen, supplied with author's type label or red color, must be considered the holotype.

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