

## Digger Wasps of the Genus *Brimocelus* (Hymenoptera, Sphecidae, Crabroninae)

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**Abstract**—In the present revision of digger wasps of the genus *Brimocelus* Arnold, 1927, the type species *Brimocelus radiatus* (Arnold) is redescribed and the lectotype of this species is designated. Two new species, *B. roosevelti* from the Cape Province of South Africa and *B. schwarzi* from Namibia, are described. *B. roosevelti* differs from *B. radiatus* in the smaller size, presence of narrow apical spots on abdominal tergites and sternites, and whitish yellow coloration of the humeral tubercle, scape, and ventral part of the flagellum. *B. schwarzi* differs from other species of the genus in the noticeably depressed temple and strongly developed pale body pattern (yellow-white clypeus, scutellum, and metanotum, and rufous abdomen with wide yellow preapical bands). A key to species of the genus is given.

*Brimocelus* Arnold, 1927 was originally described as a subgenus of *Belomicrus* A. Costa, 1871 from a single species, *B. radiatus*. Later, it was quite reasonably accepted as a distinct genus by Pate (1940), who considered the reduced pronotal ridge and strongly convex mesoscutum as basic characters distinguishing the genus *Brimocelus*.

At the same time, in Pate's opinion, *Brimocelus* resembling *Belomicroides* Kohl, 1899 in the convex abdominal sternites and "absence of lateral carinae on the propodeum," and *Belomicrus*, in the developed propodeal spine and dilated prominences at the metanotum, occupies an intermediate position between these two genera. In my opinion, two of the characters mentioned by Pate are fundamental for revealing intergeneric relations within the tribe Oxybelini and, therefore, deserve special attention.

First of all, it is a question concerning the presence of lateral carinae of the propodeum. In the original description of the subgenus *Brimocelus*, Arnold (1927) mentioned only a spine (mucro) and sculpture on sides and dorsal part of the propodeum (epinotum). Pate (1940), who did not examine the material on *Brimocelus*, confining himself to an analysis of the original description, apparently, regarded Arnold's characteristics as indication of the absence of lateral carinae on the propodeum, mentioning it in his diagnosis of *Brimocelus* as a distinct genus. Later, Bohart and Menke (1976) elucidated the question, indicating the presence of lateral carinae on the propodeum of *B. radiatus*. In

fact, according to my data, lateral carinae are present not only in all the known species of *Brimocelus*, but also in the majority of species of *Belomicroides* (s. lat.).

The second question, concerning scales (squamae) on the metanotum in the genus *Brimocelus*, arose, in my opinion, because of an inaccurate definition of these structures. Squamae are only typical of species of the tribe Oxybelini (similar prominences are found only in some species of the genus *Encopognathus* Kohl, 1897). Descriptions of squamae are usually based on their structure and shape in species of *Oxybelus* Latreille, 1796, the largest genus of the tribe, where these structures most frequently look like more or less dilated triangular posterolateral prominences on the metanotum, distinctly separated from its median part by grooves. In the monotypic genus *Enchemicrum* Pate, 1929, closely related to *Oxybelus*, rather narrow lamelliform prominences are also distinctly separated by grooves. However, in species of another, rather voluminous genus *Belomicrus* (s. lat.), posterolateral prominences on metanotum possess significantly more variable structure and shape. They can be either spine-shaped (e.g., in the *schulthessi* species-group), or triangular (*odontophorus* species-group), or narrow lamelliform (*radoszkowskii* species-group), but in all cases distinctly separated from the median part of metanotum. At the same time, different variants are found of strongly swollen posterolateral prominences forming more or less common plane with the dorsal surface of median part of metanotum (some species of

the *italicus* group), or of swollen to various extent and bent upwards prominences (e.g., the *affinis* species-group), but in all cases not separated from the median part by any noticeable bend or groove. Most frequently, posterolateral prominences differ from the median part of metanotum itself in the coloration or level of sclerotization (prominences may be entirely or partly hyaline), but in some cases no differences either in the coloration or in the level of sclerotization are observed. It is necessary to note specially that true sutures between median and posterolateral parts of metanotum are absent, and posterolateral prominences in the genus *Belomicrus* are traditionally designated as "squamae of metanotum" independently of their structure. Posteriorly bifurcated posterolateral prominences on metanotum with a noticeably depressed dorsal surface, colorless along external margin but not separated from the median part of metanotum, are typical of the species of the genus *Brimocelus*. However, they differ from similar structures found in species of the *affinis* group (*Belomicrus*) only in the shape of external margin.

As a result, the ambiguity in interpretation of the posterolateral prominences on metanotum in Oxybelini manifested itself in the monograph by Bohart and Menke (1976). In diagnoses of the genus and the entire tribe Oxybelini (in the part concerning *Brimocelus*), the authors insisted on the absence of "true" squamae in *Brimocelus*, using, however, this term (metanotal squamae) to distinguish *Brimocelus* in a key to genera of the tribe. In my opinion, posterolateral prominences on the metanotum in *Brimocelus* species and any other structures projecting beyond the limits of the median part of metanotum in Oxybelini, should be considered true squamae.

The present revision was performed using almost all the *Brimocelus* specimens from collections of the American Museum of Natural History (New York, NY, USA—AMNH), the Natural History Museum (London, UK—BMNH), South African Museum (Cape Town, South Africa—SAM); and the collection by Dr. Maximilian Schwartz (Anselden, Austria—MS).

### *Brimocelus* Arnold, 1927.

Type species *Brimocelus (Brimocelus) radiatus* Arnold, 1927, by original designation.

**Diagnosis.** Small species, length 2.4–4.6 mm. Inner eye orbits nearly parallel in female or slightly converging downward in male. Upper ommatidia in fe-

male slightly, and in male distinctly smaller than lower ones. Ocelli unmodified, ocellar triangle strongly obtuse-angled. Clypeus with roundly projecting anterior margin. Epicranial plate indistinct. Occipital carina opened, not reaching hypostomal carina. Labrum oval, unmodified at apex. Mandible apically unmodified, with shallow median incision at inner margin and distinct ventral tooth at outer margin. Palpal formula 6–4; antenna 12-segmented in female and 13-segmented in male; inner surface of scape more or less depressed before apex in both sexes.

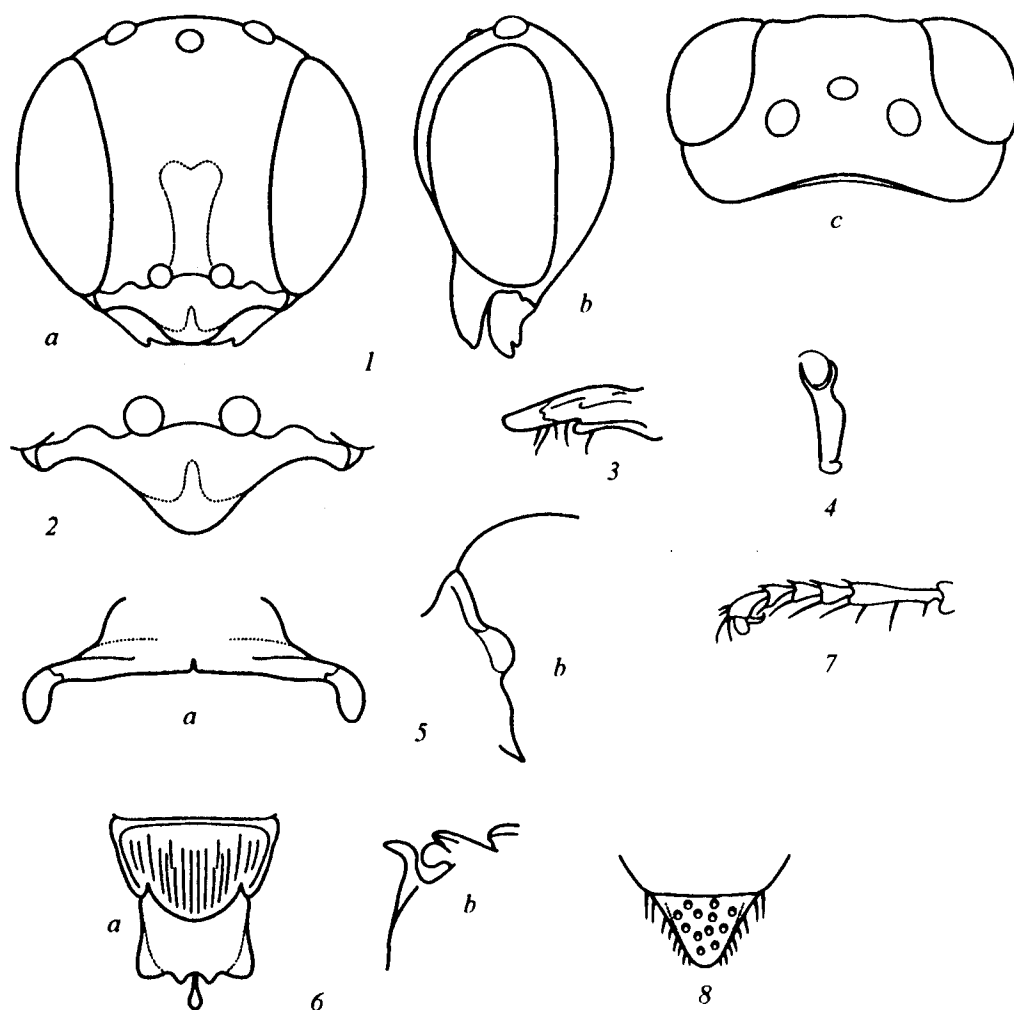
Pronotal ridge lying distinctly lower than upper margin of mesoscutum, rather narrow, without transverse carina, with or without more or less distinct median groove. Mesoscutum strongly convex, longitudinally rugose, with more or less distinct median ridge; admedial lines fine, strongly converging; parapsidal lines (notauli) at base of mesoscutum indistinct; adlateral lines short, indistinct; scutellum transversely rugose, with lateral costae passing into blunted teeth posteriorly. Metanotum with bifurcated, smooth, depressed lamelliform squamae (Figs. 1, 6a; 2, 5a; 3, 7a, 8) bearing compressed premedial prominences (Figs. 1, 6b; 2, 5b; 3, 7b). Mesopleura convex laterally, flattened or concave anteriorly, with distinct episternal suture (Fig. 3, 4); postspiracular carina, omaulus, acetabular carina, sternaulus, and hypersternaulus absent; precoxal field with flat triangular tooth directed backward. Metapleura weakly swollen apically, without distinct dorsal carina.

Legs unmodified. Middle coxae separated, hind ones approximate. Fore tarsus with long irregular outer bristles distinct in female and less distinct or obscure in male. Apical tarsal segments not enlarged.

Wing venation typical of the tribe. Marginal cell of fore wing with narrowly rounded apex lying at anterior wing margin; *cu-a* antefurcal; hind wing with distinct jugal lobe (Fig. 3, 6).

Propodeum with distinct dorsal spine, lateral carinae, fine sculpture, and basal median costa apically bifurcated before shallow median pit.

Abdomen with distinct punctation; tergites without lateral costae, roundly bent toward ventral side; in male, abdomen without hairy basal foveae. Abdominal tergite I distinctly depressed-oval anteriorly; in female, tergite VI with triangular pygidial area bordered with smoothed costae; sternite VI unmodified; in male, tergite VII triangular, with rounded apex and distinct pygidial area.



**Fig. 1.** *Brimocelus roosevelti* sp. n., male: (1) head in (a) anterior, (b) lateral, and (c) dorsal view; (2) clypeus, anterior view; (3) mandible, outer view; (4) scape, anterior view; (5) pronotum in (a) dorsal and (b) lateral view; (6) scutellum, metanotum, and spine on propodeum in (a) dorsal and (b) lateral view; (7) fore tarsus; (8) abdominal tergite VII, dorsal view.

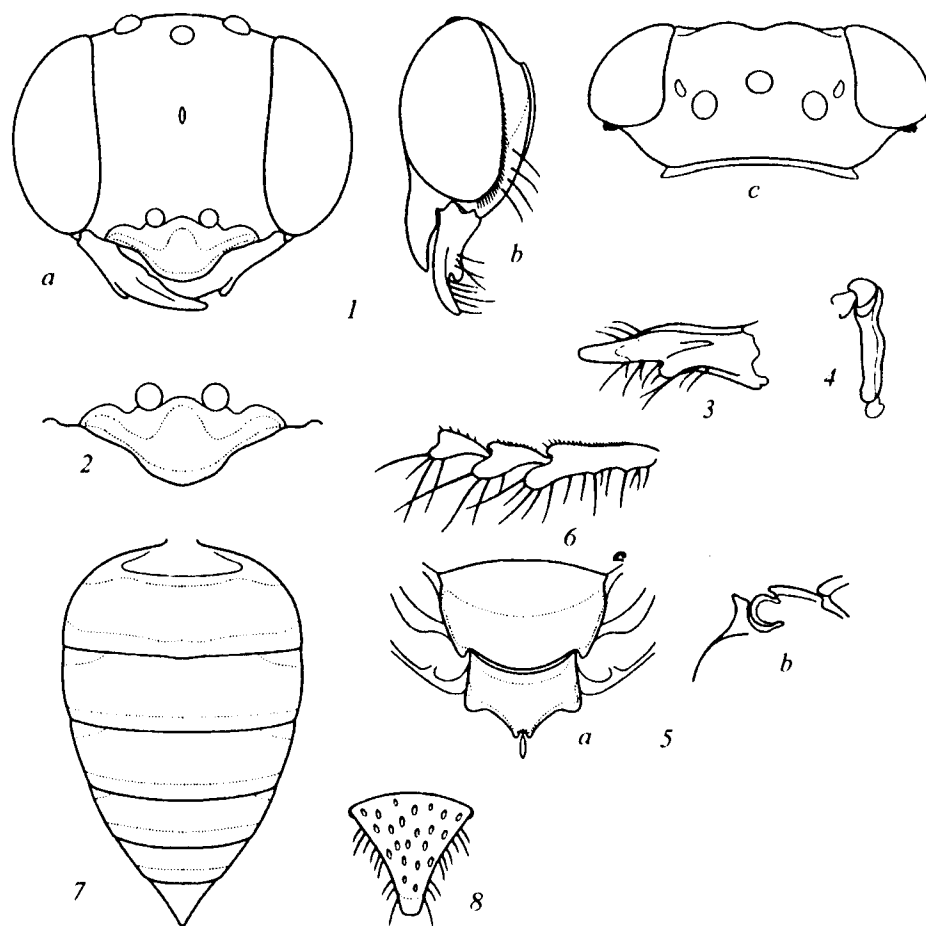
**Distribution.** Species of the genus have been found exclusively in Namibia and the Cape Province of South Africa.

**Biology.** Unknown, but the developed psammophore and digging bristles on fore tarsus in females suggest that representatives of the genus *Brimocelus*, like the majority of species of the tribe Oxybelini, dig their nests in friable soil. All species of the genus *Brimocelus* are, apparently, either very rare or strictly ecologically specialized, because I have found only 4 specimens of the genus (excluding the type series of *B. radiatus* described by Arnold) among several hundred species of the tribe Oxybelini examined.

**Taxonomy.** Relationships between *Brimocelus* and other genera of the tribe Oxybelini remain uncertain. Pate (1940a, 1940b) assumed this genus to be an in-

termediate link in the evolution of the tribe, originating from the ancestor branch commonly with the genus *Belomicroides*. This point of view could be accepted if, after Pate (1940, 1940a) and Bohart and Menke (1976), we consider *Belomicroides* a "primitive" group, which is, however, not reliably substantiated yet. In any case, I find the genus *Brimocelus* to be closely related to the branch of Oxybelini including undoubtedly related genera *Enchemicrum* and *Oxybelus*, rather than to *Belomicrus*.

Species of the genus *Brimocelus* differ from other genera of the tribe Oxybelini first of all in the strongly convex pronotum distinctly projecting beyond upper margin of the poorly developed pronotal ridge and in the distinctive structure of bifurcated posterolateral prominences on the metanotum, consisting of triangular lateral and compressed premedial parts.



**Fig. 2.** *Brimocelus schwarzi* sp. n., female: (1) head [(a) anterior, (b) lateral, (c) dorsal view]; (2) clypeus, anterior view; (3) mandible, outer view; (4) scape, anterior view; (5) scutellum, metanotum, and spine of propodeum [(a) dorsal, (b) lateral view]; (6) fore tarsus; (7) abdomen, dorsal view; (8) abdominal tergite VI, dorsal view.

***Brimocelus roosevelti* Antropov, sp. n.**

**Material.** Holotype ♂: "REP. SOUTH AFRICA, Cape Province: 16 km S of Vioolsdrif, 29.XI.1974 (J.G. & B.L. Rosen)" [AMNH].

**Description. Male.** Head rounded in front view (Fig. 1, 1a). Inner eye orbits parallel, slightly converging in the middle of frons. Frons slightly depressed in the middle of ventral part, convex on dorsal part. Vertex uniformly convex, without foveae near inner eye orbits (Fig. 1, 1b). Occiput slightly convex. Temple convex. Occipital carina incomplete, not extending to hypostomal carina. Median lobe of clypeus uniformly convex, without lateral corners (Fig. 1, 2). Mandible with distinct ventral tooth (Fig. 1, 3). Scape with oval preapical depression (Fig. 1, 4). Flagellar segments unmodified, basal segments transverse, apical ones nearly as long as wide. Pronotal ridge weakly convex, with indistinct, rather wide median depression dorsally and smoothed transverse carinae somewhat

above humeral tubercles (Fig. 1, 5a, b). Metanotum uniformly depressed, with rather short premedial parts of squamae (Fig. 1, 6a). Fore coxa unmodified; fore tarsus without distinct digging comb (Fig. 1, 7). Spine of propodeum rather long, bent posteriad apically (Fig. 1, 6b). Abdominal tergite I with oval depression and median groove in basal half; tergite VII pointed-oval at apex (Fig. 1, 8).

Body sculpture moderately dense, surface shining. Middle of median lobe of clypeus polished, shining. Frons smoothed and impunctate behind scapes, densely punctate medially and on upper part, with distance between punctures ( $d$ ) slightly exceeding their diameter ( $\emptyset$ ). Vertex with similar but finer punctation; occiput densely shagreened. Pronotal ridge smoothed and shining dorsally. Mesoscutum densely punctate ( $d \approx \emptyset$  laterally and anteriorly,  $\geq \emptyset$  in the middle, and  $= 2\emptyset$  posteriorly), with fine transverse striae and fine gentle transverse carina. Scutellum with

very sparse punctures ( $d = 3-5\varnothing$ ) and fine longitudinal striae, without median carina (Fig. 1, 6a). Metanotum polished. Mesopleura ventrally with punctation denser and coarser than that on mesoscutum ( $d < \varnothing$ ); dorsally with distinct; and posteriorly less distinct, dense longitudinal striation. Metapleura longitudinally rugose. Propodeum finely olveolate at sides; more finely olveolate (almost shagreened) on posterior part; dorsally bearing fine, radially diverging regular costae more distinct at base of propodeal spine; base of posterior part with short median carina forming two short branches below shallow rounded median fovea. Basal half of abdominal tergite I shining, with minute punctures at bases of sparse hairs; apical part slightly more densely punctate ( $d = 2-3\varnothing$ ). Abdominal tergite II with fine transverse striation at base; tergites II-III with sparse, indistinct fine punctation ( $d > 3\varnothing$ ); tergites IV-V with sparser and coarser fine punctation; tergite VI with large and shallow punctures ( $d \geq \varnothing$ ); tergite VII with even larger punctures; abdominal sternites irregularly and finely striate, impunctate.

Pubescence mostly indistinct, fine. Ventral part of frons laterally, clypeus (except for apical part of median lobe), and middle and ventral part of temple with dense appressed silvery hairs concealing the sculpture; dorsal part of frons, vertex, pronotum and mesoscutum, and mesopleura with short semi-appressed pale hairs; length of the hairs 0.25 times diameter of anterior ocellus or less. Propodeum glabrous. Abdomen with rather sparse, appressed pale hairs not concealing the sculpture; tergite II basally with lateral hairy fields; tergites III-IV with erect lateral bristles; sternites II-IV with preapical rows of sparse erect bristles. Temples without psammophore. Mandible ventrally with psammophores formed by several short erect bristles; length of bristles half mandible width at base. First segment of fore tarsus with 2-3 erect pointed bristles of similar length; 2nd-4th segments with solitary long apical bristles.

Body mostly black. Scape and pedicel entirely, flagellum ventrally (except for ultimate segment), basal 2/3 of mandible, humeral tubercles, wing plates at base and wing scales, wing veins, all tarsi and tibiae entirely, fore and middle femora (except for posterior part), hind femora apically, and narrow apical spots at sides of tergites II-IV and sternites II-IV, all dazzling yellow-white. Flagellum dorsally, its entire ultimate segment, apex of mandible, and large spots behind fore and middle femora fuscous. Apex of clypeus, cor-

ners of lateral lobes of squamae of metanotum, and apical segment of abdomen rufous.

Body length 2.4 mm.

**Female unknown.**

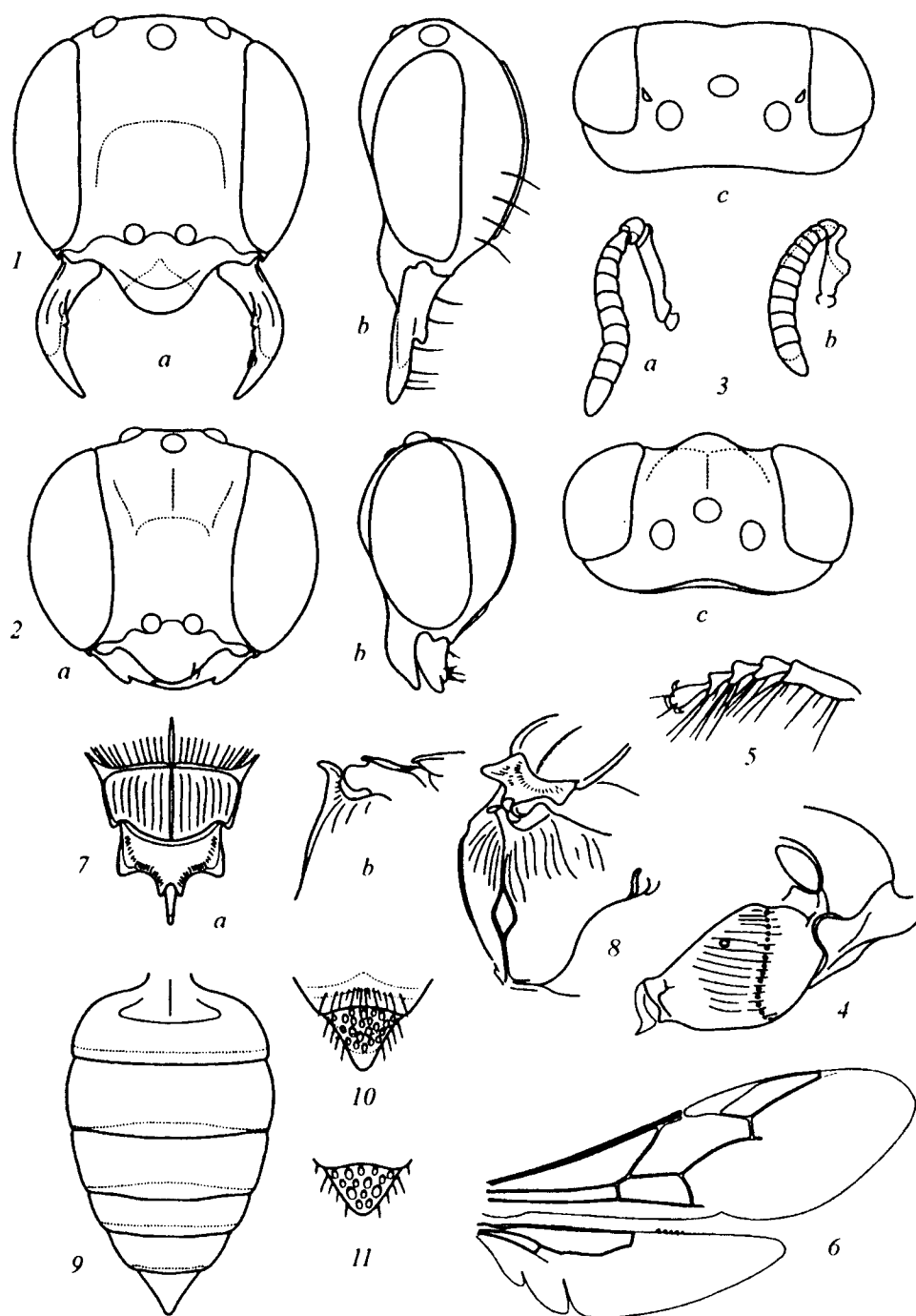
**Differential diagnosis.** This species is most closely related to *B. radiatus*; differing from it in the somewhat smaller size, scutellum lacking median costa, shorter premedial parts of squamae of metanotum, narrow but distinct white apical spots on abdominal tergites II-VI and sternites II-IV, and entirely whitish yellow scape, ventral part of flagellum, and humeral tubercles (all concerns males).

**Etymology.** The species is named after Mr. Theodore Roosevelt, whose Foundation supported my work at the American Museum of Natural History, New York (AMNH).

*Brimocelus schwarzi* Antropov, sp. n.

**Material.** Holotype ♀: "NAMIBIA: Karibib: 15 km W Karibib, 26.II.1990 (Max. Schwarz)" [MS].

**Description. Female.** Head strongly transverse in front view (Fig. 2, 1a). Inner eye orbits almost parallel, slightly converging downward. Frons convex on upper part, with shallow median groove; distinctly depressed on lower part as far as scape apices. Vertex slightly depressed laterally to lateral ocelli, with small pubescent oval foveae near inner eye orbits (Fig. 2, 1b). Occiput and, especially, temple distinctly depressed; temple with row of short bristles along outer eye orbit (Fig. 2, 1b, c); occipital carina extending nearly to hypostomal carina. Median lobe of clypeus convex, with oval transverse median depression and hyaline rufous fringe (Fig. 2, 2). Mandible with robust, apically rounded ventral tooth (Fig. 2, 3). Scape with oblique preapical depression on inner side (Fig. 2, 4). Lateral ocelli more than 1.5 times as long as median ocellus. Pronotal ridge dorsally convex, rounded, with distinct median groove. Squamae of metanotum with hyaline margins of lateral prominences and compressed premedial prominences (Fig. 2, 5a). Legs rather long; segments of fore tarsus asymmetrical, with irregular long bristles; apical bristles of each segment as long as, or longer than subsequent segment (Fig. 2, 6). Propodeum with rather short and pointed spine (Fig. 2, 5b). Abdominal tergite I with distinct oval depression anteriorly; tergite VI acute-triangular, with slightly compressed pygidial field bordered by smoothed lateral carinae (Fig. 2, 8); sternite I without paired costae.



**Fig. 3.** *Brimocelus radiatus* (Arnold): (1) head of female in (a) anterior, (b) lateral, and (c) dorsal view; (2) head of male in (a) anterior, (b) lateral, and (c) dorsal view; (3) antenna in (a) female and (b) male, anterior view; (4) thorax, lateral view; (5) fore tarsus; (6) wings; (7) scutellum, metanotum, and spine on propodeum in (a) dorsal and (b) lateral view; (8) scutellum, metanotum, and spine on propodeum in dorsoposterior view; (9) abdomen of female, dorsal view; (10) abdominal tergite VI of female, dorsal view; (11) abdominal tergite VII in male, dorsal view.

Sculpture mostly fine. Lower part of frons uniformly finely punctate ( $d \geq \emptyset$ ) laterally, impunctate and finely shagreened medially; upper part sparsely punctate ( $d > 3-4\emptyset$ ), mainly shining, with very fine longitudinal striation. Vertex densely and finely irregularly

striate, shining. Occiput dull, with fine radial striation. Sides of pronotum dull, finely shagreened; pronotal ridge with shallow punctures dorsally ( $d \geq \emptyset$ ). Mesoscutum shining, with fine gentle longitudinal striae anteriorly, impunctate medially, shagreened and indis-

tinctly punctate laterally ( $\emptyset = d > 2\emptyset$ ), rather coarsely irregularly punctate ( $d > 2-3\emptyset$ ) and distinctly longitudinally striate posteriorly, with indistinct median costa before prescutellar suture. Scutellum shining, with sculpture similar to that on posterior part of mesoscutum, bearing indistinct median costa. Metanotum polished, shining, smooth. Mesopleura dull, with fine dense longitudinal fine striae dorsally and medially, densely shagreened ventrally. Metapleura dull, with dense longitudinal striation. Propodeum with fine, radially diverging regular costae more distinct at base of propodeal spine; dull and finely shagreened posteriorly and laterally; posterior side with basal median costa bifurcating ventrally to oval and rather deep median fovea. Depressed part of abdominal tergite I smooth, finely sparsely punctate; paler part of the tergite distinctly and densely punctate ( $d = \emptyset$ ); paler part of tergite II with similar punctation; tergites III-IV with sparser, and tergite V, with denser punctation; punctures on tergites I-V of equal diameter; surface of tergite I semi-dull; tergite V shining; tergite VI polished, with very large contiguous punctures at bases of short erect bristles. Sternite II with indistinct fine punctures ( $d > 3-4\emptyset$ ) and fine striae. Sternites III-IV with more distinct, sparse punctures ( $d > 2-3\emptyset$ ); sternite V with even sparser and larger punctures; sternites III-IV and VI with similar punctation; all sternites shining.

Pubescence mostly indistinct. Clypeus with sparse erect hairs not concealing the sculpture; erect hairs on dorsal part of frons and vertex as long as diameter of anterior ocellus, those on mesoscutum and scutellum half as long; temples posteriorly with very dense appressed silvery hairs entirely concealing the sculpture. Psammophore on temple consisting of 4-5 erect bristles as long as base of mandible; ventral side of mandibles with similar sparse bristles. Mesopleura with sparse appressed silvery hairs not concealing the sculpture. Propodeum glabrous. Abdominal tergites I-III glabrous; tergites IV and, especially, V with semi-appressed hairs and several erect lateral bristles; sternites only with preapical rows of bristles.

Body mostly pale. Most part of median lobe and apical stripes on lateral lobes of clypeus, oval spots on ventral part of head posteriad gena, inner side of scape, almost entire pedicel and entire flagellum (except for apex of ultimate segment), at least 2/3 of mandible length from base, palpus, mouthparts entirely, posterior margin of humeral tubercles, posterior half of scutellum, metanotum entirely, all coxae ven-

trally, all trochanters and femora entirely, most part of tibiae, bases of fore and middle tarsi, wing plates and wing scales entirely, wide apical band on abdominal tergite I, most part of tergites II-V, tergite VI entirely (Fig. 2, 7), apical part of sternite I, apical half of sternites II-III, sternites IV-VI entirely, all yellow-white. Lateral costae and posterior teeth of scutellum and margins of lateral prominences of squamae of metanotum hyaline. Apical fringe of clypeus, fore tarsus beginning with 2nd segment, middle tarsus beginning with apex of 2nd segment, hind tarsus almost entirely, veins, basal half of abdominal tergite I, narrow basal stripes on tergites II-V, and basal half of abdominal sternites II-III, all rufous. Flagellum dorsally and apical segments of hind tarsus fuscous. Apex of mandible and humeral tubercle mostly dark fuscous. Abdominal sternite II with small oval black lateral spots as large as lateral ocellus.

Body length 4.6 mm.

Male unknown.

**Differential diagnosis.** *B. schwarzi* clearly differs from the congeners in the distinct pale pattern on the body (mostly yellow-white clypeus, scutellum, and metanotum and rufous abdomen with yellow preapical bands), and the noticeably depressed temples with a row of short bristles along inner eye orbit. The female of *B. schwarzi* differs from the male of *B. roosevelti* in the following sex-independent characters: smooth scutellum without longitudinal costae; longer premedial prominences on squamae of metanotum; shorter spine of propodeum, bent posteriorly to a lesser extent; and the body twice as large as in *B. roosevelti*. Taking into account a weak sexual dimorphism in *B. radiatus* (Arnold, 1927), in which both sexes have been described, I can conclude that the compared specimens belong to different species.

**Etymology.** The species is named for a famous Austrian entomologist and collector of Aculeata, Dr. Maximilian Schwarz (Ansfelden, Austria).

*Brimocelus radiatus* (Arnold, 1927)

*Belomicrus (Brimocelus) radiatus* Arnold, 1927: 62, ♂, ♀. Cape Province, South Africa.

*Brimocelus radiatus* (Arnold): Pate, 1940: 9; Bohart and Menke, 1976: 364.

**Material.** Lectotype ♂, designated here: "S. Africa, Cape Province, Ceres, Nov. 1920 (R.E. Turner, Brit. Mus. 1920-497.236)" [BMNH no. 21.1.152a]. Para-

lectotype, 1 ♂: "S. Africa, Cape Province, Montagu, 1–21 Oct. 1924 (R.E. Turner, Brit. Mus. 1924-466.238)" [BMNH no. 21.1.152b]. 1 ♀: "S. Africa, Aliwayl North, Cape Province, 4350 ft. 1–13.I.1923 (R.E. Turner, Brit. Mus. 1923–70)," 1 ♂: "S. Africa, Cape Province, Montagu, 1–21 Oct. 1924 (R.E. Turner, Brit. Mus. 1924–466)" [SAM].

**Description. Female.** Head rounded in front view (Fig. 3, 1a). Inner eye orbits parallel. Frons depressed at the level of scape apex; moderately convex medially, with gentle median depression. Vertex moderately convex, with small oval foveae between lateral ocellus and inner eye orbit (Fig. 3, 1b, c). Occiput slightly convex. Temples convex (Fig. 3, 1c). Occipital carina incomplete, not extending to hypostomal carina. Median lobe of clypeus arcuately convex, rounded anteriorly, without lateral corners. Scape with oblique inner oval depression before apex (Fig. 3, 3a). Mandible with distinct ventral tooth (Fig. 3, 1b). Pronotal ridge indistinct, slightly rounded dorsally, significantly lower than upper margin of strongly convex pronotum (Fig. 3, 4). Mesoscutum with distinct median costa. Scutellum convex, with median carina. Metanotum uniformly obliquely depressed, with elongate premedial parts of squamae (Fig. 3, 7a). Segments of fore tarsus asymmetrical, with irregular long bristles; apical bristles of each segment longer than succeeding segment (Fig. 3, 5). Spine of propodeum moderately long, with pointed apex bent posteriad (Fig. 3, 7b). Abdominal tergite I with deep median groove extending as far as its middle and with oval depression anteriorly (Fig. 3, 9); abdominal tergite VI flattened, with wide pygidial field bordered laterally by rounded carinae (Fig. 3, 10).

Body sculpture irregularly dense, intervals between punctures shining. Median lobe of clypeus polished, with 2–3 large lateral punctures. Lower part of frons with smoothed microsculpture, impunctate; upper part very sparsely punctate ( $d > 5\varnothing$ ). Vertex irregularly finely striate, with fine oblique groove between lateral ocellus and inner eye orbit. Occiput shagreened. Pronotal ridge without distinct median depression dorsally, with smoothed sculpture. Mesoscutum finely shagreened anteriorly and laterally, sparsely punctate ( $d > 2-3\varnothing$ ) medially and posteriorly, smoothed anteriorly and laterally, distinctly longitudinally striate medially and posteriorly. Scutellum with sparse solitary punctures and dense longitudinal striation (similar to that on posterior part of mesoscutum). Metanotum polished. Mesopleura densely longitudinally striate

over most part, densely finely punctate anteriorly and ventrally. Metapleura with dense longitudinal striation. Sides of propodeum densely finely punctate; dorsal part of propodeum finely punctate at sides, smoothed medially, with distinct regular small costae radially diverging from base of spine; posterior part of propodeum with even finer punctation and basal median costa bifurcating dorsally before shallow rounded median fovea; diameter of fovea 0.67 times length of basal median costa. Abdominal tergite I smooth anteriorly, with transverse fine striae and shallow but rather dense punctures ( $d = 2\varnothing$ ) on posterior part; tergites II–IV with similar fine punctation; tergite V with coarser punctation ( $d = \varnothing$ ); tergite VI with very strong and coarse punctation ( $d < \varnothing$ ); abdominal sternites with smoothed sculpture looking like transverse fine striation formed by sparse punctures ( $d > 2-3\varnothing$ ).

Body mostly black. Apex of scape, ventral part of 2nd and 3rd antennal segments, entire flagellum beginning with 1st segment, basal third of mandible, posterior margin of humeral tubercle, apices of femora, fore and middle tibiae (except for posterior part), hind femur at base and apex, tarsi entirely, and also wing plates and wing scales, all whitish yellow. Anterior margin of clypeus, 2nd and 3rd antennal segments dorsally, middle of mandible, posterior spots on fore and middle tibiae, most of hind tibia in middle, and apex of abdominal segment VI, all rufous.

Pubescence mostly pale and very short. Psammophore on temple consisting of 4–5 erect bristles as long as, or shorter than base of mandible; ventral side of mandibles with similar bristles. Sides of ventral part of frons, lateral lobes of clypeus, and temple with dense appressed silvery hairs concealing the sculpture. Rest of head and thorax with indistinct short pale hairs 0.5–0.67 times as long as diameter of anterior ocellus. Propodeum glabrous. Abdominal tergite I glabrous anteriorly, covered with fine indistinct hairs posteriorly; tergites II–IV with semi-appressed fine hairs densest at sides and forming preapical spots; tergite V with rather dense (especially in subapical part) pale hairs; tergite VI with rigid erect pale bristles 1.5–2 times as long as anterior ocellus diameter; abdominal sternites also with indistinct pubescence represented mainly by preapical rows of erect bristles on sternites II–V; sternite VI with fine sparse hairs.

Body length 3.5 mm.

**Male.** In general, similar to female; differing in the following characters (mainly sex-dependent): inner



eye orbits slightly converging downward (Fig. 3, 2a), median groove on frons more distinct, vertex without foveae near inner eye orbits (Fig. 3, 2c), scape with deep oval preapical inner emargination (Fig. 3, 3b), flagellum dorsally and apical half of its ultimate segment ventrally, all fuscous. Humeral tubercle entirely black. Wing plates and wing scales fuscous. Temples without psammophores. Mandibles with indistinct psammophores on lower part (Fig. 3, 2b). Lower part of frons and lateral lobes of clypeus with less distinct pubescence; temple without pubescence concealing sculpture. Tergite I arcuately pointed at apex (Fig. 3, 11)

Body length 3.5 mm.

**Differential diagnosis.** *B. radiatus* is most closely related to *B. roosevelti*; differing from it (by males) in the entirely black abdomen without pale preapical spots on tergites and sternites, mostly dark fuscous scapes, black ultimate segment of the ventrally pale rufous flagellum, distinct median costa on scutellum, and longer premedial parts of squamae of metanotum.

**Notes.** Arnold (1927) described *B. radiatus* from 4 specimens, with two of these designated as types. In his types, I designated the female as the lectotype and the male, as the paralectotype. I could not examine two more specimens mentioned by Arnold [1 ♀: "December (R.E. Turner)" and "1 ♂: "Aliwayl North, December (R.E. Turner):], because I have not found them.

*Key to Species of the Genus Brimocelus Arnold, 1927*

1. Clypeus, scutellum, and metanotum mostly yellowish white with black; abdomen rufous with wide yellow preapical bands (pygidium entirely yellow); head distinctly transverse in front view; temple noticeably depressed, with row of short bristles along outer eye orbit; mesoscutum and scutellum with indistinct median costa ..... *B. schwarzi* sp. n.
- Clypeus, scutellum, and metanotum without yellow or white spots; abdomen entirely black or with indistinct pale preapical spots; head rounded in front

view; temple undepressed, without row of short bristles along outer eye orbit ..... 2

2. Abdominal tergites II–V lateroventrally and sternites II–IV with small whitish apical spots; tergite VI with narrow white preapical band; scape, flagellum ventrally, humeral tubercle, and all tibiae entirely whitish yellow; scape with gently sloping preapical emargination; mesoscutum with indistinct median costa; scutellum without median costa ..... *B. roosevelti* sp. n.
- Abdomen entirely black; humeral tubercle black; scape dark fuscous; female flagellum entirely whitish; male flagellum pale rufous ventrally, dark fuscous dorsally; ultimate segment of flagellum entirely black; inner side of middle tibia and hind tibia fuscous on most part; male scape with deep apical emargination; mesoscutum and scutellum with strong median costae ..... *B. radiatus* (Arnold, 1927) (♀, ♂).

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