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SHORT COMMUNICATIONS

A New Genus of Digger Wasps of the Tribe Oxybelini (Hymenoptera, Sphecidae, Crabroninae) from South Africa

A. V. Antropov

Zoological Museum, Moscow State University, Moscow, 103009 Russia

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Abstract—The digger wasp *Wojus inopinatus*, gen. et sp. n. (Hymenoptera, Sphecidae, Crabroninae) from the Cape Province of South Africa is described. A new representative of the tribe Oxybelini is similar to members of the *schulthessi* species group of the genus *Belomicrus* A. Costa, differing in fore-wing venation—presence of the developed 2nd submarginal cell unique to Crabroninae (s. str.). The probable origin of fore-wing venation in tribes Oxybelini and Crabronini is discussed.

Until recently, digger wasps of the subfamily Crabroninae have been considered an indivisible group, most frequently ranked as a distinct subfamily. Just in this rank, wasps of the group Crabroninae are mentioned in Bohart and Menke's (1976) fundamental revision of digger wasps of the World fauna. The significant reduction of fore-wing venation is one of the most characteristic features of this group. The reduction of venation itself is not unique to the family Sphecidae. By contrast, it is a clear evolutionary trend found in recent representatives of different subfamilies, most distinctly developed in some Pemphredonidae and Larrinae (sensu Bohart and Menke, 1976). However, while being more or less distinctly distinguishable in the last two subfamilies, the reduction trends are unclear in Crabroninae; until recently, only the variety with developed solitary submarginal and discoidal cells has been known. Forms of Crabroninae with divided submarginal and discoidal cells are united into the tribe Crabronini, and those with fused cells, into the tribe Oxybelini.

The tribe Oxybelini is commonly related to the subfamily Crabroninae in narrow (Bohart and Menke, 1976; Finnamore, 1993) or wide (Menke, 1988; Menke and Fernández, 1996) senses and considered to include 5 genera. The genus *Belomicroides* Kohl, 1899, comprising 7 species, is known only from the Old World; the genus *Belomicrus* A. Costa, 1871 (115 species), from the Old World and North America including Mexico; the genus *Brimocelus* Arnold, 1927 (1 species), only from South Africa; the genus *Enchemicrum* Pate, 1929 (1 species), only from Nearctic; and the most abundant genus *Oxybelus* Latreille, 1796 (more than 220 species) is known from both Old and New World, including the Neotropic Region. Representatives of the tribe Oxybelini have not been found only in the Australian zone.

In their revision of sphecid genera, Bohart and Menke (1976) underlined the following main distinctions of the tribe Oxybelini from the rest of Crabroninae (s. str.): reduction of the longitudinal vein *RS* + *M* on the fore wing, leading to fusion of submarginal and discoidal cells; special prominences (squama) of varied shape on postscutellum; spine on the propodeum (mucro); and also subequal distances between inner eye orbits in the upper and lower parts of the face. Alexander (1992) also considers the three first characters to be autapomorphies for the tribe Oxybelini. However, it is necessary to note that his cladistic analysis of Apoidea is based on an insufficient number of genera examined; for example, only characters of a single genus, *Oxybelus*, were taken into account within Oxybelini. At the same time, only the first character of those listed above is completely valid for the genus *Belomicroides* (sensu Bohart and Menke, 1976) (in the species included in this genus, the postscutellum either possesses a weak lamellar fringe, or has no special formations, and propodeum has no spine in all species), and the two first characters are valid for the genus *Belomicrus* (s. lat.) (representatives of some groups of species possess no spine of propodeum at all). In addition, the reports of Bohart and Menke (1976) about the absence of prominences on postscutellum in *Brimocelus* are erroneous, and structures similar to these scales occur in the genus *Encopognathus* Kohl (tribe Crabronini). As for the distance between the inner eye orbits, this character can play a definite role when considering Oxybelini and Cra-

bronini as separate subfamily, but loses its meaning when Larrinae and Crabroninae (s. str.) are united into a single subfamily; the necessity for this unification was pointed out by Menke (1988). At the same time, the inner eye orbits are practically parallel in the genera *Tracheloides* A. Morawitz and *Alinia* Antropov (tribe Crabronini), but distinctly drawn together in a number of species of the genus *Belomicrus* and in *Wojus* gen. n (tribe Oxybelini) described below. Thus, the fusion of the submarginal and discoidal cells must be considered the only character uniting all representatives of the tribe Oxybelini.

WOJUS ANTROPOV, GEN. N.

Type species *Wojus inopinatus* Antropov, sp. n; by monotypy.

Diagnosis. Frons flat, convex, without deep depression behind scapes; inner eye orbits clearly approximate downward in both sexes; vertex without tubercles behind lateral ocelli; genae without carinae; median lobe of clypeus without special external prominences, distinctly outlined laterally; paramandibular prominence of hypostome developed, but not reaching clypeus, leaving mandibular incision half-open (figure, *3*); mandibles with simple apex and inner rectangular lobe, but without ventral lobe, angle, or incision; palpal formula 6–4; psammophore developed on mandibles but indistinct on temples in both sexes; female scape simple, male scape with apical depression and ventral tubercle (figure, *7*); flagellar segments unmodified in both sexes.

Pronotal carina convex, with median depression, somewhat lower than pronotum. Mesonotum moderately and uniformly convex, with median depression, without distinct longitudinal striae; scutellum convex, with lateral ridges, posteriorly passing into rounded teeth; postscutellum short, convex, with fine pointed scales (figure, *8*); mesopleura anteriorly flat-concave, dorsally and caudally convex and bearing separated lobe; episternal suture and hypersternaulus developed; omaulus, sternaulus, acetabular and precoxal carinae, and precoxal tubercle absent; metapleura dorsally deeply depressed, with sharp and straight dorsal ridge.

In both sexes, apical tarsal segments unmodified and digging ridge on fore tarsi indistinct.

Fore wing with two submarginal cells, second cell anteriorly cauliform (figure, *10*); hind wing with closed cells, undivided row of hamuli and developed jugal lobe.

Propodeum with lateral carinae and short, pointed dorso-median spine.

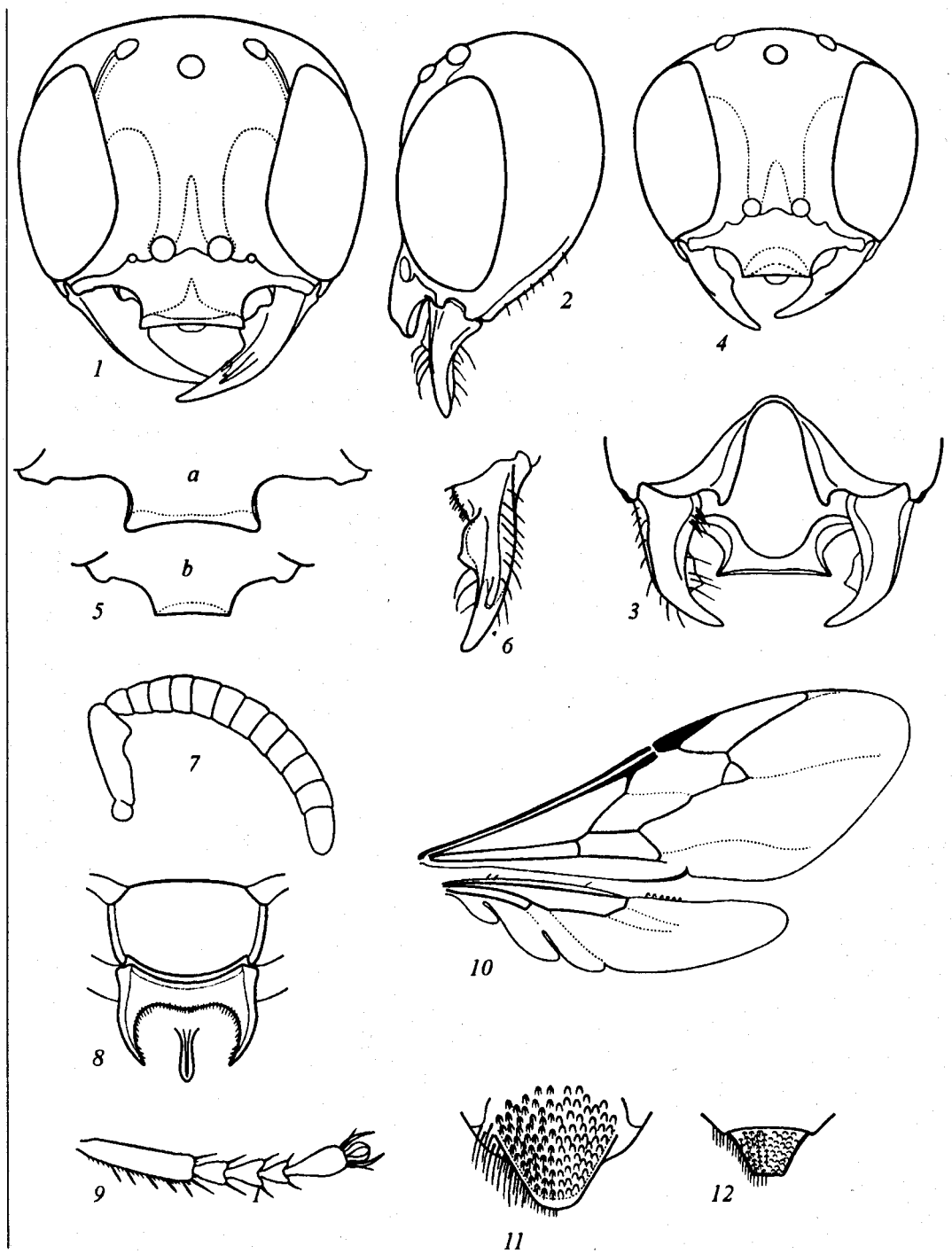
Abdomen with lateral ridges and nearly flat sternites; pygidial field widely triangular in female and trapezoid, caudally cut in male; female apical sternite unmodified.

Comparison. The new species differs from all representatives of the tribe Oxybelini primarily in the developed 2nd submarginal cell of the fore wing; and also in dorsocaudally convex mesopleura forming a special lobe covering the deeply depressed upper part of the metapleura fringed by a sharp dorsal ridge. In the structure of the postscutellar scales, the new species resembles representatives of the *schulthessi* species group of the genus *Belomicrus* (s. str.) (Antropov, 1995), differing from all the species included into this group in the weakly developed psammophore on temples and digging ridge on fore tarsi in both sexes. It is necessary to note that in South Africa the genus *Belomicrus* (s. str.) is represented only by two species belonging to special groups (*B. bicornutus* Arnold, 1927 and *B. ferrieri* Kohl, 1924), with no species of the *schulthessi* group reported from these region.

Distribution. Known only from the Cape Province of South Africa.

Etymology. The generic name of the masculine gender was given for one of the leading modern sphecidologists, Dr. Wojciech J. Pulawski (California Academy of Sciences, US), to whom I am sincerely grateful for providing an opportunity to examine his material.

Notes. The genus *Wojus* gen. n. is the only genus in the entire subfamily Crabroninae (sensu Bohart and Menke, 1976) retaining a distinct 2nd submarginal vein. No reversions in the development of cells lost in digger wasps in the course of evolution are known to me; probably, they are impossible. Evidently, the forewing venation in *Wojus* gen. n. must be considered archaic. In my opinion, the presence of the anteriorly cauliform 2nd submarginal vein is a good evidence in favor of the close relationship between the subfamilies Larrinae and Crabroninae (s. str.) and the necessity to unite them in a single subfamily of digger wasps. In my opinion, the fact that such a structure of the submarginal sector is retained by a representative of



Wojus inopinatus gen. et sp. n.. (*1*) female head, frontal view; (*2*) the same, lateral view; (*3*) lower side of female head, posterior view; (*4*) male head, anterior view; (*5*) clypeus, anterior view [(*a*) female; (*b*) male]; (*6*) female left mandible, anterior view; (*7*) male antenna, anterior view; (*8*) scales of postscutellum and spine of propodeum, dorsal view; (*9*) male fore tarsus, anterior view; (*10*) wings, dorsal view; (*11*) female pygidial field, dorsal view; (*12*) male abdominal tergite VII, dorsal view.

a rather specialized group of species of the tribe Oxybelini is more interesting.

Furthermore, the acute external free angle of the united fore-wing cell, typical of Oxybelini, indicates that the elimination of the 2nd submarginal cell had probably occurred via reduction of its proximal longitudinal vein RS^{2-1}. According to the retained traces of cauliform 2nd submarginal vein in some species of the genus *Encopognathus*, this vein could also have been original for the tribe Crabronini. However, the obtuse

external free margin of the submarginal cell is characteristic of Crabronini, and elimination of the 2nd submarginal cell had probably occurred via reduction of its base M^2 and the distal longitudinal vein *1 r–m*. Thus, the solitary submarginal cell of Oxybelini, united with the discoidal cell, is actually formed by fused 1st and 2nd submarginal cells, in contrast to Crabronini, where this cell is a true 1st submarginal one.

Wojus inopinatus Antropov, sp. n.

Material. Holotype ♀: "SOUTH AFRICA: Western Cape Province: Swartrivier 7 km NW of Prince Albert, 33°10'S 21°59'E, 26.XII.1996 (W.J. Pulawski)" [CAS]. Paratypes: 1 ♀, 2 ♂: "SOUTH AFRICA: Western Cape Province: Swartrivier 7 km NW of Prince Albert, 33°10'S 21°59'E, 26.XII.1996 (W.J. Pulawski)", 6 ♀, 2 ♂, "SOUTH AFRICA: Western Cape Province: Swartrivier 7 km NW of Prince Albert, 33°10'S 21°59'E, 29.XII.1996 (W.J. Pulawski)"; 3 ♀, 2 ♂: "SOUTH AFRICA: Western Cape Province: Swartrivier 7 km NW of Prince Albert, 33°10'S 21°59'E, 31.XII.1996 (W.J. Pulawski)" [CAS, ZMUM].

Description. Female. Head frontally rounded, ventrally somewhat narrowing (figure, *1*). Inner eye orbits distinctly approximate ventrally. Frons ventrally slightly concave, dorsally with indistinct median groove; frons punctation ventrally in the middle fine and dense (intervals between points equal to their diameter), before ocellar triangle similarly fine but significantly sparser (interval between points 2–3 times point diameter). Vertex enlarged, without tubercles behind ocelli and with distinct narrow groove between lateral ocellus and inner eye orbit; vertex puncture as in upper part of frons; dense striae developed above occipital suture. Temples strongly developed, not shorter than eye length (figure, *2*); their punctation markedly denser than on vertex, with points forming vertical grooves; dense striation developed at ends of occipital carina. Median lobe of clypeus convex, densely punctured, shining before apex, apically oblique or slightly concave, with distinct lateral teeth (figure, *5a*). Mandibles with developed flat inner lobe (figure, *6*).

Apical part of pronotum with fine, dense, concentric semicircular striae; pronotal carina convex, with distinct median groove.

Mesonotum convex, with more or less distinct traces of adlateral grooves; on most part of surface, punctation irregularly sparse (intervals between points 2–4 times point diameter), somewhat coarser than in frons, caudally as dense as in lower part of frons. Scutellum convex, posteriorly rounded, with lateral ridges posteriorly passing into rounded teeth; punctation irregularly sparse (intervals between points 1.5–3 times point diameter). Postscutellum with widely divided, narrow, pointed scales slightly bent inside (figure, *8*). Mesopleura convex, frontally and ventrally distinctly depressed, ventrally densely and more or less uniformly punctured (interval between points equal to point diameter), dorsally and caudally with sparse punctation, in posterior part passing into oblique, more or less coarse rugae dispersing fan-shaped from posterior margin; apically and caudally to mesopleura convex lobe developed, possessing sharp, colorless posterior margin and cavity inside.

Metapleura longitudinally costate, dorsally strongly depressed and outlined by sharp and straight dorsal ridge.

Propodeum convex, with developed lateral carinae adjoining dorsal ridges of metopleura, dorsally and caudally densely reticulate, laterally with weak, smoothed sculpture and interrupted longitudinal rugae; posterior side with shallow median depression; spine of propodeum short, fine, apically slightly broadened and colorless, in lateral view acute-angled.

Legs unmodified; tarsal ridge on fore tarsus indistinct, its setae no longer than width of segments (figure, *9*); middle and hind tibiae externally with rows of long and coarse small spines, hind femur longitudinally depressed ventrally.

Fore-wing marginal cell strongly narrowed and apically rounded; accessory cell indistinct; stalk of 2nd submarginal cell no longer than cell length (figure, *10*).

Abdomen with lateral ridges on all tergites; punctation of tergites dense (interval between points 1–2 times point diameter), uniform, becoming sparser from tergite I to tergite IV; apical parts of tergites I–V colorless but not depressed, basal parts of tergites II–IV transversely depressed; pygidial field widely triangular, slightly rounded apically, with dense punctation (point diameter longer than interval between points), coarser than that of entire body and with points somewhat longitudinally elongate (figure, *11*); sternites flat, densely punctured (intervals between points equal to point diameter) basally and laterally and sparser medi-

ally at apex (intervals between points 2–3 times point diameter).

Pubescence of head and thorax sparse, silvery, mainly erect, that on frons comparable with diameter of anterior ocellus, on thorax significantly shorter; lateral parts of frons base and clypeus, except for apical part of median lobe, with dense, short, appressed pubescence concealing sculpture; abdomen pubescence dense but not concealing sculpture, mainly semi-erect and developed mainly on lateral and apical parts of tergites.

Body mainly black; humeral tubercles, outer parts of wing covers, and scales of postscutellum with hyaline external areas; large apical spots at bases of middle femora, and also all tibiae externally white; apices of scapes ventrally, bases of mandibles and middle tibiae mainly yellow; apex of clypeus, middle of mandibles, all tarsi, hind tibiae from inside at base, semitransparent apical parts of tergites II–V, apices of sternites II–V, and abdominal segment VI entirely red; inner lobe of mandibles and abdominal sternites II–V mainly red brown; hind tibiae with large dark brown apical spot.

Body length 4.2–5.0 mm.

Male. In sculpture, pubescence, and body color similar to female, excluding characters associated with sex: head frontally comparatively narrower (figure, *4*); external angles of entirely black median lobe of clypeus somewhat obtuse (figure, *5b*); scape entirely yellow, with distinct apical depression and apical tubercle (figure, *7*); flagellar segments unmodified, mainly shorter than wide; setae of tarsal ridge indistinct on fore legs; abdominal tergite VII apically cut (figure, *12*). In addition, sometimes small yellow spots present on pronotal carina laterally to median groove.

Body length 3.2–4.5 mm.

Etymology. The species name emphasizes the unique fore-wing venation (*inopinatus*, Latin for unexpected).

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