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Notes on *Bembecinus* of southern Africa, Madagascar, and Australia with descriptions of new species (Hymenoptera, Sphecidae, Nyssoninae, Stizini)

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Abstract.—Twelve new species of *Bembecinus* are described and figured: *B. chilwae,* Mozambique; *B. gilvus,* Namibia; *B. pakhuisae,* South Africa; *B. ruficaudus,* South Africa; *B. zebratus,* South Africa; *B. admedius,* Ivory Coast; *B. brooksi,* Madagascar; *B. irwini,* Namibia; *B. namibicus,* Namibia; *B. rozenorum,* Namibia; *B. tinkeri,* Western Australia; *B. wenzeli,* Madagascar. A rearrangement of species groups and subgroups of *Bembecinus* is presented. New synonymy of *Bembecinus caffer* (Saussure) and *B. argentifrons* (F. Smith) is given: *bredoi* (Arnold) 1940 = *caffer* (Saussure) 1854; *braunsii* (Handlirsch) 1894 and *barkeri* (Arnold) 1940 = *argentifrons* (F. Smith) 1856.

Wasps of the genus *Bembecinus* A. Costa occur worldwide. Bohart and Menke (1976) listed 150 species. Bohart (1996), working with North and Central American fauna, raised two subspecies to species status, and described two additional forms as new. With about 175 species, barring unknown synonymy, *Bembecinus* has the second most species of any genus in the Nyssoninae (after *Bembix*). Bohart and Menke (1976) discussed the relationships of the Stizini, separating from Bembicini by the exserted but short labrum of the former. In its tribe *Bembecinus* is most easily identified by having only a single distal vein issuing from the hindwing median cell.

Principal authors who dealt with *Bembecinus* from southern Africa were Frederick Smith, Anton Handlirsch, and George Arnold. The detailed descriptions and accompanying figures, as well as the key to species of southern African *Bembecinus* by Arnold (1929) have been particularly useful. The principal worker on the Australian fauna was Handlirsch. A summary of the species known from that continent was given by Cardale (1985).

The following possibly unfamiliar symbols are used in descriptions: F-I etc., flagellomere; ID, interocular distance; PD, puncture diameter; S-I etc., sternum; T-I etc., tergum; UA, upper profile of propodeal flange; tarsomere V, fifth segment of tarsus.

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The group and subgroup concept in *Bembecinus*

Handlirsch (1892) in his landmark treatment of Nyssoninae was the first to introduce the group concept in *Bembecinus*. He mentioned and partly diagnosed the following groups, placing them in the genus *Stizus*: *tridens, meridionalis, loriculatus, peregrinus, caffer, discolor, inermis*. Arnold in his most comprehensive paper on *Bembecinus* (1929) discussed and keyed the South African species, using the group names of Handlirsch and adding the *oxydorcus, cinguliger,* and *rhopalocerus* groups. All of these were still placed in the genus *Stizus*.

Bohart and Menke (1976) revised and condensed the group system, listing *inermis* (including *caffer*) and *cinguliger* (including *oxydorcus* and *rhopalocerus*) groups as one major group. The other major grouping included the *discolor, tridens,* and *peregrinus* (including *meridionalis, crassipes,* and *gynandromorphus*) groups. All were placed in *Bembecinus*.

The twelve new species described here belong to various groups that have been used for separation by former authors. The following summary of groups elaborates that of Bohart and Menke. It is original mainly in the outlining of subgroups.

In one of the more revisional publications on *Bembecinus* Jacques de Beaumont (1954) stressed the importance of the presence of spines on the inner surface of the hindfemur of males of some species. In dealing with the palearctic fauna Beaumont listed 19 species with such spines. He placed all of these in his "*peregrinus* group". I have added some Ethiopian Region species, and have divided this assemblage into 3 subgroups: first, those with a median projection on male S-II (*peregrinus* subgroup); second, those with a median projection on male S-III (*meridionalis* subgroup); and third, those without a projection on male S-II or III (*spinicornis* subgroup). Females in the 3 subgroups above have little to distinguish them from those in the *tridens* subgroup except the sternal punctation, which is more spaced in the latter. The presence of a spine or spines on the inside of the male hindfemur occurs in all of the Madagascan species in the *tridens* group. However, this character has not been found in any of the New World species, or in those of Australia. An additional subgroup of the *tridens* group I have labeled the *irwini* subgroup. It is characterized by the short and subequal F-I-II-III in both sexes (of *irwini*). Also, the sternal punctation is fine and close. The female of the other included species, *distinctus,* is unknown.

Groups and subgroups of *Bembecinus*

I. *Bembecinus caffer* group—Male antenna simple, slender (Fig. 8a), female foretarsal V and arolium not unusually large, no spines on inner side of male hindfemur.
   A. *B. caffer* subgroup—Medium large (11–20 mm long) stout species with lateral tergal markings, ID at midocellus less than 2× that of clypeal base. Representative species: *caffer* (Handlirsch), *laterimacula* (Handlirsch), *haplocerus* (Handlirsch), *chilwae* R. Bohart, new species.
   B. *B. inermis* subgroup—Small species (5–10 mm long), more slender, tergal markings various but not predominantly lateral, LID at midocellus more than 2× that at clypeal base. Representative species: *inermis* (Handlirsch), mirus (Arnold), *assentator* (Arnold).

II. *Bembecinus rhopalocerus* group—Male and female antennae simple but clubbed (Fig. 6), ID at midocellus

more than 2× that at clypeal base, female foretarsal V and arolium larger than those of the midtarsus or hindtarsus. No spines on inner side of male hindfemur.

A. *B. rhopalocerus* subgroup—Propodeal flange with UA evenly curved in profile (Fig. 7f) no sternal projections in male. Representative species: *gilvus* R. Bohart, new species, *hyperocrus* (Arnold), *lomii* (Guiglia), *mutabilis* (Arnold), *pakhuisae* R. Bohart, new species, *rhopaloceroides* (Arnold), *rhopalocerus* (Handlirsch), *ruficaudus* Bohart, new species, *somalicus* (Arnold), *zebratus* Bohart, new species.

B. *B. oxydorcus* subgroup—Propodeal flange with UA incurved or notched below, S-II of male with median projection (*cinguliger*) or without (*oxydorcus*). Representative species: *oxydorcus* (Handlirsch), *cinguliger* (F. Smith).

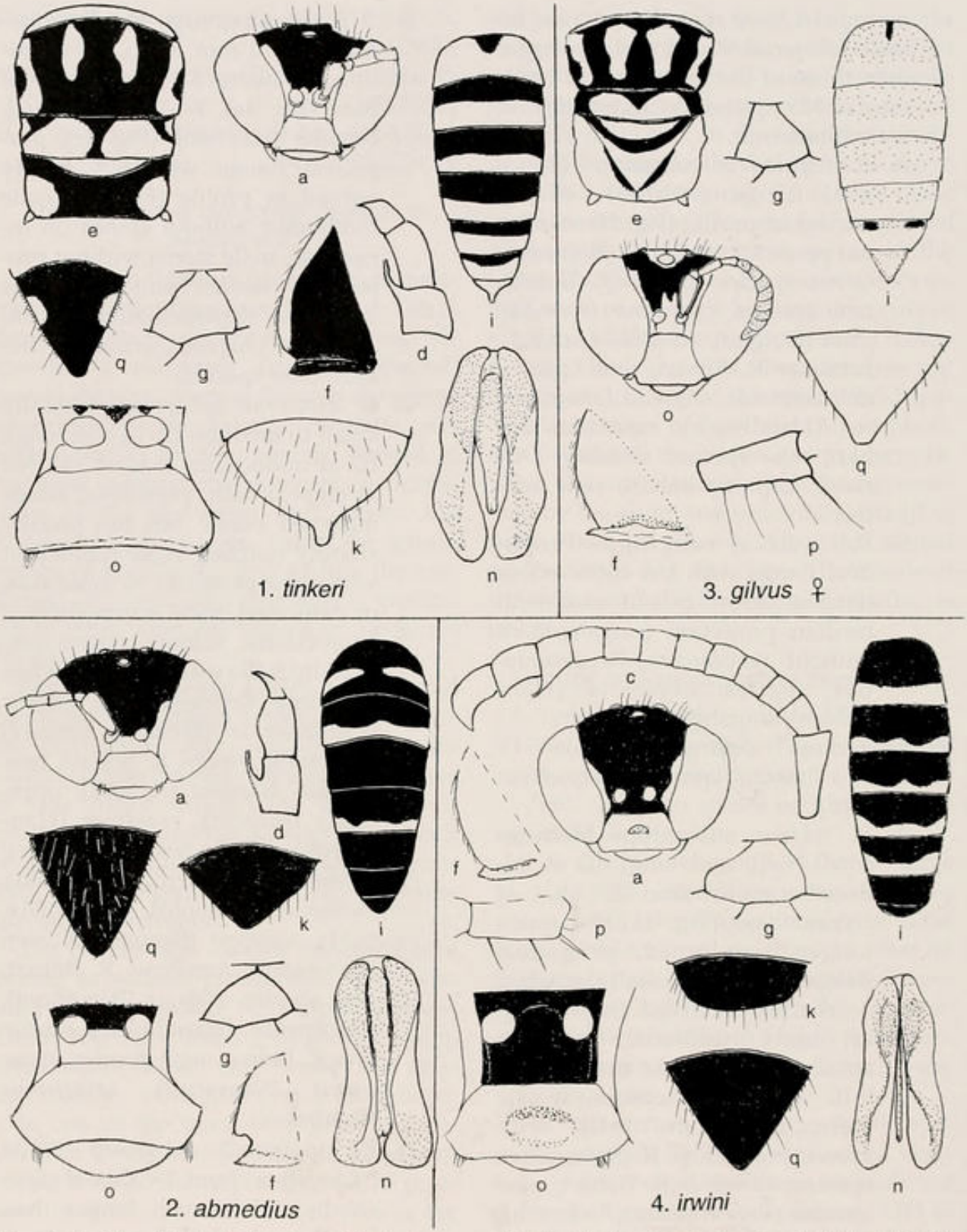
III. *Bembecinus tridens* group—Male F-IX with a lateral, spinelike projection (Fig. 1d).

A. *B. tridens* subgroup—Medium small (6–10 mm long), ID at midocellus more than 2× that at clypeal base (Fig. 1a), F-I much longer than broad, propodeal flange with UA usually notched or sharply incurved below (Fig. 2f) male hindfemur without spines on inner side, male S-II or S-III without projections, female sterna (especially S-III) with spaced punctation. Representative species: *abmedius* R. Bohart, new species, *argentifrons* (F. Smith), *barbarus* Beaumont, *bytinskii* Beaumont, *cyanescens* (Radozkowsky), *egens* (Handlirsch), *haemorroidalis* (Handlirsch), *hirtulus* (F. Smith), *hungaricus* (Frivaldsky), *tenellus* (Klug), *tinkeri* R. Bohart, new species, *tridens* (Fabricius).

B. *B. irwini* subgroup—Small to medium (5–10 mm long), ID at midocellus about 2× that at clypeal base (Fig. 4a), F-I-II-III subequal, broader than long (Fig. 4c), propodeal flange with UA evenly curved in profile (Fig. 4f), male hindfemur without spines on inner side, male sterna without projections, sternal punctation fine and close. Representative species: *distinctus* (Arnold), *irwini* R. Bohart, new species.

C. *B. spinicornis* subgroup—Medium small to medium (7–11 mm long), ID at midocellus at least 2× that at clypeal base, propodeal flange incurved below but not usually sharply notched, male hindfemur with spine or spines on inner side, or deformed, male sterna without projections, female sterna (especially S-III) with punctation fine and close. Representative species: *acanthomerus* (Morice), *bernardi* Beaumont, *brooksi* R. Bohart, new species, *buyssoni* (Arnold), *carpetanus* (Mercet), *crassipes* (Handlirsch), *cyprius* Beaumont, *fertoni* (Handlirsch), *fraterculus* (Arnold), *hirtiusculus* (Arnold), *kobrowi* (Arnold), *mattheyi* (Beaumont), *naefi* (Beaumont), *namibicus* R. Bohart, new species, *podager* (Beaumont), *polychromus* (Handlirsch), *rozenorum* R. Bohart, new species, *spinicornis* (Saussure), *spinifemur* (Beaumont).

D. *B. meridionalis* subgroup—ID at midocellus about 2× that at clypeal base, F-I much longer than broad, propodeal flange various, male hindfemur usually with one or more spines on inner side, male S-III with a median projection, sternal punctation usually fine and close. Representative species: *gynandromorphus* (Handlirsch), *la-*



Figs. 1–4. Morphological characters of *Bembecinus* spp.: 1, *tinkeri*; 2, *abmedius*; 3, *gilvus* female; 4, *irwini*. Arabic letters a–n indicate male characters (except *gilvus*), o–r indicate female characters (a, face; b, lower face enlarged; c, antenna, front view; d, flagellomeres IX–XI, lateral; e, thoracic pattern; f, outline of left propodeal flange in lateral view; g, second submarginal cell of forewing; h, hindfemur, outer view; i, abdomen with tergal banding, dorsal; k, outline of T-VII; m, terminal terga VI–VII, shape and pattern; n, genitalia, dorsal; n', enlargement of genitalia toward apex; o, lower face except eyes; p, forebasitarsus, lateral outline; q, shape and markings of T-VI; r, markings of female T-III-VI).

ticinctus (Arnold), *meridionalis* A. Costa, *zibanensis* (Morice).

E. *B. peregrinus* subgroup—About as in subgroup D , but male S-II with a median projection. Representative species: *dentiventris* (Handlirsch), *gazagnairei* (Handlirsch), *hoplites* (Handlirsch), *mayri* (Handlirsch), *monodon* (Handlirsch), *peregrinus* (F. Smith), *proteus* (Arnold), *revindicatus* (Schulz).

F. *B. loricatulus* subgroup—ID at midocellus less than 2× that at clypeal base, propodeal flange UA with 2 indentations and 3 teeth, male hindfemur without spines on inner side, male sterna without projections, sternal punctation of female fine and close, female foretarsal V and arolium not enlarged. Representative species: *loricatulus* (F. Smith).

G. *B. discolor* subgroup—ID at midocellus less than 2× that at clypeal base, propodeal flange UA at most broadly incurved below, male S-II and S-III without projections but S-VI with a mediobasal groove or tooth, female foretarsal V and arolium enlarged. Representative species: *discolor* (Handlirsch), *nyasae* (Turner), *wenzeli* R. Bohart, new species.

Bembecinus caffer group, *caffer* subgroup

Bembecinus chilwae R. Bohart, new species
(Fig. 8)

Male holotype. Length 13.0 mm. Body black, yellow, and red. Yellow are: facial marks including scape (Fig. 8a), narrow posterior band across pronotum, summit of propodeal flange (Fig. 8f); foreleg partly, including basal three tarsomeres, lateral tergal markings (Fig. 8i); brownish red are: antennal flagellum, occipital band, pronotum behind yellow margin, scutum laterally, scutellum, metanotum posteriorly, large upper mesopleural spot, legs mostly, T-VII, S-VI and following; wings basally and veins reddish, membrane clear. Pubescence pale and short on vertex, quite short and reddish on notum, abundant and erect as well as red on S-VII to VIII, lateral fringe on genitalia (Fig. 8n). Punctation close, mostly fine, a little more coarse on mesopleuron. Facial proportions including antenna as in Figs. 8a, 8b, lateral view of propodeal flange as in Fig. 8f; hindfemur concave toward base, excavated within (Fig. 8h); second submarginal cell not petiolate (Fig. 8g), genitalia slender (Fig. 8n).

Female. Length 14 mm. About as in male, but facial proportions as in Fig. 8o, labrum red, markings of propodeal flange reddish, clypeus with scattered punctures (Fig. 8o), forebasitarsus with 3 preapical rake setae, more apical ones stouter (Fig. 8p); T-VI long, red, smooth (Fig. 8q), propodeal flange UA with a very small notch.

Holotype male (LONDON), southwest of Lake Chilwa, Mozambique, I-9–14 (S. A. Neave). Paratype female (LONDON), Mlange, Mozambique, I-20–14 (S. A. Neave).

This species belongs in the *caffer* group with male antenna slender and apically simple. The lateral tergal spots (Fig. 8i) place it in the *caffer* subgroup. The weakly defined notch of the propodeal flange UA (Fig. 8f) is small and irregular which distinguishes both sexes of *chilwae* from *caffer* Handlirsch, *laterimacula* Handlirsch, and *haplocerus* Handlirsch. Also, the male of *chilwae* differs from *caffer* by its simple S-V, from *laterimacula* by its more slender genitalia (Fig. 8n) and from *haplocerus* by its deformed male hindfemur (Fig. 8h). The specific name refers to the locality of the holotype, Lake Chilwa.

Bembecinus caffer (Saussure)

Stizus caffer Saussure 1855:28, Fig. 9. Holotype female, Natal Province, South Africa (GENEVA).

Stizus bredoi Arnold 1946:88. Syntype males, fe-

males, "Albercorn," Gambia ("N. Rhodesia"), (PRETORIA ?). New synonymy.

This has been essentially an unknown species since the original description because the holotype has the second submarginal cell of the forewing briefly petiolate above, unusual in the group. However, I collected a series of specimens on sand dunes at St. Lucia, Natal Province, South Africa in 1972. One of the males has the second submarginal cell petiolate just as in the holotype female of *caffer*. Otherwise, the females all agree closely with that holotype, which I have studied. I have not seen the syntypes of *bredoi*, but Arnold's detailed description and figures leave little doubt that it is synonymous with *caffer*. Males have a patch of fine, close setae basomedially on S-V, a unique feature.

Bembecinus rhopalocerus group,
rhopalocerus subgroup
Bembecinus gilvus R. Bohart,
new species
(Fig. 3)

Female holotype. Length 9.0 mm. Body black with extensive light orange and yellow to yellowish white. Light orange are: flagellum beyond F-II, broad basal tergal bands (stippled on Fig. 3i); yellowish white are: facial marks including antennal base (Fig. 3o), posterior bands on terga and sterna (unstippled areas on Fig. 3i); yellow are: thoracic notal (Fig. 3e) and pleural areas, legs (a little lighter beyond femora); wings transparent. Pubescence pale, inconspicuous. Punctation fine, close. Facial proportions including antenna as in Fig, 3o, thoracic pattern as in Fig. 3e, propodeal flange UA evenly curved (Fig. 3f), second submarginal cell as in Fig. 3g, forebasitarsus as in Fig. 3p, T-VI nearly triangular (Fig. 3q).

Male. Unknown.

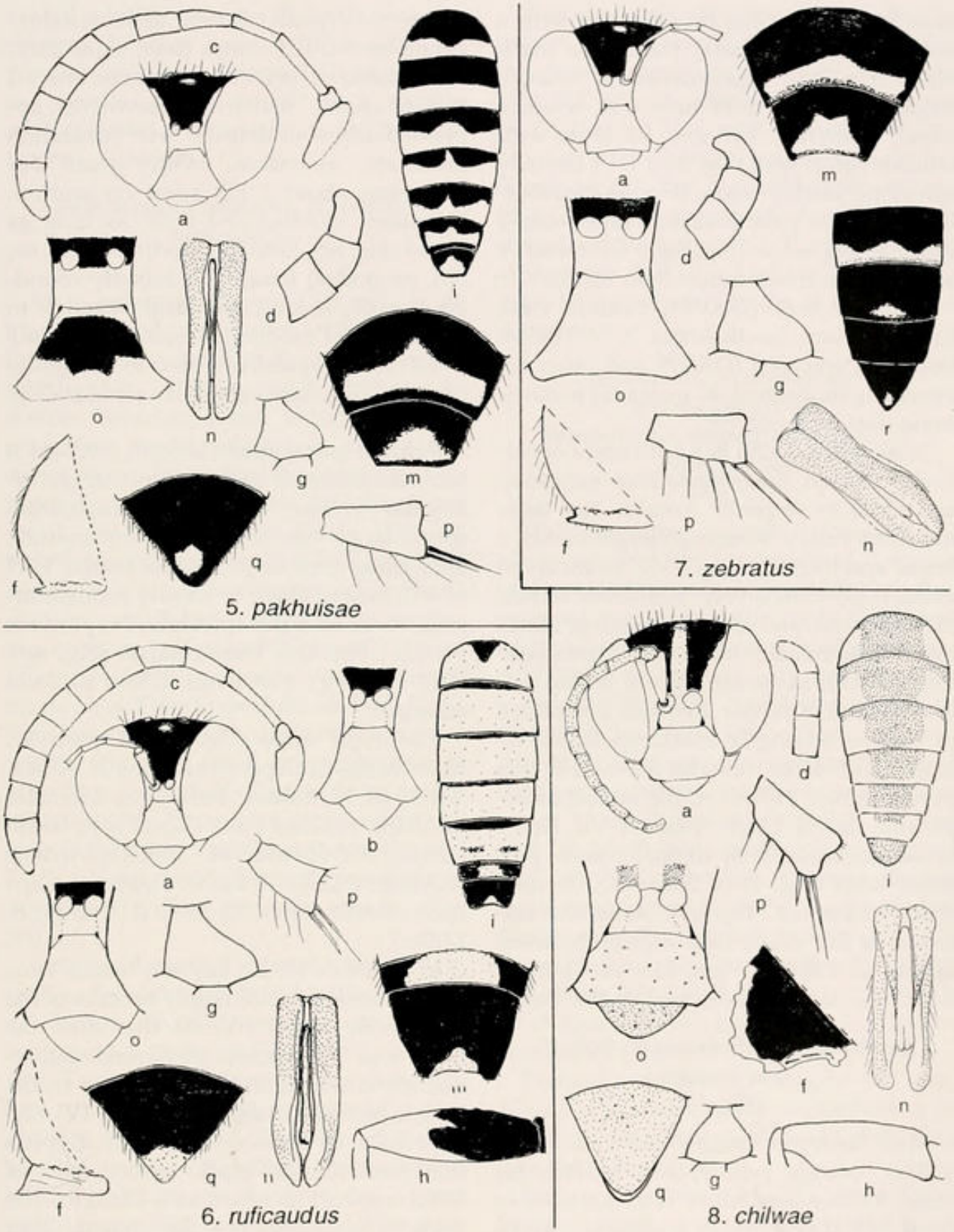
Holotype female (WASHINGTON), Gobabeb, Namibia, I-6-80 (Wharton, Coll.) Paratype female (DAVIS), same data as holotype. Paratype female (GAINESVILLE), 20 km w. Usakos, Namibia, II-4-83 (L. Stange, R. B. Miller).

This species is remarkable for its extensive yellow and yellowish orange coloration. In the only comprehensive key to South African *Bembecinus* (Arnold, 1929) it runs between numbers 40 and 41. On the basis of the clavate antennae and rounded UA it falls in the *rhopalocerus* subgroup. The strong submedian yellow marks of the scutum (Fig. 3a) relate it to *quadristrigatus* Arnold. *B. gilvus* differs from *quadristrigatus* and from other *Bembecinus* by the greatly reduced black areas, particularly on the abdomen. It is a small species, 9–10 mm long, in contrast to *quadristrigatus*, whose length is 11–14 mm, according to the original description. The specific name refers to the extensively yellow and light orange coloration.

Bembecinus pakhuisae R. Bohart,
new species
(Fig. 5)

Male holotype. Length 13.0 mm. Body black marked with sulfur yellow on antenna toward base, face below middle (Fig. 5a), posterior margin of pronotum including lobes, scutal spot over wing base, tegula, post-tegula, lateral streaks on scutellum and metanotum, legs mostly but black toward base, apical bands on all terga (Fig. 5i), narrow apical bands on S-II to IV; flagellum mostly pale tan in front; wings clear, veins reddish brown. Pubescence whitish, moderate, erect on vertex and T-I toward base. Punctation moderate, extensive, punctures mostly 1.0 PD apart, clypeus with punctures 1–3 PD apart. Flagellum clubbed, F-I 5.3× as long as broad (Fig. 5c), F-XI slightly incurved within (Fig. 5d), facial proportions as in Fig. 5a, propodeal flange UA evenly rounded (Fig. 5f), second submarginal cell as in Fig. 5g, terga moderately slender (Fig. 5i), T-VII broadly truncate at apex (Fig. 5m), genitalia slender (Fig. 5n).

Females. Length 10–12 mm. About as in



Figs. 5–8. Morphological characters of *Bembecinus* spp.: 5, *parkhuisae*; 6, *ruficaudus*; 7, *zebratus*; 8, *chilwae*. Arabic letters a–n indicate male characters, o–r indicate female characters (a, face; b, lower face enlarged; c, antenna, front view; d, flagellomeres IX–XI, lateral; e, thoracic pattern; f, outline of left propodeal flange in lateral view; g, second submarginal cell of forewing; h, hindfemur, outer view; i, abdomen with tergal banding, dorsal; k, outline of T-VII; m, terminal terga VI–VII, shape and pattern; n, genitalia, dorsal; n′, enlargement of genitalia toward apex; o, lower face except eyes; p, forebasitarsus, lateral outline; q, shape and markings of T-VI; r, markings of female T-III-VI).

male except: clypeus broader and with a broad median or basal transverse black mark (Fig. 5o); legs extensively orange; tergal bands on I to IV narrower, whitish, edged with red; T-V and VI often with whitish apical spot (Fig. 5q); T-VI laterally spiculate, weakly setose (Fig. 5q); forebasitarsus with 4 pale, preapical rake setae, 2 stout apical setae (Fig. 5p), foretarsal V and arolium much larger than others.

Holotype male (DAVIS), Pakhuis Pass, Cape Province, South Africa, X-7-75 (R. M. Bohart). Paratypes (DAVIS and other cooperating museums), 47 males, 32 females, same data as holotype.

In Arnold's (1929) key both sexes of *pakhuisae* run to the *rhopalocerus* subgroup and close to *mutabilis* Arnold. The latter has deep yellow to orange tergal bands, a broad and incised male T-VII, an incurved male F-XI, extensively yellowish female mesopleuron, and abundant orange markings in the female. In *pakhuisae* the markings of both sexes are mostly lemon yellow to whitish yellow. Reddish is confined to narrow edging of markings in the female, and some females have the legs partly orange. However, the female mesopleuron is all black. Male T-VII has a broad but truncate or slightly convex posterior edge (Fig. 5m). Also, F-XI is only weakly incurved. The type series was collected as the wasps flew rapidly between bushes at Pakhuis Pass, east of Clanwilliam. The name is dedicated to the Pass.

Bembecinus ruficaudus R. Bohart, new species
(Fig. 6)

Male holotype. Length 12.0 mm. Black, yellow, orange yellow, and reddish orange. Yellow are: lower face, antenna in front to F-II (Fig. 6a, c) posteriorly, pronotal lobe; orange yellow are: lateral scutal spot, wing base, scutellum laterally, lateral streak on metanotum, legs mostly, distal one-third of hindfemur (Fig. 6h); reddish orange are: abdominal terga mostly (Fig. 6i, stippled areas), S-I posteromedial spot, S-II to S-IV posterolateral spots (slightly joined on S-II-III); wings clear, veins dark. Pubescence silvery, erect on vertex and T-I toward base, scattered elsewhere, appressed and abundant on face. Punctation moderate, extensive, mostly close but punctures about 1 PD apart on scutum. Flagellum clubbed, F-I 5.3× as long as broad (Fig. 6c), facial proportions (Figs. 6a, 6b), propodeal flange UA broadly rounded (Fig. 6f), second submarginal cell as in Fig. 6g, terga moderately slender (Fig. 6i), T-VII broad apically where it is slightly concave (Fig. 6m), genitalia slender (Fig. 6n).

Female paratypes. Length 10.5–11.0 mm. About as in male except: larger triangular yellow spot on mesopleuron, spots larger on scutellum, metanotum, spot along crest of propodeal flange, T-VI to VII mostly black or mostly reddish orange. T-VI laterally spiculate. Proportions of face (Fig. 6o), forebasitarsis (Fig. 6p), T-VI (Fig. 6q). Foretarsal V and arolium enlarged.

Holotype male (DAVIS), Doorn R., Moedverloor, Cape Prov., South Africa, X-8-75 (R. M. Bohart). Paratypes, 2 females (DAVIS), Pakhuis Pass, Cape Prov., South Africa, X-7-75 (R. M. Bohart); female (GAINESVILLE), 10 km w. Steinkopf, Cape Prov., South Africa, XI-10-90 (L. Stange, R. Miller).

In Arnold's (1929) key the female runs to *hyperocrus* Arnold mainly because of the extensively red T-I-V. At that time the male was not known to Arnold. Subsequently it was found to be similar to the female but with orange-red on T-I-IV only. The male of *hyperocrus* has the clypeus and pronotum all black, incised apex of T-VII one-half as broad as F-I length. The male of *ruficaudus* has the clypeus light yellow, pronotum with a yellow posterior band, weakly emarginate apex of T-VII that is as broad as F-I length (Fig. 6m). Females of *hyperocrus* have a large basal black clypeal spot contiguous with a black supraclypeal area. In *ruficaudus* these areas

are all whitish yellow (Fig. 6o). Also, *hyperocrus* females have T-VI slightly expanded apically, whereas T-VI of *ruficaudus* females tapers evenly to a narrow apex (Fig. 6q). The specific name refers to the red abdomen.

Bembecinus zebratus, R. Bohart, new species
(Fig. 7)

Male holotype. Length 11.0 mm. Body black marked with sulfur yellow as follows: antenna toward base, face below middle (Fig. 7a); posterior margin of pronotum including lobes, scutal spot over wing base, tegula, post-tegula, lateral traces on scutellum and metanotum, spot on mesopleuron, legs mostly but black toward base, apical tergal bands (Fig. 7i), apicolateral traces on S-II-IV; flagellum mostly pale tan in front; wings clear, veins dark brown. Pubescence whitish, moderate, erect on vertex and T-I basally. Punctation moderate, extensive, 1–3 PD apart on clypeus. Flagellum clubbed, F-I 5.3× as long as broad, F-XI distinctly incurved within (Fig. 7d), facial proportions as in Fig. 7a, propodeal flange UA evenly rounded (Fig. 7f), second submarginal cell as in Fig. 7g, terga moderately slender and T-VII slightly but distinctly emarginate apically (Fig. 7m), genitalia slender (Fig. 7n).

Females. Length 9–12 mm. About as in male except: clypeus broader (Fig. 7o); tergal bands whitish, narrower on T-I-III, with only a trace on IV, absent on V-VI (Fig. 7r), legs sometimes partly deep yellow to light orange, sterna nearly always entirely black; T-VI laterally spiculate, weakly setose (Fig. 7q); forebasitarsus with 4 pale, preapical rake setae, 2 stout apical setae (Fig. 7p); foretarsal V and arolium are enlarged.

Holotype male (DAVIS), Worcester, Cape Prov., South Africa, X-?-75 (R. M. Bohart). Paratypes (DAVIS) and other cooperating museums), 10 males, 9 females, same data as holotype.

This species is very close to *pakhuisae* R. Bohart. However, *zebratus* males differ by the more strongly curved F-XI (compare Figs. 7d, 5d), the distinctly concave apex of T-VII (Fig. 7m), and the usual occurrence of a mesopleural yellow spot. In the female of *zebratus* the unmarked clypeus (Fig. 7o), large mesopleural yellow spot, absence of markings on T-V and reduction of those on T-IV (Fig. 7r) are differentiating. The name refers to the striping of the abdomen.

Bembecinus tridens group,
tridens subgroup
Bembecinus abmedius R. Bohart, new species
(Fig. 2)

Male holotype. Length 8.0 mm. Body black, marked with whitish as follows: lower face except black mandible (Fig. 2a), pronotal margin including lobe, fore- and midcoxae partly, fore- and midfemora distally, tibiae and tarsi mostly, restricted tergal marks (Fig. 2i), lateral traces on S-II-IV; yellowish white are: antenna in front, lateral spot on scutum posteriorly, lateral spot on scutellum, trace on metanotum; wings clear. Pubescence silvery, clypeus with a small and sublateral apical tuft (Fig. 2a). Punctation fine. Antenna slender; facial proportions as in Fig. 2a, propodeal flange roundly notched below (Fig. 2f), second submarginal cell with a short petiole above (Fig. 2g), T-VII narrowly rounded at apex (Fig. 2k), genitalia expanded toward apex (Fig. 2n).

Female paratypes. Length 9.0 mm. About as in male. Facial proportions as in Fig. 2o; T-VI slender, all black, with long pale hair (Fig. 2q).

Holotype male (DAVIS), Foro-Foro, Bouake, Ivory Coast, Africa, I-31-72, savannah (D. Duviard). Paratypes (DAVIS, PARIS), PRETORIA), 1 male, 4 females, Foro-Foro, Bouake, Ivory Coast, II-28-72 to IV-10-72 (D. Duviard).

This species is in the *tridens* subgroup. It is similar in size to the widespread *ar-*

gentifrons F. Smith. The second submarginal cell (Fig. 2g), is also similar. However, *argentifrons* has T-III banded, mandible and hindfemur partly yellow, and UA incision sharply pointed in contrast to *abmedius* (Fig. 2f). *B. corpulentus* (Arnold) has the same tergal pattern as *abmedius* but it belongs in the *spinicornis* subgroup. The common North African *bitinskii* has a similar tergal pattern but its mandible is yellow and the propodeal flange has at most a tiny notch. The specific name *abmedius* refers to the all-black T-III of the tergal pattern.

Bembecinus tridens group,
spinicornis subgroup
Bembecinus brooksi R. Bohart,
new species
(Fig. 12)

Male holotype. Length 9.0 mm. Body black with extensive yellow and orange-yellow markings. Yellow to light orange-yellow are: antenna in front; lower frons, clypeus, labrum (Fig. 12a); scutum except median and lateral black stripes, remaining thorax except small black at middle of propodeum, legs almost entirely, terga except weak brownish transverse subapical stripes on T-IV-V, median darkened area on T-VII (Fig. 12k). Wings transparent. Pubescence pale, inconspicuous. Punctation fine, close, appearing granular on T-VII. Facial proportions including antenna (Figs. 12a, d), propodeal flange UA obtusely emerginate below (Fig. 12f), second submarginal cell not petiolate (Fig. 12g), terga moderately stout as in paratype (Fig, 12i), T-VII laterally incurved toward rounded apex (Fig. 12k), genitalia rounded laterally and apically (Fig. 12n).

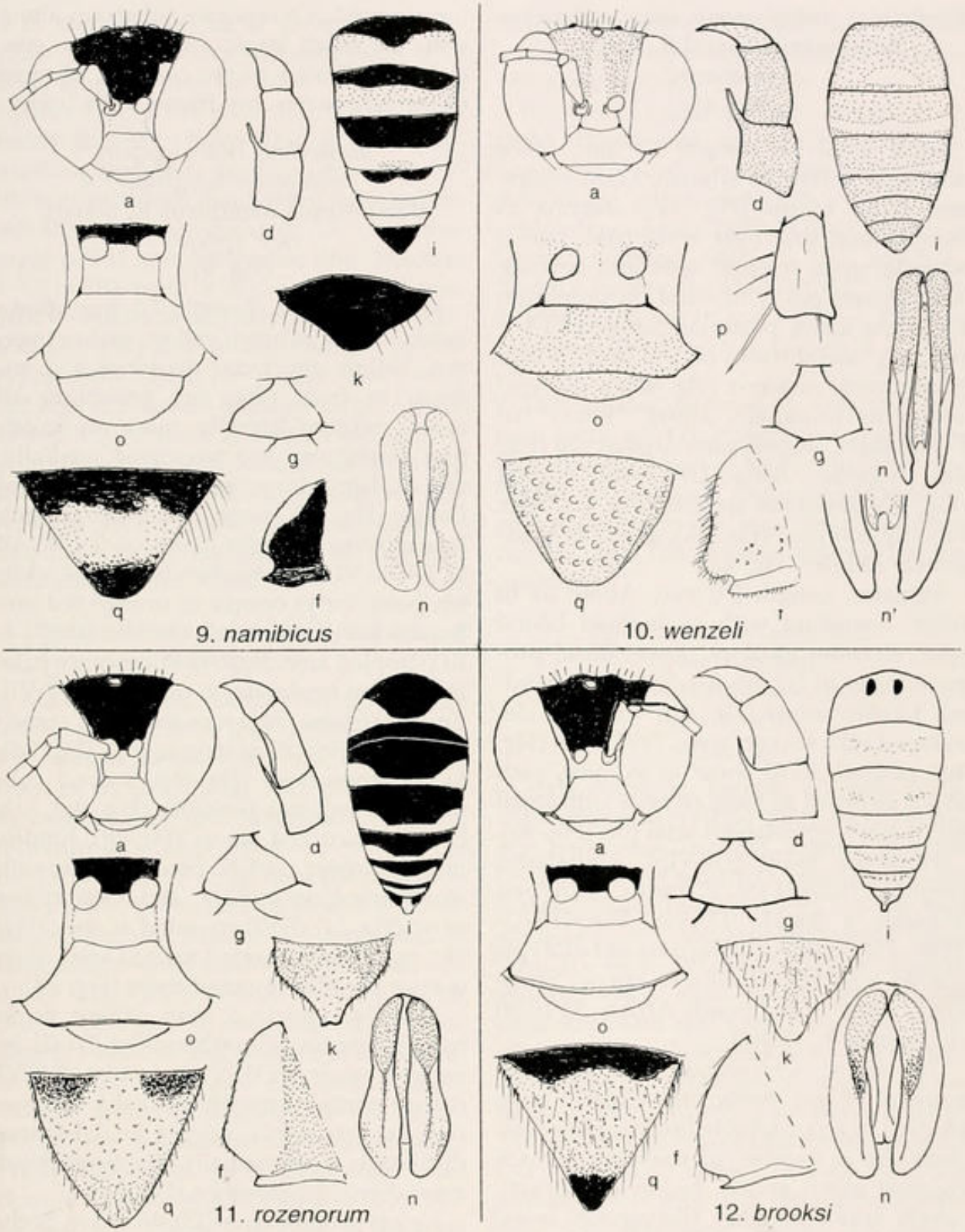
Females. Length 8.0–9.0 mm. Body black and yellow to orange-yellow. Yellow are: lower frons, clypeus, labrum (Fig. 12o), antenna in front; pronotum all across, lateral spots on scutum, scutellum, propodeum; strip across metanotum, legs mostly but femora black above, apical bands on T-I-V, slightly enlarged medially and laterally, S-II large lateral spot, apical bands on S-II-V. Orange-yellow are: T-VI but darkened basally and a little apically (Fig. 12q), S-VI elongate medial spot. Wings slightly stained. Sternal punctation fine and close.

Holotype male (LAWRENCE), Beza Mahafaly Res., Tulear Prov. Madagascar XI-21-84 (R. W. Brooks). Paratypes (LAWRENCE, DAVIS, etc.), 182 males, 72 females, same data as holotype, both sexes from nesting aggregations.

The other *Bembecinus* known from Madagascar (Arnold, 1945) are: *mirus* (Arnold), *assentator* (Arnold), *spinicornis* (Saussure), *hirtiusculus* (Arnold), *wenzeli* R Bohart, new species, and *rectilateralis* Arnold. I have identified specimens of all of these, and *brooksi* is quite different. The lectotype female (seen) of *rectilateralis* in the PARIS Museum agrees closely with Arnold's original description. Among other points there is a black spot on the supraclypeal area of the type (and of an associated male), the forebasitarsus is black-edged posteriorly, T-VI is all black, and the thoracic sides are practically straight as seen from above. The lectotype female of *rectilateralis* here designated was from Bekily. Other syntypes were from Antanimora, and Ranomafana.

In any case, *brooksi* is quite different, distinguished from all previously described Madagascan species by the untoothed male S-VIII, extensively yellow T-VI in both sexes and a broad notch on the propodeal flange.

Of the total 277 males of *brooksi* 271 are the yellow phase and the scutum always has at least a pair of submedian yellow stripes. However, the extent of yellow varies considerably, particularly on the abdomen. Females are of the dark phase, with medially black scutum and more regularly banded terga, on a black background. Six males (less than 2.2%) resemble the females in markings. The name is dedicated to the collector, my friend, Robert Brooks.



Figs. 9–12. Morphological characters of *Bembecinus* spp.: 9, *nambicius*; 10, *wenzeli*; 11, *rozenorum*; 12, *brooksi*. Arabic letters a–n indicate male characters, o–r indicate female characters (a, face; b, lower face enlarged; c, antenna, front view; d, flagellomeres IX–XI, lateral; e, thoracic pattern; f, outline of left propodeal flange in lateral view; g, second submarginal cell of forewing; h, hindfemur, outer view; i, abdomen with tergal banding, dorsal; k, outline of T-VII; m, terminal terga VI–VII, shape and pattern; n, genitalia, dorsal; n′, enlargement of genitalia toward apex; o, lower face except eyes; p, forebasitarsus, lateral outline; q, shape and markings of T-VI; r, markings of female T-III-VI).

Bembecinus tridens group, *irwini* subgroup

Bembecinus irwini R. Bohart, new species

(Fig. 4)

Male holotype. Length 5.0 mm. Black and light yellow to whitish. Light yellow are: facial marks (Fig. 4a), antenna in front, scutal spot over wing base, lateral scutellar spot, femoral apex and beyond; whitish are: posterior band on pronotum including lobes, posterior bands on T-I-V (Fig. 4i), lateral traces on S-II to III; wings transparent. Antenna (Fig. 4c) with basal segments unusually short, "spine" of F-VIII short, second submarginal cell (Fig. 4g), propodeal flange UA evenly curved (Fig. 4f), abdomen slender (Fig. 4i), apex broadly rounded (Fig. 4k), genitalia moderately slender (Fig. 4n).

Females. Length 5.0 mm. About as in male. Scutellum with or without lateral spot, sternum all dark, lower facial proportions as in Fig. 4o, T-I-V apically banded, forebasitarsus (Fig. 4p) with one developed rake seta on apex, T-VI black (Fig. 4q); pedicel, F-I-II about as in male, each about as broad as long; clypeus with small but distinct apicolateral setal tuft (Fig. 4o).

Holotype male (DAVIS), Maltahohe, Namibia, II-17-74 (M. E. Irwin). Paratypes, 9 males, 1 female (DAVIS, WASHINGTON, PRETORIA), same data as holotype; female (GAINESVILLE) 10 km w. Steinkopf, Cape Prov., South Africa, XI-10-90 (L. Stange, R. Miller).

The size of *irwini* (about 5 mm long), the smallest of any *Bembecinus* which I have studied, is a remarkable feature. However, there are a number of characters which contrast *irwini* and *B. tridens* (Fabricius), which taken together distinguish *irwini* from all other known members of the genus. These are: the short F-I-II-III (about as long as broad) (Fig. 4c), evenly curved UA (Fig. 4f), all black supraclypeal area, oval spot in clypeal middle in both sexes (Figs. 4a, 4o), and very broadly rounded apical margin of male T-VII (Fig. 4k). I have placed it a separate subgroup along with the much larger *distinctus*. The species is dedicated to the collector of most of the type series, my friend Mike Irwin.

Bembecinus tridens group, *spinicornis* subgroup

Bembecinus namibicus R. Bohart, new species

(Fig. 9)

Male holotype. Length 7.0 mm. Body black, yellow, whitish yellow, and orange-red. Yellow are: facial markings and antenna in front (Fig. 9a), pronotum all across, scutum laterally, mark on scutellum posteriorly but narrowed medially, metanotum, large spot on propodeal flange (Fig. 9f), large mesopleural spot, legs mostly, posterior bands on T-I-IV, all of T-V to VI (Fig. 9i); (bands become whitish posteriorly) orange to orange red are: femora partly (especially hindfemur), T-I-III (stippled area, Fig. 9i). Pubescence pale. Punctation moderate on upper face, T-VII, fine elsewhere. Antenna slender, "spine" on F-VIII one-half as long as F-IX (Fig. 9d), facial proportions (Fig. 9a), second submarginal cell not petiolate (Fig. 9g), UA broadly incurved below (Fig. 9f), hindfemur on lower part of inner surface with small spine at middle, abdomen rather stout (Fig. 9i), T-VII rounded at apex (Fig. 9k), genitalia expanded toward apex, gonostyles broadly rounded there (Fig. 9n).

Females. Length 7 mm. About as in male. Posterior yellow bands on T-I-III, irregular bands on IV-V, and most of T-VI (bands partly or mostly whitish). Orange-red are: legs partly, edging on T-I-V medial bands, T-VI medially (Fig. 9q stippled area). Facial proportions (Fig. 9o).

Holotype male (DAVIS), 45 km w. Seeheim, Bethanien Dist., Namibia, sandy river bank, II-19-74 (M. E. Irwin). Paratypes (DAVIS), female, same data as holotype, 2 males (DAVIS), Namib Desert, II-15-74 (M. E. Irwin), female (GAINESVILLE), 26 km n. Gochas, Namibia, II-6-83 (L. Stange, R. Miller).

B. namibicus is one of the many *Bembecinus* in the *spinicornis* subgroup with body length falling between 7 and 10 mm. Many of these, like *namibicus*, have UA obtusely angled in below (Fig. 9f). A distinguishing feature of *namibicus* is the leg coloration in which orange-red and yellow are almost evenly divided. Also, submarginal cell II is not petiolate (Fig. 9g), and F-XI of the male is unusually short (Fig. 9d). *B. namibicus* vaguely resembles *buyssoni* (Arnold) and *mitulus* (Arnold) (holotypes seen) which have more extensively red legs and red on terminal terga. Another red-legged form is *witzenbergensis* (Arnold) (holotype seen), which has inner eye margins much less divergent above. Differences from *rozenorum* are discussed under that species. The name is an adjective indicating "from Namibia."

Bembecinus rozenorum R. Bohart, new species

Male holotype. Length 10 mm. Body black, deep yellow, and orange-red. Yellow are: facial markings and antenna in front as far as F-I (Fig. 11a), pronotum all across, scutum and scutellum laterally, metanotum, large spot on propodeal flange (Fig. 11f), large mesopleural spot, legs mostly, posterior bands on T-I-VI, enlarged laterally, that on T-I composed of large lateral spots narrowly connected medially (Fig. 11i), S-I band, lateral spots on S-II-V. Orange-red are: antenna in front (lightly) beyond F-I, slight mark on forefemur, midfemur and hindfemur above basally, trochanters partly, T-VII lightly except for basolateral dark areas (Fig. 11k). Pubescence pale. Punctation fine, close, a little more coarse on T-VII. Antenna slender, "spine" on F-VIII reaching middle of F-IX (Fig. 11d) facial proportions (Fig. 11a), second submarginal cell not petiolate (Fig. 11g), UA broadly incurved below (Fig. 11f), hindfemur on lower part of inner surface with small spine at basal one-third, abdomen rather stout (Fig. 11i), T-VII narrowed to slightly indented apex (Fig. 11k), genitalia expanded toward apex, gonostyles rather narrowly rounded there (Fig. 11n).

Females. Length 10 mm. About as in male. Hindfemur more extensively orange-red. Facial proportions (Fig. 11o), T-VI shape and markings (Fig. 11q).

Holotype male (NEW YORK), 38 km n. Usakos, Namibia, III-26-76 (J. G. and B. L. Rozen). Paratypes (NEW YORK, DAVIS), 3 females, 38 km n. and 19 km e. Usakos, Namibia, III-18-26-76 (J. G. and B. L. Rozen).

This species is close to *namibicus* and may occur with it. However, *rozenorum* is considerably larger (7 vs 10 mm long), the female tergal bands more deeply yellow, and male gonostyle less blunt (compare Fig 9n, 11n). The name is dedicated to the collectors.

Bembecinus tridens group,
tridens subgroup
Bembecinus tinkeri R. Bohart, new species
(Fig. 1)

Male holotype. Length 9.0 mm. Black with extensive yellow markings. Yellow are: lower face (Fig. 1a), antenna in front (F-II-XI orange-tinted), pronotum all across, notum marked as in Fig. 1e, legs almost entirely, bands on abdominal terga (Fig. 1i), S-I-V, VI partly, wings slightly stained, veins dark brown. Pubescence pale, abundant and erect on vertex, laterally on terga. Punctures fine, moderately close, about 1.0 PD apart on notum, mesopleuron, terga. Antenna slender, F-I about 2.0× as long as broad, slightly longer than F-II (Fig. 1a), "spine" of F-IX reaching middle of F-X (Fig. 1d); facial proportions (Fig. 1a); propodeal flange UA evenly rounded in profile (Fig. 1f); second submarginal cell not petiolate (Fig. 1g); T-VII drawn out apically (Fig. 1k); genitalia with gonostyles expanded toward apex (Fig. 1n).

Female paratypes: Length 8.0–10.0 mm. About as in male; facial proportions as in

Fig. 1o, T-VI as in Fig. 1q (lateral spots sometimes larger).

Holotype male (PERTH), 22 km n. Eneabba, Western Australia, dry bed of Arrowsmith River, I-2-13-95 (A. Tinker). Paratypes (DAVIS and other cooperating museums listed in Acknowledgments), 15 males, 54 females, same data as holotype.

The only other Australian *Bembecinus* with markings similar to those of *tinkeri* is *signatus* Handlirsch (1892:53). The holotype male of *signatus* was from Sydney, South Australia. It was deposited in the Hamburg Museum, and was subsequently destroyed. According to the description by Handlirsch the male of *signatus* differs from *tinkeri* in several characters: body length 11 mm, clypeus with a median black mark, UA with an excision, legs partly black, wings strongly "citrinae" in part, T-VII with a median yellow strip. The type series of *tinkeri* was taken in a Malaise trap by Alan Tinker, and the name is dedicated to him.

Bembecinus tridens group,
discolor subgroup
Bembecinus wenzeli R. Bohart,
new species
(Fig. 10)

Male holotype. Length 11.5 mm. Body dark reddish brown to black (background color), markings light brownish and yellow. Yellow are: posterior rim of pronotum, lateral spot on scutellum, submedian dash across metanotum, legs in front beyond femur, forefemur in front, short subapical mark on T-I, narrow subapical bands on T-II-III (that on III somewhat translucent) (Fig. 10i), lateral spots on S-II-III, traces on S-IV-V; light brownish are: facial markings (Fig. 10a), F-XI, most wing veins; wing membrane faintly reddish. Pubescence pale, partly erect, partly appressed; erect but not thick on upper face and mesopleuron; long and thick on S-VII-VIII. Punctures mostly moderate, sparse on clypeus, larger in front of ocellar triangle and on mesopleuron, 2–3 PD apart on scutellum, 1 PD apart or closer on propodeal enclosure and more terminal terga. Proportions of face including antenna (Figs. 10a, 10d); second submarginal cell not petiolate (Fig. 10g); propodeal flange UA obtusely rounded before posterior notch (Fig. 10f); abdomen stout (Fig. 10i), T-VII broad; obtusely truncate (Fig. 10i); S-VI with small basomedial tooth; S-VII lateral lobes fully exposed; genitalia slender (Fig. 10n) aedeagus strongly notched at apex (Fig. 10n').

Female paratype. Length 11.0 mm. About as in male, but facial proportions as in Fig. 10o, scutellum all brown, legs all brown, yellow band only on T-II, lateral spots only on S-II, foretarsal V and arolium much larger than others, forebasitarsus about 1.7× as long as broad (Fig. 10p), T-VI with a definitive pygidial plate and large punctures (Fig. 10q).

Holotype male (LAWRENCE), 38 km n. Toliara, Madagascar, XII-2-86 (J. W. Wenzel). Paratypes (LAWRENCE, DAVIS), 9 males, same data as holotype; female (LAWRENCE), 10 km e. Sakaraha, Madagascar, XII-4-86 (J. W. Wenzel).

This species belongs to the *tridens* group according to the projection on male F-IX, and to the *discolor* subgroup by the basomedian tooth on S-VI of the male, and short forebasitarsus of the female (Fig. 10p). The extensive dark reddish brown coloration (Fig. 10i, stippled area), broadly subtruncate T-VII of the male (Fig. 10i), and coarse punctation of the partial pygidial plate of the female (Fig. 10q), distinguish the species. No other species of *Bembecinus* known to me is like it on Madagascar or on continental Africa. The specific name is dedicated to the collector, John W. Wenzel.

NOTES ON PREVIOUSLY DESCRIBED SPECIES

Bembecinus tridens group,
tridens subgroup
Bembecinus argentifrons (F. Smith)

Larra argentifrons F. Smith 1856:339. Syntype males "Port Natal", Natal Prov., South Africa, (LONDON).

Stizus braunsii Handlirsch 1894:287. Lectotype female (here designated), "Transvaal", Transvaal Prov., South Africa, (GENEVA). New synonym.

Stizus barkeri Arnold 1940:114. Holotype female, Durban, Natal Prov., South Africa (PRETORIA ?). New synonym.

I have studied the lectotype of *braunsii* and a paratype male of *barkeri* from PRETORIA. They agree nicely with specimens in a long series (32 males, 5 females) that I collected on a sandy bank at the mouth of Umgazi River, Natal Prov., South Africa, October 28, 1972. Characteristics of this species are: Both sexes with length usually 7–9 mm; a quite sharp notch below on UA; second submarginal cell briefly petiolate; black and yellow markings, including those of legs, but tending toward whitish on female terga; males with yellow bands or spots on T-I-VII, females with bands or spots on T-I-IV or sometimes a lateral spot on V, females with a median black clypeal spot, and with foretarsal V and arolium not enlarged.

A presumed male syntype of *argentifrons* was sent to me from the British Museum. It bears the label "Port Natal" but the clypeus is mostly black contrary to Smith's original description. Therefore, I have not designated it as lectotype. Nevertheless, I feel quite certain that *argentifrons* is the senior synonym for *braunsii* and *barkeri*.

Bembecinus tridens group, *spinicornis* subgroup
Bembecinus spinicornis (Saussure)

Stizolarra spinicornis Saussure 1887:9. Holotype male, Madagascar. (type seen, PARIS).

Stizus varians Arnold 1945:73. Holotype male, Bekily, Madagascar (type seen, PARIS). Synonymy by Leclercq 1940.

Arnold (1945) suggested the possibility of the above synonymy although he had not seen the holotype of *spinicornis*. A comparison of this type, a flavid male, and the type of *varians*, both furnished by Dr. J. Casevitz-Weulersse, verifies the relationship of the two names. Arnold's description and figures of *varians* based on 7 males, particularly the bladelike tooth of S-VIII, are unmistakable. The flavid holotype of *spinicornis* has 3 small spines scattered along the lower edge of the inner surface of the hindfemur. Also, the forebasitarsus is all yellow.

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