# NOTES ON BRACHYPOGON KIEFFER (DIPTERA, CERATOPOGONIDAE), A NEW SPECIES, AND TWO NEW NEOTROPICAL GENERA OF THE TRIBE CERATOPOGONINI<sup>1</sup>

WILLIS W. WIRTH AND FRANKLIN S. BLANTON
Systematic Entomology Laboratory, Entomology Research Division
Agr. Res. Serv., USDA<sup>2</sup> and Department of Entomology,
University of Florida, Gainesville, Florida 32601, respectively

#### ABSTRACT

Two new genera are described in the Ceratopogonini: Baeohelea, type-species nana n. sp. from Colombia and Dominica, and Rhynchohelea, type-species monilicornis n. sp. from California and Florida. Two species are transferred to Baeohelea: (new combinations) Ceratopogon bourioni Clastrier 1961 and C. fuscipennis Tokunaga 1964. Brachypogon is restored to generic rank and characterized, and in it are included (newcombinations): Ceratopogon africanus de Meillon 1929, C. bergensis de Meillon and Hardy 1953, C. corius de Meillon and Hardy 1954, Palpomyia fuscivenosa Lutz 1914, Ceratopogon impar Johannsen 1938, C. insulicola Tokunaga 1959, C. novaguineae Tokunaga 1964, C. papuensis Tokunaga 1964, C. petersi Tokunaga 1964, C. sensegalensis de Meillon and Wirth, 1955, C. sitius de Meillon 1959, and C. vitiosus Winnertz 1852. Brachypogon fuscivenosus Lutz is redescribed and B. paraensis n. sp. is described from Brazil.

The genus Ceratopogon Meigen and its relatives in the tribe Ceratopogonini have remained in a state of confusion ever since the original allinclusive genus Ceratopogon was subdivided by Kieffer (1906, 1919, 1925), Goetghebuer (1920) Goetghebuer & Lenz (1934), and Edwards (1926). In the generic treatments by Edwards (1926), Goetghebuer & Lenz (1934), Macfie (1940), Johannsen (1943), and Wirth (1952), the tribe Ceratopogonini has grown to include the genera or subgenera Alluaudomyia Kieffer, Anakempia Kieffer, Brachypogon, Kieffer, Ceratopogon Meigen, Fanthamia de Meillon, Isohelea Kieffer, Nilohelea Kieffer, and Psilohelea Kieffer. Macfie (1940) recognized five genera in this group in two divisions: those with patterned, hairy wings, and unequal hind tarsal claws in the female (Alluaudomyia and Fanthamia), and those with unmarked bare wings and equal tarsal claws (Ceratopogon, Isohelea, and Brachypogon). Following Edwards (1926), the classification of the latter group was based on the extent of wing vein M2, it being entire in Ceratopogon, broadly interrupted at the base in Isohelea, and absent in Brachypogon. De Meillon in a series of papers (1929, 1939, 1953, 1954, 1959) kept pointing out the serious shortcomings of this system, and it was finally more or less abandoned in recent papers by Clastrier (1961) and Tokunaga (1964) who recognized only the genus Ceratopogon in this group.

Work by the present authors and Dr. Niphan Ratanaworabhan is progressing on a world-wide classification and key to the genera of the Ceratopogonidae. In the tribe Ceratopogonini we will not use the extent

<sup>&</sup>lt;sup>1</sup>This investigation was supported in part by. U. S. Army Medical Department Contract No. DA-49-193-MD-2177.

<sup>2</sup>Male address: c/o U. S. National Museum, Washington, D. C. 20560.

of vein M1 as a generic character, but will rely more on the condition of the radial cells, the separation of the eyes, various other modifications of the head, palpus and antenna, on the structure of the male and female genitalia, and to a lesser degree on wing macrotrichia and modifications of the tarsal claws. We are now describing two new genera and presenting a revised definition of *Brachypogon* in preparation for the broader and briefer treatment to be followed in the comprehensive paper.

We are greatly indebted to Dr. Niphan Ratanaworabhan and Miss Linda Heath for making the illustrations.

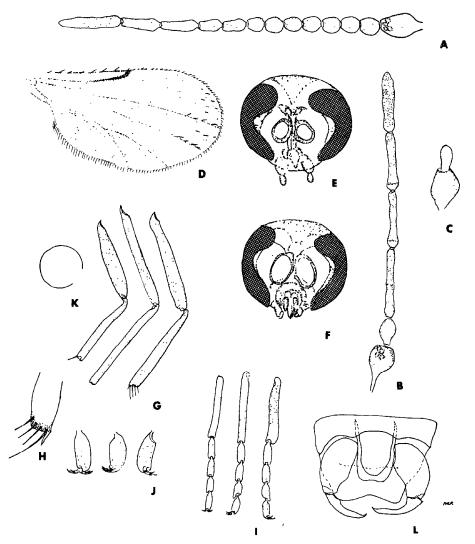


Fig. 1, Baechelea nana: a, female antenna; b, male antenna; c, female palpus; d, female wing; e, female head; f, male head; g, femora and tibiae (left to right) of fore, mid, and hind legs; h, hind tibial comb; i, female tarsi (left to right) of fore, mid, and hind legs; j, female fifth tarsomere and claws (left to right) of fore, mid, and hind legs; k, female spermatheca; l, male genitalia.

Baeohelea, new genus (Fig. 1)

Type-species, Baeohelea nana, new species.

Head (Fig. le): Eyes broadly separated, with fine, short, interface-tal hairs. Female frons with a submedian pair of low, tuberculate swellings just above antennal bases. Female antenna (Fig. la) 15-segmented; third segment elongate, provided with 4-5 sensory pits bordered by short setae; segments 4-10 short oval, 11-12 long oval, 13-15 more elongate and tapering; verticils short. Male antenna (Fig. 1b) 7-10 segmented, the distal 2-4 segments much elongated, plume absent but segments provided with sparse, long verticils. Palpus (Fig. 1c) 2-segmented, the first (primitive third) swollen, with a few spoon-shaped sensilla borne on mesal surface near base; second segment slender. Proboscis greatly reduced, scarcely extending below ventral head margin; mandible vestigial.

Thorax broad, relatively flattened above, humeral pits not apparent. Legs (Fig. lg) slender, without special armature or strong bristles; hind tibial comb (Fig. 1h) with 4 spines, a distinct spur present. Tarsi (Fig. 1i) without spines or armature, segments slender; claws of female (Fig. 1j) short, sharp, nearly straight, each provided with a short, hairlike, basal barb; male claws similar to those of female.

Wing (Fig. 1d) short and broad, distally rounded, anal angle reduced; costa reaching about two-fifths of wing length; radial cells obsolete, the radius somewhat thickened near costa; vein M2 complete nearly to base of medial fork; sparse, rather long macrotrichia present on distal fifth of wing.

Abdomen: Short and slender; female genital opening without special armature. Spermatheca (Fig. 1k) single, spherical, without neck, the opening of the duct broad. Male genitalia (Fig. 1L) quite small and poorly developed; ninth sternum a narrow ribbon; ninth tergum short and rounded, slightly bilobed without apicolateral processes; basistyle moderately broad, simple; dististyle slender, curved, with pointed tip; aedeagus in form of a high arch with the distal end broad and somewhat truncate; parameres not developed.

#### Baeohelea nana, new species

Female.—Wing 0.58 mm long. Thorax brown subshining; abdomen with 2 proximal segments whitish, distal segments dull brownish black; legs pale; wing glassy clear; halter pale. Antenna with lengths of flagella segments in proportion of 25-10-12-12-12-12-12-12-20-20-25-25-42. Costa extending to 0.41 of wing length. Spermatheca measuring 0.034 mm in diameter.

Male.—Similar to the female with differences as noted above. Wing 0.50 mm long; costa extending to 0.37 of wing length. Antenna 7-segmented, lengths of flagellar segments in proportion of 26-60-50-55-60; fourth segment (see Fig. 1b) frequently divided just past the basal swelling bearing the verticils. Genitalia as in Fig. 1L.

Distribution.—Colombia, Dominica, Eucador.

Types.—Holotype female, Pont Casse, Dominica, 2000 ft., 12 February 1965, W. W. Wirth, rain forest (Type no. 70647, USNM). Allotype male, Fond Figues River, Dominica, 13 March 1965, W. W. Wirth, light trap. Paratypes, 15 males, 10 females, as follows:

COLOMBIA: Rio Raposo, Valle, March-August 1964, V. H. Lee, light trap, 4 males, 1 female.

DOMINICA: Dleau Gommier, 15 February 1956, W. W. Wirth, stream margin, 1 male, 1 female; Fond Figues River, January-March 1965, W. W. Wirth, rain forest, 12 males, 6 females; Freshwater Lake, 21 January 1965, W. W. Wirth, 1 male, 1 female.

ECUADOR: Linje Chimborazo, July 1955, R. Levi-Castillo, 1 male, 1 female; Pambay, Napo Pastaza, March 1956, R. Levi-Castillo, 6 males.

Discussion. In Dominica, Baeohelea nana is confined to the rain forest at an elevation of about 2000 ft. or above. In its appearance it greatly resembles the small chironomid midge Corynoneura Winnertz and some of the small parasitic Hymenoptera. Its habits and breeding place are unknown.

The genus Baeohelea stands somwhat between Alluaudomyia and Brachypogon, but it has become greatly specialized and in many ways degenerated. The structure of the female antenna, the hyaline wing with reduced radial cells and scanty macrotrichia, and slender legs are remindful of Alluaudomyia of the parva group. The absence of radial cells and general structure of the male genitalia are similar to Brachypogon. The extreme reduction of the palpus and proboscis, the female tarsal claws, and the male antenna are unique in the Ceratopogonini. The generic name is taken from the Greek: baeo (tiny) +heleia (marsh dweller).

Ceratopogon bourioni Clastrier (1961) from France and C. fuscipennis Tokunaga (1964) from New Guinea are referred to Baeohelea (NEW COMBINATIONS) on the basis of their male and female antennal segmentation, palpal segmentation, similar head structure, including the wide eye separation and reduced proboscis, small simple tarsal claws, and all features of the male genitalia. These two species are very similar to each other and quite set apart from B. nana, however, in the presence of a small but complete second radial cell and of coarse microtrichia in the wing, and in the persence of 2 female spermathecae. In these two species the male antenna is 9 or 10-segmented and only the distal 2 or 3 segments are moderately to much elongated.

#### Rhynchohelea, new genus (Fig. 2)

Type-species, Rhynchohelea monilicornis, new species.

A small, stocky, black midge with bicolored legs and bare, smoky wings. Known only from the female.

Head (Fig. 2d): Eyes broadly separated, the arcuate line separating frons and vertex sharply demarcated and bordered by 3 setae on vertex; eyes with long interfacetal hairs. Clypeus broad; head bearing an elongate proboscis with apex broadly truncate and armed with several strong hooks and spines. Antenna (Fig. 2a) 14-segmented, moniliform, segments 7-11 slightly broader than long, 14 as long as 12-13 together, with blunt pointed tip; 3 short and scarcely expanded, provided with a sensory pit bordered by short setae; verticils very short. Palpus (Fig. 2b) 5-segmented, first segment indistinct, third segment very short and broad, bearing a small, deep, sensory pit. Mandible (Fig. 2e) well developed with about 8 distal teeth.

Thorax moderately broad and convex; mesonotum provided with scat-

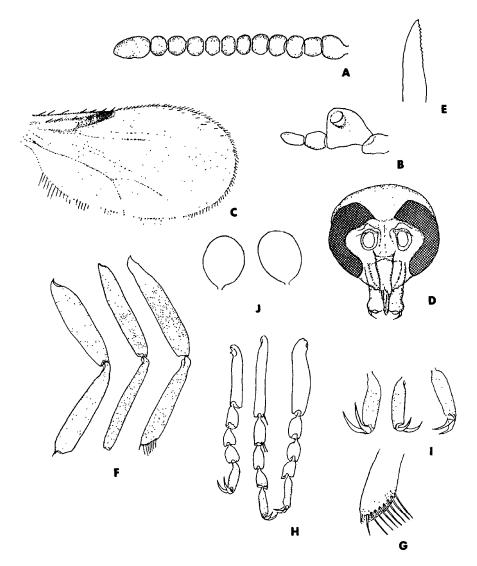


Fig. 2, Rhynchohelea monilicornis, female: ..a, antenna; b, palpus; c, wing; d, head; e, mandible; f, femora and tibiae (left to right) of fore, mid, and hind legs; g, hind tibial comb; h, tarsi (left to right) of fore, mid, and hind legs; i, fifth tarsomere and claws (left to right) of fore, mid, and hind legs; j. spermathecae.

tered, erect, moderately long hairs; scutellum with 2 pairs of marginal hairs. Legs (Fig. 2f) short and moderately stout, without special armature or long bristles; hind tibial comb (Fig. 2g) with 8 spines, the spur quite small. Tarsi (Fig. 2h) with some sharp ventral spines, more prominent on mid legs; basitarsi elongate, as long as next 3 tarsomeres combined, distal tarsomeres short, fourth not condiform, fifth unarmed ventrally; claws (Fig. 2i) sharp and slightly curved, without basal barb, moderately long on foreleg, short on mid and hind pairs.

Wing (Fig. 2c) short and broad, bluntly rounded distally, anal angle reduced; costa reaching to less than half of wing length; radial cells obsolete, the fused radial veins forming a distinct stigma; vein M1 obsolete distally, vein M2 entirely absent, mediocubital fork at same level as end of costa; macrotrichia absent; microtrichia coarse and dark, but forming a distinct pale line in middle of medial cell.

Abdomen: Short and rounded distally; genital opening without special armature. Spermathecae (Fig. 2j) 2, oval, with short, slender necks (3 present in the paratype).

#### Rhynchohelea monilicornis, new species

Female.—Wing 0.52 mm long. Head, thorax, and abdomen dark brown; antenna brown, palpus yellow; foreleg yellow except dark knee spot; and hind legs brownish, tarsi and bases of femora yellowish; wing smoky grayish brown, radius forming a dark stigma; halter with dark brown stem, the knob pale. Antenna with lengths of flagellar segments in proportion of 12-10-10-10-9-8-8-8-9-10-10-23. Costa extending to 0.41 of wing length. Spermathecae subequal, each measuring 0.030 by 0.024 mm.

Male.—Unknown.

Distribution.—California, Florida.

Types.—Holotype females, Torreya State Park, Liberty Co., Florida, 20 May 1966, H. V. Weems, light trap (Type no. 70648, USNM). One female paratype, Westmorland, Imperial Co., California, 6 April 1949, W. W. Wirth.

Discussion.—The generic name is taken from the Greek: rhyncho (nose, snout, muzzle) +heleia (marsh dweller). The striking feature of this genus is the short, broadly truncate proboscis provided distally with strong hooks and spines, and opposing this on each side, the well developed palpus with greatly expanded third segment. The antenna is developed similarly to that of many species of Brachypogon in which the segments are reduced to 14 and the intermediate segments are reduced in size. The wing is much like that of Brachypogon, with even greater reduction of the media, and M1 becoming obsolete distally. The wing is superficially similar to that of Baeohelea fuscipennis (Tokunaga) from New Guinea, but in that species the second radial cell is distinct and the costa is much longer.

#### Genus Brachypogon Kieffer

Brachypogon Kieffer, 1899: 69. Type-species, Ceratopogon vitiosus Winnertz, by original designation.

Brachypogon has nearly unanimously been accepted as a subgenus of Ceratopogon based upon the complete lack of vein M2 and the obsolescence of the radial cells. A survey of the species which have been placed in Brachypogon on the basis of these characters shows some important common features apart from the wing venation. The eyes are always contiguous on the midline; the palpi are 5-segmented, the third bearing a small deep pit; the antennae are 14 or 15-segmented, the intermediate segments or the female usually reduced in size, and the male bearing a plume; there is 1 spermatheca present; the male genitalia have the ninth tergum tapering but without strong apicolateral processes; basistyles usu-

ally rather stout; dististyles gradually curved and tapering; aedeagus a simple, moderately broad, distally tapering plate with short basal arms; parameres usually 2 moderate size submedian processes, sometimes fused in an H-shaped or U-shaped piece. In the wing venation the absence of radial cells due to the fusion of the branches of the radius is a constant feature in Brachypogon as here defined, but the extent of vein M2 is useless, except that no Brachypogon species has it complete to the base. The species of Baeohelea and Rhynchohelea which also lack radial cells and vein M2 differ greatly from Brachypogon in having widely separated eyes, reduced or highly modified proboscis and palpi, and the male genitalia with very short ninth tergum, aedeagus with long anterior arms and broadly rounded apex, and reduced parameres.

A complete description of the type-species *B. vitiosus* (Winnertz), has never been made, and material is not available for its description here. As an example of the genus the description and illustration of the following species is made in some detail, showing the generic features as well as the specific characters.

### Brachypogon parasensis, new species (Fig. 3)

Female.—Wing 0.95 mm long. A pale yellowish brown species; legs pale yellow, knee spots brownish, hind tibia with median brownish band; wing whitish with 3 prominent small brown anterior spots (on r-m crossvein, on end of costa and radius, and in middle of cell R5) and brown streaks in cells M1 and M2 directly behind the spot in cell R5; halter pale.

Head (Fig. 3f): Eyes contiguous on midline, with fine interfacetal hairs. Antenna (Fig. 3a) long and slender, with lengths of flagellar segments in proportion of 23-15-15-16-18-20-20-30-35-40-35-35; distal sensory pit present on third segment. Palpal segments (Fig. 3d) with lengths in proportion of 10-15-30-15-25; third segment slightly swollen, 2.5 times as long as broad, with a small, deep, round, sensory pit. Proboscis well developed, elongate; mandible (Fig. 3g) with 7-8 large teeth.

Thorax: Moderately broad and convex; mesonotum with scattered, moderately long hairs; scutellum with 4 marginal hairs. Legs (Fig. 3h) moderately slender, with scattered short hairs; femora unarmed; hind tibial comb (Fig. 3i) with 6 spines, spur small; tarsi (Fig. 3j) with a few sharp ventral spines at apices of tarsomeres; fourth segment short and simple, fifth slender; claws (Fig. 3k) long and slender, subequal, each with small basal barb on inner side.

Wing (Fig. 3e): Radial cells both obsolete; costa extending to 0.60 of wing length; tips of costa and radius thickened forming a distinct stigma; vein M1 slightly undulating, vein M2 obsolete at base; microtrichia inconspicuous, macrotrichia absent.

Abdomen: Yellowish; constricted distally from seventh to tenth segment; eighth segment in form of a yellowish sclerotized ring. Spermatheca (Fig. 3m) single, obliquely ovoid, with short conical portion tapering to duct, measuring 0.073 mm in both length and breadth.

Male.—Similar to the female with the usual sexual differences. Antenna (Fig. 3b) with segments 3-13 fused, 13-15 with lengths in proportion of 53-44-50, 13-14 with long verticils; plume well developed. Palpus (Fig. 3c) as in female. Claws (Fig. 3L) short and equal. Genitalia (Fig. 3n) with

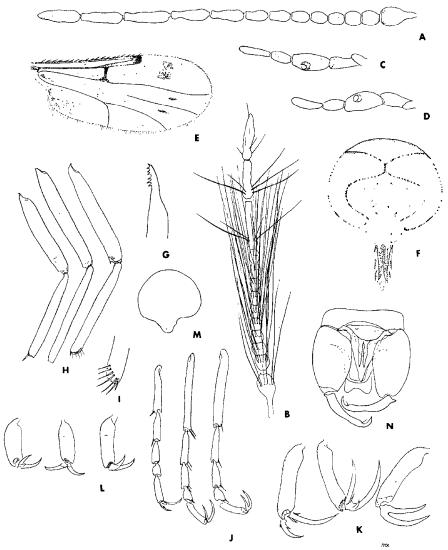


Fig. 3, Brachypogon paraensis: a, female antenna; b, male antenna; c, male palpus; d, female palpus; e, female wing; f, female head; g, female mandible; h, femora and tibiae (left to right) of fore, mid, and hind legs; i, hind tibial comb; j, female tarsi (left to right) of fore, mid, and hind legs; k, female fifth tarsomere and claws (left to right) of fore, mid, and hind legs; l, male fifth tarsomere claws (left to right) of fore, mid, and hind legs; m, female spermatheca; n, male genitalia.

ninth sternum short and transverse; ninth tergum tapering abruptly to rather narrow distal portion with bilobed apex. Basistyle moderately stout, straight; dististyle long and slender, slightly curved, abruptly narrowed and slightly bent distally with a sharp tip. Aedeagus with broad, low basal arch, tapering to slender, blunt-pointed tip; a pair of strongly sclerotized, pointed, submedian processes extending caudad from arch about two-thirds way to tip. Parameres fused in a short, strongly

sclerotized sclerite articulating at base with inner corners of basistyles and distally with bases of the submedian dorsal processes of aedeagus, with a slender median point extending caudally between the submedian dorsal processes.

Distribution.—Brazil.

Types.—Holotype female, allotype male, 10 male, 15 female paratypes, Mission Tiriyos, Rio Paru, Para, Brazil, 14 March 1962, E. J. Fittkau, at light (Type no. 70649, USNM).

Discussion.—This species is closely related to B. fuscivenosus (Lutz) with close agreement in wing venation, head structure including antennae and palpi, and details of the legs and abdomen. Specific differences are found in the number of antennal segments bearing sensory pits, the wing markings, body color, shape of the spermatheca, and small details in the structure of the male genitalia. Both species differ somewhat from other Brachypogon species available for study in their long antennae, somewhat more bristly legs, and longer and more perpendicular r-m cross-vein.

Brachypogon fuscivenosus (Lutz), NEW COMBINATION (Fig. 4)

Palpomyia fuscivenosa Lutz, 1914: 94 (Male, female; Brazil; Fig. wing); Floch and Abonnenc, 1942: 4 (French Guiana; Fig. wing, palpus). Parabezzia fuscivenosa (Lutz; Lane, 1945: 370 (types redescribed; Brazil; Fig. male genitalia).

Female.—Wing 0.96 mm long. A dull grayish brown species, mesonotum heavily greenish-gray dusted; legs yellowish, knee spots blackish, mid and hind coxae, trochanters, femora, tibiae, and tarsi brown; wing (Fig. 4c) whitish, with deeply infuscated lines along veins and 2 prominent dark brownish spots, one covering 4-m crossvein and the other across the swollen apex of costa and radius and extending caudad about a third-way across cell R5. Eyes continguous, with long interfacetal hairs. Antenna (Fig. 4a) with lengths of flagellar segments in proportion of 30-20-20-20-20-20-20-30-32-38-40-40, distal sensory pits present on segments 3-6. Palpal segments (Fig. 4b) with lengths in proportion of 10-25-31-23-25; third segment moderately swollen, 1.7 times as long as greatest breadth, with a moderately large, round, shallow, sensory pit. Mandible with 8 teeth. Legs moderately stout, with scattered, short, stout, stiff, erect bristles; hind tibial comb with 8-9 spines; claws long and curved, 0.6 as long as fifth tarsomere, each with prominent internal barb at base. Wing (Fig. 4c) with costa extending to 0.60 of wing length; radial cells obsolete, end of costa and radius greatly thickened, forming a prominent stigma; r-m cross-vein unusually long and nearly perpendicular, vein M2 obsolete at extreme tip and for about proximal fourth of its length; macrotrichia absent. Halter pale. Abdomen grayish brown; eighth segment heavily sclerotized on sternum with an angular posterior median cleft. Spermatheca (Fig. 4d) single, subspherical with a long subconical neck, measuring 0.095 + 0.022 (neck) by 0.086 mm (some Panama specimens with the neck quite slender).

Male.—Similar to the female with the usual sexual differences; antennal segments 3-13 fused, segments, 13-15 with lengths in proportion of 70-55-53; plume well developed. Genitalia (Fig. 4f) large and heavily sclerotized; ninth tergum tapering with a bluntly truncated apex; basistyle

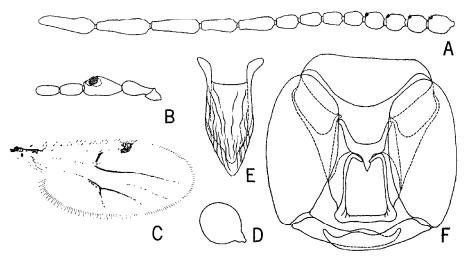


Fig. 4, Brachypogon fuscivenosus: a, female antenna; b, female palpus; c, female wing; d, spermatheca; e, male aedeagus; f, male genitalia, aedeagus removed.

moderately stout, not curved; dististyle moderately stout, nearly straight, apical portion with cancavity on inner side, with bent, slender tip. Aedeagus (Fig. 4e) about 2.5 times as long as broad, basal arms short and stout, only slightly diverging, basal arch rounded, main portion tapering to a bluntly rounded point, ventral surface wrinkled, dorsal side provided with a semi-hyaline sheath with pointed apex slightly surpassing tip of aedeagus proper. Mesal side of ninth tergum distally with a large, quadrate, strongly sclerotized thickening with anterior margin notched to fit the base of the U-shaped parameres.

Distribution.—Florida, Mexico, Panama, French Guiana, Brazil, Jamaica, Virgin Islands.

Specimens Examined .-

FLORIDA: Everglades city, Collier Co., February 1949, June 1950, Davidson, light trap, 18 specimens; Key Largo, Monroe Co., 30 May 1950, Buderus, light trap, 2 females, 16 March 1965, S. Kemp, light trap, 3 males; Lake Worth, 9 August 1951, W. W. Wirth, light trap, 1 female; Longboat Key, Manatee Co., 27 April 1956, light trap, 1 male; Palm Beach Co., August 1953, E. L. Seabrook, light trap, 1 female; Sanibel Island, Lee Co., 24 April 1956, Woodring, light trap, 1 female; Vero Beach, April 1956, 1959, October 1958, Ent. Res. Center, light trap, 11 males, 36 females.

JAMAICA: Duncans, 25 February 1958, D. J. Lewis, 1 female; Runaway Bay, February 1969, W. W. Wirth, light trap, 1 female.

MEXICO: Cozumal, Espirito Santo Bay, 5 April 1960, J. F. G. Clarke, 2 females; Quintano Roo, Puento de Morelo, June 1961, light trap, 1 female.

PANAMA: Almirante, Bocas del Toro Prov., April 1953, F. S. Blanton, light trap, 1 female; Chame, Panama Prov., 3 April 1951, F. S. Blanton, light trap, 2 females; Fort Knobbe, Camaron, C. Z., 23 June 1952, F. S. Blanton, light trap, 7 males, 6 females; France Field, C. Z., 22 April 1952, F. S. Blanton, light trap, 1 male, 1 female; Galeta Point, C. Z., 15 Sep-

tember 1958, S. Breeland, emergence trap, 1 male, 1 female, 26 August 1952, F. S. Blanton, light trap, 2 males, 2 females; Garachine, Darien Prov., February 1963, F. S. Blanton, light trap, 2 males; Mojinga Swamp, Fort Sherman, C. Z., January 1953, F. S. Blanton, light trap, 1 female; Patino Pt., Darien Prov., 21 July 1952, F. S. Blanton, light trap, 1 male, 2 females.

VIRGIN ISLANDS: Lameshur Bay, St. John, 5 September 1961, R. W. Williams, emergence trap, 2 males, 2 females.

## List of Species of Genus Brachypogon Kieffer

- africanus (de Meillon) 1929:248 (Ceratopogon, subgenus Brachypogon) Transvaal (Fig. wing, male genitalia; male only). N. COMB.
- bergensis (de Meillon and Hardy) 1953:26 (Ceratopogon) Cape Prov., S. Africa (male; Fig. wing, hind leg, aedeagus, parameres). N. COMB. corius (de Meillon and Hardy) 1954:69 (Ceratopogon) Cape Prov., S.

Africa (male; Fig. wing, genitalia). N. COMB.

- fuscivenosus (Lutz) 1914:94 (Palpomyia) Brazil (male, female; Fig. wing). N. COMB.
- impar (Johannsen) 1938:223 (Ceratopogon, subg. Brachypogon) Puerto Rico (female). N. COMB.
- insulicola (Tokunaga) 1959:350 (Ceratopogon, subg. Brachypogon) Caroline Islands (female; Fig. antenna, palpus, wing, spermatheca). N. COMB.
- novaguineae (Tokunaga) 1964:294 (Ceratopogon) New Guinea (male, female; Fig. antennae, palpi, wings of male and female, male genitalia). N. COMB.
- papuensis (Tokunaga) 1964:296 (Ceratopogon) New Guinea (male female; Fig. male, female antennae, female palpus, wing, male genitalia). N. COMB.
- paraensis Wirth and Blanton, new species, Brazil (male, female; Figs.). petersi (Tokunaga) 1964:293 (Ceratopogon), New Guinea (male, Fig. antenna, palpus, wing, genitalia). N. COMB.
- senegalensis (de Meillon and Wirth) 1955: 275 (Ceratopogon, subg. Brachypogon) Senegal (male, Fig. genitalia). N. COMB.
- sitius (de Meillon) 1959:345 (Ceratopogon, subg. Brachypogon) Natal (male; Fig. genitalia). N. COMB.
- vitiosus (Winnertz) 1852:49 (Ceratopogon) Europe (male, female; Fig. wings, male palpus).

### LITERATURE CITED

- Clastrier, J. 1961. Notes sur les Ceratopogonidés XV. Ceratopogon et Alluaudomyia de la Région Paléarctique. Arch Inst. Pasteur de'Algérie 39: 401-440.
- de Meillon, B. 1929. Some ceratopogoninae from the transvaal. Trans. Entomol. Soc. London 77:245-249.
- de Meillon, B. 1939. A new sub-genus of Ceratopogon. Ruwenzori Exped., 1934-35, 1 (5). Ceratopogonidae. Appx., p. 103-107.
- de Meillon, B. 1959. Diptera (Nematocera) Ceratopogonidea. S. Afr. Animal Life 6:325-355.
- de Meillon, B., and F. Hardy 1952. New records and species of biting in-

sects from the Ethiopian Region-IV. J. Entomol. Soc. S. Afr. 16:17-35.

de Meillon, B. and F. Hardy 1954. New records and species of biting insects from the Ethiopian Region. V. J. Entomol. Soc. S. Afr.

de Meillon, B., and W. W. Wirth 1955. A new species of Ceratopogon from West Africa (Diptera, Ceratopogonidae). Proc. Entomol. Soc. Washington 57:275-276.

Edwards, F. A. 1926. On the British biting midges (Diptera, Cerato-

pogonidae). Trans. Entomol. Soc. London 74:389-426, 3 plates. Floch, H., and E. Abonnenc 1942. Ceratopogonides divers de la Guyane Française III. Inst. Pasteur Guyanne et Terr. l'Inini publ. 55, 6 pp. Goetghebuer, M. 1920. Ceratopogoninae de Belgique. Mém. Mus. Roy.

Hist. Nat. Belgique 8:1-116.

Goetghebuer, M., and F. Lenz 1933, 1934. Heleidae (Ceratopogonidae). In Lindner, Flieg. Pal. Reg. Fam. 13, 77:1-48 (1933); 78:49-133 (1934), 12 pl.

Johannsen, O. A. 1938. New species of Nemocera from Puerto Rico. J. Agr. Univ. Puerto Rico 22:219-225.

Johannsen, O. A. 1943. A generic synopsis of the Ceratopogonidae (Heleidae) of the Americas, a bibliography, and a list of the North American species. Ann. Entomol. Soc. Amer. 36:763-791.

Kieffer, J. J. 1899. Description d'un nouveau genre et tableau des genres européens de la famille des Chironomidés. Bull. Soc. Entomol.

France p. 66-70.

Kieffer, J. J. 1906. Diptera, Fam. Chironomidae. In Wytsman, Genera Insectorum, fasc. 42, 78 p.

Kieffer, J. J. 1919. Chironom'des d'Europe conservés au museé national hongrois de Budapest. Ann. Mus. Nat. Hungarici 17:1-131.

Kieffer, J. J. 1925. Faune de France. Diptères (Nematoceres piqueurs): Ch'ronomidés Ceratopogoninae. Paris Lechavalier 11:1-138.

Lane, J. 1945. Redescrição de Ceratopogonideos Neotropicos. (Diptera: Ceratopogonidae). Rev. de Ent. 16:357-372.

Lutz, A. 1914. Contribuição para o conhecimento das "Ceratopogon-

inas" do Brasil. Mem. Inst. Oswaldo Cruz 6:81-99, 2 pl. Macfie, J. W. S. 1940. The genera of Ceratopogonidae. Med. Parasit. 34:13-30. Ann. Trop.

Tokunaga, M. 1964. Biting midges of the genus Ceratopogon from New Guinea (Diptera: Ceratopogonidae). Pacific Insects 6:292-299. Tokunaga, M., and E. K. Murachi 1959. Diptera: Ceratopogonidae. In-

sects of Micronesia 12:103-434.

Winnertz, J. 1952. Beitrag zur Kenntniss der Gattung Ceratopogon Meigen. Linnaea Ent. 6:1-80, 8 pl. Wirth, W. W. 1952. The Heleidae of California. Univ. California

Pubs. Entomol 9:95-266.

The Florida Entomologist 53 (2) 1970