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UNDESCRIBED SPECIES OF NEMATOCEROUS DIPTERA. PART VI.¹

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The preceding part under this general title appeared in 1958 (Bul. Brooklyn Ent. Soc. 53: 48-52). The types of the novelties here considered are preserved in my personal collection, with the exception of that of *Radinoderus toxopei* which will be returned to the Government Natural History Museum, Leiden, Netherlands. I am very greatly indebted to Dr. M. A. Lieftinck for the privilege of studying the Tipuloidean flies of the Third Archbold Expedition to New Guinea, 1938-39.

TANYDERIDAE

Radinoderus toxopei, n.sp.

Size large (wing of female about 20 or more mm.); legs yellow, the femoral tips rather narrowly black, the tibial bases more broadly so; wings whitish with a delicate solidly infuscated pattern, the chief marks being two X-shaped areas that are broadly confluent in cell C, with further darkenings at wing base and tip; abdomen dark brown, segments two to seven, inclusive, with conspicuous silvery white lateral areas on both tergites and sternites.

Male: Length about 16-20 mm.; wing 15-18.5 mm.

Female: Length about 24-27 mm.; wing 19.5-23 mm.

Rostrum and palpi black. Antennae of male 24-segmented, of female 21-segmented; scape black, pedicel dark brown, flagellum yellow; flagellar segments subcylindrical, with very long outspreading pale setae. Head light gray; anterior vertex narrow, only about one-half the diameter of the scape.

Cervical region elongate, dark brown, a little paler on sides. Pronotum dull brownish gray. Mesonotal praescutum reddish brown, with four darker brown stripes, the intermediate pair narrowly separated, lateral praescutal border weakly darkened; scutal lobes dark brown, the central area infuscated, with light gray spots on either side of the median line and again at base of scutellum; posterior sclerites dark brown. Pleura dark brown, more or less pruinose; dorsopleural region darkened. Halteres with stem yellow, knob dark brown. Legs with coxae brownish gray; tro-

¹ Contribution from the Entomological Laboratory of the University of Massachusetts.

chanters light brown; femora yellow, the tips rather narrowly blackened; tibiae similarly yellow, with the bases slightly more extensively blackened; remainder of legs yellow, terminal two tarsal segments brown. Wings whitish, with a delicate brown pattern, the pale areas subequal in amount or slightly more extensive than the dark; patterned areas appearing chiefly as two X-shaped marks, broadly interconnected in the costal region at end of Sc ; areas solidly darkened, slightly paler behind, without differentiated margins, as in some allied species; further darkenings at base, broken by four white spots located in cell C beyond h , before arculus, and in bases of cells R and M beyond the arculus, and at base of Anal cell; wing tip also darkened, solidly in cell R_2 , including parts of cells R_1 and R_3 , all connected with the outer crossband in cell R_4 ; small seams at tips of veins R_1 , R_4 and M_3 , in cases more reduced or obliterated; veins yellow, slightly darker to infuscated in the patterned areas.

Abdomen dark brown, with conspicuous obscure yellow areas on the basal rings; tergites two to seven, inclusive, with a very conspicuous arcuated to oval silvery white nearly lateral area, sternites with a comparable more nearly straight lateral marking; genitalia of both sexes brownish black. Cerci oval in outline, the tips broadly obtuse.

Habitat: Netherlands New Guinea.

Holotype: ♂, Moss Forest Camp, Third Archbold Expedition, 2700 meters, October 21, 1939 (L. J. Toxopeus). *Allotopotype*: ♀, October 10, 1939. *Paratopotypes*: 1 ♂, 1 ♀, October 28–31, 1939. *Paratype*: 1 ♀, Araucaria Camp, Third Archbold Expedition, 2275 meters, March 31, 1939 (L. J. Toxopeus). Type in the Government Natural History Museum, Leiden; paratypes in the American Museum of Natural History and collection of the author.

I dedicate this interesting fly to the collector, Dr. Lambertus Johannes Toxopeus, entomologist of the Third Archbold Expedition to New Guinea, 1938–39. The great series of Tipulidae taken by Toxopeus on this noteworthy expedition to the Snow Mountains of Netherlands New Guinea are being described by the writer in another series of reports. There now are five species of Tanyderidae known from New Guinea, all belonging to the genus *Radinoderus* Handlirsch. The only regional species having the leg pattern about as in the present fly is *Radinoderus oculatus* (Riedel), of extreme eastern New Guinea, which is best distinguished by the more ocellate arrangement of the darkened areas of the wing. The other regional species include *R. mirabilis* (de Mei-

jere), *R. pictipes* Alexander, and *R. supernumerarius* Alexander, all distinguished by characteristic wing and leg patterns. Outside of New Guinea, *Radinoderus* is represented by the genotype, *R. ornatissimus* (Doleschall) of Amboina, *R. holwayi* Alexander and *R. solomonis* Alexander of the Solomon Islands, and by three species in Australia, *R. dorrigenensis* Alexander and *R. terrae-reginae* Alexander in the east, and *R. occidentalis* Alexander, in the west.

Radinoderus mirabilis (de Meijere)

Tanyderus mirabilis de Meijere, 1915, Nova Guinea, 13, Zool. 1: 51–52, fig. 1 (wing).

Type from Kloof-Biwak, October 29, 1912 (Versteeg). Third South New Guinea Expedition.

Additional records: Netherlands New Guinea—Utakwa River, September 1912–March 1913 (A. F. R. Wollaston); British Museum. Araucaria Camp, 2600 meters, March 9, 1939 (L. J. Toxopeus); Third Archbold Expedition, in Leiden Museum.

The latter specimen shows a weak supernumerary crossvein in cell R_3 of the wings, such as occurs in the type specimen of *Radinoderus supernumerarius* Alexander, discussed below.

Radinoderus supernumerarius Alexander

Radinoderus supernumerarius Alexander, 1953, Bul. Brooklyn Ent. Soc. 48: 97–98.

Type, a male, from Netherlands New Guinea—Iffar, Lake Sentani, near Hollandia, August 1936, swept from foliage over stream (L. E. Cheesman); British Museum. One further specimen seen by me, Markham River Valley, Nadzab, May 5–17, 1944 (K. V. Krombein).

This latter specimen lacks the supernumerary crossvein in cell R_3 of the wings but agrees with the type in all other regards, including the small size, variegated wing bands and uniformly infuscated legs. It seems evident that the presence or absence of the supposed supernumerary crossvein in the present fly and in *R. mirabilis* is an adventitious rather than a supernumerary character.

CECIDOMYIDAE

***Catotricha antennata*, n. sp.**

Size very large (wing of male about 10 mm.); antennae brownish black, the flagellar verticils very long and outspreading; mesonotal praescutum and scutum light gray, with four dark brown to blackish stripes, scutellum and postnotum brownish yellow; hal-

teres yellow; tibiae and tarsi brownish black; wings weakly tinged with brown, patterned with darker brown, especially as a large cloud in outer half of cell M at and beyond the bend of vein Cu_1 .

Male: Length about 7.5 mm.; wing 10 mm.; antenna about 8.8 mm.

Rostrum and palpi brownish black. Antennae of male dark brown to brownish black; scape about twice as long as the pedicel; outspreading verticils of flagellar segments very long, the longest only a little less than the segments. Head black, pruinose to appear plumbeous, more heavily so on the posterior orbits and genae; anterior vertex very narrow, somewhat less than the width of two ommatidia, strongly bilobed immediately behind the antennal bases.

Pronotum dark brown, narrowly yellowed behind. Mesonotal praescutum and scutum light gray, with four dark brown to blackish stripes, the intermediate pair confluent in front, with conspicuous yellow setae on the interspaces; scutellum and postnotum pale brown to brownish yellow. Pleura dark brown, sparsely pruinose, paling to more reddish on the ventral sternopleurite. Halteres uniformly yellow. Legs with coxae and trochanters yellow; femora yellow basally, the outer half appearing darker because of the dark vestiture; tibiae and tarsi brownish black to black. Wings weakly tinged with brown, patterned with darker brown behind vein $1st A$ and as a larger cloud in outer half of cell M , at and beyond the bend of vein Cu_1 ; veins dark brown. Venation: Sc_1 distinctly reaching the costa, ending about opposite to just beyond one-third the length of vein M_{1+2} . In *nipponensis*, Sc is shorter, Sc_1 ending about opposite one-fourth the length of M_{1+2} .

Abdomen black, with conspicuous yellow setae; hypopygium fulvous.

Habitat: Japan (Honshu).

Holotype: ♂, Akigami, On-take, Shinano-Hida, 1800 meters, October 4, 1957 (Toshio Mishima).

I am indebted to Mr. Mishima for several interesting Tipulidae from various parts of Honshu. The present fly differs from *Catotricha nipponensis* (Alexander) in the larger size, very conspicuous flagellar verticils, and in details of coloration and venation. Following Tillyard's interpretation of venation, in the present fly M is three-branched, with M_{1+2} forking outwardly into M_1 and M_2 and with M_3 arising far basad, the stem of M thus being very short. Both Edwards and I interpret M as being simply forked and consider that the M_3 of Tillyard is actually Cu_1 .

BLEPHAROCERIDAE

Blepharocera micheneri, n.sp.

Size medium (wing of male 6.5 mm.); general coloration of mesonotum buffy, with three brownish gray stripes; antennae with terminal segment very long, the penultimate unusually short; compound eyes of male unequally divided, the dorsal area approximately one-half as extensive as the lower part; outer radial veins of wing with numerous macrotrichia over their entire length; male hypopygium with the dististyle unusually small, the outer style trilobed, all lobes with setae.

Male: Length about 7 mm.; wing 6.5 mm.; antenna about 2 mm.

Head brown. Antennae with terminal flagellar segment very long, approximately equal to the preceding four segments combined; penultimate segment greatly reduced, about one-third the length of the antepenultimate. Eyes of male unequally divided, the dorsal area of enlarged ommatidia less extensive than the lower, being approximately one-half as large.

Pronotum brownish gray. Mesonotal praescutum and scutum buffy, with three darker brownish gray stripes, the central one continued caudad to the scutellum, the laterals interrupted by the sutures; scutellum and postnotum yellow. Pleura yellow, the propleura and anepisternum darker. Halteres with stem yellow, clearest on basal half, knob dark brown. Legs with all coxae and trochanters light yellow; remainder of legs obscure yellow, the outer tarsal segments slightly more infuscated. Wings subhyaline, the costal border more yellowed with brownish yellow veins, remaining veins brown. Both branches of R_s with numerous macrotrichia over their entire length. Venation: Cell R_3 at margin relatively extensive, approximately four-fifths cell R_4 ; cell M_4 narrowed at base.

Abdomen brown, the incisures paler; hypopygium yellowish brown. Male hypopygium with each tergal lobe subrectangular, narrowly separated at midline, surface of outer half and along mesal margin with conspicuous setae. Basistyle long; dististyles two, very small in proportion to the size of other parts; outer style unequally trilobed at apex, all lobes setiferous, the smaller upper one with four large setae, the other lobes with more abundant but smaller bristles; inner style a glabrous blade, narrowed outer third to the obtuse tip. Phallosome very large, broad-based, narrowed to the subtruncated apex. Filaments of the penis very long and slender, all equal in length and diameter, very slightly dilated and truncated at outer ends.

Habitat: California (Riverside County).

Holotype: ♂, Idyllwild, San Jacinto Mts., May 22, 1940 (C. D. Michener); California Academy of Sciences, Thomas Aitken, leg.

This distinct fly is named for the collector, Dr. Charles D. Michener, outstanding student of the Lepidoptera, Hymenoptera and Acarina. It is readily told from the other regional members of the genus, including *Blepharocera jordani* Kellogg, *B. osten-sackeni* Kellogg, and *B. shastensis*, n. sp., by the structure of the eyes and antennae and the details of the male hypopygium. In the trichiation of the outer radial veins of the wing it is more like *B. jordani*.

***Blepharocera shastensis*, n.sp.**

Size small (wing of male about 4.5 mm.); general coloration of thorax buffy yellow in male, darker in female; praescutum and scutum with darker stripes; antennae short, terminal segment from one and one-half to twice the penultimate; eyes unequally divided, the upper area in the male much more extensive than the lower; mandibles lacking in both sexes; wings with macrotrichia of outer veins very reduced in number, lacking on R_4 and restricted to the outer half of R_5 ; male hypopygium with the outer dististyle subrectangular in outline, its outer apical angle a little produced, with strong setae; inner style very unequally bifid, the blades obtuse at tips.

Male: Length about 3.8–4 mm.; wing 4.3–4.5 mm.; antenna about 1–1.1 mm.

Female: Length about 4.5–5 mm.; wing 5–5.5 mm.; antenna about 0.8–0.85 mm.

Rostrum obscure yellow; palpi pale yellow to brownish yellow. Mandibles lacking in both sexes. Antennae short, dark brown to brownish black; basal flagellar segments short, nearly as long as broad, the outer ones progressively longer and more slender; terminal segment from one and one-half to nearly twice the penultimate, the latter a very little shorter than the antepenultimate. Head gray; male with eyes unequally divided, the dorsal area of larger ommatidia much more extensive than the lower, in cases to approximately twice as much, in living specimens rich cinnamon brown in color. In the female the upper area is much reduced in size, approximately one-fifth the size of the lower or less.

Thorax with ground buffy yellow in male, darker brownish gray in female; in the male with darker brown praescutal stripes, the yellow interspaces restricted. Pleura pale, more or less pruinose.

Halteres with stem yellow, knob brownish black. Legs with coxae and trochanters yellow; remainder of legs brownish yellow, tips of femora more infuscated, outer tarsal segments brownish black. Wings subhyaline; veins brown. Macrotrichia of veins unusually reduced in number, in the outer radial field with none on R_4 and relatively few (about 2 to 15) on the outer third of R_5 .

Abdomen of male with intermediate segments bicolored, dark brown, the incisures yellow, the color involving the narrow posterior margins and the broader bases of the segments; outer segments, including hypopygium, black. In the female, abdomen more uniformly darkened. Male hypopygium with the posterior border of tergite emarginate, lobes rounded, the setae restricted to the outer parts. Outer dististyle subrectangular in outline, outer apical angle a little produced and strongly setiferous; inner style very unequally bifid, both blades obuse at tips. Filaments of penis obliquely acute at tips.

Habitat: California (Shasta County).

Holotype: ♂, Castle Crags State Park, along the Sacramento River, 2000 feet, July 30, 1958 (C. P. Alexander). *Allotopotype*: ♀, pinned with type. *Paratopotypes*: ♂ ♀, July 29–30, 1958.

This very interesting net-winged midge is quite distinct from all other species known from western North America. It is the smallest American member of the genus, being exceeded in this respect only by *Blepharocera japonica* Kitakami, of Japan, which seems to be its nearest ally. *B. japonica* and *B. shastensis* have the macrotrichia of the wing veins greatly reduced in number, being entirely lacking on vein R_4 . All other western North American species, including *B. jordani* Kellogg, *B. micheneri*, n. sp., and *B. osten-sackeni* Kellogg, have these trichia much more numerous, including long to complete series on both R_4 and R_5 . The loss of the mandibles in the female of the present fly is noteworthy and apparently is the first record of such an occurrence in the genus although it is known in certain other exotic genera of Blepharoceridae. As noted by various authors, the mandibles in females in this family either are fully developed or else are quite lacking, there being no evidence of progressive reduction in the size of the organ. The most recent comprehensive summary of the family is in a paper by the writer.²

² Alexander, Charles P. Geographical distribution of the net-winged midges (Blepharoceridae, Diptera). Proc. Tenth Internat. Cong. Ent. 1: 813–828, 23 figs. (venation), 3 maps; December, 1958.