

NEW NEARCTIC CRANE-FLIES (TIPULIDAE, DIPTERA):

PART XXVIII.

BY CHARLES P. ALEXANDER,
Massachusetts State College, Amherst, Mass.

The preceding part under this title was published in 1947 (*Can. Ent.*, 78: 155-159). At this time I am describing four species of the genus *Tipula* from Arizona and California, the types being preserved in my collection except where indicated to the contrary in the text.

***Tipula (Trichotipula) prolixa* n. sp.**

Mesonotum brownish gray, the praescutum with four very poorly differentiated darker stripes; antennae short; wings with a strong brownish yellow tinge, the prearcular field, costal border and stigma more saturated brownish yellow; macrotrichia in the outer ends of cells R_5 and M_1 ; R_s short, subequal to R_2+3 ; abdomen of male unusually long; male hypopygium with the beak of the inner dististyle long-produced, slender, the lower beak subbasal in position, appearing as a slender sclerotized arm.

Male. Length about 16-17 mm.; wing 12-13.8 mm.; abdomen alone 12-13 mm.; antenna about 2-2.2 mm.

Frontal prolongation of head yellow, relatively long but shorter than the remainder or head; nasus elongate; palpi obscure yellow. Antennae (male) short; scape yellow, pedicel more testaceous, flagellum dark brown; flagellar segments simple or virtually so, the longest verticils exceeding the segments. Head above obscure brownish yellow, gray pruinose; a more or less distinct median brown line; vertical tubercle low and simple.

Pronotal scutum pale, sparsely pruinose; scutellum and pretergites light yellow. Mesonotal praescutum with the ground brownish gray, with four very poorly differentiated stripes, best indicated by narrow brown margins, the capillary median one most distinct; posterior sclerites of notum brown, sparsely pruinose, parascutella and katapleurotergite clearer yellow; postnotal mediotergite with a vague obscure yellow central line. Pleura yellow, more or less pruinose. Halteres with the stem yellow, knob infuscated. Legs with the coxae yellow, sparsely pruinose; trochanters yellow; femora and tibiae yellow, the tips more infuscated, tarsi passing into black; claws (male) toothed. Wings with a strong brownish yellow tinge, the prearcular field, cell Cu_1 , costal border and stigma more saturated brownish yellow; veins pale brown. No squamal setae; relatively numerous macrotrichia in outer third of cells R_5 and M_1 , especially the former; no stigmal trichia. Venation: R_s short, subequal to the second section M_1+2 or to R_2+3 ; R_1+2 preserved; petiole of cell M_1 , shorter than m ; Cell 1st M_2 narrow M_3+4 short, about one-third to one-half the basal section of M_1+2 ; $m-cu$ on M_4 shortly beyond the perpendicular origin.

Abdomen of male unusually long; tergites infuscated medially above, paling to obscure yellow on sides, the outer segments, and especially the sternites and hypopygium more uniformly obscure yellow. Male hypopygium having the ninth tergite with a deep V-shaped notch, the lateral lobes with retrorse blackened spinous setae. Outer dististyle moderately long, its greatest width about one-fourth the length, provided with scattered yellow setae. Inner dististyle with the beak long-produced, slender; lower beak subbasal in position, appearing as a slender sclerotized arm, the apex subcultrate in outline; on side of style above the lower beak with a low darkened flange; surface above this flange and onto the base of beak with strong dark-colored setae.

Habitat. Arizona (Cochise County).

Holotype. ♂, Silver Creek, Chiricahua Mts., altitude 4500-6000 ft., October 3, 1927 (J. A. Kusche); California Academy of Sciences, through Dr. Edward S. Ross, Curator of Insects. *Paratopotype.* ♂. *Paratype.* ♂, Tex Canyon, Chiricahua Mts., altitude 4500-6000 ft., October 8, 1927 (J. A. Kusche).

The present fly is quite distinct from the other regional members of the subgenus, differing in the coloration of the wings, elongate abdomen and structure of the male hypopygium. In some regards it is more similar to certain Mexican species, such as *Tipula* (*Trichotipula*) *religiosa* Alexander and *T. (T.) vultuosa* Alexander, yet quite distinct in hypopygial structure.

***Tipula* (*Lunatipula*) *biproducta* n. sp.**

Belongs to the *impudica* group; size medium (wing, male, 15.5 mm.); general coloration brownish gray to gray, the praescutum with four darker brown stripes; basal flagellar segments weakly bicolored; wings with the ground color weakly infuscated, restrictedly patterned with darker brown and whitish subhyaline, the latter pattern in female more extensive and contrasted; male hypopygium having the basistyle and sternite fused into a single structure, the outer portion of the former narrowed and produced into a powerful spine.

Male. Length about 17 mm.; wing 15.5 mm.; antenna about 5 mm.

Female. Length about 21 mm.; wing 18 mm.

Frontal prolongation of head obscure yellow in male, much darker and pruinose basally in female; nasus short and stout; palpi in male with proximal segments brownish yellow, the terminal one black; in female, basal segments more infuscated. Antennae (male) with proximal three segments yellow, succeeding segments obscurely bicolored, the basal swellings dark brown, the outer portions brown, at tips even paler; outer segments more uniformly darkened; flagellar segments with rather prominent basal enlargements. Head brownish gray, with a conspicuous narrow dark brown median vitta.

Pronotum brown to brownish gray, vaguely marked with darker. Mesonotal praescutum with the ground brownish gray (in male) to darker gray (female), with four darker brown stripes, the intermedite pair forming the lateral borders of the broad median ground stripe, lateral stripes broader; scutal lobes each with two brown spots; posterior sclerites of notum light brown or brownish gray, with a narrow brown median vitta, more distinct on the scutellum. The coloration in the female is definitely grayer and darker. Pleura and pleurotergite chiefly pale brownish yellow, a little darker and more pruinose on the sternopleurite. Halteres with stem yellow, knob more or less darkened and variegated with pale. Legs with the coxae obscure yellow, sparsely pruinose; trochanters yellow; femora obscure yellow, the tips rather narrowly brown or brownish black, the amount subequal on all legs; tibiae obscure yellow, the tips very narrowly infuscated; tarsi passing into black; claws (male) toothed. Wings of male with a weak brownish tinge, the prearcular and costal fields more yellowed; a vague darkening in cell *M* adjoining vein *Cu* and in outer ends of cell *R*₂ and *R*₃; stigma brown, its cephalic portion paler; prestigmal oblitative area relatively conspicuous, especially across cell 1st *M*₂, involving the bases of cells *M*₃ and *M*₄; poststigmal brightening less conspicuous; in female, the pattern more contrasted, the white areas, especially the band at cord, very wide and broadly reaching the posterior margin in cells *M*₃ and *M*₄; poststigmal brightening more conspicuous; cell *R*₅ more or less whitened, as are the tips of the outer cells at wing apex; distinct white streaks along vein 1st *A* and more caudad in the same cell; veins brown, pale in the brightened areas. Venation: *R*_s relatively short, scarcely twice *m-cu*; *R*₁₊₂ entire; *m* and petiole of cell *M*₁ subequal or the latter longer (in male).

Abdominal tergites obscure yellow, with three broken stripes, the median one forming linear brown streaks, most evident on segments three to five; lateral stripes represented by darker but still smaller spots, best indicated on the posterior ring of tergite two and on basal portions of tergites three to five; lateral tergal borders broadly, the posterior margins more narrowly yellow; outer segments more uniformly yellow; sternites yellow, the outermost more discolored. Male hypopygium when viewed from the side showing the tergal canthi directed chiefly dorsad, their tips caudad; basistyle and ninth sternite completely fus-

ed, the produced apex of the former directed caudad and slightly ventrad. Ninth tergite with the canthi, as viewed from above, appearing as triangular plates, the small apical points incurved, the mesal edge with small setigerous tubercles to produce a roughened appearance; median lobe (subtergal process) extended beyond the tips of the canthi, compressed-flattened on dorsal portion, more expanded laterally below, the apex produced into pale shapeless membrane; lateral processes very broadly triangular, their tips obtuse. Outer portion of region of basistyle produced caudad into a powerful pointed spine, as described, provided with scattered setae except on the more sclerotized outer third. Outer dististyle expanded basally, the apical half slender and attenuated, the more basal setae unusually long, approximately two-thirds the length of style. Inner dististyle with the beak and lower beak broad; dorsal crest very low; posterior crest unusually small, separated from the end of the outer basal lobe by a notch; style unusually glabrous; outer basal lobe a little shorter than the main body of style, the posterior end produced into a strong spine that is stouter than the somewhat comparable one of the basistyle, its tip obliquely truncated, provided with setae over almost its entire length; an extensive area of dense delicate setae; sensory area small but compact, consisting of from 15-18 pores. Eighth sternite sheathing, the apex broadly truncate, with small oval lateral lobes that bear abundant elongate roughened setae; the broad median area between the lobes with a fringe of similar setae; in the membrane with a stout dusky median lobe, somewhat as in *mitrata* and other species.

Habitat. California (San Diego County).

Holotype. ♂, Borego, California Painted Desert, April 21, 1944 (J. L. Sperry). *Allotopotype.* ♀.

The present fly is readily told from all other members of the *impudica* group by the structure of the male hypopygium, especially the produced basistyle, a unique character in the group. In other regards, it is most similar to species such as *Tipula (Lunatipula) carunculata* Alexander, *T. (L.) diversa* Dietz and *T. (L.) lyrifera* Dietz.

Tipula (Lunatipula) spinerecta n. sp.

Size medium (wing, male, about 17 mm.); mesonotum gray, the praescutum with four brown stripes; antennae with scape and pedicel yellow, flagellum black; wings whitish subhyaline, restrictedly clouded with brown, most heavily in the outer ends of cells R_3 and R_2 ; obliterative band before cord extending from vein R to the posterior border, including all of cell 1st M_2 ; abdominal tergites obscure yellow, trivittate with brownish black, the middorsal stripe very conspicuous; male hypopygium with the caudal border of tergite emarginate, the lateral lobes subacute; a median tergal lobe that terminates in a compressed pale spatulate blade; basistyle with its dorsal margin produced into a very powerful erect black spine.

Male. Length about 16-17 mm.; wing 16-17 mm.; antenna about 4.5 mm.

Frontal prolongation of head obscure yellow, more infuscated on ventral surface, the dorsal area light gray pruinose; nasus short and stout; palpi black. Antennae (male) relatively short; scape and pedicel yellow; first flagellar segment black, its proximal end obscure yellow, remainder of organ black; flagellar segments feebly incised; longest verticils subequal in length to the segments. Head light gray, the vertex with a narrow dark median line; vertical tubercle very low.

Pronotal scutum gray, with three brown spots; scutellum above clear light yellow. Mesonotum gray, the praescutum with four brown stripes, the intermediate pair narrow, especially behind, forming the lateral borders of a wider more plumbeous central stripe; posterior sclerites of notum gray, each scutal lobe with two slightly darker areas; scutellum and mediotergite gray, with

a brown central line. Pleura light gray, the broad dorsopleural region light yellow. Halteres with stem yellow, knob dark brown. Legs with the coxae light gray; trochanters yellow, the tips narrowly brownish black; tibiae obscure brownish yellow, the tips narrowly dark brown; tarsi brownish black; claws slender, toothed. Wings whitish subhyaline, restrictedly clouded with brown, most heavily so in outer ends of cells R_5 and R_6 ; cells behind vein M more extensively clouded with paler brown, variegated by the ground, including streaks at base of Anal cells and along vein 1st A ; oblitative band before cord extending from R to the posterior border, including all of cell 1st M_2 and much of cell M_4 ; cells R M and R_1 extensively whitened; post-stigmal brightening relatively restricted; outer ends of cells R_5 and M_1 whitened; prearcular and costal fields more yellowed; veins brown, paler in the brightened fields. Squamal setae few. Venation: R_s long, nearly three times $m-cu$; R_{1+2} entire; M_{3+4} and basal section of M_{1+2} subequal.

Abdominal tergites obscure yellow, with a conspicuous, almost entire brownish black central stripe; sublateral portions of tergites with an even broader brownish black line that is more or less pruinose; lateral tergal borders more bulky; sternites pruinose, the central portion more infuscated. Male hypopygium having the ninth tergite entirely separate from the ninth sternite; basistyle separated from the ninth sternite by the ventral suture only. Ninth tergite transverse, gently narrowed outwardly, the caudal margin with a U-shaped notch, the subtending angles produced into subacute lobes; from the base of the notch extends a more slender median arm that terminates in a compressed pale spatulate blade that is densely setuliferous. Ninth sternite with its appendage unequally bilobed, the low dorsal lobe with coarse erect setae; lower lobe much smaller, its setae very long, exceeding the lobe in length. Basistyle with the ventral or outer end slightly produced into an obtuse lobe; dorsal margin bearing a very powerful erect black spine, directed dorsad. Outer dististyle very broad at base, more narrowed outwardly, the apex obtuse; posterior margin with coarse erect setae. Inner dististyle with both beak and lower beak blackened, the latter more pointed; beak longitudinally corrugated; outer basal lobe large and conspicuous, flattened, erect, its apex truncated or virtually so; sensory area on body of style opposite the notch. Eighth sternite moderately sheathing, the caudal margin nearly truncate, with a low central cushion that bears numerous very long yellow setae from conspicuous darkened bases.

Habitat. California (Kern County).

Holotype. ♂, Cuyama Valley, April 10, 1932 (E. P. Van Duzee); California Academy of Sciences, through Dr. Ross *Paratopotypes.* 3 ♂♂.

The somewhat peculiar armature of the basistyle of the male hypopygium is quite sufficient to separate the present species from all others that have the sclerite produced in various manners. Similarly, the ninth tergite and dististyles show virtually as strong characters. In some regards, particularly the ninth tergite and outer dististyle, a resemblance to members of the *impudica* group is suggested but I hesitate to make a definite group reference at this time.

Tipula (Lunatipula) timberlakei n. sp.

Allied to *modoc*; size small (wing, male, 9 mm.); mesonotum gray, the praescutum with four entire brown stripes; nasus short; antennae relatively short in both sexes, basal three segments yellow, the pedicel clearer yellow, flagellum black; head gray with a central brown line; scutellum and mediotergite with a similar brown stripe; legs brown, claws simple; wings with a brownish tinge, variegated with darker brown and whitish subhyaline, the latter including a small post-stigmal area and a very broad stripe at and before cord, cell 1st M_2 chiefly whitened; tergites trivittate with brown, sternites with a long single broad stripe; male hypopygium with the caudal margin of tergite with a very broad V-shaped notch, the margins glabrous; inner dististyle with the outer

basal lobe a long straight pale rod, its base more expanded; sensory area at extreme base of style; phallosome with the apophyses terminating in very long and slender curved horns that are decussate at the midline; eighth sternite with the caudal margin truncate, with a group of about 20 long yellow setae on either side of the midline; ovipositor with the cerci compressed, expanded and tridentate at apex; hypovalvae very deep and compressed, the tips obtusely rounded.

Male. Length about 9 mm.; wing 9 mm.; antenna about 3 mm.

Female. Length about 12–13 mm.; wing 9–11 mm.

Frontal prolongation of head light gray above, obscure yellow on sides and beneath; nasus short; palpi black, terminal segment relatively short. Antennae relatively short in both sexes; scape and first flagellar segment brownish yellow, the pedicel clearer yellow, remainder of flagellum black; flagellar segments moderately incised; verticils shorter than the segments. Head gray, the anterior vertex clearer gray; a central brown line, narrowed to a point behind.

Pronotum gray pruinose, darker medially above, the scutellum yellow. Mesonotal praescutum gray, with four entire brown stripes, the intermediate pair from three to four times as wide as the median ground vitta; scutal lobes brownish gray, the median area paler; scutellum and mediotergite gray with a capillary brown median vitta, less distinct on the latter. Pleura gray; dorso-pleural membrane extensively yellow. Halteres brown, the base of stem restrictedly yellow. Legs with coxae gray pruinose; trochanters testaceous brown; remainder of legs brown, the outer tarsal segments darker brown; tips of femora and tibiae not or scarcely darker; claws slender, simple. Wings with a brownish tinge, variegated with darker brown and whitish subhyaline, the brown including the stigma, a spot at origin of R_5 and a narrow seam over $m-cu$; the whitish areas include a broad mark at and before cord, extending from costa into the bases of cells M_3 and M_4 , most extensive in cells R and R_1 ; cell 1st M_2 chiefly whitened; a smaller whitened post-stigmal area; prearcular and costal fields more yellowed; veins brown, more brownish yellow in the brightened fields. Squama with a few setae. Venation: Sc_1 ending about opposite midlength of R_5 ; R_1+2 preserved; cell 1st M_2 small; M_3+4 short, only about one-fourth the basal section of M_1+2 .

First abdominal tergite grayish pruinose, the succeeding ones orange-yellow, conspicuously trivittate with dark brown, the lateral borders broadly light yellow, the caudal margins very narrowly gray; sternites dark brown, the lateral portions extensively yellow; outer abdominal segments more extensively dark brown, the apices of the basistyles yellow. Ovipositor with the cerci compressed, the tips expanded, tridentate, the surface with sparse scattered yellow setae; hypovalvae very deep and compressed, the tips obtusely rounded. Male hypopygium having the ninth tergite transverse, the caudal margin with a very broad V-shaped notch, the lateral lobes relatively narrow, the entire caudal border glabrous. Ninth sternite without a clearly defined lobe or appendage. Outer dististyle much dilated at outer end into a spatula, provided with numerous long coarse setae. Inner dististyle with the beak long-extended, with a blackened point or flange that extends backward as a ridge or carina to the low dorsal crest; lower beak lacking; outer basal lobe a long straight pale rod from a more expanded base, the latter on its lower edge with a few small setae; sensory rear at extreme base of style, composed of about 15 pores. Phallosome with the gonapophyses appearing as inrolled plates to form a somewhat cylindrical structure, the apex of each apophysis further produced into a slender curved horn, these decussate at the midline. Eighth sternite with the caudal margin truncate, on either side of midline with a group of about 20 long yellow setae, these barely decussate.

Habitat. California (Riverside County).

Holotype. ♂, Riverside, March 26, 1937 (P. H. Timberlake). *Allotopotype*. ♀, March 26, 1935 (P. H. Timberlake). *Paratopotypes*. 1 ♀, in copula with the type; 10 ♂ ♀, April 1-2, 1935 (P. H. Timberlake).

This interesting species is named for the collector, Mr. Philip Hunter Timberlake, student of the parasitic Hymenoptera, to whom I am indebted for several interesting crane-flies from California. The species to be most nearly allied to *Tipula* (*Lunatipula*) *modoc* Alexander and *T. (L.) perfidiosa* Alexander which are readily told by the large size and by all details of structure of the male hypopygia.

BOOK NOTICE

FLEAS OF WESTERN NORTH AMERICA, by Clarence Andresen Hubbard; 533 pp., 15 photographs of Siphonapterists, 95 text figures, 1947. Iowa State College Press, Ames, Iowa. \$6.00.

The ever present menace of plague in Western North America has given an impetus, lacking in the East, to the study of the Siphonaptera. The term "Western" in this work is defined as The zone west of the 100th meridian.

Part One of this volume is introductory in nature, consisting of chapters on "Students of Western American Fleas and their Contributions," "The Medical Importance of Fleas," "Field and Laboratory Technique," and "Anatomy of the Flea in Relation to its Taxonomy." Under "The Medical Importance of Fleas" the author has given a summary of plague in Western America, and murine typhus and tularaemia in North America. Reference is made to the Alberta records of plague-infested ground squirrels in the period 1939-1942, to a tularaemia-positive flea and to tularaemia-positive ticks in 1942. With regard to the latter disease, although not mentioned by the author, it is interesting to note that the R.C.A.M.C. plague survey (1943), conducted in Western Canada, records that the disease was wide-spread in Alberta, captured tularaemia-positive animals including rabbits, Richardson's ground squirrels, meadow and white-footed mice, and a Franklin gull.

In Part Two, sixty-six genera comprising some 230 species and subspecies are dealt with in generic sequence suggested to the author by Karl Jordan prior to the publication of the author's checklist of the fleas of the Pacific Northwest of the United States (1940). Keys to families, genera, and to many species are included. Under each species the author has included: description, range, hosts, records, and such bibliography as has been built up since 1939 (the previous bibliography having been thoroughly dealt with by Jellison and Good (1942) in "Index to the Literature of the Siphonaptera of North America"). A useful and admirable feature of the specific descriptions is the inclusion of figures of taxonomic characters of some 250 species.

Part Three comprises a host index and a selected bibliography. The host index includes "Hosts of Western Rodent Fleas, and Fleas of Western Carnivora, Insectivora, Bats, Birds, and Reported from Man."

This volume, which deals with twice as many genera and four times as many species of fleas as have been recorded for Eastern America, should be very welcome to students of the Siphonaptera, and in addition should serve as a handy reference to those entomologists who, from time to time, are concerned with flea problems.

R. H. Ozburn.