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BITING MIDGES FROM MANCHURIA*

(CERATOPOGONIDAE, DIPTERA)

By

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(徳 永 雅 明)

(With One Plate and Seven Text-Figures)

I have already recorded five biting midges from Manchuria and at present I intend to add several other species to the Ceratopogonid fauna of Manchuria. I am greatly indebted to Prof. Dr. TEISO ESAKI, Dr. MASUZO UENO, Mr. SABURO TAKAGI and Mr. ZENUEMON ONO for their kind collections of the materials.

The morphological terms used in the present paper are the same as I have adopted in my recent paper (1937. Tenthredo, vol. 1, no. 3). The abbreviations used in the text are all identical with those in my previous report (1940. Tenthredo, vol. 3, no. 1).

Lasiohelea nudocula TOKUNAGA

TOKUNAGA, 1937. Tenthredo, 1 : 269–270 and 1940. Tenthredo, 3 : 107.

Specimens—Females; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Forcipomyia albiradialis TOKUNAGA

TOKUNAGA, 1940. Tenthredo, 3 : 75–76.

Female—Body 1.7 to 2 mm. long. Antennal ratio about 0.74. Fore tarsal ratio 1.3 to 1.4; hind tarsal ratio about 1. Wing with R_{4+5} ending before middle of wing (32 : 38). Abdomen with a yellow band on penultimate tergite; spermathecae two, oval, equal.

Male—Body length 1.7 to 2.1 mm. Antennal ratio 0.9 to 1.07. Fore tarsal ratio 1.07 to 1.1; hind tarsal ratio 0.77 to 0.8. R_{4+5} ending before middle of wing (27 : 40). Abdomen with brown tergal bands, of which those of anterior segments obscurely interrupted at middle.

Specimens—Females and males; Yablonia, Manchuria; June to July, 1939 and August 7, 1940; collected by Mr. S. TAKAGI.

*Contributions from the Entomological Laboratory, Kyoto Imperial University, No. 114.

Forcipomyia brevipedicellata KIEFFER

TOKUNAGA, 1940. Tenthredo, 3:85.

Female—Fore tarsal ratio about 1.37; hind tarsal ratio about 1.08. Wing vein R_{4+5} ending before middle of wing (39 : 47).

Specimens—Females; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Forcipomyia takagii sp. nov.

This midge is somewhat allied to the Micronesian species, *F. ornata* TOKUNAGA.

Female—Body 2.2 to 2.8 mm. long. Head and mouth parts brown, with eyes contiguous. Antenna with scape and distal elongate segments brown and basal short segments yellow; terminal stylet present; antennal ratio 1.36 to 1.4; relative lengths of distal eight segments as follows: 17 : 17.3 : 18.5 : 35.5 : 37 : 35.5 : 35.5 : 49.5; basal short flagellar segments with slender sensillae. Thoracic notum brown, with yellow pubescence; scutum with very narrow paler lines along foveae; pleural sides extensively yellow, with sclerites brown; thoracic setae all yellow. Legs including coxae yellow; hind femur with a narrow dark pre-apical ring; middle femur with an obscure dark pre-apical ring, but sometimes which is absent, hind tibia entirely yellow but sometimes with a faint dark sub-basal ring; narrow scales present on all legs; fore tarsal ratio 0.56 to 0.61; hind tarsal ratio 0.41 to 0.48. Wings without paler spots; radial cell darker, obliquely truncate distally; first radial cell absent; R_{4+5} extending beyond middle of wing (47.5 : 41.5). Halteres yellowish white. Abdomen with tergites and sternites complete, brown; pleural hairs dark; cerci yellowish white.

Locality—Yablonia, Manchuria.

Type specimens—Females; August 7, 1940; collected by Mr. S. TAKAGI.

The allied species is *F. ornata* TOKUNAGA, in which the dark rings of the legs are more distinct, the fore tarsal ratio is 0.71 and the hind ratio is 0.57, differing from the present species.

Forcipomyia manchuriensis sp. nov.

This species is somewhat allied to *F. tenuisquama* KIEFFER.

Female—Body length about 2.3 mm. Head dark brown. Antennae entirely dark brown; basal segments with sensillae very strong; terminal stylet present; antennal ratio about 0.79; relative lengths of distal eight segments as follows: 21 : 21 : 20 : 25 : 24 : 24 : 26 : 40. Thorax mat, entirely dark brown, but pleural membranes yellow; scutal hairs and pubescence yellow. Legs dark brown, but knee-joints yellowish; scales present on all legs and very narrow;

fore tarsal ratio about 1.41 and hind ratio about 0.81. Wing dark, with a very obscure small whitish costal spot along margin just beyond radial cell; R_{4+5} ending before middle of wing (34 : 53); first radial cell absent, second cell oval and small; *fMCu* under tip of R_1. Halteres white. Abdomen with pleural hairs dark brown and not thick.

Locality—Yablonia, Manchuria.

Type specimens—Females; August 7, 1940; collected by Mr. S. TAKAGI.

In the allied species, *F. tenuisquama* KIEFFER, the distal antennal segments from tenth to penultimate are shorter than the ninth segment, the fore tarsal ratio is smaller being 1.13 and the wing is provided with a large whitish spot covering the second radial cell, differing from the present species.

Atrichopogon (Kempia) dorsalis TOKUNAGA

TOKUNAGA, 1940. Philip. Jour. Sci., 72: 273–274.

Specimens—Females; Harbin, Manchuria; September 7, 1940; collected by Dr. T. ESAKI.

Atrichopogon (Atrichopogon) thienemanni KIEFFER var. no. 1

Female—Body length about 1.3 mm. long. Head brown, with vertex black. Antennae with basal short segments discoidal; ratio about 2.2; relative lengths of distal eight segments 9 : 9 : 10 : 25 : 26 : 27 : 30 : 41. Thorax brown, mat. Legs yellow; coxae brown; hind femur with a broad dark pre-apical ring; relative lengths of segments of fore leg 20 : 20 : 11 : 3.5 : 3 : 2.5 : 3 and those of hind leg 26 : 24 : 13.5 : 4.5 : 4 : 2.5 : 3. Wing with macrotrichia only about twelve between arms of intracellular fork of cell R_5; relative lengths of R_1 and R_{4+5} about 7 : 22, those of first and second radial cells about 4 : 16. Halteres white. Abdomen brown.

Specimens—Females; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

This variety is somewhat different from the European specimens in the following points: in the type specimens the body is larger being about 2 mm. long, the antennal ratio is slightly larger being about 2.25 and the macrotrichia of the wing are thicker being distributed in cells R_5 and M_1.

Atrichopogon (Atrichopogon) fossicola KIEFFER

Female—Body about 1.8 mm. long. Head black. Antennae entirely dark brown, with basal short segments round; antennal ratio about 1.9; relative lengths of distal eight segments about 11 : 11 : 13 : 30 : 30 : 31 : 34 : 47. Thorax black, mat. Legs yellowish brown, but coxae brown; relative lengths of seg-

ments of fore and hind legs as follows: 23 : 23 : 14 : 4 : 3 : 2.5 : 3 and 31 : 28 : 15 : 5 : 4 : 3 : 3.5. Wings with macrotrichia distributed on surface as in female of *A. rostratus* WINNERTZ or more sparse; venation: R_{4+5} about thrice as long as R_1, relative lengths of first and second radial cell about 8 : 20, *fMCu* just beyond base of first radial cell, stem of M_{1+2} as long as *r-m*. Halteres white. Abdomen yellowish brown, with brown setae; dorsal side with a median pale longitudinal line.

Specimens—Females; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Dasyhelea sp. no. 4

Female—Body length about 1.3 mm. Antennae without striation and terminal stylet; distal five segments short but subcylindrical. Thorax black and strongly shining, without paler spots or vittae; scutellum and humeral angles (posterior pronotum) yellow. Legs with coxae, trochanters and femora brown, other segments pale brown. Wing with stigmal area pale brown, macrotrichia sparsely spread over surface; venation: R_{4+5} ending slightly before middle of wing (23 : 26), second radial cell subrectangular. Halteres white. Abdomen with complete brown tergites and sternites, without paired pale punctures or paler caudal tergites.

Specimen—Famale; Harbin, Manchuria; July 21, 1940; collected by Dr. M. UENO.

This undetermined species is very closely allied to *D. subscutellata* TOKUNAGA, *D. pelilioensis* TOKUNAGA and *D. palauensis* TOKUNAGA.

Culicoides onoi TOKUNAGA

TOKUNAGA, 1940. Tenthredo, 3 : 147–149.

This species was first collected at Sinkyo by Mr. Z. ONO. Recently three females were found at Yablonia, Manchuria, at August 7, 1940, by Mr. S. TAKAGI.

Culicoides obsoletus MEIGEN

TOKUNAGA, 1937. Tenthredo, 1 : 321–322. KÔNO and TAKAHASI, 1940. Insecta Matsumurana, 14 : 71–72.

This biting midge is very common in Saghalien and Hokkaido. From Manchuria, however, Mr. S. TAKAGI has collected first a female at Yablonia, at August 7, 1940.

Female—This specimen somewhat smaller than the Japanese specimens, being 1.4 mm. long.

Culicoides sugimotonis SHIRAKI

TOKUNAGA, 1937. Tenthredo, 1: 290–295 and 1940. Tenthredo, 3: 145.

This species is very common in Honsyu, Kyusyu, Sikoku and Tyosen, and *C. albogutatus* KIEFFER, *C. arakawae* MATSUMURA and *Ceratopogon shimai* SASAKI are all synonymous with this species. A female specimen was first collected from Manchuria at Yablonia, at August 7, 1940 by Mr. S. TAKAGI.

Culicoides amamiensis TOKUNAGA

TOKUNAGA, 1937. Tenthredo, 1: 325–327.

Female—The Manchurian specimens somewhat different in the markings of the wings. A white small spot at tip of the vein M_1 absent differing from the type.

Specimens—Females; Yablonia, Manchuria, June to July, 1939; collected by Mr. S. TAKAGI.

Culicoides nubeculosus MEIGEN

TOKUNAGA, 1937. Tenthredo, 1: 280–284 and 1940. Tenthredo, 3: 144.

Female—Rarely wing with an additional obscure paler spot along distal margin of cell M_1. Sometimes cell M_1 white on basal half and other distal white spots obscure and second white costal spot not constricted.

Specimens—Males and females; Yablonia, Manchuria; July and August 7, 1940; collected by Mr. S. TAKAGI. Arutaimen, Uyoku-ki, Sinparuko, Koanhoku-syo, Manchuria; July 6, 1940; collected by Mr. Z. ONO.

According to Mr. Z. ONO, this species sucks blood of men in the day time.

Culicoides kibunensis TOKUNAGA

TOKUNAGA, 1937. Tenthredo, 1: 298–301.

Female—Wing markings very obscure, paler spot in cell M_4 almost absent.

Specimens—Females; Yablonia, Manchuria; June to July, 1939; collected by Mr. S. TAKAGI.

Culicoides erairai KÔNO et TAKAHASI

KÔNO and TAKAHASI, 1940. Insecta Matsumurana. 14: 70–71.

This species was recorded from Hokkaido in 1940. The Manchurian specimens are somewhat different from the Japanese specimens in the following points:

Female—Body length about 1.3 to 1.5 mm. Antennal ratio about 1; relative lengths of distal eight segments as follows: 14: 14: 15: 16: 18: 19: 20: 34. Maxillary palpi 5-segmented (10: 20: 21: 10: 10). Thorax dark brown, with obscure yellowish spots on scutum: one pair of oval spots on humeral

pits, one pair of elongate spots on caudoscutal area along foveae, and three oval spots on either lateral area. Legs brown, with distinct white rings on femora and tibiae, knee-joints dark, tarsi pale brown; in fore leg, femur broadly dark at middle and white pre-apically, tibia white sub-basally and pre-apically; in middle leg, femoral and tibial pre-apical white rings obscure but tibial sub-basal white ring distinct and tibia darker than in fore leg, first tarsal segment white and faintly pale brown distally; in hind leg, femur without dark median and white pre-apical rings being almost uniformly brown, tibia dark with two white rings as in fore leg. Wings (Plate I, fig. 1) relatively narrower than in Japanese specimens; macrotrichia rather sparsely distributed all over surface. Wing base white but with a dark cloud before arculus, first costal white spot not circular but transverse and widest on costal margin, third costal white spot not separated from costal margin, fourth costal white spot hemicircular on distal

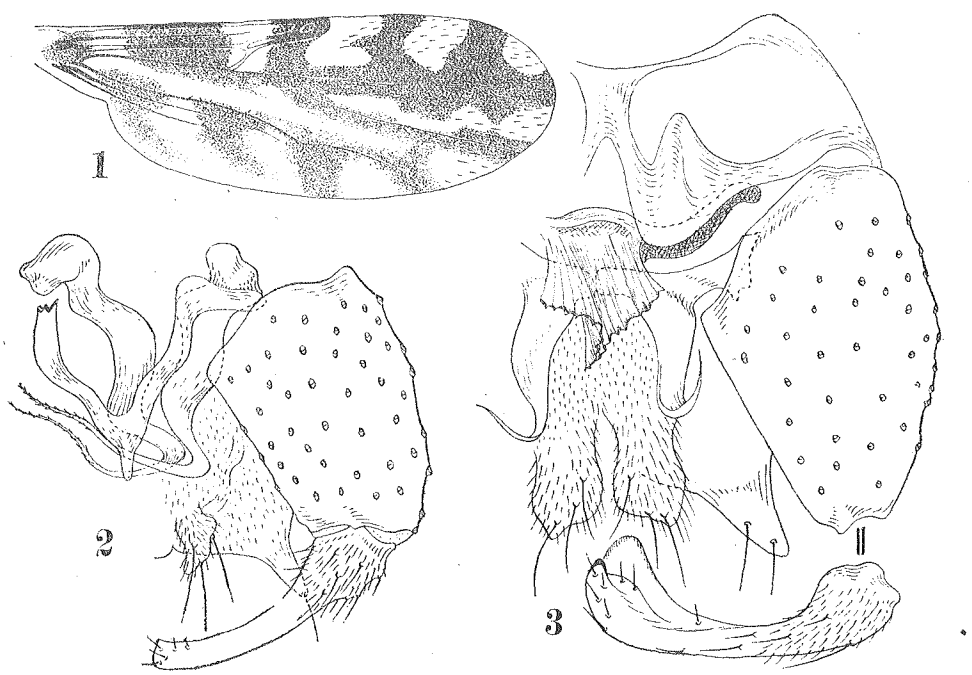


Fig. 1. *Culicoides erairai*; male wing.
Fig. 2. *Culicoides erairai*; male hypopygium.
Fig. 3. *Culicoides sinanoensis*; male hypopygium.

corner of cell R_5 and separated from M_1; cell M_1 with three white spots, of which basal one elongate and oval, middle one small and circular, distal one hemicircular and along margin; cell M_2 with a white long longitudinal stripe which is confluent with white wing base and a white distal spot which is large, hemicircular and along margin; anal cell with a basal spot confluent with longitudinal stripe in cell M_1 and double spots under *fMCu*. Second radial cell of wing large and about twice as long as first cell. Halteres with knobs white and stems pale brown. Abdomen with sclerites brown, membranous areas pale brownish dark; spermathecae three and brown; two equal, almost spherical and each with a distinct neck region the other vestigial, tubular.

Male—Body about 1.5 mm. long. Coloration almost identical with that of female. Antennae with plumose hairs pale brown; no terminal stylet; antennal ratio about 0.65; relative lengths of distal seven segments about 12 : 12 : 14 : 32 : 29 : 33. Relative lengths of segments of hind leg about 21 : 21 : 10 : 5 : 3 : 2 : 3. Wings (fig. 1) elongate and oval, with macrotrichia very sparsely distributed on distal part of cells R_5, M_1 and M_2; second white costal spot not deeply constricted; three white spots in cell M_1 confluent with each other forming a longitudinal spot; white spots in anal cell also confluent with each other; venation: first radial cell elongate, about twice as long as small oval second cell, *fMCu* under base of second cell, Cu_1 ending under tip of radial vein. Hypopygium as in figure 2.

Specimens—Females and males; Yablonia, Manchuria; July and August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides sinanoensis TOKUNAGA

TOKUNAGA, 1937. Tenthredo, 1 : 331–332.

The Manchurian specimens are somewhat different from the Japanese specimens in the following points:

Female—Relative lengths of distal eight antennal segments about 13.5 : 14 : 14 : 20 : 21 : 23 : 26 : 40. Thoracic scutum brown, median area between foveae yellow but anterior and posterior parts brown, lateral area with double obscure yellow spots behind humeral pit and with an elongate oval yellow spot on posterior part. In some specimens thorax entirely brown almost uniformly. Legs pale brown, but bases of all tibiae, tip of hind tibia and all tarsi white. Sometimes wing markings not very clear. Abdomen white, with tergites brown and slightly concave on each posterior margin, sternites represented by paired brown patches; spermathecae two, equal, oval, brown, without neck part.

Male—Boby 1.5 to 1.7 mm. long. Coloration as in female. Antennae pale brown, but scape dark; terminal stylet absent; antennal ratio about 0.74;

relative lengths of distal six segments as follows: 15 : 14.5 : 14.5 : 34.5 : 35 : 41. Wing with white areas far larger than in female and subconfluent with each other, so that dark areas form three transverse bands; macrotrichia distributed only along distal margin of cells R_5 and M_1; venation: *fMCu* under radial cross-vein, relative lengths of first and second radial cell about 7 : 5.5. Hypopygium (fig. 3) with large anal points and paired parameres short, pointed and flat.

Specimens—Females and males; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides pulicalis LINNAEUS var. ***ocellaris*** KIEFFER

TOKUNAGA, 1937. Tenthredo, 1 : 308–311 and 1940. Tenthredo, 3 : 146–147.

This species is rather variable in coloration and in size of body. In my previous paper I have reported a Mongolian specimen which is provided with very paler wings, but the present Manchurian specimens are all provided with darker wings, in which the dark clouds are confluent with each other and those in anal cell, cell M_1 and cell M_2 very extensive.

Female—Body length 1.5 to 2 mm. Dark spot in cell M_4 always distinctly isolated (Plate I, fig. 2). Spermathecae two, equal, short-oval, brown, with neck part very short, other one vestigial.

Male—Body about 1.7 mm. long. Antenna with scape dark brown, flagellum and plumose hairs pale brown, without terminal stylet; antennal ratio about 0.67; relative lengths of distal six segments as follows: 17 : 17 : 22 : 47 : 42 : 47. Legs dark, but bases of middle and hind tibiae and tip of hind tibia yellow, all tarsi yellowish white; claws bifid at tip; relative lengths of segments of fore leg about 25 : 25 : 13.5 : 6 : 4 : 2.5 : 2.7, those of hind leg about 30 : 30 : 15 : 8.5 : 5 : 2.5 : 3. Wing with macrotrichia rather sparse, spread on distal part of cells R_5, M_1 and M_2; *fMCu* under tip of first radial cell, first radial cell long and far longer than second (10 : 6); dark clouds of wing far paler than in female; second dark costal cloud covering distal half of first radial cell and not covering second radial cell. Halteres white. Hypopygium (fig. 4) with anal points slender, styles strong and curved, coxites with strong short bristles on mesal side, paired parameres furcate at tip.

Specimens—Females and males; Yablonia, Manchuria; June to July, 1939 and July and August 7, 1940; collected by Mr. S. TAKAGI; Tozan, Boturi-ken, Sanko-syo, Manchuria; September 23, 1940; collected by Mr. Z. ONO.

According to Mr. Z. ONO, this species is very troublesome in calm days and severely attacks men.

Culicoides impunctatus GOETGHEBUER

Female—Body length 2 to 2.4 mm. Eyes bare, just contiguous above. Maxillary palpi 5-segmented (10 : 38 : 42 : 18 : 13), slender; third segment with scattered sensillae but with a small depression just beyond middle, this depression also provided with sensillae. Antennae brown, without terminal stylet; antennal ratio about 1; distal eight segments with following proportional lengths: 22 : 22 : 22 : 30 : 33 : 33.5 : 33 : 52; shape of segments closely similar to that of *C. pulicaris* LINNAEUS. Thorax entirely dark brown, but median area of scutum brown and caudoscutal and anterior scutal areas faintly dark. Legs dark brown, but tarsi pale brown, bases of all tibiae and distal end of hind tibia yellow; fourth tarsal segments cylindrical; relative lengths of segments of fore leg as follows: 31 : 32 : 17 : 7 : 5 : 3 : 3.7, those of hind leg 39 : 40 : 20 : 11 : 5.5 : 3.5 : 4. Wing (Plate I, fig. 3) with colour markings somewhat resembling those of *C. pulicaris*, but no white spots at end of M_1 and M_2, no dark spot in cell M_4, third dark costal spot strongly constricted, second radial cell extensively white, dark cloud covering Cu_1 somewhat rectangular; macrotrichia rather thickly spread over surface. Halteres pale brown. Abdomen with tergites brown, sternites with paired brown sclerites.

Specimens—Femeles; Yablonia, Manchuria; June to July, 1939 and August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides impunctatus GEOTGHEBUER var. ***minor*** var. nov

This variety is different from the type in the following points: Body smaller, being about 1.7 mm. long; shape of wing markings identical with those of type, but dark clouds darker and shape of wings relatively shorter or broader.

Specimens—Females; Yablonia, Manchuria; June to July, 1939; collected by Mr. S. TAKAGI.

Culicoides arcuatus WINNERTZ

TOKUNAGA, 1937. Tenthredo, 1 : 311-312.

Female—Antennae brown; antennal ratio about 0.9; relative lengths of distal eight segments as follows: 20 : 20 : 20 : 25 : 27 : 28 : 30 : 41. Maxillary palpi slender, 5-segmented (8 : 30 : 32 : 12 : 15); third segment with scattered sensillae on distal half, but sometimes with a small shallow depression which bears sensillae. Thoracic colour as in *C pelilioueusis* TOKUNAGA, scutellum sometimes with a dark clouds on anterior margin. Legs pale brown, knee-joints of all legs and apical end of hind tibia yellowish; relative lengths of segments of fore leg as follows: 25 : 26 : 13 : 5 : 3.5 : 2 : 3, those of hind leg 30 : 31 : 15 : 8 : 4 : 3 : 3. Wing with first and second dark costal clouds not con-

fluent, distal white spot in cell R_5 large, a white spot in anal cell just before *fMCu* oval; macrotrichia rather thicker. Other characters similar to those of Japanese specimens.

Specimens—Females; Yablonia, Manchuria; June to July, 1939 and August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides arcuatus WINNERTZ var. ***nigrus*** var. nov.

This variety distinctly differs from the type, in the markings of the wings (Plate I, fig. 4): dark clouds extensive and all confluent with each other, two radial cells largely covered by second costal dark cloud, third costal dark cloud broad, median white spots above and beneath vein M_2 obscure.

Specimen—Female; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides arcuatus WINNERTZ var. no. 1.

This variety is very closely allied to type, but different in the following points of the wings (Plate I, fig. 5): first radial cell very narrow, second radial cell pointed distally and subtriangular, first and second dark costal clouds not confluent, oval white spot of anal cell isolated, dark cloud covering vein Cu_1 extending towards wing tip forming a spur-like projection. Body is somewhat large, being about 1.8 mm. long.

Specimen—Female; Yablonia, Manchuria; August 7, 1940; collected by Mr. S. TAKAGI.

Culicoides manchuriensis sp. nov.

The wing markings of this species are closely allied to those of *C. miharai* KINOSHITA.

Female—Body 1.3 to 1.4 mm. long. Eyes bare and separated narrowly as in *C. miharai*. Antennae (fig. 5) brown, without terminal stylet; antennal ratio about 1.1; relative lengths of distal eight segments as follows: 12.5 : 13 : 13 : 19 : 20 : 23 : 23 : 28. Maxillary palpi (fig. 6) 5-segmented (10 : 20 : 23 : 11 : 12); third segment strong, with common sensory pore just beyond middle, sensillae long and extruding out from pore. Thorax brown, but caudoscutal area pale brown and with yellowish stripes along foveae. Legs brown, with knee-joints dark; tibiae with obscure paler rings on sub-basal area; penultimate tarsal segments cylindrical; relative lengths of segments of hind leg about 25 : 26 : 14 : 7 : 4.5 : 3 : 3. Wings (Plate I, fig. 6) with macrotrichia thickly spread over surface, provided with many white spots; no bare areas along vein M_1 and M_2; wing marking not very clear; wing base white and containing an obscure dark

spot; first costal white spot large, covering *r-m* and basal half of first radial cell, extending caudad, subconfluent with double white spots on distal area of anal cell forming a band; second white costal spot large, not covering second radial cell; third costal spot oval and not separated from costal margin; cell M_1 with two oval white spots, of which basal one beneath second costal spot, distal one widely separated from distal margin and situated under third costal spot, cell M_2 with a long longitudinal stripe which arises from wing base and ends under basal spot of cell M_1 and with a large hemicircular spot along distal margin, cell M_4 with a large hemicircular spot along margin, anal cell with a basal spot subconfluent with white wing base and with double white spots just before *fMCu*. Venation: first radial cell long and longer than second

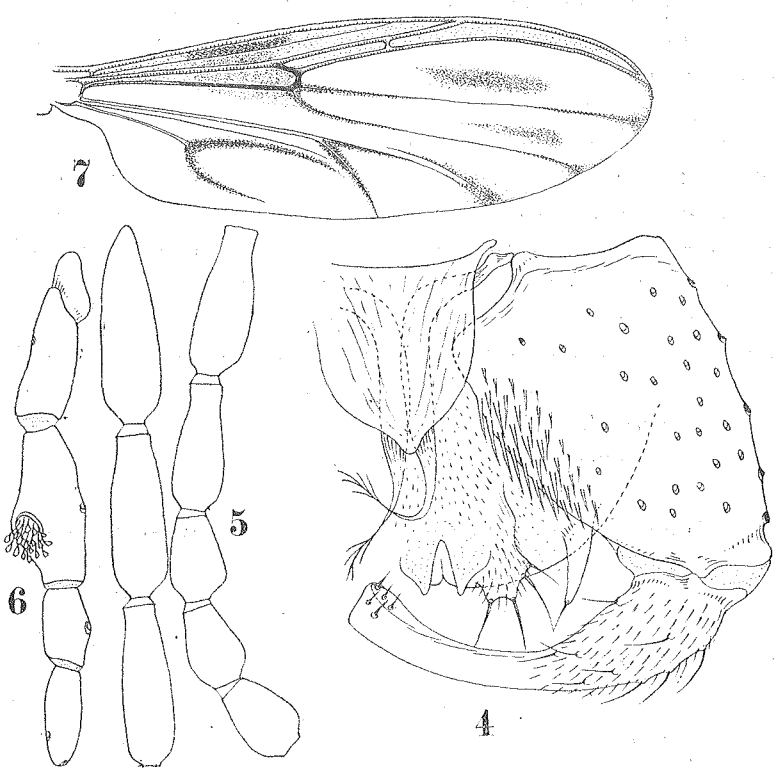


Fig. 4. *Culicoides pulicalis* var. *ocellaris*; male hypopygium.
Fig. 5. *Culicoides manchuriensis*; female antenna.
Fig. 6. *Culicoides manchuriensis*; female maxillary palpus.
Fig. 7. *Palpomyia nubeculosa*; female wing.

cell, second cell roundly ending, *fMCu* just before tip of first radial cell, Cu_1 ending under tip of R_1. Halteres pale brown. Abdomen entirely brown, with sclerites deeply brown.

Locality—Yablonia, Manchuria.

Type specimens—Females; August 7, 1940; collected by Mr. S. TAKAGI.

This species is closely allied to *C. miharai* KINOSHITA, but in the allied species the tenth antennal segment is about twice as long as preceding one, the antennal ratio is larger being 1.4 or 1.5, the sensillae of the maxillary palpi are very short and not extruded out from the sensory pore, the white spots of the wing are far smaller, especially the second costal spot is very narrow and oblique, all differing from the present new species.

Sphaeromias pictus MEIGEN var. no. 1.

TOKUNAGA, 1940. Tenthredo, 3: 156–157.

Female—Body length about 5 mm. Antennae short, as long as fore femur, with scapes and basal short flagellar segments orange, distal five segments black; antennal ratio about 1.26, relative lengths of distal eight segments as follows: 26 : 26 : 30 : 55 : 59 : 55 : 55 : 54. In alcoholic specimens, scutellum yellowish brown. Femora yellowish brown on dorsal and basal area; femoral spines arranged on distal half: nine on fore, fourteen on middle and ten on hind femur; ultimate tarsal segments with ventral spines: six on fore tarsus, seven on middle and hind tarsi. Wings with veins pale yellow; relative lengths of first and second radial cell about 35 : 85. Halteres white. In alcoholic specimens, abdomen yellowish pale brown; each tergite with a dark basal band, pleurites with dark clouds, each sternite with a brown incomplete basal band; ultimate two segments and cerci brown. Other characters and values of measurement quite identical with those of Japanese specimens.

Specimens—Females; Harbin, Manchuria; July 21, 1940; collected by Dr. M. UENO

These Manchurian specimens are more closely similar in coloration to the European specimens than to the Japanese specimens recorded in my previous paper.

Palpomyia nubeculosa sp. nov.

Female—Body 4.8 to 5.2 mm. long, stout, setigerous with short setae. Head yellowish red, with mouth parts orange but labrum black; eyes just contiguous above. Antennae yellow, but distal elongate segments black, with following relative lengths of distal eight segments: 32 : 35 ; 36 : 69 : 74 : 76 : 86 : 103; antennal ratio 1.44. Thorax, in dry condition, highly pruinose in gray,

with paired black spots on humeral pits, an obscure elongate black spot on either lateral side, a triangular black spot on caudoscutal area, an inverted V-shaped brown median stripe on anterior area, a pair of short brown stripes on posterior area; in alcoholic condition, scutum and postscutellum black, scutellum orange but dark on median area, sternal and pleural sides dark with orange markings. Legs orange in ground colour, tarsi white, apical ends of all segments more or less dark, knee-joints dark, femora each with a dark pre-apical ring, which is faint in fore leg and broad and distinct in other legs; tibiae each with a dark sub-basal ring, which is obscure and narrow in fore and middle legs, but broad and distinct in hind leg; all femora thick on distal part and with many ventral spines: twenty two on distal half of fore femur, nine on distal one-third of hind femur; eleven on distal one-third of hind femur; tarsal spines present only on middle leg: paired distal spines on basal three segments and first segment with two additional spines before middle; ultimate tarsal segments of all legs with nine or eight strong ventral bristles on entire length; fourth tarsal segments flat and subcordiform; claws long, each with a basal slender tooth; relative lengths of segments of fore leg about 80 : 76 : 27 : 17 : 10 : 7 : 15, those of hind leg about 104 : 85 : 47 : 20 : 9 : 6 : 15. Wings (fig. 7) with dark clouds along veins and small isolated clouds in cells R_5 and M_1, an obscure large dark cloud before *r-m*; cells *C*, *Sc*, *R* and first and second radial cells yellowish; veins brown, but distal half of *M*, M_{1+2}, *r-m* and first section of R_{4+5} black; venation: R_{4+5} very long, about twice as long as R_1 (123 : 63), extending along costa and ending just before tip of wing, relative lengths of two radial cells about 38 : 90, first section of M_{1+2} shorter than *r-m*, *fMCu* beyond *r-m*. Halteres white. Abdomen yellowish white in alcoholic state and white-pruinose in dry state; tergites each with a pair of lateral brown stripes and a black sinuous very narrow anterior band, but this band absent in basal two tergites, eighth and ninth tergites and cerci white; pleural sides with dark clouds; sternal sides brown or yellowish white.

Locality—Harbin, Manchuria.

Type specimens—Females; July 21, 1940; collected by Dr. M. UENO.

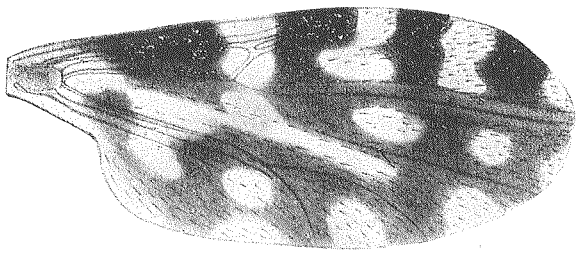
This species is somewhat allied to *Sphaeromias pictus* MEIGEN and *S. fasciata* MEIGEN, but highly different from these specimens in possession of the markings of the wings, as well as from other known species of the genus *Palpomyia*.

Dicrobezzia venusta MEIGEN

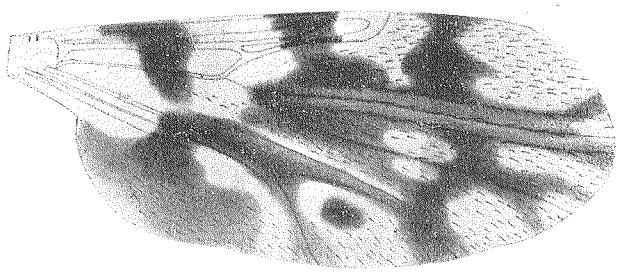
Female—Body about 3.5 mm. long. Head black, with mouth parts yellowish white; eyes barely separated. Antennae with scapes yellow, following eight

segments white, and ultimate five elongate segments brown, without terminal stylet; antennal ratio about 1.5; relative lengths of distal eight segments as follows: 25 : 27 : 31 : 64 : 67 : 66 : 66 : 83. Thorax black, shining, with many bristles; scutal tubercule absent. Legs yellow, but fore femur black and very narrowly yellow at base, middle femur black on distal half, hind femur black on distal one-third, fore and middle tibiae narrowly black at distal and basal ends, hind tibia narrowly black at distal end and with a broad black ring on sub-basal part, tarsi all white, but last segments black; middle tibia and first tarsal segment each with two apical spurs; middle third and all fourth tarsal segments cordiform; fifth tarsal segments elongate, each with six or five strong bristles on ventral side; claws equal, each with a blunt basal tooth. Wing colorless on basal one-third and very slightly fumous on distal two-thirds or colorless on distal one-third; venation: R_{4+5} very long ending at tip of wing, *fMCu* under fork of M_{1+2}, basal section of R_{4+5} longer than that of M_1, *r-m* shorter than the latter. Abdomen yellowish white, tergites from second to fifth or third to fifth segments black.

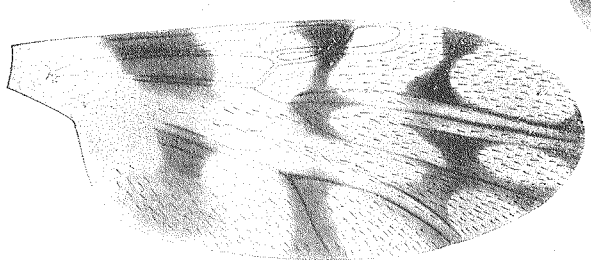
Specimens—Females; Yablonia and Harbin, Manchuria; August 7 and September 7, 1940; collected by Mr. S. TAKAGI and Prof. Dr. T. ESAKI.



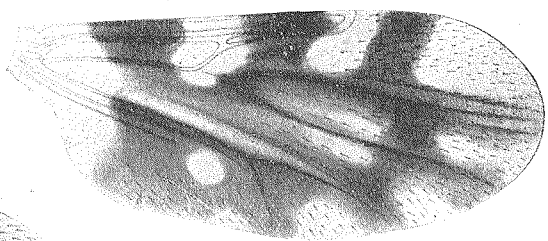
1. *Culicoides erairai* KÔNO et TAKAHASI (female)



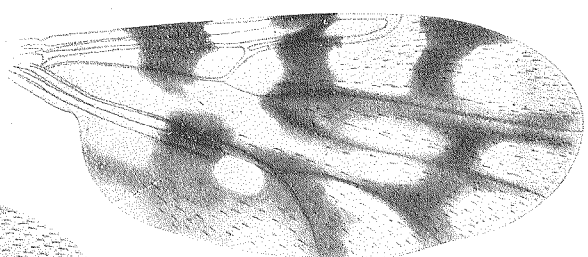
2. *Culicoides pulicaris* LINNAEUS var. *ocellaris* KIEFFER (female)



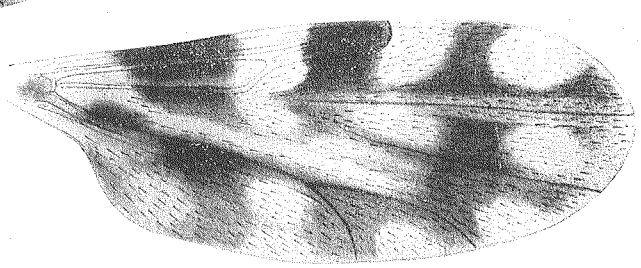
3. *Culicoides impunctatus* GOETGHEBUER (female)



4. *Culicoides arcuatus* WINNERTZ var. *nigrus* var. nov. (female)



5. *Culicoides arcuatus* WINNERTZ var. no. 1. (female)



6. *Culicoides manchuriensis* sp. nov. (female)