



Title	A Revision of the Culicoides-species of Saghalien and Hokkaido (Ceratopogonidæ, Diptera)
Author(s)	Kono, Hiromichi; Takahashi, Hiroshi
Citation	Insecta matsumurana, 14(2-3), 69-77
Issue Date	1940-03
Doc URL	http://hdl.handle.net/2115/9437
Type	bulletin (article)
File Information	14(2-3)_p69-77.pdf



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A REVISION OF THE *CULICOIDES*-SPECIES OF
SAGHALIEN AND HOKKAIDO¹⁾
(*CERATOPOGONIDÆ*, *DIPTERA*)

By

HIROMICHI KÔNO & HIROSI TAKAHASI

(河野廣道・高橋 弘)

(With 5 Figures)

In the last few years, the authors have been engaged in studies of the blood-sucking insects of Northeastern Asia. As a part of these studies it is proposed in this paper to report on the *Culicoides*-species of Hokkaido and Saghalien.

As far as the authors are aware, two species, *Culicoides obsoletus* (MEIGEN) (= *Ceratopogon yezoensis* MATSUMURA) from Saghalien and Hokkaido, and *Culicoides sigaensis* TOKUNAGA from Hokkaido, have been hitherto recorded. In this paper three new species and one unrecorded species, *Culicoides pegobius* KIEFFER, are added to the Ceratopogonid fauna of Saghalien and Hokkaido.

On this occasion the authors wish to offer grateful thanks to General C. KOIZUMI, Prof. T. KABURAKI, and Prof. T. UCHIDA for their continual encouragement and valuable advice.

Genus *Culicoides* LATREILLE

Key to the Species

1. Wing with markings 2
- Wing without marking 5
2. Second radial cell including marginal veins entirely dark ... *C. erairai* sp. nov.
- Second radial cell or its marginal veins partially white 3
3. Wing extensively whitish, with suffused greyish markings
..... *C. sawamotoi* sp. nov.
- Wing dark, with whitish markings 4
4. Wing with third white costal spot *C. sigaensis* TOKUNAGA
- Wing without third costal white spot *C. obsoletus* (MEIGEN)
5. Wing with macrotrichia spread over entire surface *C. ponkikiri* sp. nov.
- Wing with macrotrichia spread over distal one-third only
..... *C. pegobius* KIEFFER

1): This report is a part of the studies for the Foundation for the Promotion of Science and Industrial Research of Japan.

1. *Culicoides erairai*²⁾ sp. nov. (Fig. 1)

♀. Body brown; scutum not dotted; wing pale grey, with some clear scattered markings on membrane; macrotrichia sparsely spread over surface.

Vertex dark brown; antennae and mouth-parts pale yellow; front clypeus with six short setae; eyes bare, narrowly separated at vertex. Antenna (Fig. 1, b) with scape brown, flagellum pale brown, relative length of seven distal segments 13:14:16:16:18:20:34; antennal ratio³⁾ 0.86 (104:120). Maxillary palpus (Fig. 1, c) slender, with many scattered spoon-like sensillae on distal

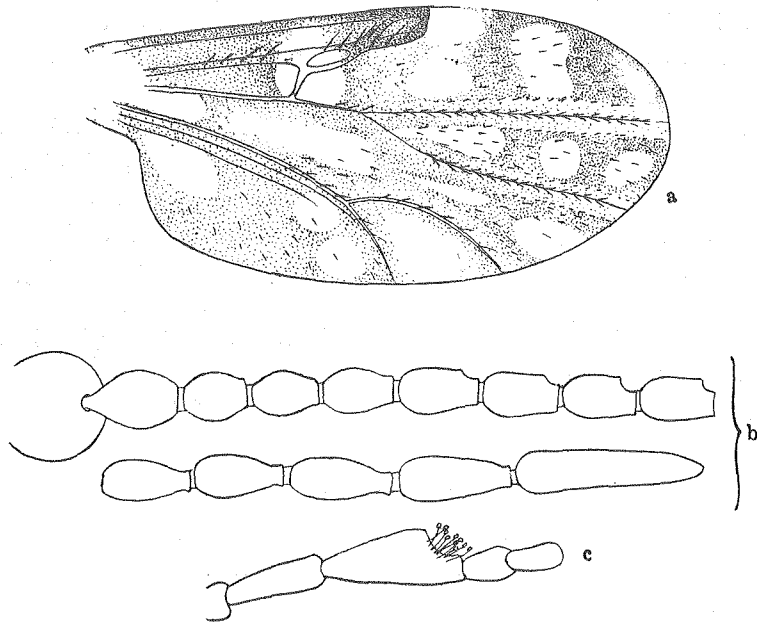


Fig. 1. *Culicoides erairai* sp. nov.
a. Wing⁴⁾; b. Antenna⁵⁾; c. Maxillary palpus⁶⁾.

half of the third segment; proportional length of the segments 10:20:26:9:12. Proboscis distinctly shorter than length of head (75:100). Mandible with about thirteen minute teeth; galea with sixteen teeth; labrum-epipharynx with five lateral teeth on either side and with three minute terminal teeth. Thorax brown; scutum shining; scutellum and postscutellum brown. Halteres white.

2): "Erairai" is the Ainu name for some *Culicoides*-species.

3): The ratio of the relative length of five ultimate cylindrical segments of antenna to the eight preceding segments taken together.

4): Microtrichia and fringe omitted.

5) 6): Hairs omitted.

Wing (Fig. 1, a) pale grey, with about fifteen distinct clear spots. Wing base white, with four clear costal spots characteristic in shape; first spot covering $r-m$, elongated; second double costal spots just beyond second radial cell, consisting of an anterior semicircular spot and a posterior circular spot; third clear spot obscurely separated from costal margin, concave on middle; fourth costal spot on distal corner of cell r_5 oval, not very sharply defined; cell M with three distinct spots, two of which are subconfluent and suffused, and the other one below M distal and circular. Cell M_4 with a distinct circular large spot along wing margin; anal cell with a double circular spot on proximal part. Macrotrichia not extending level with end of R_1 ; anal cell with macrotrichia on distal margin; linear areas along veins M_1 and M_2 without macrotrichia. Legs pale brown; knee-joints dark brown; fore and middle legs with whitish yellow rings above and below knee-joints; hind legs broadly whitish yellow on basal end of tibia; fourth tarsal segment of all legs cylindrical. Proportional length of the segments of legs with exception of coxae and trochanters as follows: 30:25:12:6:3:2:3 in fore leg, 34:33:16:6:4:2:3 in middle leg and 32:32:14:7:4:3:4 in hind leg. Abdomen yellowish white, paler than thorax; each sternum somewhat paler than tergum; two large spermathecae brown, spherical, and one slender spermatheca tubular; cerci white.

Body length: 2 mm. Length of wing: 1.3 mm.

Holotype (♀): Sapporo, 24/VII, 1939, H. TAKAHASI.

Type in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Hokkaido (Sapporo).

Japanese Name: *Ezo-nukaka*.

This species is closely allied to *C. sugimotois* TOKUNAGA, but easily distinguished from the latter by the shape of the third costal clear spot of the wing and by many scattered spoon-like sensillae on the distal half of the third palpal segment.

The blood-sucking habit of the midge is unknown. This species was collected with other blood-sucking *Culicoides*-species such as *Culicoides obsoletus*, etc.

2. *Culicoides obsoletus* (MEIGEN)

Ceratopogon obsoletus MEIGEN, Syst. Besch., I, p. 76 (1818).

Ceratopogon arcuatus KERTÉSZ (nec WINNERTZ), Catalog Dipt., I, p. 160 (1902); KERTÉSZ (nec WINNERTZ), Katalog Paläarkt. Dipt., I, p. 85 (1903) (part.).

Ceratopogon yezoensis MATSUMURA, Jour. Coll. Agr. Tohoku Imp. Univ., IV, pt. I, p. 60 (1911); MATSUMURA, Konchu Buruigaku, II, p. 56 (1915); MATSUMURA, 600 Ill. Ins. Jap. Emp., p. 401, fig. 278 (1931).

Culicoides obsoletus EDWARDS, Trans. Ent. Soc. London, LXXIV, p. 405, Pl. XCII, fig. 16 (1926); TOKUNAGA, Tenthredo, I, 3, p. 321, Text-fig. 23, Pl. XXVIII, fig. 18 (1937).

Habitat: Saghalien (Keton, 2 ♀♀, 8/VIII, 1939, H. TAKAHASI); Kuriles (Kunashiri, 1 ♀, VIII, 1939, T. SUEMITSU); Hokkaido (Teshio, 6 ♀♀, 30/VI, 1922, S. MATSUMURA, Sapporo, 1 ♀, 25/VII, 1939, H. TAKAHASI).

G. D.: Saghalien; Hokkaido; Europe.

J. N.: *Nukaka*.

Dr. M. TOKUNAGA (l. c.) reported that he has examined a female paratopotype of *Ceratopogon yezoensis* MATSUMURA which was collected from Hokkaido and confirmed that it was quite identical with *Culicoides obsoletus* (MEIGEN). However, it is not the real paratopotype; because *Ceratopogon yezoensis* was originally described from a single specimen collected from Saghalien, and the type is preserved in Mr. Y. NAWA's collection. From the authors' investigation, the ideotype of *yezoensis* may be also identical with *Culicoides obsoletus* (MEIGEN).



Fig. 2. Forearm showing scars caused by bites of *Culicoides obsoletus* (MEIGEN) and *Culicoides sawamotoi* KONO et TAKAHASI. (Photographed four months after bites).

This species is very common in Saghalien and Hokkaido. The midge is very familiar to everyone in the woodlands of these regions. The irritation swelling caused by the bite of this species depends very greatly upon the susceptibility of the individual attacked. Some persons are so little affected that they are almost ignorant of the attacks of a large number of midges. On the other hand, the bite might even produce a large swelling, reddish in colour, and accompanied by an edema, disagreeable inflammation and severe irritation. Moreover, by scratching it is very easy to tear the skin from the swelling. Thus such a sore heals much more slowly than a sore produced by an accidental cut or scratch, and it is also likely to be infected by bacteria. The sore heals after three or four months, or even longer.

3. *Culicoides pegobius* KIEFFER (Fig. 3)

Culicoides pegobius KIEFFER, Ann. Sci. Bruxelles, XLI, p. 235 (1922).

♀. Body dark brown; eyes not hairy; scutum shining; wing almost entirely hyaline; legs pale brown.

Head brown, with vertex dark brown; eyes contiguous; antennae and

mouth-parts yellowish. Antenna (Fig. 3, b) pale brown except scape which is dark brown; relative length of seven distal segments as follows: 10:12:16:15:17:20:30; antennal ratio about 1 (20:19). Mixillary palpus (Fig. 3, c) 5-segmented (12:14:14:7:11), slender, with a series of several spoon-like sensillae in small sensory pore on third segment. Proboscis distinctly shorter than length of head (8:15). Thorax brown. Halteres white. Wing (Fig. 3, a) hyaline, without marking on membrane; macrotrichia very sparsely scattered on distal margin. Legs entirely pale brown; knee-joints somewhat darker. Proportional length of segments of legs, with the exception of the coxae and trochanters, as follows: 18:17:9:4:3:2:3 in for leg; 23:22:

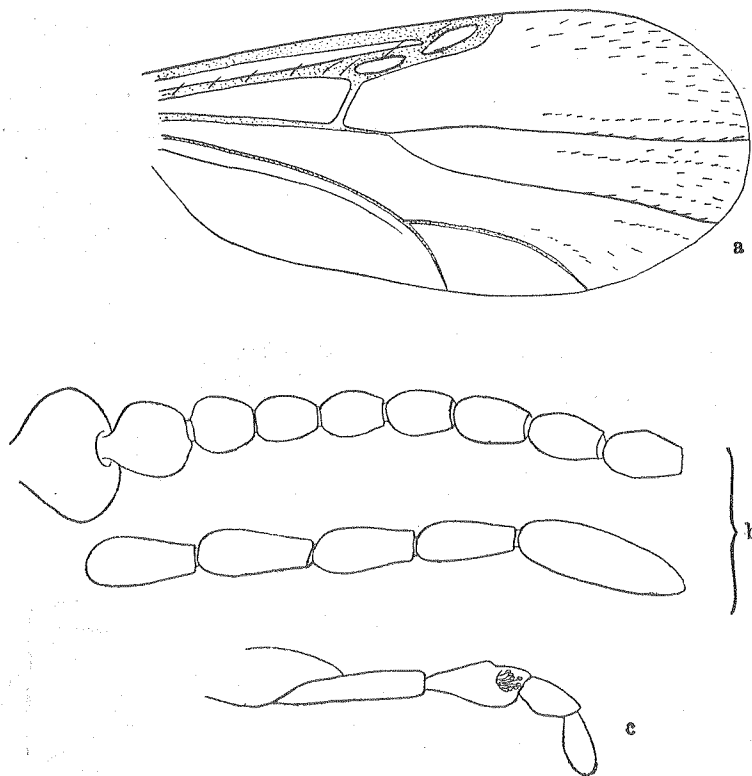


Fig. 3. *Culicoides pegobius* KIEFFER
a. Wing; b. Antenna; c. Maxillary palpus.

12:5:3:2:3 in middle leg; 20:24:8:5:3:2:3 in hind leg. Abdomen entirely brown; two unequal spherical spermathecae brown, their relative breadths being 9:8, and one short tubular spermatheca vestigial; cerci white.

Length of body: 1.3 mm. Length of wing: 1.0 mm.

Habitat: Saghalien (Keton, 1 ♀, 8/VIII, 1939, H. TAKAHASI; Horo, 3 ♀ ♀, 13/IX, 1939, T. SAWAMOTO); Hokkaido (Tokachidake, 1 ♀, 1/VIII, 1939, T. SAWAMOTO).

General Distribution: Saghalien; Hokkaido; Europe.

Japanese Name: *Mumon-nukaka*.

This species is new to the fauna of the Empire of Japan. The specimen collected at Keton was found with numerous buffalo-gnats which attacked the belly of a horse.

4. *Culicoides ponkikiri*⁷⁾ sp. nov.

♀. Body brown; scutum shining; wing entirely hyaline, without dark marking on membrane; legs entirely yellow.

Head with eyes slightly separated; vertex dark brown; frontal aspect and mouth parts yellow. Antenna (Fig. 4, b) yellow, the scape brown; relative length of seven distal segments 11:11:30:30:32:31:38; antennal ratio 1.78 (161:90). Maxillary palpus short, stout, distinctly swollen at the third segment; sensory organ of the third segment very large, consisting of a series of

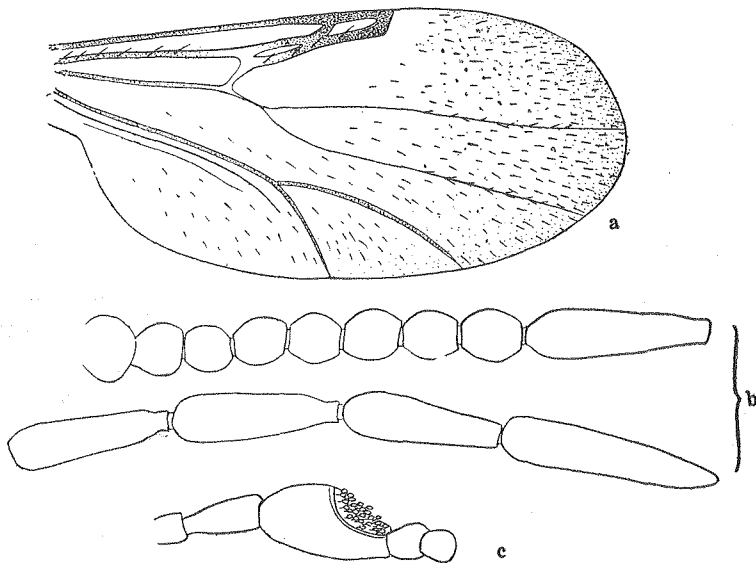


Fig. 4. *Culicoides ponkikiri* sp. nov.

a. Wing; b. Antenna; c. Maxillary palpus.

7): "Ponkikiri" is the Ainu name of some *Culicoides*-species. Pon = small; kikiri = a insect.

many short minute granule-like sensillae in very large shallow circular depression; proportional length of the segments 10:15:25:5:6. Proboscis stout, distinctly shorter than length of head (55:100). Mandible with about twelve minute teeth; galea with about sixteen teeth; labrum-epipharynx with four lateral teeth on either side and three minute terminal teeth. Thorax dark brown; scutum shining, scutellum without dots and postscutellum brown. Halteres white. Wing (Fig. 4, a) hyaline, without marking; macrotrichia almost entirely spread over, excepting costal, subcostal and first and second radial cells; radius with about eleven setae. Legs entirely pale brown; proportional length of segments of legs, with the exception of the coxae and trochanters, as follows: 20:20:10:5:4:2:3 in fore, 23:27:13:5:4:2:3 in middle and 26:26:12:5:3:2:3 in hind leg. Abdomen mainly brown, slightly paler than thorax; each sternum somewhat paler than tergum; two unequal spermathecae spherical with very small neck region and one short tubulose spermatheca vestigial; cerci white.

Length of body: 1.4 mm. Length of wing: 1.1 mm.

Holotype (♀): Sapporo, 24/VIII, 1939, H. TAKAHASI.

Type in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Hokkaido (Sapporo).

Japanese Name: *Kebuka-mumon-nukaka*.

This species somewhat resembles *Culicoides crassipilosus* TOKUNAGA, but is distinguished from the latter by the very large sensory pore of the third palpal segment.

The blood-sucking habit of the fly is not yet ascertained.

5. *Culicoides sawamotoi* sp. nov. (Fig. 5)

♀. Body brown; scutum shining; wing hyaline, with small dark scattered markings on membrane; macrotrichia sparsely spread over distal two-thirds of wing; legs entirely pale brown.

Head with eyes contiguous, vertex dark brown; frontal aspect and mouth-parts yellowish brown. Antenna (Fig. 5, b) yellow, the scape dark brown; relative length of seven distal segments 8:8:12:14:16:16:23, antennal ratio about 1 (19:18). Maxillary palpus (Fig. 5, c) long, with a series of several spoon-like sensillae in a common small sensory pore on the third segment, which is distinctly thickened at middle; proportional length of the segments 3:12:14:5:6. Proboscis distinctly shorter than length of head (40:65). Mandible with about twelve minute teeth; galea with sixteen teeth; labrum-epipharynx with four or five lateral teeth on either side and with three

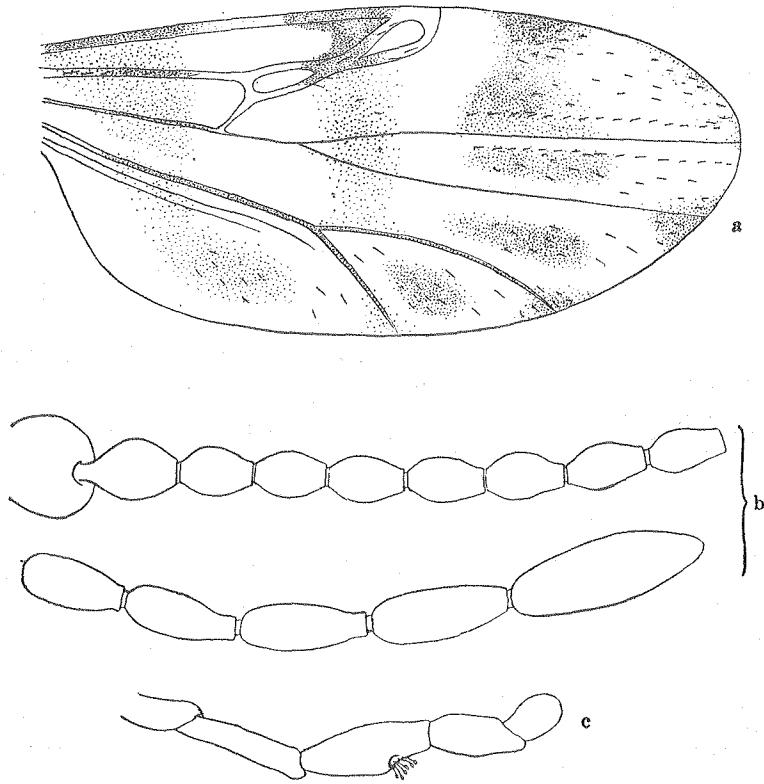


Fig. 5. *Culicoides sarvamotoi* sp. nov.
a. Wing; b. Antenna; c. Maxillary palpus.

or four minute terminal teeth. Thorax brown; scutum shining, scutellum and postscutellum brown. Halteres white. Wing (Fig. 5, a) hyalin, with small scattered markings on membrane; first dark costal marking fumose; second dark costal marking covering the middle of two radial cells; third costal dark marking elongated to near M_1 and constricted at middle. Other dark markings almost entirely circular or oval; macrotrichia comparatively sparse, spread over distal two-thirds of wing; R_1 with a series of macrotrichia. Legs brown in general appearance; proportional length of segments of legs, with the exception of the coxae and trochanters, as follows: 19:20:11:5:3:2:3 in fore leg, 24:23:12:6:3:2:3 in middle leg and 23:25:13:6:4:2:3 in hind leg; all legs not flattened. Abdomen mainly brown, slightly paler than thorax; each sternum somewhat paler than tergum; two unequal spermathecae almost spherical with very small neck regions, their relative breadth being 11:10, and

one short tubulose spermatheca vestigial.

Length of body: 2 mm. Length of wing: 1.2 mm.

Holotype (♀): Horo, 1/IX, 1939, T. SAWAMOTO.

Type in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Saghalien (Horo).

Japanese Name: *Sawamoto-nukaka*.

This specimen was caught by Mr. T. SAWAMOTO together with *C. obsoletus* (MEIGEN), sucking blood from his arm.

This species somewhat resembles *C. maculatus* SHIRAKI, from which it is distinguished by the wing markings.

6. ***Culicoides sigaensis*** TOKUNAGA

Culicoides sigaensis TOKUNAGA, Tenthredo, I, 3, p. 322, Text-fig. 29, Pl. XXVIII, fig. 19 (1937).

Habitat: Hokkaido (Sapporo, 2 ♀ ♀, 24/VII, 1939, H. TAKAHASI).

General Distribution: Hokkaido; Honshu.

Japanese Name: *Siga-nukaka*.