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DESCRIPTION OF FIVE NEW SPECIES OF  
*SIMULIIDAE* FROM MANCHOUKUO  
(STUDIES ON *SIMULIIDAE* OF MANCHOUKUO, I)<sup>1)</sup>

By

HIROSI TAKAHASI

(高橋 弘)

(With 7 Figures)

In 1940, the author had a good opportunity to collect many blood-sucking insects in Manchoukuo. Although Simuliid flies are very important in medical entomology, no work on these flies from Manchoukuo has yet been published by any entomologist. On this occasion five new species of *Simuliidae*, four from North Manchoukuo and one from South Manchoukuo, and one new recorded species are described. The generic arrangement in this paper follows Prof. ENDERLEIN's system. The larvae and pupae of these species will be reported in the near future.

Here the author's hearty thanks must be offered to General C. H. KOIDZUMI and Colonel M. ISHIKAWA, who suggested this problem and under whose kind and able direction it was carried out. Acknowledgements are also due to Prof. T. UCHIDA and Dr. H. KONO for their constant encouragement and advice. He is also indebted to Dr. C. WATANABE for his kind advice in compiling this thesis. Moreover, he has to thank Mr. S. KARIYA for his kindness in presenting valuable specimens.

**Key to the Species**

1. Hind leg without calcipala and pedisulcus ..... 2
- Hind leg with distinct calcipala and pedisulcus ..... 3
2. Claws simple ..... *Hellichia kariyai* sp. nov.
- Claws bifid (i. e., with basal tooth) ..... *Astega lanata* sp. nov.
3. Fore tarsi cylindrical, brown; fore tibiae without white patch .....
- ..... *Titanopteryx koidzumii* sp. nov.

1) The studies on which this paper is based were conducted with the support and under the auspices of the "Rikugun Gun-i Gakkō", Tokyo.

- Fore tarsi flattened, black; fore tibiae with white patch ..... 4
- 4. Claws simple ..... 5
- Claws bifid ..... *Odagmia halonensis* sp. nov.
- 5. All femora clear yellow ..... *Simulium ishikawai* sp. nov.
- Femora brownish ..... *Simulium reptans* (LINNÉ)

Genus *Hellichia* ENDERLEIN

*Hellichia* ENDERLEIN, Zool. Anz., LXII, 9/10, p. 203 (1925).

Genotype: *Hellichia latifrons* ENDERLEIN (1925).

1. *Hellichia kariyai*<sup>2)</sup> sp. nov.

♂. Length, 3.2 mm.<sup>3)</sup>; Wing, 3.6 mm.

Frons very small usually, black, obscured by grayish dust; face oblong,

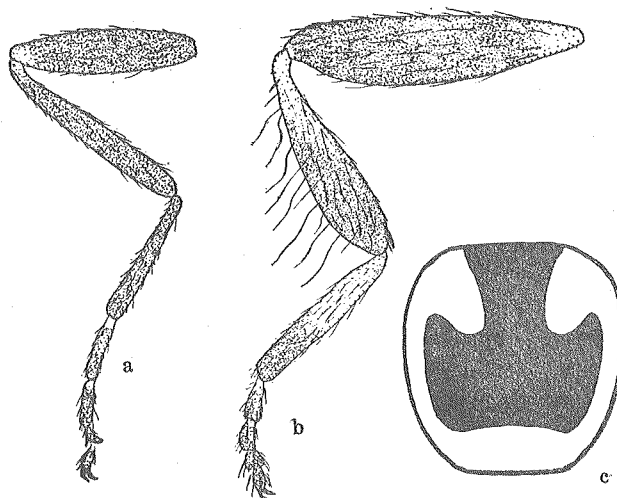


Fig. 1. *Hellichia kariyai* sp. nov. ♂

a. Fore leg; b. Hind leg; c. Pattern on thorax.

covered with dense tomentum and furnished with rather long dark brown hairs. Proboscis and palpi dark brown. Antennae 11-jointed, brown, covered with dense white pubescence. Eyes usually very large, the large facets occupying

2) The species is named in honour of Mr. S. KARIYA.

3) The length, as reported in this paper, is measured on dry specimens.

more than the frontal half. Mesonotum velvety black, with scattered pale yellow hairs, along the anterior margin with a pair of silvery white oval patches, when seen from behind along the posterior margin there is a broad silvery white transverse band, which is invisible from above (Fig. 1, c). Pleura slate-gray, without a patch of soft hairs on the membrane behind the thoracic spiracle. Halteres yellow with the stem brown. Scutellum black, furnished with long white hairs. Abdomen black; basal segments with gray hairs. All femora brown. Fore tibiae and tarsi brown, except the outside of tibiae somewhat yellowish (Fig. 1, a). Middle tibiae and metatarsi yellow on the basal 3/5. Hind tibiae yellow on basal half, rather spindle-shaped. Hind metatarsi yellow on the basal 3/5. Second joint of hind tarsi yellow on basal half, other joints brown (Fig. 1, b). Calcipala absent and pedisulcus indistinct. All claws simple. Relative length of femora, tibiae and tarsi (1st: 2nd: 3rd: 4th: 5th) as follows: fore leg—50: 58: 78 (.8: 1.7: 1.2: 5: 6)<sup>4)</sup>; middle leg—52: 50: 66 (3.2: 1.2: 8: 6: 8); hind leg—70: 62: 82 (4.8: 1.3: 8: 6: 7). Basal cell of wing lacking; radial vein bare between the stem and the base of radial sector.

**Holotype** (♂): Kōshurei (公主嶺), 7/V, 1939, S. KARIYA.

The type-specimen is deposited in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Manchoukuo.

Remarks: This species is somewhat allied to the male of *Stilboplax 5-striatum* SHIRAKI<sup>5)</sup> in the thoracic markings, but is easily distinguished from the latter by the wing-structure.

#### Genus *Astega* ENDERLEIN

*Astega* ENDERLEIN, Arch. Klass. phyl. Ent., I, p. 83, 88 (1930).

**Genotype:** *Astega lapponica* ENDERLEIN (1921).

#### 2. *Astega lanata* sp. nov.

♀. Length, 3 mm.; Wing, 3.6 mm.

Frons and face covered with yellow pubescence; frons narrow, length to width as 9:4. Proboscis and palpi black, obscured by white dust. Antennae 11-jointed, entirely black, clothed with minute white hairs. Mesonotum black, obscured by yellowish dust, and sparsely clothed with golden-yellow hairs, without any stripes. Pleura gray, without a patch of soft hairs on the membrane behind the thoracic spiracle. Scutellum shining black, with pale long

4) "60" = 1 mm.

5) SHIRAKI, Mem. Fac. Agr. Taihoku Imp. Univ., XVI, 1, p. 27 (1935).

hairs on the anterior border. Halteres pale brown with the stem brown. Abdomen dark brown, entirely clothed with fine golden-yellow hairs. Venter somewhat paler. Legs (Fig. 2, a & b) entirely dark brown, clothed with pale yellow hairs. Calcipala absent and pedisulcus indistinct. Relative length of femora, tibiae and tarsi as follows: fore leg—55:55:57 (30:13:8:8:8); middle leg—50:50:74 (38:12:8:8:8); hind leg—82:70:88 (51:18:8:8:8). Claws with large basal tooth. Wing without basal cell; subcosta and base of radius with dark hairs, *Rs* simple, *Cu*<sub>2</sub> with a distinct double bend.

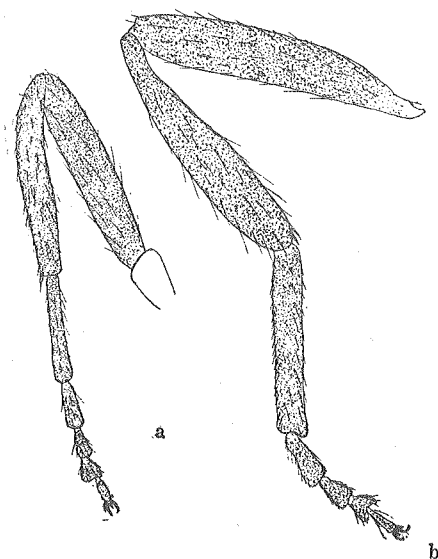


Fig. 2. *Astega lanata* sp. nov. ♀  
a. Fore leg; b. Hind leg.

**Holotype** (♀): Aershshan (阿爾山), 15/VIII, 1940, H. TAKAHASHI.

The type is preserved in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Manchoukuo.

Remarks: This species closely resembles *Astega yerburyi* (EDWARDS)<sup>6)</sup>, but is easily distinguished from the latter in the distinct black longitudinal stripe of the mesonotum. It is also allied to *Cnetha subexcisa* (EDWARDS)<sup>7)</sup>, from which it differs in the structure of second joint of hind tarsi.

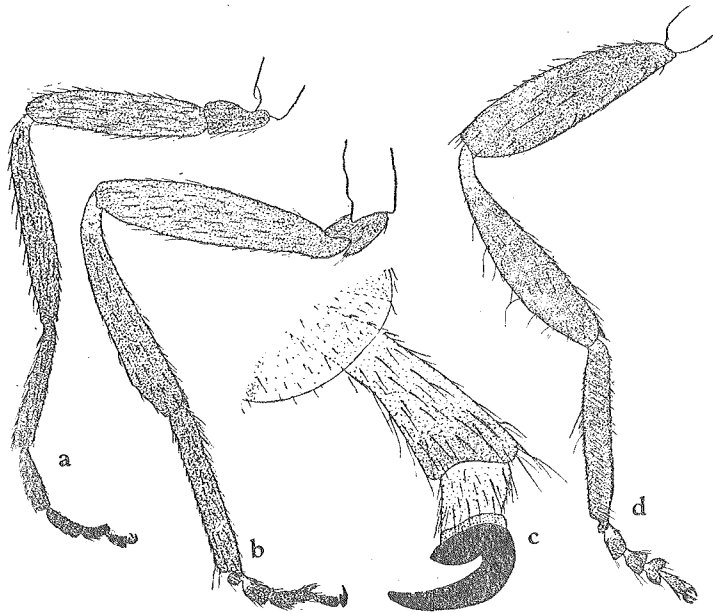
6) EDWARDS, Bull. Ent. Res., XI, p. 245 (1920); ENDERLEIN, Arch. Klass. phyl. Ent., I, p. 88 (1930).

7) EDWARDS, Bull. Ent. Res., VI, p. 41 (1915); ENDERLEIN, Arch. Klass. phyl. Ent., I, p. 92 (1930).

Genus *Titanopteryx* ENDERLEIN*Titanopteryx* ENDERLEIN, Sitz. Ber. Ges. Naturf. Freunde, 1934, p. 360 (1934).Genotype: *Titanopteryx maculata* (MEIGEN) (1804).3. *Titanopteryx koidzumii*<sup>8)</sup> sp. nov.

♀. Length, 1.6 mm.; Wing, 1.9 mm.

Head clothed with whitish pubescence. Frons triangular, with whitish tomentum; face oval with whitish pubescence like the frons. Proboscis and

Fig. 3. *Titanopteryx koidzumii* sp. nov.a. Fore leg of female; b. Hind leg of female;  
c. Hind claw of female; d. Hind leg of male.

palpi dark brown. Antennae 11-jointed, brown, entirely covered with silvery pubescence. Mesonotum silvery whitish with fine yellow pubescence and three black parallel stripes; median stripe of the mesonotum long, narrow, reaching from the anterior border to the scutellum, and two short rather broad stripes situated on either side, extending from about one-fourth of the mesonotum to

8) This species is named in honour of General C. H. KOIDZUMI.

near the scutellum. Scutellum slate-gray, with long yellow hairs along the posterior border. Pleura slate-gray, without a patch of soft hairs on the membrane behind the thoracic spiracle. Halteres white with the stem brown. Abdomen as long as the head and thorax united, slightly narrower than thorax. Dorsum black with a grayish tomentose posterior band on each segment: the last two or three segments with a broad gray band; each tergite with a large elliptical rather brilliant black spot on the middle; 5-8 tergites with golden-yellow hairs scattered on the surface. Venter gray, the basal two stergites brownish and the others slate-gray. Legs entirely brown, with pale yellowish hairs. Fore tarsi not flattened, the tibiae without a white patch (Fig. 3, a). Hind leg with a distinct calcipala and a pedisulcus (Fig. 4, b). Relative length of femora, tibiae and tarsi as follows: fore leg—30:34:43 (20:10:5:4:4); middle leg—32:34:46 (27:6:4:4:5); hind leg—37:37:54 (25:6:4:4:5). Claws with large basal tooth (Fig. 3, c). Wings with no basal cell, veins yellow excepting those of costal area; radial vein not divided into two; medial vein rather straight and forked near the base; sutura media forked just behind the middle. Terminalia (Fig. 4, b, c, d). Eighth sternite with a median chitinised area. Parapoctes large, quadrated, with long bristles. Cerci about half as long as the parapoctes.

♂. Length, 1.5 mm.; Wing, 2.5 mm.

Frons oblong, black. Eyes large, closely contiguous from vertex to just above the antennae, with the large facets occupying the upper  $\frac{2}{3}$ , the dividing line distinct and nearly straight. The large facets about twice as large as the smaller ones in diameter. Antennae 11-jointed, black, when seen from a certain direction slightly grayish white, and densely covered with minute soft hairs. Proboscis and palpi black. Mesonotum velvety black, without any markings or stripes. Humerus somewhat brownish. Pleura slate-gray, without a patch of soft hairs on the membrane behind the thoracic spiracle. Halteres brown with the stem dark brown. Abdomen with velvety black tergites. Venter brown. Hairs of the basal segments golden-yellow. All segments of legs brown. Fore tarsi cylindrical. Hind tibiae somewhat spindle-shaped and hind metatarsi not spindle-shaped (Fig. 3, d). Calcipala present and pedisulcus distinct. All claws with large basal tooth. Relative length of femora, tibiae and tarsi as follows: fore leg—32:35:47 (23:10:7:3:4); middle leg—30:30:33 (16:6:4:3:4); hind leg—35:35:41 (25:6:4:3:4). Terminalia (Fig. 4, a). Coxites short and roundish, with long bristles and as long as  $\frac{1}{4}$  the length of the clasper, the distal end produced into an outer projection. Clasper long and slender, with long bristles, about 4 times as long as their maximum width. Intercoxal piece narrow with fine setae on the anterior part and with one basal strongly chitinised cup-like process. Mesosoma broad, serrated anteriorly, with

an extremely narrow genital opening and with a thumb-like basal process. Medial process strongly chitinised, short, cylindrical, serrated apically.

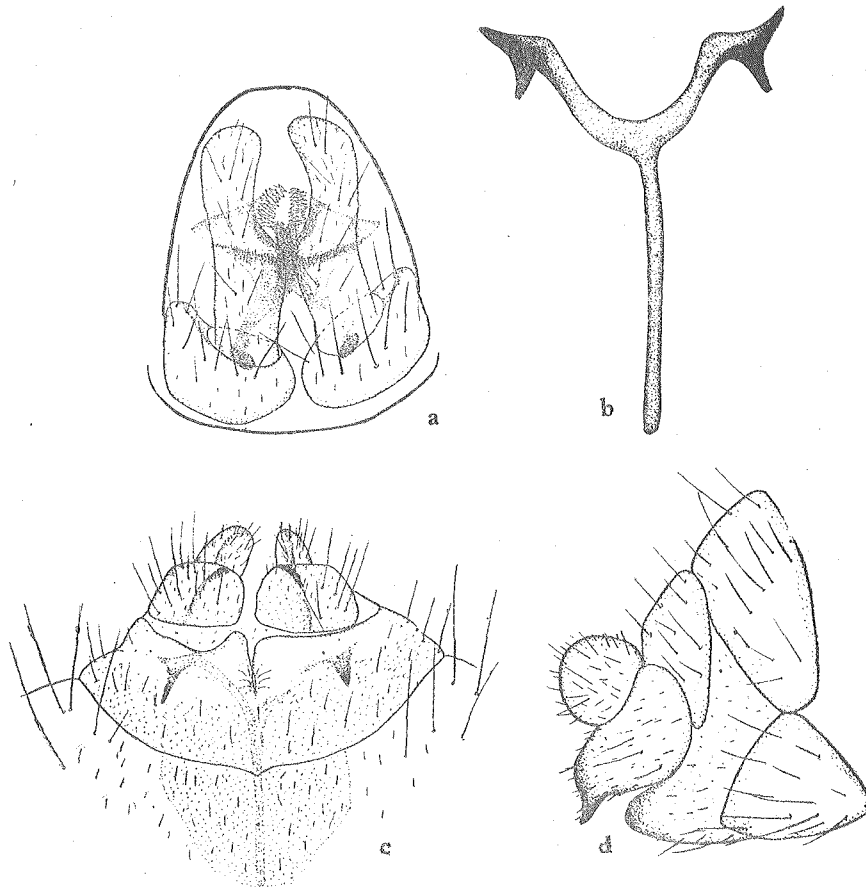


Fig. 4. Terminalia of *Titanopteryx koidzumii* sp. nov.

a. Ventral view of male; b. Genital fork of female;  
c. Ventral view of female; d. Lateral view of female.

**Holotype** (♀) & **Allotype** (♂): Hailar (海拉爾), 3-4/VIII, 1940, H. TAKAHASI.

**Paratype**: Many specimens were collected by H. TAKAHASI from Songo (孫吳, 7-10/VII), Heiho (黑河, 13/VII), Hailar (3-4/VIII), Nanton (南屯, 5/VIII), Nailemuto (奈勒穆圖, 6/VIII), Uerukui (上庫力, 7/VIII), Mandchouri (滿洲里, 13/VIII) and Aerhshan (15/VIII)<sup>9)</sup> in 1940.

9) Only one female specimen.



The type-specimens are deposited in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Manchoukuo.

Remarks: This new species somewhat resembles *Cnetha subexcisa* (EDWARDS), but is easily distinguished from the latter by the small size, and in having a distinct calcpala and a pedisulcus of the 2nd hind tarsal joint.

Genus *Odagmia* ENDERLEIN

*Odagmia* ENDERLEIN, Deutsch. Tier. Woch., 29, p. 199 (1921).

Genotype: *Odagmia ornata* (MEIGEN) (1818).

4. *Odagmia halonensis* sp. nov.

♀. Length, 1.8 mm.; Wing, 2.5 mm.

Frons shiny black, very broad; length to width as 4:3. Proboscis and palpi brown; antennae black, the basal annulation pale brown. Mesonotum

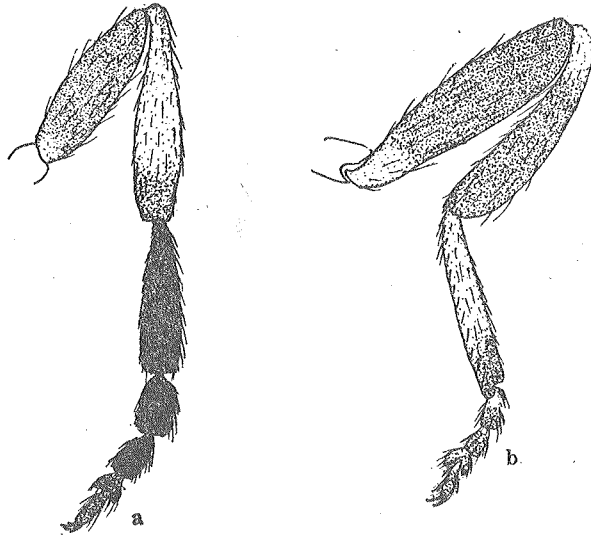


Fig. 5. *Odagmia halonensis* sp. nov. ♀

a. Fore leg; b. Hind leg.

shining black, with the white hairs scattered on the whole surface. Scutellum dark brown. Pleura black, rather shining, without a patch of soft hairs on the membrane behind the thoracic spiracle. Halteres white with the stem brown.

Abdomen mat, black; 6th to 9th tergites shining black, with fine pale brown hairs. All femora and tibiae brown except the fore tibiae which have a silvery white patch; fore tarsi black and flattened (Fig. 5, a). Middle and hind metatarsi yellow, the apical  $\frac{1}{5}$  of hind metatarsus brown (Fig. 5, b). Calcipala present and pedisulcus distinct. All claws with rectangular small tooth. Relative length of femora, tibiae and tarsi as follows: fore leg—30:36:49 (24:10:7:4:4); middle leg—40:30:38 (18:6:4:5:5); hind leg—40:36:51 (30:7:5:4:5). Wings without the basal cell and hairs on the subcosta and base of radius, *Rs* simple.

**Holotype** (♀): Aerhshan, 15/VIII, 1940, H. TAKAHASI.

The type-specimen is preserved in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Habitat: Manchoukuo.

Remarks: One female specimen was collected by the author mixed with two other species, *Simulium reptans* LINNÉ and *Simulium ishikawai* sp. nov.

This species somewhat resembles *Odagnia specularifrons* ENDERLEIN<sup>10)</sup> from which it differs in the shining black mesonotum.

#### Genus *Simulium* LATREILLE

*Simulium* LATREILLE, Hist. Nat. Ins. Crust., III, p. 426 (1802).

**Genotype**: *Simulium reptans* (LINNÉ) (1758).

#### 5. *Simulium ishikawai*<sup>11)</sup> sp. nov.

♀. Length, 2.8 mm.; Wing, 3.5 mm.

Frons black, entirely obscured by white dust, with a few golden-yellow hairs<sup>12)</sup> scattered on the whole surface. Face oval, with silvery white pubescence. Proboscis and palpi dark brown. Antennae 11-jointed, brown, with two basal annulations pale brown, entirely covered with silvery white pubescence. Mesonotum black with an indistinct band of silvery dusting on the anterior border. Mesonotum clothed with golden-yellow hairs on all the surface. Humerus brown. Pleura slate-gray, without a patch of soft hairs on the membrane behind the thoracic spiracle. Scutellum black with pale yellow hairs on the anterior border. Halteres clear yellow with the stem brown. Tergites brown; hairs on the basal segments pale yellow, second segment more or less yellowish, brownish white at the side. Tergites 2-5, with large rectangular shining brown spots; tergites 5-8 shining brown with fine yellowish hairs.

10) ENDERLEIN, Sitz. Ber. Ges. Naturf. Freunde, 1920, p. 217 (1921).

11) This species is named in honour of Colonel M. ISHIKAWA.

12) Some of the specimens do not have golden-yellow hairs, but they may have fallen off.

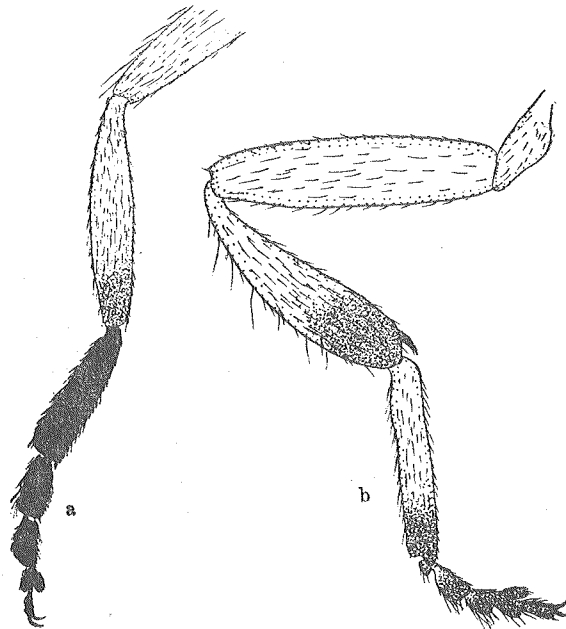


Fig. 6. *Simulium ishikawai* sp. nov. ♀. a. Fore leg; b. Hind leg.

Venter pale brown, the apical segment rather brown. All coxae and femora yellow, fore tibiae yellow with a large white patch on outside, the apical  $\frac{1}{4}$  brown. Fore tarsi flattened (Fig. 6, a). Middle tibiae entirely clear yellow, the basal end somewhat brownish. Middle metatarsi yellow, others brownish.

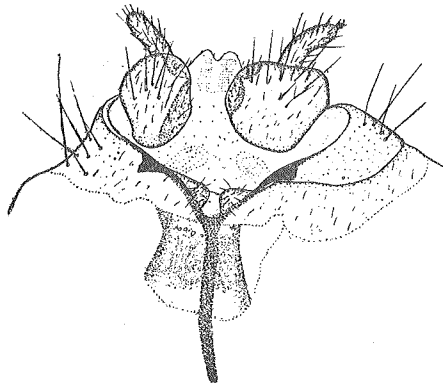


Fig. 7. Female terminalia of *S. ishikawai* sp. nov. in ventral aspect.

Hind tibiae yellow on the basal  $\frac{3}{4}$ , apically brown; metatarsi yellow, somewhat brownish on the basal extreme and the apical  $\frac{1}{3}$ , otherwise brown (Fig. 6, b). Calcipala present and pedisulcus distinct. Relative length of femora, tibiae and tarsi as follows: fore leg—42:47:62 (30:12:10:5:5); middle leg—44:41:45 (22:8:5:5:5); hind leg—54:48:58 (33:9:5:5:6). All claws simple. Wing resembling that of *S. reptans* (LINNÉ). Terminalia (Fig. 7). Eighth sternite without a median chitinised area. Paraproctes large and cerci narrow, strongly chitinised.

**Holotype** (♀): Aerhshan, 15/VIII, 1940, H. TAKAHASI.

**Paratype**: 6 ♀ ♀, the same data.

The type-specimens are deposited in the Entomological Institute of the Hokkaido Imperial University, Sapporo.

Hobitat: Manchoukuo.

Remarks: This species comes near to *Simulium heidenreichi* ENDERLEIN<sup>13)</sup>, but is distinguished from the latter by the golden-yellow pubescence on the mesonotum.

## 6. *Simulium reptans* (LINNÉ)

*Culex reptans* LINNÉ, Syst. Nat., Ed. X, p. 603 (1758).

*Simulium reptans* LATREILLE, Hist. Nat. gen. Crust. Inst., IV, p. 269 (1809); KERTÉSZ, Cat. Dipt., I, p. 290 (1902); EDWARDS, Bull. Ent. Res., VI, pp. 27, 30 (1915); EDWARDS, Bull. Ent. Res., XI, pp. 216, 230 (1920); FRIEDERICHS, Zeitschr. angew. Ent., VIII, pp. 37, 48 (1921); ENDERLEIN, Deutsch. Tier. Woch., XXIX, pp. 199, 200 (1921); ENDERLEIN, Arch. Klass. phyl. Ent., I, p. 95 (1930); ENDERLEIN, Tierwelt Mitteleuropas, VI, Lief. 2, Ins. 3, p. 42 (1936).

♀. Length, 2.4 mm.; Wing, 2.6 mm.

Frons rather broad, shining black, entirely obscured by gray-white dust, and along the eye-margin furnished with yellow pubescence which extends and becomes longer on the vertex and still longer on the occiput. Face oval, with silvery white tomentum. Proboscis and palpi dark brown. Antennae 11-jointed, brown with the basal annulation pale, entirely covered with silvery-white pubescence. Mesonotum dull greenish black with a pair of large patches of silvery dusting on the shoulders, more conspicuous in certain light; whole mesonotum clothed with golden-yellow hairs. Humerus brown. Pleura slate-gray without a patch of soft hairs on the membrane behind the thoracic spiracles. Scutellum black with pale yellow hairs. Halteres white. Tergites dark brown, hairs on basal segments pale yellow; 2nd segment more or less yellowish, silvery white at side; tergites 3-5 dull black, tergites 6-9 shining black, with fine yellowish hairs. Legs with coxae clear yellow; femora almost entirely blackish brown; tibiae yellow, black on the apical  $\frac{1}{4}$ , the usual patch of silvery gray

13) ENDERLEIN, Sitz. Ber. Ges. Naturf. Freunde, 1920, p. 219 (1921).

dusting present; tarsi black, very expanded. Middle leg with coxae and femora black except at the extreme base; tibiae clear yellow on the basal half, black at apex; metatarsus yellow on basal half, others blackish. Hind leg with coxae and femora brownish black, except at the extreme base; tibiae yellow on the basal half, brownish at the apex; metatarsi clear yellow on the basal  $\frac{2}{3}$ , brownish at apex, the other joints blackish. Calcipala present and pedisulcus distinct. Relative length of femora, tibiae and tarsus as follows: fore leg—37:43:58 (28:11:8:5:6); middle leg—37:36:42 (19:7:5:5:6); hind leg—50:44:56 (34:6:5:5:6). All claws simple. Wings lacking basal cell, radial vein bare between the stem and base of radial sector. Eighth sternite with a median chitinised area. Paraproctes large, with long bristles on the anterior surface. Cerci as long as the paraproctes.

Habitat: 1 ♀, Hengtaohotze (黃道河子), 24/VII, 1940, H. TAKAHASI; Aershshan, 5 ♀ ♀, 15/VIII, 1940, H. TAKAHASI.

Gen. Distr.: Manchoukuo; Europa.

This species is new to the fauna of Manchoukuo.

## 摘 要

### 滿洲國産蚋の研究 第一報

滿洲國に於ける重要な問題の一つとして、人體害蟲たる蚋の害の大なる事が屢々傳へられて居るが、從來、同國の蚋に關する研究は全々發表されて居ない。著者は陸軍軍醫學校の指示の下に昭和 15 年夏、同國の北部地區を採集旅行をする事を得たので、茲に報告する次第である。但し本文に於ては、成蟲のみに就いて記載し、幼蟲、蛹に就いては他日報告する。尙一般に蚋の害として傳へられて居るものの中には、ヌカカ (*Ceratopogonidae*) も含まれて居る事を確認し得たが、ヌカカに就いては、他に一文を綴る豫定である。

著者の同定し得た蚋の種類は次の 6 種で、其の内の 1 種はヨーロッパから北ロシアに廣く分布して居るもので、他の五種は新種と認められ、次の通り命名した。

*Hillichia kariyai* sp. nov.

*Astega lanata* sp. nov.

*Titanopteryx koidzumii* sp. nov.

(本新種名を小泉親彦閣下に捧げる)

*Odaemia halonensis* sp. nov.

*Simulium ishikawai* sp. nov.

(本新種名を石川元雄教官に捧げる)

*Simulium reptans* (LINNÉ)

終りに陸軍軍醫學校及び在滿各機關の絶大なる御庇護に對し厚く感謝の意を表す。