THREE MARINE CRANE-FLIES FROM JAPAN[1]

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EIGHTEEN TEXTFIGURES

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The crane-flies discussed herein include two new and one known species collected from Kyushu on the rocky sea-shore between tide-marks by Prof. Dr. Hiroshi Ohshima and Mr. Hiroshi Hori. With this report, the marine series of the Tipulidae has come to contain thirteen species including seven Japanese species.

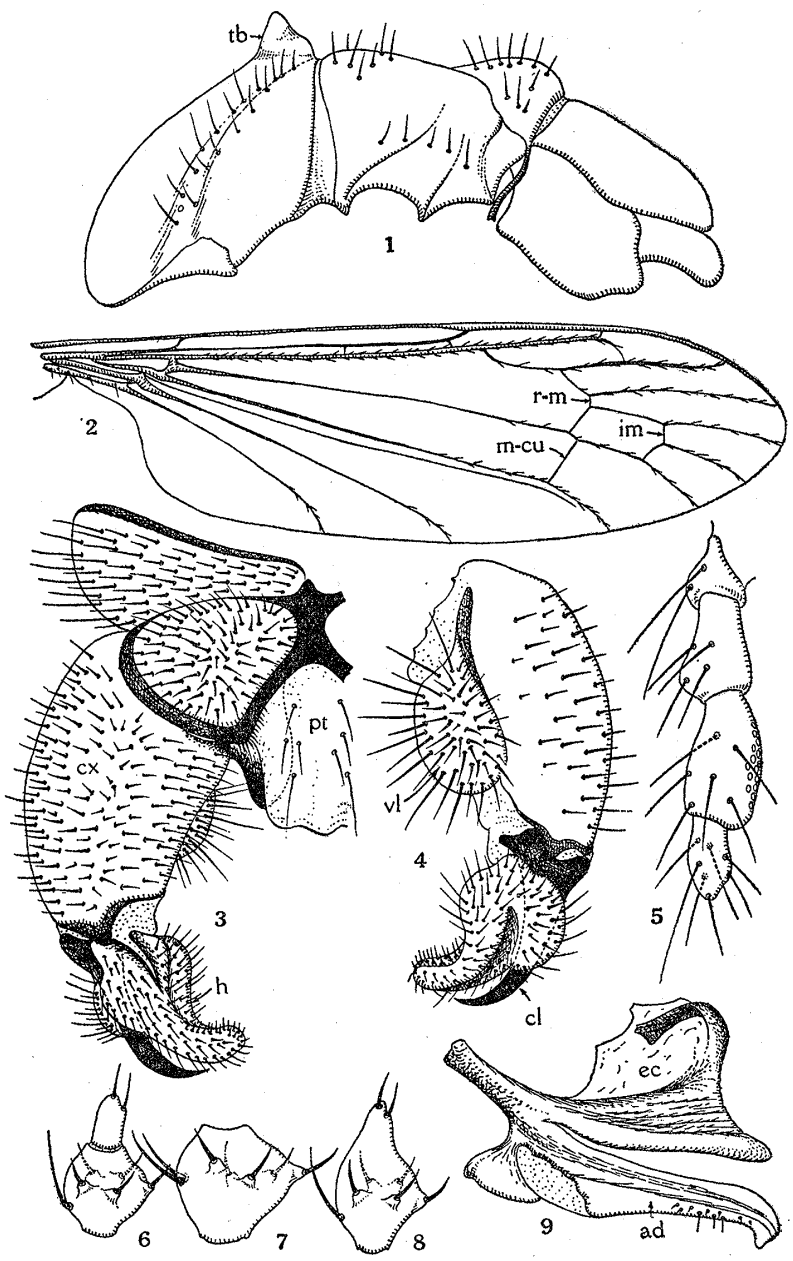
I am greatly indebted to the above mentioned zoologists for their invaluable collections of these remarkable insects. Sincere thanks must be extended to Prof. Dr. Teiso Esaki for his continuous encouragement in my study of the marine insect-fauna of Japan and for his kind permission for investigating these interesting flies which are deposited in the Entomological Laboratory of Kyushu Imperial University. I am also deeply indebted to Prof. Dr. Chukichi Harukawa and Dr. Hachiro Yuasa for their invaluable suggestions in my work and for their kind help in preparation of this report.

Limonia (*Idioglochina*) *medidorsalis* sp. nov.

There have been reported two marine species of the subgenus *Idioglochina* Alexander, viz., *L. tokunagai* Alexander and *L. pacifica* Tokunaga, and the present species represents the third marine species of this subgenus. According to the collector, Mr. H. Hori, this fly was actively flying on the rocky shore between tide-marks during the ebb-tide and it is highly probable that the immature forms will be found to occur on the tidal zone under algæ.

Male.—Body about 4.3–4.4 mm in length in dry specimens; coloration of dry specimens as follows; almost entirely dark brown or brown (immature?), legs and halteres uniformly brown, wings also entirely brown and semihyaline, mesotergum somewhat pruinose and without distinct dorsal vittæ.

[1] Contributions from the Entomological Laboratory, Kyoto Imperial University, No. 59. Papers from the Amakusa Marine Biological Laboratory, No. 47.



Limonia (*Idioglochina*) *medidorsalis* sp. nov. (male)

Fig. 1. Lateral aspect of mesothoracic tergum (*tb*: mid-dorsal tubercle). Fig. 2. Wing (*im*: medial cross-vein; *m-cu*: medio-cubital cross-vein; *r-m*: radio-medial cross-vein). Fig. 3. Dorsal aspect of hypopygium (*cx*: coxite; *h*: ventral style; *pt*; anal tube). Fig. 4. Ventral aspect of hypopygium (*cl*: dorsal style; *vl*: ventral lobe of coxite). Fig. 5. Maxillary palpus. Fig. 6. Two distal segments of 15-segmented antenna. Fig. 7. Intermediate flagellar segment. Fig. 8. Distal segment of 14-segmented antenna. Fig. 9. Lateral aspect of penis (*ad*: aedeagus; *ec*: ectoparamere).

Head with bare, widely separated compound eyes; occipital margin with a small dorsal thickened projection besides odontoideæ; mouth-parts reduced, with short proboscis; maxillary palpi reduced, 4-segmented (12 : 27 : 40 : 24), two ultimate segments being completely fused with each other (fig. 5). Antennæ 14- or 15-segmented, when 15-segmented ultimate very small (fig. 6); scape twice as long as width, with black setæ; pedicel about half as long as scape; intermediate flagellar segments subequal to each other in shape and size, slightly produced ventrad, each provided with five or six ventral and two dorsal setæ (fig. 7).

Thorax uniformly dark brown or brown, not shining but mat, without colored dorsal vittæ, with a characteristic mid-dorsal projection just cephalad of parapsidal groove (fig. 1, *tb*). Protergum scantily setigerous; mesotergum also scantily setigerous as in figure 1; mesonotepisternum with a short seta near by wing basis; mesosternepisternum moderately setigerous at side; mesonotepimeron with several setæ on dorsal margin; metepisternum scantily haired. Legs entirely brown; tibia and two proximal tarsal segments of each leg with ventral and apical strong setæ; third tarsal segment with strong apical setæ, a ventral row of special setæ excepting on basal part; fourth tarsal segment with this ventral setigerous line throughout entire length. Claws each with a small and a large teeth at base; epodium extending at middle of claws, entirely covered with minute hairs. Proportional lengths of legs of holotype as follows: 8 : 5 : 47 : 49 : 22 : 10 : 6.5 : 4 : 5 in fore, 11 : 5 : 61 : 56 : 25 : 12 : 8 : 4 : 5 in middle and 10 : 5 : 65 : 64 : 29 : 14 : 8 : 4.5 : 5 in hind leg (18 units = 1 mm). Halteres uniformly pale brown. Wings (fig. 2) longer than body being 4.9–5.5 mm, without colored stigmata: veins pale brown, setigerous, feebly developed, excepting specially thickened costa and radial veins; Sc_1 ending on costa opposite to or slightly before origin of Rs; Sc_2 present; a supernumerary cross-vein in cell Sc slightly beyond middle; r-m usually short, rarely extremely shortened; first section of M_3 longer than im, usually more or less curved; m-cu usually slightly beyond and sometimes just at medial fork.

Abdomen dark brown or brown, setigerous with small erect setæ; octatergum subdivided into narrow lateral triangular halves; novatergum with a deep V-shaped incision at caudomesal margin, highly thickened at margin, specially setigerous with minute setæ at latero-caudal points; octasternum very large; novasternum atrophied into bare membrane; coxites (*cx*) large, setigerous with small erect setæ,

each with a spherical highly setigerous ventral lobe (*vl*); ventral style (*h*) comparatively small, deeply bilobate: mesal lobe larger, with a longitudinal furrow to receive dorsal style, setigerous with forewardly and backwardly grown setæ; latero-ventral lobe small, also setigerous; dorsal style (*cl*) black, bare, sharply pointed; anal tube (*pt*) large, extending caudad beyond tip of ædeagus, with several long setæ; ædeagus (*ad*) not associated with setigerous novasternum, with minute sensilla on distal half; ectoparameres (*ec*) comparatively large, ending before tip of ædeagus, not furcate or serrulate (figs. 3, 4 and 9).

Female.—Body length 4.9–5.4 mm, coloration similar to male, but usually somewhat paler; wings and legs far shorter than in male. Proportional lengths of segments of legs as follows in allotopotype; 8 : 4 : 36 : 39 : 18 : 7 : 5 : 4 : 4.5 in fore, 10 : 4 : 44 : 42 : 15 : 7 : 5 : 4 : 4.5 in middle, and 9 : 4 : 49 : 44 : 17 : 7 : 5 : 4 : 4.5 in hind leg (18 units = 1 mm); ultimate tarsal segment with a row of special setæ on ventral side; claws sometimes with three basal teeth; wings 4.2–4.3 mm in length. Hypopygium with shining dark brown cerci; octavalvæ also shining, dark brown, broad, not longer than twice the basal widths of paired valvæ taken together (56 : 33). Other structures closely similar to those of male.

Habitat.—Seashore between tide-marks; Kyushu, Japan.

Holotype.—Dry male; Kurose, Tomie, Goto Islands, Nagasaki Prefecture; May 18, 1935.

Allotopotype.—Dry female; May 18, 1935.

Paratypes.—Alcoholic and dry males and female; Tomie and Ohama, Goto Islands; May 18 and 19, 1935.

Type specimens.—Deposited in the Entomological Laboratory, Kyushu Imperial University; collected by Mr. H. Hori.

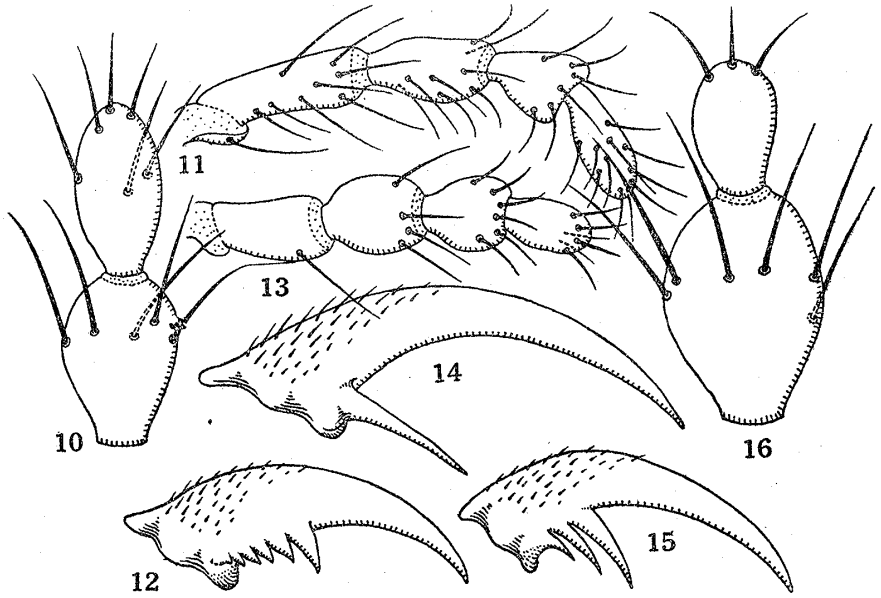
This small marine crane-fly is so highly peculiar that it is almost unnecessary to point out the differences from the other known species in the possession of the characteristic thoracic mid-dorsal tubercle. The distinct sexual dimorphism and reduction of the maxillary palpi in the present species are also very curious. Moreover it may be noteworthy that the flagellar segments of both sexes show an intermediate character between two subgenera, *Dicranomyia* and *Idioglochina*, being slightly produced ventrad. Further biological survey for this species, especially for the immature forms, is most desirable.

Limonia (*Dicranomyia*) *trifilamentosa* Alexander

Imagines.—Alexander, C. P. Philip. Jour. Sci. 49 : 112-113 (1932)

Metamorphosis.—Tokunaga, M. Philip. Jour. Sci. 50 : 327-342 (1933)

This marine crane-fly was originally known from the Pacific coast of the Kii Peninsula. Recently Mr. H. Hori has collected three females from islands off the coast of Kyushu. The records of recent collections are as follows: two females; Kurose, Tomie, Goto Islands, Nagasaki Prefecture; May 18, 1935 and one female; Meshima, Danjo Islands, Nagasaki Prefecture; May 22, 1935.



L. (*D.*) *trifilamentosa* Alexander (figs. 10-12) and
L. (*D.*) *halobia* sp. nov. (figs. 13-15).

Fig. 10. Two distal segments of male antenna.
Fig. 11. Male maxillary palpus. Fig 12. Female claw.
Fig. 13. Female maxillary palpus. Fig. 14. Male claw.
Fig. 15. Female claw. Fig. 16. Two distal segments of female antenna.

Although the descriptions and figures given by Prof. Dr. C. P. Alexander are accurate, more detail is necessary to distinguish it from the following new marine crane-fly and here I intend to supplement Alexander's descriptions after re-examination of the specimens from Kii and Kyushu.

Maxillary palpi (fig. 11) 5-segmented (13 : 47 : 37 : 25 : 35), setigerous with slender setæ; penultimate shorter than ultimate segment, far paler than other segments, distinctly dilated distally; antennæ (fig. 10) with ultimate segments subequal to penultimate. Relative lengths of

segments of legs, excepting two proximal segments, as follows: 66 : 82 : 46 : 13.5 : 7 : 4 : 3 in fore, 82 : 75 : 33 : 13 : 7 : 4 : 3 in middle, 87 : 80 : 35 : 14 : 7.5 : 4 : 3 in hind leg of male and 68 : 76 : 42 : 13 : 6 : 4 : 4 in fore, 83 : 76 : 33 : 13 : 6.3 : 3.8 : 4 in middle, 86 : 83 : 37 : 14 : 7 : 3.5 : 4 in hind leg of female (18 units = 1 mm); third tarsal segments of all legs of both sexes each with a ventral row of special setæ at least on distal half; claws as in figure 12, similar to each sex. In male, octatergum subdivided into lateral narrow halves which are thickened along cephalic margins; novatergum semicircular, being usually not concave at caudomesal margin, with thickened setigerous lateral margins, without special isolated setæ or setal groups; coxites much shortened, each with comparatively slender ventral lobe, with highly setigerous area on mesal side before articulation of styles; dorsal style black, sickle-shaped, slender; ventral style oval in shape, very large, usually far larger than in Alexander's figure, being about twice (1.7–2.1 times) the length of coxite, with a shallow slightly thickened groove to receive dorsal style; rostral prolongation of ventral style setigerous with small but stiff setæ beside two long isolated setæ on mesal side; ectoparamere with a projection which is rather pointed than to be spatulate, strongly curved dorsad and minutely serrulate into two or three teeth at tip; edge of mussel-shaped ectoparamere also minutely serrulate; ædeagus comparatively broad, short. In female cerci about 1.6–1.7 mm in length, longer than twice their basal widths put together (29-31 : 13); octavalvæ about 2–2.1 mm in length, comparatively short, being shorter than twice their basal widths put together (37-38 : 24-27).

The present record of collections made by Mr. H. Hori at Kyushu is the most southerly for this species in Japan.

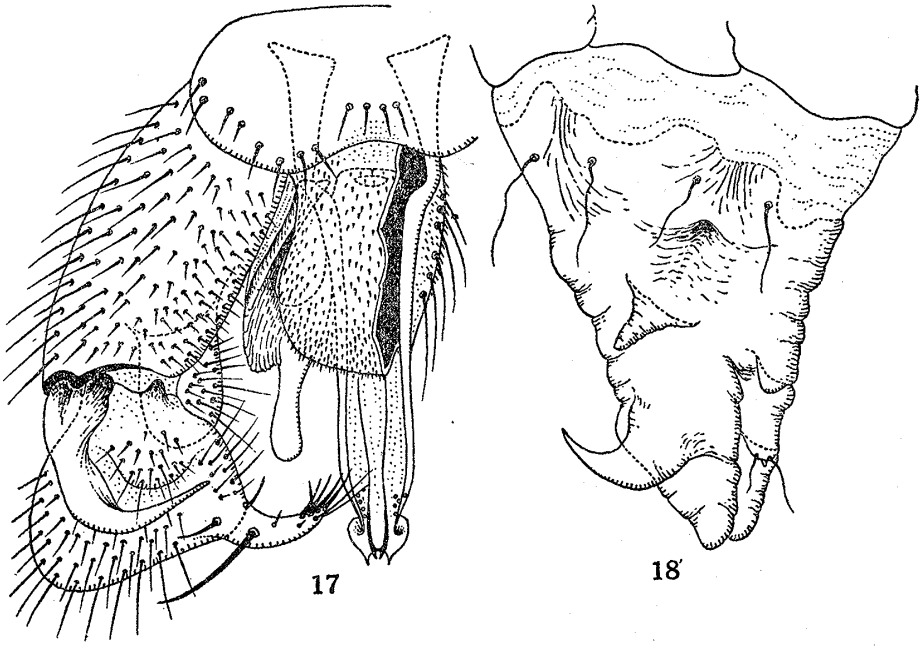
Limonia (*Dicranomyia*) *halobia* sp. nov.

One specimen for each of both sexes and an exuvia of a female pupa of the present species were collected by Prof. Dr. H. Ohshima from rocky sea-shore at Shiroiwa, Tomioka, Amakusa Islands.

Male.—Body length about 4.2 mm, yellowish white in ground color. Head, including mouth-parts and antennæ, uniformly brownish yellow; thorax entirely yellowish white; mesotergum not shining, without colored vittæ; thoracic spiracular areas indistinctly brown; legs with coxæ and trochanters yellowish, other segments uniformly brownish yellow; abdomen also brownish yellow on dorsal and ventral sides, somewhat darker on pleural membranes; hypopygium yellowish brown.

Head with antennæ 14-segmented; ultimate flagellar segment far smaller than penultimate; maxillary palpi short, moniliform, scantily setigerous with small setæ, 5-segmented.

Wings about 4.8 mm in length, pale yellowish hyaline; venation closely similar to that of *L.* (*D.*) *trifilamentosa*, Sc_1 ending slightly before origin of Rs, Sc_2 absent, a supernumerary cross-vein in cell Sc, m-cu slightly before or just at medial fork, im lacking; wing stigma obscure. Halteres brownish yellow. Legs unicolorous, without apical dark rings of femora; proportional lengths of segments of legs, excepting coxæ and trochanters, as follows: 57 : 71 : 43 : 15 : 6.5 : 3 : 3 in fore, 69 : 69 : 31.5 : 14 : 7 : 3.5 : 3 in middle, and 76 : 78 : 33 : 14 : 7 : 3 : 3 in hind leg (18 units = 1 mm); ventral row of special setæ on tarsal segments highly reduced, that of third segment shorter than half of the segment; claws (fig. 14) each with only one long basal tooth.



Limonia (*Dicranomyia*) *halobia* sp. nov.

Fig. 17. Dorsal aspect of male hypopygium. Fig. 18. Lateral aspect of abdominal end of female pupa.

Abdominal octatergum narrow, especially narrowed at meson but not subdivided, not specially thickened at cephalic margin; novatergum shallowly concave at caudal margin, with a median setal group besides lateral marginal setæ, not thickened along lateral margins: hypopygium (fig. 17) with coxites elongate; ventral lobe of coxite comparatively broad; style yellow, stout; ventral style shorter than coxite, somewhat

triangular, its dorsal groove for dorsal style not thickened; rostral projection apically setigerous with stiff setæ, its basal shorter isolated seta atrophied on right side; ædeagus comparatively slender; ectoparamere with ventral lobe smooth, spatulate and slightly up-curved at tip; mussel-shaped lobe minutely serrulate at margin.

Female.—Color as in male; body length about 5.3 mm; relative lengths of two ultimate antennal segments 23 : 12 (fig. 16); maxillary palpi (fig. 13) 5-segmented (10 : 30 : 30 : 24 : 20). Segments of legs showing the following proportional lengths: 52 : 59 : 31 : 10 : 5 : 3 : 3 in fore, 60 : 55 : 23.5 : 11 : 6 : 3 : 3 in middle, and 71 : 64 : 29 : 12.7 : 6 : 3 : 3 in hind leg (18 units = 1 mm); third tarsal segment with a ventral row of special setæ which extends beyond middle of segment; ultimate tarsal segment also provided with this structure; claws (fig. 15) comparatively small, each with three slender basal teeth. Wings about 4.7 mm in length. Structure of abdominal end similar to that of *Limonia* in general; cerci and octavalvæ brownish yellow, somewhat shining; cerci longer than twice their basal widths put together (33 : 14); octavalvæ comparatively slender, somewhat shorter than twice their basal widths put together (43 : 25). Other structures largely as in male.

Pupa (exuvia of female).—Body about 6.1 mm in length; head, thorax, wing sheaths and genital sheaths brownish yellow; abdominal region glassy hyaline, with yellow creeping welts which are five on dorsal side from third to seventh abdominal segments and four on ventral side from fourth to seventh segments; prothoracic respiratory organ about 1 mm in length trifilamentous, median filament longest, lateral subequal in length to each other, their relative lengths being 18 : 20 : 18; genital sheath comparatively elongate, with a pair of strong pre-apical tubercles which are distinctly curved ventrad, a pair of small lateral tubercles. Other structures very closely resembling those of *L. (D.) trifilamentosa.*

Habitat.—Sea-shore between tide-marks; Kyushu, Japan.

Holotype.—Male; Shiroiwa, Tomioka, Amakusa Islands, Kumamoto Prefecture; September 7, 1934.

Allotopotype.—Female; September 7, 1934.

Type specimens.—Alcoholic; deposited in the Entomological Laboratory, Kyushu Imperial University; collected by Prof. Dr. H. Ohshima.

This is most closely allied to *L. (D.) trifilamentosa* in wing venation, male hypopygium and pupal structures, but they are quite different in the details of structures of the antennæ, maxillary palpi, claws of legs, hypopygium, and pupal genital sheaths as already alluded to.

APPENDIX

I take this opportunity to correct a few errors in my previous paper. A few additional notes are also appended. I am greatly indebted to Prof. Dr. C. P. Alexander, who has given many invaluable suggestions in connection with these appended notes.

Limonia (*Idioglochina*) *pacifica* Tokunaga

L. (*I.*) *pacifica* Tokunaga (1935). Annot. Zool. Japon., 15 : 194-196

An insular species of this subgenus, *L.* (*I.*) *kotoshoensis* Alexander (1933) is known from Formosa (Ann. Ent. Soc. Amer., 16 : 57-58). This Formosan species is somewhat similar to *L.* (*I.*) *pacifica* but these two allied species may be easily distinguished from each other by the following differences: In the former species, wings entirely pale brown; *Rs* very short, about two-thirds of first section of R_{4+5}; *m-cu* just beyond medial fork; first medial cell M_2 longer than any of the veins beyond it; abdomen brownish yellow; dorsal dististyles stout, a little shorter than ventral dististyles. In the latter specis, wings distinctly yellow on basal and costal areas; *Rs* very slightly shorter than first section of R_{4+5} (25 : 27); *m-cu* just at or before medial fork; first medial cell M_2 subequal in length to distal section of M_{1+2}; abdomen dark brown, being not yellowish; dorsal dististyles slender, a little longer than ventral dististyles.

Trichocera imanishii (Tokunaga)

Alfredia imanishii Tokunaga (1935). Annot. Zool. Japon., 15 : 198

Although the genus *Alfredia* established by Bezzi is included in the Trichoceridæ by Dr. C. Pierre (Faune de France, 1924, 8 : 138), it may be better to consider this genus as a synonym of *Limnophila* Macquart or *Ischnothrix* Bigot (Tipulidæ). While the present fly, excepting the unique subapterous feature, is provided with the typical characters of the Trichoceridæ especially of the genus *Trichocera* Meigen. The male of the fly, which is unknown yet, is probably with normal wings and until this point is settled it may be best to refer the fly to the genus *Trichocera*.