

INSECTS OF MACQUARIE ISLAND. DIPTERA: TIPULIDAE

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A very satisfactory account of Macquarie Island has been provided by Gressitt (1961: 56, figs. 20, 21), with illustrations, partly in color, showing different sections of the island. This is the southernmost major sub-antarctic island, lying at 54° 37' S. Lat., 158° 34' E. Long. There are no trees or other woody plants, the hillsides being clothed with relatively few species of higher plants, including tussock grass, *Poa*, and a few dominant herbaceous angiosperms, including *Azorella*, *Pleurophyllum*, and the so-called Maori or Macquarie cabbage, *Stilbocarpa polaris*, additional to various ferns and mosses. The center of the island is a plateau attaining an altitude of nearly 500 m. Gressitt, who collected the adults of the single species of crane-fly known from Macquarie, indicated that it was exceedingly numerous and was found flying during the rare spells of good weather or else was found resting on plants in various places, from the coastal strips to the higher levels of the plateau (Gressitt, 1961: 56).

I am considering the fly herein discussed as representing a subspecies of *Erioptera* (*Trimicra*) *pilipes* (Fabricius) and am taking the opportunity to bring up to date information on the general occurrence and synonymy of this crane-fly, undoubtedly the most widespread of any member of the Tipulidae.

Erioptera (*Trimicra*) *pilipes* (Fabricius)

Tipula pilipes Fabricius, 1787, Mantissa Ins. 2: 324.

Trimicra pilipes Osten Sacken, 1869, Mon. Dipt. N. Amer. 4: 167.

Erioptera (*Trimicra*) *pilipes* Edwards, 1938, Soc. Brit. Ent., Trans. 5: 129.

The most generally distributed single species in the family, its range involves all six of the major biotic regions of the earth, as well as many of the more remote oceanic islands in the Pacific including Hawaii, the sub-Antarctic islands of New Zealand, Galapagos and Juan Fernandez, and in the Indian ocean, St. Paul island, at 38° 43' S. Lat., 77° 31' E. Long. It still is very much in question as to how this distribution has been attained. Formerly I suggested that perhaps this might have been brought about, at least in part, through human agencies, such as whaling vessels with the immature stages occurring in discarded ballast, or in some similar manner. However, there is no actual evidence of this and it now seems more probable that much or all of this distribution has been accomplished through natural agencies, including in part, at least, wind dispersal.

In any series of specimens of these flies from virtually any part of this vast area there occurs a surprising range in physical size, hairiness of the legs, degree of intensity of the

wing pattern, and the relative length of *Rs* and course of vein *2nd A*. The largest males have the setae of the legs longest, particularly the slightly dilated ends of the hind femora and the fore and hind tibiae; smaller males and the females have these setae shorter and less conspicuous. This variation, in conjunction with its wide range, has been responsible for producing an unusually extensive synonymy. It now appears that the great majority of the specific names that have been proposed in *Trimicra* are synonyms of *pilipes* but further study with more abundant materials may show that certain of these may represent geographical races or clines. In New Zealand and on some of the sub-Antarctic islands belonging thereto are a few further species that seem to be distinct from *pilipes* and are listed at the conclusion of the synonymical record provided. Such species are distinguished by venation or, in two cases, by a great reduction in the wings to produce a subapterous condition.

Synonymical list: Names representing synonyms of *pilipes* or at most geographical races thereof.

- andalusiaca* (Strobl)—Europe (Spain)
andensis (Alexander)—Ecuador, Peru
annuliplena (Bezzi)—Ethiopia (Eritrea)
anomala (Osten Sacken)—United States
antarctica (Schiner)—St. Paul I., Indian Ocean
apoecila (Philippi)—Chile
brunnipennis (Macquart)—Europe (France)
 ? *capensis* (Macquart)—South Africa
fibriata (Meigen)—Europe
haligena (Wollaston)—Madeira
hirsutipes (Macquart)—Canary Is.; Algeria
hirtipes (Walker)—Australia
inconspicua (Loew)—South Africa
inconstans (Alexander)—New Zealand
lanuginipes (Walker)—South Africa
lateralis (Grimshaw)—Hawaii
macquariensis Alexander, subsp. n., this report—Macquarie I.
marina (Pierre)—Europe (northern France)
microcephala (Thomson)—Australia
obscurata (Blanchard)—Chile
omissa (Lackschewitz), a chirographic name of Wiedemann—Europe
pauliani (Séguy)—Europe
pilipes (Fabricius)—Europe
reciproca (Walker)—Argentina, Uruguay
sancti-paulii (Schiner)—St. Paul I., Indian Ocean
sidneyensis (Schiner)—Australia
strasseni (Enderlein)—St. Paul I., Indian Ocean
trichopus (Philippi)—Chile
umbripennis (Schummel)—Europe

The following species originally were assigned to *Trimicra* but actually fall in other genera and subgenera.

Trimicra angularis Alexander—Western United States—*Erioptera (Symplecta) stictica angularis* (Alexander)

Trimica (Trichotrimicra) hirtipennis Alexander—South Africa—*Ormosia (Trichotrimicra) hirtipennis* (Alexander)

Trimicra minuta Meunier—Baltic Amber (Upper Eocene)—*Gnophomyia minuta* (Meunier)

Trimicra pygmaea Alexander—Eastern United States—*Ormosia (Ormosia) pygmaea* (Alexander)

The following apparently represent valid species and are considered briefly below.

antipodarum Alexander—Antipodes I., 49° S. Lat., 180° E. Long.

brachyptera Alexander—Campbell I., 52° 30' S. Lat., 169° E. Long.

confluens (Alexander)—New Zealand

The New Zealand and sub-Antarctic species may be separated by the following key.

1. Wings reduced, subapterous 2
Fully winged in both sexes 3
2. Halteres reduced to linear strips, much shorter than wings. (Campbell I.)
..... **brachyptera** Alex.
Halteres normal, about 1/4 of wings which are long and narrow, venation entirely distorted. (Antipodes I.)..... **antipodarum** Alex.
3. Cell M_2 open by atrophy of basal section of vein M_3 ; wings unpatterned. (New Zealand) **confluens** (Alex.)
Wings with cell $1st\ M_2$ present; wings restrictedly patterned with brown, especially along the cord. (*pilipes* races)..... 4
4. Femora obscure yellow; wings more evidently patterned with brown, especially at origin of R_s and over the cord; R_s shorter, not more than 1/2 longer than R . (New Zealand) **pilipes inconstans** (Alex.)
Femora outwardly black; wings weakly patterned with darker, not distinctly marked at origin of R_s or $r-m$; R_s longer, more than 1/2 longer than R , in extreme cases (fig. 1) almost 2× as long. (Macquarie I.)..... **pilipes macquariensis** n. subsp.

The immature stages of *Trimicra*.

Tillyard (1920: 25) gave a figure and brief description of the pupa of the Macquarie subspecies. He believed that these might pertain to the genus *Limonia*, subgenus *Dicranomyia*, but the reference to the present fly is certain. A single larva that was found and was believed to pertain to this same species actually is entirely different, being a eucephalous Nematoceran, presumably belonging in the Psychodoidea. The pupae of *Trimicra* discussed by Tillyard were found in the mud of a stagnant pool at the north end of the island on 29 Jan. 1913, by Harold Hamilton.

The immature stages of *Trimicra* elsewhere are well known and I am listing various references where such are considered (Alexander, 1920; Bruch, 1939; Gerbig, 1913; Pierre, 1924; Vaillant, 1953). In order to make the present paper more complete I am providing figures of the larva and pupa of *pilipes* (after Bruch, 1939). The immature stages wherever known are found in mud and wet earth along the margins of ponds or streams. Pierre (1924: 88–89) in northern France at the Strait of Dover had materials that were taken under brackish to nearly marine conditions.

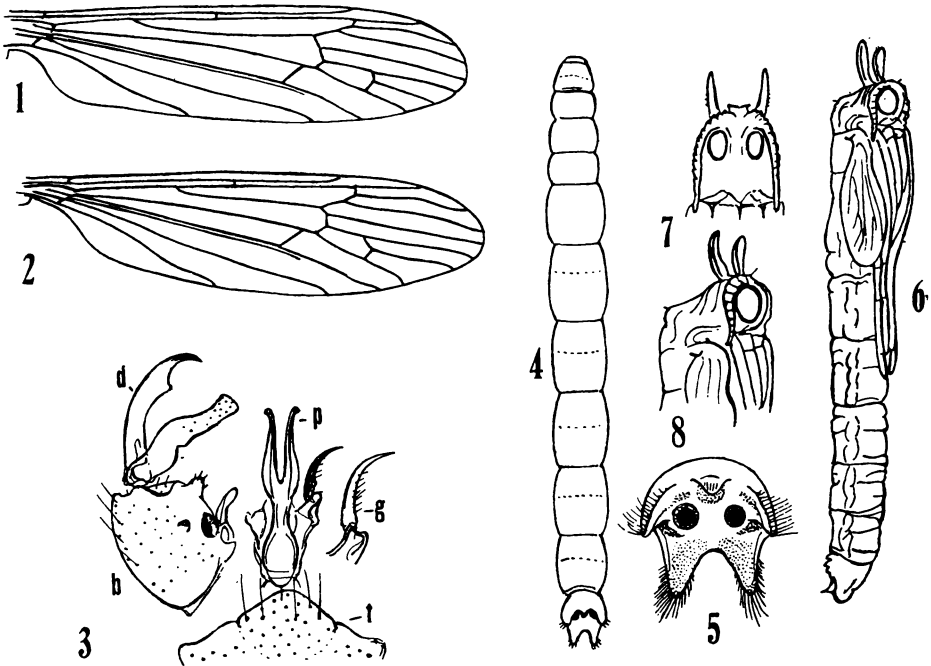
1. *Erioptera (Trimicra) pilipes macquariensis* Alexander, n. subsp.

Male: Length about 5–8 mm; wing 7–9.5.

Female: Length about 6.5–8 mm; wing 8–9.

Rostrum and palpi black. Antenna with scape and pedicel dark brown, flagellum black; flagellar segments strongly produced ventrally, with conspicuous verticils and a short dense white pubescence. Head dark brown, sparsely pruinose, clearer gray in front.

Pronotal scutellum pale brown, darker medially. Mesonotal praescutum with 3 confluent brownish black stripes, lateral borders paler, pseudosutural foveae black; scutal lobes brownish black, posterior angles reddened; scutellum black, reddened on either side at base; mediotergite black, heavily gray pruinose, pleurotergite darkened dorsally, broadly yellow beneath. Pleura brownish black, pruinose, conspicuously variegated with yellow on pteropleurite and more ventrally on sternopleurite and metapleura, meron darkened. Halteres brownish yellow, knobs dark brown. Legs with coxae and trochanters obscure yellow; femora blackened, bases obscure yellow, the dark color more extensive on fore legs where about the outer 2/3 is included; tibiae and tarsi brownish yellow to pale brown. Wings (figs. 1, 2) weakly infuscated, restrictedly patterned with brown, including narrow seams at cord, outer end of cell *1st M*₂, over outer radial veins and along *Cu*; stigmal region slightly more yellowed with either end slightly darkened; veins brown. Venation: *Rs* variable in length,



Figs. 1–8. 1, 2, *Erioptera (Trimicra) pilipes macquariensis* n. subsp., venation; 3, same, ♂ hypopygium; 4, *Erioptera (Trimicra) pilipes* (Fabricius), larva, dorsal aspect; 5, same, dorso-caudal aspect of spiracular disc; 6, same, pupa, lateral aspect; 7, same, pupa, anterior end, ventral aspect; 8, same, pupa, anterior end, lateral aspect. (Figs. 4–8 adapted from Bruch, 1939). Symbols: ♂ hypopygium; *b*, basistyle; *d*, dististyles; *g*, gonapophysis; *p*, phallosome; *t*, tergite 9.

in some cases very long, slightly exceeding $2\times$ length of R ; cell $1st M_2$ closed.

Abdomen black, pleural region more yellowed; hypopygium chiefly dark brown to brownish black. Male hypopygium (fig. 3) with tergite, t , produced medially, this area provided with several elongate setae. Basistyle, b , stout, mesal face with various lobules, as shown. Dististyles, d , terminal, outer style ending in a blackened point, lower margin distinctly angulated; inner style approximately as long and stout, apex obtusely truncate. Phallosome, p , including the relatively narrow lyriform aedeagus, genital apertures terminal, and small slender gonapophyses, g , blackened, concave margin with long setae, as in the species.

Holotype ♂ (BISHOP), Macquarie I., Plateau, 200–400 m, 4–10. XII. 1960, J. L. Gressitt. Allotopotype, ♀. Paratypes (BISHOP, C. S. I. R. O.) several of both sexes, with the types; near Bauer Bay, 4–7. XII. 1960, labelled '*Pleurophyllum*; tussock'; North Head, west side, 4–7. XII. 1960.

APPENDIX

After the foregoing account of occurrence of *Erioptera (Trimicra) pilipes macquariensis* had been submitted for publication, a further important series of this species became available and is discussed briefly, as an appendix to the basic account.

The specimens were collected almost entirely by Mr. Keith Watson while a member of the 1960–61 Australian National Antarctic Research Expeditions (ANARE), a very few of the specimens having been taken by Mr. J. H. Calaby, a member of the expedition.

The abundant series of adults, larvae, and pupae all pertain to this single species and from the wealth of material collected in many parts of the island and throughout the mild season (November 6—April 13), it seems certain that this is the only species of crane-fly to be found on Macquarie Island. I am listing below all of the stations where the fly was taken, with the date of capture. In the more than 80 adult specimens available, the same great range in physical size, hairiness of the legs, and intensity of the wing pattern that was discussed in the preceding section, was found. Further there was noted an unusual number of specimens showing deformities in the wing venation, particularly in the medial field and involving cell $1st M_2$ and the cells beyond. This marked number of abnormal specimens may perhaps be explained by the restriction in area of the available habitat, with consequent inbreeding. Occasional comparable cases of teratological specimens have been recorded in various other species within the family, as, for example, in the Nearctic fauna, *Pedicia (Tricyphona) inconstans* (Osten Sacken) and *Cladura (Cladura) flavoferruginea* (Osten Sacken), but rarely showing the range and degree exhibited in the present instance. It is to be hoped that some student in Australia will take the opportunity to study and discuss this series of abnormal specimens. Likewise, the numerous larvae and pupae that were submitted and which have been returned to Mr. Watson, offer an unusual opportunity to further our knowledge of this subject and should be studied in more detail than has been possible at this time.

The stations represented by adult flies are as follows:

Aerial Cove	—Dec. 29, 1960; March 3, 29, April 13, Nov. 6, 23, 29, 1961
Bauer Bay	—Jan. 4, 1961
East Coast	—Jan. 9, 1961

Gadget Gully	—Dec. 5, 6, 17, 1960; Nov. 25, 1961
Halfmoon Bay	—Jan. 14, 1961
Handspike Point	—Jan. 14, 1961
Hasselborough Bay	—Nov. 9, Dec. 5, 1961; the largest single series of specimens
Langdon Bay	—March 22, 1961
Nuggets Creek	—Nov. 26, 1961
Plateau	—Dec. 6, 1960 (Calaby)
Sandell Bay	—Jan. 8, 1961
Wireless Hill	—Dec. 1, 1961

All of the adult specimens have been treated as paratypes of this race. The great majority of the specimens have been returned to Mr. Watson and will be added to the basic series of Macquarie Island arthropods collected by members of the ANARE. I am greatly indebted to the officers of ANARE and to Mr. Watson for the opportunity to study these specimens and to retain a small proportion of the materials in my personal collection of World Tipulidae.

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