



Title	On some marine shore Dolichopodidae of Taiwan (Diptera)
Author(s)	Takagi, Sadao
Citation	Insecta matsumurana, 29(2), 51-58
Issue Date	1967-04
Doc URL	<a href="https://hdl.handle.net/2115/9746">https://hdl.handle.net/2115/9746</a>
Type	departmental bulletin paper
File Information	29(2)_p51-58.pdf



ON SOME MARINE SHORE DOLICHOPODIDAE  
OF TAIWAN  
(DIPTERA)

By SADAŌ TAKAGI

Entomological Institute, Faculty of Agriculture  
Hokkaido University, Sapporo

In the broadest sense the marine shore Dolichopodidae comprise diverse members of the family inhabiting any site under the direct influence of sea. I will try with some audacity to classify them into the following three groups according to their habitats.

Halobionts.—The halobionts are dwellers exclusively in the inter-tidal zone on marine rocks, and in the strict sense of the word are real marine shore insects. Some main genera to which these insects belong are *Aphrosylus*, *Paraphrosylus*, *Cymatopus*, *Conchopus*, *Acymatopus*, etc. These genera are usually referred into the Aphrosylineae of Becker's subfamilies. The larvae live in the matting of filamentous algae or in the shells of living barnacles on rocks exposed at every ebb but inundated with marine water when the tide is at the full level. The published studies on the life history or early stages of some halobiont-dolichopodids are found in Wheeler (1897), Roubaud (1903), Saunders (1928), Johannsen (1935) and Williams (1939).

Estuarians.—Under this term are included various Dolichopodidae which occur on estuaries, salt marshes, tide pools or other bodies of quiescent water on marine shores. They are not always stenotope halophils, but may be also found on inland marshes, ponds, rain pools, etc. They belong to *Tachytrechus*, *Hydrophorus*, *Thinophilus*, *Machaerium*, *Syntormon* and other genera of various subfamilies. Some of these species are water-skaters in the adult. The life history was studied in some species by Williams (1939), Vaillant (1949) and others.

Xerophils.—The xerophils live on littoral plants of sand dunes in the adult or in both the adult and developing stages, and are also found inland. They belong to *Sciopus*, *Chrysosoma*, *Medetera*, etc. The early stages of *Medetera*, studied by authors, are found in the burrows of bark beetles.

This paper is based on a small collection of Taiwanese marine shore Dolichopodidae made in connection with the Japan-U.S. Co-operative Science Programme in 1965. This collection includes two localities:

Yeh-liu-pi, Tai-pei Hsien. The rocky head of a cape. The bed of the shore is rugged, with tide pools.

A coastal site by the bay Nan-wan, near Heng-chun, Ping-tung Hsien. A sand dune shore, with a large body of quiescent water on the mouth of a stream.

The main part of the collection, including the holotype of a new species described hereinafter, is deposited in the National Science Museum, Tokyo.

### Halobionts

In his essay on the halophilous insects of Taiwan Takahashi (1941) stated that he found 2 or 3 species of Dolichopodidae on inter-tidal rocks at Tan-shui and Ta-li, but he did not describe them. In the present collection is found the following single species.

***Conchopus taiwanensis*, n. sp.**

Referable to the *rectus*-group, that is with the proboscis not enormously prolonged below, and with tiny setae below the wing-roots in front of the posterior spiracles. Sixth abdominal sternite of the male terminating in an elongate process, which is called pedunculate process, but the other sternites lacking any accessory process.

♂. Length, 3.5–3.9 mm.; of the wings, 3.8–4.0 mm. Head little specific, being of the normal form of the group. Proboscis about half as long as the eye-height. Palpi with setae mostly along the margin. Upper orbital cilia of the occiput descending about a half eye-height. Third antennal segment  $\times 1.5$  as long as deep; arista about twice as long as the antennal segments united. Thorax with a black marking characteristic of the genus on the mesonotum, the median band of the marking not divided into a pair of stripes and the lateral bands not emarginate just laterally to the attenuated presutural prongs. Acrostichal setae in a rudimentary biserial row of varying length but not attaining the suture; posterior notopleural much smaller than the anterior. Scutellum with the lateral marginal setae much smaller than the mesals. Prothoracic setae 5–8 in number; mesothoracics about 5–6 in a short, oblique, double row; 1–2 tiny setae below the wing-root. Wing-venation as in *borealis*, *sikokianus* and *puclius*, the 4th longitudinal vein being somewhat thickened except for the base and the apical half. Fore coxae scattered with hairy setae on the anterior surface, the setae short except for some anterolaterals towards the base. Hind coxae with 1 or 2 setae below the outer bristle. Fore femora produced below into a small tubercle at apical  $1/5$ , with hairy setae below little longer towards the base. Middle femora little bent backwards, with 4–6 prominent anterior bristles beyond the middle. Hind femora gently curved backwards, with prominent anterodorsal bristles beyond the middle, and with antero- and postero-ventral setae rather elongate and hairy. Fore tibiae a little longer than the fore femora (45 : 38), with elongate and erect anteroventral setae in an outstanding row beyond the middle, and with antero- and posterodorsal bristles few (2 or more in number) and often indistinct; apex of the tibiae not expanded, but clothed with a thick mass of setae, on the anterior surface. Middle tibiae as long as the middle femora (58 : 62; 58 : 59), with 2 posterodorsal bristles distinct, and with 2 smaller anterodorsals. Hind tibiae a little shorter than the hind femora (60 : 70), with antero- and posterodorsal bristles few (2 or 3 in number) but more or less distinct. Fore tarsi with the basal lobe of the 1st segment small, rounded, shining dark brown on the anterior surface, margined with black, and fringed with a comb of setae on the posterior side; 2nd segment twice as long as the 1st (21 : 10), with 2 or 3 (or rarely 4) prominent, erect, subbasal, anterodorsal bristles, the basalmost bristle being the longest; 3rd segment as long as 1st (11 : 10). Middle tarsi with the 1st segment a little longer than the 2nd and 3rd united (32 : 16 : 10; 32 : 18 : 11). Hind tarsi with the basal 3 segments as 25 : 53 : 14 in length. Fourth sternite of the abdomen with a pair of a little thickened and elongate setae medially towards the base, and with another pair of similar setae at the posterolateral corners.

Fifth sternite with strong setae in a pair of clusters mesally towards the base, and with a pair of quite prominent setae at the posterolateral corners. Pedunculate process of the 6th sternite with the terminal vesicular enlargement gently lobed out ventrally. Outer lamellae of the genitalia well expanded apically. Ventral lobes (lobi ventrales) pediform. Inner lamellae bilobed as in the other species of the *rectus*-group, each lobe being not much elongated.

♀. Length, 3.7-3.9 mm.; of the wings, 4.3-4.5 mm. Face wider than the ocellar tubercle at the narrowest part (8:6); proboscis  $2/3$  as long as the eye-height. Antennae as in the male. Mesothoracic setae 5-8 in number, rather hairy in a double horizontal row. Wing-venation not modified, the apical section of the 5th longitudinal vein twice as long as the posterior cross-vein, which is slightly convex outwards. Fore legs with abundant, rather bristly setae over the anterior surface of the coxae, and with antero- and posterodorsal and posteroventral bristles few and distinct on the tibiae, otherwise with nothing particular. Middle femora slightly curved backwards, with prominent anterior bristles beyond the middle. Hind femora gently curved backwards, or rather sinuate in the dorsal view, with more or less distinct anterodorsal bristles beyond the middle. Fore tibiae as long as the fore femora (41:41). Middle tibiae a little shorter than the middle femora (57:61), with 2 antero- and 2 posterodorsal bristles distinct; antero- and posteroventrals less distinct, variable in number, but usually few. Hind tibiae a little shorter than the hind femora (60:69; 57:70), their bristles are practically as in the middle tibiae. Basal 3 tarsal segments as follows in length: 17:15:10 in the fore legs, 30:16:9 in the middle legs and 25:22:12 in the hind legs.

Specimens examined: 16 ♂♂ and 12 ♀♀ (holo- and paratypes), Yeh-liu-pi, 30-III-1965, S. Miyamoto and S. Takagi leg.

This species comes closest to *Conchopus pudicus* Takagi in the size of the body, the wing-venation, the setae of the legs, the genitalia and abdominal sternites of the male, etc. It is not difficult, however, to distinguish the males of the two. The present new species is a little larger, and the setae of the legs tend to be stronger. The 2nd tarsal segment of the fore legs bears 2 or more erect anterodorsal bristles in *taivanensis*, whereas a single bristle in *pudicus*. The median band of the mesonotal black marking is divided into a pair of stripes by a slender line in *pudicus*, but not in *taivanensis*. The tibiae are much longer than the femora in the fore legs in *pudicus* (51:35), whereas less in *taivanensis*. The 3rd antennal segment is about 1.5 times as long as deep in *taivanensis*, whereas twice in the other. The ventral lobes of the genitalia are pediform in the new species, but little so in *pudicus*. It is rather difficult to distinguish the females: except for the differences in the body size and the 3rd antennal segment, the new species may be distinguishable from *pudicus* by the posterior cross-vein of the wings gently convex outwards.

### Estuarians

Some species described or recorded by Becker (1922) from Taiwan are estuarians, belonging to *Tachytrechus*, *Hydrophorus* and *Thinophilus*. Four species of these genera are found in the present collection as given below.

#### *Tachytrechus picticornis* Bigot

Bigot, Ann. Soc. Ent. Fr. (6) 10: 293, 1890 [*Neurigona*]; Becker, Mt. Mus. Berlin 2: 63, 90,

1903 [*salinarius*]; Parent, *Encycl. Ent. Dipt.* 1: 59, 1924 [*salinarius*].

♂. Length, about 5.5 mm.; of the wings, about 4.5 mm. Head somewhat broader than high. Frons metallic green, with grayish golden pollen; face covered with thick grayish golden pollen, a little narrower than the ocellar tubercle across its narrowest part. Occiput metallic green, with thin grayish pollen; orbital cilia white on the lower 2/3 of the eye-height. Antennae brownish yellow on the basal 2 segments, black on the 3rd; 1st segment about twice as long as the 2nd; 3rd segment as long as deep, rather square in the lateral view, with the apex truncated. Mesonotum coppery green, dusted with quite thin pollen. Pleura covered with gray pollen, well tinged with green. Prothorax with 2 or 3 black setae above the prothoracic bristle, and with white, quite fine, delicate setae in 2 groups. Wings slightly tinged with gray. Costa much thickened basally to the tip of the 1st longitudinal vein. Calypters with the cilia black. Halteres yellow. Coxae concolorous with the pleura; fore coxae with a transverse row of bristles basally on the anterior surface. Femora brownish yellow; hind femora with 3 antero-dorsal bristles on the apical 2/5 and 1 anterior subapical. Tibiae brownish yellow, distinctly infuscated apically in the middle and hind legs; fore tibiae with 3 antero- and 2 posterodorsal, 2 or 3 posteroventral and small preapical bristles; middle tibiae with 1 dorsal bristle at the basal 1/3, at least 4 antero- and 3 posterodorsals distinct, many antero- and posteroventrals on the whole length, and 5 preapicals; hind tibiae with 5 antero- and 6 posterodorsal bristles, 1 dorsal subapical, 3 preapicals and some less developed ventrals. Basal 3 tarsal segments as follows in length: 16:7:5 in the fore legs; 28:19:10 in the middle legs; and 25:25:16 in the hind legs; 1st segment with 1 ventral bristle basally in the middle and hind tarsi. Abdomen dark green, with coppery reflections, and with silvery white pollen in some lights. Hypopygium black. Outer lamellae black, oval in outline, with the cilia black. Inner genital processes as follows (terms after Buchmann): lamellae laterales broad, with the apex roundish and hairy; lamellae mediales narrowing towards the apex, ending in 2 small sharp spines, with an eminent subapical seta on the mesal side; lobi ventrales simple in shape, small, with 2, apical and subapical, setae; appendix dorsalis expanded apically into 2 lobes. Left sheath of the intromittent organ with 2, apical and subapical, spinous processes.

♀. Length, 5.0-5.7 mm.; of the wings, 4.5-4.7 mm. Face as broad as the ocellar tubercle. Wings with the costa slightly thickened basally to the tip of the 1st longitudinal vein. Middle tibiae with antero- and posteroventral bristles fewer (3 or 4 antero- and 4 or 5 posteroventrals) but stronger than in the male. Hind tibiae without a dorsal subapical. Basal 3 tarsal segments as follows in length: 16:7:6 in the fore legs; 27:13:9 in the middle legs; and 24:21:15 in the hind legs.

Specimens examined: 1 ♂, Yeh-liu-pi, 30-III-1965, S. Takagi leg.; 14 ♂♂ and 14 ♀♀, Nan-wan, 4-IV-1965, R. Kano and S. Takagi leg.

This species occurs widely in southern Asia including Pacific islands (New Caledonia, etc.) as west as Egypt. It was recorded by Becker (1922) from Taiwan on the basis of Sauter's collection. Some specimens collected in southern Ryukyu (Isigaki; Miyako) by Dr. I. Miyagi are also at hand.

Since the genital composition of the male agrees with certain Dolichopodines studied by Buchmann (1961), although none species of the genus *Tachytrechus* was included in his work, it would be tedious to give here explanation on it.

***Tachytrechus genualis* Loew**

Loew, Zs. D. Ges. Naturwiss. 10: 102, 71, 1857; Stackelberg, Flieg. Palaeark. Reg. 29: 218 1941.

♀. Length, 5.5 mm.; of the wings, 5.3 mm. Head broader than high, broadest just below the antennae, covered with white pollen on the frons, face and occiput; face as broad as the ocellar tubercle below the antennae; frons and occiput with green in some lights. Orbital cilia of the occiput pale yellow on the lower 5/6 of the eye-height. Antennae wholly black; 1st segment about twice as long as the 2nd, the 3rd apparently shorter than deep, triangular in the lateral view. Mesonotum blackish, tinged with green, with brownish gray pollen. Pleura blackish, slightly tinged with green, covered by grayish pollen; prothorax with 2 groups of hairy black setae. Wings tinged with gray; costa a little thickened basally to the tip of the 1st longitudinal vein. Calypters reddish yellow, the cilia black. Halteres reddish yellow. Coxae concolorous with the pleura; fore coxae with a transverse row of strong bristles basally on the anterior surface. Femora dark green, with thin pollen; middle and hind femora with the apex brownish; hind femora with 4 anterodorsal bristles beyond the middle (the specimen at hand has 8 anterodorsal bristles on the right hind femur). Fore tibiae blackish, with the base brownish, and with white pollen, the middle and hind tibiae brownish, darkened towards the apex; fore tibiae with 3 anterodorsal, 4 dorsal and 2 posteroventral bristles; middle tibiae with 1 dorsal basally to the middle, 5 antero- and 3 posterodorsals, 1 or 2 antero- and 4 posteroventrals and 5 preapicals; hind tibiae with 6 antero- and 7 posterodorsal, 4 anteroventral and 3 preapical bristles. Basal 3 tarsal segments as follows in length: 17:5:5 in the fore legs; 31:12:9 in the middle legs; and 23:21:15 in the hind legs. Abdomen dark green, with silvery white pollen.

Specimens examined: 1♀, Yeh-liu-pi, 30-III-1965, S. Takagi leg.

This species occurs widely in central Europe. It was recorded by Becker (1922) from Taiwan.

***Hydrophorus praecox* Lehmann**

Lehmann, Indic. Schol. Hamb.: 42, 1822 [*Dolichopus*]; Frey, Acta Soc. Fauna Flora Fenn. 40: 60, 1915; Parent, Faune de France, Dolichopodidae: 286, 1938.

♂. Length, 2.9-3.3 mm.; of the wings, 4.2-4.5 mm. Head densely covered with coarse silvery white pollen; frons brownish black in the ground colour, at times with a green tinge; face nearly twice as broad as the ocellar tubercle below the antennae, gently broadened below. Cheeks distinct in the shape of a deltoid. Palpi covered with small white hairs. Black orbital cilia of the occiput descending the upper 1/3 of the eye-height; beard white, abundant. Antennae velvety dark brown, or practically black, in whole. Mesonotum dark brown, with a green tinge in some lights, and with thin grayish pollen; dorsocentral setae 7-10 in number; scutellum with 4 marginal setae; pleura gray owing to white pollen, prothorax with a black bristle and many fine white hairs. Wings tinged with gray, the veins dark brown except for the 1st longitudinal vein and the basal half of the costa brown; 3rd longitudinal vein slightly sinuate apically; posterior cross-vein slightly convex outwards. Halteres yellow. Legs black; coxae with white pollen, with small white hairs, the fore coxae with black bristles on the antero-lateral angle and on the mesal side towards the base (the mesal side is not visible in situ). Femora and tibiae tinged with metallic green; fore femora deepest, 1/4 as deep as long, at the basal 1/5, with a row of black strong bristles below ascending on the

apical  $2/3$  onto the anteroventral side, these bristles being mostly about  $1/4$  as long as the depth of the segment. Fore tibiae  $4/5$  as long as the femora, with a series of black bristles below, the apex slightly produced below, this apical prominence terminating in a strong black bristle. Abdomen gray owing to white pollen, tinged with green, with coppery reflections; with white hairs. Fifth sternite with a pair of subapical processes, which are depressed, curved mesoposteriorly and scaly. Outer lamellae short. Ventral lobes of the 9th segment (lobi ventrales) not much produced. Sheath of the intromittent organ or the anteriormost genital process beaked apically.

♀. Length, 3.2–3.5 mm.; of the wings, 4.4–5.0 mm. Face a little more than twice as broad as the ocellar tubercle below the antennae. Fore femora with a double row of black bristles below on the whole length.

Specimens examined: 3 ♂♂ and 1 ♀, Yeh-liu-pi, 30-III-1965, S. Takagi leg.; 16 ♂♂ and 25 ♀♀, Nan-wan, 4-IV-1965, S. Takagi leg.

This species occurs widely over the world, and was recorded by Becker (1922) from Taiwan on the basis of a female specimen collected by Sauter. Many specimens of this species collected in Japan (Hokkaido; Sikoku) are also at hand.

The male genitalia were studied by Frey (1915) in 17 species, from Finland, and by Hardy (1964) in 2 other species, from Hawaii, of *Hydrophorus*. All these species are quite uniform in the composition of the genitalia. On the basis of the present study on *praecox* the abdominal composition of the male of generic value should be briefly given below. The abdomen has 5 visible segments, with the succeeding telescoped in the 5th. The 5th sternite is much reduced in size in comparison with the preceding segments and broadly membranous medially, with a pair of depressed processes within the apical margin. These processes are similar in appearance to the "auriform process" of the 5th sternite in certain species of *Conchopus*, but are paired. The 6th segment is represented by a comparatively well-developed tergite, but the 7th is much reduced to a quite narrow dorsal sclerite and the 8th to a hairy, rounded tergite, which is narrowed into a slender sclerite on the left side of the body. The 9th segment is not developed to form a heavy genital capsul, but reduced to a ring which is expanded in a deltoid on each lateral side, producing into ventral lobes or lobi ventrales. The remains of the genital processes are the outer lamellae, intromittent organ and sheath of the intromittent organ. The last is the anteriormost, being located at the base of the hypopygium. It appears to be not articulated with the hypopygium, but to be an extension from the latter. It is invaginated on its posterior base, sheathing there the intromittent organ.

#### *Thinophilus* sp.

Specimens examined: 1 ♀, Nan-wan, 4-IV-1965, S. Takagi.

Since the female specimen at hand is not in good condition, it is not easy to make a satisfactory identification of it.

#### Xerophils

Becker (1922) described or recorded some species of *Chrysosoma* from Taiwan, of which the following species is found in the present collection and is evidently a dweller on marine shore sand dunes.

*Chrysosoma leucopogon* Wiedemann

Wiedemann, *Analecta Entomol.*: 40, 69, 1824 [*Dolichopus*]; Becker, *Capita Zoologica* 1 (4): 168 1922.

♂. Length, 5.9 mm.; of the wings, 6.0 mm. Frons and face shining metallic green, the latter broad, with thin grayish white pollen. Vertex with a tuft of hairs on each side on the orbit, the hairs being white, delicate and abruptly bent outwards. Palpi brownish yellow, with 2 black setae and many white hairs. Beard white. Antennae black, the 2nd segment with a quite prominent ventral bristle and a shorter dorsal bristle, the 3rd conical, about twice as long as deep. Mesonotum shining metallic green, with 3 pairs of acrostichal and posterior 2 pairs of dorsocentral setae well developed. Scutellum with 2 pairs of marginal bristles, the outer pair somewhat smaller. Pleura green, tinged with coppery reflections and covered by grayish white pollen. Wings hyaline, tinged with gray; posterior cross-vein sinuate. Calypters white, with the apex black, the cilia white. Halteres yellow. Coxae black, with white hairs; fore coxae with abundant hairs over the anterior surface, and with 3 white, rather bristly setae on the apex. Femora black, the apices of the fore and middle femora yellow; all with abundant, white, delicate hairs below; fore femora with 4-6 white long bristles below, the bristle which comes in 2nd from the base is the longest and nearly 1/2 as long as the segment. Fore tibiae yellow, with 4 black anterodorsal bristles. Middle tibiae yellow except for the apex black, with 2, subbasal and middle, anterodorsal bristles. Hind tibiae gently but distinctly dilated dorsoventrally near the base, yellow except for the subbasal dilation and a broad apical area black, with a dorsal bristle at the apical 1/4, the subbasal dilation being excavated on the posterior side. Fore tarsi yellow on the 1st segment, black on the rest, the 1st segment as long as the fore tibiae (29 : 32), with 2 or 3 small anterodorsal bristles. Middle tarsi: 1st segment as long as the middle tibiae (50 : 52), yellow, but broadly white subapically and black apically; 2nd and 3rd segments black; 4th white, fringed above with white hairs on the whole length. Hind tarsi wholly black, the 1st segment shorter than the hind tibiae (45 : 65). Abdomen shining metallic green, with abundant, long, white hairs below, and with shorter white hairs on the basal tergite and on the sides of the succeeding 2 segments. Hypopygium dark brown, practically black, with white delicate hairs on the 8th abdominal segment dorsally. Outer lamellae of the genitalia bifurcate beyond the middle, fringed with white hairs. Intromittent organ terminating in a pair of small, sharp spines.

♀. Length, 5.3 mm.; of the wings, 5.0 mm. Fore coxae yellow apically, with pale yellow bristly apical setae. Trochanters black. Femora yellow, the base of the middle femora and the base and apex of the hind femora black; all with white hairs below; fore femora with eminent bristles below as in the male, but these bristles are pale yellow. Tibiae yellow, the apex of the middle tibiae and the apical half of the hind tibiae black; all with well-developed bristles; fore tibiae with 3 anterodorsal bristles, and with 1 ventral beyond the middle; middle tibiae with 2 antero- and 2 posterodorsal and 3 ventral bristles; hind tibiae with 2 anterodorsal bristles, and with 1 dorsal towards the apex. Fore and middle tarsi yellow except for a broad apical area black, the hind tarsi wholly black; fore tarsi with 2 anterodorsal bristles on the 1st segment, which is a little shorter than the fore tibiae (21 : 28); middle legs with tibia and 1st tarsal segment as 30 : 39 in length, and the hind legs as 24 : 55.

Specimens examined: 1♂ and 1♀, Nan-wan, 4-IV-1965, S. Takagi leg.

This species is widely distributed in southern Asia, Australia, Africa and Mauritius. It was recorded by Becker (1922) from Taiwan on the basis of Sauter's collection.

The male genitalia appear to be identical in composition with those of the *Sciopus*-species studied by Buchmann (1961).

### Acknowledgment

Acknowledgement is made to Prof. C. Watanabe for his kindness in reading this manuscript, and to Dr. S. Asahina for giving me the opportunity to study the present collection.

### Literature

- Ardö, P. Studies in the marine shore dune ecosystem, with special reference to the Dipterous fauna. Opus. Ent. Suppl. 14, 255 pp., 1957.
- Becker, Th. Dipterologische Studien—Dolichopodidae der indo-australischen Region, 247 pp., 19 pls., 1922.
- Buchmann, W. Die Genitalanhänge mitteleuropäischer Dolichopodiden, 51 pp., 13 pls., 1961.
- Frey, R. Zur Kenntnis der Dipterenfauna Finlands III, Dolichopodidae. Acta Soc. Fauna Flora Fenn. 40, 1-80 pp., 3 pls., 1915.
- Hardy, E. Insects of Hawaii 11—Diptera: Brachycera, 458 pp., 1964.
- Johannsen, O. A. Aquatic Diptera II. Cornell Univ. Agr. Exp. Sta. Memoir 177, 62 pp., 12 pls., 1935.
- Roubaud, M. Sur des larves marines de Dolichopodes attribuées au genre *Aphrosylus* (Wlkr.). Bull. Mus. Nat. Hist. Nat. 9, 338-340 pp., 1903.
- Saunders, L. G. Some marine insects of the Pacific coast of Canada. Ann. Ent. Soc. Amer. 31, 521-545 pp., 1928.
- Takagi, S. A contribution to the knowledge of the marine shore Dolichopodidae of Japan. Ins. Mats. 27, 49-84 pp., 26 pls., 1965.
- Takahashi, R. [Marine and marine shore insects of Taiwan]. Kwagaku no Taiwan 9, 1-8 pp., 1941 (in Japanese).
- Vaillant, F. Les premiers stades de *Tachytrechus notatus* Stann. et de *Syntormon zelleri* Lw. (Dolichopodidae). Bull. Soc. Zool. Fr. 74, 122-126 pp., 1949.
- Wheeler, W. M. A genus of maritime Dolichopodidae new to America. Proc. Cal. Acad. Sci. Ser. 3, 1, 145-152 pp., 1897.
- Williams, F. X. Biological studies in Hawaiian water-loving insects III B. Proc. Hawai. Ent. Soc. 10, 281-315 pp., 1939.

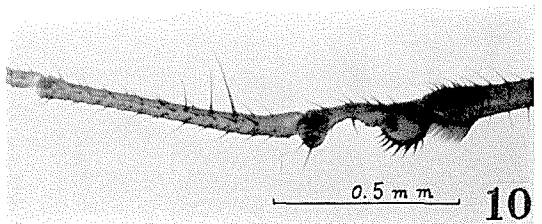
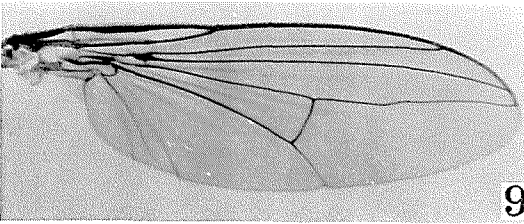
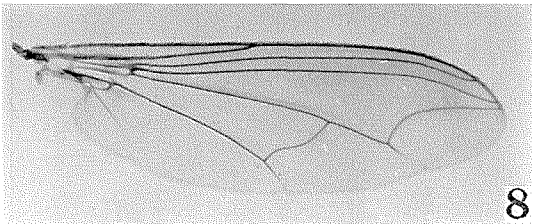
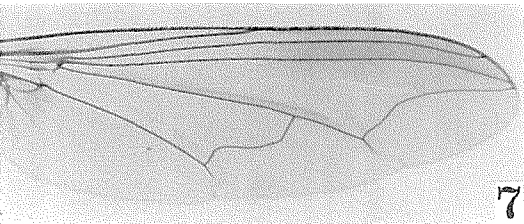
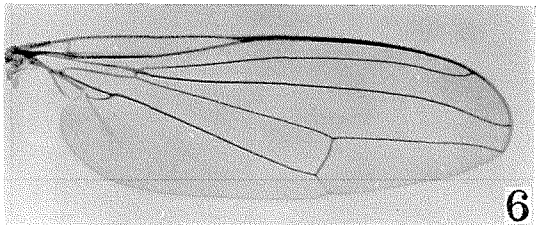
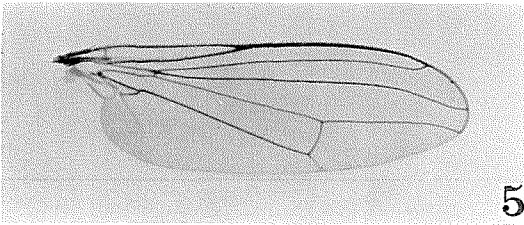
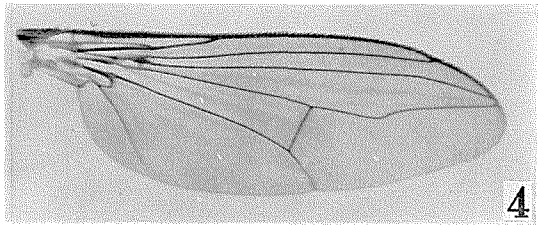
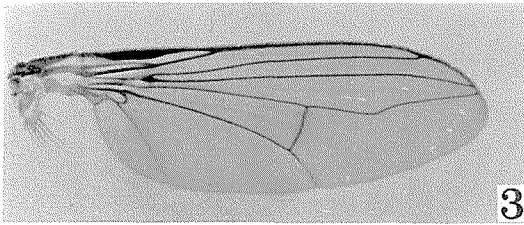
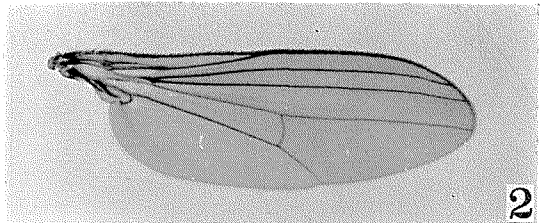
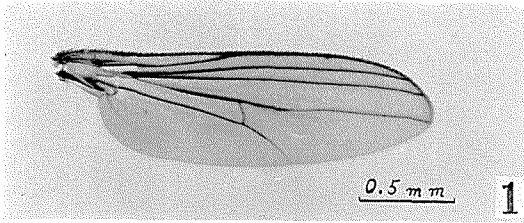
### Explanation of plates

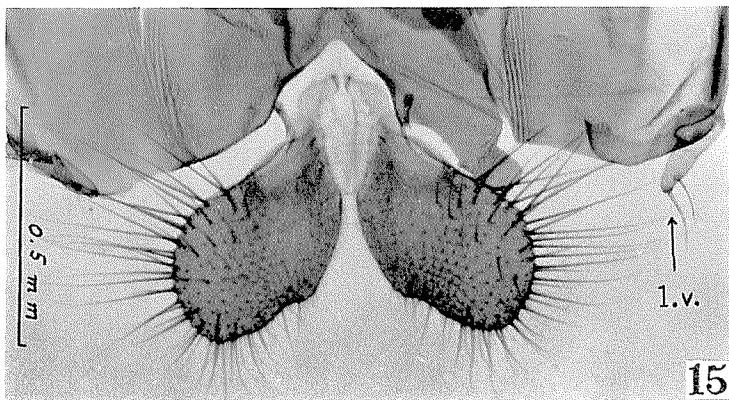
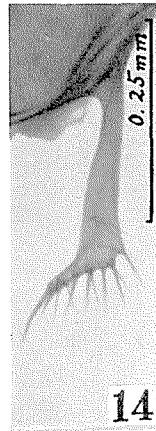
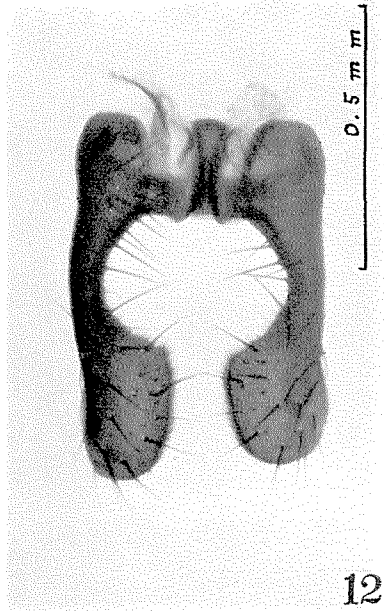
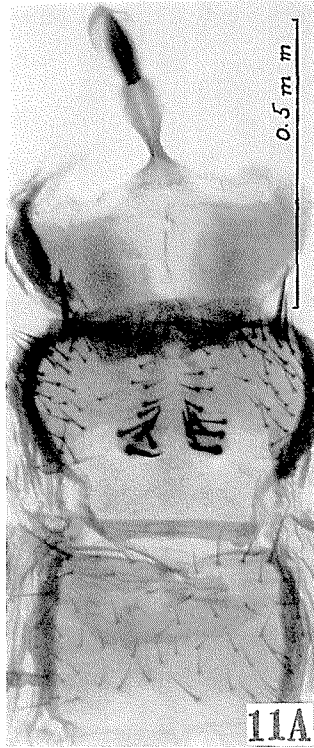
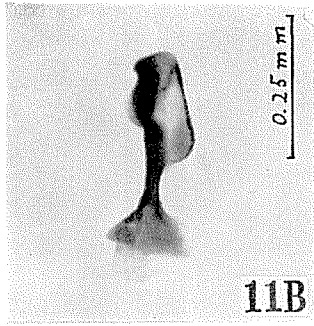
**Plate XXIX.** Figs. 1-9, wings. Fig. 1, *Conchopus taivanensis* ♂, 2, ♀; 3, *Tachytrechus picticornis* ♂, 4, ♀; 5, *Hydrophorus praecox* ♂, 6, ♀; 7, *Chrysosoma leucopogon* ♂, 8, ♀; 9, *Tachytrechus genualis* ♂. Fig. 10, *Conchopus taivanensis* ♂, fore tarsus.

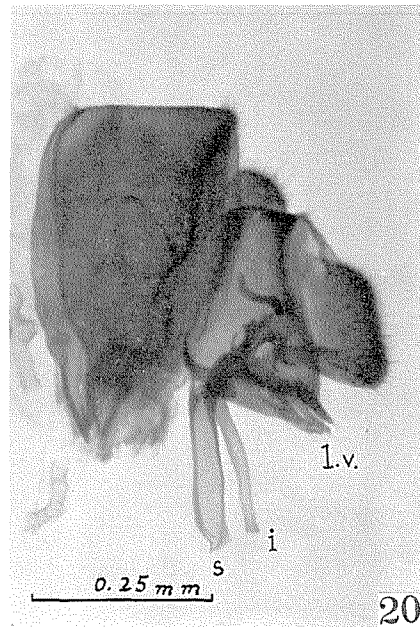
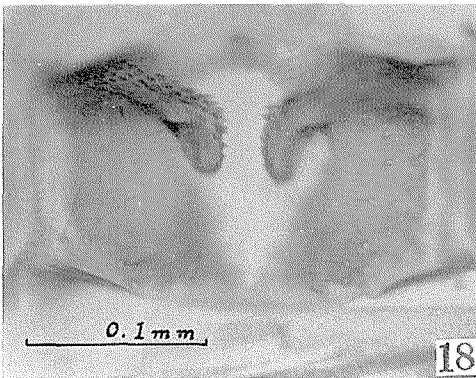
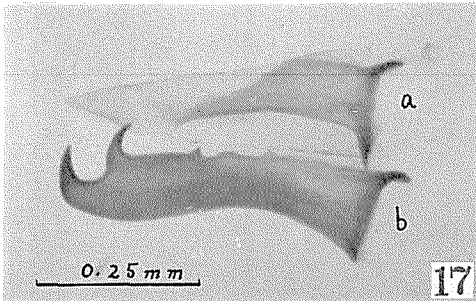
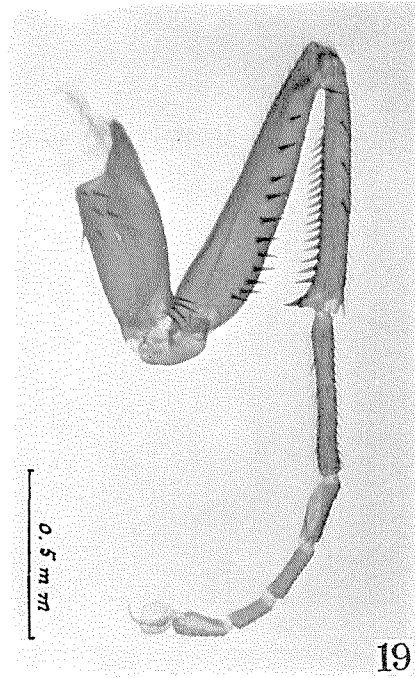
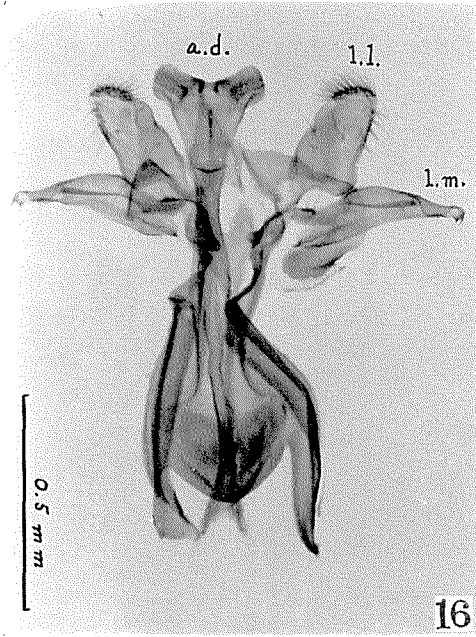
**Plate XXX.** Figs. 11-14, *Conchopus taivanensis* ♂: 11 A, abdominal sternites; 11 B, lateral view of the pedunculate process; 12, outer lamellae; 13, inner lamella; 14, ventral lobe (lobus ventralis). Fig. 15, *Tachytrechus picticornis* ♂, outer lamellae, l. v.: lobus ventralis.

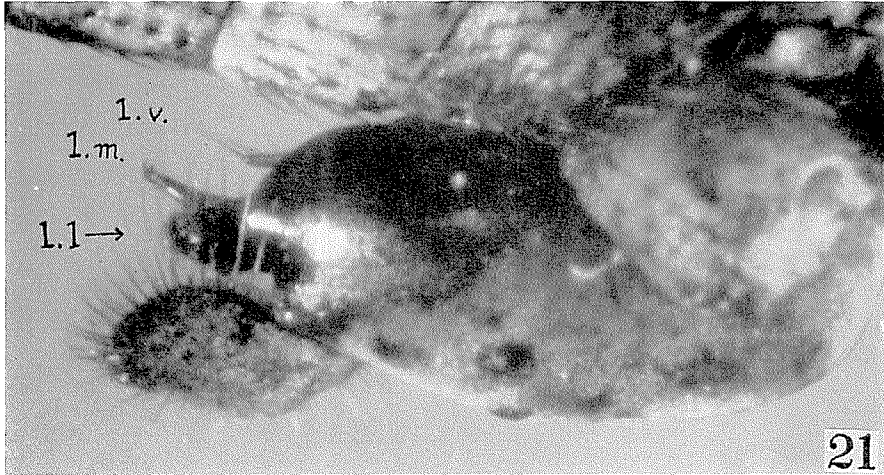
**Plate XXXI.** Figs. 16 and 17, *Tachytrechus picticornis* ♂: 16, lamellae laterales (l. l.), lamellae mediales (l. m.) and appendix dorsalis (a. d.); 17, right (a) and left (b) sheaths of the intromittent organ. Figs. 18-20, *Hydrophorus praecox* ♂: 18, 5th abdominal sternite; 19, fore leg; 20, genitalia, l. v.: lobus ventralis, i: intromittent organ, and s: sheath of the intromittent organ.

**Plate XXXII.** Hypopygii. Fig. 21, *Tachytrechus picticornis*, l. l.: lamella lateralis, l. m.: lamella medialis, l. v.: lobus ventralis; 22, *Chrysosoma leucopogon*, l. v.: lobus ventralis, i: intromittent organ.









### Errata

Vol. 29, No. 2, p. 43, line 6 from top, for "Kuroda" read "Kodama".

Vol. 29, No. 2, p. 43, line 2 and 4 from bottom; p. 44, line 1 and 3 from top, for "*Parana*" read "*Parnara*".

Vol. 29, No. 2, p. 43, line 2 from bottom; p. 44, line 1, 2 and 5, for "*paranae*" read "*parnarae*".

Vol. 29, No. 2, p. 46, line 17 from top; p. 47, line 19 from top; p. 48, line 13 from top; and p. 49, line 11 from top, for "postfulcal" read "postfurcal".

Vol. 29, No. 2, p. 48, between lines 17 and 18 from bottom add "Length; body 6-7 mm.; forewing 4.5 mm."

Vol. 29, No. 2, p. 50, line 15 from bottom, for "Japaan" read "Japan".

Vol. 29, No. 2, p. 51, line 18 from bottom, insert a comma between "*Hydrophorus*" and "*Thinophilus*".