

XIV. KNOWN DROSOPHILA SPECIES IN CHINA WITH DESCRIPTIONS OF TWELVE NEW SPECIES

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CONTENTS

	PAGE
Introduction.....	196
Description of species.....	197
<i>Drosophila coracina</i> Kikkawa and Peng.....	197
<i>Drosophila busckii</i> Coquillett.....	197
<i>Drosophila melanogaster</i> Meigen.....	197
<i>Drosophila ananassae</i> Doleschall.....	197
<i>Drosophila auraria</i> Peng.....	197
<i>Drosophila montium</i> de Meijere.....	197
<i>Drosophila rufa</i> Kikkawa and Peng.....	197
<i>Drosophila suzukii</i> Kamizawa.....	197
<i>Drosophila takahashii</i> Sturtevant.....	197
<i>Drosophila pulchrella</i> , <i>sp. nov.</i>	198
<i>Drosophila transversa</i> Fallén.....	198
<i>Drosophila mutandis</i> , <i>sp. nov.</i>	198
<i>Drosophila virilis</i> Sturtevant.....	199
<i>Drosophila cheda</i> , <i>sp. nov.</i>	199
<i>Drosophila pullata</i> , <i>sp. nov.</i>	200
<i>Drosophila afer</i> , <i>sp. nov.</i>	200
<i>Drosophila immigrans</i> Sturtevant.....	201
<i>Drosophila hexastriata</i> , <i>sp. nov.</i>	201
<i>Drosophila nixifrons</i> , <i>sp. nov.</i>	202
<i>Drosophila virgata</i> , <i>sp. nov.</i>	203
<i>Drosophila heterobristalis</i> , <i>sp. nov.</i>	204
<i>Drosophila meitanensis</i> , <i>sp. nov.</i>	204
<i>Drosophila histrio</i> Meigen.....	205
<i>Drosophila kweichowensis</i> , <i>sp. nov.</i>	205
<i>Drosophila tumiditarsus</i> , <i>sp. nov.</i>	205
<i>Drosophila subtilis</i> Kikkawa and Peng.....	206
SUMMARY.....	206
LITERATURE CITED.....	206

INTRODUCTION

Little has been reported concerning the distribution of *Drosophila* species in China since the publication of Kikkawa and Peng in 1938, who described twenty-seven species of which eleven were new at that time. To date we have found twelve new forms, most of which were collected in the various parts of China where we had travelled during the period of Japanese occupation of China's coastal line.

Descriptions of the twelve new species are given in this article, together with the names and distribution records of the previously described

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species. These species are presented in the text in the order of their taxonomic arrangement as determined by Sturtevant (1942). All except four of the twenty-six listed species have been assigned to species groups. We have added a new species group (*bizonata*) to include three very similar forms.

DESCRIPTION OF NEW SPECIES WITH RECORDS
OF KNOWN FORMS

Subgenus **Pholadoris** Sturtevant 1942.

Drosophila coracina Kikkawa and Peng 1938.

Distribution.—Meitan, Hangchow.

Subgenus **Dorsilopha** Sturtevant 1942.

Drosophila busckii Coquillett 1901.

Distribution.—Lushan (Peng, 1937), Taoho, Ishan, Liuchow, Tsunyi, Meitan.

Subgenus **Sophophora** Sturtevant 1939.

3. *melanogaster* group

Drosophila melanogaster Meigen 1830.

Distribution.—Nanchang, Lushan, Shanghai, Peiping (Peng, 1937), Manchuria, Formosa (Kikkawa and Peng, 1938), Taiho, Ishan, Liuchow, Kweiyang, Tsunyi, Meitan, Hangchow.

Drosophila ananassae Doleschall 1858.

Distribution.—Shanghai (Peng, 1937), Formosa (Kikkawa and Peng, 1938), Ishan, Tsunyi, Meitan.

Drosophila auraria Peng 1937.

Distribution.—Nanchang, Sanhu, Ningpo (Peng, 1937), Formosa (Kikkawa and Peng, 1938), Taiho, Ishan, Liuchow, Tsunyi, Meitan, Hangchow.

Drosophila montium de Meijere 1916.

Distribution.—Formosa (Kikkawa and Peng, 1938), Hangchow; Race A: Ningpo (Kikkawa and Peng, 1938), Tsunyi, Meitan, Liuchow, Hangchow; Race B: Liuchow, Meitan, Kweilin.

Drosophila rufa Kikkawa and Peng 1938.

Distribution.—Liuchow, Meitan, Hangchow.

Drosophila suzukii (Matsumura) Kamizawa 1931.

Distribution.—Liuchow, Ishan, Kweiyang, Tsunyi, Meitan, Hangchow.

Drosophila takahashii Sturtevant 1927.

Distribution.—Sanhu, Hangchow (Peng, 1937), Manchuria, Formosa (Kikkawa and Peng, 1938), Ishan, Tsunyi, Meitan, Hangchow.

Drosophila pulchrella sp. nov.**External characters of imagines.**

♂. Arista with about eight branches. Antenna yellowish, third joint brownish. Front less than $\frac{1}{2}$ width head, wider above, yellow. Middle orbital about $\frac{2}{5}$ length proclinate and $\frac{1}{3}$ reclinate. Second oral about 0.7 length first. Carina narrow. Palpus with only one prominent bristle. Cheek yellow, greatest width about $\frac{1}{12}$ diameter of eye.

Acrostichal hairs in 8 rows. No prescutellars. Anterior scutellars convergent. Mesonotum, pleurae and scutellum brownish yellow. Legs yellow, apical bristles on second tibiae, preapicals on all three. Two transverse sex-combs on the first tarsal joint of front leg, the distal one having a row of 4 stout black teeth, and the proximal comb just above the distal one with only two such teeth. Two similar combs on second tarsal joint with two teeth each.

Abdomen yellowish brown, terminal tergites black.

Wings clear, a blackish spot at tip of the second longitudinal vein, extending to the third. Another blackish spot near the wing base, from the second costal break to the base of the fourth vein. Costal index about 2.4, 4v index 2.3, 4c index 1.2, 5x index 2.0.

Length of body 2.2 mm., wing 2.8 mm. (dried specimen).

♀. Wings void of spots, legs with no sex-combs; Costal index 3, 4c index 1.

Other characteristics, relationships, and distribution.

Chromosomes.—2 pairs of V's, one pair of rods and one pair of dots.

Relationship.—Close to *D. suzukii*; belongs to the melanogaster group of the subgenus *Sophophora*.

Distribution.—Meitan.

Subgenus **Drosophila** Fallén 1823.

1. *quinaria* group

Drosophila transversa Fallén 1823. This species may not be identical with the true *transversa* described from Europe by Fallén.

Distribution.—Meitan, Hangchow.

Drosophila mutandis sp. nov.**External characters of imagines.**

♂. Arista with about 9 or 10 branches. Antenna brown. Front over $\frac{1}{2}$ width head, wider above. Middle orbital about $\frac{1}{4}$ length other two. Second oral over $\frac{2}{3}$ first. Carina elevated and broad below. Face and proboscis yellow. Several bristles on palpus with terminal one especially prominent. Cheek yellow, with greatest width about $\frac{1}{4}$ to $\frac{1}{3}$ diameter of eye.

Achrostical hairs in 6 rows. No prescutellars. Anterior scutellars convergent. Mesonotum and scutellum dull brownish yellow and shining.

Pleurae and legs pale yellow. No sexual characters on front tarsus. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen brownish yellow and shining, with faint blackish anterior bands on the basal tergites.

Wings clouded along crossveins. Costal index 3.0, 4v index 1.6, 4c index 0.5, 5x index 1.3.

Length body 2.9 mm., wing 2.8 mm. (dried specimens).

♀. Abdominal bands less distinct than in male.

Other characteristics, relationships, and distribution.

Eggs.—3 filaments, the middle one larger.

Puparia.—Anterior spiracles $1/7$ to $1/6$ length puparium.

Chromosomes.—5 pairs of rods and one pair of dots. Two of the rod-shaped pairs about twice as long as other three pairs. One pair long, representing the X; the Y is indistinguishable from the X (cf. Tan, 1942).

Relationship.—Belongs to the *quinaria* group of the subgenus *Drosophila*. Close to *D. transversa*, but differs in not having the posterior black spots on abdominal segments.

Distribution.—Meitan.

4. *virilis* group

Drosophila virilis Sturtevant 1916.

Distribution.—Peiping, Hangchow (Peng, 1937), Kirin (Kikkawa and Peng, 1938), Taiho, Ishan, Liuchow, Tsunyi, Meitan. This species differs from the american *virilis* in that it occurs both in domestic and wild habitats.

9. *robusta* group.

***Drosophila cheda* sp. nov.**

External characters of imagines.

♂ ♀. Arista with about 9 branches, two below terminal fork. Antenna blackish. Front black, frontal lines and ocellar triangle brownish. Middle orbital about $1/3$ other two. Second oral $1/2$ first. Carina broad, low. Face brownish. Palpus with one large and numerous fine bristles. Cheek blackish, its greatest width about $1/3$ diameter of eye.

Acrostichal hairs in 6 rows, somewhat irregular. No prescutellars. Anterior scutellars convergent. Mesonotum blackish, with brownish stripes: one at mid-dorsal line, two inside dorsocentral lines, two outside dorsocentral lines interrupted at their anterior $1/3$, and two on alar-bristle zone. Pleurae black with greyish patches. Sterno-index 0.7. No sexual characters on front tarsus. Apical bristles on first two tibiae, preapicals on all three.

Abdomen black, with posterior greyish band on first 4 tergites.

Wings dusky, with golden tint. Posterior crossvein slightly clouded. Halteres yellow. Costal index about 3.2, 4v index 1.7, 4c index 0.9, 5x index 1.1.

Length body 2.5 mm., wing 2.5 mm.

Internal characters of imagines.

Testes orange, spiral, with about 7 gyres.

Spermathecae oval, yellowish, chitinized.

Other characteristics, relationships, and distribution.

Eggs.—4 filaments, each as long as the egg.

Puparia.—Anterior spiracles with about 13–14 branches; horn about 1/7 length of puparium.

Chromosomes.—Four pairs: one pair of large V's, one pair of smaller V's, one pair of rods and one pair of dots.

Relationship.—Belongs to the robusta group of the subgenus *Drosophila*, close to *D. sordidula* Kikkawa and Peng.

Distribution.—Hangchow.

***Drosophila pullata* sp. nov.**

External characters of imagines.

♂. Arista with about 10 branches. Antenna dark, slightly brownish. Front over 1/3 width of head. Middle orbital about 2/3 length proclinate and 1/2 reclinate. Second oral about 3/5 first. Carina nose-like. Numerous bristles on palpus. Cheek grey, its greatest width about 1/3 diameter of eye.

Acrostichal hairs in 6 rows. No prescutellars. Mesonotum dull brown, rather shining, with a broad median dark longitudinal band and two lateral ones. Scutellum dull brown. Pleurae greyish brown. Sterno-index about 0.8. Legs yellow, no sexual characters on front tarsus. Apical bristles on first two tibiae, preapicals on all three.

Wings clear, veins brown. Costal index about 3.8, 4v index 1.8, 4c index 0.4, 5x index 1.4.

Length body 3.5 mm., wing 4 mm. (dried specimens).

♀. Palpi with less numerous bristles than in male.

Other characteristics, relationships, and distribution.

Eggs.—Four filaments.

Puparia.—Anterior spiracles with about 13–16 branches; horn about 1/4 length puparium.

Chromosomes.—Four pairs of V's and one pair of dots.

Relationship.—Relationships obscure, but probably belongs to the robusta group of the subgenus *Drosophila*.

10. *melanica* group

***Drosophila afer* sp. nov.**

External characters of imagines.

♂. Arista with about 7 branches, two below terminal fork. Antenna blackish, third joint black. Front black, frontal lines paler. Middle orbital about $\frac{2}{3}$ other two. Only one prominent oral bristle. Carina broad; face grey. Palpus with a number of thin bristles. Cheek greyish black; greatest width about $\frac{1}{3}$ diameter of eye.

Acrostichal hairs in 6 rows. No prescutellars. Anterior scutellars convergent. Mesonotum and scutellum concolorous, velvety black. Sterno-index 0.75. No sexual characters on front tarsus. Apical bristles on first two tibiae, preapicals on all three.

Abdomen black, concolorous.

Wings clear; costal index about 3 or less, 4v index 1.8, 4c index 1.1, 5x index 1.1.

Length body 2.2 mm., wing 2.2 mm.

♀. Abdomen yellow, first tergite black, tergites 2–6 with broad black posterior band on each, interrupted at the middle on 3 and 4.

Internal characters of imagines.

Anterior malpighian tubes 2, free; posterior tubes completely fused within a lumen.

Testes bright orange, spiral, with about 7 gyres.

Spermathecae 2, yellow, chitinized, spherical, telescoped at base.

Other characteristics, relationships, and distribution.

Egg.—2 filaments.

Puparia.—Anterior spiracles with about 10 branches; branches plus horn about $\frac{1}{5}$ length puparium.

Chromosomes.—Five pairs: two pairs of V's, one pair of rods, one pair of J's and one pair of dots.

Relationship.—Apparently belongs to the melanica group of the subgenus *Drosophila*.

Distribution.—Hangchow, Meitan.

14. *immigrans* group

Drosophila immigrans Sturtevant 1921.

Distribution.—Lushan, Sanhu (Peng, 1937), Formosa (Kikkawa and Peng, 1938), Taiho, Liuchow, Ishan, Tsunyi, Meitan, Hangchow.

Drosophila hexastriata* sp. nov.*External characters of imagines.**

♂. Arista with about 10 branches. Antenna brownish yellow. Front less than $\frac{1}{3}$ width head, whitish. Middle orbital about $\frac{1}{2}$ or less other two. Only one prominent oral bristle. Carina flattened. Cheek whitish yellow, its greatest width about $\frac{1}{5}$ to $\frac{1}{4}$ diameter of eye. Palpus with two prominent bristles.

Acrostichal hairs in 8 rows. No prescutellars. Mesonotum dull yellow, with six definite stripes arranged as follows: two along dorsocentral

lines; two between them each enclosing two acrostichal rows, and somewhat continuous to scutellum; two outside dorsocentral lines reaching transverse sutures. Pleurae dull yellow, also striped though less distinctly than on mesonotum: two from the upper portion of the wing base to upper corner of humerus, two from tip of wing base to lower part of humerus, two from base of haltere to below humerus, and still two short ones between bases of first and second legs. Sterno-index about 0.5. Legs yellow, a row of about 8–10 short spines on lower apical part of first femur. Tarsal joints of first legs shortened and thickened, and bear many recurved hairs. Apical bristles on first two tibiae, preapicals on all three. Abdomen yellow, each tergite with a posterior broad black band.

Wings clouded at posterior crossvein. Costal index about 4.2, 4v index 1.3, 4c index 0.5, 5x index 1.1.

Length body 3.4 mm., wing 3.6 mm.

♀. Tarsal joint of front leg not shortened and thickened and bears fewer recurved hairs. Length body 3.5 mm., wing 3.8 mm.

Other characteristics, relationships, and distribution.

Eggs.—Four filaments.

Puparia.—Anterior spiracle about $\frac{1}{5}$ to $\frac{1}{4}$ length puparium.

Chromosomes.—X a long rod, Y J-shaped; 3 pairs of autosomes: one pair of rods shorter than the X, one pair of V's, and one pair of dots (cf. Tan, 1942).

Relationship.—Belongs to the immigrans group of the subgenus *Drosophila*.

Distribution.—Liuchow, Ishan, Meitan.

***Drosophila nixifrons* sp. nov.**

External characters of imagines.

♂. Arista with about 10 branches. Antenna brownish, third joint dark brown. Front reddish yellow, orbital lines silvery. Middle orbital $\frac{1}{3}$ other two. Second oral nearly as long as first. Carina broad. Palpus with a few prominent bristles. Cheek yellowish, its greatest width about $\frac{1}{10}$ diameter of eye.

Acrostichal hairs in 8 rows. No prescutellars. Anterior scutellars convergent. Mesonotum reddish. Pleurae yellowish, with a distinct brownish longitudinal stripe. Legs yellowish, with a row of short stout spinules on front femur. Apical bristles on second tibiae, preapicals on all three. No sexual characters on front tarsus. First tarsal joint of middle leg with a bristle nearly as long as preapical of middle tibia, first tarsal joint of hind leg with two such bristles.

Abdomen reddish yellow, with a dull brownish band on each tergite.

Wings clouded along crossveins. Costal index about 3.4, 4v index 1.5, 4c index 0.7, 5x index 1.4.

♀. Frontal lines not silvery.

Other characteristics, relationships, and distribution.

Eggs.—Four filaments, each about $\frac{1}{2}$ length egg.

Puparia.—Anterior spiracles with about 18 branches; horn about $\frac{1}{2}$ length puparium.

Chromosomes.—One pair of V's, 3 pairs of rods, and one pair dots. One pair rods represent the X; Y is longer than X.

Relationship.—Belongs to the immigrans group of the subgenus *Drosophila*, close to *D. komaii* Kikkawa and Peng.

Distribution.—Meitan.

***Drosophila virgata* sp. nov.**

A single female was collected by Mr. T. T. Liu on September 6, 1945, and no offspring was obtained. A handsome, brilliantly marked, large fruit fly having a row of black stout spinules on the inner surface of front femur. These spinules are a little longer than those of the immigrans group of the subgenus *Drosophila*.

External characters of imagines.

♀. Arista with about 10 branches, two below terminal fork. Antenna yellowish, third joint brown. Front less than $\frac{1}{3}$ width head, wider above, yellowish brown. Frontal lines dark brown. Middle orbital about $\frac{1}{2}$ length proclinate and $\frac{2}{5}$ reclinate. Second oral 0.7 first. Carina high, nose-like. Proboscis yellow. Palpus dark brown, with two prominent bristles. Cheek yellow, its greatest width about $\frac{1}{5}$ diameter of eye.

Acrostichal hairs in 6 rows. No prescutellars. Anterior scutellars divergent. Mesonotum, pleurae and scutellum yellowish brown. Seven dark longitudinal stripes on mesonotum; the second and sixth ones originate from the transverse suture, others complete. Two such stripes on scutellum and two similar longitudinal stripes on each side pleura. A dark patch also present on each pleura to which wing is articulated. Sterno-index about 1. Legs brownish, coxae, tibiae and femora mottled with dark spots. Apical bristles on first two, preapicals on all three.

Abdomen yellowish brown, each tergite with a broad posterior band interrupted at the middle.

Wings brown, with golden tint; crossveins slightly clouded. Costal index about 4.2, 4v index 1.4, 4c index 0.6, 5x index 1.1.

Length body 2.9 mm., wing 3.5 mm. (dried specimen).

Relationships and distribution.

Relationship.—Very obscure, but probably belongs to the immigrans group of the subgenus *Drosophila*.

Distribution.—Meitan.

20. *bizonata* group

This group includes yellowish species with second orbital bristle very fine, carina narrow and high, cheek width about $\frac{1}{5}$ greatest diameter of

eye, acrostichal hairs in 6 rows, sterno-index 0.6, and abdomen shining yellow. *Type D. bizonata* Kikkawa and Peng. The only significant difference between *bizonata* and the two new forms described below is found in the number of egg filaments. The two newly described species have two egg filaments, while *bizonata* has four. This same variation is found in the melanica group, in which six of the known species each has two filaments and one has four.

***Drosophila heterobristalis* sp. nov.**

External characters of imagines.

♂. Arista with about 10 branches, those above the midrib very long. Antenna dull brownish yellow. Front slightly over $\frac{1}{3}$ width head, wider above, dull brownish yellow. Middle orbital very fine, hair-like. Second oral nearly as long as first. Carina narrow, high. Face dull yellow. Palpus with about five prominent bristles. Cheek yellow, its greatest width about $\frac{1}{5}$ diameter of eye.

Acrostichal hairs in 6 rows, somewhat irregular. No prescutellars. Mesonotum and scutellum shining brownish yellow. Pleurae and legs yellow. Sterno-index 0.6. No sexual characters on front tarsus. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen shining yellow, somewhat brownish; each tergite with a broad dark posterior band interrupted at middle region, last two or three tergites entirely black.

Wings slightly clouded along posterior crossveins. Costal index 3.5, 4v index 1.8, 4c index 1.3, 5x index 1.3.

Length body 2.6 mm., wing 2.4 mm.

♀. Abdominal bands narrower and last two or three tergites not entirely black.

Other characteristics, relationships, and distribution.

Eggs.—Two filaments.

Puparia.—Anterior spiracles plus horn $\frac{1}{4}$ length puparium.

Chromosomes.—Two pairs of V's, one pair of rods and one pair of dots.

Relationship.—Belongs to the *bizonata* group of the subgenus *Drosophila*, close to *D. bizonata* Kikkawa and Peng.

Distribution.—Meitan.

***Drosophila meitanensis* sp. nov.**

Morphologically indistinguishable from *D. heterobristalis*. Species identification based on uncrossability with *D. heterobristalis* and chromosome constitution.

Chromosomes.—Two pairs of V's, one pair of J's and one pair of dots. The J-pair is the X.

Distribution.—Meitan.

Unclassified species

Drosophila historio Meigen 1830.

Distribution.—Meitan.

Remarks.—We have examined specimens of this species from Europe and find that it does not belong to the tripunctata group, where Sturtevant (1942) has suggested that it might perhaps belong.

***Drosophila kweichowensis* sp. nov.**

External characters of imagines.

♂. Arista with about 8 branches. Antenna yellowish brown, third joint dark brown. Front about 1/3 width head, yellowish brown. Middle orbital less than 1/2 other two. Only one prominent oral bristle. Carina broad and flat. Palpus with two prominent bristles. Cheek yellowish brown, its greatest width about 1/10 diameter of eye.

Acrostichal hairs in 8 rows. No prescutellars. Anterior scutellars convergent. Mesonotum and scutellum brownish, slightly shining. Pleurae light brown, with a dark brownish longitudinal stripe. Legs brownish, no sex characters on front tarsus. Apical bristles on second tibiae, preapicals on all three.

Abdomen shining black, basal four tergites usually interrupted by yellowish brown bands in mid-dorsal part.

Wings slightly dusky. Costal index about 1.8, 4v index 2.7, 4c index 1.6, 5x index 2.2.

♀. Each abdominal tergite has an anterior yellowish band.

Relationship and distribution.

Relationship.—Belongs to the subgenus *Drosophila*.

Distribution.—Meitan.

***Drosophila tumiditarsus* sp. nov.**

External characters of imagines.

♂. Acrostichal hairs in 8 rows. No prescutellars. Anterior scutellars convergent. Mesonotum brown, bristles and hairs arising from dark spots which fuse into rather large splotches as follows: a middle stripe bifid behind, a large patch on transverse suture, one patch in midway between humeral sclerite and the mid-dorsal line, and one each at supra-alar and post-alar regions. Pleurae brownish, with three distinct longitudinal stripes; one from humeral sclerite to wing base, one across sternopleural and one in between. Sterno-index about 0.6. Scutellum yellowish brown, with dark patches. Legs paler. Apical bristles on first two tibiae, preapicals on all three. First femur shortened and thickened, with numerous bristles; first tarsal joints shortened, the proximal two joints swollen and bear thick hairs, like those of *D. immigrans*.

Abdomen greyish brown. Each tergite with a wide interrupted dark brown band at the middle, reaching the anterior margin near the lateral edges of the tergite.

Wings clear; costal index about 3.0, 4v index 1.7, 4c index 0.9, 5x index 1.2.

Length body 3.5 mm., wing 3.2 mm.

♀. Abdominal dark band interrupted near the edge. First femur and tarsal joints not thickened and shortened and bear no dense hairs.

Internal characters of imagines.

Testes lemon yellow, spiral.

Anterior malpighian tubes 2, not branched; posterior tubes fused.

Spermathecae 2, brown, oval.

Other characteristics, relationships, and distribution.

Eggs.—4 filaments, about 3/4 length of egg.

Puparia.—Anterior spiracles with about 14 branches. Horn about 1/12 length of puparium.

Chromosomes.—Two pairs of V's, one pair of J's, and one pair of dots. One of the V-pairs represents the sex chromosomes, with the Y a little shorter and more compact than the X (cf. Hsu, 1943).

Relationship.—Belongs to the subgenus *Drosophila*. This species was first assigned to the *repleta* group, under the name of *D. repletoides*, but the swollen tarsal joints of males and the separation of the anal plate and genital arch show that it does not belong to the *repleta* group.

Distribution.—Meitan, Liuchow, Hangchow.

Drosophila subtilis Kikkawa and Peng.

Distribution.—Meitan.

Remarks.—The flies of this species feed on the sap of trees and do not breed on laboratory media.

SUMMARY

Of the seven established subgenera of the genus *Drosophila*, four are represented among these twenty-six Chinese species. The subgenera *Pholadoris* and *Dorsilopha* are each represented by a single species. The subgenus *Sophophora* is represented by eight species, all members of the *melanogaster* group. Of the sixteen species belonging to the more complex subgenus *Drosophila*, twelve can be assigned to species groups, as follows: One each for the *virilis* and *melanca* groups; two each for the *quinaria*, *robusta*, and *bizonata* groups; and four for the *immigrans* group.

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