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Drosophila Survey of Hokkaido XIII. Some Remarkable or
Rare Species of *Drosophila* from the Southern-most Area
in the Hidaka Mountain Range¹⁾

With 6 Text-figures

Haruo TAKADA

Biological Laboratory, Otaru Fisheries High School
(Communicated by S. MAKINO)

It is quite recently that the investigations concerning the distribution ecology of drosophilid flies in Hokkaido have made remarkable progress. About sixty species of the Drosophilidae, new to science or new to fauna of Hokkaido have been obtained in the surveys made by Dr. Eizi Momma and his co-workers. The present author undertook a drosophilid survey in the Hidaka Mountains in August, 1959, during the period from the 3rd to the 10th with the co-operation of three students taking the biological course at Otaru Fisheries High School. The collections were mainly

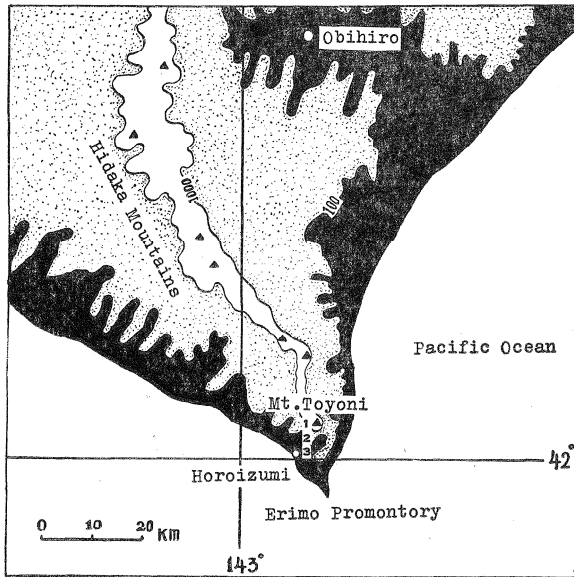


Fig. 1. Map showing Mt. Toyoni and adjacent localities. Collecting sites; 1st station, near the top of Mt. Toyoni (1105 m high), 2nd station, half-way up Mt. Toyoni (about 700 m above the sea-level), 3rd station, Horoizumi (about 5 m above the sea-level).

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(about 700m elevation) from the 6th to the 8th, and near Horoizumi, a small town on the Erimo Promontory, from the 8th, to the 10th, respectively. Their general sites are as shown in Figure 1.

Flies were mostly collected by the same trapping method as that adopted by Takada (1958). Five traps with fermenting banana were placed at each station. Sometimes net sweeping was made on fungi and herbs in mountain paths. The species of flies and the numbers obtained are shown in Table 1. A total of 625 flies representing 19 species were collected. *Drosophila bifasciata* and *D. testacea* were found to be the dominant species, so far as the present survey is concerned. The author wishes to record in this paper the characters of some remarkable or rare species obtained in this collection.

Before going further the author wishes to express his gratitude to Professor Sajiro Makino, Hokkaido University, for his keen interest in this study and for revision of the manuscript, and to Dr. Eizi Momma for his kind guidance and encouragement throughout

Table 1

Numerical data from collections on Mt. Toyoni, Hidaka Mountains (Aug., 1959)

Species	Female	Male	Total	Method of collection	No. of station
<i>Amiota (Phortica) sp. like variegata</i>	0	1	1	S. H.	2
<i>Leucophenga quinquemaculipennis</i>	2	3	5	S. H.	2
<i>Mycodrosophila shikokuana</i>	8	19	27	S. F.	2
<i>M. takachihonis</i>	0	1	1	S. F.	2
<i>Drosophila (Hirtodrosophila) alboralis</i>	1	1	2	S. F.	2
<i>D. (H.) sexvittata</i>	3	4	7	S. F.	2
<i>D. (H.) histrioides</i>	2	7	9	T.	2, 3
<i>D. (Paradrosophila) coracina</i>	12	12	24	T.	3
<i>D. (Sophophora) bifasciata</i>	56	140	196	T.	2, 3
<i>D. (S.) suzuki</i>	0	6	6	T.	3
<i>D. (S.) auraria</i> type A	1	4	5	T.	3
<i>D. (S.) auraria</i> type B	4	5	9	T.	2, 3
<i>D. (S.) auraria</i> type C	0	2	2	T.	3
<i>D. (Drosophila) nigromaculata</i>	4	1	5	T.	2, 3
<i>D. (D.) testacea</i>	101	43	144	T.	1, 2, 3
<i>D. (D.) histrio</i>	19	10	29	T.	2, 3
<i>D. (D.) funebris</i>	21	22	43	T.	3
<i>D. (D.) immigrans</i>	19	13	32	T.	3
<i>D. (D.) ezoana</i>	3	4	7	T.	2
<i>D. (D.) lacertosa</i>	33	29	62	T.	2, 3
<i>D. (D.) moriwakii</i>	6	3	9	T.	2
	Total		625		

S. H., sweeping on herbs. S. F., sweeping on fungi. T., trapping with fermenting banana. 1, 1st collecting station, near the top of Mt. Toyoni (1105 m high). 2, 2nd collecting station, halfway up Mt. Toyoni (about 700 m above the sea-level). 3, 3rd collecting station, Horoizumi (about 5 m above the sea-level).

this work. Cordial thanks are also due to Dr. Toyohi Okada of Tokyo Metropolitan University, for his valuable advice involving the revision of species here considered.

DESCRIPTION

1. *Amiota (Phortica)* sp. like *variegata* (Fallen) (Fig. 2).

Male: Body about 4.5 mm, large tannish colored species, mesonotum dull blackish brown. Antenna reddish brown, 3rd joint brown. Arista with about 8 branches including small fork, 0-1 below it. Eye dark red, and bare. Palpus basally dark, spindle-shaped, with a few prominent bristles, apical one being longest. Clypeus black, interrupted at middle. Front black, marginally pale, about half as broad as head width. Carina black and flat. Face white, pale brown above. Proboscis reddish brown. Cheeks blackish brown, the greatest width about 1/10 diameter of eye. Anterior reclinate about 1/4 proclinate. Second oral about 1/3 vibrissa. Ocellar triangular periorbits pale. Scutellum tan with bifid dark brown spot extending from anterior margin to posterior margin. Humerus dark brown, tannish above, humeral 1. Thoracic pleuron blackish brown, white below wing. Acrostichal hairs in 10 rows. Anterior scutellars divergent, longer than the posterior ones. Sterno-index about 0.8.

Legs yellow, with dark brown markings, and coxae dark brown. Preapicals on middle and hind tibiae, apicals on middle. Abdomen yellow, with dark brown patches as follows: 1st tergite with caudal band projected anteriorly at middle and each lateral side, showing a patch which looks like the Chinese character "yama" (mountain). From 6th to 7th tergite dark brown with interruption in middle. Sternites white. Wings hyaline, veins brown, cross-veins somewhat clouded. Radius 4+5 and media apically convergent. Costal-index about 2.4; 4V-index about 3.2; 4c-index about 2.0; 5x-index about 0.8. First costal section with apical bristle 1, 3rd costal section with heavy bristles on its basal about 3/4. Halteres white.

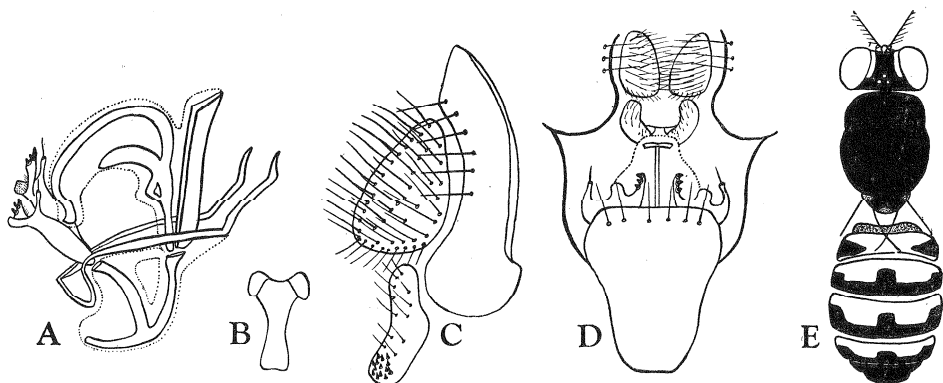


Fig. 2. *Amiota (Phortica)* sp. like *variegata* (Fallen). A, phallic organs (lateral aspect). B, decasternum (ventral aspect). C, peripheral organs (lateral aspect). D, male genital apparatus (ventral aspect). E, dorsal feature of male.

Peripheral organs (Fig. 2, C): Genital arch dark brown, pale below, heel

high and curved upward; upper margin with about 6 hairs, lower margin bare. Clasper oblong, yellow and a darker yellow margin, submedially curved caudated, and with about 15 short setae and about 10 hairs. Anal plate dark yellow, oval, with about 60 long black hairs on the surface. Decasternum (Fig. 2, B) pale, quadrate and trilobed proximally, median piece longer than broad.

Phallic organs (Fig. 2, A): Aedeagus reddish brown, strongly arcuated dorsally, apically with a quadrate flap, and subbasally to inward with a rod-like process. Apodeme of aedeagus reddish brown, crescent and with the base of anterior paramere. Vertical rod also reddish yellow, long and flattened, contiguous to the apical of anterior paramere, apically with trifid branches as follows: outer branch pole-like with a prominent seta on apical; middle one slightly quadrate and pubescent; inner ones oblong with three black spines on tip, and inner surface with short hairs. Ventral fragma small and triangular with a narrow black arch. Phallosomal index about 1.5.

Specimen examined: 1 male, 8 VIII, 1959; at half-way point on Mt. Toyoni, Hidaka Mountains (Takada).

Collecting method: Sweeping herbs with net.

Relationship: Closely allied to *Amiota (Phortica) variegata* (Fallen) by Okada (1956) from Japan and Korea in general bodily and genital characters, being distinguishable from the latter, however, in having mesonotum of dull blackish brown marking, scutellum with bifid dark spot, and more ventral rod of anterior paramere with trifid branches on its apicals.

2. *Leucophenga quinquemaculipennis* Okada (Fig. 3).

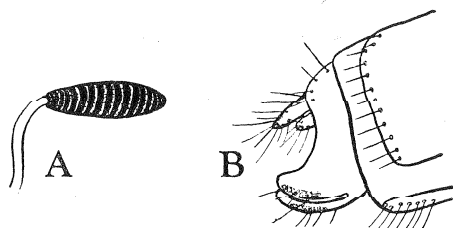


Fig. 3. *Leucophenga quinquemaculipennis* Okada. A, spermatheca. B, female external genital organs (lateral aspect).

This species is remarkable, since a female specimen has never previously been recorded from Japan. Okada (1956) described this species on the basis of the male characters. Two females and three males were collected by sweeping on herbs at the 2nd station. The description of the female characters is presented below:

Spermatheca (Fig. 3, A) elongate, black and with about 15 transverse striations. Egg-guides (Fig. 3, B); lobes greyish yellow, proximally fused to each other, and with about 5 long hairs.

3. *Mycodrosophila takachihonis* Okada (Fig. 4).

This is a very rare species in Hokkaido. Okada (1956) described this species based on

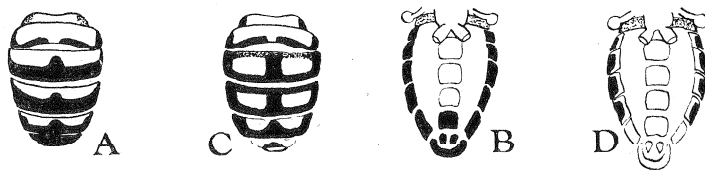


Fig. 4. A, *Mycodrosophila takachihonis* Okada; male abdomen (dorsal aspect). B, do (ventral aspect), C, *Mycodrosophila shikokuana* Okada; male abdomen (dorsal aspect). D, do (ventral aspect).

the examination of three males from Kyushu, Japan. Only one male was collected in this survey by sweeping on fungi at the 2nd station. Color of abdominal tergites and sternites are as shown in Figure 4, A and B.

4. *Mycodrosophila shikokuana* Okada (Fig. 4).

This species is also rare in Hokkaido. Okada (1956) originally described it from the island Shikoku, of Japan. In this collection, the author collected eight females and nineteen males of this species on fungi at the 2nd station with the use of net. Color patterns of tergites and sternites are as shown in Figure 4, C and D.

5. *Drosophila (Hirtodrosophila) histrioides* Okada (Fig. 5).

Two females and seven males were collected at the 2nd and 3rd stations by trapping. This species is rather widely distributed in Hokkaido, Honshu and South Korea (Okada and Kurosawa, 1957; Takada and Lee, 1958). It seems to be divisible into two color patterns; one type shows abdominal bands on 2nd-5th tergites interrupted at middle (Okada and Kurosawa, 1957); the other type has abdominal bands non-interrupted (Fig. 5, A and B). However, there are some specimens in which the abdominal bands on 2nd-4th tergites are narrowly interrupted at the middle.

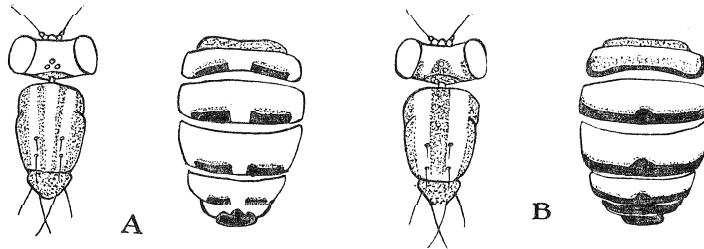


Fig. 5. Two color types of the abdomens in males of *Drosophila (Hirtodrosophila) histrioides* Okada.

This species resembles *D. D. histrio* in being attracted to banana traps (Momma, 1957; Takada, 1958).

6. *Drosophila (Drosophila) testacea* van Roser (Fig. 6).

D. testacea is a cosmopolitan species found in the northern hemisphere; it is widely distributed in Hokkaido, from high to low lands (Takada, 1958). They were distributed from the foot to the edge of the alpine plant zone at top of Mt. Taisetsu, Mt. Rishiri and Mt. Rausu where no other species were found to occur. Basden and Harnden (1956) proposed to call this type of vertical distribution "contour distribution". In this survey, 144 specimens which correspond to 23 per cent of the total flies were collected. The majority of them were collected at the 2nd and 3rd stations (0-700m, above sea-level). There were six color types in the specimens collected. Similar color types have been noted by Burla and Gloor (1952) in south-west European specimens, and by Y. J. Chung (in personal correspondence) in south Korean specimens.

Nine blackish individuals referred to as BL and BB types were obtained at the 1st station near the top of Mt. Toyoni (Table 2). A somewhat detailed description of the six color types is given below.

Black type (BL); Ocellar triangle and periorbits black. Mesonotum and scutellum entirely black, abdominal tergites black, with 2nd-4th tergites slightly interrupted at middle. Sternites dark brown. Legs blackish brown, joints

pale. Only males of this type were collected.

Blackish brown type (BB); Ocellar triangle and periorbits blackish brown. Mesonotum and scutellum blackish brown, abdominal tergites blackish brown, with interruptions at middle of 2nd-4th tergites, reaching near anterior margin laterally of 2nd tergite. Pleuron blackish brown, in some cases reddish brown. Sternites dark brown.

Dark brown type (DB); Ocellar triangle and periorbits dark brown. Mesonotum and scutellum dark brown, anterior half and lateral margin of 2nd-4th tergites being slightly pale, with interruptions at middle. Sternites, coxae and femora dark brown.

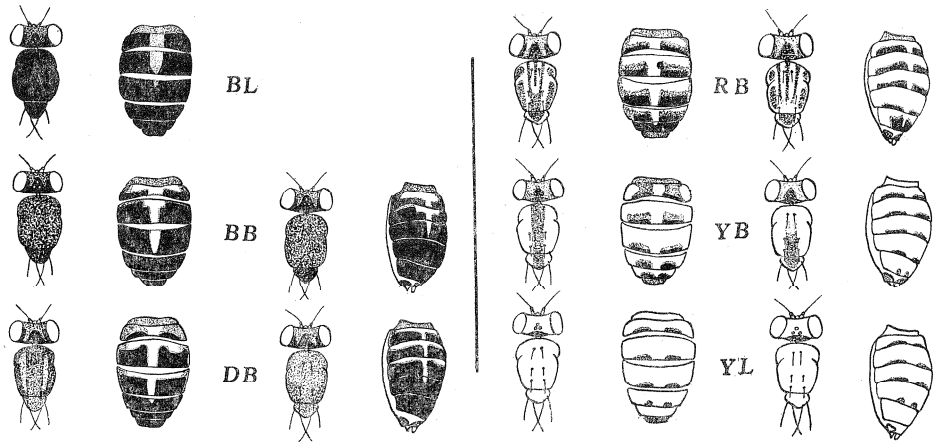


Fig. 6. Color types in the abdomens of *Drosophila (Drosophila) testacea* van Roser; left half, male; right half, female. BL, black type. BB, blackish brown type. DB, dark brown type. RB, reddish brown type. YB, yellowish brown type. YL, yellow type.

Reddish brown type (RB); Ocellar triangle and periorbits reddish brown. Mesonotum and scutellum reddish brown with three slightly dark stripes to fused posterior scutellum and in some cases separated, two lateral stripes broader than the middle one. Abdominal tergites reddish brown, with broad black bands or caudal black band on 2nd-5th tergites which are interrupted at middle; 6th tergite somewhat interrupted at upper half in middle. Sternites reddish yellow.

Yellowish brown type (YB); Mesonotum and scutellum yellowish brown, with a broad dark longitudinal stripe or slightly dark stripe at posterior half. Abdominal tergites yellowish brown, with lateral dark brown or black patches comparatively larger than in YL type. Sternites dark yellow.

Yellow type (YL); Mesonotum and scutellum yellow or pale yellow. Abdominal tergites yellow or pale yellow with black to slightly dark caudal bands, which are interrupted at middle of 2nd-5th tergites. Sternites and legs yellow.

It seems very probable from the above observations that the six color types represent a series of phenotypical polymorphism which has been known to occur only in *D. testacea*, *D. polymorpha* and *D. rufa* (Da Cunha, 1949; Freire-Maia,

1954; Oshima and Taira, 1956). In *D. testacea*, the distribution and frequency in occurrence of flies are variable by color types (Table 2). Details will be reported later, since investigation is being continued.

Table 2
Vertical distributions shown by six color types of *Drosophila testacea*
on Mt. Toyoni, Hidaka Mountains, Hokkaido (Aug., 1959)

Above sea-level (m)	Color type													
	BL		BB		DB		RB		YB		YL		Total	
	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂
1100±5	0	4	2	3									2	7
700±5					1	0	8	17	41	12	40	4	90	33
0+5					3	2	3	1	1	0	2	0	9	3
Total	0	4	2	3	4	2	11	18	42	12	42	4	101	43

7. *Drosophila (Sophophora) auraria* Peng type C.

Two males of type C collected at 3rd station of Horoizumi. This type is rare in Hokkaido, while it is rather common in southern parts of Japan and south Korea. In the present species, three morphological types, A, B and C, were found by Moriwaki, Okada and Kurokawa (1952), Okada (1954), and Kurokawa (1956a, b). According to the latter author, the three types can be regarded as distinct races. Type C is characterized by bodily structures somewhat intermediate between type A and B, being rather close to type B.

SUMMARY

Collections of drosophilid flies were made in the southern-most part of the Hidaka Mountain range in Hokkaido during a period from the 3rd to the 10th August, 1959. The data derived from this survey are listed in Table 1. Among the 19 species collected the characters of the following five rare or remarkable species were observed; *Amiota (Phortica)* sp. like *variegata*, *Leucophenga quinquemaculipennis*, *Mycodrosophila takachihonis*, *Mycodrosophila shikokuana*, and *Drosophila (Sophophora) auraria* type C.

Different color patterns were found in two species, *Drosophila (Hirtodrosophila) histrioides* and *Drosophila (Drosophila) testacea*.

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