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Drosophila Survey of Hokkaido, XXVII. On Drosophilid Flies from Seven Localities of the Hidaka District in Southern Hokkaido ¹⁾²⁾

By

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(With 3 Text-figures and 3 Tables)

Since 1949 considerable information has been accumulated on the Drosophilidae of Hokkaido. Some fragmental notes on the distribution of drosophilids were published in D.I.S. (Nos. 23-43) and some others (Mizuno 1952, Suzuki 1955, Ishihara 1955, Takada 1957, Shima 1960, Toyofuku & Kimura 1961, Kaneko & Tokumitsu 1963, and others). Momma (1957) reported summarizingly the distribution of Drosophila from various districts of Hokkaido during a period of 1951 to 1956. Since then on, some brief notes were published by Takada (1958), Kaneko & Shima (1962), Wakahama *et al.* (1963), Kaneko *et al.* (1966, 1968).

Drosophila survey in the Hidaka district, southern Hokkaido, has remained in poor state: collections were made at Nishi-Mombetus, Shizunai, Samanai and Obihoro, by T. Mizuno, T. Kanehisa, K.I. Wakahama and some others, but the most results were not reported. The flies collected cover 17 species belonging to 2 genera: they are represented by *Scaptomyza graminum*, *Drosophila coracina*, *D. histrioides*, *D. bifasciata*, *D. suzukii*, *D. auraria* race A and B, *D. brachynbephros*, *D. nigromaculata*, *D. testacea*, *D. histrio*, *D. multispina*, *D. funebris*, *D. immigrans*, *D. virilis*, *D. sordidula*, *D. lacertosa* and *D. moriwakii*.

In August, 1959, Dr. H. Takada and his students collected 625 flies belonging to 19 species of the Drosophilidae on Mt. Toyoni located near Horioizumi, a small town on the Erimo Promontory. They were reported by Takada (1960), probably the first to describe the Drosophilidae from the Hidaka district. The Hidaka district contains a considerable diversity of environments, varying in a fairly regular fashion with altitudes from near sea level to a crest of up to 2052 meters (Mt. Poroshiri-dake) covering the Hidaka Mountain Range. The Hidaka district has a rigorous climate. The average temperature of the year is about 6° to 7°C and the rain fall amounts to about 1000 mm at the foot of the mountains or at the seashore districts. In the summer of 1962, 1963, 1964, 1966 and 1967, the authors undertook a drosophilid survey in the above district. In the present article are given some brief notes on the Drosophila fauna in seven localities of this district.

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Localities and Methods of Collection: Seven localities of the present collections are as shown in Table 1 and Figure 1. Collections were made far from human habitation,

Table 1. Collection dates, and numbers of genera, species and flies obtained in seven localities of the Hidaka district

Locality	Date	Altitude (meters)	No. of flies	Genera	species
Hirowo	Aug. 17-19, 1962	50	1,189	5	24
Fuyushima	{ July 30-Aug. 2, 1963 July 28-31, 1964	30-140	2,291	5	26 (28)
Shimukapp-Chu-O	Sept. 5-7, 1964	350	60	1	4
Kamisatsunai	Aug. 5-8, 1966	600	3,620	5	34
Erimo	Aug. 9, 1966	50	144	2	7
Ôyubari	July 20-22, 1967	400	1,145	3	21 (23)
Hidaka-Nukabira	July 25-29, 1967	300	2,621	3	30 (34)

Numericals in parentheses denote the number of forms.

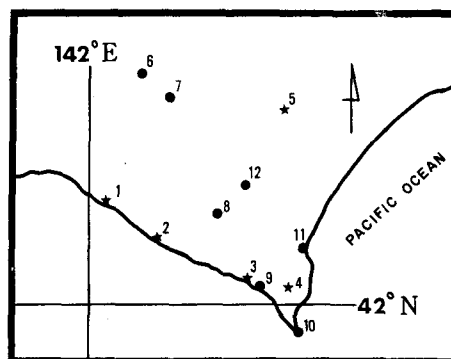


Fig. 1. Map of the Hidaka district of Hokkaido, showing localities of collection. 1-5 (asterisks): collections were made from 1950 to 1959. 6-12 (closed circles): localities dealt with in the present survey. 1, Nishi-Mombetsu. 2, Shizunai. 3, Samani. 4, Mt. Toyoni. 5, Obihiro. 6, Ôyubari. 7, Shimukapp-Chu-O. 8, Hidaka-Nukabira. 9, Fuyushima. 10, Erimo. 11, Hirowo. 12, Kamisatsunai.

mostly by exposing fermented fruits, together with incidental net-sweeping collections on various kinds of grasses and fungi. Banana pieces were fermented with dense water suspension of a baker's yeast and they were transferred into containers. In Fuyushima, pieces of

Table 2. Drosophilid flies attracted to

Species	Localities	Ôhyubari		Hidaka-Nukabira		Fuyushima	
		♀ ♀	♂ ♂	♀ ♀	♂ ♂	♀ ♀	♂ ♂
<i>Amiota alboguttata</i> f. <i>furcata</i>		0	2	—	—	—	—
<i>A. dispina</i>		—	—	—	—	—	—
<i>A. stylopyga</i>		—	—	—	—	3	2
<i>A. variegata</i>		—	—	—	—	—	—
<i>Leucophenga maculata</i>		—	—	—	—	0	1
<i>L. quinque-maculipennis</i>		—	—	—	—	0	1
<i>Chymomyza atrimana</i>		—	—	—	—	—	—
<i>Scaptomyza pallida</i>		—	—	1	0	—	—
<i>S. concimilis</i>		—	—	—	—	—	—
<i>S. polygonia</i>		—	—	—	—	—	—
<i>Drosophila raridentata</i>		—	—	—	—	—	—
<i>D. alboralis</i>		—	—	—	—	1	0
<i>D. histrioides</i>		—	—	2	1	38	50
<i>D. nokogiri</i>		0	1	—	—	—	—
<i>D. sp.</i> (<i>Hirtodrosophila</i>)		—	—	—	—	—	—
<i>D. sexvittata</i>		—	—	—	—	—	—
<i>D. busckii</i>		—	—	—	—	—	—
<i>D. coracina</i>		145	105	596	525	50	34
<i>D. sp.</i> of <i>fenestrarum</i> group		—	—	1	0	2	0
<i>D. alpina</i>		—	—	—	—	—	—
<i>D. bifasciata</i>		13	12	31	17	150	154
<i>D. imaii</i>		—	—	13	20	—	—
<i>D. helevetica</i>		—	—	3	1	—	—
<i>D. suzukii</i>		—	—	15	36	8	26
<i>D. lutea</i>		—	—	—	—	1	3
<i>D. auraria</i> race A		5	32	9	20	160	221
race B		80	326	189	245	253	435
race C		8	68	9	4	4	4
<i>D. brachynephros</i>		0	1	10	3	41	46
<i>D. unispina</i>		—	—	—	—	11	10
<i>D. nigromaculata</i>		37	12	14	4	57	22
<i>D. testacea</i>		32	29	132	46	49	60
<i>D. makinoi</i>		—	—	—	—	—	—
<i>D. histrio</i>		2	0	20	8	34	38
<i>D. funebris</i>		—	—	—	—	7	7
<i>D. multispina</i>		—	—	—	—	—	—
<i>D. immigrans</i>		1	0	10	2	—	—
<i>D. pengi</i>		—	—	—	—	0	1
<i>D. ezoana</i>		10	3	7	5	4	5
<i>D. moriwakii</i>		71	66	38	35	10	13
<i>D. lacertosa</i>		17	26	167	217	124	118
<i>D. okadai</i>		5	1	11	5	1	3
<i>D. neokadai</i>		9	4	5	1	—	—
<i>D. sordidula</i>		—	—	—	—	4	6
<i>D. pseudosordidula</i>		0	1	18	29	—	—
Total		435	689	1301	1224	1012	1260

fermenting furits (banana, orange and apple)

Hirowo		Kamisatsunai		Shimukapp-Chu-O	
♀ ♀	♂ ♂	♀ ♀	♂ ♂	♀ ♀	♂ ♂
—	—	2	1	—	—
—	—	2	4	—	—
—	—	—	—	—	—
1	1	0	3	—	—
—	—	—	—	—	—
—	—	2	2	—	—
1	0	—	—	—	—
5	1	1	1	—	—
—	—	7	6	—	—
—	—	1	0	—	—
1	4	—	—	—	—
—	—	—	—	—	—
9	2	2	1	—	—
—	—	—	—	—	—
—	—	1	0	—	—
1	4	—	—	—	—
—	—	0	1	—	—
0	4	9	2	—	—
—	—	—	—	—	—
—	—	2	3	—	—
4	6	263	413	2	0
—	—	25	25	—	—
—	—	3	1	—	—
1	7	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
123	387	0	5	28	17
—	—	—	—	—	—
1	1	—	—	—	—
5	0	—	—	—	—
25	5	11	1	1	0
62	12	113	21	—	—
—	—	1	0	—	—
3	1	3	0	—	—
—	—	1	2	—	—
—	—	1	0	—	—
0	1	—	—	—	—
—	—	—	—	—	—
—	—	31	8	—	—
—	—	1168	1126	—	—
114	116	2	3	9	3
2	0	45	35	—	—
—	—	3	1	—	—
—	—	—	—	—	—
—	—	—	—	—	—
358	552	1699	1665	40	20

Table 3. Drosophilid flies obtained on various kinds of

Species	Localities	Ôyubari		Hidaka-Nukabira	
		♀ ♀	♂ ♂	♀ ♀	♂ ♂
<i>Amiota alboguttata</i> f. <i>furcata</i>		0	4	0	3
f. <i>elongata</i>		—	—	0	8
f. <i>clavata</i>		—	—	0	2
<i>A. stylopyga</i>		—	—	0	1
<i>A. variegata</i>		—	—	0	1
<i>Leucophenga magnipalpis</i>		—	—	—	—
<i>Microdrosophila cristata</i>		—	—	—	—
<i>Chymomyza caudatula</i>		—	—	—	—
<i>Scaptomyza pallida</i>		1	0	6	7
<i>S. graminum</i>		—	—	—	—
<i>S. concimilis</i>		—	—	1	0
<i>S. polygonia</i>		—	—	—	—
<i>S. okadai</i>		—	—	1	0
<i>Drosophila raridentata</i>		—	—	—	—
<i>D. alboralis</i>		—	—	—	—
<i>D. histrioides</i>		—	—	1	0
<i>D. sexvittata</i>		—	—	5	6
<i>D. trivittata</i>		—	—	6	1
<i>D. sp. of fenestrarum group</i>		1	1	10	6
<i>D. bifasciata</i>		0	2	—	—
<i>D. imaii</i>		—	—	—	—
<i>D. helvetica</i>		—	—	1	0
<i>D. magnipectinata</i>		1	0	—	—
<i>D. nipponica</i>		3	0	2	2
<i>D. auraria</i> race A		—	—	—	—
race B		—	—	—	—
<i>D. brachynepros</i>		—	—	3	2
<i>D. unispina</i>		—	—	0	1
<i>D. nigromaculata</i>		4	2	3	2
<i>D. testacea</i>		—	—	4	4
<i>D. histrio</i>		—	—	0	1
<i>D. tenuicauda</i>		2	0	2	4
Total		12	9	45	51

banana, orange and apple without inoculation of any yeast were also used besides above banana pieces fermented with the yeast. The containers used were dry milk cans with about 660 ml and those with about 1,000 ml or more in capacity. The bait traps were set in shady sites on the preceding the first day of collections, being suspended by strings from branches of trees or shrubs to keep about 30–50 cm high above the ground. The flies collected were transferred to glass vials containing 70% alcohol for examination in the laboratory. In Ôyubari, Hidaka-Nukabira, Fuyushima (1963), Hirowo and Kamisatsunai, flies were collected on three successive days, at one-hour-intervals from 4.00 a.m. to 7.00 p.m., together with occasional collections by net sweeping. In Shimukapp-Chu-O, flies were collected from 5.00 a.m. to 6.00 p.m. In Hidaka-Nukabira, Kamisatsunai and Fuyushima (1963), incidental collections were also made for more one or two additional days with fermented fruits. In Fuyushima in 1964, flies were occasionally caught with traps scattered

grasses and fungi, and around human eyes, with the net

Fuyushima		Hirowo		Kamisatsunai		Erimo	
♀ ♀	♂ ♂	♀ ♀	♂ ♂	♀ ♀	♂ ♂	♀ ♀	♂ ♂
—	—	—	—	0	1	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	0	1	—	—
—	—	1	2	—	—	—	—
1	1	—	—	—	—	—	—
—	—	—	—	0	1	—	—
3	3	92	121	7	17	46	65
—	—	0	5	—	—	3	0
—	—	1	3	4	4	1	0
—	—	—	—	—	—	7	12
—	—	—	—	—	—	2	4
—	—	3	0	—	—	—	—
—	—	—	—	2	2	—	—
—	—	0	2	—	—	—	—
—	—	1	3	17	12	—	—
—	—	1	4	73	44	—	—
3	1	3	5	5	5	—	—
—	—	—	—	—	—	—	—
—	—	—	—	1	1	—	—
—	—	—	—	1	0	—	—
—	—	3	1	—	—	—	—
3	0	—	—	—	—	—	—
0	1	—	—	—	—	—	—
0	1	7	11	—	—	0	1
—	—	—	—	—	—	—	—
—	—	1	0	1	2	—	—
2	0	6	1	2	2	2	1
—	—	2	0	32	18	—	—
—	—	—	—	—	—	—	—
—	—	—	—	0	1	—	—
12	7	121	158	145	111	61	83

more broadly than in 1963. Net-sweeping collections only were made in Erimo. Temperature, humidity, cloud amount and wind class were recorded at each place.

Results and Remarks

A total of 11,070 flies of the family Drosophilidae involving 5,241 females and 5,829 males were collected in the present survey. The flies were represented by 52 species (56 forms) belonging to 6 genera which are summarized in Tables 1-3. Flies mostly of the genus *Drosophila*, were attracted to the fermenting fruits. Flies of the other genera were mostly obtained by net sweeping on various kinds

of vegetations and near or on human eye. There were 10,255 specimens belonging to 43 species (45 forms) and to 5 genera which were caught by trapping, while 814 specimens were represented by 29 species (32 forms) belonging to 6 genera and secured by net sweeping. Twenty species (21 forms) of 3 genera were collected by trapping and sweeping. The details are given in Tables 2-3.

In Kamisatsunai all flies of *D. sexvittata* and *D. trivittata* given in Table 3 were collected from a fungous, *Pleurotus cornucopioides* (Pers.) Rolland. It is of interest to note that there were three forms of *Amiota alboguttata* in sweeping collection from Hidaka-Nukabira. Forma *furcata* is common but *elongata* and *clavata* are rare in occurrence. It is sure that the latter two forms are new members to the drosophilid fauna of Hokkaido. It is noticeable that one female of *Chymomyza atrimana* and eight specimens of *Drosophila* (subgenus *Dichaetophora*) *raridentata* were obtained in Hirowo. They are new members to the drosophilid fauna of Hokkaido. *Drosophila raridentata* was described as a new species by Okada and Chung (1960) based on only a male specimen from South Korea. The structure of the egg-guide was reported by Tokumitsu (1963) based on the specimens collected from Maruyama in the suburbs of Hirowo town. The habitat was rather dark even in the daytime, because of branches preventing the ground from sunlight, such as shown in Figure 2. Since then, up to the present (1968) no flies of this species has been recorded from any other localities in Japan, in spite of extensive collections.

By and large, 15 species which correspond to the "abundant or "common" species of Mather (1956) were in the seven localities of the Hidaka district (Fig. 3), so far as our observations are concerned. Some analyses were made in relation to the vertical distribution and unusual sex ratios.

Drosophila auraria is widely distributed in Japan (Kurokawa 1958) and especially is abundant in the southern part of Hokkaido (Momma 1957, Kaneko *et al.* 1968). This species includes three races, A, B and C, which have their own habitats (Kurokawa 1956). Race A is abundantly found around areas of human habitations, race B in distantly wild regions from human district and race C in the intermediate areas (Kurokawa 1958, Kaneko & Tokumitsu 1963). Race A is abundant at the lowest elevation but race B and C are conspicuous at higher elevations (Takada 1954, Kurokawa 1967). The present observations came out the distribution of the three races in the Hidaka district, ranging 30 to 600 meters in altitude. Cohabitation of races, A, B and C was found at collecting sites in Fuyushima, Hidaka-Nukabira and Ôyubari. In Hirowo, Shimukapp-Chu-O, Kamisatsunai and Erimo, only race B was obtained. Race B showed the most extent in the Hidaka district, though the relative frequencies decreased prominently at high elevation.

Drosophila nigromaculata and *D. brachynephros* belong to the *quinaria* group. The former is the most common species with most extensive distribution over Hokkaido as a whole (Momma 1957). This species was obtained in all localities surveyed, though being not so abundant in occurrence. *D. brachynephros* is

frequently found in relatively low lands and its relative frequency is fairly less than that of *D. nigromaculata*. In the present survey *D. brachynephros* was not collected at 600 m elevation in Kamisatsunai locality. Another instance of no record of *D. brachynephros* in such high altitude was ascertained by the collection on Mt. Toyoni (Takada 1960). These suggest clearly that *D. brachynephros* has smaller extent in vertical distribution than that of *D. nigromaculata*.

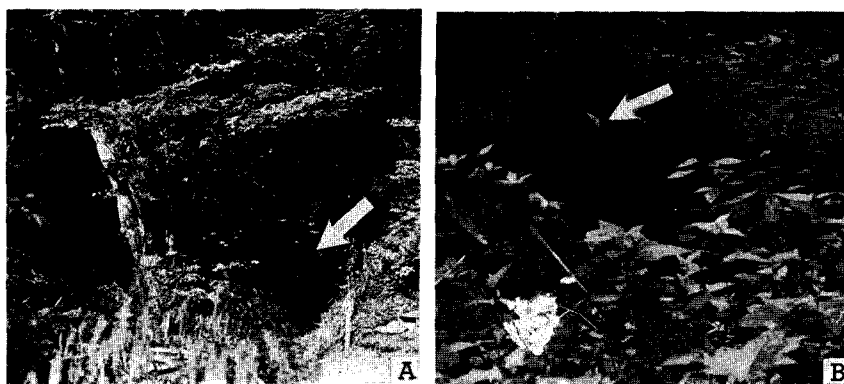


Fig. 2. Photographs showing a collecting site on the half way up to Maruyama (117 meters in altitude) in the vicinity of Hirowo, where flies of *D. raridentata*, a new member of the drosophilid fauna in Japan, were obtained. A: an arrow indicates the entrance down to dark grassy damp ground with a brooklet. B: an arrow indicates a trap at the damp ground.

Drosophila bifasciata is very common in highland areas of Hokkaido (Momma 1957, Takada 1958). This species was relatively abundant in Kamisatsunai where collecting sites were chosen at about 600 m in altitude. In the other six localities, the relative frequencies were rather or extremely low. Takada (1960) also noted the preponderance of *bifasciata* on Mt. Toyoni in the Hidaka Mountains, where collecting sites were placed ranging from 700 to 1105 meters elevation. Moriwaki *et al.* (1967) described *Drosophila imaii*, a new sibling species related to *D. bifasciata*. According to them, this species was nearly always found together with *bifasciata* in the same locality. This species can be collected at low elevations in early summer and the distribution is confined to Hokkaido. They reported no flies of this species in the southwestern and southern parts of Hokkaido. The present survey noted the occurrence of *D. imaii* in the two mountainous localities, such as Hidaka-Nukabira and Kamisatsunai.

Drosophila testacea is common in Hokkaido (Momma 1957), with a wide distribution covering low to high elevations (Takada 1960). Especially this species has a tendency to increase in its relative frequency with elevations, since the relative abundance of the other *Drosophila* species decline (Takada 1958). This

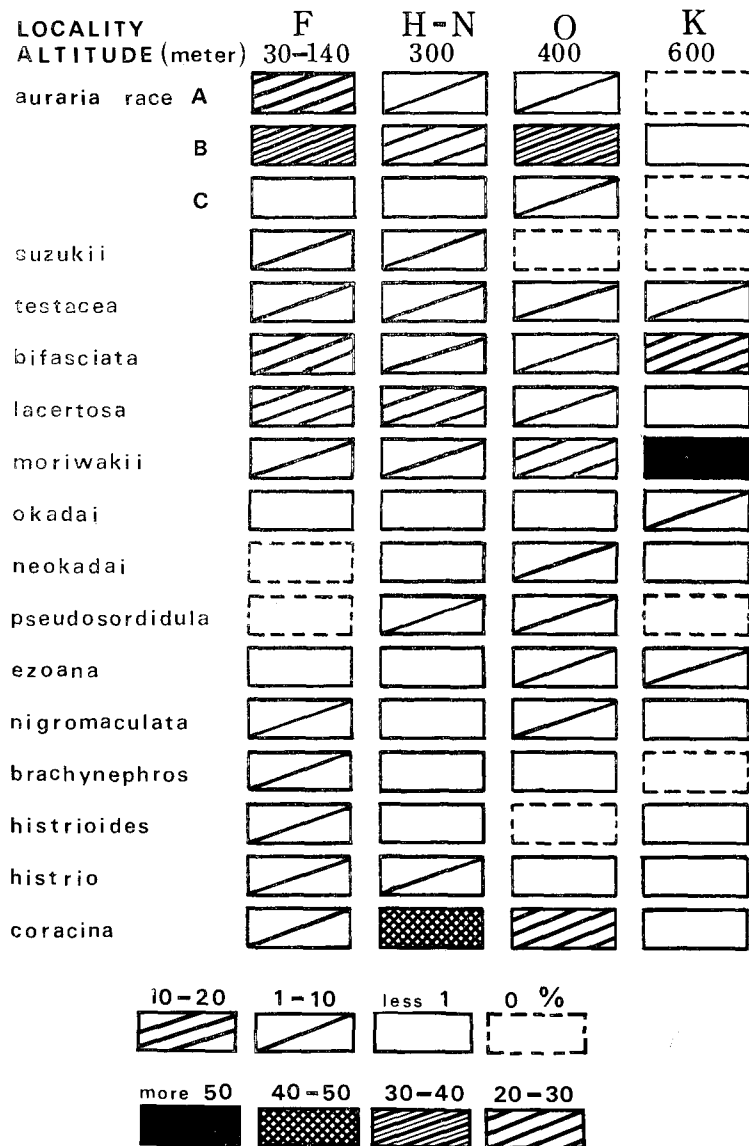


Fig. 3. Altitudinal distribution in relative frequency (%) of common species of *Drosophila* attracted to fermented fruits in the Hidaka district. F: Fuyushima. H-N: Hidaka Nukabira. O: Ôyubari. K: Kamisatsunai.

species was obtained in all localities, except Shimukapp-Chu-O and Erimo, with more or less 5% relative frequency of the total specimens collected.

The *robusta* species group were found in all localities with an exception of Erimo cape, where collections were made only by a net. This species group preferred humid environments and occurred conspicuously in riverside areas (Kaneko *et al.* 1968). Especially, *D. lacertosa* and *D. moriwakii* were abundant in deciduous wood lands of northern parts of Japan. The former predominates at lower elevations (Momma 1957, Kaneko & Tokumitsu 1963), while the latter's relative frequency increases at higher elevations (Kaneko, unpubl.). Indeed, in the Hidaka district, *D. lacertosa* was superior in occurrence to *D. moriwakii* at altitudes ranging from about 30 to 350 meters, for instance in Hirowo, Fuyushima, Hidaka-Nukabira and Shimkapp-Chu-O. On the contrary, a inverse relation was obvious at higher elevations than about 400 meters, for instance in Ôyubari and Kamisatsunai localities. Similar situation was obtained other districts of Hokkaido (Kaneko, unpubl.). It is speculated that the superiority of *lacertosa* is gradually replaced by that of *moriwakii* at about 400 meters above sea level. At higher elevations than the haunt of *moriwakii*, the population composition seems to be predominated by *D. okadai* and *D. neokadai* (Kaneko, unpubl.). In the Hidaka district, these two species showed a tendency to increase in the relative frequency with elevations, though it was not very clear-cut. Kaneko observed the preponderance of *okadai* and *neokadai* sympatrically and the absence of *lacertosa* and *moriwakii* at the area near or along streams in Yukomanbetsu (about 1100 meters in altitude) on the way up to Mt. Asahi in the Daisetsu Mountains, in summer, 1965 and Autumn, 1968 (Kaneko, unpubl.). They seem to be the most extensive in a vertical distribution. Furthermore the two species have the most preference to wet environments. They showed a strong attraction to banana traps placed along or over streams in several localities (Kaneko, unpubl.).

Besides *robusta* species group, we know another species which prefers to wet environments: it is *D. ezoana* of the *virillis* group. It is widely distributed around water systems from northern part of Honshu island to all over Hokkaido island. The relative frequency of this species in the Hidaka district was less than 2 per cent of the total specimens caught at each of the localities surveyed, ranging from 30 to 600 meters above sea level. This species was also recorded from higher altitudes; 700 m elevation in the Hidaka Mountains (Takada 1960), and more than 1000 m in the Daisetsu Mountains (Kaneko, unpubl.). The features suggests that *D. ezoana* is one of species sharing the most extensive vertical distribution. *D. ezoana* occurred with higher frequency at 400 and 600 elevations of altitudes ranging from 30 to 600 meters. This is of interest in relation to fact that *D. ezoana* showed the coldest resistance in hibernation experiments on *Drosophila* species undertaken by Takada and Toyofuku (1960).

Drosophila coracina is known as a unique species on account of its diurnal behavior, with a peak in the daytime (Lee 1962, Kaneko 1968), while most other *Drosophila* species showed one or two peaks in the morning and the evening. In

the Hidaka district this species gave high relative frequencies at 300 and 400 m elevations (Hidaka-Nukabira and Ôyubari), so far as the present collections are concerned.

Drosophila historioides (subgenus *Hirodrosophila*) and *D. histrio* (subgenus *Drosophila*) are relatively allied to each other in external morphology. The two species were collected in most localities in this survey. They occurred also at higher elevations than the localities where the present collections were made. The distribution was ascertained at 700 m on Mt. Toyoni (Takada 1960) and more than 1000 meters on the Daisetsu Mountains (Takada 1957, and Kaneko, unpubl.). It is likely that *D. historioides* and *D. histrio* have a great extent in the vertical distribution, from the level of the sea shore to more than 1000 meters above. But the relative frequencies tended to decline with elevation so far as the present survey is concerned.

Finally, *D. suzukii* is a species common in the southern part of Hokkaido (Momma, 1965). In the Hidaka district this species was not obtained at the altitudes of more than 400 meters.

Unusual sex-ratios were noted in some species. The considerable preponderance of males occurred in *Amiota alboguttata*, *A. variegata*, *Scaptomyza pallida*, *S. polygonia*, *Drosophila bifasciata*, *D. auraria* races, A, B and C, *D. suzukii*, *D. lacertosa* and *D. pseudosordiula*. The pronounced female superiority was observed in *Drosophila trivittata*, *D. coracina*, *D. helvetica*, *D. nigromaculata*, *D. testacea*, *D. ezoana*, *D. okadai* and *D. neokadai*.

The distinct preponderance of males in *D. auraria* was reported by Momma (1964). According to him the frequencies of females are very high in the beginning and the end of the season, and very low in the middle, in the University Botanical Gardens, so far observed in seven years (1956–1962). The distinct male superiority of *D. suzukii* was also reported in other localities of Hokkaido (Takada 1957, Momma 1965, and Kaneko, unpubl.), Honshu (Wakahama 1962) and Korea (Lee 1965). Male superiority of *D. bifasciata* occurred in several other localities (Ishiara 1955, Takada 1958, and Kaneko, unpubl.). The remarkable female preponderance in *D. testacea* and *D. nigromaculata* was also found in many other localities of Hokkaido (Ishiara 1955, Takada 1960, Kaneko & Shima 1962, Kaneko *et al.* 1958, and Kaneko unpubl.). The marked preponderance of males or females in *S. pallida*, *D. coracina*, *D. ezoana*, *D. lacertosa*, *D. okadai* and *D. neokadai* was noted in some other localities of Hokkaido (Takada 1957, 1958, and Momma & Kaneko, unpubl.).

It is uncertain at the present status that unusual sex-ratios as above observed are responsible for a real picture or for a differential attraction to the baits. Here speculation may be possible on the bases of our rather long period observations (Sapporo in 1956–1962, and Nopporo in 1962–1966) that sex ratio tends to fluctuate by season in certain species.

Summary

Collections of drosophilid flies were made in seven localities of the Hidaka district, southern Hokkaido, in the summer of 1962, 1963, 1964, 1966 and 1967. A total of 11,070 specimens were obtained: they are represented by 52 species (56 forms) belonging to 6 genera (*Amiota*, *Leucophenga*, *Microdrosophila*, *Chymomyza*, *Scaptomyza* and *Drosophila*). Most of them were collected with traps containing fermented fruits, while some were secured by net sweeping on various vegetations and near or on human eye. *Amiota alboguttata* f. *elongata*, *A. alboguttata*, f. *clavata*, *Chymomyza atrimana*, *Drosophila rardientata* and *D. (Hirtodrosophila)* sp. were new to fauna of the family Drosophilidae in Hokkaido. *Drosophila imaii*, a sibling species related to *D. bifasciata*, was distributed in the Hidaka Mountains. Cohabitation of the three races of *D. auraria* was observed in 3 out of 7 localities. In other 4 localities only race B was obtained. Some analyses were made with respect to the vertical distribution in abundant and common species (Fig. 3). The occurrence of the *robusta* species group was represented by *D. lacertosa*, *D. moriwakii*, *D. okadai*, *D. neokadai*, *D. sordidula* and *D. pseudosordidula*. Among them the preponderant species seemed to replace correspondingly with elevation. Unusual sex-ratios were noted in 17 species, showing a male superiority in 9 species and a female superiority in 8 species.

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