

HABITAT STRUCTURE OF A DROSOPHILID COMMUNITY AT INUVIK, NWT, CANADA (DIPTERA: DROSOPHILIDAE)

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The northern subarctic region is the limit of the distribution of Drosophilidae (Toda 1984); the family is of tropical origin (Throckmorton 1975). Hence, a drosophilid community inhabiting the northernmost subarctic region is likely to have a relatively simple community structure. This note presents information on the habitat preferences of a drosophilid community at Inuvik (68°22' N, 133°45' W) in the Mackenzie delta, Northwest Territories, Canada.

Sixteen traps of 'retainer' type I (Toda 1977a) baited with banana fermented by Baker's yeast were set for 9 days (31 July to 8 August 1980) in 7 environments as follows: (1) Four traps (1-4) were used to investigate the vertical stratification in a birch (*Betula papyrifera*) forest. The upper two traps (No. 1 at 10.5 m and No. 2 at 5.5 m) were suspended by a rope hung from a bough of the canopy, No. 3 was set at the shrub layer (1 m high), and No. 4 on the ground (0.1 m high). The canopy of the forest was not completely closed, so that the vegetational stratification was somewhat indefinite. (2) Nos. 5 and 6 were placed in birch-shrub patches in a valley-like lowland. (3) Nos. 7 and 8 were placed in alder bushes in an area burned by a forest fire in 1968. (4) Nos. 9 and 10 were placed in birch trees beside a building at the Inuvik Scientific Resource Centre. (5) No. 11 was placed beside a pond and No. 12 in a willow grove between the pond and the East Channel of the Mackenzie River, relatively close to human habitations. (6) Nos. 13 and 14 were placed beside a pond, remote from human habitations. (7) Nos. 15 and 16 were placed beside a stream (ca. 3 m wide) running through a forest in the valley-like lowland.

The classification of heterogeneous habitats was made by cluster analysis (UPGMA), details of which are described in Toda and Tanno (1983). The species-habitat correspondence was also demonstrated by the method of Toda and Tanno (1983). Samples and species containing a total number of individuals below a certain limit (for samples, the limit was 11, the total number of species; for species, the limit was 16, the total number of traps) were excluded from these analyses.

A total of 811 individuals of 11 drosophilid species was obtained. Figure 1 shows the result of cluster analysis for the similarity of sample composition among trap sites. The 14 trap sites were classified into 6 habitats. The first habitat included five trap sites, Nos. 1-3, 5, and 6. Nos. 1-3 were traps set higher than 1 m in a birch forest, and Nos. 5 and 6 at birch shrubs. Therefore, this habitat was regarded as representing the foliage environment of various forests. The second habitat consisted of only one trap site, viz., No. 4 set on the ground of the birch forest, representing the forest-floor environment. The third corresponded to Nos. 7 and 8 at alder bushes in a burned area. The fourth included four trap sites, Nos. 9-12, in and near human habitations. The fifth corresponded to No. 13 at pondside, and the sixth to No. 15 at streamside.

The species-habitat correspondence is shown in Table 1. *Amiota quadrata* corresponded to the forest foliage, and was particularly abundant at traps 2 and 3. Thus, this species showed a habitat preference for the foliage environment. The relatively large sample size of this species at trap 14 may be due to the fact that this trap was set in the foliage of a shrub beside a pond. The habitat preference for the foliage layer is characteristic of the genus *Amiota*. Many species of this genus have been observed distributed more or less exclusively in the canopy foliage layer in temperate forests (Basden 1953; Toda 1977b; Beppu 1980). Two species of the quinaria group, *Drosophila transversa* and *D. rellima*, showed preferences for the forest floor, though the latter species was more eurytopic. This habitat preference for the forest floor is common to temperate relatives of the same species group. All Japanese species of the quinaria group are characteristic inhabitants of the forest

Table 1. Number of drosophilid flies collected by 16 traps at Inuvik, with indication of the community habitat structure. Species-habitat correspondence is indicated with square enclosure (solid: primary correspondence; broken: secondary). Two trap samples (Nos. 14 and 16) and five species, which were excluded from the correspondence analysis, are also incorporated in this table, though indicated in parentheses. (cf. the caption of Fig. 1 for habitat explanations)

Habitat Trap No.	I					II	III			IV				V		VI		TOTAL
	1	5	2	3	6	4	7	8	9	10	11	12	13	(14)	15	(16)		
<i>Amiota quadrata</i>	1	2	10	7	-	-	1	1	1	-	-	-	-	6	-	-	29	
(<i>Drosophila borealis</i>)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	
<i>D. transversa</i>	1	4	1	-	-	5	1	3	1	-	-	3	-	-	1	-	20	
(<i>Chymomyza caudatula</i>)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
<i>D. rellima</i>	2	2	5	31	-	6	1	13	-	1	-	1	13	-	-	-	75	
(<i>Ch. aldrichii</i>)	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	3	
<i>D. athabasca</i>	17	26	32	114	19	20	8	20	31	23	27	67	19	1	16	1	441	
(<i>D. testacea</i>)	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	2	
<i>Ch. costata</i>	1	5	3	7	2	-	5	19	46	26	16	55	12	-	-	-	197	
<i>D. montana</i>	-	-	-	-	-	1	-	-	9	4	7	3	10	-	5	1	40	
(<i>Ch. tetonensis</i>)	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	2	
TOTAL	22	40	51	161	21	32	16	57	88	55	51	130	55	8	22	2	811	

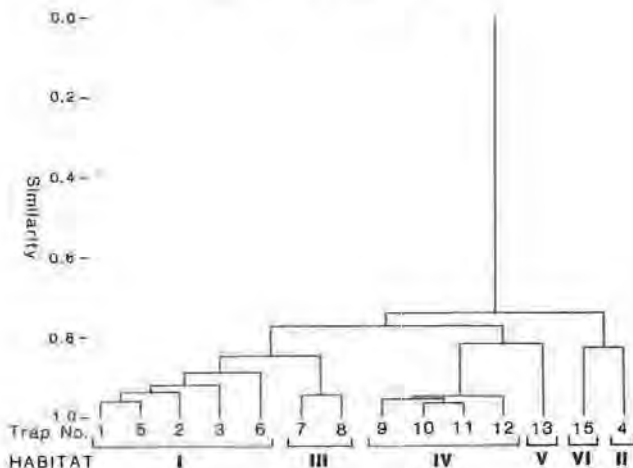


FIG. 1. Cluster analysis (UPGMA) of trap samples at Inuvik. Habitat I: forest foliage, II: forest floor, III: burned area, IV: human habitations, V: pondside, VI: streamside.

floor (Toda 1977b, 1982; Beppu 1980, 1984). The most abundant species, *D. athabasca*, comprising more than half (54.4%) of the total sample, corresponded primarily to the forest foliage and the human habitations, and secondarily to the forest floor, the burned area, the pondside and the streamside, showing the most eurytopic nature. The second predominant species, *Chymomyza costata*, corresponded primarily to the human habitations, and secondarily to the burned area and the pondside. *Drosophila montana* showed a specific preference for waterside environments, the pondside and the streamside. Thus, the habitat differentiation among members of this northern drosophilid community seems to occur along a habitat gradient: forest foliage — forest floor — human habitations — watersides. This habitat gradient is essentially the same as in a northern Finnish subarctic community (Lumme *et al.* 1979).

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