Drosophila has only been presented in thesis form (Schmidt 1975) though ocellar ultrastructure has been published for the fleshfly (Toh et al. 1971).

We thank Allen Shearn for providing the mutant and the HVEM Laboratory for beam time. This work was supported by a Faculty Development Award to WSS from UMC, a Summer Research Fellowship to WSS from the UMC Graduate School Research Council and Hatch grant 2100 to SDC. We thank H.-M. Chu from the HVEM laboratory for technical assistance.

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Toda, M.J. Hokkaido University, Sapporo, Japan. The northernmost subarctic Drosophilidae.

The northernmost areas of the Holarctic region are the most interesting for consideration of biogeographical relationships between the two continents, Eurasia and North America, for it is there that the two continents were sometimes connected in the past and are the closest even at the present time, through Beringia and several Arctic islands. In a recent monograph on drosophilid biogeography (Ashburner et al. eds. 1981), Wheeler (1981) and Bächli & Rocha Pite (1981) reviewed Nearctic and Palaearctic drosophilids, respectively, but did not specify the northernmost fauna in the two regions.

The strong cohesion of drosophilid distribution to woodland areas has been confirmed not only latitudinally (Basden 1956; Wheeler & Throckmorton 1960) but also altitudinally (Burla 1951; Basden & Harnden 1956; Bächli 1977), except for some specimens sporadically collected far beyond the forest boundary. It can be, therefore, concluded that the northernmost drosophilid fauna as a biogeographical entity is virtually confined to the subarctic forest zone, never deeply entering the real tundra.

Basden (1956) listed a total of 23 arctic species by choosing arbitrarily the Arctic Circle as the southern limit of the area, though this is obviously artificial and biologically meaningless as recognized by himself. Since then, considerable information on northern drosophilid fauna has been brought from several subarctic localities, Alaska (Wheeler & Throckmorton 1960), northern Finland (Lumme et al. 1979), and Mackenzie Delta, N.W.T., Canada (Takada & Toda 1981). By reviewing these reports, the northernmost subarctic drosophilid fauna are listed below. The chorological types are classified into four: Palaearctic (P), Nearctic (N), Holarctic (H) and Cosmopolitan (C); and are given before the specific number.

P 1 Cacoxenus (Paracacoxenus) argyreator Frey
P 2 Stegana (Stegana) furta (Linne)
P 3 St. (Steganina) stroblii Mik
H 4 St. (Stn.) coleoptrata (Scopoli)
P 5 Amiota (Amiota) alboguttata (Wahlberg)
N 6 A. (A.) quadrata Takada et Toda
N 7 A. (A.) sp. Wheeler & Throckmorton 1960
P 8 Chymomyza fuscimana (Zetterstedt)
N 9 Ch. aldrichii Sturtevant
N 10 Ch. coxata Wheeler
N 11 Ch. tetonensis Wheeler
N 12 Ch. wirthi Wheeler
H 13 Ch. caudatula Oldenberg
H 14 Ch. costata (Zetterstedt)
P 15 Scaptomyza (Scaptomyza) flava (Fallen)
P 16 Sc. (Sc.) griseola (Zetterstedt)
N 17 Sc. (Sc.) nigrita Wheeler
H 18 Sc. (Sc.) graminum (Fallen)
H 19 Sc. (Sc.) montana Wheeler
H 20 Sc. (Sc.) teinoptera Hackman
P 21 Sc. (Sc.) sp. (= Finnish Sc. ?montana Basden 1956)
N 22 Sc. (Hemiscaptomyza) terminalis (Loew)
H 23 Sc. (Hsc.) trochanterata Collin
H 24 Sc. (Hsc.) unipunctum (Zetterstedt)
C 25 Sc. (Parascaptomyza) pallida (Zetterstedt)
P 26 Sc. sp. Lumme et al. 1979
N 27 Sc. sp. Wheeler & Throckmorton 1960
P 28 Drosophila (Sophophora) alpina Burla
P 29 D. (So.) bifasciata Pomini
P 30 D. (So.) eskoi Lakovaara et Lankinen
P 31 D. (So.) obscura Fallen
P 32 D. (So.) subsilvestris Hardy et Kaneshiro
N 33 D. (So.) athabasca Sturtevant et Dobzhansky
N 34 D. (So.) populi Wheeler et Throckmorton
C 35 D. (So.) melanogaster Meigen
P 36 D. (Lordiphosa) fenestrarum Fallen
C 37 D. (Dorsilopha) busckii Coquilett
P 38 D. (Hirtodrosophila) lundstroemi Duda
P 39 D. (H.) subarctica Hackman
C 40 D. (Drosophila) funebris (Fabricius)

P 41 D. (D.) ezoana Takada et Okada
P 42 D. (D.) littoralis Meigen
P 43 D. (D.) lummei Hackman
N 44 D. (D.) borealis Patterson
H 45 D. (D.) montana Patterson et Wheeler
C 46 D. (D.) immigrans Sturtevant
H 47 D. (D.) testacea von Roser*
P 48 D. (D.) phalerata Meigen
N 49 D. (D.) rellima Wheeler
H 50 D. (D.) transversa Fallen
N 51 D. (D.) melanderi Sturtevant

* Takada & Toda (1981) reported D.putrida from MacKenzie Delta, but that was a misidentification of D.testacea.

The northernmost subarctic drosophilidfauna is characterized by the relative richness in species number of the following taxa: Chymomyza, Scaptomyza, the obscura group (Nos. 28-33) and the virilis group (Nos. 41-45). It is notew thy that the southernmost antarctic drosophilidfauna is monopolized by Scaptomyza (Brncic & Dobzhansky 1957). The relative percentages of the four chorological elements, calculated by excluding unidentified species, are as follows: Palaearctic (19 spp., 40.4%), Nearctic (12 spp., 25.5%), Holarctic (11 spp., 23.4%) and Cosmopolitan (5 spp., 10.6%). The relatively high percentage of Holarctic elements suggests that the intercontinental faunae exchange, possibly across Beringia, repeatedly occurred until relatively recent times in the northernmost subarctic region.

This work is No. 2357 contributed from the Institute of Low Temperature Science, Hokkaido University.

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Tolchkov, E.B. and V.A.Gvozdev. Institute of Molecular Genetics, USSR Academy of Sciences, Moscow USSR. The structure of two rearrangements resulting in the Pgd gene position effect in Drosophila melanogaster.

The study shows that the previously described rearrangements T(1;4)pn2 and Tp(1)pn3 (Ilyina et al. 1980) are pericentric inversions, designated In(1LR)pn2a and In(1LR)pn2b, respectively, with very similar genetic structurs.

Analysis of recombination in pn2a/y cv v f car females has shown the genetic map of the rearrangement to differ from that of the normal X chromosome. The pn2a rearrangement is characterized by the following order of the markers: cv-v-f-car-y (cf. y-cv-v-f-car in the normal chromosome). The distances between the y gene and the markers nearest to it, car and f, in the rearrangements are in good agreement with the reported (Schalet & Lefevre 1976) distances between these markers and the centromere. The easiest way to explain these results is to assume that the distal section of the X chromosome carrying the y^+ gene is transferred to the centromeric region of the X chromosome and not to the 4th chromosome, as formerly believed. The genetic maps of the rearrangements pn2a and pn2b do not differ. Analysis of the polytene chromosome shows the distal end of the rearranged chromosome to break off in the 2DE region. The telomere of the rearranged chromosome consists of heterochromatic material, as attested by its metachromasy (bluish staining with azure-eozine, as opposed to the violet staining of the bulk of the chromosomes) and the presence of highly repetitive sequences, probably satellite DNA, revealed by in situ hybridization with total labelled DNA in a set-up where the hybridization of highly repetitive DNA is selectively favoured. THe 1A-2DE region is associated with the chromocenter through the 2DE segment. The metaphase chromosomes show an enlarged XR the size of the 4th chromosome, which probably corresponds to the 1A-2DE fragment. Comparative analysis of the data on the recombination and structure of the polytene and metaphase chromosomes suggests that the rearrangements are pericentric inversions of the X chromosome (Figure 1).

The euchromatic break point of the inversions lies in the 2D-F region, whose fine genetic structure has been studied earlier (Gvozdev et al. 1973; Gvozdev et al. 1975). Genetic analysis has demonstrated that in both inversions the genes corresponding to