Case 3: Presence of mutation at the end of the second series of crosses and absence on the first one: The unstability would be due to genes of the II chromosome in the unstable strain. Case 4: Absence of mutation at the end of the both series of crosses: The unstability would not be caused by transponsable genetic elements, without being able to specificate which genes of the unstable strain are responsible for it.

NOTES: (1) The chromosomes coming from the unstable strain are indicated by the notation (m). (2) 'a', 'b' and 'c' indicate the recessive markers used in order to detect the presence of mutation.

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Stark, W.S., K.Srivastava, S.D.Carlson* and M.B.Garment.* University of Missouri, Columbia, USNA. *University of Wisconsin, Madison USNA. Characteristics of none, a mutant with no ocelli and narrow eyes.

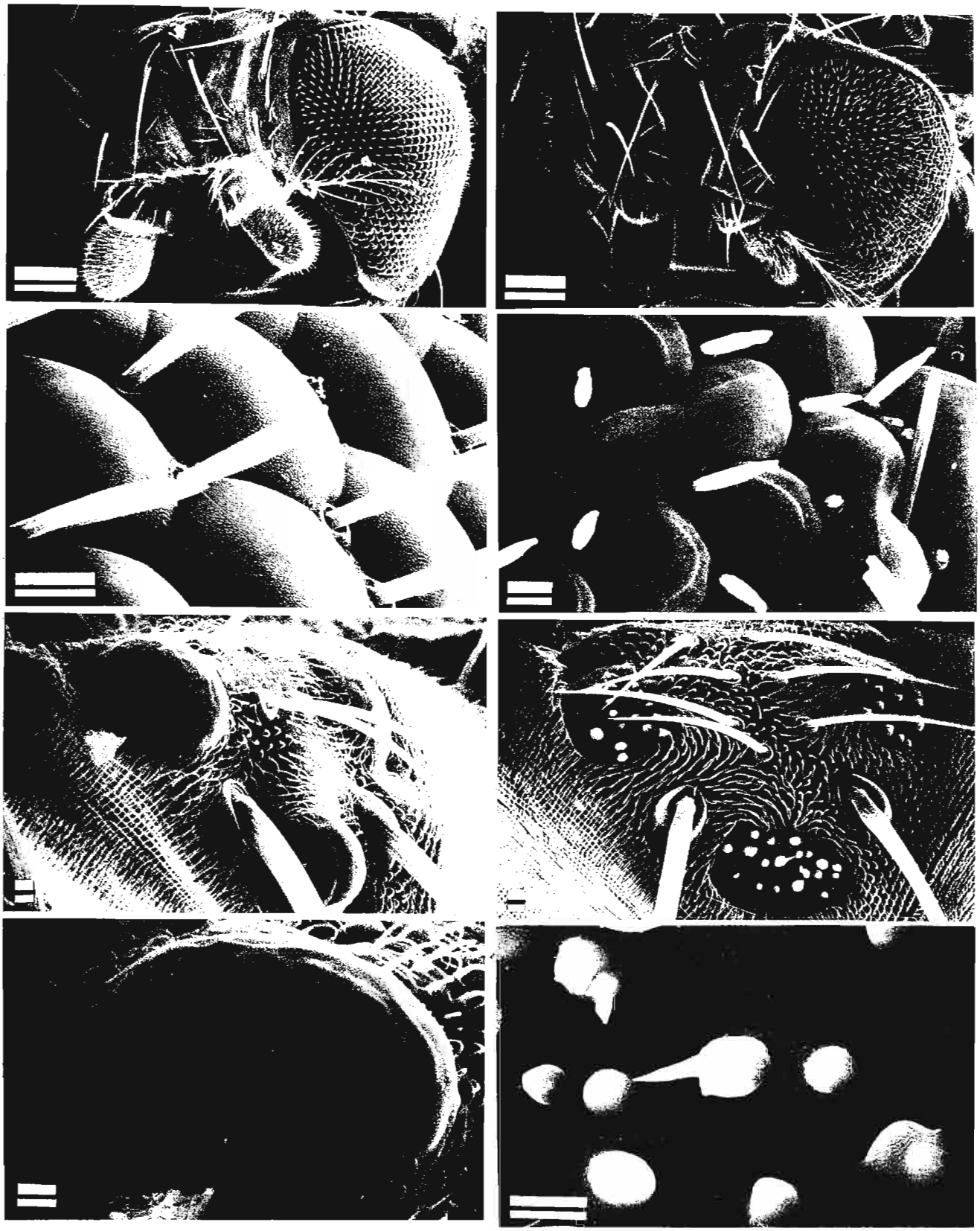
Drosophila mutants with abnormalities of the visual system have been widely used for studies of the development and function of the visual system. Some years ago, one of us (WSS) obtained a mutant from Allen Shearn at The Johns Hopkins Univeristy. Shearn had names this mutant "no ocelli, narrow eyes (none)." In an effort to process this mutant for further electrophysiological studies of receptor function and microspectrophotometric studies of the photopigment, this mutant was made white eyed with w using standard Mendelian genetics. Now only the w;none stock is retained. The initially disappointing finding was that the compound eye had no electroretinogram (ERG), and thus, if there were receptor cells, they did not work (c.f. Stark et al. 1976). Further, the eye showed no deep pseudopupil or optical density changes, thus revealing no photopigment (c.f. Stark & Johnson).

Based on these physiological findings we sought ultrastructural evidence to explain this dysfunction. We processed flies for histology, transmission electron microscopy and scanning electron microscopy. The accompanying plate shows the external featuresof the head from scanning electron micrographs. (Calibration bars show 100 microns, top row, 5 microns, remainingrows.) The external morphology of the compound eye is in some disarray (right) when compared with a control fly (left). On higher magnification (second row) the fusion of corneal facets and displacement of corneal hairs can be observed; yet the mutant does have the characteristic corneal nipples, the fine granularity which functions as an impedance matching device and an anti-reflective coating. On close examination of the ocellar area (third and fourth rows) the normal fly's ocellar lenslets and the remnants of the mutant's lenselts can be observed.

We have preliminary observations of the compound eye from the High Voltage Electron Microscope (HVEM), an NIH Biotechnology Resource in Madison, WI (c.f. Stark & Carlson 1983). In spite of the external corneal disarray, Semper cells are present as are the pseudocones which the former secrete. A corneal lenslet with its underlying pseudocone make up the distal dioptric (optical) apparatus for one ommatidium. Proximally, the compound eye's peripheral retina is separated from the first synaptic neuropile (lamina ganglionaris) by a basement membrane. Between these dioptric and basement membrane areas there is a complete absence of photoreceptor cells. Most of the volume of the peripheral retina is occupied by pigmented glia based on cell morphology, electron density and types of organelles. In a survey of this metaplasia we found no recognizable specializations such as rhabdomeres (the microvillar organelles which house the visual pigment molecules). Also, beneath the basement membrane, glial elements and interneurons exist. Yet we have observed no organization such as the normal fly's optic cartridges which are formed by terminals of receptor axons onto discrete clusters of lamina monopolar interneurons. In conclusion, the finding of an all glial cell mass in the peripheral retina readily explains the lack of an ERG and the deep pseudopupil.

The morphological features of none's compound eye are not unlike those of Glued mutants (Harte & Kankel 1982). Possibly none is an allele of Glued. Unfortunately, the micrographs of Glued do not show the ocellar area.

We hope to further characterize the specific cellular and developmental deficits in this mutant. It would be particularly useful to section the ocelli of none flies and to compare these structures to those of normal flies. To our knowledge, ocellar ultrastructure in



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

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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)