

Agnew, J.D. University of the Witwatersrand, Johannesburg, South Africa. Morphological differences in larval *D. melanogaster* and *simulans*.

Third instar larvae (♂♂ and ♀♀) of wild-type strains of *melanogaster* (Cape Town) and *simulans* (Zoutpansberg) were fixed in the extended condition in warm (45-50°) Bouin, washed and dehydrated in an ascending ethanol series. After mounting ventral side up, larvae were coated

first with silver and then gold and examined under scanning electron microscopy (Cambridge 'Stereoscan').

Attention was concentrated on the ventral bands of minute teeth and hooks ornamenting the integument. Larvae have paired rows of teeth above the mouth (head segment), and eleven bands of teeth, one on each segment, i.e. three on the thoracic segments and eight on the abdominal segments. The postoral bands are weakly developed dorsally and laterally and strongly developed ventrally. The oral and thoracic bands are scarcely visible under the highest power of the (light) stereo microscope, being colourless, whereas the abdominal bands are black and thus are more readily seen. A well-developed band, such as occurs in the middle region of the larva, consists of 6-8 irregularly developed rows of teeth.

Some typical results are shown in the photomicrographs. The number of oral rows was impossible to determine because in most specimens the head was not fully extended; better fixation should rectify this. Eight pairs of oral rows are seen in the photo of *simulans*. The thoracic bands consist of rows of flat triangular teeth, the free apex of each tooth making an angle of about 30°. Abdominal bands consist of rows of varying sizes of conical teeth with the ends directed cephalad (anterior rows) and caudad (posterior rows). Sex differences were not observed within a species. Some differences between *melanogaster* and *simulans* are: (1) the oral teeth are relatively more slender in *melanogaster* (see Figs. 1, 2, 6); (2) in the second thoracic band, the teeth are set closer together in *simulans* than in *melanogaster* (Figs. 3, 7). Teeth in this band were counted from the photographs, per units of 50 μ with the following results from three specimens: (Figures on following pages)

Numbers of teeth/50 μ, second thoracic band, ventral

| | <u>mean ± std. dev.</u> | <u>coeff. variation</u> |
|-----------------------------|-------------------------|-------------------------|
| (1) <i>melanogaster</i> ♀ | 10.30 ± 0.62 | 6.02 |
| (2) <i>melanogaster</i> ♂ | 11.25 ± 1.25 | 11.11 |
| (3) <i>simulans</i> (sex ?) | 16.50 ± 2.07 | 12.54 |

Variance-ratio test between (1) & (2): F = 4.05, P > 0.10
 " " " " (1) & (3): F = 11.17, P > 0.05

t test for difference between means:

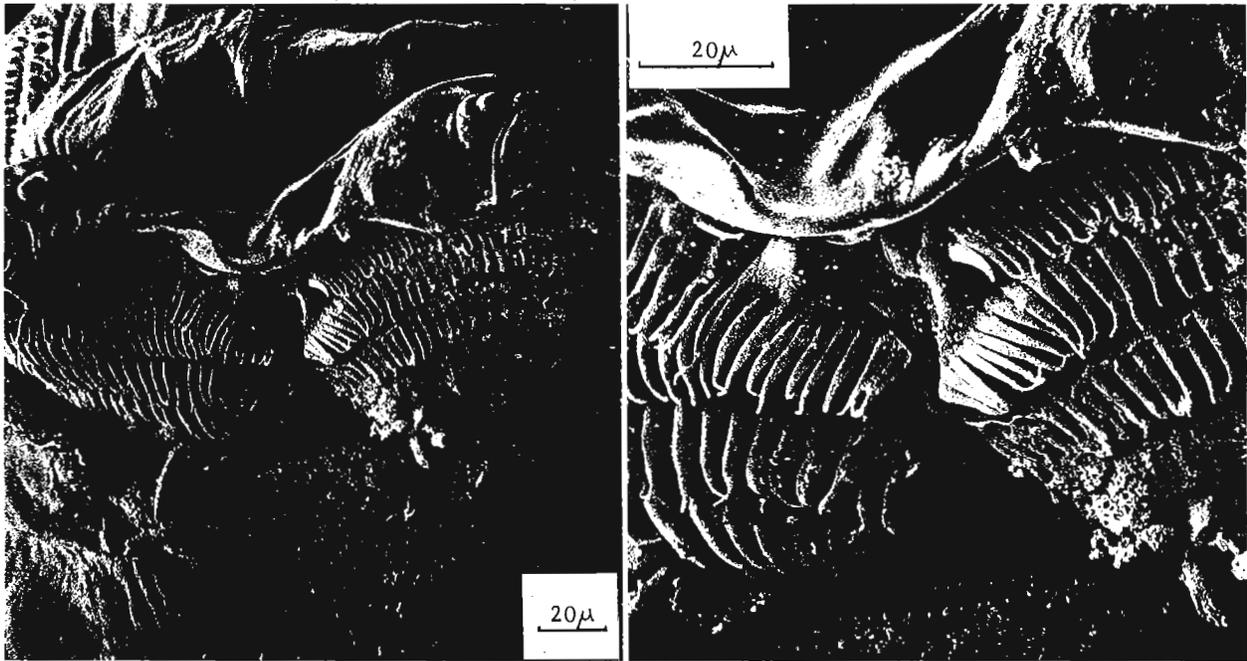
between (1) & (2): t = 1.16, d.f. = 5, P > 0.10
 " (1) & (3): t = 2.99, d.f. = 5, P < 0.05*
 " (2) & (3): t = 2.51, d.f. = 6, P < 0.05*

* significant at 5 percent level.

The conclusion is that, in the specimens studied, there is no sex difference in mean tooth number, in *melanogaster* at least; but that *simulans* has a significantly higher mean number than *melanogaster*.

A fuller study is planned. The teeth must play a role in the movement of the larva through the food medium, and it may later be possible to correlate the differences noted above with the consistency of the food under natural conditions. The denser packing of teeth in *simulans* may indicate an adaptation to a firmer or drier substrate offering more resistance to the passage of the larva. Evidence supporting this: *simulans* becomes more abundant relative to *melanogaster* during hot dry summer months (1); and in the lab pupates mainly on the food surface (2). These observations appear to indicate an adaptation to a drier medium. Also, Hoenigsberg (3) has described how a change in the biotic environment (elimination of soft fruits) led to an immediate change in the *melanogaster/simulans* ratio favouring the latter species.

References: (1) Patterson, J.T. 1943, Univ. Texas Publ. 4313; (2) Sameoto, D.D. and R.S. Miller 1968, Ecology 49:407; (3) Hoenigsberg, H.F. 1968, Amer. Nat. 102:389.



Figures 1 and 2: *D. melanogaster* ♂, oral region.

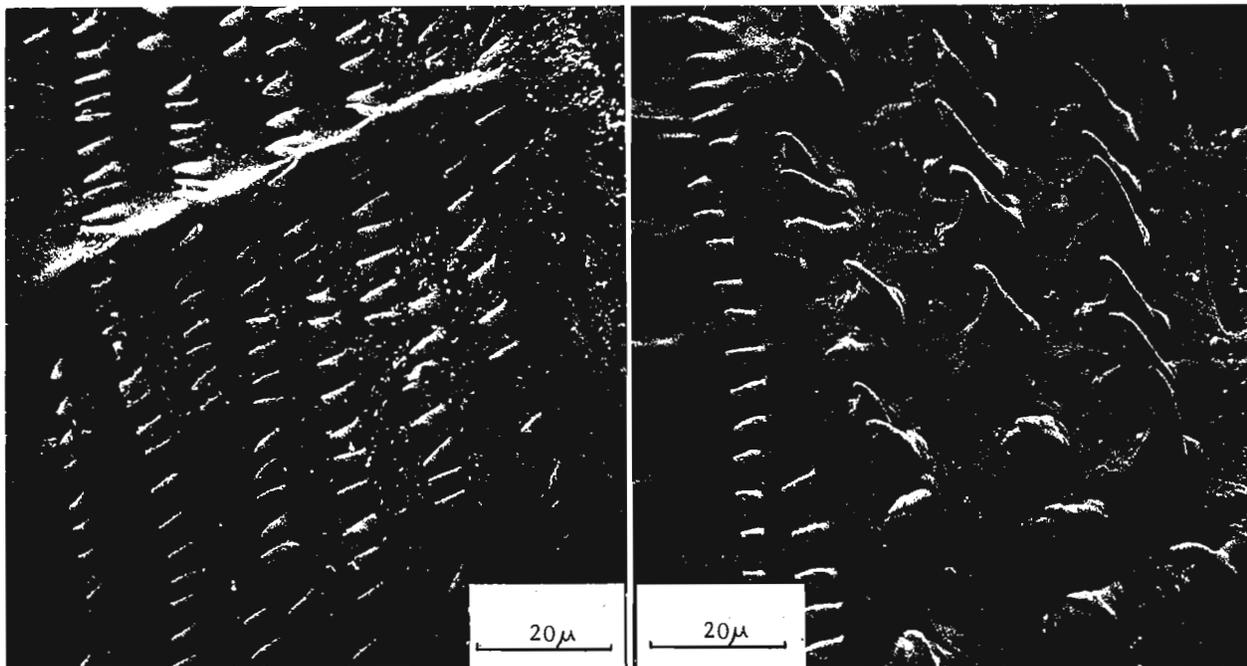


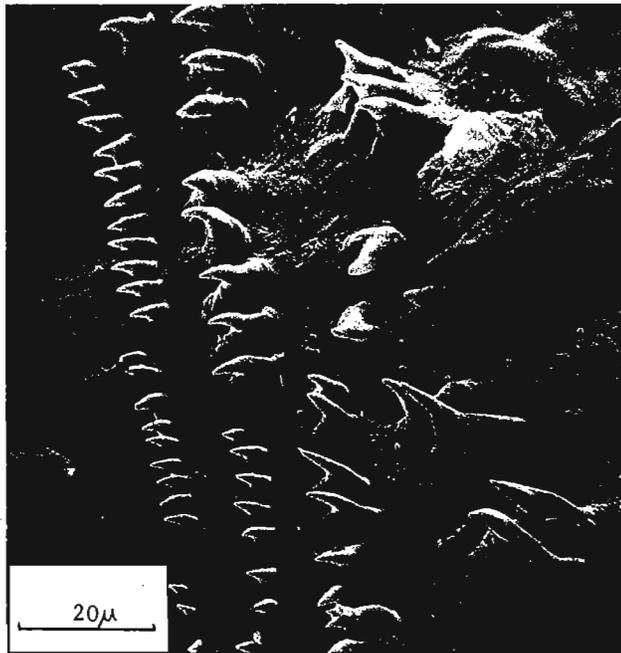
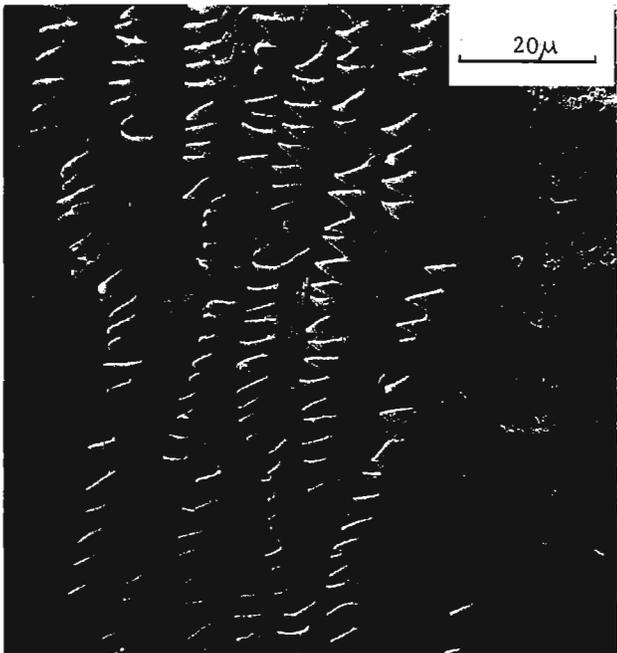
Figure 3: *D. mel.* ♂, second thoracic band

Figure 4: *D. mel.* ♂, first abdominal band



Figure 5: *D. mel.* ♂, third abdominal band

Figure 6: *D. simulans* (? sex), oral region



Figures 7 and 8: *D. simulans* (? sex), second thoracic band (7) and first abdominal band (8)