Kuhn, D. T., and M. L. Sawyer. Department of Biology, University of Central Florida, Orlando, FL 32816. Distribution pattern of spinules and hairs on the dorsal surface of the 3rd instar *D. melanogaster* cuticle.

Morphological specializations on the *D. melanogaster* larval cuticle have provided valuable clues as to the function of many genes required during early development. Most of the focus has been on mutant transformations in the 1st instar stage. However, for mutants that survive to later larval stages, cuticle analysis can provide further insights into developmental fate since the morphology is quite complex. We detail here the specializations found on the dorsal surface of the 3rd instar larval cuticle, which allow one to distinguish between all abdominal segments. The analysis emphasizes differences between compartments and parasegments. Features not addressed here are the sensory pits and hairs in the naked cuticle regions.

The anterior compartment of the 3rd thoracic segment (aT3) is characterized by 5 to 6 rather horizontal rows of very small triangular, posterior pointing spinules tightly compacted (Figure 1A). In parasegment 6 (PS6) pT3 lacks features conferring unique identity to this compartment while aA1 is frequently marked by 5 relatively horizontal rows of somewhat larger posterior pointing spinules. However, parts of posterior rows tend to angle in a slightly posterior direction (Figure 1B). The pA1 of PS7 lacks spinules needed for identification. aA2 has continuous rows of larger, posterior pointing spinules that are not as straight as in aA1 (Figure 1C). However, the rows are discontinuous in the middle of this spinule belt, with the exception of the posterior most row. Spinules in the anterior most row are larger, less dense, and wider spaced than more posterior rows. In the middle of this spinule belt, there is a conspicuous constriction due a lack of spinules in the center of the anterior most rows. For PS8, pA2 displays a half row of anterior pointing spinules medially, while aA3 (Figure 1D) exhibits roughly 5 rows of larger, posterior pointing spinules. A gradient exists with larger spinules becoming smaller progressing posteriorly. The aA3 spinules are not as compact or dense as those of A2. The pA3 compartment of PS9 has 2/3 a row of anterior pointing spinules, with 3 spinules on the lateral edge of the belt (Figure 1E). aA4 displays roughly 4 rows of posterior pointing spinules, with rows generally less dense, wider spaced and more disorganized than in A3 (Figure 1E). The pA4 of PS10 contains a complete row of anterior pointing spinules (1F) that are V-shaped. The aA5 generally contains only 3 rows of posteriorly oriented spinules that are widely spaced, with the most posterior rows found in A4 absent (Figure 1F). In PS11, pA5 displays one complete row of anterior pointing spinules and a second very incomplete row (Figure 1G). The aA6 varies; normally not containing many posterior pointing spinules. Sometimes 2 rows of spinules form with Figure 1G showing more spinules than normally encountered. The PS12 pA6 generally possesses 2 complete rows of spinules, plus an anterior pointing medial row (Figure 1H). The aA7 generally consists of slender, circular based spinules. Although wide-based, triangular spinules do appear in this region, showing split tips. Figure 1H shows an unusual number of spinules, yet the type and shape of them are typical of A7. In PS13, pA7 displays 3 horizontal rows of anterior pointing spinules, which are long, slender, and round based. Usually a tiny 4th row of short thin spinules appears anterior to the 3 complete rows. Also, unlike A6, the larger, triangular, wide-based spinules are conspicuously absent in the most posterior row. Spinules appearing in the aA8 are long, slender and almost wispy in appearance (Figure 1I). An analysis of other features in A8-A10 can be found in Kuhn *et al.* (1992) and Kuhn *et al.* (1993).

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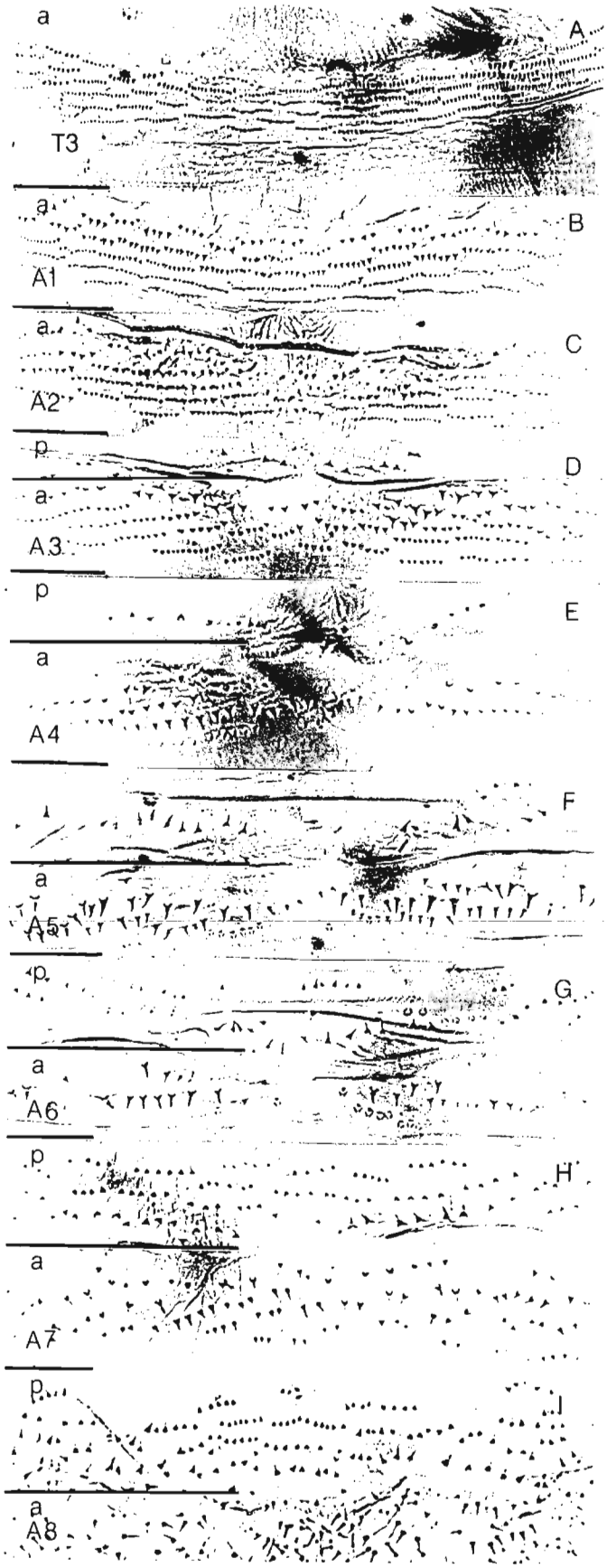
References: Kuhn, D.T., M. Sawyer, J. Ventimiglia, and Th. E. Sprey 1992, Dros. Inf. Serv. 71: 218; Kuhn, D.T., M. Sawyer, G. Packert, G. Turenchalk, J.A. Mack, Th. E. Sprey, E. Gustavson, and T.B. Kornberg 1993, Development 116: 11.

Figure 1 (next page). Dorsal spinule belts of a Canton-S 3rd instar larva. Short lines mark parasegment borders, while long lines mark segments. Naked cuticle regions, pits and hairs have been omitted. A) aT3. B) aA1. C) aA2. D) PS8 (pA2-aA3). E) PS9. F) PS10. G) PS11. H) PS12. I) PS13 (pA7-aA8). a, anterior compartment; A1-A8, abdominal segments 1 through 8; p, posterior compartment; T3, thoracic segment 3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