

Kosuda, Kazuhiko. 2002. Gynandromorph in a melanotic tumorous strain of *Drosophila melanogaster*. *Dros. Inf. Serv.* 85: 3-5.



Gynandromorph in a melanotic tumorous strain of *Drosophila melanogaster*.

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A unique type of melanotic tumor in the C-104 strain of *Drosophila melanogaster* derived from a natural population in Hungary was already reported (Kosuda, 1990, 1996). In this mutant strain, melanotic tumors develop not at the larval stage but at the adult one, whereas other tumors appear in the third instar larvae shortly before pupation (Sparrow, 1978). They often become visible in the abdomen of female flies without unaided eyes when fully grown up. Usually, however, they can only be detected under the microscope in the vicinity of spermatheca. Melanotic tumors exclusively attach to either one or both spermatheca and are subsequently encapsulated. In other words, their expression is sex-limited and organ-specific. Why these melanotic tumors are exclusively developed in the vicinity of female spermathecae remains unknown.



Figure 1. Gynandromorph fly found in the melanotic tumor strain.

Here I report that various kinds of sex mosaic were found in this melanotic tumor strain from almost completely bilateral gynandromorphs to partial ones. The upper half of the sexually mosaic fly shown in Figure 1 is female. The lower half is male, since the male-specific sex comb, a row of thick dark bristles on the tarsus, can be seen in the upper first leg, whereas it is lacking in the lower half. Furthermore, the size of the upper wing is remarkably longer than the lower one and the abdomen is asymmetric. It curves from up to down toward the male side, since the body size is generally smaller in males than females in *Drosophila*. The black

pigmentation pattern in the 5th and 6th dorsal plates is also asymmetrical and genitalia are abnormal in the gynandromorphs. Figure 2 show that one of two spermathecae is completely encapsulated by a melanotic tumor. Melanotic tumors, however, do not necessarily develop in all gynandromorphs. As far as I know this is the first report describing melanotic tumor development in a strain generating gynandromorphs in *Drosophila melanogaster*.

The melanotic tumor formation is a result of an aggregation of haemocytes accompanied by melanization and encapsulation (Salt, 1970; Ratcliffe, 1993). The phenomenon is considered to be one of self-defense reaction in insects. The appearance of gynandromorphs in the C-104 strain suggests that the formation of this unique melanotic tumor results from gynandromorphism. The gene that causes melanotic tumor formation also gives rise to gynandromorphs. Haemocytes of the male part may aggregate and encapsulate spermatheca in the female body, since spermathecae are foreign intruders to males. Accordingly, there may be a conflict between female and male in gynandromorphs. If gynandromorph is the cause of the melanotic tumor formation, it is expected that melanotic tumors



Figure 2. Female spermatheca and penis coexist in a gynandromorph. P: penis; MT: melanotic tumor; SM: spermathecae.

develop in the adult stage and that they grow as the female fly ages (Kosuda, 1990). It is hardly conceivable that the development of melanotic tumors and gynandromorphs in the C-104 strain are independent since both phenomena are extremely rare.

References:

- Kosuda, K., 1990, *Gerontology* 36: 121-125; Kosuda, K., 1996, *Zool. Sci.* 13: 821-824; Ratcliffe, N.A., 1993, In: *Parasites and Pathogens of Insects*, volume 1, Academic Press, San Diego; Salt, G., 1970, *Cambridge Monographs in Experimental Biology*, No. 16; Sparrow, J.C., 1978, In: *The Genetics and Biology of Drosophila*, volume 2b, pp. 277-313, Academic Press, New York.