CENTRIFUGATION OF CHIRONOMUS EGGS INSERTED INTO THE HOLES IN AN AGAR PLATE

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Longitudinal double malformations are induced by centrifugation of Chironomus eggs (Yajima, 1960, 1983; Gauss and Sander, 1966; Overton and Raab, 1967; Kalthoff et al., 1977; Rau and Kalthoff, 1982). In Chironomus samoensis, when the eggs were centrifuged by the Yajima's method (1970), in which the egg mass was sucked into a glass tubing, the developmental results differed among the centrifuged egg masses. This may be ascribed to the shortcoming of the method as follows;

(1) If the inside diameter of the tubing is wider than the width of egg mass, it couldn't be obtained eggs centrifuged parallel to their lenghts. The parallel centrifugation yields a lot of double malformations (Yajima, 1960).
(2) Since the egg mass is stretched to about 4 cm in the tubing, the differences of the centrifugal forces are so large between the centripetal and centrifugal end of egg mass.

Therefore, modifying little the method of centrifugation of Drosophila eggs adoped by Howland (1941), in which the eggs were inserted into holes in an agar plate, I compared the result obtained from the agar method with that from the glass tubing method. However, when groups of eggs, one group from each egg mass, were centrifuged by the agar method and the results were compared, there still occurred difference of frequency of developmental types, including double cephalons and inverted embryos, among these egg masses.

Since in this agar method, several egg groups from the same egg mass are

treated separately in different experimental conditions, I performed following two experiments. Firstly, egg groups from a same egg mass were centrifuged one by one at different developmental stages from two pole cells to nuclear migration stage. The result showed that the frequency of the various developmental types varied in small cycles and decreased gradually toward nuclear migration stage. These results may be due to the appearance and disappearance of mitotic apparatus or a change of viscosity accompanied with nuclear division cycle.

Secondary, eggs were centrifuged anterolaterally at various angles. The results showed that the frequency of the various types of development changed with the angle. For example, the frequency of double cephalons and inverted embryos was higher after the anterolateral centrifugation at 60° than after the anterior centrifugation (90°). The latter angle is the same as that of the early glass tubing centrifugation. In future study, I would like to investigate effects of the oblique centrifugation in detail.

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