

PRELIMINARY NOTES ON THE EMBRYONIC DEVELOPMENT OF THE PRIMITIVE
MOTH, ERIOCRANIA SP. ON ALNUS (LEPIDOPTERA: ERIOCRANIIDAE)

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We have investigated the embryonic development of several primitive Lepidoptera, such as Neomicropteryx nipponensis in the suborder Zeugloptera (Kobayashi & Ando, 1981, 1982), Endoclita excrescens and E. sinensis in the suborder Exoporia (Ando & Tanaka, 1976, 1980; Kobayashi et al., 1981), and revealed that the mode of their embryonic development is largely different from that of the advanced suborder Ditrysia in some important respects, but is similar to that of the closely related order Trichoptera. However, nothing was known about the embryogenesis of other primitive Lepidoptera, such as the member of the suborder Daconypha. In the present study we describe the external features of the developing embryo of one of the eriocranid species belonging to the Daconypha, and discuss their phylogenetic significances from the comparative embryological standpoint.

The eggs of Eriocrania sp. on Alnus are laid in the tissue of leaf buds of Alnus inokumae. The newly laid egg is elongated ovoid, about 0.48 by 0.23 mm in size and later it progressively increases to about 0.62 by 0.35 mm. The egg period is about 6 days at the temperature of about 20°C.

The features of embryonic development in this species are as follows:

1. The germ disk is very large as in the case of the ditrysiian species, whereas the germ disk of the Zeugloptera and Exoporia is small.

2. The germ disk differentiates into a large germ band in situ. The invagination of the germ disk into the yolk as observed in the Zeugloptera and

Exoporia does not form.

3. Embryonic membranes are formed by the fusion of amnio-serosal folds. In the mode of embryonic membrane formation, this situation is assumed to be an archetype of the fault type in the advanced ditrysian embryo.

4. The germ band develops on the yolk surface as in the case of the zeuglopteran and trichopteran eggs. On the other hand, the germ band of the exoporian and ditrysian Lepidoptera sinks into the yolk.

5. In spite of the superficial germ band type, embryonic membranes persist even after dorsal closure of the embryo; therefore, the secondary dorsal organ does not form. This situation is common to all other Lepidoptera except for the Zeugloptera in which the organ forms.

6. In the early germ band, two temporary transverse furrows form, one in the posterior gnathal segments, the other in the anterior abdominal segments. The former is somewhat similar to the cephalic furrow in the dipteran embryos. However, furrows of this kind have not been observed in any other lepidopteran embryos; thus, the formation of these furrows seems to be characteristic of the Dacnonypha.

7. In the egg of the pre-revolution stage, hydropyle cells are present on the dorsal surface of the egg. This feature is common only between the Zeugloptera and Dacnonypha.

To summarize, against our initial assumption, it became evident that the embryonic development of the eriocranid species, as a whole, has closer affinity to that of the advanced ditrysian Lepidoptera than to that of other primitive Lepidoptera, such as the Zeugloptera and Exoporia.

References

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