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Preliminary Note on the Ovarian Structure and Oogenesis in a Scolopendromorph Centipede, *Scolopocryptops rubiginosus* (Myriapoda: Chilopoda)*

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Our knowledge of the ovarian structures and oogenesis of myriapods is still inadequate to enable a reconstruction of their ground plan. Most previous studies have focused on the cytological changes of oocytes during oogenesis mainly of diplopods. A few studies have been done on the ovaries of another main myriapod group, class Chilopoda (on a scutigeromorph: Knoll, 1974; on a lithobiomorph: Herbaut, 1974; on a scolopendromorph: Jangi, 1957). In the present study, we observed the ovarian structure and oogenesis in a scolopendromorph centipede, *Scolopocryptops rubiginosus*, as an example of chilopod.

Adult females of *S. rubiginosus* (L. Koch) were collected from leaf litter and from under stones in Tsukuba City, Ibaraki Prefecture, Central Japan, during 2009–2010. Specimens were fixed with Bouin's solution after excision of the ovaries with a razor blade in physiological saline. Fixed ovaries were then dehydrated and embedded in paraffin. Serial sections of 5 μm thickness were stained with Mayer's haematoxylin-eosin, alcian blue-periodic acid SCHIFF (PAS)-haematoxylin, or azocarmine G-aniline blue-orange G.

The ovary of *S. rubiginosus* is a single long sac-like organ located along the median body axis between the dorsal artery and the alimentary canal. An oviduct extends backward from the posterior end of the ovary. The ovarian wall, surrounding an ovarian lumen, consists of a layer of thin and flattened ovarian epithelial cells. On the outer surface of the ovary, the ovarian epithelium is lined with a thick basement membrane. A number of oogonia and oocytes of various sizes were found in the ovary.

Oogonia and early previtellogenic oocytes of 3 to 20 μm in diameter are located among thickened areas of the ovarian epithelial cells. Around the surface of each oocyte larger than 15 μm in diameter, a thin layer of vitelline membrane is formed. Each oocyte in late previtellogenic and vitellogenic stages leaves from the epithelial layer, and is located in the inner space of its own follicular pouch consisting of cuboidal epithelial cells. The follicular pouch is a dent in the ovary, and is formed by the continuous layer of the ovarian epithelium accompanied by a continuous lining of the basement membrane. Hemocytes were often found at the space between the basement membrane of the follicular pouch and the outer envelop of the oocyte. The inner space of the pouch containing the growing oocyte is therefore hemocoelic. Each oocyte in the follicular pouch is surrounded by two layers of vitelline membranes. The inner layer is thick and tight, and the outer layer is thin and loose.

In a juliformid diplopod, *Ophyiulus pilosus*, Kubrakiewicz (1991) clearly described the presence of oocytes in the hemocoelic inner space of the follicular pouches rather than in the ovarian lumen. In the present study, we observed the similar location of growing oocytes in the follicular pouches in a scolopendromorph centipede, *S. rubiginosus*. In the other mandibulate arthropod groups, the Hexapoda and the Crustacea, oocytes are known to grow in the ovarian lumen. In the Chelicerata, growing oocytes surrounded by the basement membrane produced by the ovarian epithelial cells protrude from the outer surface of the ovarian tubes. Therefore, the oocyte growing in the hemocoelic inner space of the follicular pouch seems to be a distinctive common feature among myriapods.

In some respects, however, our results on *S. rubiginosus* differ from the description of Kubrakiewicz (1991). For example, the time of oocyte movement from the ovarian epithelial layer to the hemocoelic inner space of the follicular pouch varies between the two myriapod species. In *O. pilosus*, oogonia are located in the ovarian epithelial layer, but very early oocytes surrounded by some somatic cells are seen in the hemocoelic space (Kubrakiewicz, 1991). In the present study, however, we observed young oocytes still locationg among ovarian

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epithelial cells.

Our knowledge of the ovarian structure and the process of oogenesis in myriapods is still fragmentary. How and when do early oocytes move from the ovarian epithelium to the hemocoel? How are follicular pouches formed? How do ripe oocytes ovulate into the ovarian lumen from the hemocoelic space of the follicular pouches? To elucidate the ground plan of the myriapod ovarian structure, the above questions should be answered in future studies.

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