

EXTERNAL FEATURES OF EMBRYONIC ABDOMEN OF A SPRINGTAIL,  
TOMOCERUS ISHIBASHII YOSII (COLLEMBOLA: TOMOCERIDAE)

Hideyuki Uemiya

Institute of Biological Sciences, University of Tsukuba,  
Sakura-mura, Ibaraki, 305 Japan

The abdomen of the collembolan that is a member of the apterygotan insects has characteristics of the following points: six-segmented; and abdominal organs originated from abdominal appendages. The abdomen formation during embryogenesis of a collembolan, T. ishibashii was externally observed with light microscope.

At the early period of blastokinesis, six abdominal segments are formed, and the number of segments is fixed and invariable since this stage. Shortly after, the anlagen of appendages begin to develop in first four abdominal segments. The sixth segment has a pair of appendage-like swellings which form the subanal lobes. The anlage of each appendage except for the second one elongates and divides into two parts. After this process, the first to fourth anlagen begin to approach each other, and the proximal parts of them finally fuse, but the distal parts never fuse. The ventral tube, tenaculum and furcula differentiate from the anlagen of the first, third and fourth appendages. The second anlagen become flat, and spread over the ventral side of this segment. Basal plates in the first to the fourth segments also differentiate from the anlage of each appendage.

The anlagen of the first, third and fourth appendages divide into two parts in the same manner as thoracic ones. Accordingly, the proximal parts of the first, third and fourth appendage anlagen are regarded as the coxopodites of thoracic ones, and the distal parts as the telopodites. The coxopodite of each appendage fuses each other, but the telopodite never fuses, similarly as

in a microcoryphian, Pedetontus unimaculatus (Machida, 1981). In the present study, however, it comes to no definite conclusion whether the paired swellings of the sixth abdominal segment are the true appendages or not.

Snodgrass (1931) has suggested that the tenaculum was formed in the same manner as the furcula. In T. ishibashii, furthermore, the formation of the ventral tube is similar to that of the tenaculum and furcula. According to Claypole (1898), Philiptschenko (1912) and Garaudy (1957), it is believed that three paired anlagen appear in the first, third and fourth abdominal segments. In T. ishibashii, however, four paired anlagen appear in first four segments. Each basal plate also originates from their anlagen. Accordingly, the ventral sides of first four abdominal segments are almost occupied by the element of each appendage in origin.

#### References

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