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SIDE-LINE ORGAN IN GAMMARIDS (CRUSTACEA, AMPHIPODA)

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ABSTRACT

In a SEM study of the microstructures of amphipod integuments a new organ is found, which in a way resembles the lateral-line organ of fishes. The external morphology is described and its function discussed.

INTRODUCTION

In gammarids of the genera *Gammarus* and *Echinogammarus* on each body somite as well as on the telson groups of characteristic elements are present. These elements and groups of elements, showing an obvious regularity, were found using a scanning electron microscope (ISI DS 130). The specimens were prepared with routine critical-point drying, mounted and sputtercoated with gold.

The anatomy as well as the taxonomic value of this organ will be treated in a future paper.

DESCRIPTION

The elements have a medium length of 4 μm, are flattened and distally bilobed, the two parts of this bilobation being oriented in one direction (fig. 1). These elements are implanted inside cuticular rings.

The elements form groups, which are located within shallow excavations (fig. 2) of the cuticle; they are arranged in a fan-like fashion (except those on the telson); each element of a group is differently oriented from all others of the group (fig. 3).

The groups are arranged in four series parallel to the body axis; two dorsal rows and a lateral row on each side of the body (figs. 5 and 6) on all body somites except for the head. On the telson only two dorsal rows are present, of which the elements are all oriented in one direction (fig. 7).

The composition of a dorsal and a lateral group differs slightly (figs. 4, 5 and 6), whereas the left and right dorsal groups show a perfect symmetry.

DISCUSSION

The arrangement of the groups suggests a mechanoreceptorial function. Each group may provide the animal with information about the direction and possibly also the velocity of water currents at that part of the body; due to their flat shape all elements will react differently to water movements. All groups together may provide information to assist the animal in its orientation.

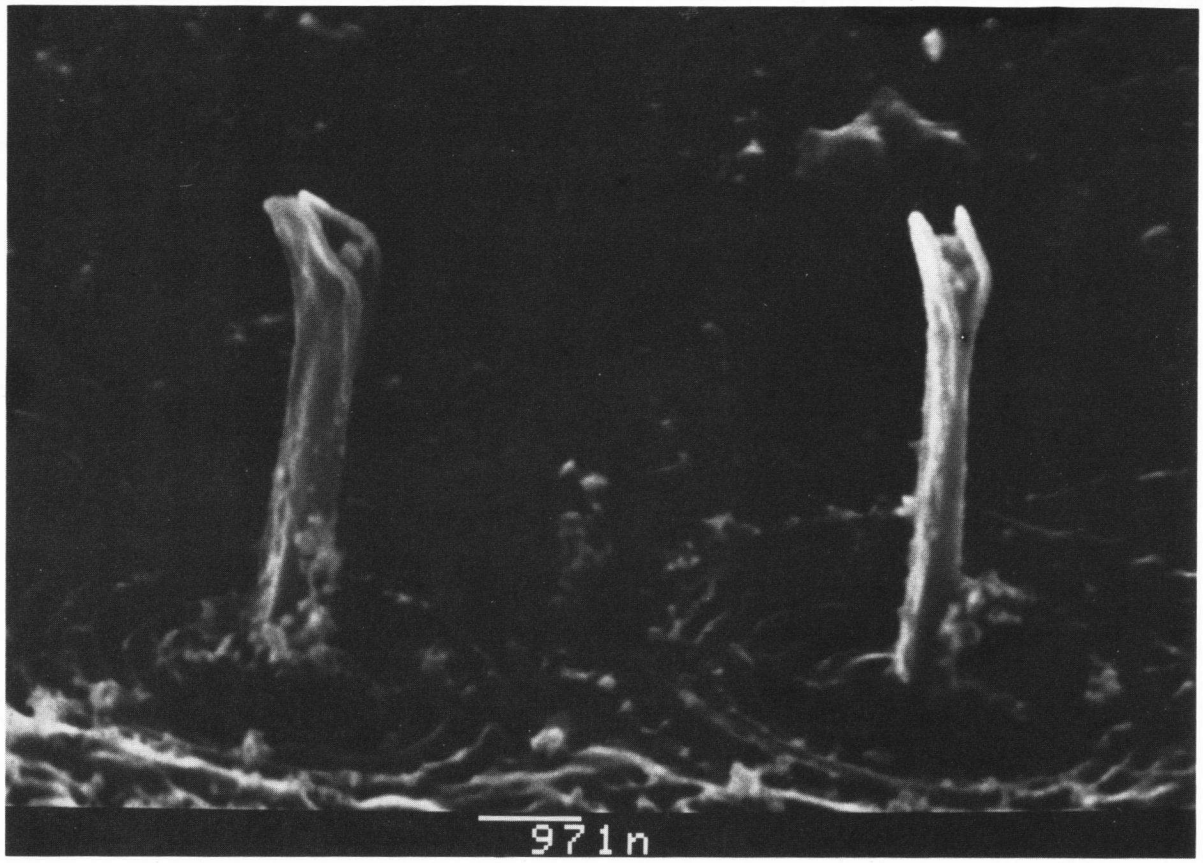


Fig. 1. *Echinogammarus veneris*. Two microtrichs in lateral view.

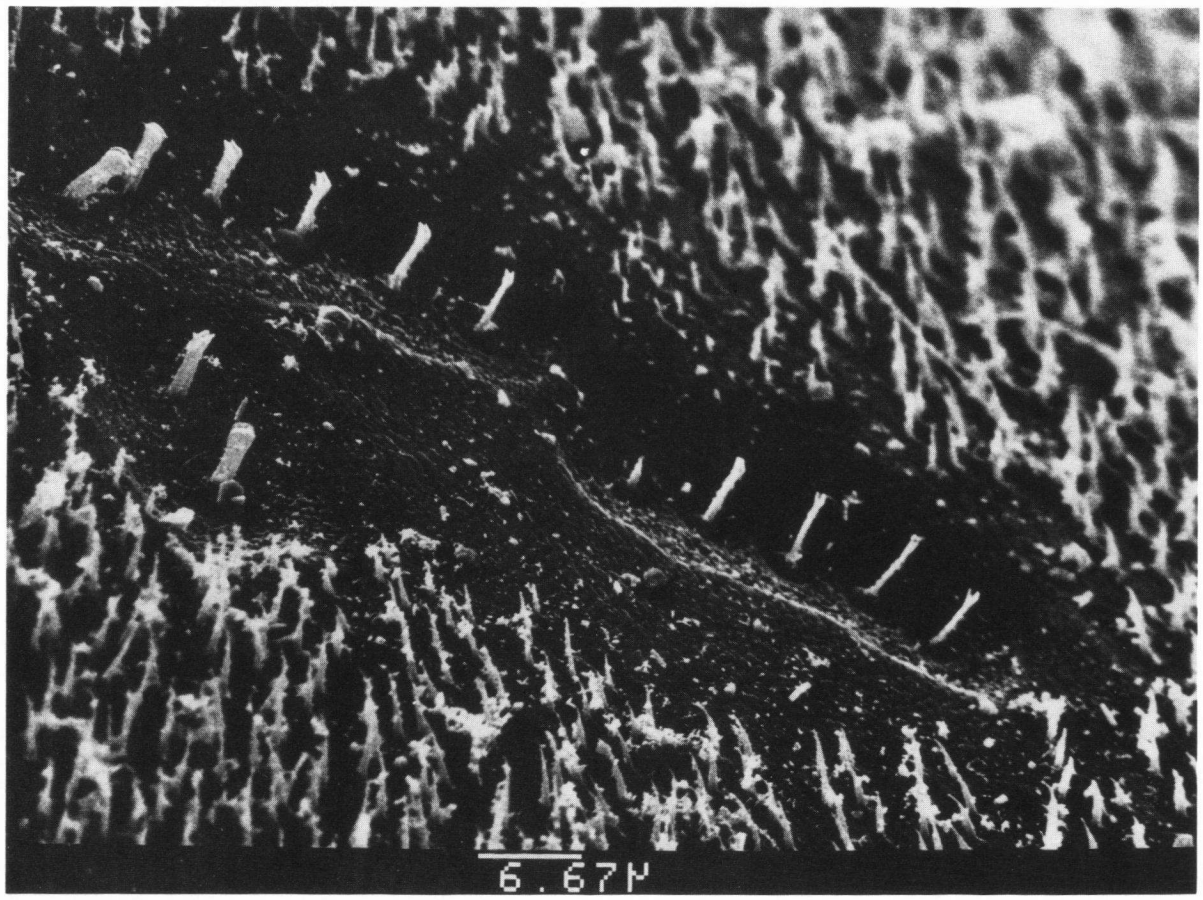


Fig. 2. Dorsal group of microtrichs.

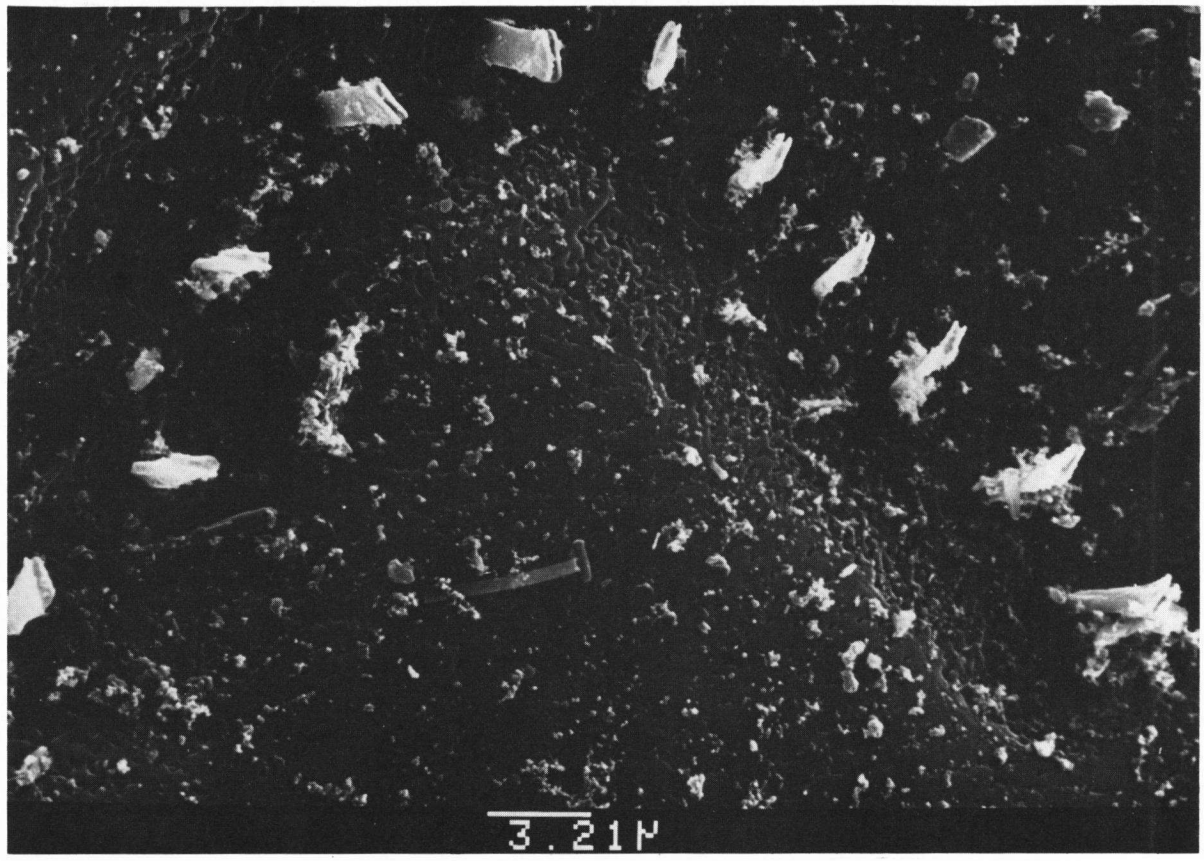


Fig. 3. *Echinogammarus veneris*. Lateral group of microtrichs.

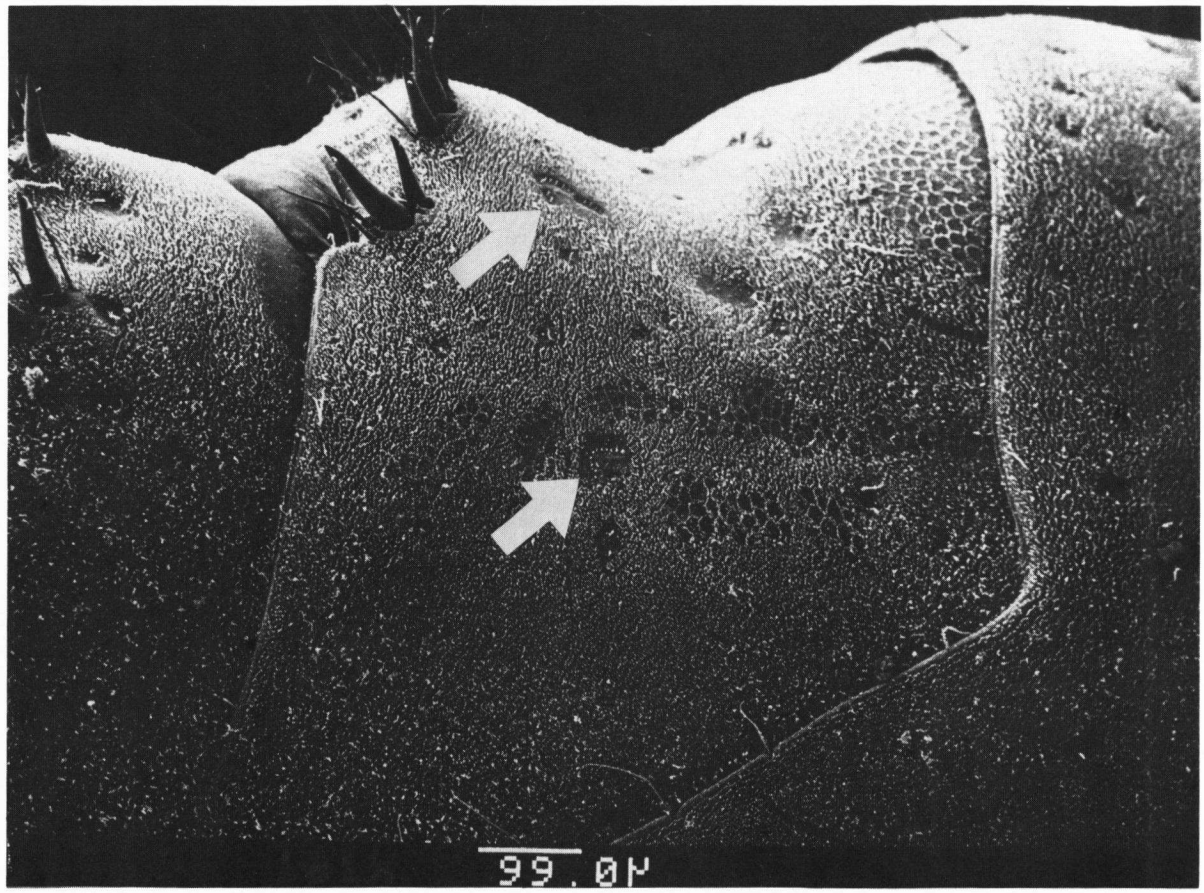
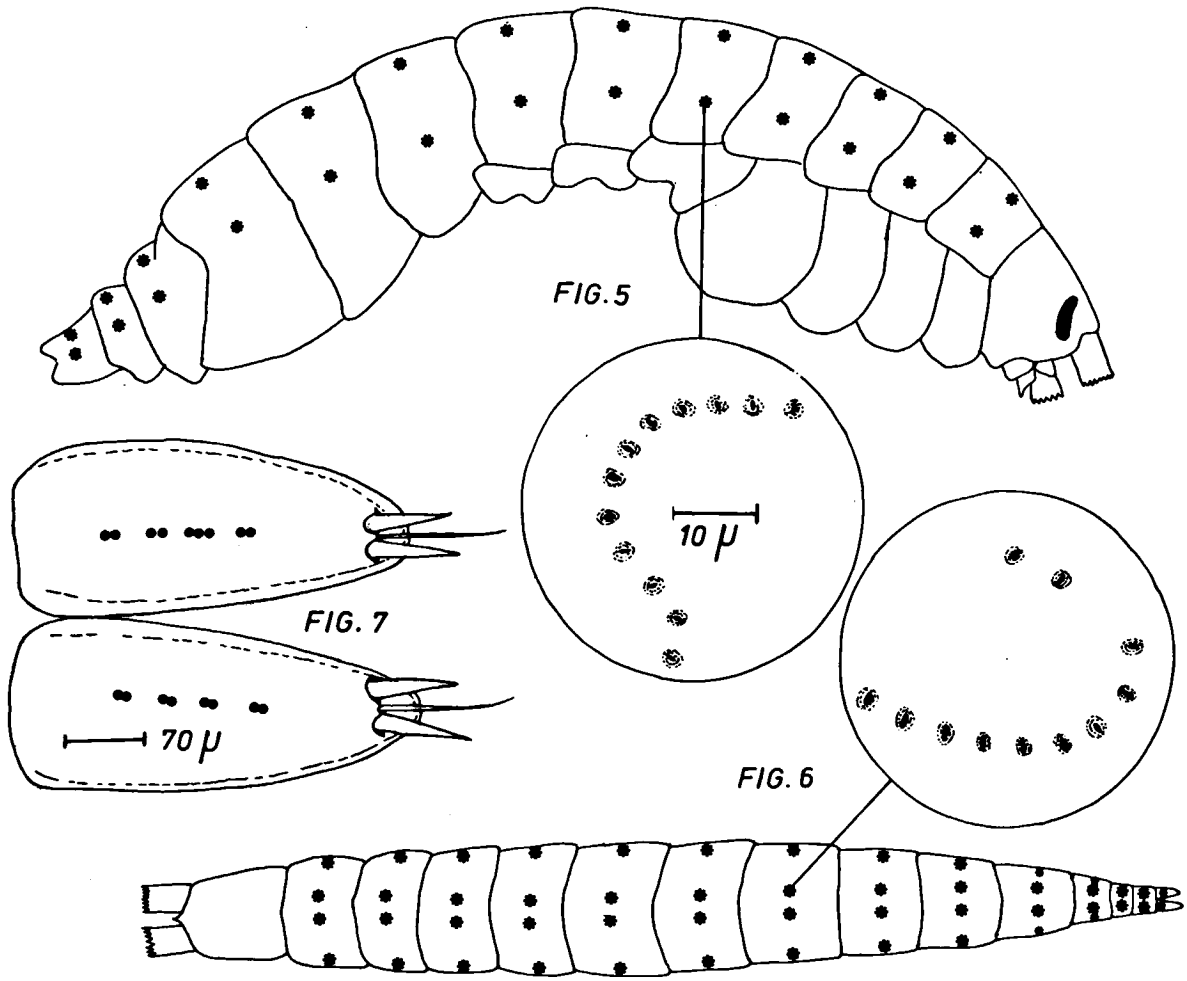


Fig. 4. Indication (by white arrows) of the position of a lateral and a dorsal group of elements on the first urosomite.



Figures 5-7. Fig. 5. *Echinogammarus veneris*. Lateral view of animal (asterisks indicate the position of the groups of microtrichs). Encircled group of microtrichs more strongly enlarged. Fig. 6. Dorsal view of same animal. Fig. 7. Dorsal view of telson. Black dots indicate the position of the microtrichs.

According to the classification of microtrich sensilla developed by Oshel *et al.* (in prep.) these elements should be called type II microtrich sensilla. However, since these elements show a strong coherence the name should be derived from their function.

The complexity of this organ makes a chemoreceptorial function rather unlikely (Barber, 1961; Lincoln & Hurley, 1981).

Pressure waves may be detected by this organ.

A possible function as a balancing organ can not be excluded, which could explain the absence of statocysts in amphipods.

Study on the innervation of the elements and the cuticular rings is needed to determine the actual function of this organ.

This organ has significance for phylogenetic studies, since the author observed differences between the families in the structure of the elements and the composition and location of the groups.

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