

Ultrastructure of the Hairy Attachment Pads
in the Earwig *Timomenus komarovi*

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Many insects have adopted nanoscale fibrillar structures on their feet to achieve the extraordinary adhesion for vertical walls and ceilings. These biological adhesion devices consist of fine hairy setule with various contact sizes depending on the body weight of insect species. It has been revealed that the van der Waals interaction plays a dominant role of the dry attachment by fibrillar adhesion system for smooth surface. Here, we have observed the whole tarsal appendages of the earwig *Timomenus komarovi* using field emission scanning electron microscope (FESEM) to observe the fine structural characteristics of its hairy attachment pad. All six legs are morphologically similar in length and shape. Each leg has a pair of claws and two groups of setae. The claws are quite sharp and they are adapted to walking the coarse surface. Groups of setae have flattened cuticular surfaces commonly, and they are covered with either spoon-shaped setae and hook-shaped setae, respectively. The spoon-shaped setae are observed only at the central region, whereas the hook-shaped setae along the marginal region, characteristically.

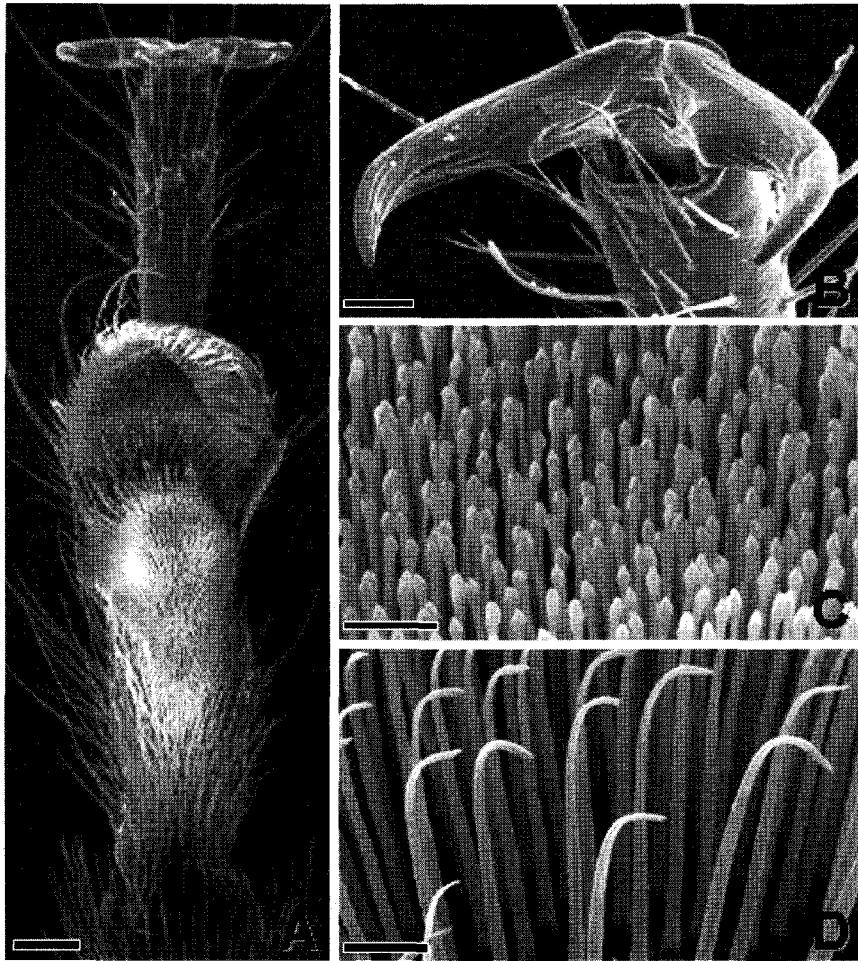


Fig. 1. A: Legs in the earwig which consist of setules and a pair of claws. B: A pair of claws. C: Fine structure of the spoon-shaped setules at the central region of the attachment pad. D: Fine structure of the hook-shaped setules at the marginal region of the attachment pad. Scale bars indicate 100 μm (A), 50 μm (B) and 10 μm (C, D), respectively.