

Microscopic morphology and distribution of the antennal sensilla in the double spine bark beetle, *Ips duplicatus*

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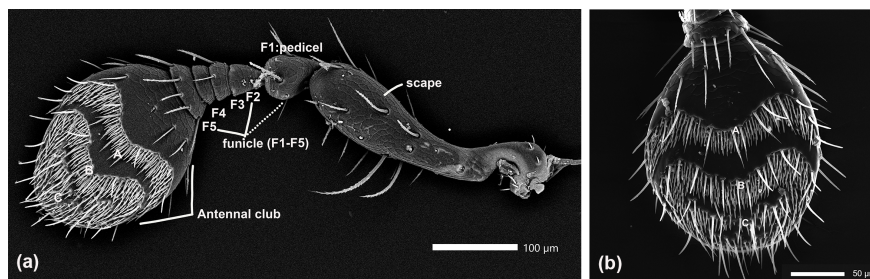
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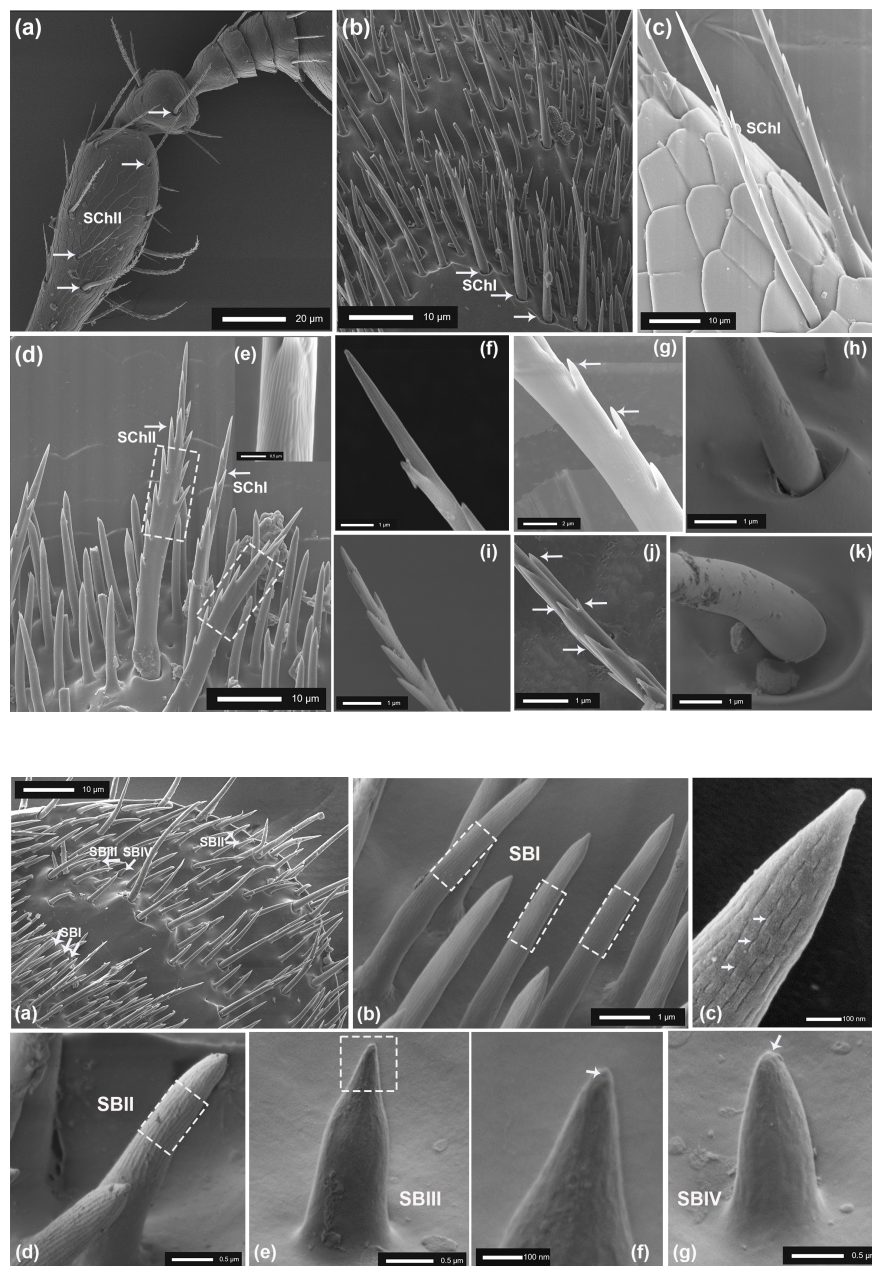
Abstract

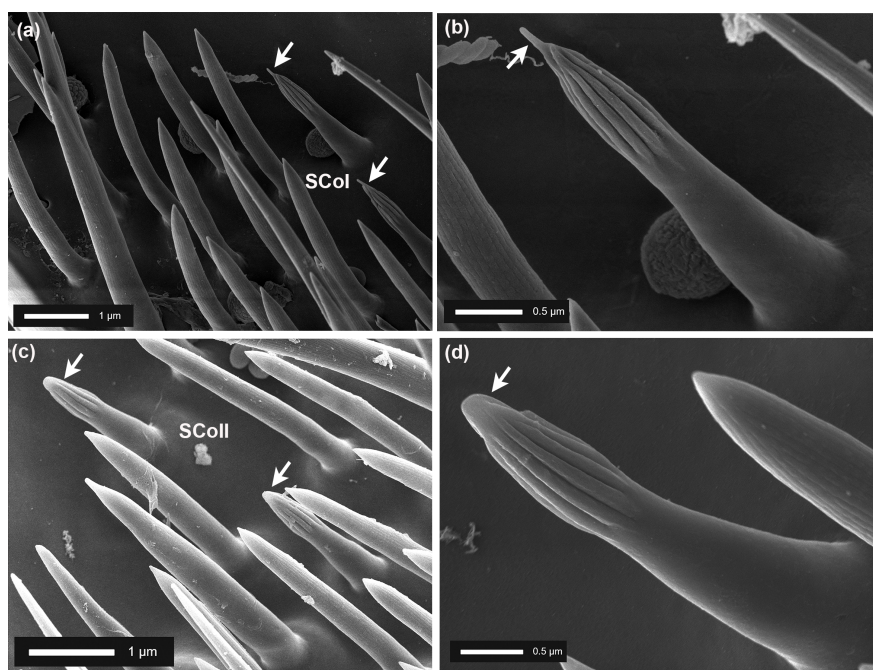
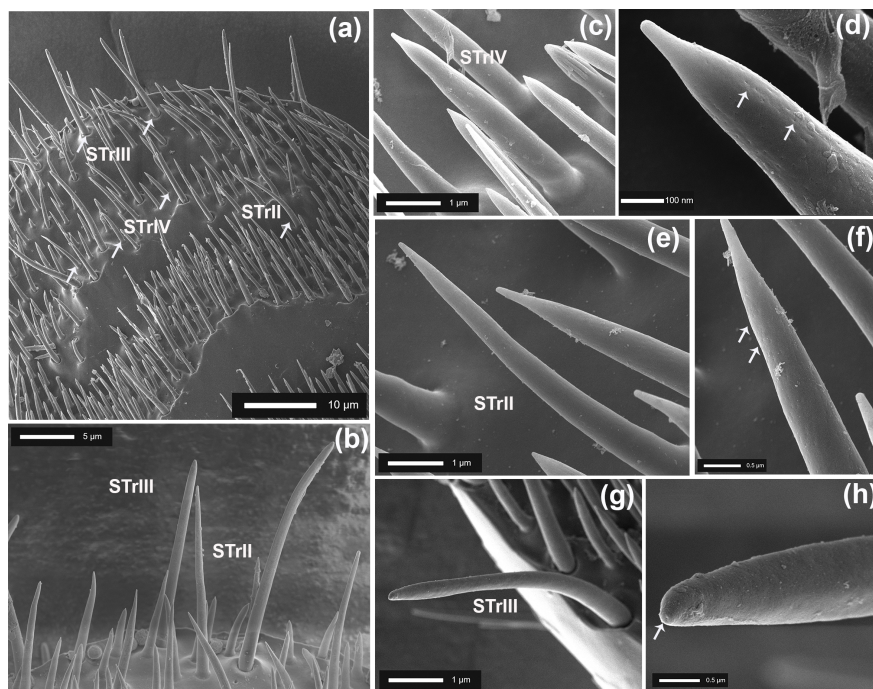
ABSTRACT The double-spined spruce bark beetle, *Ips duplicatus* has become an infamous secondary pest of Norway spruce, causing extensive ecological and economic destruction in many Central European countries. Antennae are the primary olfactory organs that play fundamental role in insect-host chemical communication; therefore, understanding morphology is crucial before conducting electrophysiological investigations. Here, we present our analysis of sensilla types on the antennal surface of *I. duplicatus* for the first time, using high-resolution-scanning electron microscopy. We studied the external morphological characteristics of antennae and the types, numbers, and distribution of the antennal sensilla in males and females. Our results revealed the presence of five different types of morphologically distinct sensilla: sensilla chaetica, sensilla basiconica, sensilla trichodea, sensilla coeloconica, and Böhm's bristles. We observed two subtypes in sensilla chaetica (SChI and SChII), four subtypes in sensilla basiconica (SBI, SBII, SBIII and SBIV), three subtypes in sensilla trichodea (STrII, STTrIII and STTrIV) and two subtypes in sensilla coeloconica (SCoI and SCoII), respectively in *I. duplicatus* males and females. Minor differences in length and numbers between the sexes for some sensilla types were found. Distribution maps for different sensillar types were constructed and specific areas for the respective sensilla were found. Possible functions of observed sensilla types are discussed. The present study provides a basis for future electrophysiological studies aimed at understanding how *I. duplicatus* detects ecologically important olfactory cues.

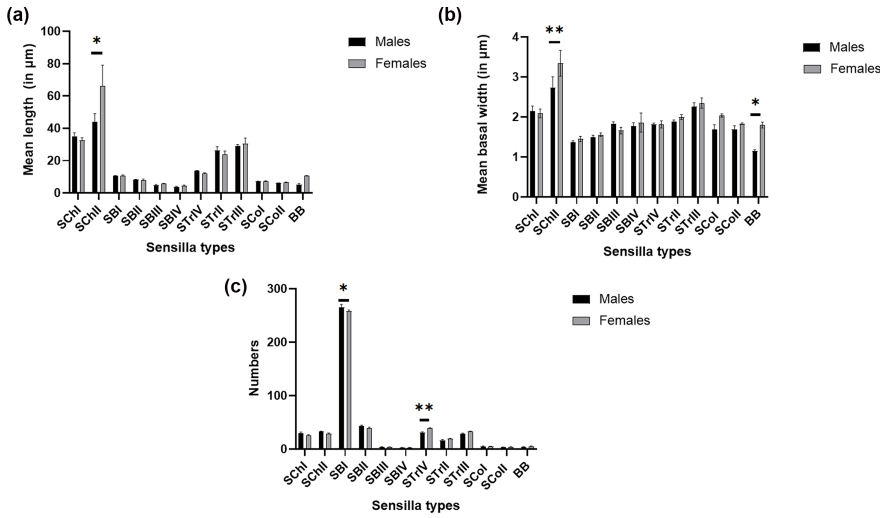
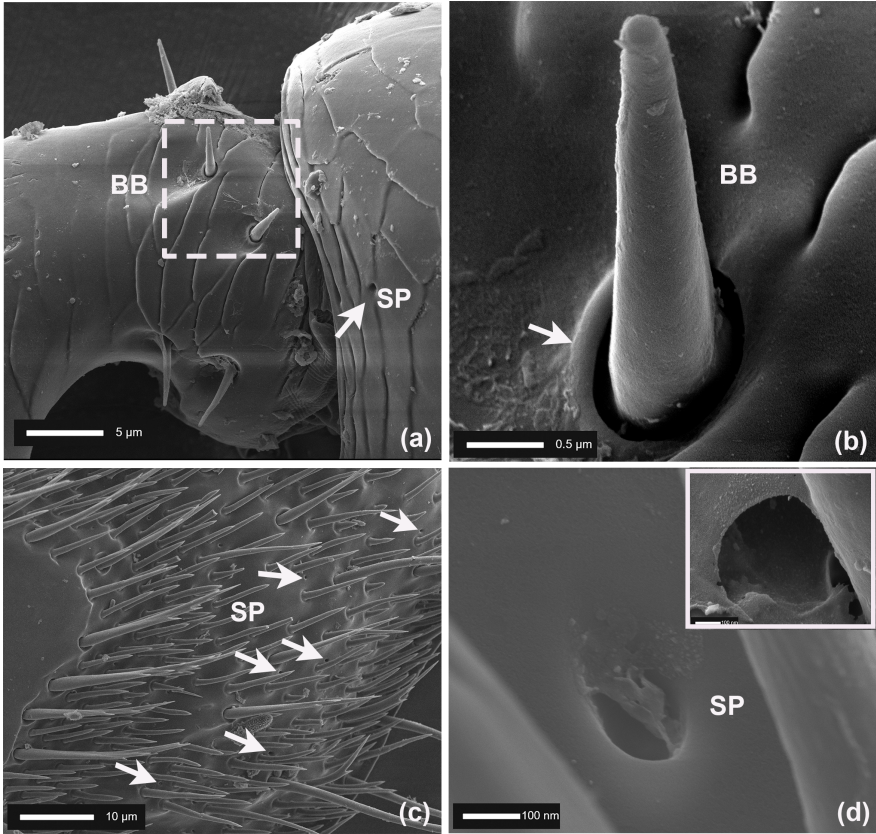
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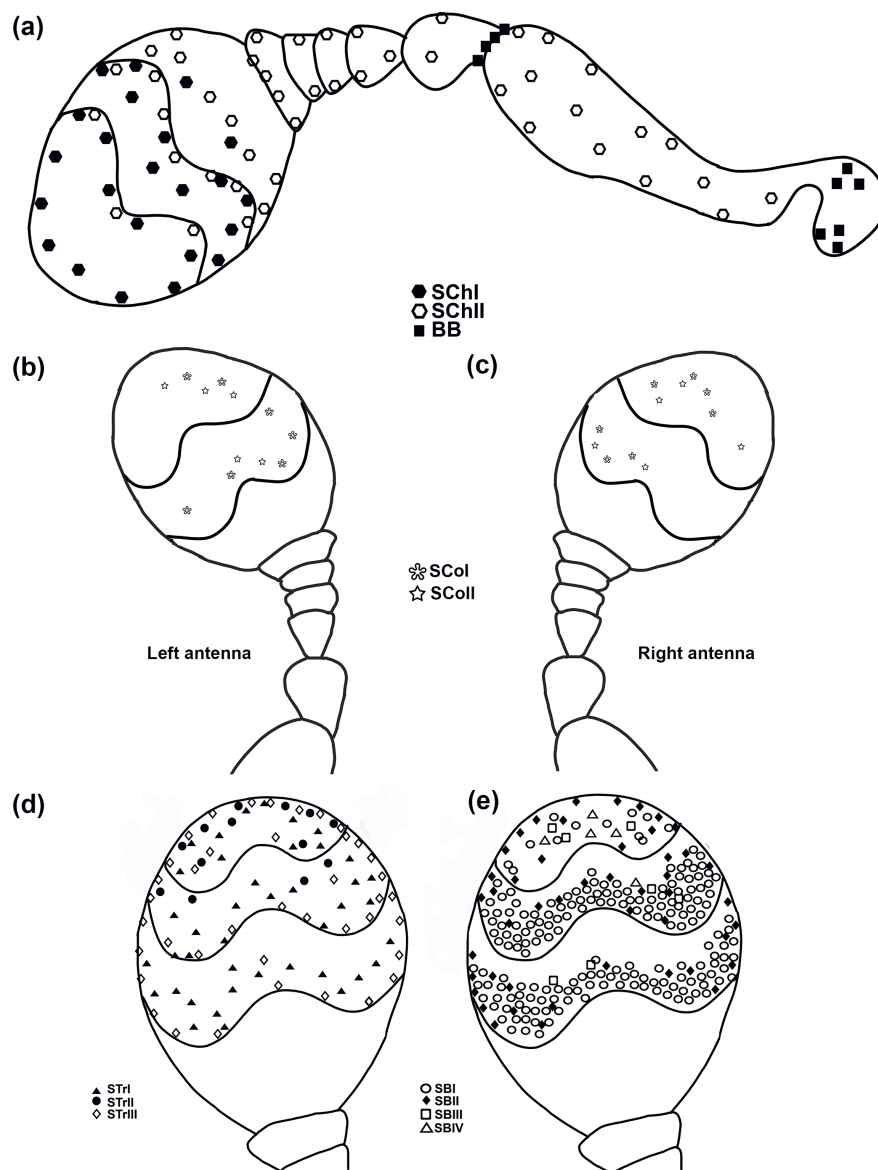
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