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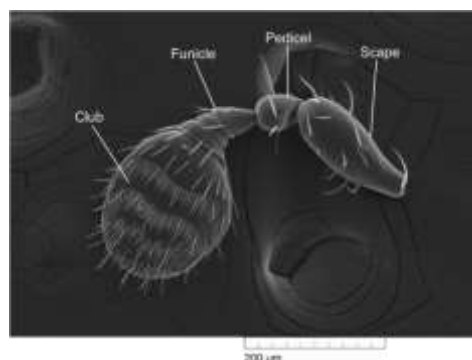
ACOUSTIC COMMUNICATION AND THE ROLE OF ANTENNAE AS PUTATIVE ACOUSTIC SENSORY ORGANS IN PINE ENGRAVER BEETLES, *IPS PINI*

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Pine engraver beetles, *Ips pini*, are widely distributed across Canada, and invade several species of pine trees (Pinaceae), where they complete their life cycle under the outer bark, in the phloem. Acoustic communication confers many advantages to insects, and is used in avoiding predation, courtship and mating, marking territory, and facilitating social interactions. The way that female pine engraver beetles produce acoustic signals has long been known, but the mechanism by which these signals



are received has not yet been described. This study examined the potential role of the antennal pedicel as an acoustic receptor in pine engraver beetles. Firstly, the external morphology of the pedicel and the other antennal segments was described to determine if there was any sexual dimorphism, or differences in antennal segment size among each sex. Secondly, stridulatory behaviour was recorded within the phloem with an accelerometer-based sensor to understand how acoustic signals are transmitted between individuals through air or substrate and to compare how signals vary over the course of a male-female interaction, by comparing interpulse intervals. Significant differences were not found in any of eight parameters of antennal size among 10 males and 10 females. The pedicel of the antenna does not appear to be enlarged to contain chordotonal organs for acoustic reception, but this should be confirmed with further histological and physiological studies. Interpulse intervals prior to female entry into the nuptial chamber were most commonly between 0.4-0.7 ms, whereas post-entry interpulse intervals were 0.1 ms. Over a six-week period, interpulse intervals were most commonly 0.1 ms. These data suggest that although interpulse intervals may not vary much within the introduction of a female, they do differ between the introduction and post-entry. Further studies should examine the possibility of a subgenual vibration-detecting organ in pine engraver beetles and conduct long-term monitoring on more logs to provide additional data.

Colleen O'Connor graduated from Immaculata High School in Ottawa, Ontario in 2009. She is currently completing her Honours degree in Biology and is graduating in May 2013. In 2012, she was granted an NSERC Undergraduate Student Research Award to fund her thesis research. During her time at Acadia, Colleen received a Deacon George Thomas Scholarship and Clarke K. McLeod Pre-Medical Scholarship. Over the past four years, Colleen has been involved with the S.M.I.L.E. (Sensory Motor Instructional Leadership Experience) program as an instructor, and currently serves as the Co-President of the Pre-Health Society. After graduation, Colleen plans to spend some time working while applying to medical school.

