PHEROMONE-BASED AGGREGATION IN *ORTHOTOMICUS CAELATUS* (EICHHOFF) (COLEOPTERA: SCOLYTIDAE)

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Abstract

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Two field experiments were conducted to determine if *Orthotomicus caelatus* (Eichhoff) was attracted to pine bolts infested with conspecifics and to assess the roles of the sexes in attraction. Traps baited with pine bolts artificially infested with males attracted both males and females, but traps baited with uninfested bolts or bolts with females caught very low numbers of beetles. The addition of females to bolts with males reduced the attraction produced by males in a second experiment. Bolts with males and females did not reduce the attraction produced by other males in adjacent bolts, suggesting that females do not produce a masking pheromone. The pheromone system of *O. caelatus* is similar to those known for other species in the Ipini in which males initiate gallery construction, produce an attractant, and attract females and opportunistic males. Preliminary gas chromatographic analyses of extracts of hindguts and frass from males boring on pine bolts suggested the presence of ipsdienol and ipsenol, two commonly occurring pheromones in other species of the Ipini. The pheromone system of *O. caelatus* is discussed with regard to the complexity of the pine bark beetle guild in the southeastern United States.

Résumé

On a effectué deux expériences de terrain afin de savoir si *Orthotomicus caelatus* (Eichhoff) est attiré par des bûches de pin infestées d'individus conspécifiques et de comprendre le rôle des sexes dans le phénomène d'attraction. Des pièges appâtés de bûches de pin infestées artificiellement de mâles ont attiré des mâles et des femelles, alors que des pièges appâtés de bûches non infestées ou infestées de femelles seulement ont attiré peu de charançons. Dans une deuxième expérience, l'ajout de femelles à des bûches portant déjà des mâles a réduit l'effet d'attraction obtenu avec des mâles. Des bûches porteuses de mâles et de femelles n'ont pas réduit l'effet attirant de bûches adjacentes porteuses de mâles, indiquant que la femelle ne produit pas de phéromone masquante. Le système phéromonal de *O. caelatus* est similaire à ceux d'autres Ipini dont c'est le mâle qui initie la galerie, produit un attractant et attire des femelles et des mâles opportunistes. L'analyse chromatographique préliminaire d'extraits d'intestin et de fèces de mâles en train de forer des bûches de pin indique la présence d'ipsdiénol et d'ipsénol, deux phéromones communément rapportées chez d'atures Ipini. On discute du système phéromonal de *O. caelatus* en rapport avec la complexité de la guilde des charançons des pins du sud des USA.

Introduction

Orthotomicus caelatus (Eichhoff) is a widely distributed and common species of bark beetle that infests coniferous trees of the Pinaceae throughout North America (Wood 1982). *Orthotomicus caelatus* breeds in the phloem of logging slash and the boles, branches, and root collar regions of host trees that are moribund or severely stressed. Because the species is not aggressive, it is considered to have little or no economic significance (Baker 1972; Furniss and Carolin 1977; Drooz 1985). The ecological role of *O. caelatus* is that of a secondary bark beetle (Stark 1965) that generally infests host material already being colonized by other phloeophagus insects. Because *O. caelatus* is a common associate in different groups of coniferous bark beetle species throughout North America (e.g. Beal and Massey 1945; Reid 1955), its role in interspecific interactions and its mechanism of host colonization are of interest. Very little is known about the biology and host selection behavior of this common insect (Wood 1982).

While conducting a field experiment on pheromones of the eastern sixspined engraver, *Ips calligraphus* (Germar) (unpublished data), we discovered that *O. caelatus* might use