Female-associated semiochemicals as candidates in the pine shoot beetle *Tomicus destruens*

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In Maremma (Tuscany, Italy), *Pinus pinea* L. forests have long been affected by damage caused by the pine shoot beetle *Tomicus destruens* Woll. (Coleoptera, Curculionidae, Scolytinae) [1]. Despite the increasing ecological and economic impact of this species in Mediterranean pine stands, its chemical ecology remains poorly understood. In particular, information on semiochemicals potentially involved in mate-finding and aggregation is still scarce, limiting the development of effective control strategies. This study aimed to identify volatile organic compounds (VOCs) consistently associated with *T. destruens* and/or attacked host material that could represent candidate cues for future pheromone/kairomone-based trapping systems.
Volatile emissions were investigated using thermal desorption–gas chromatography–mass spectrometry (TDU/GC–MS). VOCs were collected from 100 L chambers containing either *P. pinea* branches infested with *T. destruens* or non-infested control branches. VOCs sampling was performed for one minute using an air sampling pump (flow rate 200 sccm) through glass thermal desorption (TD) tubes packed with carbograph® at different mesh sizes. In parallel, the VOC profiles of ten mating pairs of *T. destruens,* that were separated at the onset of copulation, were determined in order to explore differences between sexes. In addition, frass collected in maternal galleries was analysed using dynamic headspace technique coupled with TDU/GC–MS.
Chemical analyses revealed qualitative differences among VOC blends emitted by infested and non-infested pine material. Notably, a consistent volatile profile was detected across infested branches, frass, and isolated females, characterized by the predominance of three sesquiterpenes. These compounds were absent or present only in trace amounts in control branches and in emissions from males, indicating a female-specific association. Overall, these results suggest that *T. destruens* females are associated with a specific sesquiterpene-based chemical signal potentially mediates mate-finding or aggregation. The identification of these candidate compounds represents a crucial step toward understanding the chemical ecology of *T. destruens* and provides promising insights for the development of new semiochemical-based monitoring and mass-trapping strategies aimed at mitigating infestations in Mediterranean pine ecosystems.

[1] A. Guerrero, J. Feixas, *Naturwissenschaften,* **1997**, *84, 155-157*.