

Inter- and Intraspecific Activities of Compounds Derived from Sex Pheromone Glands of Currant Borer, *Synanthedon tipuliformis* (Clerck) (Lepidoptera: Sesiidae)

Raimondas Mozūraitis^{a,b,*}, Vidmantas Karalius^a, Vincas Būda^a, and Anna-Karin Borg-Karlson^b

^a Laboratory of Chemical and Behavioural Ecology, Institute of Ecology, Vilnius University Akademijos 2, Vilnius LT-2600, Lithuania

^b Division of Organic Chemistry, Department of Chemistry, Royal Institute of Technology, SE-10044 Stockholm, Sweden. Fax: +4687912333. E-mail: raimis@kth.se

* Author for correspondence and reprint requests

Z. Naturforsch. **61c**, 278–284 (2006); received October 12/November 3, 2005

Gas chromatography and mass spectrometry analyses of crude sex pheromone gland extracts revealed that virgin *Synanthedon tipuliformis* (Clerck), currant borer (Lepidoptera: Sesiidae) females, produced 6 compounds, structurally related to sex pheromone components of clearwing moths. By comparison of retention times and mass spectra of natural products with corresponding properties of synthetic standards, these compounds were identified as: (2*E*,13*Z*)-octadeca-2,13-dien-1-yl acetate (*E*2,Z13-18:OAc), (3*E*,13*Z*)-octadeca-3,13-dien-1-yl acetate (*E*3,Z13-18:OAc), (13*Z*)-octadec-13-en-1-yl acetate (Z13-18:OAc), (2*E*,13*Z*)-octadeca-2,13-dien-1-ol (*E*2,Z13-18:OH), (13*Z*)-octadec-13-en-1-ol (Z13-18:OH) and octadecan-1-ol (18:OH) in the ratio 100:0.7:2.7:3.2:traces:traces. The first 3 compounds were previously known to occur in the sex pheromone gland extracts of currant borers, while the last 3 chemicals are now reported for the first time. Trapping tests carried out in the black currant field revealed that *E*2,Z13-18:OAc, when tested separately, attracted *S. tipuliformis* males, while addition of *E*3,Z13-18:OAc to the main component increased the effectiveness of *E*2,Z13-18:OAc over seven times. The attractiveness of 6 component lures did not differ significantly from the one of the binary mixture, confirming that *E*2,Z13-18:OAc and *E*3,Z13-18:OAc in the ratio 100:0.7 are essential sex pheromone components of *S. tipuliformis*. Trapping tests carried out at the dwelling place of *Synanthedon scoliaeformis* (Borkhausen) (Lepidoptera: Sesiidae) revealed that, in addition to intraspecific synergistic effect, *E*3,Z13-18:OAc increased the specificity of the pheromone signal of *S. tipuliformis*, acting by intraspecific mode as an attraction antagonist against *S. scoliaeformis* males. By this way, it ensured the specificity of the sex attraction signal of the currant borer. Consequently, both compounds *E*2,Z13-18:OAc and *E*3,Z13-18:OAc have to be present in pheromone formulations used for monitoring and/or control of *S. tipuliformis* to avoid effecting non-target species. Other compounds identified from the sex pheromone gland of *S. tipuliformis* did not show any significant interspecific activity for males of *S. scoliaeformis*, however, they provide a basis to achieve specificity of a pheromone signal of *S. tipuliformis* and could act as attraction antagonists against other clearwing moth species which, like *S. tipuliformis*, employ *E*2,Z13-18:OAc as their sex pheromone component.

Key words: Pheromone Specificity, Synergist, Attraction Antagonist