

(117) Testing attractants for trapping *Monochamus sartor* and *Monochamus sutor*

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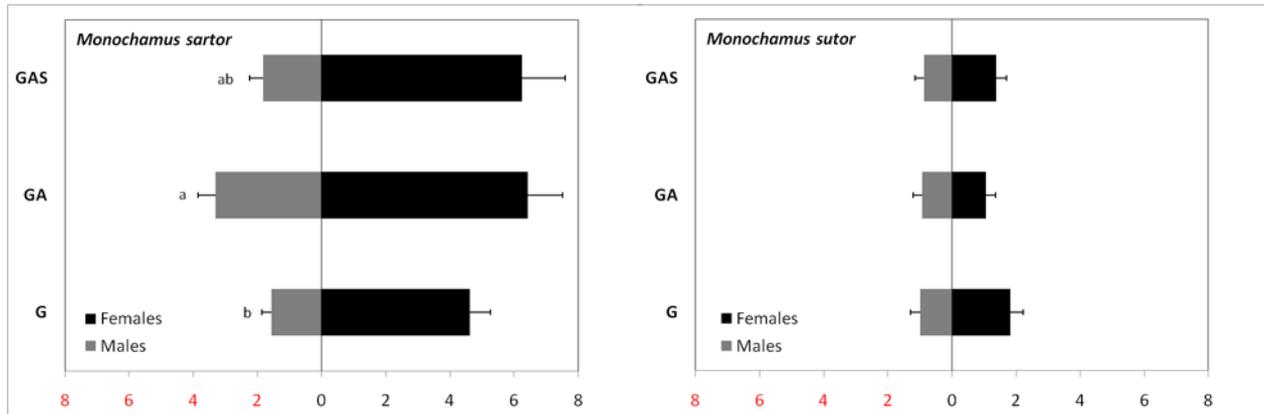
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ABSTRACT

Trapping vectors is one important measure for monitoring and control of pine wilt disease. Lures consisting of bark beetle pheromone components and a *Monochamus* pheromone compound have been developed for *Monochamus galloprovincialis*, the main pine wood nematode vector in Europe. The *Monochamus* pheromone compound 2-undecyloxy-1-ethanol has been shown to be attractive for other species in the genus, such as *M. alternatus*. We tested the response of *M. sartor* and *M. sutor* to lures known to attract *M. galloprovincialis*. These two species are important colonizers of weakened or freshly killed Norway spruce in Central Europe and have the potential to become important vectors should the pine wood nematode be introduced in this area.

The experiment was set up in a mountainous mixed spruce forest in a wilderness area in Lower Austria. No forest sanitation measures had been carried out following attacks of spruce by bark beetles as well after major damage by an avalanche allowing build-up of populations of *M. sartor* and *M. sutor* as well as other phloeo-xylophagous insects. Teflon coated 12-funnel traps (ECONEX, Spain) with three different combinations of attractants were deployed in four randomized blocks. The following lures were tested: (1) the commercially available Galloprotect-2D (SEDQ, Spain) consisting of 2-undecyloxy-1-ethanol, ipsenol, and 2-methyl-3-buten-2-ol, (2) Galloprotect-2D plus α -pinene (SEDQ, Spain), and (3) Galloprotect-2D plus α -pinene plus a blend of smoke volatiles (produced in D.R.H.'s laboratory at the Univ. Greenwich). Positions of lures were re-randomized every 10 days; the experiment lasted from 10 July to 20 August 2012. Traps were emptied every 3 or 4 days.

Traps baited with Galloprotect-2D caught 4.6 ± 0.6 female and 1.6 ± 0.3 male *M. sartor* on average per 10-day trapping period (Figure 1). Highest catches were attained when the host tree volatile α -pinene was added (6.4 ± 1.0 females and 3.3 ± 0.5 males); the increase in males was statistically significant. Further addition of smoke volatiles did not enhance captures. Due to lower *M. sutor* catch, no significant differences in response to the lures



were established. In total, our traps caught 277 *M. sartor* females and 107 males as well as 68 *M. sutor* females and 45 males over the entire trapping period.

Figure 1. Numbers of *Monochamus sartor* and *M. sutor* beetles caught per trap per 10-d period (means + SE, n = 16). G = Galloprotect-2D, GA = G plus α -pinene, GAS = G plus α -pinene plus smoke volatiles. Different letters indicate significant differences (Mann-Whitney U tests (corrected $\alpha = 0.017$) following up Kruskal-Wallis H tests).

Catches of *M. sartor* and *M. sutor* were significantly correlated with mean air temperature (Kendall's $\tau = 0.626$ and $\tau = 0.657$, respectively). No beetles were caught when mean temperatures were below 15°C . Traps caught high numbers of other phloeo- or xylophagous insects, such as other cerambycids and buprestids (total of 95 and 24 specimens). Most frequent species were *Acanthocinus griseus*, *Arhopalus rusticus*, *Spondylus buprestoides*, and *Leptura rubra*. Moreover, 136 specimens of the bark beetle predator *Thanasimus formicarius* were caught during the total 40-d trapping period. Generally, bycatch was highest in traps additionally baited with α -pinene. Woodwasps were only caught in traps containing this host tree volatile.

This experiment gave first insight into flight activity of two potential pine wood nematode vectors in mountainous Austria and their attraction to volatiles. The results indicate that *M. sartor* and *M. sutor* respond to the pheromone compound 2-undecyloxy-1-ethanol (monochamol). Attractants developed for *M. galloprovincialis* appear suitable for monitoring these potential pine wood nematode vectors.