



## NJF Seminar 389

**Pest, disease and weed  
management in strawberry –  
progress and challenges for the  
Nordic production**

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## **Volatile emission from strawberry plants is induced by mite and leaf beetle feeding and methyl jasmonate**

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We have studied the emission of volatile organic compounds (VOCs) from young strawberry plants, cultivars Polka and Honeoye, after feeding by several strawberry herbivores under laboratory conditions. The strawberry mite (*Phytonemus pallidus*) and the two-spotted spider mite (*Tetranychus urticae*) are important pests of strawberry both under field and greenhouse conditions, and their biological control by predatory mites is encouraged. Predatory mites such as *Phytoseiulus persimilis* use olfactory cues, i.e. volatiles emitted by herbivore-damaged plants, on many plant species in prey finding, but the functioning of this sort of tritrophic interaction has not been reported on strawberry. Therefore, we wanted to screen the VOC profile of two common strawberry cultivars with various potential VOC inducers (feeding by strawberry mite, two-spotted spider mite, strawberry leaf beetle (*Galerucella tenella*) and chemical treatment by methyl jasmonate (MeJA)) to assess if induced VOCs could have a role in indirect plant defence against pest mites.

VOC profile of strawberry plants is highly dominated by green leaf volatiles (GLVs), which are released also due to mechanical damage. Terpenoids were emitted from both intact and herbivore-damaged strawberry plants, and they were specifically induced by different herbivores. Spider mites induced (*Z*)-ocimene, (*E*)- $\beta$ -ocimene, (*E*)-4,8-dimethyl-1,3,7-nonatriene (DMNT), methyl salicylate (MeSA), (*E*)- $\beta$ -caryophyllene, germacrene-D, (*E,E*)- $\alpha$ -farnesene and  $\delta$ -cadinene emission from 'Polka', and (*E*)- $\beta$ -ocimene, methyl salicylate, germacrene-D and (*E,E*)- $\alpha$ -farnesene emission from 'Honeoye'. Strawberry mite feeding induced mostly GLVs. The chewing herbivore *G. tenella* significantly induced emissions of (*Z*)-ocimene, (*E*)- $\beta$ -ocimene, DMNT, (*E,E*)- $\alpha$ -farnesene, (*E*)- $\beta$ -caryophyllene and germacrene-D from 'Polka'. MeJA induced emissions of (*E*)- $\beta$ -ocimene and DMNT from both cultivars and in addition (*E,E*)- $\alpha$ -farnesene from 'Honeoye'. All these compounds are known to be typical herbivore-induced compounds on several plant species. Thus, our results reveal that strawberry has potential for inducible VOC defence, and this encourages testing the attractiveness of these strawberry VOCs to predatory mites. Yet, we have not found evidence of a functional tritrophic interaction on strawberry plants.