



Introduction – The plum psyllid *Cacopsylla pruni* is a univoltine psyllid species, which migrates between *Prunus* spp. for reproduction and conifers for overwintering. At the end of winter, adult *C. pruni* arrive in *Prunus* orchards for mating and oviposition. After development, the young adults (emigrants) leave the stone fruit trees and migrate to conifers in higher regions until they return (remigrants) to *Prunus* spp. in early spring. For this seasonal switch over long distances recognition and location of host plants is a key

challenge for proper survival and successful reproduction. *C. pruni* is the vector of the cell wall-less bacterium ‘*Candidatus Phytoplasma prunorum*’ that causes European Stone Fruit Yellows (ESFY), a severe decline disease in European stone fruit production. The pathogen is located in the phloem tissue of *Prunus* spp.. The development of an environmental friendly and selective control strategy using plant volatiles could help to reduce the number of new ESFY infections.

Methods: Headspace sampling at different phenological growth stages in the field followed by thermal desorption and GC-MS analysis

Reproduction host

Prunus persica
cv. South Haven

Prunus insititia
cv. GF 655-2

Phenological growth stages of stone fruit (Meier et al., 2018)

0: sprouting / bud development
1: leaf development
5: inflorescence emergence
6: flowering
7: development of fruit

overwintering host

Abies alba

Remigration

to reproduction host

Oviposition

Development

Emigration

to overwintering host

Life cycle of *C. pruni*



Results: Identification of species and growth stage specific volatiles e.g. aldehydes and terpenes

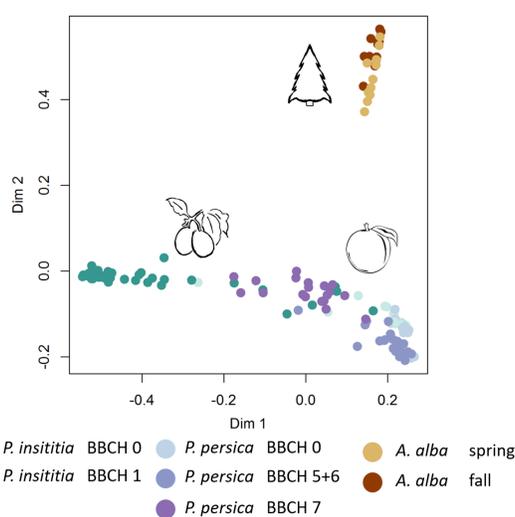
High proportions of...

...**Octanal, Nonanal, Decanal** in the headspace of both *Prunus* species
...**Dodecanal** in *P. persica*

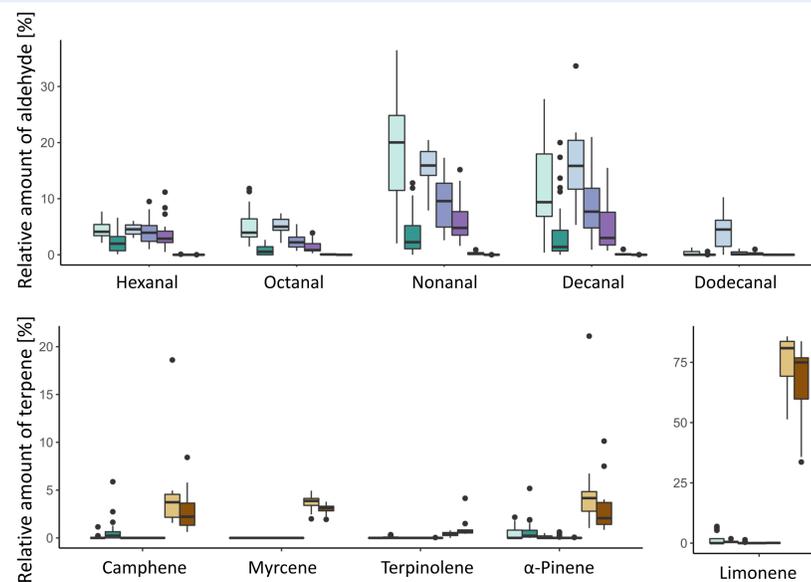
during **remigration** (BBCH 0) of *C. pruni*

...**Camphene, Myrcene, α -Pinene and Limonene** in headspace samples from *A. alba*

during **migration** and **remigration** of *C. pruni*

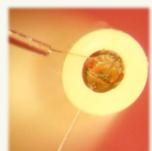


Multi-dimensional scaling (MDS) plot of random forest (RF) model classifying the headspace samples from host plants.



Methods: Electroantennography

with female emigrants

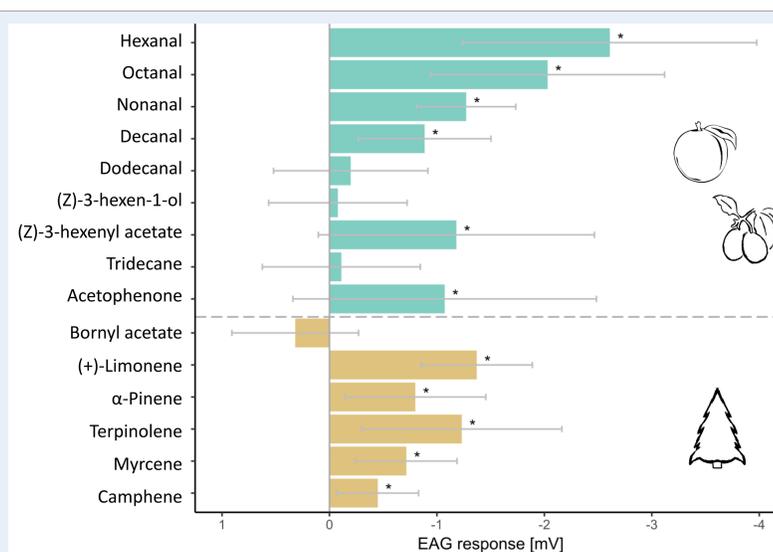


Preparation of *C. pruni* for EAG

Odor puffs of 100 μ g in DCM (positive control hexanal: 1 mg)



Scanning electron micrograph (SEM) of *C. pruni*
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Mean \pm standard deviation of summated receptor potentials. Responses to respective negative controls were subtracted. Wilcoxon matched pairs signed-rank test * $p < 0.05$, $n=10$

Results: Significant antennal response to:

- Aldehydes characteristic for *Prunus* spp. at BBCH 0
- Green leaf volatile characteristic for *P. insititia* at BBCH 1
- Acetophenone characteristic for *Prunus* spp. at BBCH 0
- Terpenes characteristic for *A. alba* in spring and fall

Conclusion – We identified volatiles specific for the different host plants of *C. pruni* at different growth stages. We found significant antennal responses of female emigrants to VOCs specific for *Prunus* species and conifers. Possibly these volatiles enable *C. pruni* to distinguish between reproduction and overwintering hosts.

Further studies should investigate how perceived volatiles manipulate psyllid behavior. Attractive and repellent substances or blends could be used for the development of an alternative control strategy for *C. pruni*, like push-and-pull or attract-and-kill strategies.