



## Follow the scent

The bacterial pathogen *Candidatus Phytoplasma mali* alters the odour of the plant that it infects to ensure maximum spread, according to new research published in the *Journal of Chemical Ecology*.

Apple proliferation disease, which causes severe economic losses, is caused by *Ca. P. mali*, and is characterized by thin branches that form 'witches brooms' and tiny, tasteless fruit that cannot be sold. The cell-wall-less bacterium *Ca. P. mali* grows in the phloem of infected plants and is vectored by the phloem-feeding psyllid *Cacopsylla picta*. *C. picta* reproduces on apple trees and newly hatched adults ingest *Ca. P. mali* from infected plant phloem. Olfactory responses to plant kairomones — chemical substances produced and released by a living organism that benefit the receiver and disadvantage the donor — were previously proposed to be important in the host-finding behaviour of psyllids. In this latest study, the behaviour of uninfected and infected insects towards odours from uninfected and infected apple plants was studied.

The behavioural bioassay used a Y-shaped olfactometer to record the responses of insects to odours of uninfected and infected apple

twigs. Psyllids were put into the olfactometer to investigate whether they opted for the arm of the apparatus that contained either infected or uninfected twigs. The infection status of insects was confirmed by PCR and the students t-test was used to establish whether results were statistically significant.

The major finding of this study was that infected apple trees specifically attracted uninfected and infected insects. The benefit to the pathogen is that uninfected insects could become infected, whereas infected insects could ingest more pathogens to increase the likelihood of an uninfected tree becoming infected. Psyllids that reproduced on infected apple trees but failed to become infected with *Ca. P. mali* had the opposite response and were repelled by infected trees, leading the authors to propose that infection with *Ca. P. mali* might also affect insect behaviour.



Chemicals emitted by apple plants were identified using gas chromatography–mass spectrometry. Infected trees produced significantly more of the sesquiterpene  $\beta$ -caryophyllene than uninfected plants, although the authors have yet to prove that *C. picta* is directly attracted to  $\beta$ -caryophyllene.

Susan Jones

**ORIGINAL RESEARCH PAPER** Mayer, C. J., Vilcinskis, A. & Gross, J. Phytopathogen lures its insect vector by altering host plant odor. *J. Chem. Ecol.* **34**, 1045–1049 (2008)