



Electrophysiological and behavioural responses of the Grapevine Moth *Lobesia botrana* to odours of the non-host plant *Perilla frutescens*



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Background

Lobesia botrana is a major pest of grape worldwide. To find novel compounds with potential application in biological control, we screened the biological activity of metabolites isolated from the Asian food plant *Perilla frutescens* on the olfactory system of the insect. Compounds from this plant have previously been shown to activate *in vitro* a novel class of mammalian receptors, TRPs (Bassoli et al 2009), which are also found in insect antennae (Chouquet et al. 2009).

Goals

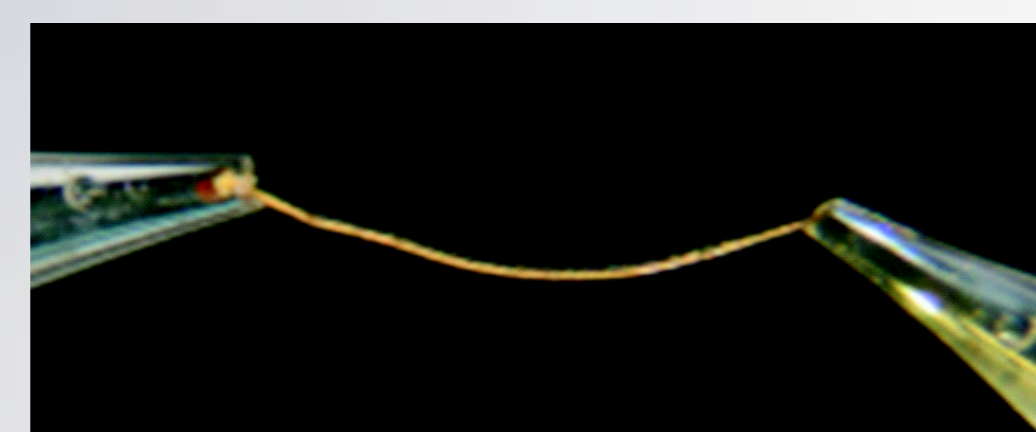
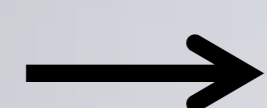
- Identifying active compounds in *P. frutescens* varieties with different chemical makeup (chemotypes)
- Testing behavioral activity of identified compounds



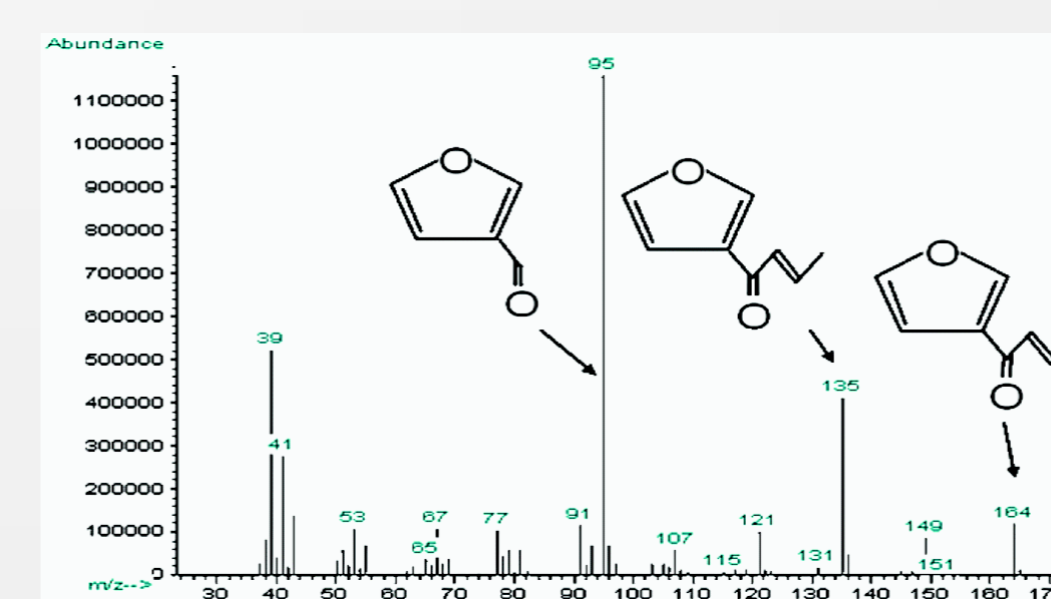
Experimental Procedure



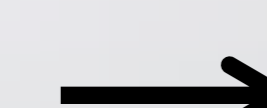
Extraction of *P. frutescens* essential oils



GC-EAD identification of active compounds

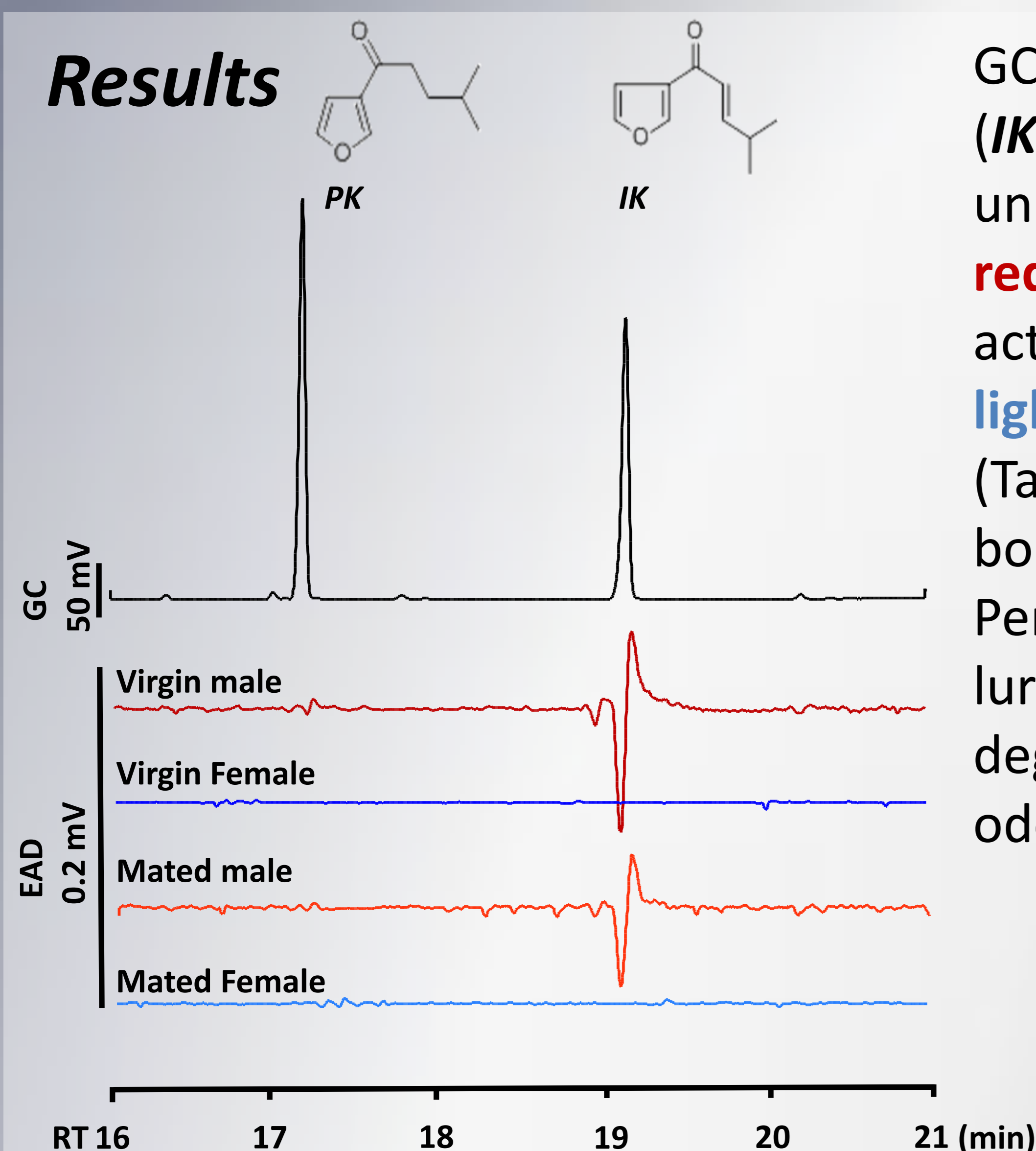


Confirming identity of compounds by GC-MS



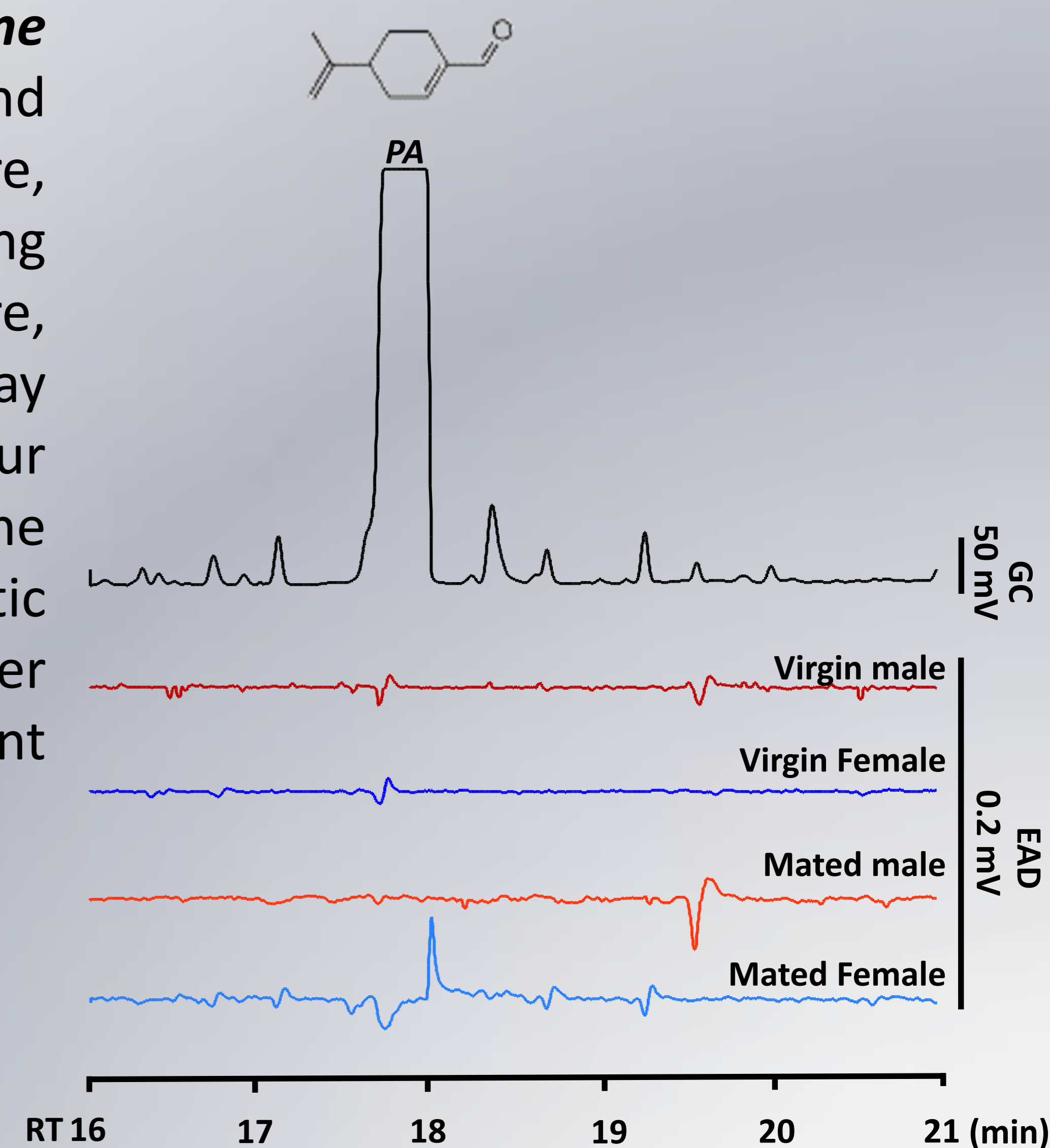
Bioassays (oviposition trials)

Results



GC-EAD experiments revealed **Isoegomaketone (IK)** as a strong activator of both mated and unmated *L. botrana* male antennae (left figure, **red tracks**) and **Perillaaldehyde (PA)** as a strong activator of mated female antennae (right figure, **light-blue track**). In a dual choice oviposition assay (Table below), the combination of an odour bouquet of a host plant with either the Perillaaldehyde essential oil (**e.O**) or a synthetic lure of the PA compound (**PA**) elicited a higher degree of **female oviposition** than the host plant odours alone (Host).

	Eggs laid % (p<0,0001)		
	Host	Host + <i>Perilla</i>	Extract
	9,60%	90,40%	e.O
	19,90%	80,10%	PA



Conclusions

- We identified compounds showing sex-specific activity, both in the antenna, and in behavior
- These could form the basis for biological control efforts

Perspectives

- Molecular, physiological and behavioural studies of the activity of single and blended *Perilla* compounds
- Study of the role of TRP receptors in *Lobesia* in the perception of these compounds