

Response of *Philaenus spumarius* and *Neophilaenus campestris* to potential semiochemicals

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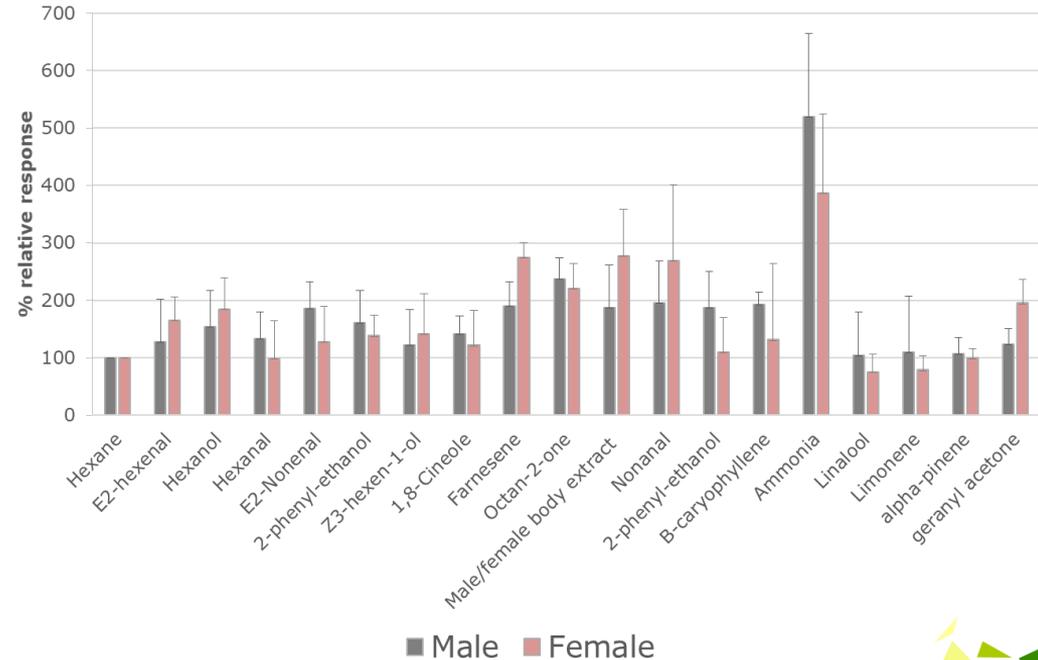
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METHODS

- Recently, the antennal sensilla fine structure and the response to several volatile organic compounds were investigated in *P. spumarius*. Although its antennal chemoreceptors are quite limited, the meadow spittlebug seems to be able to recognize and react to some substances. While the study of *P. spumarius* chemical ecology is ongoing, for *N. campestris* this topic is still uninvestigated.
- In order to evaluate the response of *P. spumarius* and *N. campestris* adults to volatile organic compounds (VOCs), several Y-tube olfactometer bioassays were carried out.
- Bergamot essential oil, farnesene, nonanal and undecenal were selected through preliminary EAG experiments. In addition to these compounds, insect body extracts obtained from 5 males and 5 females of both species were tested too. Insects were washed in 50 microliters hexane, later concentrated to obtain an insect equivalent every five microliters.

Electroantennography

EAG response of *Philaenus spumarius* (males and females) to VOCs and adult extracts

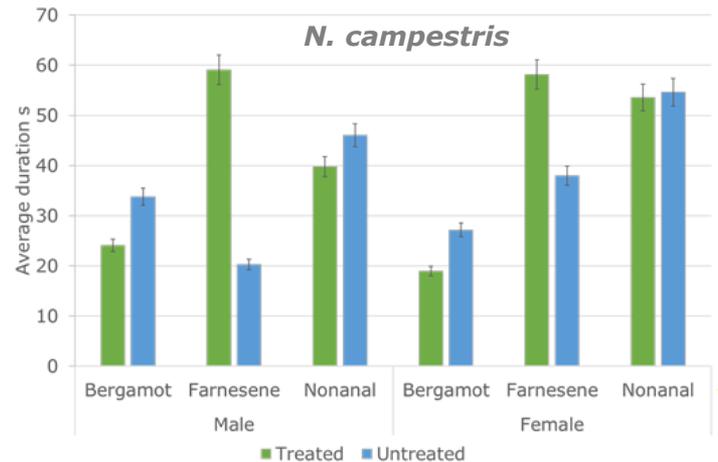
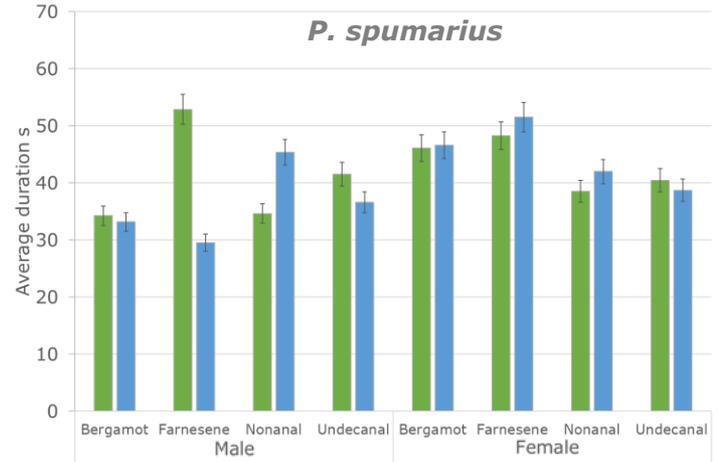


RESULTS

Response to VOCs

- The average linear speed of the insect in the olfactometer and time spent in the two arms (treatment vs. control) were evaluated.
- In response to almost all the substances, a decrease in the linear speed for both males and females was evidenced in comparison to pure air (*P. spumarius* Male $p=0.008$, Female $p=0.003$; *N. campestris* Males $p=0.022$, Female $p=0.009$).
- Males of both species responded to farnesene remaining for a longer time in the arm containing the substance respect to the arm with pure air.

Species	Olfactometer arm	Avg \pm SD	H	p
<i>P. spumarius</i>	Pure air	31.88 \pm 13.84	6.82	0.01
	Farnesene	60.69 \pm 44.85		
<i>N. campestris</i>	Pure air	19.46 \pm 20.88	4.31	0.04
	Farnesene	75.94 \pm 13.73		

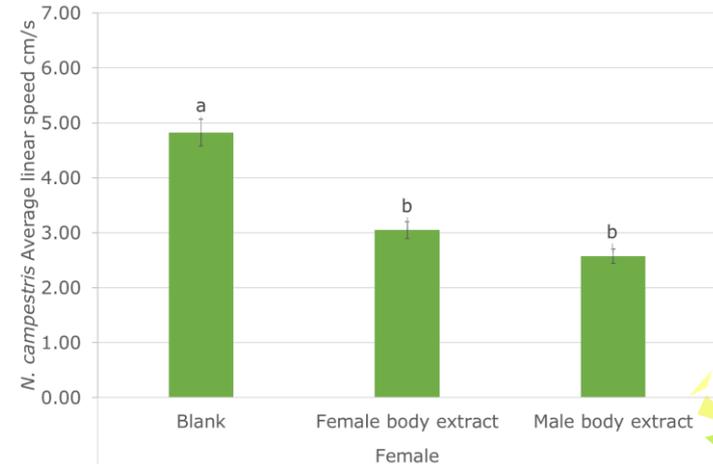
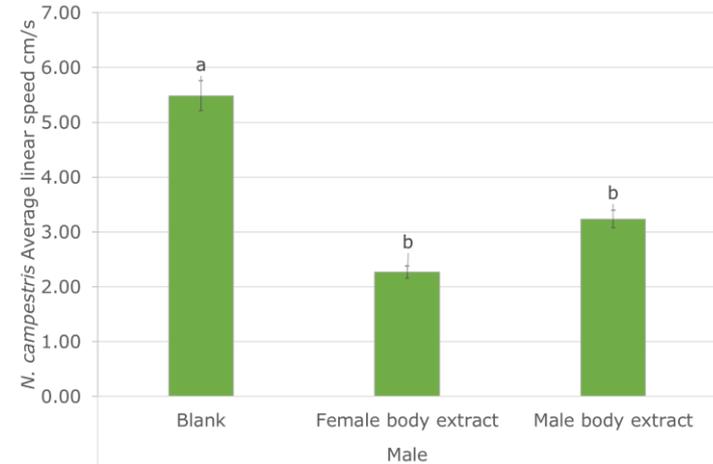


RESULTS

Response to body extracts

- When the body extracts of males or females were tested, both species showed a linear speed significantly different compared to the control bioassays.

Species	Sex	Treatment	Avg \pm SD	H	p
<i>P. spumarius</i>	Male	Blank	2.97 \pm 1.26	11.41	0.003
		Female body extract	4.20 \pm 1.36		
		Male body extract	4.28 \pm 1.21		
	Female	Blank	4.31 \pm 1.24	10.96	0.004
		Female body extract	3.25 \pm 0.73		
		Male body extract	3.78 \pm 1.87		
<i>N. campestris</i>	Male	Blank	5.49 \pm 2.44	7.25	0.027
		Female body extract	2.27 \pm 1.19		
		Male body extract	3.24 \pm 2.01		
	Female	Blank	4.82 \pm 1.63	12.19	0.002
		Female body extract	3.05 \pm 1.66		
		Male body extract	2.58 \pm 1.09		



CONCLUSION

- The need of effective control tools against spittlebugs has highlighted the lack of knowledge on several aspects of spittlebugs' chemical ecology.
- In olfactometer bioassays almost all the tested compounds stimulated responses in both sexes of *P. spumarius* and *N. campestris*.
- Males and females of *P. spumarius* and *N. campestris* perceived especially farnesene.
- Volatile compounds extracted from spittlebug bodies elicited significant responses in males and females of both species.
- The reaction of *N. campestris* to olfactory stimuli have been proved for the first time.
- These results may suggest that one or more volatile compounds could play a role as semiochemicals in spittlebugs.

