

Changes of VOCs composition from aphid honeydew and impact on predatory *Episyrphus balteatus* (De Geer, 1776)

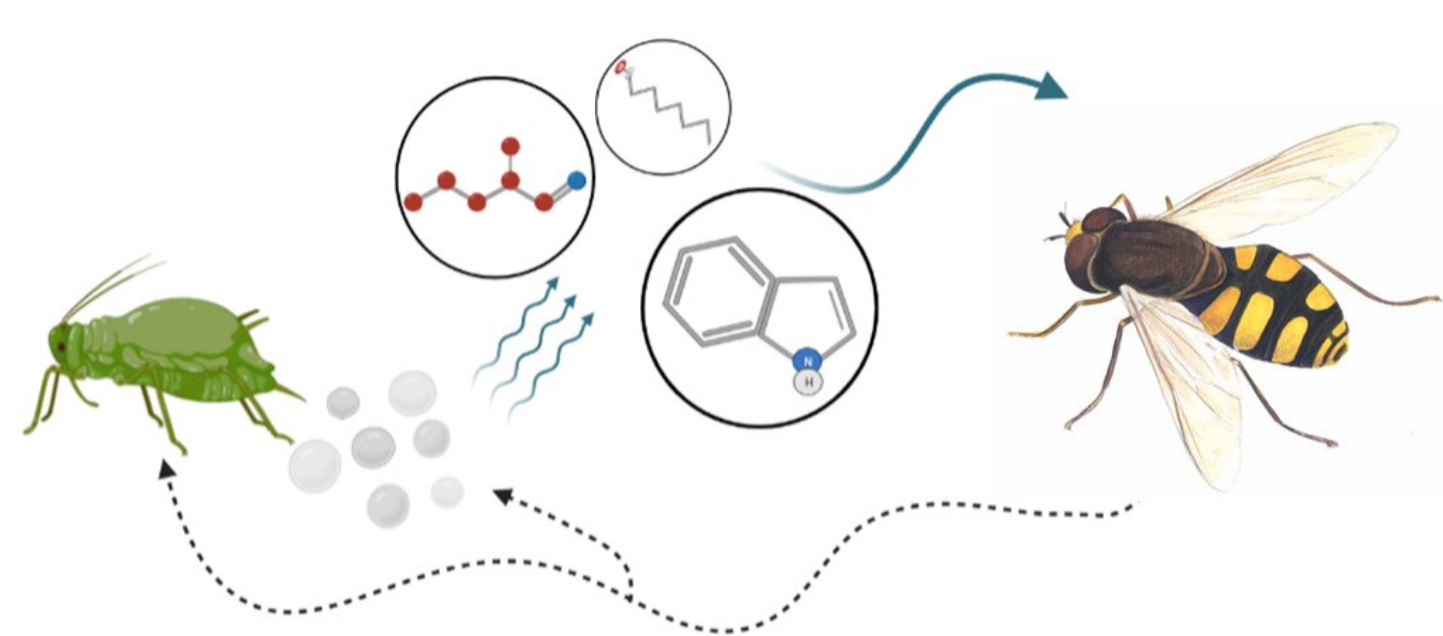
Lallie Glacet¹, Grégoire Noël¹, Clément Martin¹, Frédéric Francis¹

¹Functional and Evolutionary Entomology, Terra, Gembloux Agro-Bio Tech, University of Liege, Passage des Deportees-2, B-5030 Gembloux, Belgium;

Background

Aphid honeydew impacts tritrophic relationships between host-plant, herbivores and the natural enemies:

- Rich in sugars and amino-acids (diversity of proteins)^{1,2}
- Nutritional resource for beneficials³
- Volatile** and a contact **kairomone** : attracts natural enemies and stimulates oviposition⁴

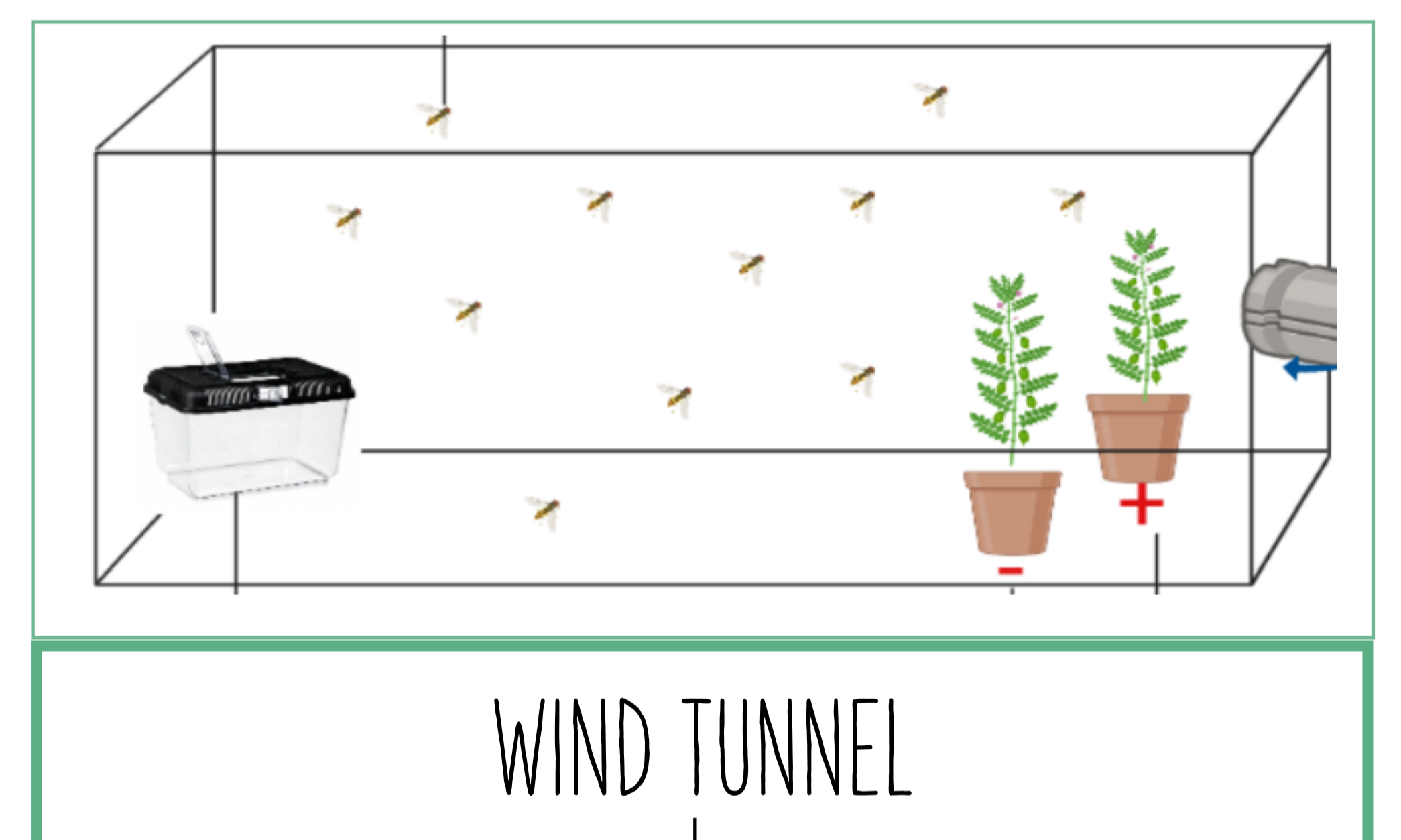
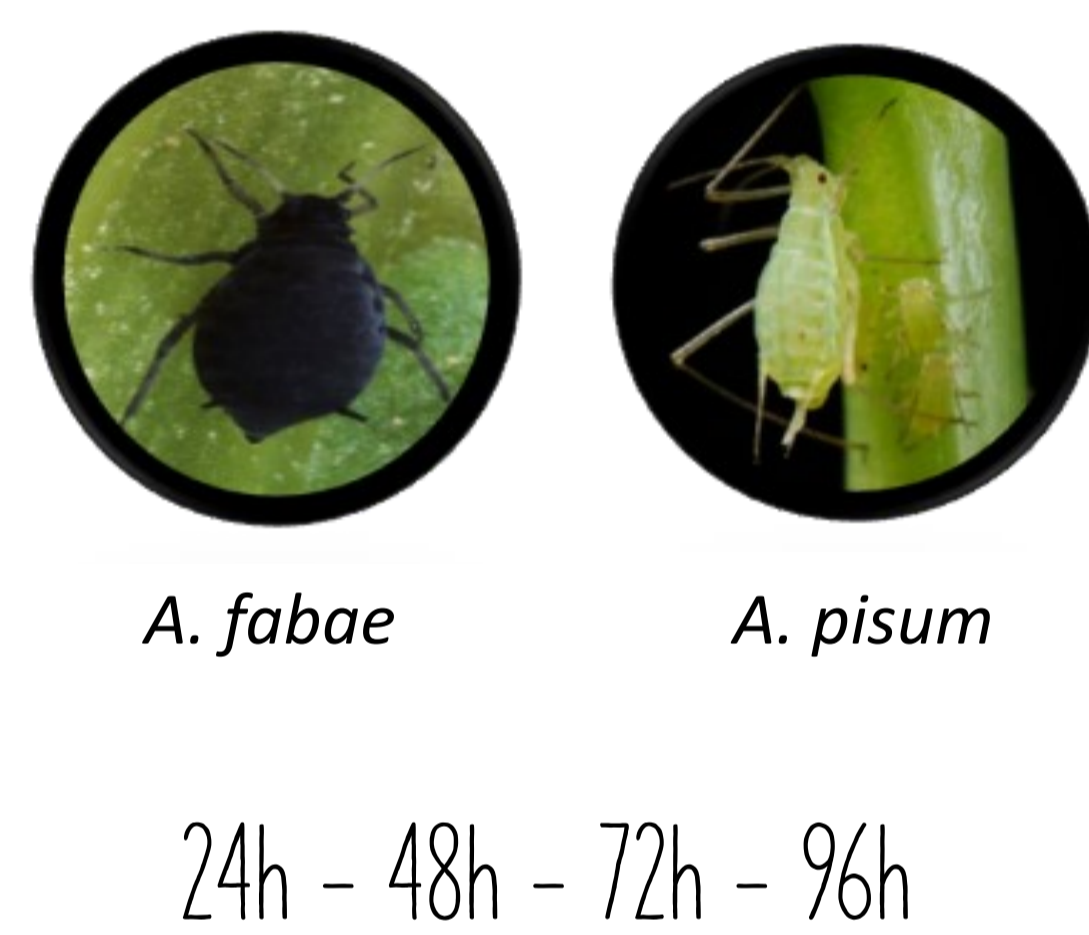
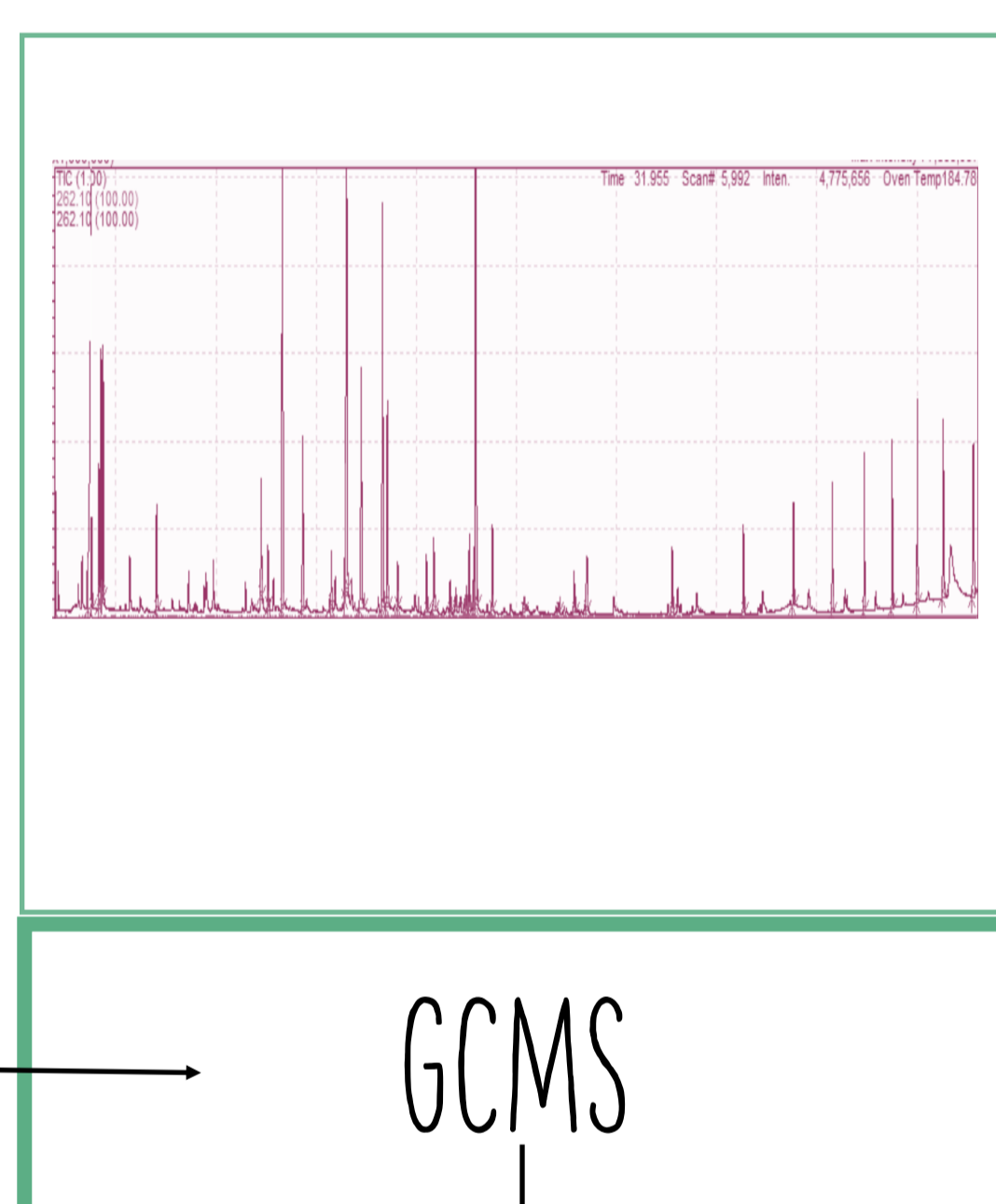
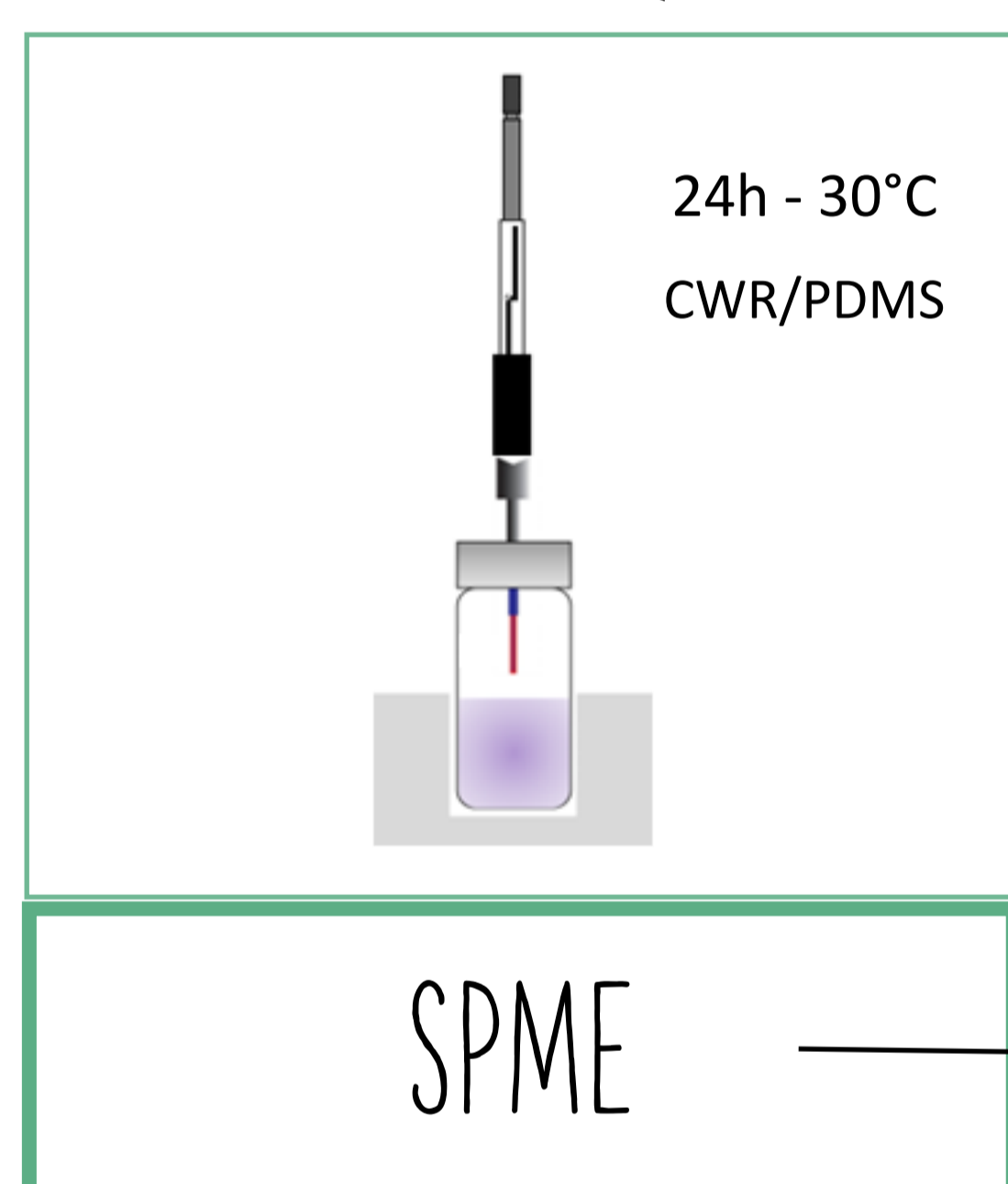


Objectives

- Analyse of the volatile organic compounds present in the honeydew of two aphid species : *Acyrtosiphon pisum* (Harris 1776) and *Aphis fabae* (Scopoli 1763)
- Analyse of the volatile organic compounds of honeydew that had undergone natural ageing (24h, 48h, 72h, 96h)
- Evaluation of the influence of naturally ageing honeydew of different species on the behaviour of the predatory hoverfly *Episyrphus balteatus*

Methods

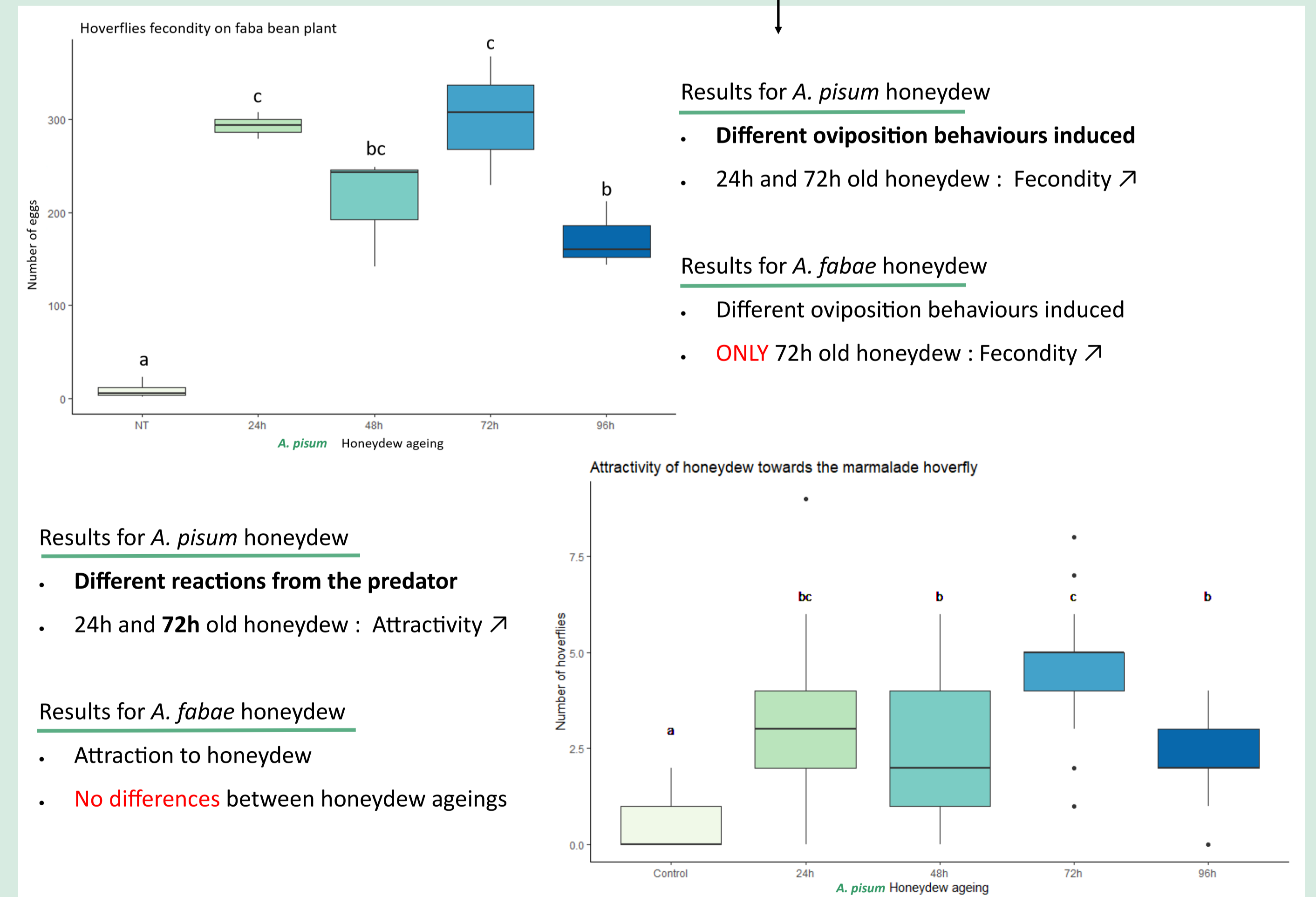
Honeydew collection



Volatile organic compounds identified in the different honeydews

Volatile compounds	<i>A. pisum</i>	<i>A. fabae</i>	Both	All of the samples
Acetoin				
3-methylbut-3-en-1-ol				
3-methylbutan-1-ol				
2-methylbutan-1-ol				
(methylsulfonyl)methane				
3-methylbut-2-en-1-ol				
3-methyl-2-butenal				
Butane-2,3-diol				
Octane				
2-Octanone				
(Z)-hept-2-enal				
1-Heptanol				
Oct-1-en-3-ol				
(Methyltrisulfanyl)methane				
(4-hydroxyphenyl)phosphonic acid*				
2-ethylhexan-1-ol*				
(E)-2-Octen-1-ol				
Octyl formate				
Undec-1-ene				
4-Methoxyphenol*				
Nonan-2-one*				
Nonadecan-2-one*				
Nonan-2-ol				
2-phenylethanol*				
1,2-dimethoxybenzene*				
1-Nonanol				
2,3-dihydro-1-benzofuran				
(2E)-3,7-dimethylocta-2,6-dien-1-ol				
Decan-1-ol				
1-methoxyundecane				
(Z)-undec-6-en-2-one				
Undecan-2-one				
1H-indole*				
6-methyl-2-methylidene-6-(4-methylpent-3-enyl)bicyclo[3.1.1]heptane*				
Tridecan-1-ol				

*Most abundant (Relative abundance)



Conclusions & Perspectives

Honeydew COV's composition is specific but :

- Some compounds may be shared by several species
- The occurrence of some compounds depends on the ageing of the honeydew

→ These differences might explain the differences in the behaviour of the predator *E. balteatus* in the presence of honeydew.

Interesting to investigate the origin of the compounds