BAC-STOP
STOP BAD BACTERIA ON OAK

Using the odour of bacteria to tackle Acute Oak Decline

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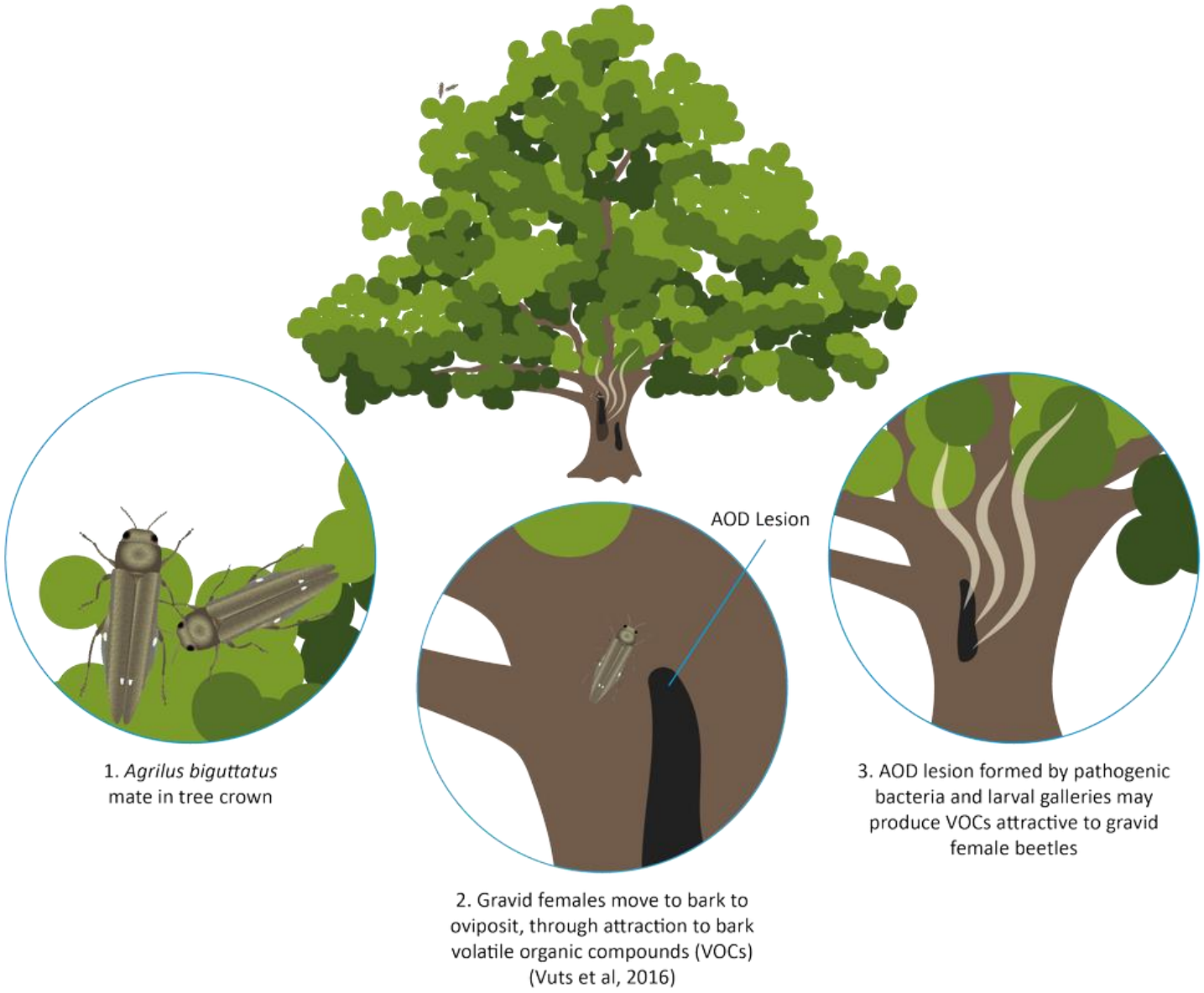
Agrilus biguttatus life cycle



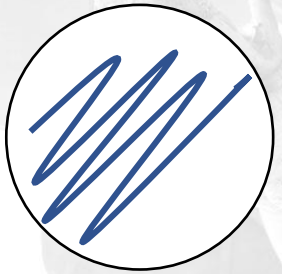
Objectives:
Determine the role of AOD bacterial odours (**volatiles**) on *A. biguttatus* behaviour

Characterise volatiles produced by AOD bacterial species

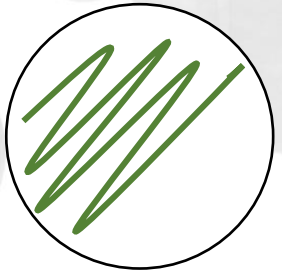
Overall project aim:
To identify bacterial volatiles attractive to the beetle, which could be used to optimise semiochemical-based lures to monitor the spread of *A. biguttatus*

Determine role of bacterial volatiles on beetle behaviour

Uninoculated growth media

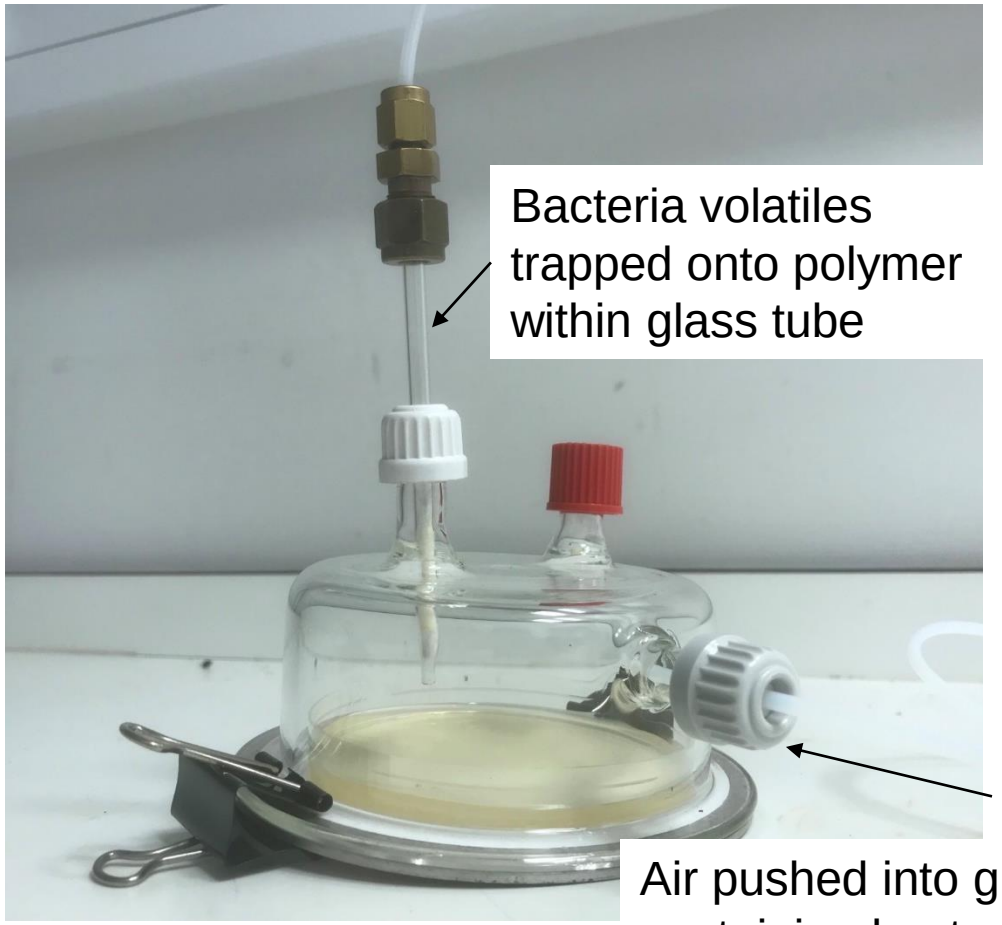


Brenneria goodwinii



Rahnella victoriana

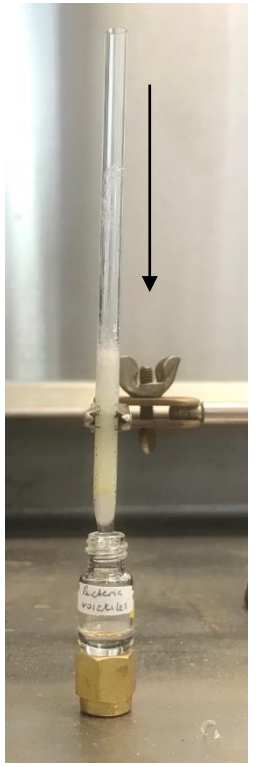
Gibbsiella quercinecans



Bacteria volatiles trapped onto polymer within glass tube

Air pushed into glass dome containing bacteria culture

Solvent passed through tube to elute volatiles into a liquid extract



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Determine role of bacterial volatiles on beetle behaviour

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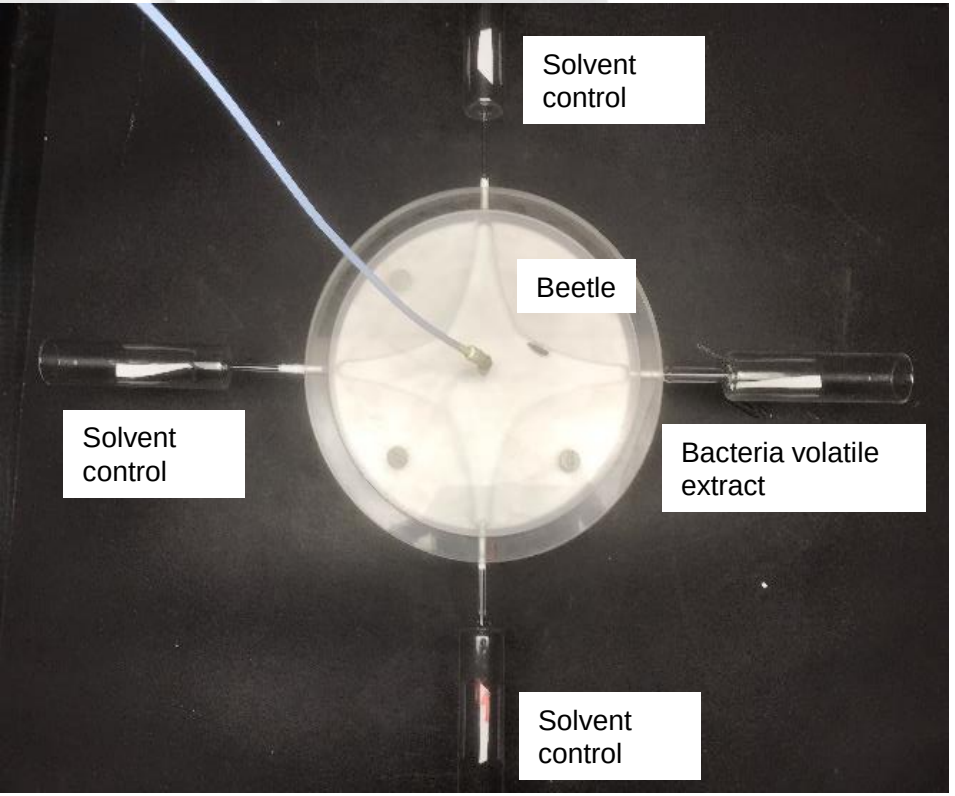

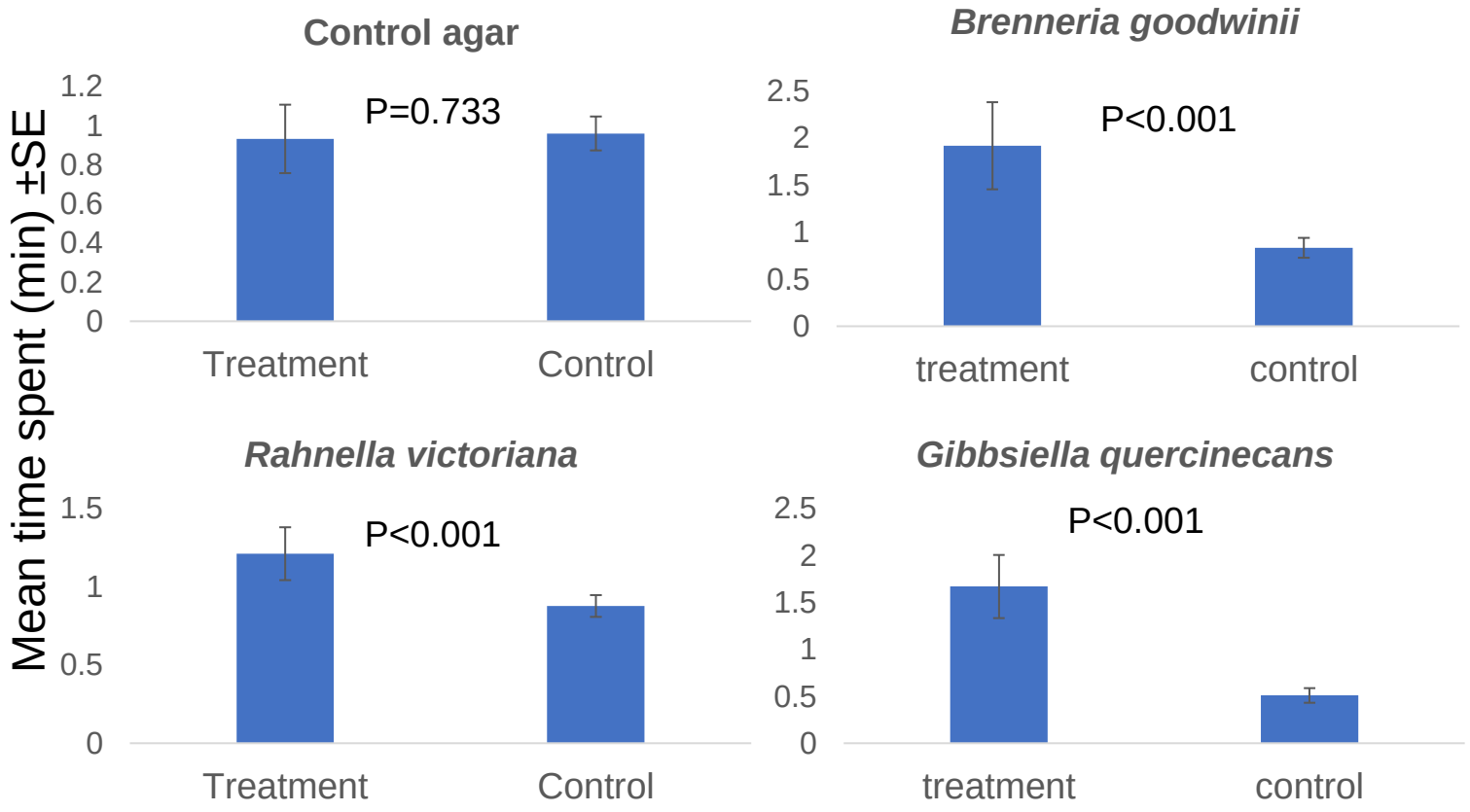

Volatiles from all tested species of bacteria are attractive to *A. biguttatus* gravid females

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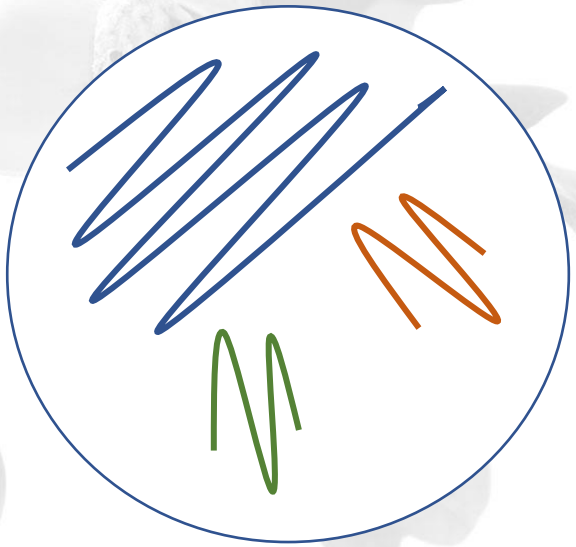
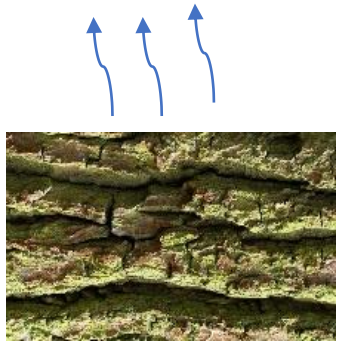
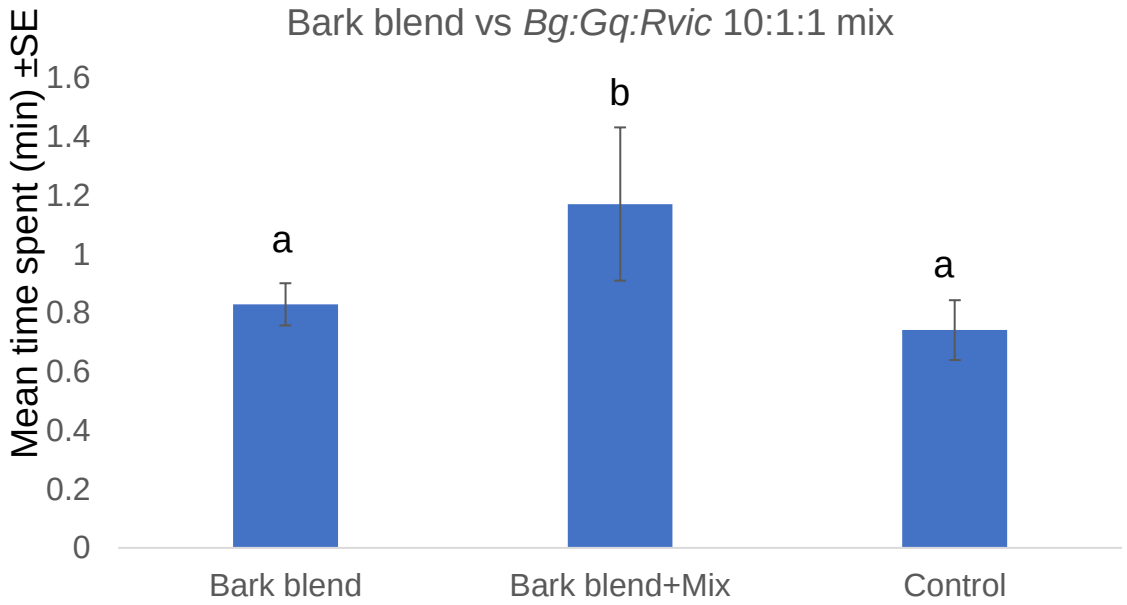
Volatile collections from mixed bacteria species in a 10:1:1 ratio (*B. goodwinii*: *G. quercinecans*: *R. victoriana*)



Volatile collection from bacterial mix



Synthetic blend of odours identified from bark ('bark blend')



Extract collected from mixture of bacteria, with the addition of a synthetic blend mimicking bark volatile production, increases beetle attraction

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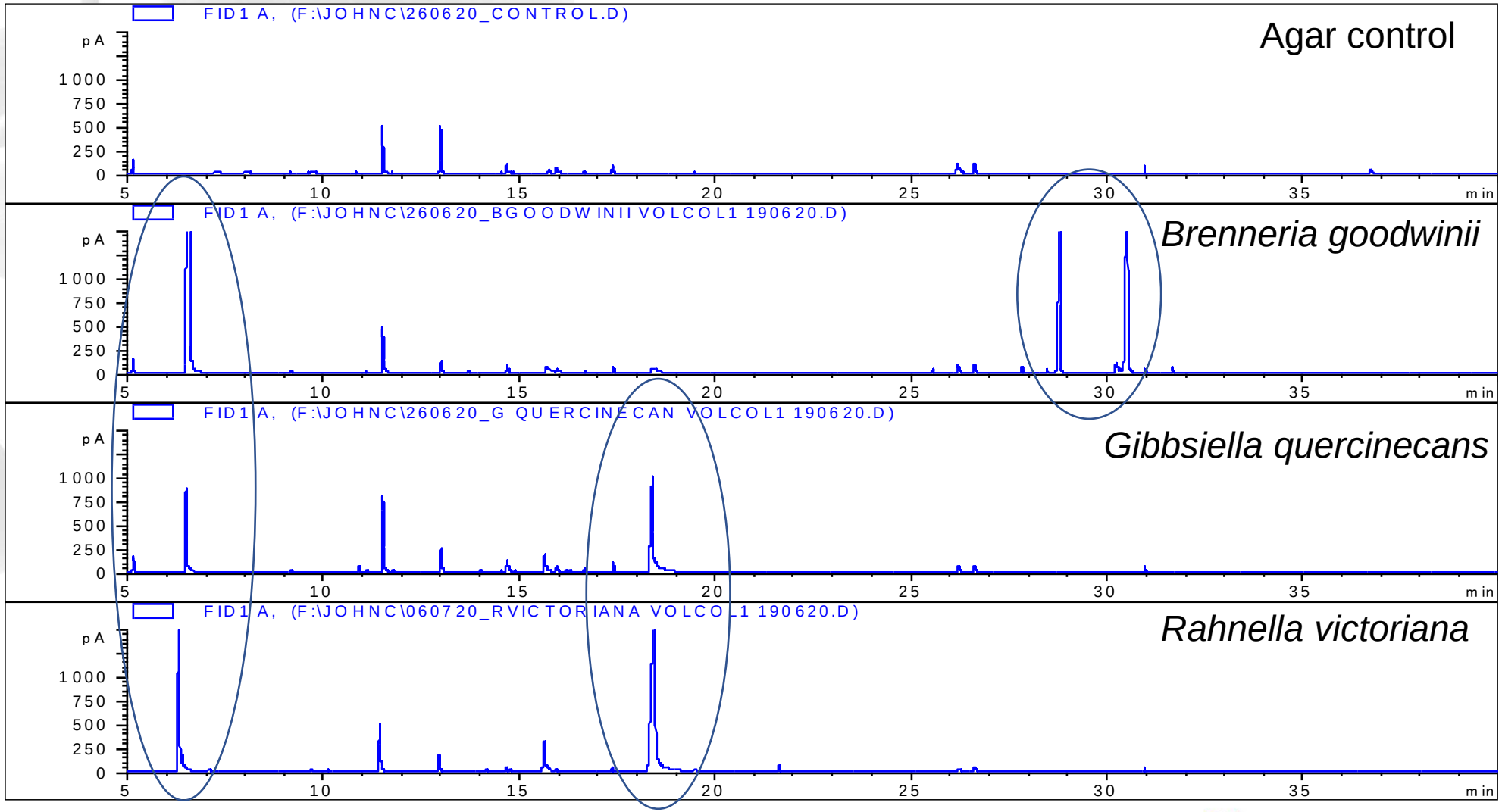
Characterise volatile production from AOD bacteria



Bacteria produce unique volatile profiles, including two compounds specific to *B. goodwinii*

Characterise volatile production from AOD bacteria

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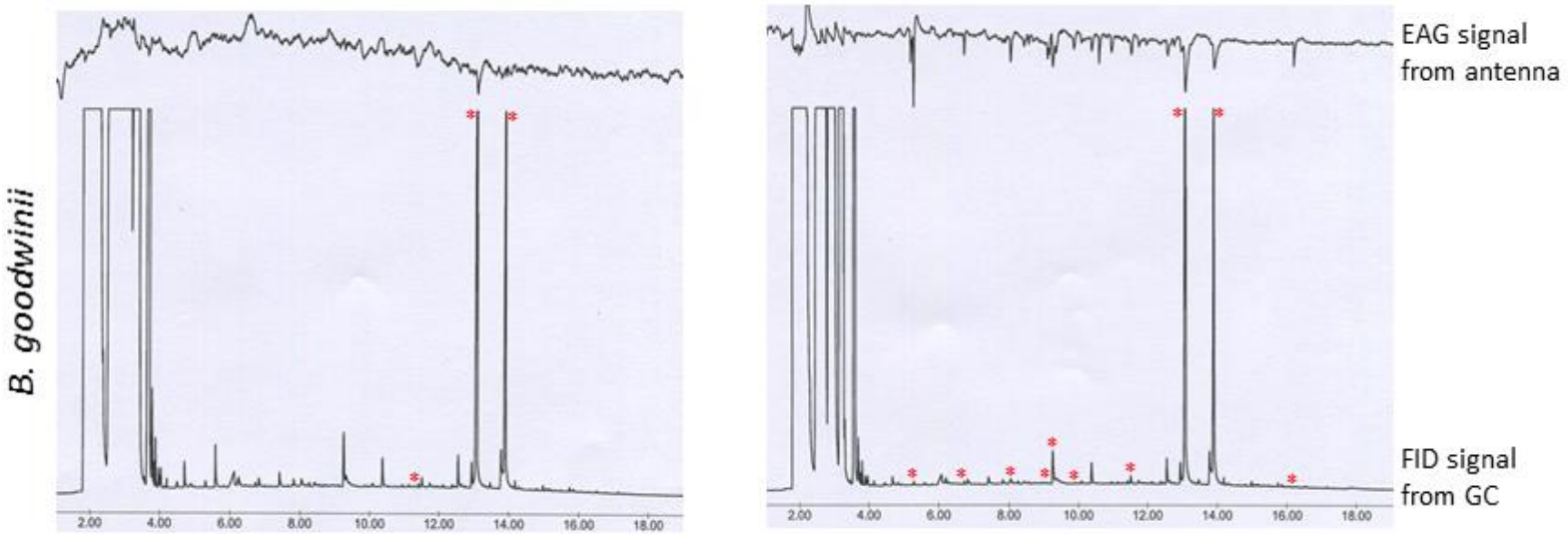
Gas Chromatography-Electroantennography (GC-EAG) used to determine whether beetles antennae respond to bacterial volatiles



Female

Male

Two *Brenneria goodwinii*-specific volatiles are detected by antennae from male and female *A. biguttatus*

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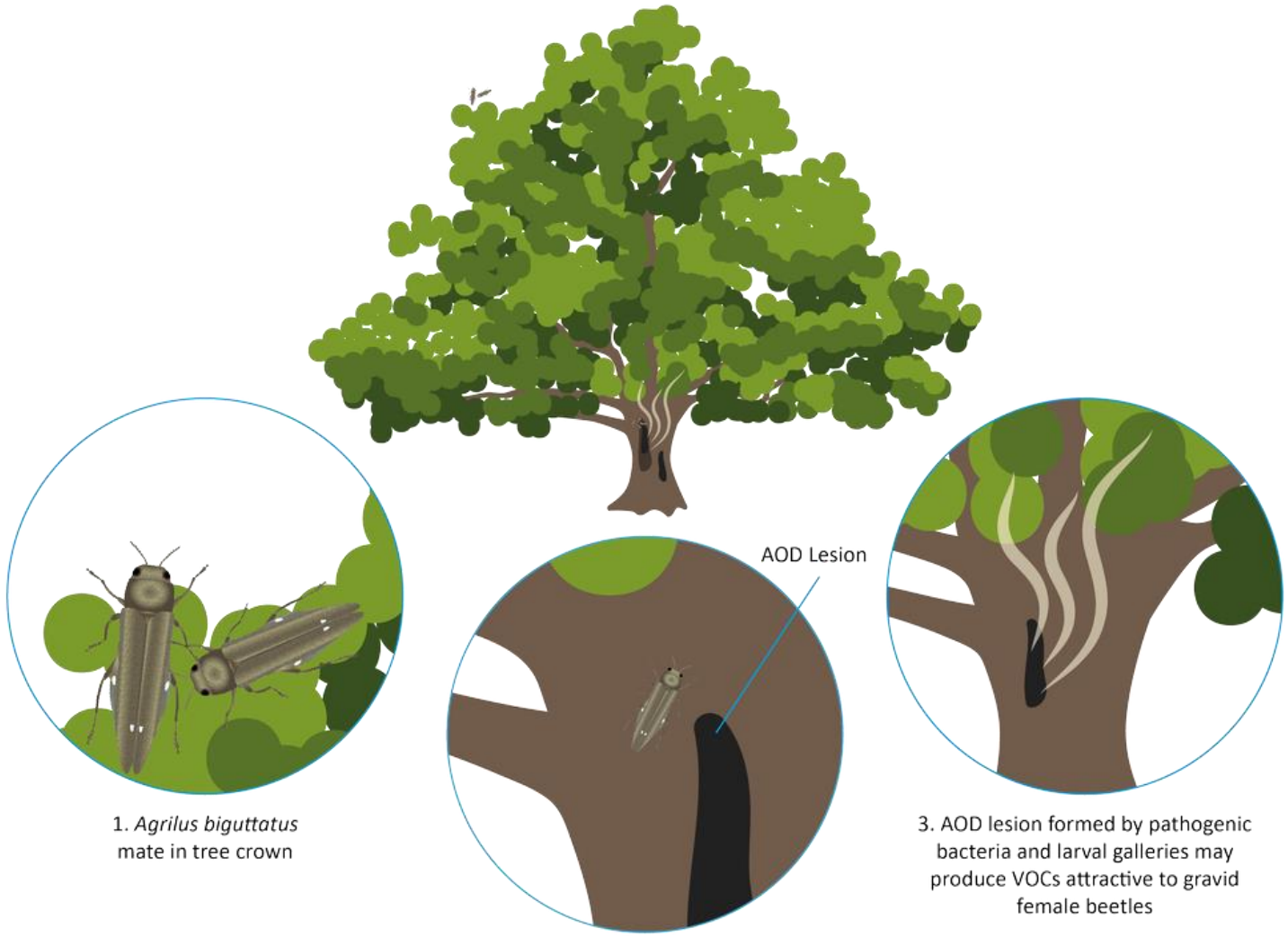
Conclusions



Bacteria volatiles

AOD bacterial volatiles are attractive to gravid females, especially volatiles from mixed AOD bacterial populations, when synthetic bark blend included

AOD bacteria produce unique volatile profiles, including two *B. goodwinii*-specific volatiles

Future work

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Synthesise and confirm identity of two *Brenneria goodwinii*-specific volatiles

Identify other bacterial odours in mixed AOD bacterial populations, and test their synthetic blends for attraction towards the beetle using four-arm olfactometry

Assess the efficacy of bacterial volatiles at attracting *A. biguttatus* in the field, through semiochemical-based lures

(Imrei et al., 2020)

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