Pinus pinaster In Vitro Shoot Volatiles from Genotypes with Varying Susceptibility to Pine Wilt Disease

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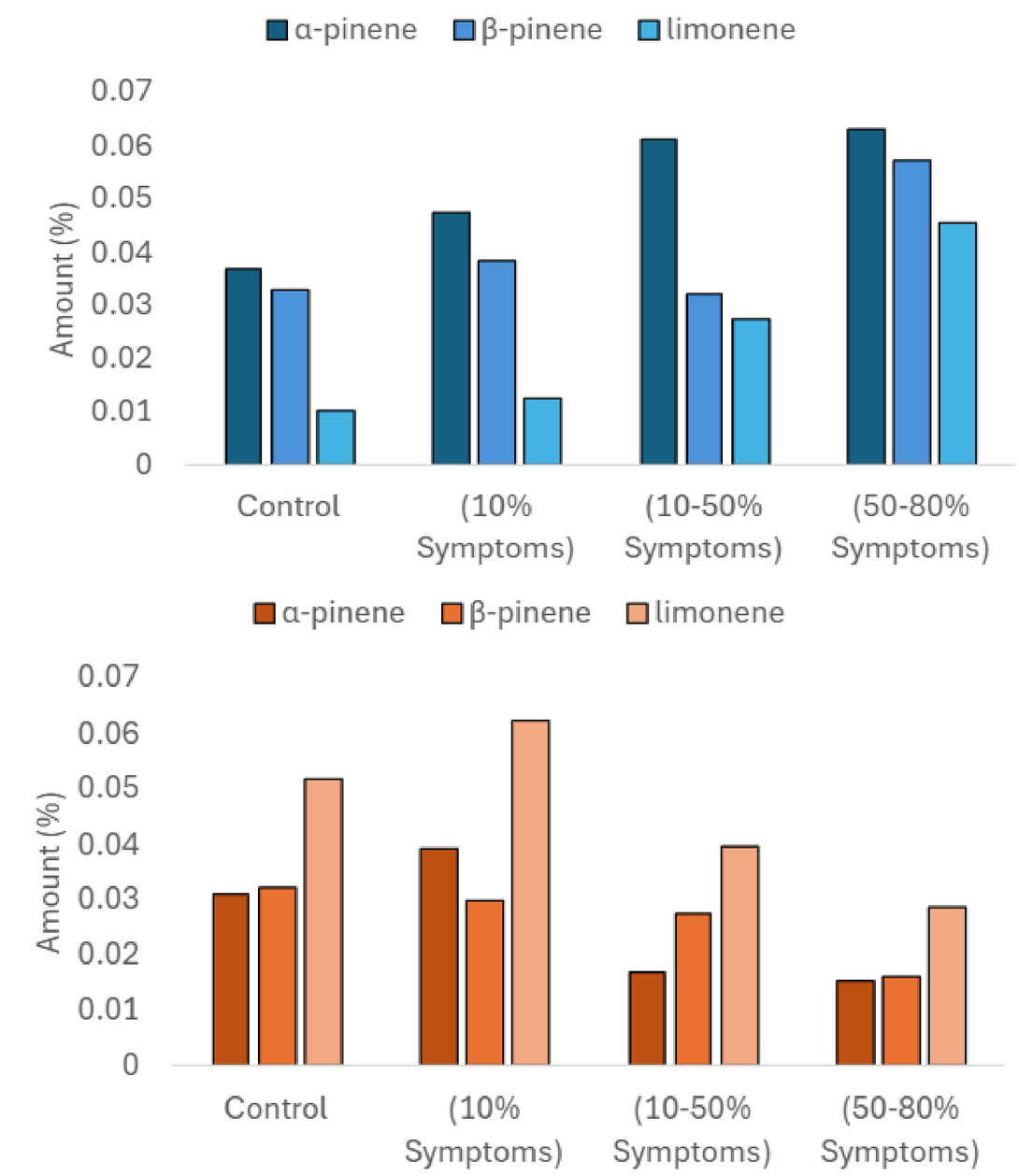
The pinewood nematode (*Bursaphelenchus xylophilus*), is the causal agent of **Pine Wilt Disease**, known to be devastating towards coniferous forests. Despite its impact, the biochemical basis of host resistance remains poorly understood. **Variability in susceptibility** among ***P. pinaster*** **genotypes** suggests inherent defense traits, potentially linked to **volatile organic compound** (VOCs) profile. As key mediators of plant defense and signalling, VOCs may serve as **biochemical markers of resistance**, offering insights towards the development of more resilient pine populations and sustainable **PWD management strategies**.

In vitro pine shoot culture Susceptible VS Resistant

Co-culture with the PWN

Before PWN infection:

- Both ***P. pinaster*** **genotypes** emitted similar proportions of **α-pinene** and **β-pinene**.
- **Resistant genotype** displayed **higher limonene levels**.



After PWN infection:

- **Susceptible genotype** developed **PWD symptoms earlier**, showing **increasing α-pinene**, **β-pinene**, and **limonene** peaks with disease severity.
- **Resistant genotype** showed **delayed symptom onset** and a **decrease** in these VOC peaks throughout disease progression.

- Distinct VOC emission patterns between **Susceptible** and **Resistant** genotypes correlated with differences in PWD symptom development.
- Results suggest emitted **VOCs** may function as **biochemical indicators of resistance** and play a role in the **defense response** of ***P. pinaster*** to **PWN**.

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