

# The ECOvette – A minimally invasive interface for monitoring plant dynamics

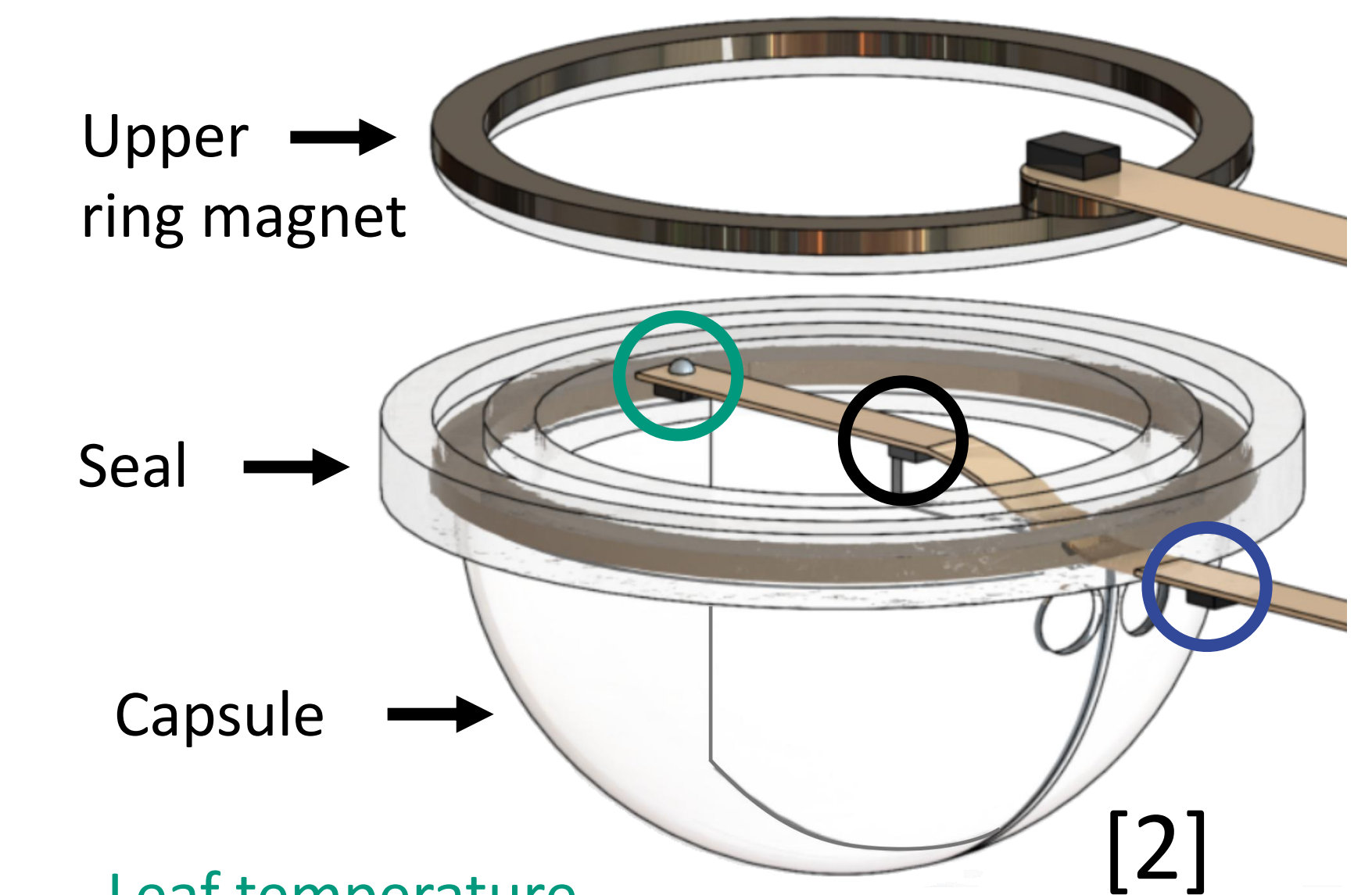
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## Why ECOvette?

- CO<sub>2</sub>, H<sub>2</sub>O and VOC fluxes are indicators of plant stress
- Existing leaf cuvettes alter natural microclimatic conditions
- Field measurements require lightweight and minimally invasive systems
- ECOvette developed for quantitative gas exchange measurements under natural conditions

**Lightweight & portable:** total weight ~6 g, minimally invasive, leaves the upper leaf surface exposed to natural conditions

**Modular design:** robust construction, adaptable to different measurement setups



Leaf temperature  
ECOvette temperature/humidity  
Ambient temperature/humidity

# The ECOvette enables real-time measurements of CO<sub>2</sub>, H<sub>2</sub>O, and VOC fluxes while preserving natural conditions.



[1] Frey et al. *ACS ES&T Engineering* 2025

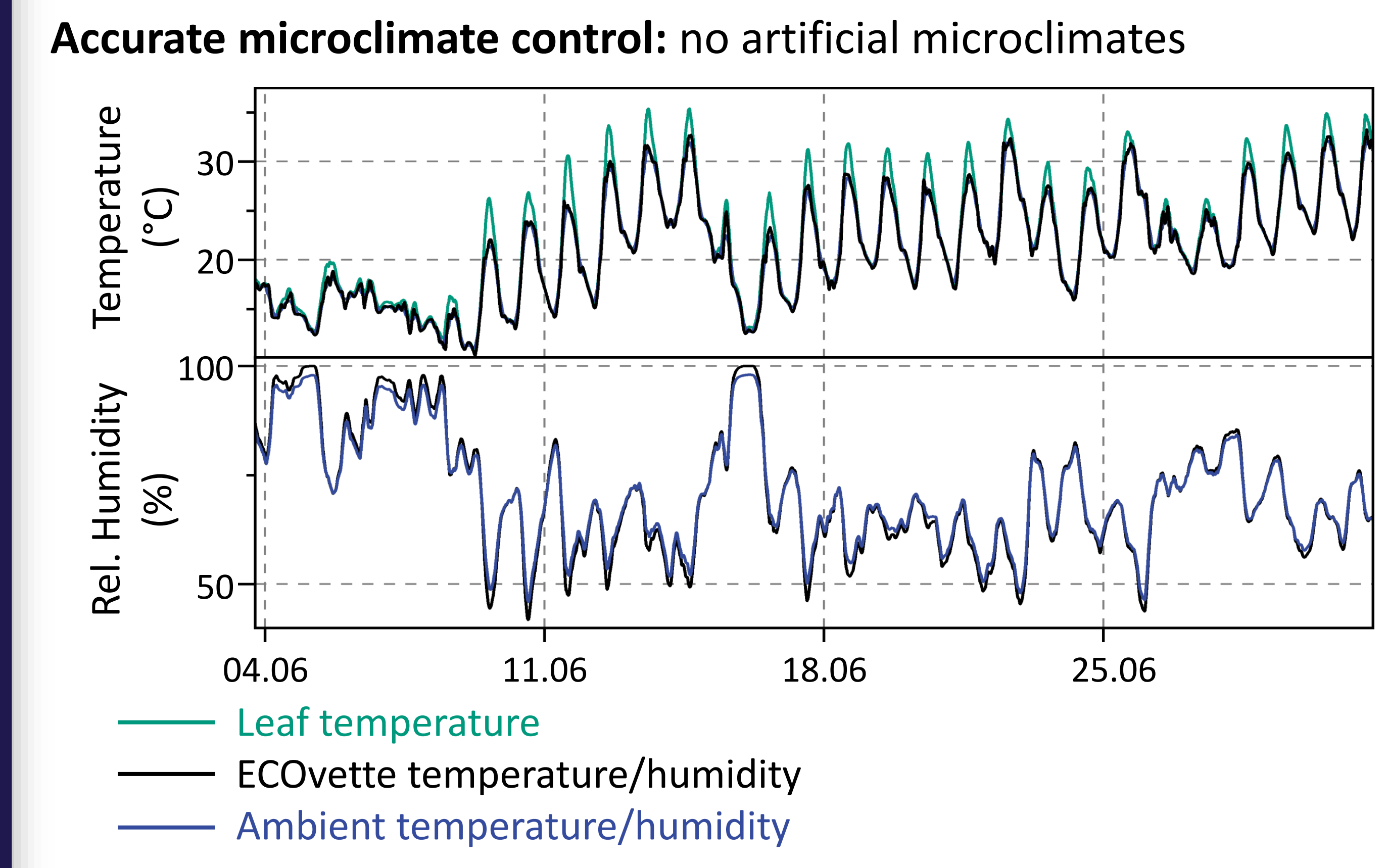
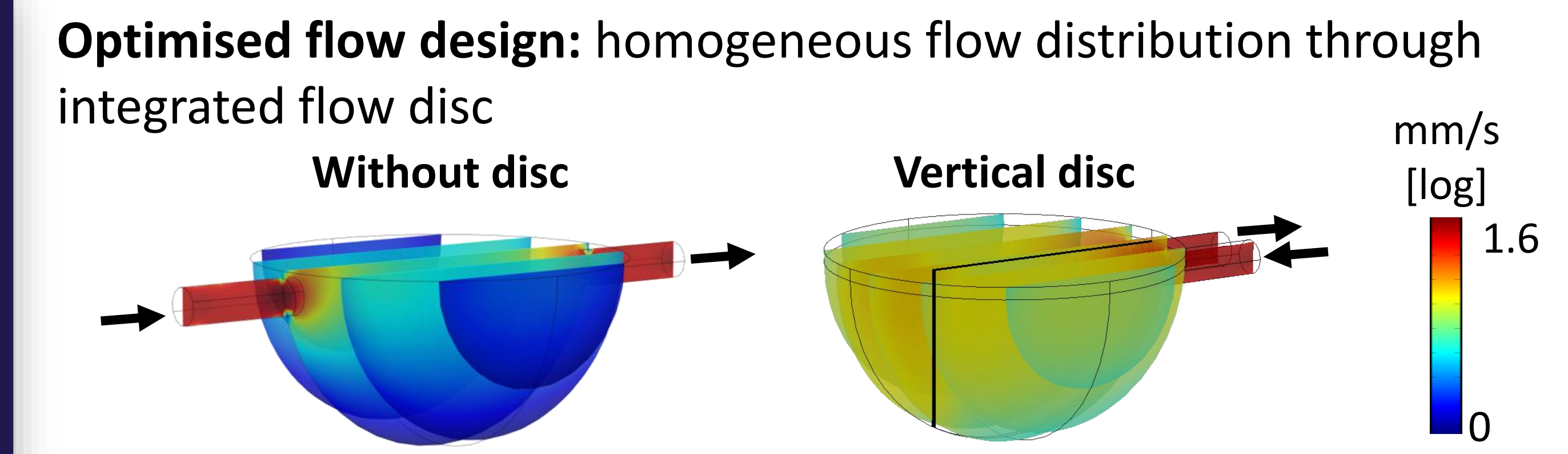


[2] Frey et al. *Sensors and Actuators A: Physical* 2025

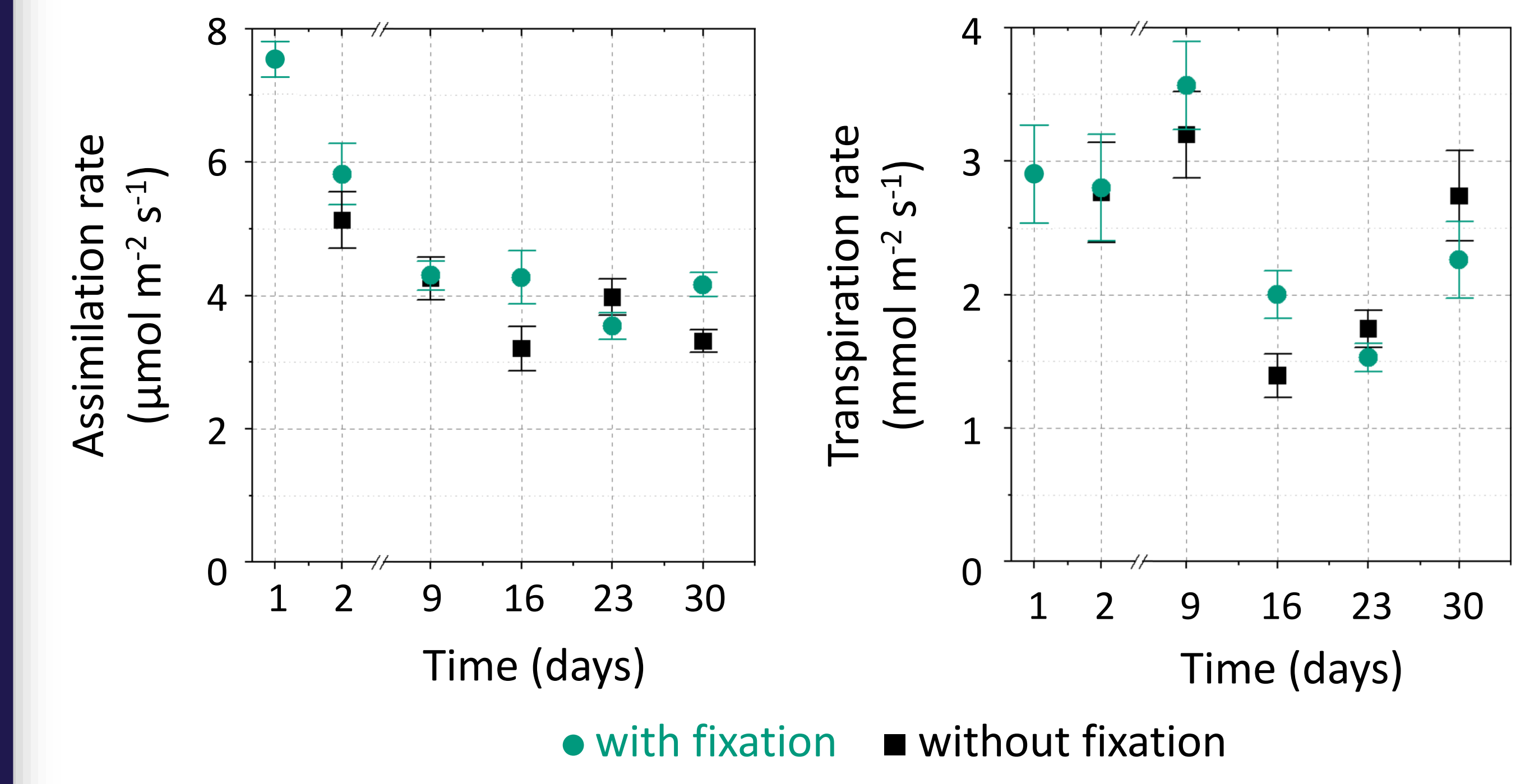
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**Non-invasive attachment:** gentle magnetic fixation, no damage to the leaf. Comparison between leaves with and without fixation.



**Quantitative flux measurements:** real-time CO<sub>2</sub>, H<sub>2</sub>O and VOC detection (ppt range) in combination with PTR-ToF-MS

