# Tradeoffs between isoprene emission, carbon gain and water use among different genera of Arundineae

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## Why

- Isoprene is a highly reactive volatile organic compound (VOC) affecting the oxidative capacity of atmosphere and it is emitted by many plant species
- The *Isps* gene has evolved many times during the evolution of plants
- Transcriptional regulation of the *Isps* gene is affected by leaf age
- *Arundineae* is a small tribe of *Poaceae* and contains different genera: *Arundo, Molinia, Phragmites, Hakonechloe*
- *A. donax* and *P. australis* are isoprene emitting species, while there is no information about isoprene emisson from other genera of *Arundineae*

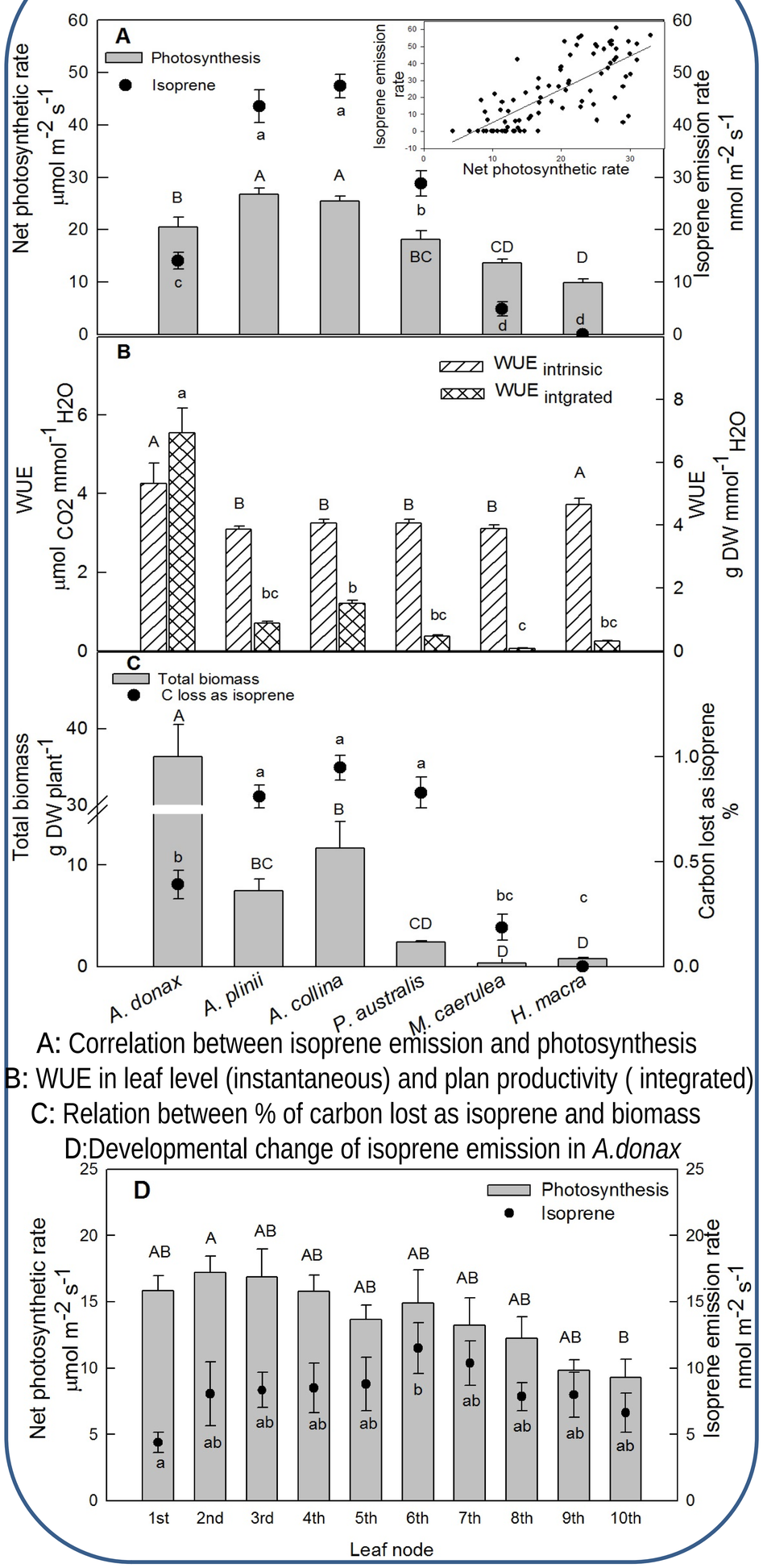
## Aim

- Which *Arundineae* taxa are able to emit isoprene?
- What is the correlation between isoprene emission and photosynthesis?
- What is the difference in chloroplast ultrastructure and leaf anatomy of plants with contrasting isoprene emissions?
- Comparison of the isoprene emision pattern in *A. donax* with dicots
- Asses the environmetal tradeoff between isoprene emission, carbon gain and water loss among *Arundineae* taxa

## How

- Photosynthesis measurements with LI-COR
- Isoprene emission measured by PTR-MS
- Profiling in all leaf levels of *A. donax*
- Further screening in three species
- 4th node leaf from apex used for all measurements except profiling

## Outcome



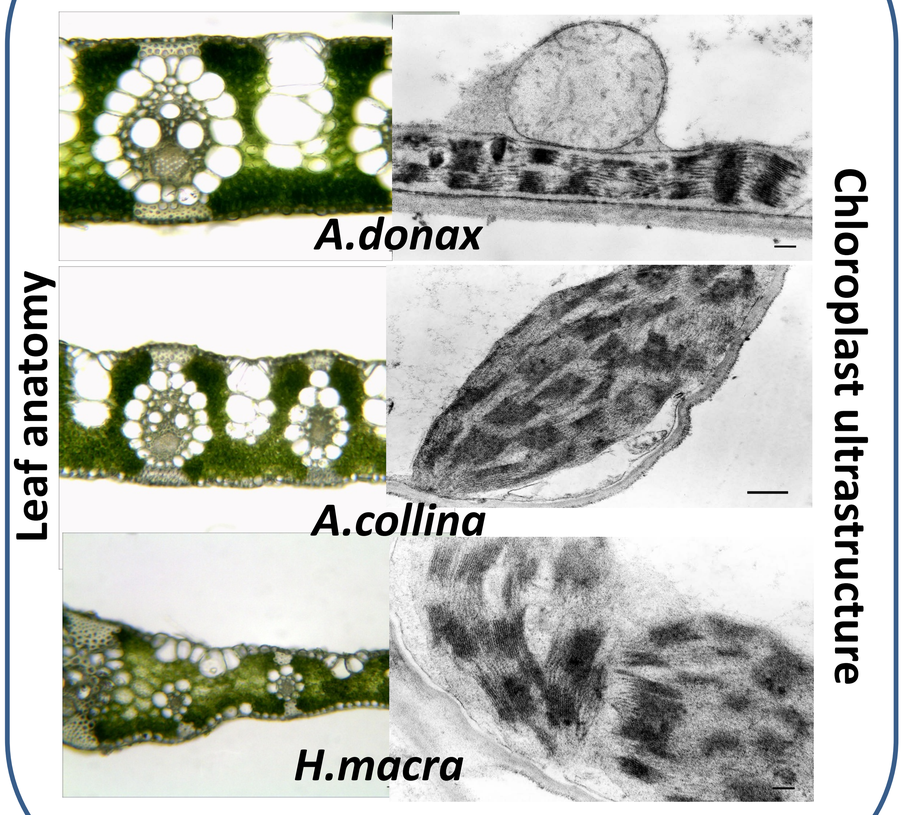

A: Correlation between isoprene emission and photosynthesis

B: WUE in leaf level (instantaneous) and plan productivity ( integrated)

C: Relation between % of carbon lost as isoprene and biomass

D:Developmental change of isoprene emission in *A.donax*




## Conclusion

- First report about the correlation between photosynthesis and isoprene emission in monocots
- Possible secondary loss of *Isps* gene in *H.macra*
- *A.donax* was an exception due to low isoprene emission and high WUE (intgrated) which highlighted its capacity as a biofuel crop in terms of environmental impact
- The pattern of isoprene emission was the same with dicots while there might be difference in transcriptional regulation of *Isps* gene
- Chloroplast ultrastructure and leaf anatomy were species specific

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