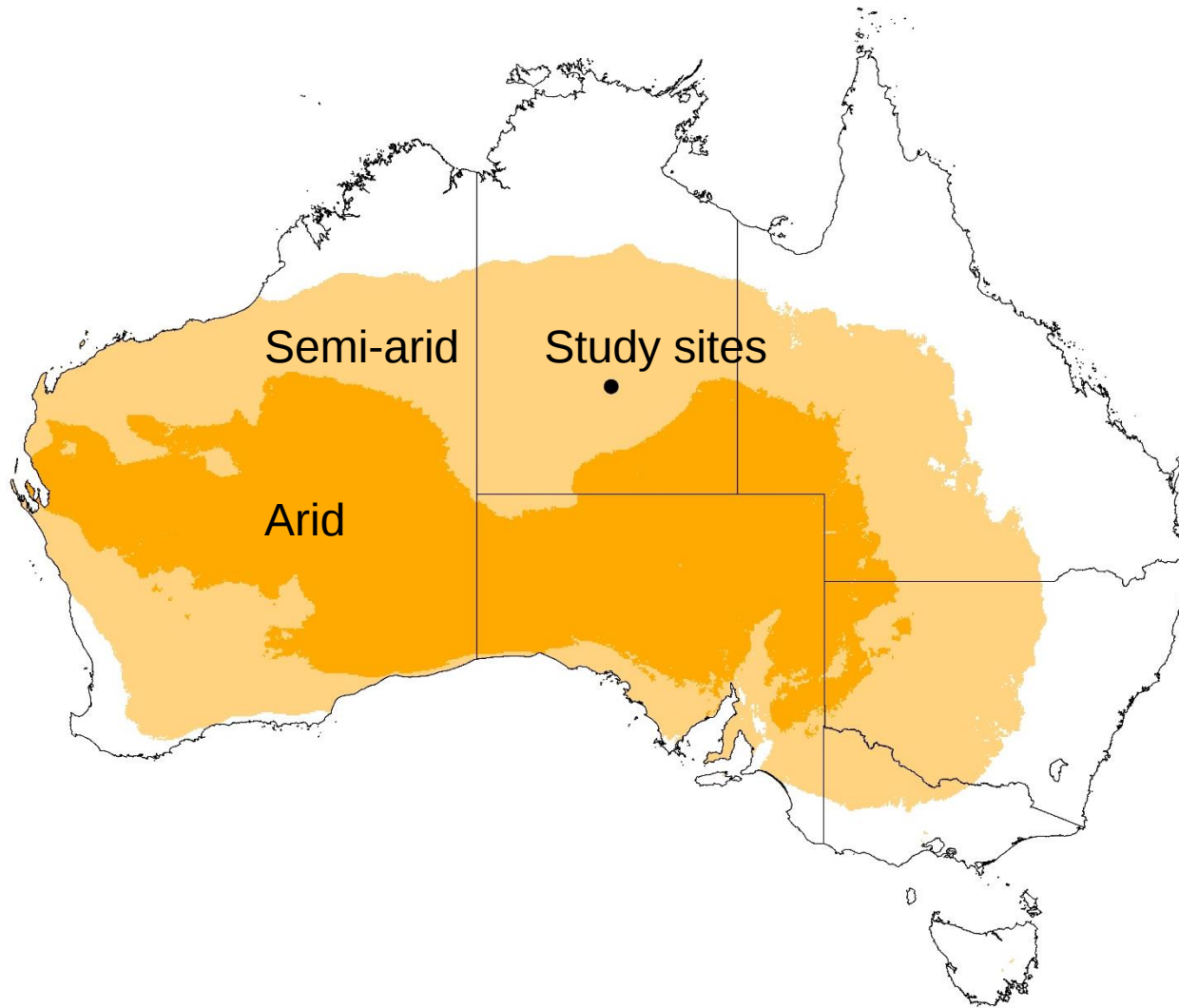


Contrasting ecophysiology at the Ti-Tree East OzFlux site and nearby riparian woodland

Rachael H. Nolan, Tonantzin Tarin Terrazas, Nadia S. Santini, James
Cleverly, Derek Eamus

Terrestrial Ecohydrology Research Group
University of Technology Sydney

Study area - location



Rainfall zones: <http://www.bom.gov.au>

Study area – vegetation

Corymbia savanna



Mulga woodland



Riparian woodland



Isohydry versus anisohydry

- Isohydry:
 - tight stomatal regulation
 - small changes in minimum Ψ_{leaf}
- Importance of stomatal regulation strategies
 - vulnerability to mortality
 - ecosystem scale fluxes
- Is stomatal regulation a function of ecohydrological niche?

Today's presentation

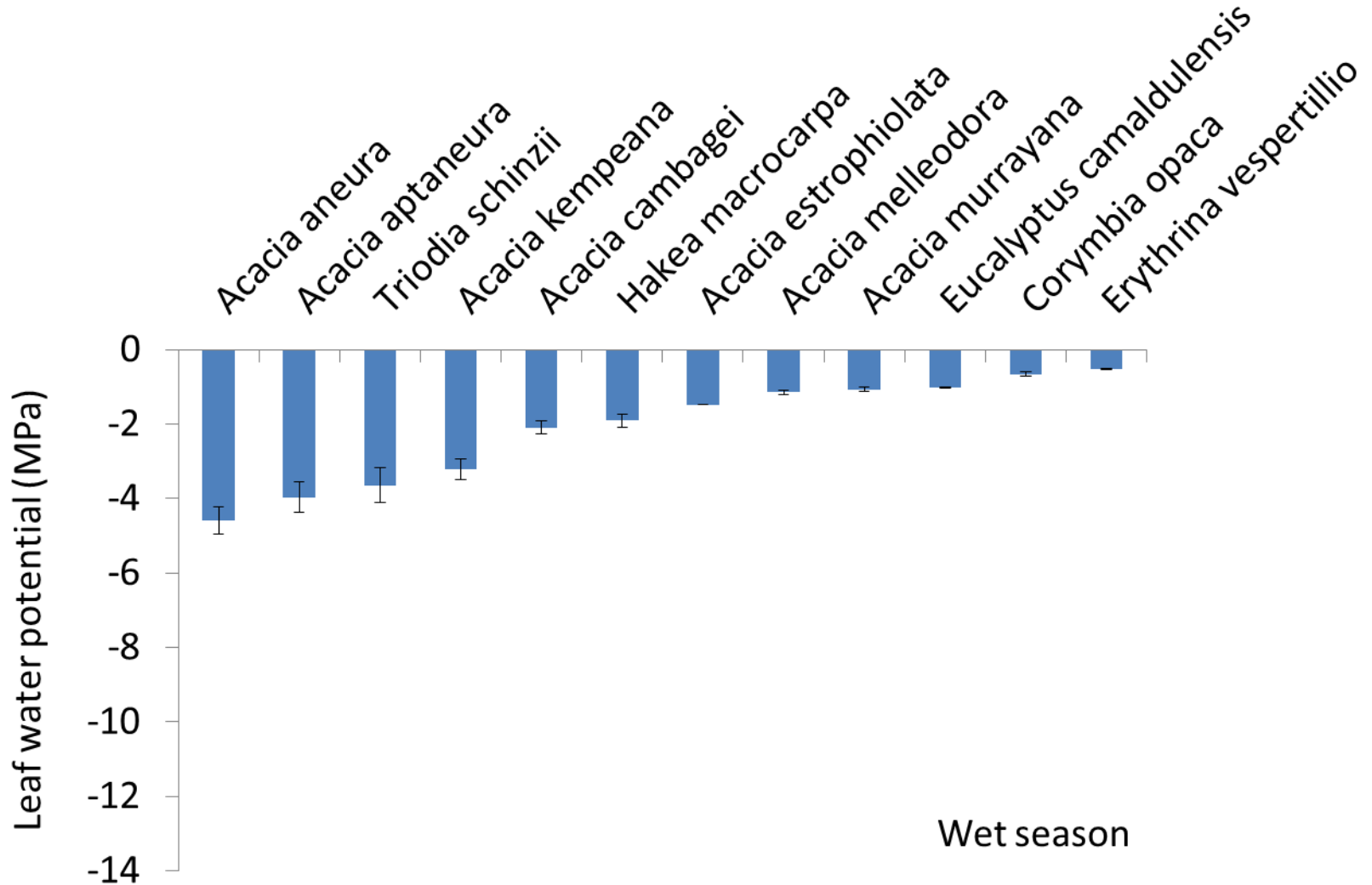
1. Field studies:
 - Characterization of iso/anisohydry
 - Plant water-use traits
 - Photosynthetic traits
2. Glasshouse study
 - Responses to drought
3. Conclusions

Field studies



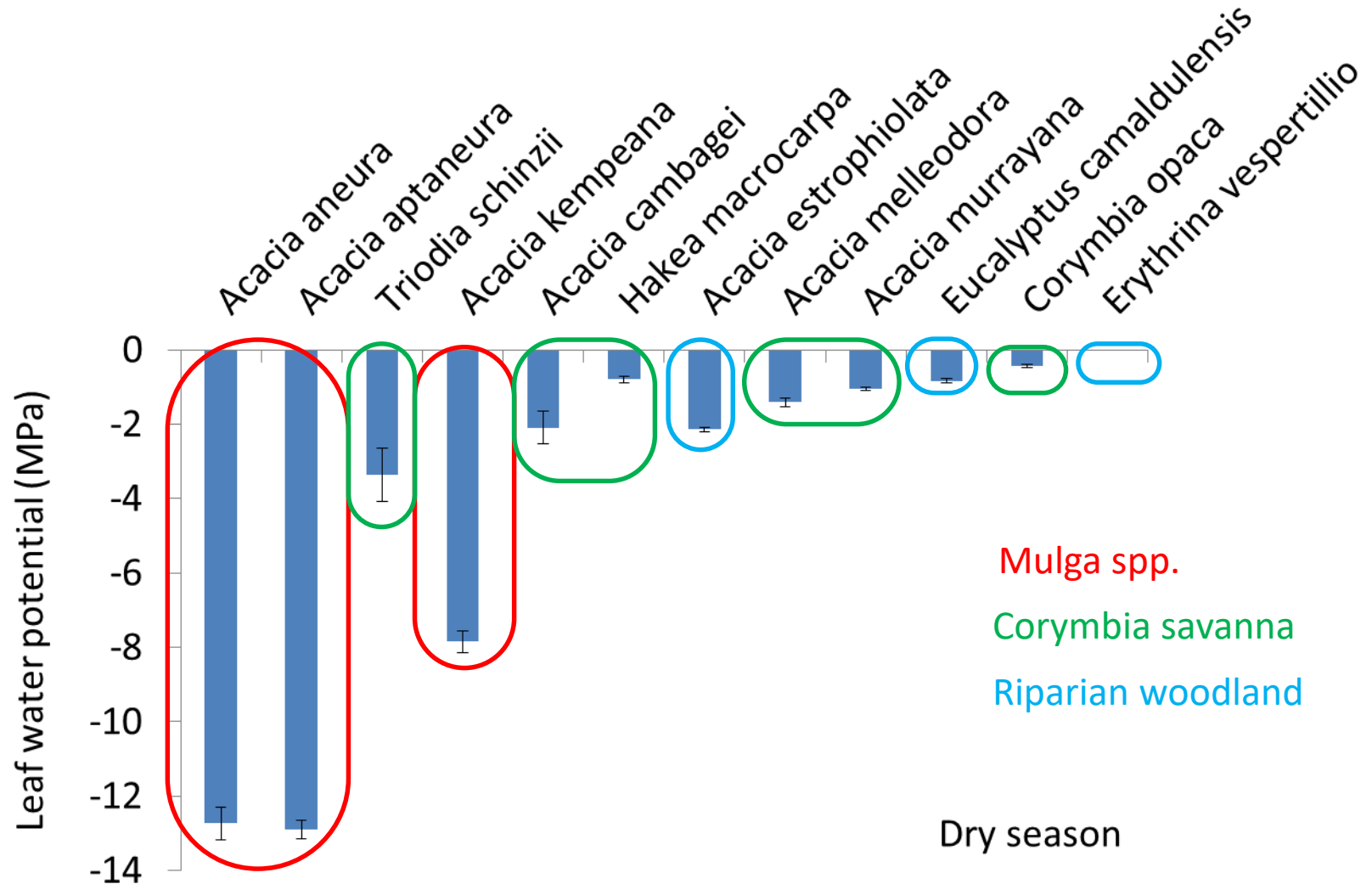
Field studies

Pre-dawn Ψ_{leaf}



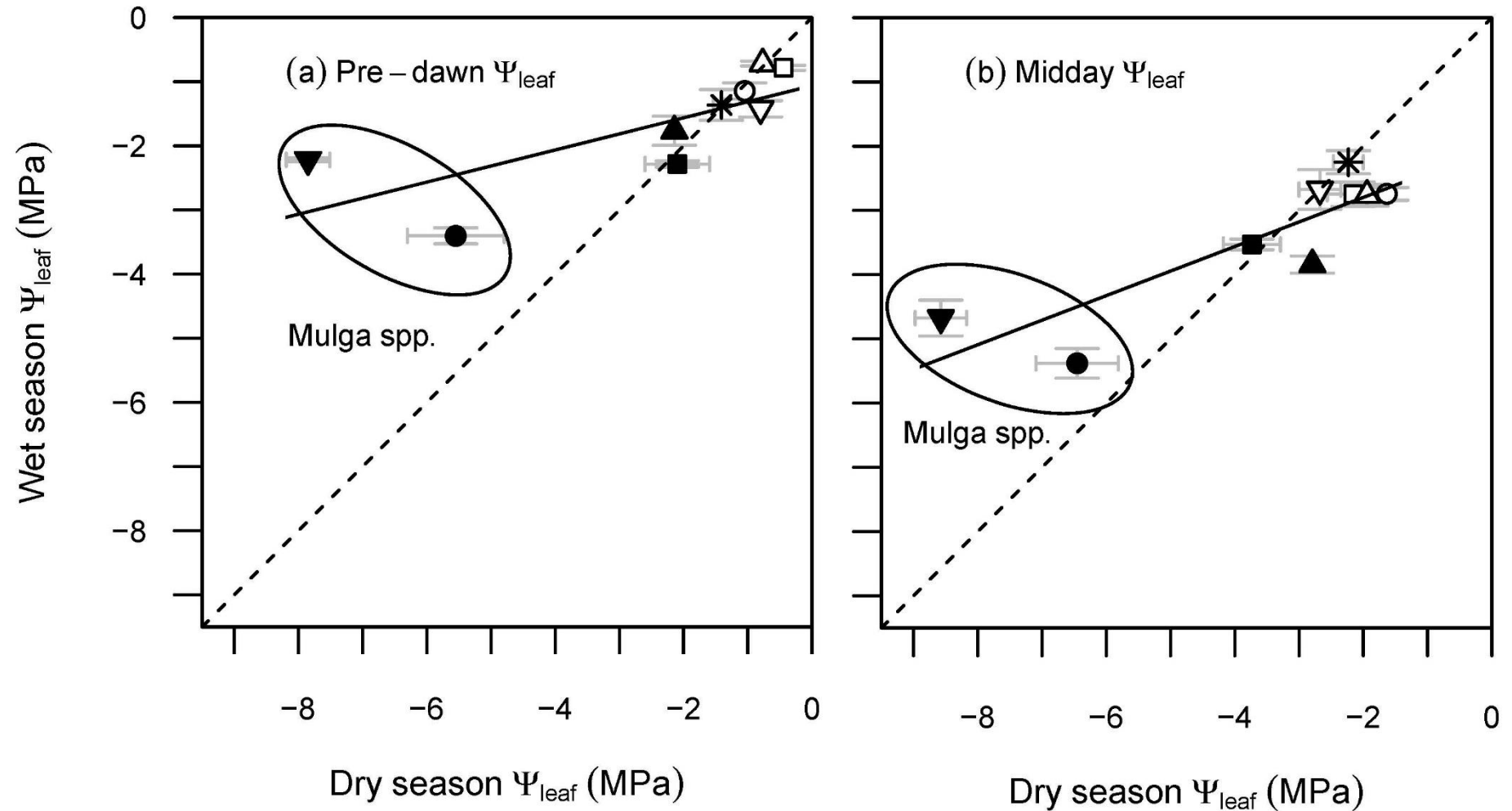
Field studies

Pre-dawn Ψ_{leaf}

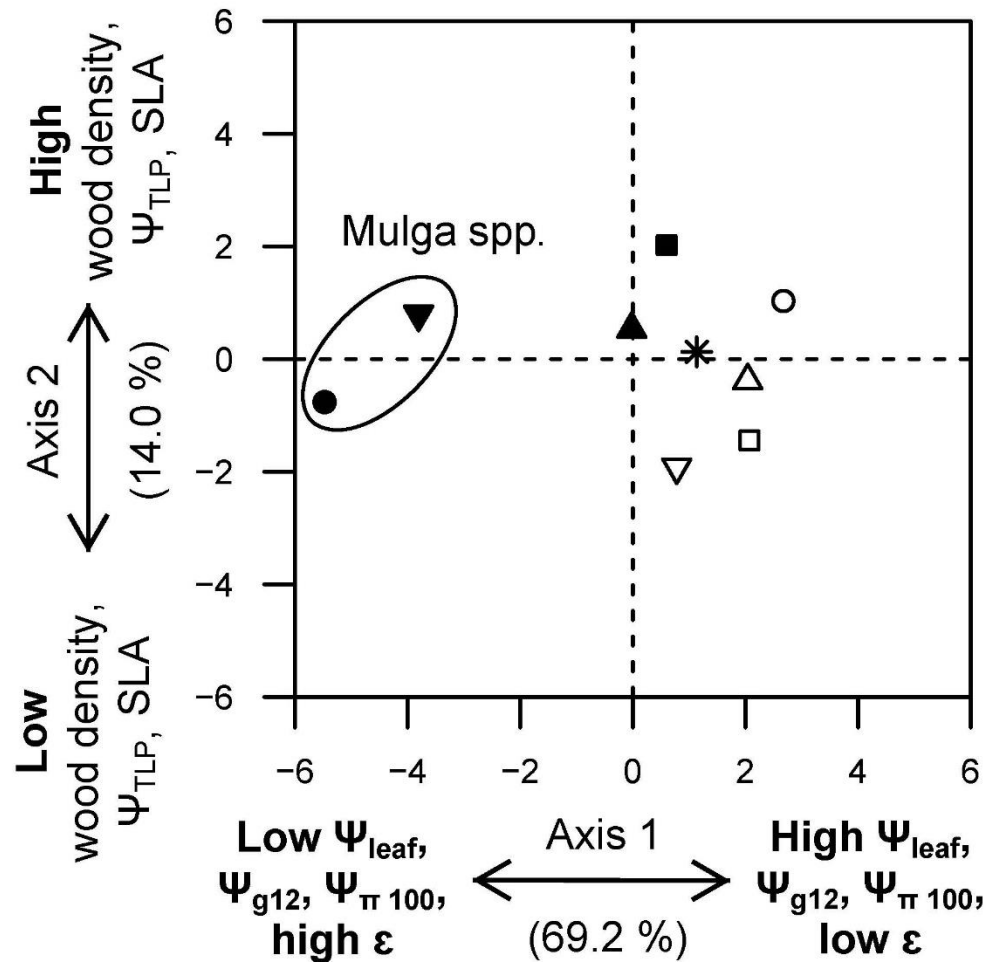


Field studies

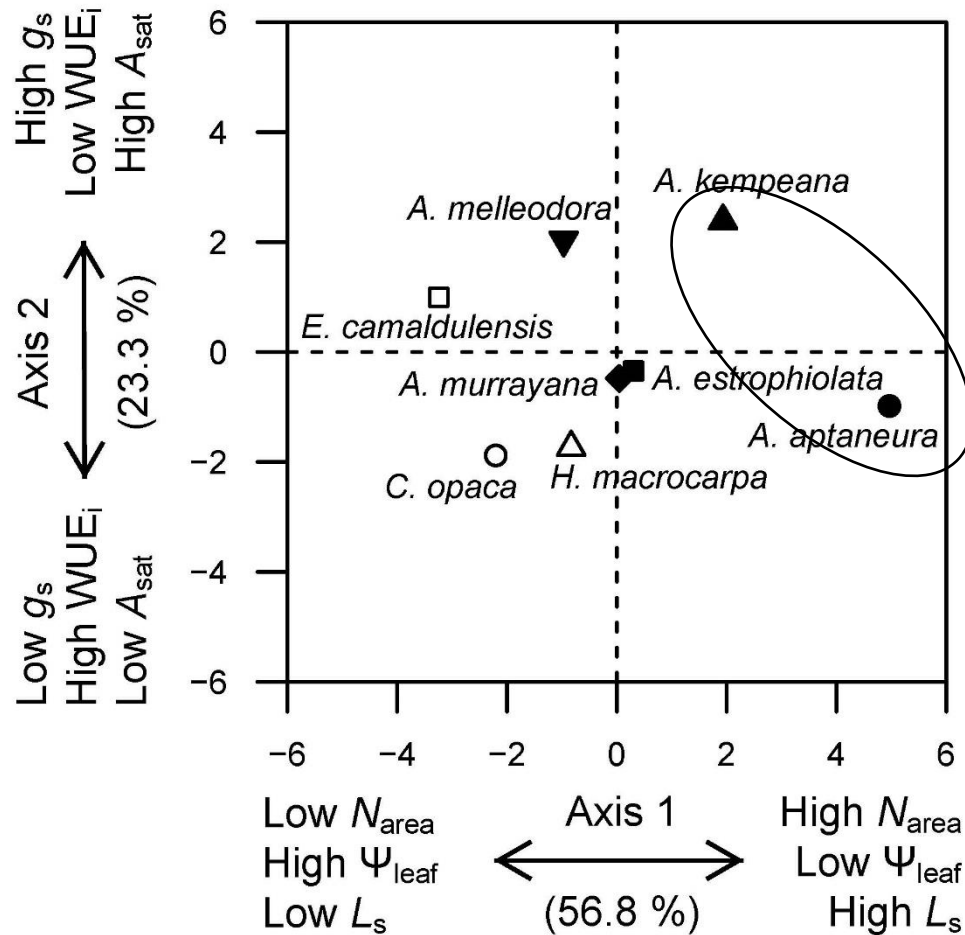
Seasonal Ψ_{leaf}



Plant water-use traits



Photosynthetic traits



Summary

- Divergence between Mulga spp. (anisohydric) and other spp.
- Anisohydric behaviour co-ordinated with water-use and photosynthetic traits
- Stomatal regulation strategy is a function of water availability

Summary

Oecologia (2009) 160:643–655
DOI 10.1007/s00442-009-1332-y

PHYSIOLOGICAL ECOLOGY - ORIGINAL PAPER

Convergence of tree water use within an arid-zone woodland

A. P. O'Grady · P. G. Cook · D. Eamus · A. Duguid ·
J. D. H. Wischusen · T. Fass · D. Worldege



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Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv



Soil moisture controls on phenology and productivity in a semi-arid critical zone☆



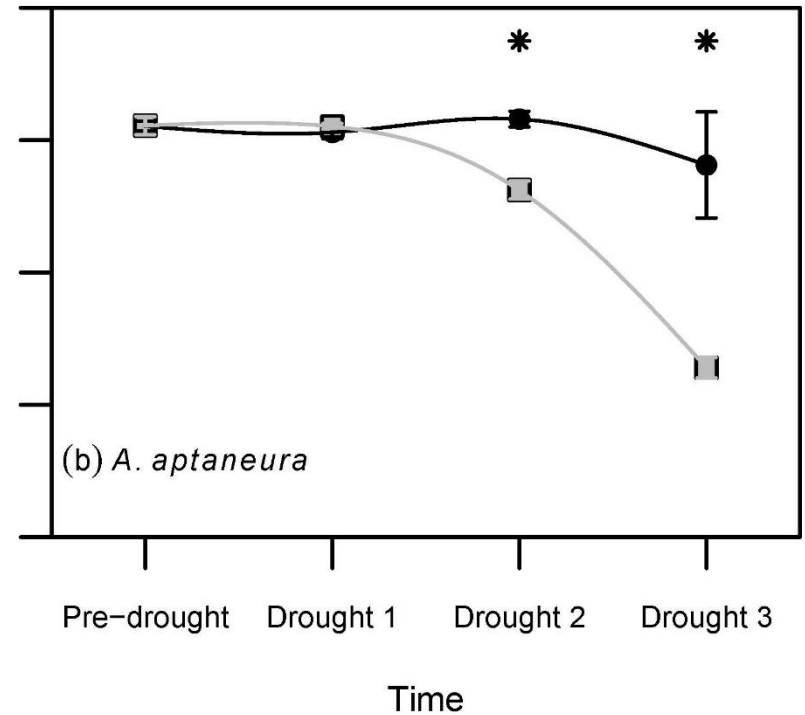
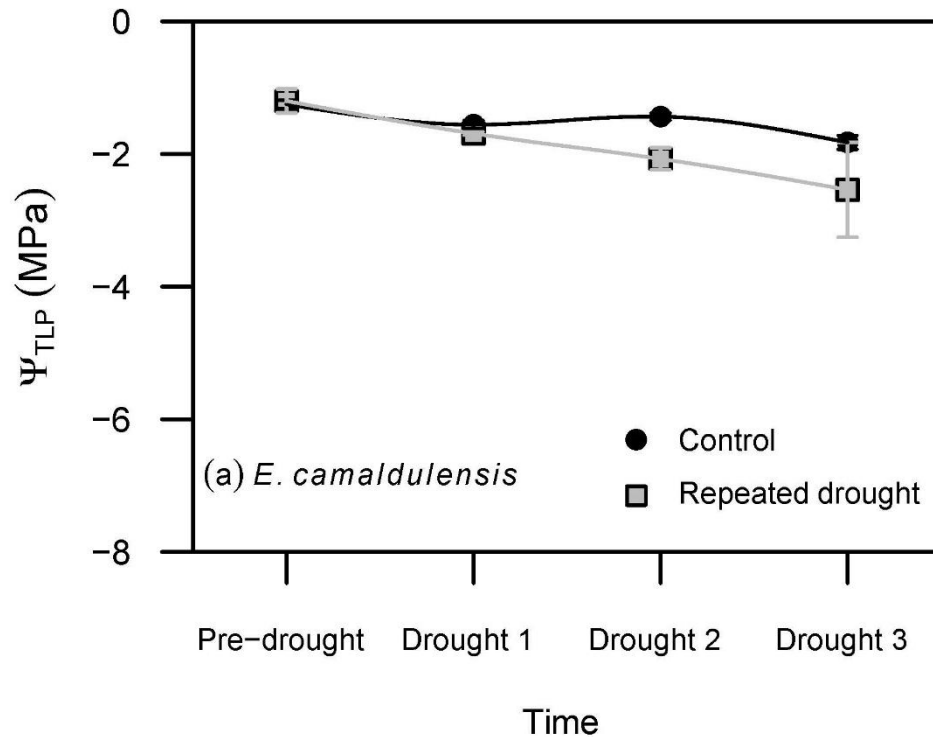
James Cleverly^{a,b,*}, Derek Eamus^{a,b}, Natalia Restrepo Coupe^{a,c}, Chao Chen^d, Wouter Maes^{a,c,1}, Longhui Li^a, Ralph Faux^a, Nadia S. Santini^a, Rizwana Rumman^a, Qiang Yu^a, Alfredo Huete^{a,c}

Glasshouse study



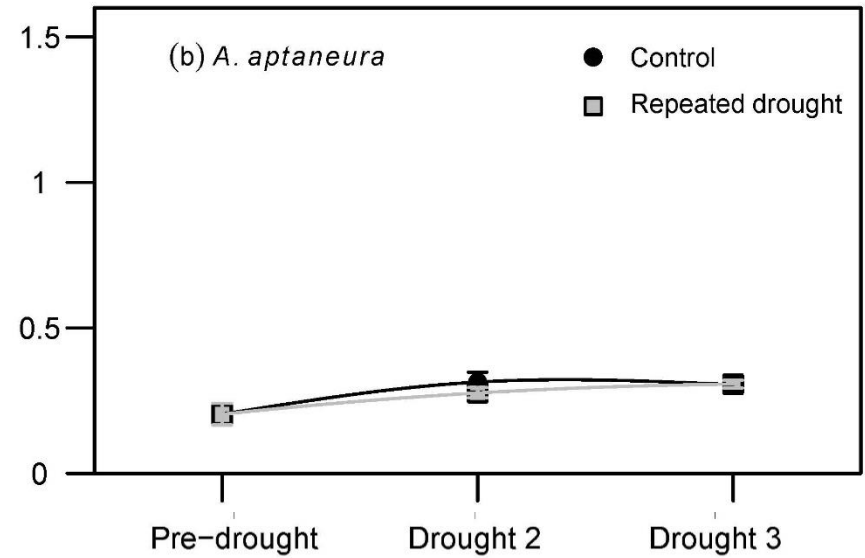
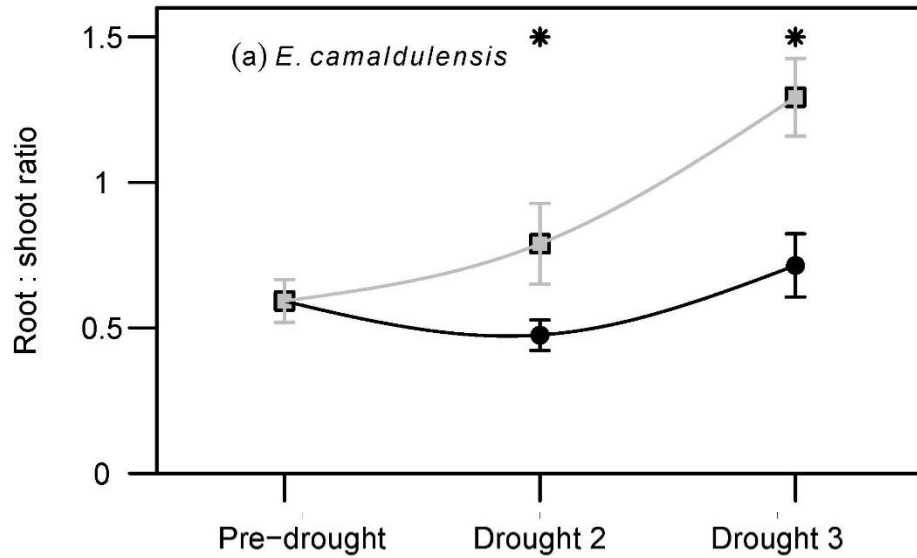
Glasshouse study

Response to drought



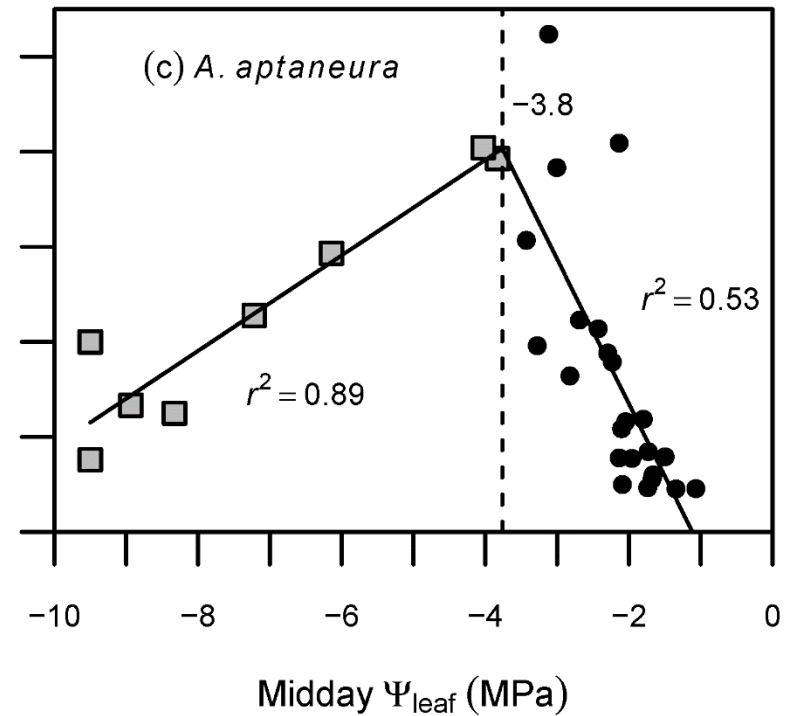
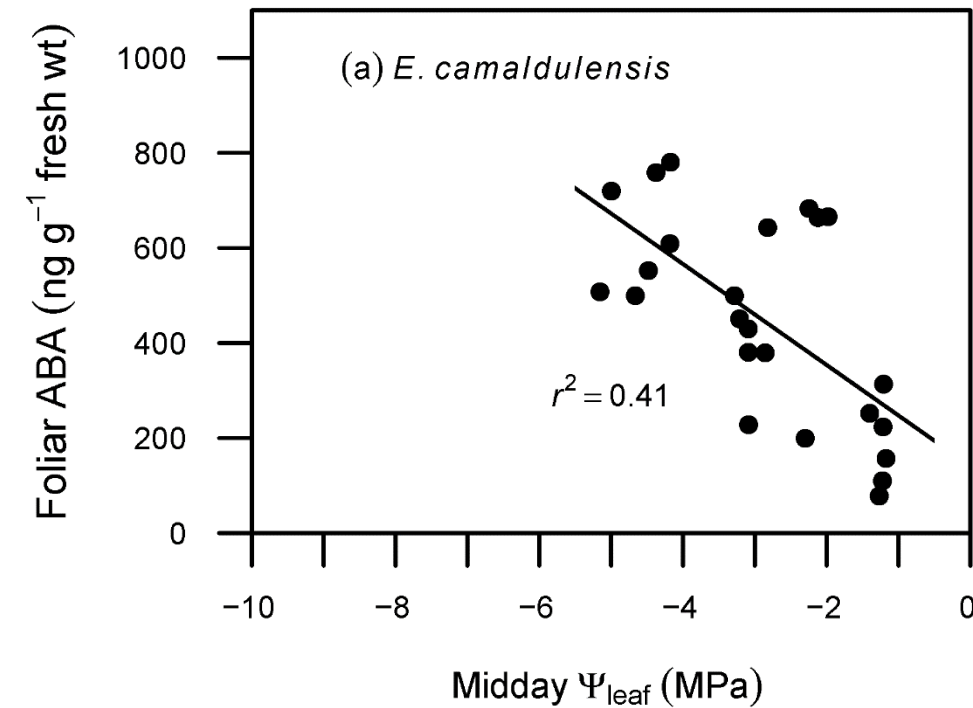
Glasshouse study

Response to drought



Glasshouse study

Response to drought



Summary

- Anishydric species adjusted osmotically, isohydric species adjusted structurally
- Anisohydric species can respond rapidly to wet / dry periods

Conclusions

- Clear differences between isohydric / anisohydric species
- Likely to be important for ecosystem scale carbon and water fluxes, particularly during and following drought
- Stomatal regulation strategy appears to be coordinated with ecohydrological niche

Acknowledgements

