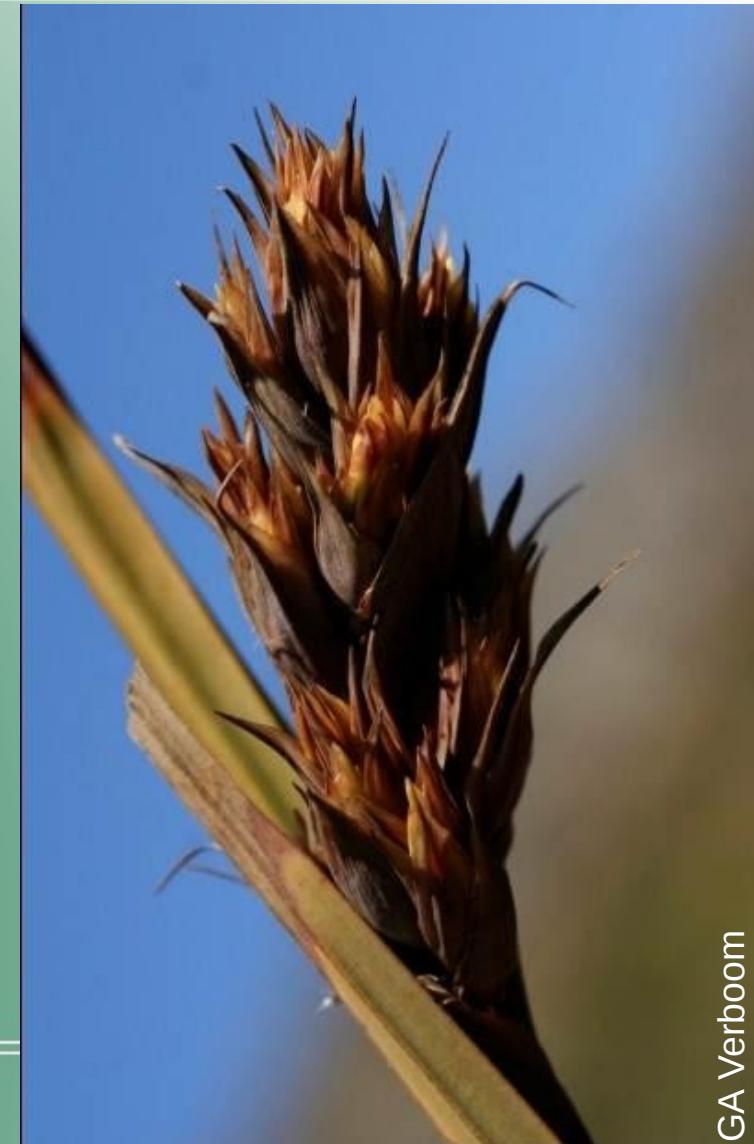


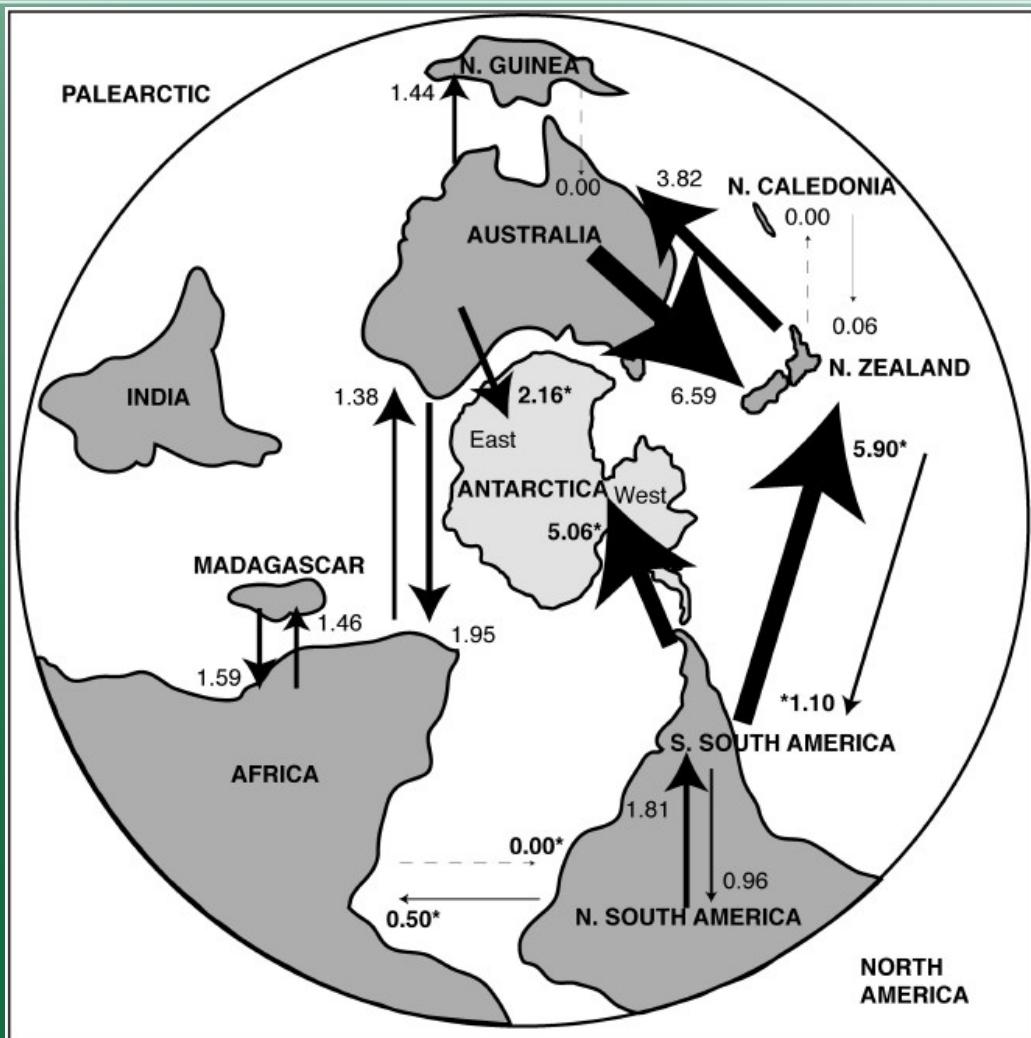
Radiation of the schoenoid sedges

J Viljoen, AM Muasya, JJ Bruhl,
AK Gibbs, KL Wilson, GA Verboom



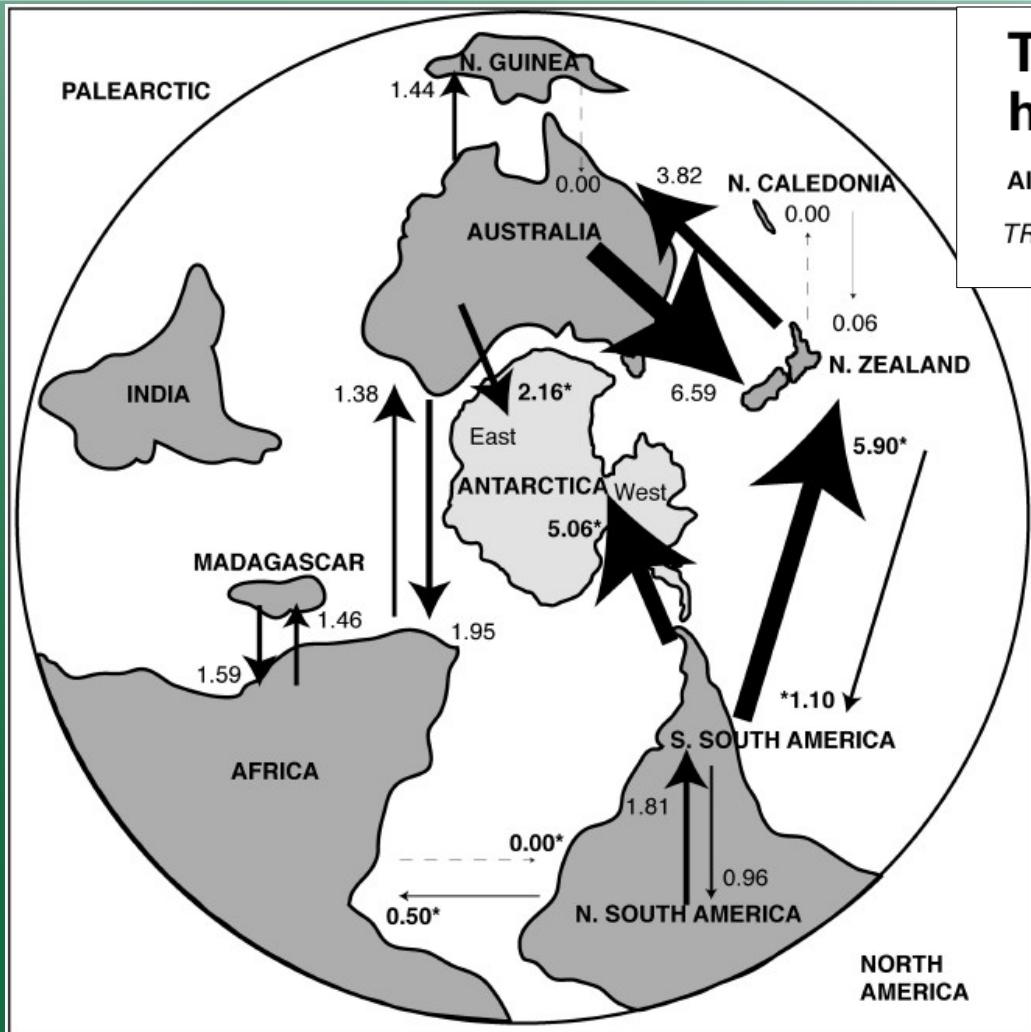
GA Verboom

Austral biogeography



- Hooker 1853: Antarctic element
- Morrone 2002: Austral Floristic Kingdom
- Gondwanan vicariance (Raven & Axelrod 1974)

Austral biogeography



The resurrection of oceanic dispersal in historical biogeography

Alan de Queiroz

TRENDS in Ecology and Evolution Vol.20 No.2 February 2005

- e.g. Sanmartín & Ronquist 2004; Bergh & Linder 2009

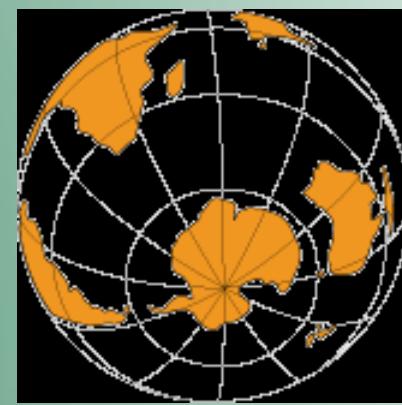
Cyperaceae (sedges)



Crown age: 75 Mya
(Besnard et al. 2009)

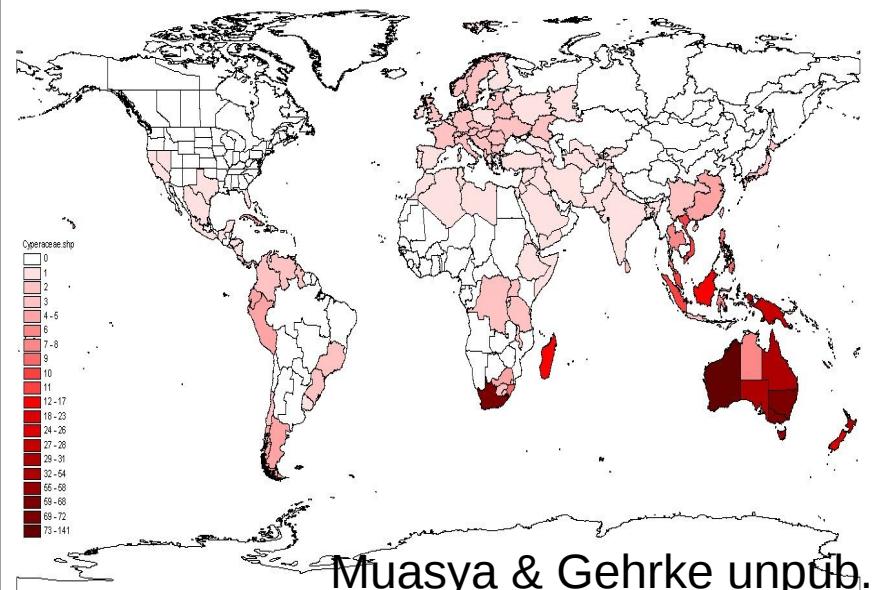
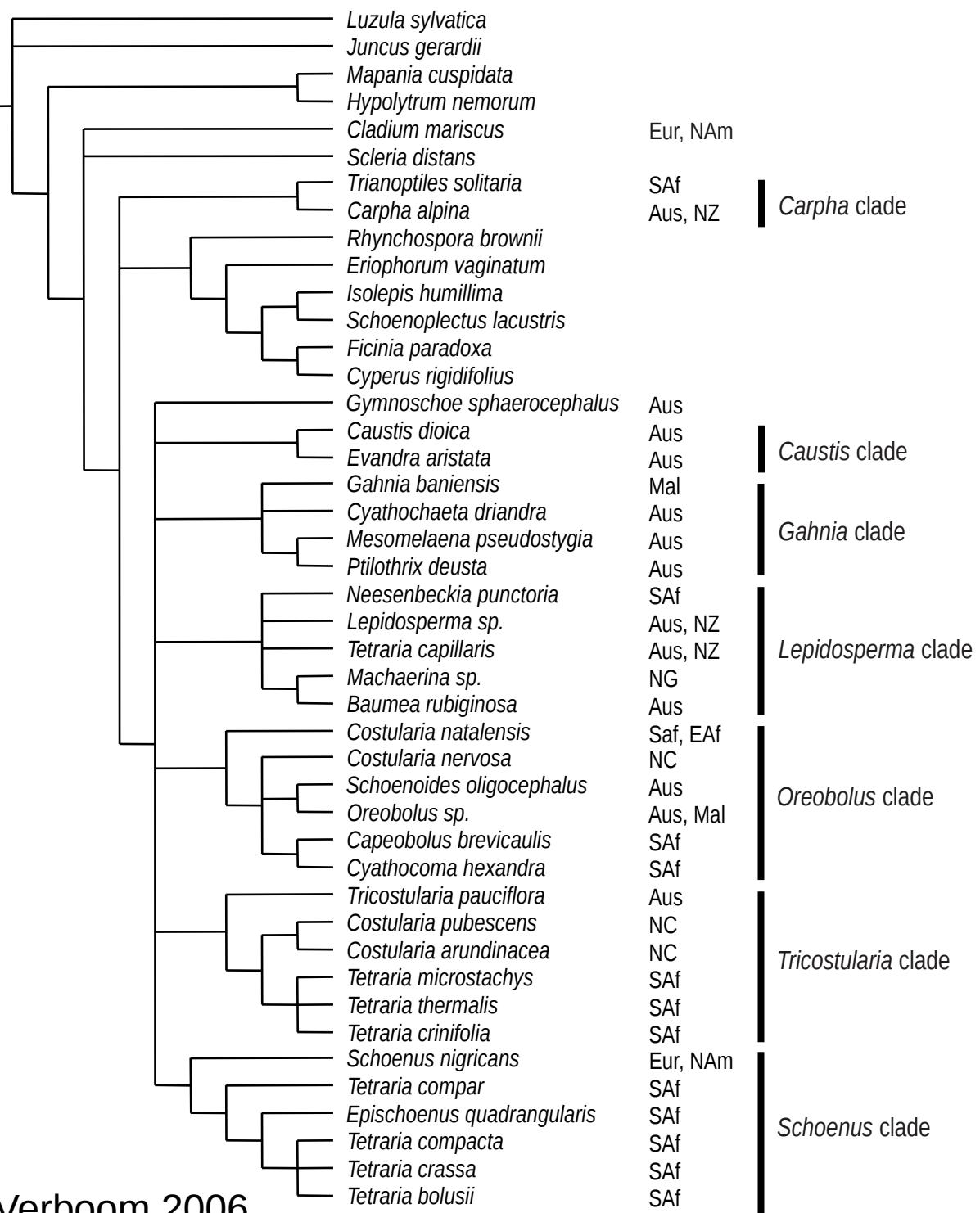


120 Mya



40 Mya

Schoeneae

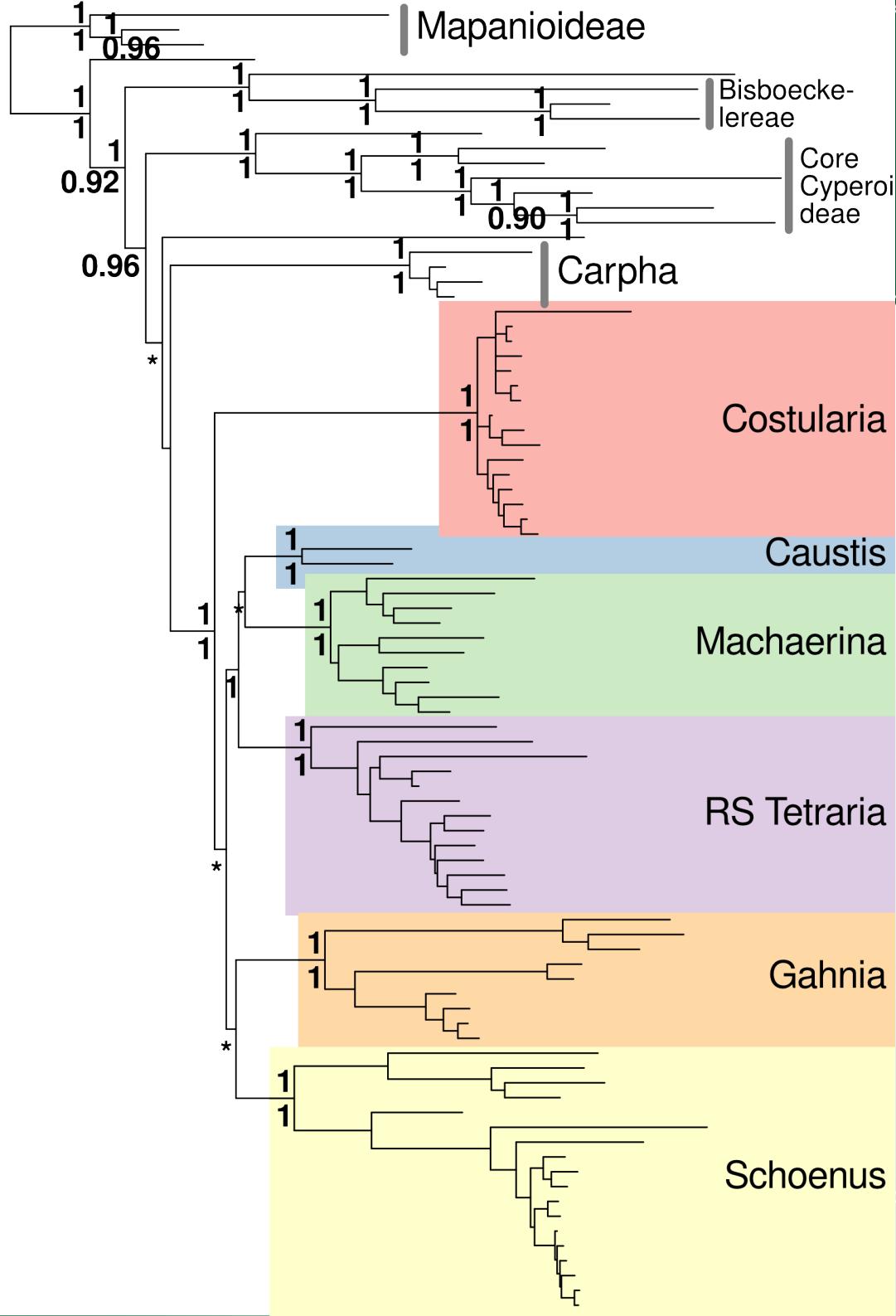


Questions

- Are the clades robust?
- What are the relationships between them?

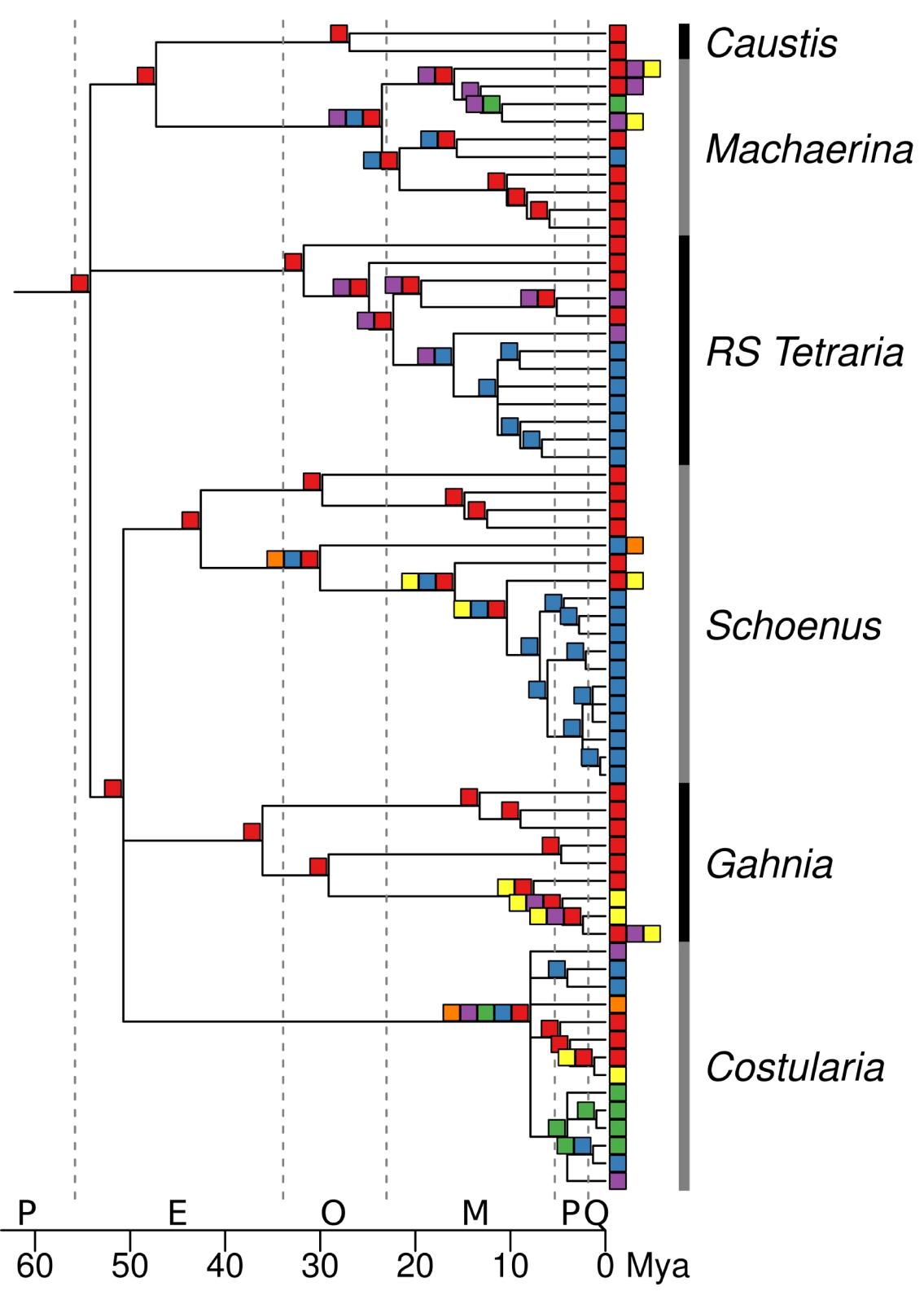
Phylogeny

- cpDNA: *rbcL*, *rps16*, *trnL*-F
nrDNA: ETS, ITS
- MrBayes, Phycas
(\pm polytomy prior)
- Schoeneae supported
- Six subclades supported
- Polytomy along backbone ($PP = 0.98$)



Questions

- Did the lineages diverge allopatrically?
- When did this radiation take place?



Ancestral area

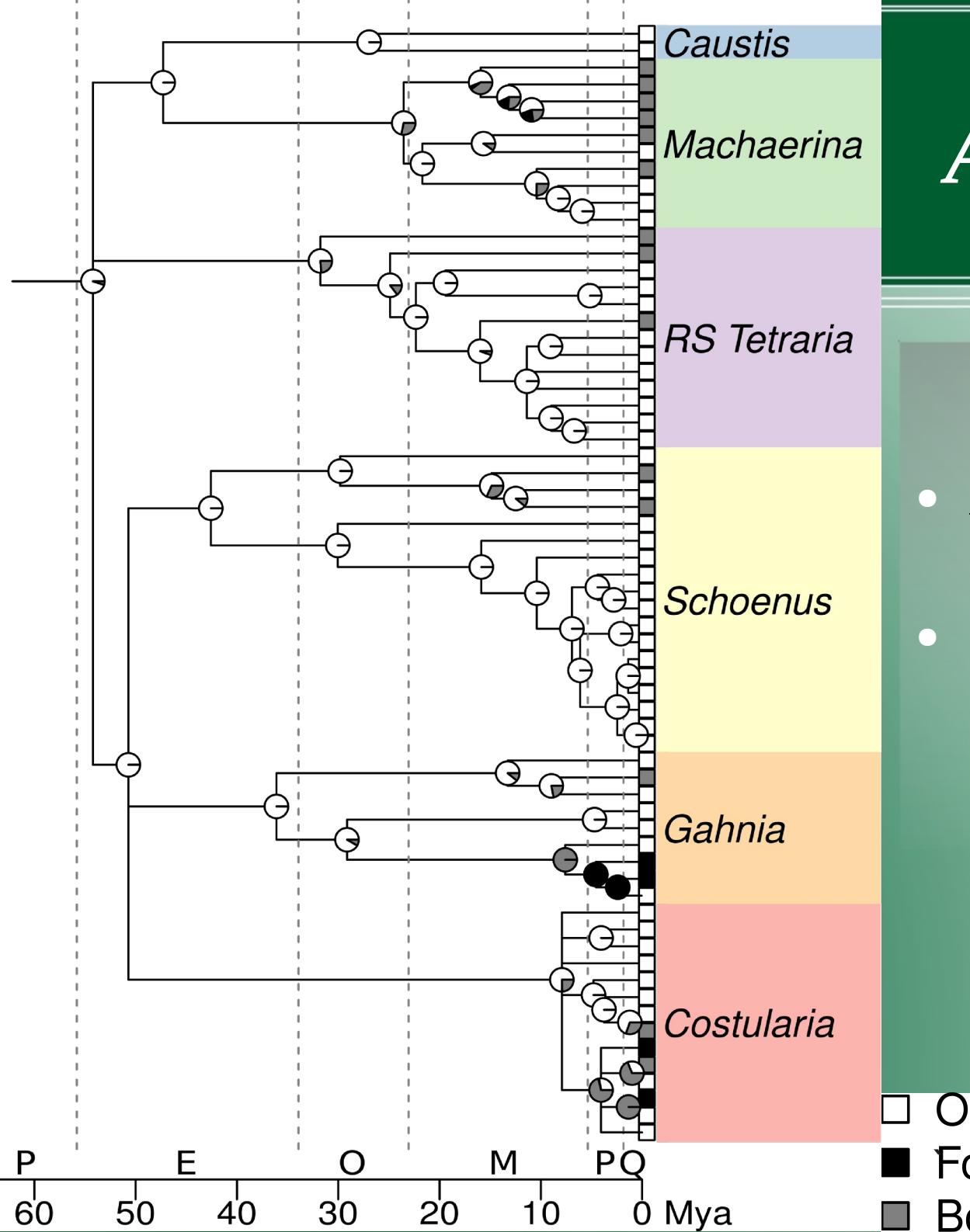
- Australian ancestor
- Radiation *within* Australia during Eocene
- Dispersal to Papua & Malesia, New Caledonia, Madagascar, Cape during Oligocene & Miocene

Australia New Zealand
South Africa
Madagascar
Pacific
South America
Southeast Asia

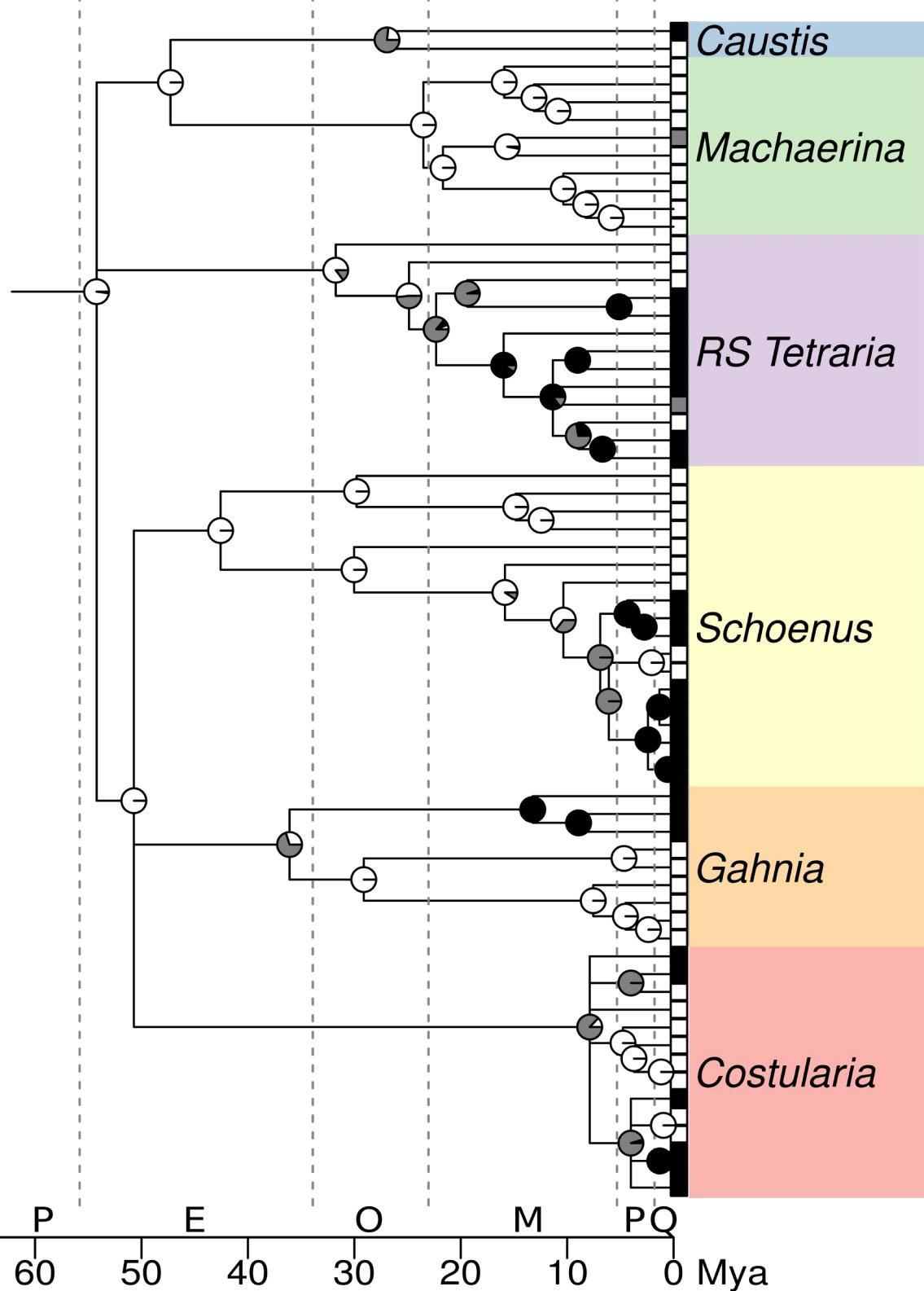
Question

- Was the radiation associated with ecological divergence?

Ancestral habitat



- Ancestor of Schoeneae *and* of six lineages in **open** vegetation
- Shade adaptation in last 10 My



Ancestral habitat

- Ancestor of Schoeneae *and* of six lineages in **wet** habitats
- Drought adaptation in last 25 My

Wet
 Dry
 Both

Conclusions

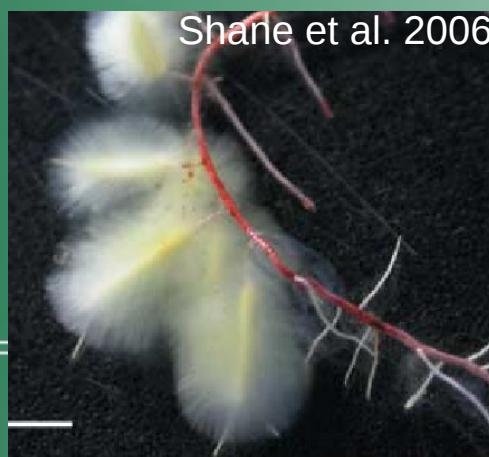
- Are the clades robust?
Monophyly of Schoeneae & subclades confirmed
- What are the relationships between them?
“Hard” polytomy
- Timing of divergence?
*Initial split during Eocene
Dispersal to other continents from Oligocene onwards*

Conclusions

- Did the lineages diverge allopatrically?
No, split within the ancestral region (Australia)
- Was the radiation associated with ecological divergence?
*No evidence from openness and wetness of habitat:
Shifts out of ancestral open, wet habitat starting in Miocene*

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GA Verboom