

Assuming that the distributions of the three *L. australis* lineages are primarily constrained by the SST allows us to infer past distributions of these lineages based on the SST paleo-record, and to make predictions about future changes in distributions. For example, during the Last Glacial Maximum (LGM), the Tasmanian region experienced significant cooling (Barrows & Juggins, 2005). Based on SST estimations of the LGM (Barrows & Juggins, 2005), it can be inferred that the Maugean lineage underwent a significant range expansion (Fig. S3b). Using museum holdings, Ó Foighil (1989) recorded the current northern boundaries of *Lasaea australis* as being Dampier Archipelago (20.7766 S) in Western Australia (Flindersia) and Caloundra (26.8167 S) in Eastern Australia (Peronia). We have tested these estimates with an additional 312 Australian Museum lots (Table S4), unavailable for the earlier study. The Western Australian northern limit remained unchanged whereas the Eastern Australia northern limit was modestly extended to Noosa Heads, Queensland (-26.3833 S) – see Fig. S3a. Isotherms near those northern boundaries did not advance significantly during the LGM (Barrows & Juggins, 2005), which indicates that both warm-temperate lineages probably experienced LGM range reductions (Fig. S3b). To test these predictions, we would need comprehensive fossil assemblages or else multilocus microsatellite genotypes to infer the demographic history of the three lineages across their ranges.

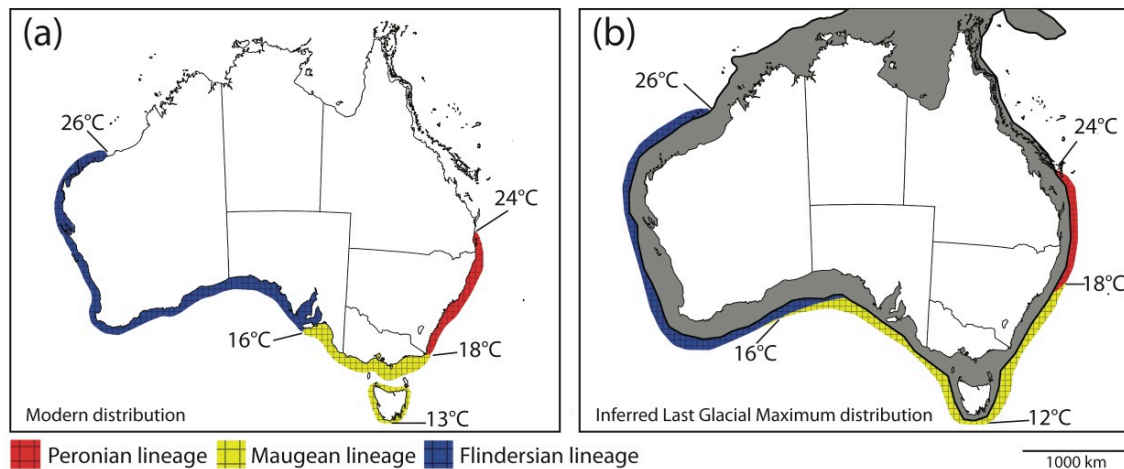


Figure S3 (a) Present-day distributions of the three *Lasaea australis* lineages. Northern boundaries of the Peronian and Flindersian lineages are defined based on Museum records (Ó Foighil, 1989; Table S4). Distribution of the Maugean lineage is inferred based on the range of Maugean province (Bennett & Pope, 1953). (b) Inferred paleo-distributions of the three lineages during the Last Glacial Maximum based on inferred Sea Surface Temperatures (Barrows & Juggins, 2005).

Reference:

- Barrows TT, Juggins S (2005) Sea-surface temperatures around the Australian margin and Indian Ocean during the Last Glacial Maximum. *Quaternary Science Reviews*, **24**, 1017-1047.
- Bennett I, Pope EC (1953) Intertidal zonation of the exposed rocky shores of Victoria, together with a rearrangement of the biogeographical provinces of temperate Australian shores. *Australian Journal of Marine and Freshwater Research*, **4**, 105-159.

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