

Supplemental Figure legends

Fig. S1. RaxML analysis

Fig. S2. MrBayes analysis

Fig. S3. BEAST 100 analysis

Fig. S4. BEAST 85 analysis

Fig. S5. BEAST 60 analysis

Fig. S6. BEAST 35 analysis

Fig. S7. BEAST 20 analysis

Fig. S8. BEAST 10 analysis

Fig. S9. Molecular clock analysis using strict rate of 0.0075 substitutions per million years applied to topology with neotropical clade nested within the Australasian clade

Fig. S10. Molecular clock analysis using strict rate of 0.012 substitutions per million years applied to topology with neotropical clade nested within the Australasian clade

Fig. S11. Molecular clock analysis using strict rate of 0.0075 substitutions per million years applied to topology with neotropical clade sister to Pedaria + Boletoscapter

Fig. S12. Molecular clock analysis using strict rate of 0.012 substitutions per million years applied to topology with neotropical clade sister to Pedaria + Boletoscapter

Fig. S13. Molecular clock analysis using strict, hypothetical rate of 0.0095 substitutions per million years applied to topology with neotropical clade sister to Pedaria + Boletoscapter

Fig. S14. Molecular clock analysis using strict, hypothetical rate of 0.0095 substitutions per million years applied to topology with neotropical clade nested within the Australasian clade.

Fig. S15. BioGeoBEARS ancestral range estimates for DEC and DEC+J models. Due to unique single character required for area codes are as follows A: South Australia; B: southern Queensland/northern New South Wales; C: central Queensland; F: Africa; L: New Caledonia; M: Moonsoon tropics; N: Wet Tropics; S: southern New South Wales; T: Neotropics; W: southern Western Australia; Y: Cape York; Z: New Zealand.

Fig. S16. BioGeoBEARS ancestral range estimates for DIVAlake and DIVAlake +J models.

Fig. S17. BioGeoBEARS ancestral range estimates for BAYAREAlake and BAYAREAlake +J models.

Fig. S18. Major ecozones, forest types and biogeographical divides in Australia. Grey circles represent the number of 21 described Australian endemic genera in the areas. These areas correspond to those coded in biogeographical analyses with the exception of the arid zone for which no species were sample. Image includes modified maps Steve Parish Nature Connect and Australian Biomes websites.

Fig. S19. Node numbers corresponding to range estimates in Table S3

Supplemental Table legends for excel spreadsheets.

Table S2. Dung beetle species included in this study.

Table S6. Probabilities of range/state areas from DEC+J ancestral range estimations colour coded by probability where dark green represents the highest probability, yellows represents low probability from 0.1-10% and red represents negligible or zero probability. Due to unique single character required for area codes are as follows A: South Australia; B: southern Queensland/northern New South Wales; C: central Queensland; F: Africa; L: New Caledonia; M: Moonsoon tropics; N: Wet Tropics; S: New South Wales; T: Neotropics; W: southern Western Australia; Y: Cape York; Z: New Zealand.