Text S1: Dispersal probability matrices for ancestral range estimation

The biogeographic dispersal matrices of Baker & Couvreur (2013) and Federman & al. (2015) were adapted to the areas used in this study.

To do so, if an area of this study fell into multiple areas of the other study, the mean dispersal probability was assigned.

For example, our area "S" (i.e. Southeast Asia) falls within the areas "IAA" (Sundaland and Indochina) and "SP" (South Pacific, including amongst others Papua New Guinea) in Federman & al. (2015). In their dispersal matrix of the marine + terrestrial model, the probability to disperse from Madagascar (MA) to the IAA is 0.05, and the probability to disperse from MA to the SP is 0.05 in the time frame 16 Mya - present. Hence, the summarized dispersal probability in our study to disperse from MA (="M" in our study) to A is $(0.05 + 0.05)/2 = 0.05$.

Mya: Million years ago

1 Dispersal probability matrices adapted from Baker & Couvreur (2013) (M_B)

Table 1: This table shows which areas of our study corresponds to which areas used in Baker & Couvreur (2013)

Our study		Baker & Couvreur (2013)	
Abbreviated area name	**Area name**	**Abbreviated area name(s)**	**Area name(s)**
M	Madagascar	D	Indian Ocean (Madagascar, Mascarenes, Comoros and Seychelles)
S	Southeast Asia	F; G	Eurasia (including west Malesia to the west of Wallace's Line); Pacific Ocean (including east Malesia to the east of Wallace's Line, Australia and the Pacific Islands)
A	Africa	C	Africa
E	Eurasia	F	Eurasia (including west Malesia to the west of Wallace's Line)

Dispersal probability matrices of model M_B used in this study. The letters correspond to the areas of our study in Table 1. Each number corresponds to the dispersal probability to go from the `row` area to the `column` area.

0 - 5 Mya

$$\begin{array}{cc} & \begin{matrix} M & S & A & E \end{matrix} \\ \begin{matrix} M \\ S \\ A \\ E \end{matrix} & \begin{pmatrix} 1 & 0.13 & 0.25 & 0.01 \\ & 1 & 0.13 & 1 \\ & & 1 & 0.25 \\ & & & 1 \end{pmatrix} \end{array}$$

5 - 30 Mya

$$\begin{array}{cc} & \begin{matrix} M & S & A & E \end{matrix} \\ \begin{matrix} M \\ S \\ A \\ E \end{matrix} & \begin{pmatrix} 1 & 0.13 & 0.5 & 0.25 \\ & 1 & 0.13 & 0.875 \\ & & 1 & 0.25 \\ & & & 1 \end{pmatrix} \end{array}$$

30 - 45 Mya

$$\begin{array}{cc} & \begin{matrix} M & S & A & E \end{matrix} \\ \begin{matrix} M \\ S \\ A \\ E \end{matrix} & \begin{pmatrix} 1 & 0.13 & 0.5 & 0.25 \\ & 1 & 0.01 & 0.625 \\ & & 1 & 0.25 \\ & & & 1 \end{pmatrix} \end{array}$$

45 - 64 Mya

$$\begin{array}{cc} & \begin{matrix} M & S & A & E \end{matrix} \\ \begin{matrix} M \\ S \\ A \\ E \end{matrix} & \begin{pmatrix} 1 & 0.13 & 0.5 & 0.01 \\ & 1 & 0.13 & 0.505 \\ & & 1 & 0.25 \\ & & & 1 \end{pmatrix} \end{array}$$

2 Dispersal probability matrices adapted from the marine+terrestrial model of Federman & al. (2015) (M_F)

Table 2: This table shows which areas of our study corresponds to which areas used in Federman & al. (2015)

Our study		Federman & al. (2015)	
Abbreviated area name	**Area name**	**Abbreviated area name(s)**	**Area name(s)**
M	Madagascar	MA	Madagascar
S	Southeast Asia	IAA; SP	Sundaland and Indochina; South Pacific (including New Caledonia, Australia, and Papua New Guinea)
A	Africa	AF	Africa
E	Eurasia	LA	Laurasia

Dispersal probability matrices of model M_F used in this study. The letters correspond to the areas of our study in Table 2. Each number corresponds to the dispersal probability to go from the `row` area to the `column` area.

0 - 16 Mya

$$\begin{array}{c c} & \begin{array}{cccc} M & S & A & E \end{array} \\ \begin{array}{c} M \\ S \\ A \\ E \end{array} & \begin{pmatrix} 1 & 0.05 & 1 & 0 \\ 1 & 1 & 1 & 0.5 \\ 1 & 0.05 & 1 & 1 \\ 0 & 0.5 & 1 & 1 \end{pmatrix} \end{array}$$

16 - 33.9 Mya

$$\begin{array}{c c} & \begin{array}{cccc} M & S & A & E \end{array} \\ \begin{array}{c} M \\ S \\ A \\ E \end{array} & \begin{pmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0.5 & 0.5 \\ 1 & 0.5 & 1 & 1 \\ 0 & 0.5 & 1 & 1 \end{pmatrix} \end{array}$$

33.9 - 61.7 Mya

$$\begin{array}{c} \\ M \\ S \\ A \\ E \end{array} \begin{array}{c} \begin{array}{cccc} M & S & A & E \end{array} \\ \begin{pmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0.5 \\ 1 & 0 & 1 & 1 \\ 1 & 0.5 & 1 & 1 \end{pmatrix} \end{array}$$

Bibliography

Baker, W. J. & Couvreur, T. L. P. 2013. Global biogeography and diversification of palms sheds light on the evolution of tropical lineages. I. Historical biogeography. *Journal of Biogeography*, 40(2):274–285. doi:10.1111/j.1365-2699.2012.02795.x.

Federman, S., **Dornburg, A.**, **Downie, A.**, **Richard, A. F.**, **Daly, D. C.**, & **Donoghue, M. J.** 2015. The biogeographic origin of a radiation of trees in Madagascar: Implications for the assembly of a tropical forest biome. *BMC Evolutionary Biology*, 15(1):216. doi:10.1186/s12862-015-0483-1.