

Appendix S3 Justification for fossils selected for molecular dating in BEAST.

To estimate the minimum age of crown Laurales the fossil *Virginianthus calycanthoides* (Friis et al., 1994) with an estimated age of 107.7 Ma (Massoni et al., 2015) was assigned to the stem Calycanthaceae. The study by Crepet et al. (2005) identified *Virginianthus* as sister to group Laurales or group Laurales excluding Calycanthaceae. The fossil has an estimated age of 106.8 Ma (Kondrakov et al., 2015). Crepet et al. (2005) described a fossil, *Jerseyanthus calycanthoides*, with an estimated minimum age of 85.8 Ma. The fossil is described to closely resemble extant Calycanthaceae species (von Balthazar et al., 2011) and was thus assigned to crown Calycanthoideae to estimate the minimum age of the Calycanthaceae. The Late Cretaceous fossil taxon *Neusenian tetrasporangiata* (Eklund, 2000) has an estimated age of minimum 83.6 Ma and was found by Neuse River in North Carolina, USA. The *Neusenian* fossil constitutes an excellently preserved flower bud and was assigned to stem Neocinnamomum to calibrate the minimum age of the genus *Neocinnamomum*, due to the fossil's particular resemblance of extant *Neocinnamomum* species (Eklund, 2000). To calibrate the minimum age of crown Monimiaceae the leaf fossil *Monimiophyllum callidentatum* with a minimum age of 52.22 Ma was assigned. The specimen shares typical Monimiaceae characters like "low leaf rank, a basally thickened midvein, strongly brochidodromous secondary veins with the basal pair relatively more acute to the midvein, and distinctive monimiod tooth morphology" and closely resembles the extant Australian species *Wilkiea hugeliana* (Knight & Wilf, 2013). Manchester & O'Leary (2010) described a fruit fossil, *Illigera eocenica*, present in the Middle Eocene with an estimated minimum age of 41.2 Ma. This fossil taxon was found to resemble the fruit of extant *Illigera* species due its inferior ovary, two main wings and additional pair of smaller wings. Consequently, this fossil was assigned crown Hernandiaceae to calibrate the minimum age of Hernandiaceae. The fossil taxon *Cryptocaryoxylon gippslandicum* (Leismann, 1986) described from silicified wood found in Victoria, Australia resembles extant *Cryptocarya* species found in Australia. The fossil has an estimated age of 39 Ma, corresponding to late Eocene-Early Oligocene and was assigned crown clade *C. rhodosperma* and *C. conduplicata* (extant Australian *Cryptocarya* species). to calibrate the minimum age of *Cryptocarya*. The perfectly preserved leaf fossil, *Alseodaphne changchangensis* sp. nov., (Jin & Li, 2009) discovered in the Eocene Changchang Formation has an estimated minimum age of between 37-48 Ma. The fossil was assigned the crown Persea group, due to the fossil's resemblance of the extant species *A. hainanensis* Merrill (Jin & Li, 2009). and was included to calibrate the minimum age of the Persea group. Finally, the fossil taxon *Machilus maomingensis* (Tang et al., 2016) from the Eocene Youganwo Formation of the Maoming Basin, South China, with an estimated minimum age of 33.7 – 33.9 Ma was assigned as calibration point to stem *Machilus*, due to its closest resemblance of the extant species *Machilus chinensis*, to estimate the minimum age of *Machilus*.