

Supplemental Table 1: Maximum and minimum age of all taxa included in the morphological matrix, including locality of the fossil taxa used in the analysis, and mean temperature used in the reconstruction shown in Figure 3.

Taxon	Minimum age	Maximum age	Main paleolocality	Other Paleolocalities	Temperature (°C)
<i>Alfaroa manningii</i>	0	0	NA	NA	21.08040
<i>Alfaropsis roxburghiana</i>	0	46	NA	NA	18.75210
<i>Allocasuarina verticillata</i>	0	0	NA	NA	14.89890
<i>Alnus clarnoensis</i>	44	48	Central Oregon, USA	China, Europe	14.00000
<i>Alnus incana</i>	0	48	NA	NA	5.18624
<i>Antiquacupula sulcata</i>	83.6	86.3	Georgia, USA	NA	NA
<i>Antiquocarya verruculosa</i>	70.6	85.8	Scania, Sweden	NA	NA
<i>Archaefagacea futabensis</i>	86.3	89.3	Honshu, Japan	NA	NA
<i>Asterocarpinus perplexans</i>	32	35	Oregon, Colorado, Montana, USA	NA	11.30000
<i>Beardia vancouverensis</i>	47.8	55.8	British Columbia, Canada	NA	3.50000
<i>Betula leopoldae</i>	47	48.6	British Columbia, Canada	NA	3.50000
<i>Betula pendula</i>	0	48.6	NA	NA	6.58120
<i>Budvaricarpus serialis</i>	83.5	88.6	Czech Republic	NA	NA
<i>Calathiocarpus minimus</i>	86.3	91.1	Germany	Europe	NA
<i>Canacomyrca monticola</i>	0	0	NA	NA	18.52060
<i>Carpinus betulus</i>	0	50	NA	NA	8.65535
<i>Carya ovata</i>	0	37.2	NA	NA	10.02540
<i>Caryanthus knoblochii</i>	83.6	86.3	Scania, Sweden	Czech Republic, Georgia (US/	NA
<i>Cascadiacarpa spinosa</i>	47.8	56	British Columbia, Canada	NA	3.50000
<i>Casholdia microptera</i>	55.8	58.7	England	NA	NA
<i>Castanea seguinii</i>	0	48.6	NA	NA	17.06220
<i>Castanopsis tibetana</i>	0	44.1	NA	NA	17.72140
<i>Castanopsoidea columbiana</i>	47.8	55.8	Tennessee, USA	NA	NA
<i>Casuarina equisetifolia</i>	0	0	NA	NA	24.23590

<i>Ceuthostoma terminale</i>	0	0	NA	NA	17.38570
<i>Chrysolepis sempervirens</i>	0	0	NA	NA	6.29411
<i>Colombobalanus excelsa</i>	0	0	NA	NA	17.14810
<i>Comptonia peregrina</i>	0	48.6	NA	NA	6.94444
<i>Contracuparius huntsvillensis</i>	27.8	33.9	Texas, USA	NA	NA
<i>Corylus avellana</i>	0	50	NA	NA	7.09862
<i>Cranea wyomingensis</i>	55.8	58	Wyoming, USA	NA	17.90000
<i>Cruciptera simpsonii</i>	38.8	44.1	Oregon, USA	Germany, England	14.00000
<i>Cyclocarya paliurus</i>	0	61.6	NA	NA	16.77820
<i>Dahlgrenianthus suecicus</i>	70.6	85.8	Scania, Sweden	NA	NA
<i>Endressianthus miraensis</i>	65.5	83.5	Scania, Sweden	NA	NA
<i>Engelhardia spicata</i>	0	0	NA	NA	NA
<i>Fagopsis longifolia</i>	33.9	49	Colorado, USA	Montana, Washington (USA)	11.30000
<i>Fagus sylvatica</i>	0	48.6	NA	NA	7.86305
<i>Ferrignocarpus bivalvis</i>	45	50	Oregon, USA	England	14.73000
<i>Formanodendron doichangensis</i>	0	0	NA	NA	NA
<i>Gymnostoma nobile</i>	0	51.9	NA	NA	24.88180
<i>Hooleya lata</i>	43.5	44.1	Oregon, USA		14.00000
<i>Juglans mandshurica</i>	0	44	NA	NA	9.45147
<i>Lithocarpus henryi</i>	0	40	NA	NA	15.58500
<i>Manningia crassa</i>	72.1	86.3	Scania, Sweden		NA
<i>Morella cerifera</i>	0	0	NA	NA	18.89850
<i>Myrica gale</i>	0	37.2	NA	NA	5.40265
<i>Normanthus miraensis</i>	65.5	83.5	Portugal	NA	NA
<i>Nothofagus aequilateralis</i>	0	70.6	New Jersey, USA	NA	20.02960
<i>Nothofagus alessandrii</i>	0	70.6	Oregon, USA	Europe, Asia	10.83000
<i>Nothofagus alpina</i>	0	33.9	Tennessee, Kentucky, USA	NA	8.59020

<i>Nothofagus antarctica</i>	0	33.9	Wyoming, USA	NA	6.95267
<i>Nothofagus balansae</i>	0	70.6	Tennessee, USA	NA	19.41150
<i>Nothofagus baumanniae</i>	0	70.6	Colorado, Wyoming, Montana, USA	NA	15.73330
<i>Nothofagus betuloides</i>	0	33.9	Georgia, USA	NA	5.87206
<i>Nothofagus codonandra</i>	0	70.6	Idaho, USA	NA	18.99060
<i>Nothofagus crenata</i>	0	0	NA	NA	17.48890
<i>Nothofagus cunninghamii</i>	0	1.8	North Dakota, Wyoming, USA	North Hemisphere	9.67186
<i>Nothofagus dombeyi</i>	0	33.9	Tennessee, USA	NA	8.76047
<i>Nothofagus fusca</i>	0	33.9	NA	NA	9.91588
<i>Nothofagus glauca</i>	0	33.9	NA	NA	11.63000
<i>Nothofagus nitida</i>	0	33.9	NA	NA	8.98421
<i>Nothofagus obliqua</i>	0	33.9	NA	NA	9.78023
<i>Nothofagus perryi</i>	0	33.9	NA	NA	15.24620
<i>Nothofagus pumilio</i>	0	33.9	NA	NA	5.87239
<i>Notholithocarpus densiflorus</i>	0	0	NA	NA	12.42770
<i>Oreomunnea mexicana</i>	0	19	NA	NA	18.41180
<i>Ostrya carpinifolia</i>	0	33	NA	NA	11.44090
<i>Ostryopsis davidiana</i>	0	0	NA	NA	8.24648
<i>Palaeocarpinus dakotensis</i>	55.8	58.7	North Dakota, Wyoming, USA	North Hemisphere	NA
<i>Palaeocarya clarnensis</i>	37.8	47.8	Oregon, USA	Europe, Asia	NA
<i>Paleooreomunnea stoneana</i>	37.2	48.6	Tennessee, Kentucky, USA	NA	NA
<i>Paleoplatycarya wingii</i>	52.5	52.7	Wyoming, USA	NA	NA
<i>Paraengelhardtia eocenica</i>	47.8	56	Tennessee, USA	NA	NA
<i>Platycarya strobilacea</i>	0	55.8	NA	NA	15.13250
<i>Polyptera manningii</i>	57	64	Colorado, Wyoming, Montana, USA		NA
<i>Protofagacea allonensis</i>	83.6	86.3	Georgia, USA	NA	NA
<i>Pseudofagus idahoensis</i>	15	16	Idaho, USA	NA	NA

<i>Pterocarya stenoptera</i>	0	33.9	NA	NA	16.42620
<i>Quercus glauca</i>	0	44	NA	NA	NA
<i>Quercus rubra</i>	0	44	NA	NA	9.34473
<i>Quercus suber</i>	0	44	NA	NA	NA
<i>Rhoiptelea chiliantha</i>	0	0	NA	NA	16.46000
<i>Soepadmoa cupulata</i>	90	94	New Jersey, USA	NA	NA
<i>Ticodendron incognitum</i>	0	0	NA	NA	19.77950
<i>Trigonobalanoidea americana</i>	47.8	55.8	Tennessee, USA	NA	NA
<i>Trigonobalanus verticillata</i>	0	37.2	NA	NA	20.12310