TABLE S3: List of primers used for DNA amplification and sequencing. Overview of all primers for A: the nuclear *phyA* region, and B: the chloroplast encoded *trnK*-intron, *matK* gene and *trnK-psbA* region, including orientation, sequence and the group they have been used. Primer orientation is given as: F: forward primer, R: reverse primer. Published primers are cited by the original reference, all other primers derive from this study.

Region	Name & Reference	Direction	Sequence	Taxa
A	SarcF	F	ACATTATCCGGCCACGGA	*Schisandra*ceae, *Magnolia*ceae, *Pseudowintera*
A	MagF	F	CATTATCCTGCCACDGA	*Austrobaileya*
A	PiperF	F	CACTACCCTGCTACCGA	*Piper, Peperomia, Verhuellia*
A	NymF	F	GCACTATCCTGCTACCGA	*Galbulimima, Hedycaria, Euryale, Victoria, Hernandia*
A	BrasF	F	GCATTATCCTGCCACTGA	*Brasenia, Gyrocarpus*
A	AristoF	F	DCATTACCCRGCCACAGA	*Aristolochia*
A	Aris F	F	CACTATCCGGCCACDGA	*Anemopsis, Asarum*
A	ChlF	F	ACATTATCCGGCCACAGA	*Neolitsea, Lindera, Chloranthus*
A	IdioF	F	GCATTATCCTGCTACTGA	*Doryphora*
A	BAPHYAR	R	ACAGCWGCCATYCCACA	*Asarum, Neolitsea, Lindera, Galbulimima, Hydycaria,*
A	EupR	R	CACAGCTGCCATCCCACA	*Magnolia, Liriodendron, Pseudowintera, Verhuellia*
A	SarcR	R	CACAGCTGCCATTCCACA	*Schisandra, Kadsura, Gyrocarpus*
A	PiperR	R	ACGGCGGCCATCCCACA	*Piper, Peperomia*
A	AristoR	R	CTMACDGCWGCCATACCACA	*Aristolochia*
B	trnK-F (Wicke and Quandt 2009)	F	GGGTTGCTAACTCAATGGTAGAG	gymnosperms, angiosperms
B	trnK-F-angio1	F	GGGTTGCTAACTCAACGGTAGAG	angiosperms
B	MG-15 (Liang and Hilu 1996)	F	ATCTGGGTTGCTAACTCAATG	*Neocinnamomum, Peperomia*
B	GKO-matK-750-F	F	ATCGCACCGTGTATTATTTC	*Gingko*
B	Hy-1330-F	F	GGGATGCTCCTTCTTTGC	*Hydatella*
B	Po-trnK-650-R	F	CATAGAGAAAGCCGTGTGC	*Porcelia*

B	AR-matK-420-F (Wanke et al. 2006)	F	AAGTGAATAAATGG ATAGAGC	*Aristolochia*
B	TH-matk-420-F (Wanke et al. 2006)	F	AACTGAATAAATGG ATAGAGC	*Thottea*
B	Lau-matK-800-F	F	GACYGTATCGYACT ATGTAT	*Lauraceae, Chloranthaceae, Hernandiaceae,*
B	DP-matK-1950-F	F	GACCGTATCGYACT ATG	*Nymphaeaceae,* Magnoliales, Laurales, *Chloranthaceae, Winteraceae, Canellaceae*
B	Ny-matK-480-F (Borsch et al. 2003)	F	CATCTGGAAATCTTG STTC	*Nymphaeaceae, Illiciaceae, Chloranthaceae, Magnoliaceae, Degeneriaceae, Himantandraceae, Eupomatiaceae, Annonaceae, Atherospermataceae, Gomortegaceae, Siparunaceae, Hernandiaceae, Lauraceae, Cannelaceae, Aristolochiacea*
B	BA-matK-2320-F	F	CATGTATATGAATG BGAATC	*Sparattanthelium, Asarum*
B	Pi-matK-1480-F (Wanke et al. 2006)	F	TCGTAAACAYAAAA GTAC	*Chloranthaceae, Magnoliaceae, Myristicaceae, Degeneriaceae, Eupomatiaceae, Annonaceae, Monimiaceae, Lauraceae, Aristolochiaceae, Asaraceae,* Piperaceae
B	DP-trnk-4530-F	F	GCAAYGAAAAATGC AAGCACGG	*Gingko, Hydatella,*
B	psbA-R (Steele and Vilgalys 1994)	R	CGCGTCTCTCTAAAA TTGCAGTCAT	gymnosperms, angiosperms
B	trnK-R2 (Wicke and Quandt 2009)	R	TCGAACCCGGAACT HGTCGG	*Gingko,* Austrobaileyales, Chloranthales, Magnoliales, Gomortegaceae, Hernandiaceae, Lauraceae, Winteraceae, Aristolochiaceae, Asaraceae, Piperaceae
B	MLC-matK-3240-R	R	TATGTTTACGAGMC AAAGTTCTA	Magnoliales, Laurales, Cannelales
B	DP-matK-3650-R	R	TAGCACAHGAAAGT CGAAG	*Gingko, Hydatella,* Illiciaceae, Chloranthaceae, Myristicaceae, Eupomatiaceae, Annonaceae, Siparunaceae, Gomortegacea, Hernandiaceae, Lauraceae, Aristolochiaceae, Asaraceae, Piperaceae
B	Ny-matK-2850-R	R	CGGTTGAGACCATA AGTGAAAATG	Hydatellaceae

B	DP-matK-2740-R	R	CATCTGGAAATCTTGSTTC	Nymphaeaceae, Illiciaceae, Chloranthales, Magnoliales, Laurales, Winteraceae, Canellaceae, Aristolochiaceae, Asaroideae,
B	BA-matk-2335-R	R	GATTCVCATTCATATACATG	Hydatellaceae, Chloranthaceae, Magnoliaceae, Annonaceae, Winteraceae,
B	DP-matK-1900-R	R	CATAGTRCGATACRGTC	*Hedyosmum, Mollinedia, Cassytha, Aristolochia*
B	AR-matK-1450-R (Wanke et al. 2006)	R	CGTTAGAGTTGCACGTTA	*Aristolochia*
B	TH- 730-R (Oelschlägel et al. 2009)	R	TGCGATACAGTCAGAACAAGG	*Thottea*