

ELECTRONIC SUPPLEMENTARY MATERIAL

Table S1. Locations and characteristics of 24 study sites: absolute latitude; mean annual temperature (T, °C); mean specific leaf area (SLA) of examined plant species ($\text{cm}^2 \text{g}^{-1}$ dry mass); plant phylogenetic diversity (PD); stream pH; and wetted stream width (SW, m). A dash indicates that the value is unavailable.

Code	Location	Region	Latitude	T	SLA	PD	pH	SW
KEN	Kenya	Tropical	0.37	15.8	131	0.384	8.3	3.2
ECD	Ecuador	Tropical	0.74	25.1	146	0.299	7.1	4.7
MAL	Malaysia	Tropical	3.15	24.8	35	0.401	6.9	0.9
FGN	French Guiana	Tropical	5.07	25.7	106	0.257	6.8	2.6
IND	India	Tropical	8.80	26.9	–	0.401	7.5	5.2
PAN	Panama	Tropical	9.09	26.2	226	0.307	7.2	6.5
VEN	Venezuela	Tropical	9.33	27.6	148	0.354	8.3	6.5
TRN	Trinidad	Tropical	10.40	26.0	–	0.401	8.2	1.1
CRA	Costa Rica	Tropical	10.43	26.0	108	0.292	6.0	3.0
PRC	Puerto Rico, USA	Tropical	18.32	21.3	92	0.401	7.1	8.0
QLD	Queensland, Australia	Tropical	18.98	20.7	102	0.266	6.1	8.5
BRL	Brazil	Tropical	19.27	18.0	250	0.318	5.2	0.5
MEX	Mexico	Tropical	19.73	15.3	70	0.395	8.3	0.9
HKN	Hong Kong	Tropical	22.43	21.7	162	0.385	6.9	3.2
NSW	New South Wales, Australia	Temperate	30.26	18.1	–	0.316	7.9	4.2
JAP	Japan	Temperate	35.83	7.6	97	0.264	8.2	3.7
CHL	Chile	Temperate	36.88	11.9	60	0.375	7.4	7.0
PTG	Portugal	Temperate	40.08	12.3	69	0.119	6.5	1.9
NZL	New Zealand	Temperate	40.81	10.1	–	0.367	7.1	2.0
ARG	Argentina	Temperate	41.24	5.5	180	0.401	7.3	1.1
NYK	New York, USA	Temperate	42.75	9.0	220	0.344	7.3	3.0
TAS	Tasmania, Australia	Temperate	42.78	9.8	88	0.250	7.7	1.5
FRN	France	Temperate	43.42	12.3	283	0.144	7.0	1.5
GER	Germany	Temperate	47.80	6.9	148	0.401	6.6	5.3

Table S2. Specific leaf area, SLA ($\text{cm}^2 \text{g}^{-1}$ dry mass), of plant species used in the litter breakdown experiment at 24 study sites. See Table S1 for site codes. A dash indicates that the value is unavailable.

Site	Plant species	Family	SLA
KEN	<i>Dombeya goetzenii</i>	Malvaceae	167
	<i>Pittosporum viridiflorum</i>	Pittosporaceae	126
	<i>Rhus natalensis</i>	Anacardiaceae	99
ECD	<i>Inga punctata</i>	Fagaceae	130
	<i>Triplaris dugandii</i>	Polygonaceae	191
	<i>Zygia cataractea</i>	Fagaceae	118
MAL	<i>Dipterocarpus elongatus</i>	Dipterocarpaceae	19
	<i>Gigantochloa scortechinii</i>	Poaceae	33
	<i>Macaranga tanarius</i>	Euphorbiaceae	53
FGN	<i>Eperua falcata</i>	Fagaceae	142
	<i>Qualea rosea</i>	Vochysiaceae	71
	<i>Vochysia densiflora</i>	Vochysiaceae	106
IND	<i>Pongamia pinnatum</i>	Fagaceae	–
	<i>Syzygium cumini</i>	Myrtaceae	–
	<i>Vitex leucoxydon</i>	Lamiaceae	–
PAN	<i>Hirtella triandra</i>	Chrisobalanaceae	235
	<i>Myriocarpa longipes</i>	Urticaceae	190
	<i>Rinorea sylvatica</i>	Violaceae	253
VEN	<i>Anacardium excelsum</i>	Anacardiaceae	110
	<i>Ficus maxima</i>	Moraceae	146
	<i>Hura crepitans</i>	Euphorbiaceae	187
TRN	<i>Clathrotropis brachypetala</i>	Fagaceae	–
	<i>Miconia multispicata</i>	Melastomataceae	–
	<i>Tabernaemontana undulata</i>	Apocynaceae	–
CRA	<i>Cecropia obtusifolia</i>	Cecropiaceae	123
	<i>Ficus insipida</i>	Moraceae	91
	<i>Hampea appendiculata</i>	Malvaceae	111
PRC	<i>Cecropia schreberiana</i>	Cecropiaceae	86
	<i>Dacryodes excelsa</i>	Burseraceae	134
	<i>Manilkara bidentata</i>	Sapotaceae	55
QLD	<i>Apodytes brachystyllis</i>	Icacinaceae	128
	<i>Cryptocarya leucophylla</i>	Lauraceae	100
	<i>Endiandra bessaphila</i>	Lauraceae	77
BRL	<i>Miconia chartacea</i>	Melastomataceae	209
	<i>Myrcia guyanensis</i>	Myrtaceae	214
	<i>Protium brasiliense</i>	Burseraceae	327
MEX	<i>Alnus acuminata</i>	Betulaceae	69
	<i>Meliosma dentata</i>	Sabiaceae	69
	<i>Zinowiewia coccinea</i>	Celastraceae	73
HKN	<i>Castanopsis fissa</i>	Fagaceae	193
	<i>Ficus fistulosa</i>	Moraceae	171
	<i>Liquidambar formosana</i>	Hamamelidaceae	123
NSW	<i>Alphitonia excelsa</i>	Rhamnaceae	–
	<i>Eucalyptus microcorys</i>	Myrtaceae	–

Table S2 continued

Site	Plant species	Family	SLA
	<i>Ficus coronata</i>	Moraceae	–
JAP	<i>Corylus sieboldiana</i>	Betulaceae	87
	<i>Prunus jamasakura</i>	Rosaceae	101
	<i>Quercus serrata</i>	Fagaceae	105
CHL	<i>Chusquea quila</i>	Poaceae	109
	<i>Nothofagus dombeyi</i>	Nothofagaceae	38
	<i>Peumus boldus</i>	Monimiaceae	33
PTG	<i>Alnus glutinosa</i>	Betulaceae	70
	<i>Castanea sativa</i>	Fagaceae	83
	<i>Quercus robur</i>	Fagaceae	56
NZL	<i>Melicytus ramiflorus</i>	Violaceae	–
	<i>Myoporum laetum</i>	Myoporaceae	–
	<i>Pittosporum eugenioides</i>	Pittosporaceae	–
ARG	<i>Berberis serratodentata</i>	Berberidaceae	75
	<i>Fuchsia magellanica</i>	Onagraceae	325
	<i>Nothofagus pumilio</i>	Nothofagaceae	140
NYK	<i>Acer saccharum</i>	Sapindaceae	205
	<i>Quercus rubra</i>	Fagaceae	168
	<i>Tilia americana</i>	Tilaceae	288
TAS	<i>Eucalyptus globulus</i>	Myrtaceae	40
	<i>Eucalyptus obliqua</i>	Myrtaceae	51
	<i>Pomaderris apetala</i>	Urticaceae	172
FRN	<i>Corylus avellana</i>	Betulaceae	330
	<i>Fagus sylvatica</i>	Fagaceae	324
	<i>Quercus robur</i>	Fagaceae	196
GER	<i>Acer pseudoplatanus</i>	Sapindaceae	167
	<i>Fagus sylvatica</i>	Fagaceae	147
	<i>Fraxinus excelsior</i>	Oleaceae	129

Table S3. GenBank sequences for partial 18S rDNA, *rbcl*, *matK*, *atpB*, *trnl*, *rpl16*, *rpoB*, and *rpoC1* in 70 plant species used in the litter breakdown experiment. Sequences for congeners were used when no data were available for a particular species (marked with asterisks). Five outgroups are included.

Species	<i>rbcl</i>	18sITS5.8s25s	<i>matK</i>	<i>atpB</i>	<i>trnl</i>	<i>rpl16</i>	<i>rpoB</i>	<i>rpoC1</i>	18S
<i>Acer pseudoplatanus</i>	HM849739.1	AY605341.1	AJ438782.1		DQ978552.1		FJ395686.1	FJ395816.1	
<i>Acer saccharum</i>	L13181.1	AF020363.1	EU749291.1	AF035893.1	AF401173.1	AF459501.1	EU749062.1	EU750201.1	
<i>Alnus acuminata</i>		AJ251673.1	FJ011815.1		FJ012045.1	FJ011930.1			
<i>Alnus glutinosa</i>	FJ844574.1	AJ251662.1	HQ600562.1		FJ012046.1	FJ011931.1		FN689654.1	X54984.1
<i>Alphitonia excelsa</i>		HQ340157.1			HQ325600.1				
<i>Anacardium excelsum</i>	JQ590134.1		JQ586468.1						
<i>Apodytes brachystylis</i> *									
<i>A. dimidiata</i>	AJ428895.1		AJ429311.1		AJ430899.1				
<i>Berberis serratodentata</i> *									
<i>B. asiatica</i>	GU934837.1	GU934647.1	GU934753.1						
<i>B. tinctoria</i>	GU934903.1	GU934729.1	GU934805.1						
<i>Castanea sativa</i>	HM849869.1		JN895513.1		AY586291.1	AY526892.1	FJ395668.1	FN689628.1	
<i>Castanopsis fissa</i>	JF941180.1	AY040390.1	FJ185053.1		EF057140.1				
<i>Cecropia obtusifolia</i>	JQ594312.1		GQ981958.1		DQ179377.1			GQ429087.1	
<i>Cecropia schreberiana</i>	HM446770.1		HM446666.1						
<i>Chusquea quila</i> *									
<i>C. coronalis</i>		GQ464814.1	AF164389.1		AY651842.1	U54759.1			
<i>C. pinifolia</i>						U54756.1			
<i>Clathrotropis brachypetala</i>		EF457714.1			AF309827.1				
<i>Corylus avellana</i>	AY263929.1	HQ442261.1	AY373442.1	AY263944.1	AY147072.1	FJ011910.1		FN689653.1	AY263895.1
<i>Corylus sieboldiana</i>		AF297345.1	AF297375.1		FJ012034.1	FJ011918.1			
<i>Cryptocarya leucophylla</i> *									
<i>C. alba</i>	GQ248578.1		AJ247158.1		JF950883.1		GQ248754.1	AM889877.1	
<i>C. meisneriana</i>				AF197602.1					AF293757.1
<i>Dacryodes excelsa</i>	GU246036.1		AY594465.1	GU246071.1	AY594509.1				
<i>Dipterocarpus elongatus</i> *									

Table S3 continued

Species	rbcl	18sITS5.8s25s	matk	atpb	trnl	rpl16	rpoB	rpoC1	18S
<i>D. alatus</i>			AB246473.1		AB246603.1				
<i>D. baudii</i>			AB006376.1		AB006393.1				
<i>Dombeya goetzenii</i> *									
<i>D. calantha</i>	GU981733.1	AY083656.1							
<i>D. brevistyla</i>		GU938045.1				GU938000.1			
<i>Endiandra bessaphila</i> *									
<i>E. dichrophylla</i>	JN564239.1		JN564113.1						
<i>E. montana</i>	JN564241.1		JN564117.1						
<i>Eperua falcata</i>	FJ038036.1	AY955805.1	EU361945.1		AF365139.1		FJ038269.1	FJ038543.1	
<i>Eucalyptus globulus</i>	108802622	AY615676.1	AY521535.1		HQ287710.1		GQ248777.1	GQ248939.1	
<i>Eucalyptus microcorys</i>		EF694714.1	HQ287634.1		HQ287718.1				
<i>Eucalyptus obliqua</i>		AF058484.1							
<i>Fagus sylvatica</i>	L13340.2	AY232985.1	JN895059.1		AF133654.1		FJ395671.1	FN689626.1	
<i>Ficus coronata</i>		AY730131.1							
<i>Ficus fistulosa</i>	HQ415155.1	AY730137.1	HQ415328.1						
<i>Ficus insipida</i>	GQ981738.1	AF165390.1	JQ588407.1		AB445569.1				
<i>Ficus maxima</i>	GQ981739.1	AF165392.1	GQ981995.1						
<i>Fraxinus excelsior</i>	FJ862056.1	EU314848.1	AM933427.1		AF231830.1	AY911660.1	GU991688.1	FN689636.1	
<i>Fuchsia magellanica</i>	HM850013.1	AY357794.1	HM851004.1		AY357835.1	AY357876.1			
<i>Gigantochloa scortechinii</i>			EU434258.1		EU434066.1				
<i>Hampea appendiculata</i>	JQ592504.1		AY589062.1						
<i>Hirtella triandra</i>	GQ424481.1	GQ424461.1	JQ587241.1						
<i>Hura crepitans</i>	AB233886.1		AB233782.1	AB233678.1	AY794636.1	JN249424.1			AB233574.1
<i>Inga punctata</i>	JQ591810.1	GU013231.1	AY386922.1		GQ118737.1			GQ118815.1	
<i>Liquidambar formosana</i>	DQ352384.1	AF133230.1	AF015650.1		DQ352220.1				
<i>Macaranga tanarius</i>	AB233866.1	DQ866584.1	AB233762.1	AB233658.1	DQ899243.1				AB233554.1
<i>Manilkara bidentata</i>	FJ038167.1	FJ037872.1	HM446708.2		FJ039185.1				

Table S3 continued

Species	rbcl	18sITS5.8s25s	matk	atpb	trnl	rpl16	rpoB	rpoC1	18S
<i>Meliccytus ramiflorus</i>		EF635449.1	DQ842612.1		DQ085928.1				
<i>Meliosma dentata*</i>									
<i>M. veitchiorum</i>	AF206793.1		FJ626530.1	AF209626.1	FJ626570.1				AF206961.1
<i>M. rigida</i>	HQ415132.1		HQ415309.1						
<i>Miconia chartacea</i>		EU055749.1							
<i>Miconia multispicata</i>		EU055808.1							
<i>Myoporum laetum</i>		EU886847.1							
<i>Myrcia guianensis</i>		JN091224.1			JN091351.1				
<i>Myriocarpa longipes</i>	AY208705.1		JQ589393.1		AY208724.1				
<i>Nothofagus dombeyi</i>	L13350.2	GQ863252.1							
<i>Nothofagus pumilio</i>	L13360.2	GQ863256.1							
<i>Peumus boldus</i>	AF206807.1	GU177689.1	60495431	AF209650.1					AF206988.1
<i>Pittosporum eugenioides</i>		AY829031.1			AY829067.1				
<i>Pittosporum viridiflorum</i>	JF265552.1		JF270894.1						
<i>Pomaderris apetala*</i>									
<i>P. rugosa</i>	AJ390063.1	DQ146615.1			AJ390363.1				
<i>P. brevifolia</i>	AY911564.1				EF528513.1				
<i>Pongamia pinnata</i>	AY289676.1	AF467493.1							AY289629.1
<i>Protium brasiliense*</i>									
<i>P. guianense</i>	GU246041.1			GU246076.1	GU246107.1				
<i>P. trifoliolatum</i>	FJ037985.1		FJ514630.1		FJ039265.1		FJ038234.1	FJ038448.1	
<i>Prunus jamasakura*</i>									
<i>P. cerasus</i>	JN893012.1	FJ899099.1	FN668844.1		EF010970.1		FN668892.1		
<i>P. serrulata</i>	GU363817.1		GU363780.1			AB254479.1			
<i>Qualea rosea</i>	FJ038210.1				FJ039348.1		FJ038396.1	FJ038836.1	
<i>Quercus robur</i>	AB125025.1		AJ491718.1		HM770039.1		FJ395716.1	FN689618.1	
<i>Quercus rubra</i>	AB125026.1	AF098418.1	AB125043.1	AF209663.1	AB124992.1		EU749135.1	EU750276.1	AF132892.1

Table S3 continued

Species	rbcl	18sITS5.8s25s	matk	atpb	trnl	rpl16	rpoB	rpoC1	18S
<i>Quercus serrata</i>	AB060576.1	HE585145.1	AB060067.1		AB063538.1				
<i>Rhus natalensis</i> *									
<i>R. copallina</i>	U00440.1	AY641483.1	AY594485.1	AF035912.1	AY640438.1				
<i>R. typhina</i>	HQ590236.1	FJ945920.1	HQ593409.1		AY640446.1				GU476470.1
<i>Rinorea sylvatica</i>	GQ981866.1		GQ982086.1		JN714115.1				
<i>Syzygium cumini</i>	GQ870669.3	FM887016.1			JF804935.1			GQ870669.3	
<i>Tabernaemontana undulata</i>			GU973970.1		HQ634605.1	GU974244.1			
<i>Tilia americana</i>	AF022127.1		HQ593469.1					HQ594158.1	AF207042.1
<i>Triplaris dugandii</i> *									
<i>T. americana</i>	Y16910.1	FJ154486.1	AY042668.1						
<i>T. poeppigiana</i>	AF297137.1	FJ154487.1	FJ154497.1						
<i>Vitex leucoxylon</i> *									
<i>V. negundo</i>	JQ322525.1	FM200123.1	AB284176.1		DQ304786.1				
<i>V. trifolia</i>	GQ436526.1	FM200128.1	AB284175.1						
<i>Vochysia densiflora</i> *									
<i>V. guatemalensis</i>	JQ594494.1		JQ589526.1						
<i>V. ferruginea</i>	GQ981918.1		GQ982128.1						
<i>Zinowiewia coccina</i>		EU328767.1	AY935922.1	AY935848.1	EU328803.1				AY929364.1
<i>Zygia cataractae</i> *									
<i>Z. racemosa</i>	FJ038059.1	FJ037829.1	FJ037923.1		FJ039293.1		FJ038294.1	FJ038590.1	
<i>Z. longifolia</i>	JQ592097.1		JQ587915.1						
OUTGROUPS									
<i>Cabomba caroliniana</i>	M77027		DQ185527.1	AF187058					AF206878
<i>Barclaya longifolia</i>	M77028		AF092982.1	AF209536					AF096692
<i>Austrobaileya scandens</i>	L12632		DQ182344.1	AJ235403	EF210565.1				U42503
<i>Schisandra sphenanthera</i>	L12665			AJ235599		AY326492.1			
<i>Amborella trichopoda</i>	L12628		DQ185522.1	D89556					U42497

Table S4. Variance inflation factors (VIFs) for the variables included in general linear models.

Variable	VIF
Mean annual temperature (T)	1.16
Specific leaf area (SLA)	1.06
Litter phylogenetic diversity (PD)	1.13
Stream pH	1.18
Wetted stream width (SW)	1.32

Fig. S2A. Climographs of tropical study sites showing annual variation in monthly mean temperature (line) and precipitation (shade; note change of scale on darker shade). Site codes are given in Table S1. Legend provided in top left-hand panel.

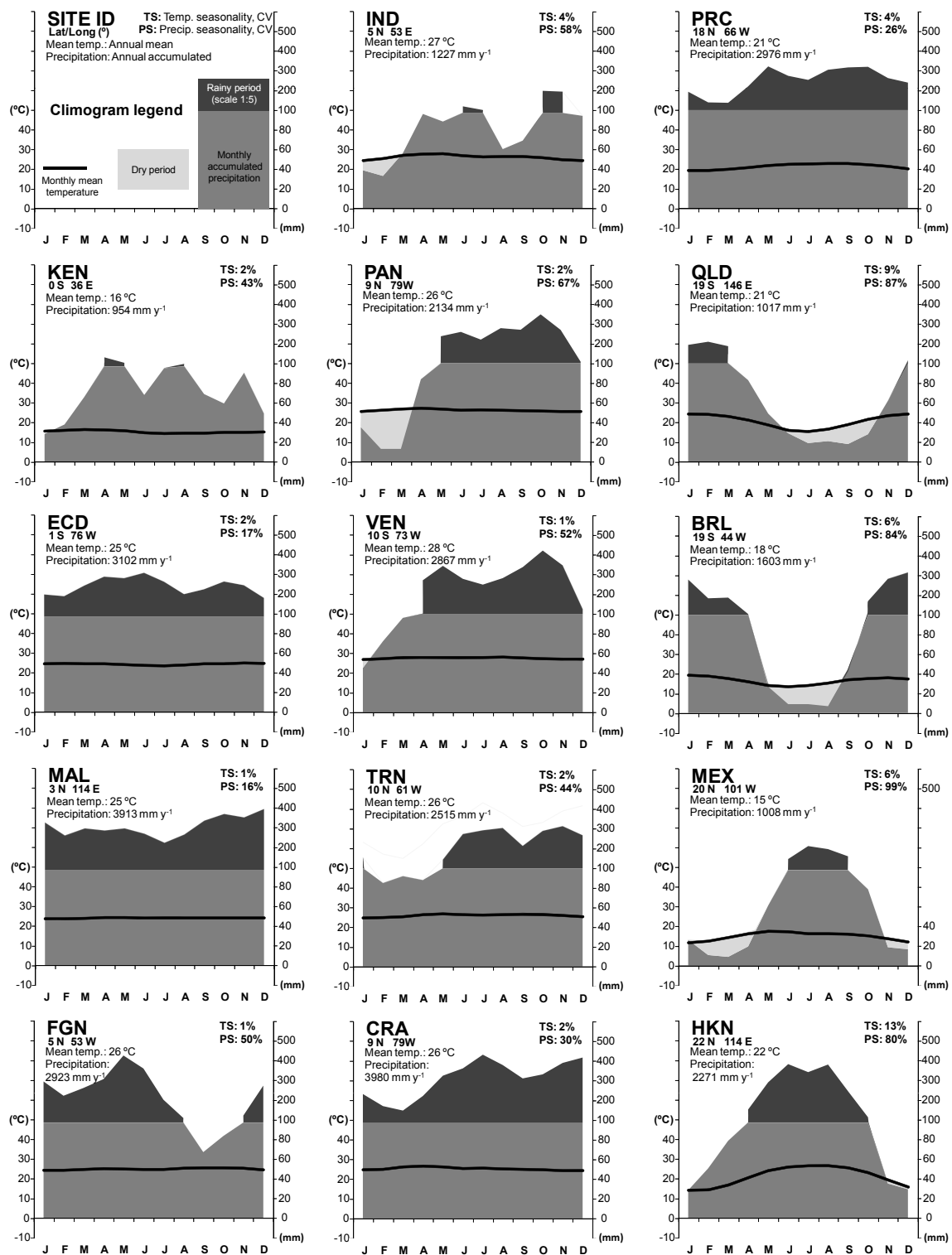


Fig. S2B. Climographs of temperate study sites (see Fig. S2a legend).

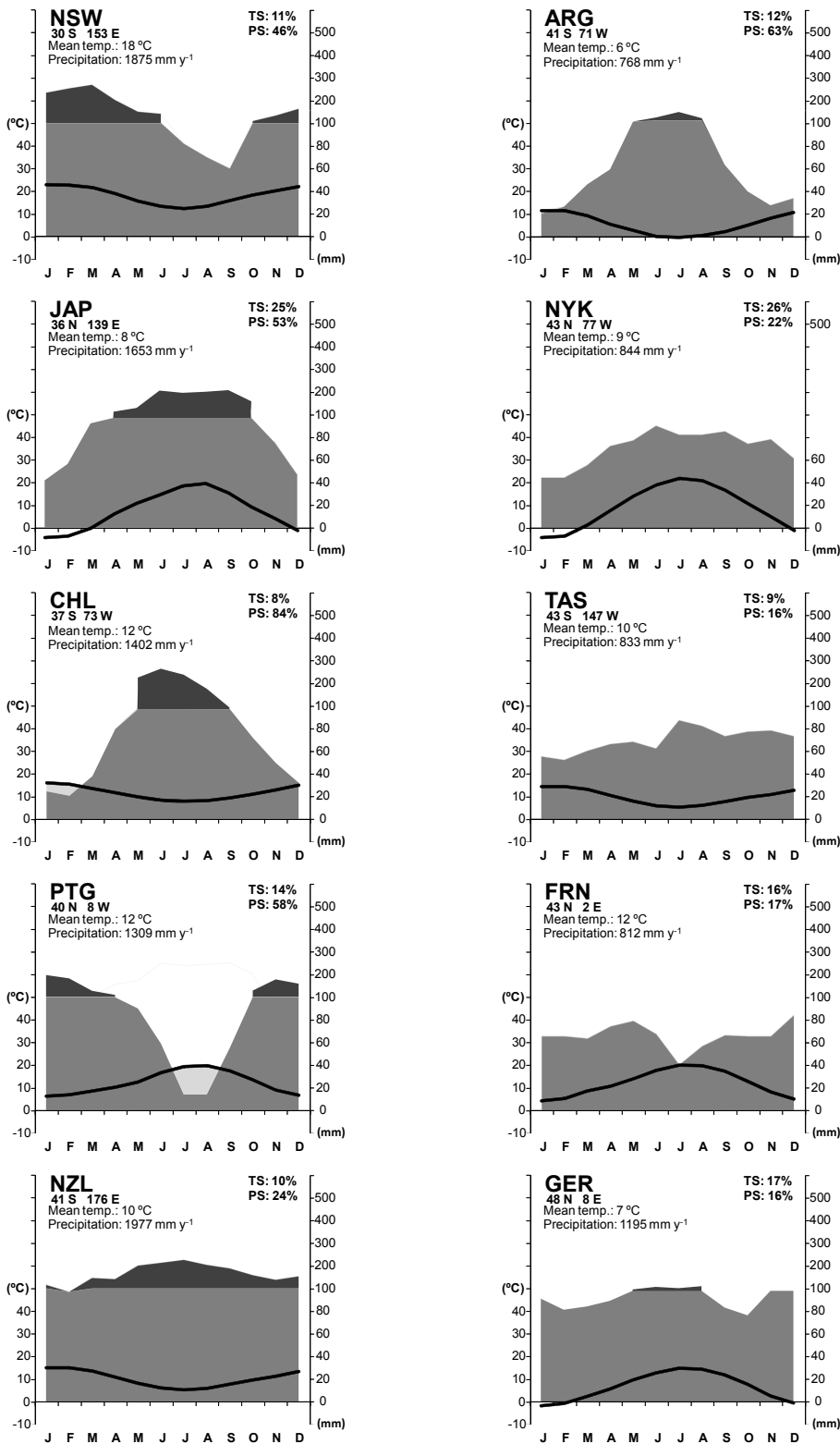


Fig. S3. Molecular phylogeny of 90 plant species and 8935 bps of DNA (including 5 outgroups) using partial 18S ribosomal rDNA, rbcL, matK, atpB, trnL, rpl16, rpoB, and rpoC1 sequences available in GenBank.

