Supporting Information

Simon *et al.* – Recent assembly of the Cerrado, a neotropical plant diversity hotspot, by in situ evolution of adaptations to fire

Contents:

1) STUDY GROUPS

Mimosa dataset

Taxon sampling: *Mimosa* (Mimosoideae, Leguminosae) is a large genus of some 530 described species, distributed mainly in the Neotropics with around 40 species occurring in the Old World. *Mimosa* is remarkably rich in fire-adapted narrow endemics in the Cerrado, but at the same time also highly diverse in other major Neotropical habitats such as seasonally dry tropical forest, subtropical grasslands, and rain forest. More than a quarter of *Mimosa* species grow only in the Cerrado and nowhere else (1), and it is the second largest genus in this biome (2). Two-hundred and fifty species were sampled to span the full range of morphological diversity and as wide a coverage of geography and ecology as possible, including all five sections and 37 of 41 series proposed in Barneby's infrageneric classification (3), plus half of the Old World species (these not included in Barneby's monograph), and 13 outgroups (Appendix S1). For some species, multiple accessions were included. Nearly half of the species listed for the Cerrado (1) were sampled (92 out of 189), most of these being narrow endemics adapted to frequent fires.

Molecular methods: Total DNA from silica-dried leaves or herbarium material was isolated using DNeasy Plant Mini Kit (Qiagen Ltd., Dorking, Surrey, UK). After an initial screening of 10 plastid regions, the *trnD-trnT* spacer was selected as the most reliable and variable DNA sequence locus. The *trnD-trnT* region was amplified using external and internal primers from (4), except for an additional forward primer trnD2 (GTG TAC AGC ATG CAT ATT CTT ACG), which was designed for this study. For most samples the *trnD-trnT* locus was amplified in a single PCR reaction. For highly degraded DNA templates, amplifications were performed using internal primers trnE and trnY, and sometimes the newly designed primer trnT2 (GAC GTA TCG CCG AGT AAT TCC). Reactions were carried out in a total volume of 25 µl containing ~5-20 ng of DNA template, 1X Buffer, 0.5 M of betaine, 1.5 mM of $MgCl_2$, 0.1 mM of each dNTP, 0.5 µM of each primer and 0.6 U of *Taq* polymerase (Yorkshire Bioscience, York, UK). PCR conditions were 94°C for 45 sec, 30 cycles of 45 sec at 94°C, 1 min at 55°C and 1 min at 72°C, followed by a final extension of 5 min at 72°C. PCR products were purified using exonuclease I and shrimp alkaline phosphatase (Exo/SAP) and sequenced in four reactions using the two PCR primers and two internal primers, using Big Dye chemistry (Applied Biosystems, Foster City, CA, USA). Consensus sequences from the four strands were assembled using Sequencher software (GeneCodes Corp., Ann Arbor, MI), and then aligned in ClustalX (5) and manually edited using BioEdit (6). The final dataset contained 2226 bp, after exclusion of 140 bp of ambiguous alignment. A total of 614 variable characters were found, 368 (16.5%) of them parsimony informative, 334 (15.0%) considering only the ingroup. A number of informative indels were also found in the dataset, but these were not used in the Bayesian analysis. GenBank accession numbers for *trnD-trnT* sequences of *Mimosa* and voucher information are given in Appendix S1.

Andira dataset

Taxon sampling: *Andira* is a mostly Neotropical legume genus comprising 29 species of trees and shrubs, with only *A. inermis* occuring outside of the Neotropics, in Africa (7). Four species grow in fire prone habitats in the Cerrado: *A. cujabensis*, *A. cordata*, *A. vermifuga*, and *A. humilis*. Of these, *A. cordata* and *A. cujabensis* are endemic to the Cerrado, and *A. vermifuga* also occurs sporadically in the Amazon and gallery forests. *Andira humilis* occurs mostly in the Cerrado, but also in other open fire prone vegetation. The dataset includes 25 species of *Andira* (42 accessions) and utilizes the genus *Hymenolobium* as an outgroup (five spp. represented). The inclusion of *Andira* in this study of Cerrado origins is relevant since it is one of many examples of tree genera which are predominantly found in the rain forest but contain a few species in the Cerrado (others include *Annona*, *Caryocar*, *Jacaranda*, *Palicourea*, *Qualea*, and *Vochysia*; 8, 9).

Molecular methods: A molecular dataset based on the 5.8S subunit and flanking internal transcribed spacers *ITS1* and *ITS2* of nuclear ribosomal DNA was generated by Skema (10) and is published here for the first time. Total DNA from fresh leaf material, herbarium specimens, or from leaves dried in silica gel or anhydrous calcium sulfate was extracted following the CTAB method (11). Each region was amplified from the 3' end of 18S through ITS1 through 5.8S through ITS2 to the 5' end of 25S using the primers ITS 5P and ITS 8P (12). For three accessions using leaf material from herbarium specimens (*A. praecox*, *A. tervequinata*, *A. trifoliolata*) this primary PCR reaction did not achieve sufficient amplification, therefore a nested PCR was carried out using the internal primers ITS 1 and ITS 4 (13) with roughly 0.25 µL of unpurified, primary PCR reaction for the DNA template. Bioline Taq and reagents (Bioline, London NW2, UK) were used for all PCR reactions in the following amounts: ~5-20 ng of DNA template, 5 µL of Bioline 10X NH_4 buffer, 200 µM each dNTPs, 2.5 mM $MgCl_2$, 0.3 µM of each primer, 1.25 U of BioTaq and distilled sterile water to 50 µL total volume. The ITS PCR conditions were 3 min at 94ºC, followed by 30 cycles of 1 min at 94ºC, 1 min at 55ºC, 1.5 min at 72ºC, finished by a final extension of 5 min at 72ºC. PCR products were purified using the QIAgen PCR Purification Kit according to manufacturer's instructions (Qiagen Ltd., Dorking, Surrey, UK). Sequencing was completed using Thermosequenase II chemistry (Amersham Pharmacia, Buckinghamshire, UK) and primarily the same primers as used for amplification, except in some instances where ITS3P, its reverse, or ITS2G (12) were also used. Sequences were viewed using Sequence Navigator (Applied Biosystems, Foster City, CA, USA) and consensus sequences were manually assembled and edited. Taxa with multiple copies of ITS were included in the dataset only when sequences of the paralogues could be deduced without cloning (*i.e.* those accessions which had only one insertion-deletion). The final dataset contained 745 bp of which 20% were variable and 13% parsimony informative as well as 14 indels of which five were parsimony informative but not used in the Bayesian analysis. GenBank accession numbers for the ITS sequences and voucher information are given in Appendix S2.

***Lupinus* dataset**

Lupinus is a predominantly New World genus with around 275 species of herbs and woody perennials. The major centres of diversity are the Andes in South America and the Rocky Mountains in North America. A total of 11 species grow in the Cerrado, mostly at higher elevation sites, and eight of them are Cerrado endemics (14, 15). The other three extend their ranges to southern Brazil, Uruguay and Argentina. Two other species, *L. ovalifolius* and *L. pouvensalanus* known only from the type collections from Minas Gerais (Brazil), could potentially also occur in the Cerrado, but the precise details of these records are unknown. We used a concatenated dataset of the 5.8S subunit and flanking internal transcribed spacers *ITS1* and *ITS2* and sequences of one copy (*LEGCYC1A*) of the *CYCLOIDEA*-like *LEGCYC1* regulatory nuclear gene (2028 bp) from Hughes & Eastwood (16), which contained 98 species (140 accessions), including five Cerrado species (*L. crotalarioides*, *L. guaraniticus*, *L. parvifolius*, *L. subsessilis* and *L. velutinus*), and eight outgroups.

Microlicieae dataset

The tribe Microlicieae in the Melastomataceae has been redefined to exclude *Eriocnema*, *Siphanthera*, *Castratella* and *Cambessedesia*, and most recent accounts recognize the core Microlicieae (referred here as Microlicieae) comprising 6 genera and 275-300 species, with approximately 90% of them endemic to the Cerrado (17, 18). This clade is formed by *Microlicia* (ca. 130 species), *Lavoisiera* (46), *Rhyncanthera* (15), *Chaetostoma* (11), *Trembleya* (18) and *Stenodon* (2), and grows in a broad variety of habitats, but are particularly rich in high altitude *campo rupestre* vegetation (17-22; Karina Silva, pers. comm.), a fire-prone habitat in which fire frequency depends on the density of grasses and herbs. Taxonomic uncertainty in this group is evident, particularly within *Microlicia*, the largest genus of Microlicieae, which is poorly understood taxonomically (18).

The analysis of the Cerrado Microlicieae was based on previous family level phylogenies of the Melastomataceae using three plastid loci (*rbcL, rpl16* and *ndhF*) containing 34 species and 2 outgroups (18, 23). Another 23 published *rpl16* sequences of Microlicieae (18) were added to the matrix in order to increase taxon sampling and the accuracy of divergence time estimates. The *rbcL* and *ndhF* partitions not sampled for the 23 species of Microlicieae were treated as missing data. The final dataset contained a total of 59 species and 3498 bp. Sampling in this clade is low (around 12%), but at least two species of the largest genera within Microlicieae have been sampled.

2) PHYLOGENETIC AND DATING ANALYSIS

Estimating the ages of legume lineages

Molecular Dataset: Sequences of the chloroplast gene *matK* and flanking *trnK* introns when available for the Leguminosae were obtained from published work and unpublished sequences deposited in GenBank (24-30). Most of these sequences were amplified using primers *trnK685F* and *trnK2R* (see ref. 24 for references), which covers the *matK* gene and part of the *trnK* intron. When available, sequences of the flanking non-coding portion of the *trnK* intron were included to improve resolution, particularly within the mimosoids which have slow rates of DNA evolution among the legumes (25). As a consequence, most sequences (689) in our dataset have this region (ca. 1100 bp) missing from the data matrix. The final aligned dataset contained 2979 bp for 829 legumes representing 400 genera, plus 10 outgroups.

Fossil calibration: The legume family represents an excellent group for molecular dating analysis because it has an abundant fossil record that is highly detectable (25, 31). By using most of the fossil constraints from previous analyses of legume divergence (24, 25) with the addition of two mimosoid fossils, and increasing taxon sampling with the addition of 101 published mimosoid sequences (26, 30, 32), the age of nodes of interest could be better estimated. A list of the 23 fossil calibration points used to constrain nodes in the legume phylogeny is given in Table S1. All fossils were defined as minimum age constraints and implemented in the dating analysis as a lognormal statistical distribution, which is an adequate prior to take account of the incompleteness of the fossil record (33, 34). One exception was fossil A, which sets a boundary between 60-70 Mya for the legume stem node based on a conservative interpretation of the early legume fossil record (25). Age estimates obtained in this analysis provided the basis for understanding the timing of diversification of particular groups of interest (*Mimosa*, *Andira* and *Lupinus*) that were used as secondary calibrations in subsequent dating analysis of Cerrado lineages.

Previous legume divergence studies (24, 25), though usually congruent regarding their interpretation of fossils, disagreed on the placement and reliability of a few specific fossils. The following paragraphs explain our interpretation, use, or omission of various fossils from these previous studies (24, 25) and introduce two new mimosoid fossils previously described which are here included as additional age constraints.

A 60 Mya fossil wood with vestured pits from Mali was used to constrain the legume crown node in Bruneau *et al.* (24). Vestured pits are a typical anatomical characteristic of legume wood, although absent in some groups. Because of the problematic placement of this fossil given the ambiguity in the optimization of this character onto the phylogeny, we preferred not to include it in our analysis. In any case, our results should not be affected by excluding this fossil wood from the analysis as the age estimate for the legume crown node was consistently older than 60 Mya (see results below), even without a minimum age constraint on this node. Fossil P, a *Caesalpinia* s.s. fossil used by Bruneau *et al*. (24) was also discarded from our analysis because it is redundant, given that another calibration point (fossil O) nested within the *Caesalpinia* clade imposes the same minimum age constraint. The winged dehiscent fossil pods attributed to *Acrocarpus* were discarded by Lavin *et al.* (25) as lacking diagnostic apomorphies. However, we included it as a calibration point in our analysis (fossil M) following the interpretation of Bruneau *et al.* (24).

One of the earliest macrofossils attributed to the mimosoids are the fossil flowers *Protomimosoidea buchanensis* described from the Paleocene-Eocene boundary (55 Mya) of North America (35). These authors argued that these magnificent fossils provide the earliest unequivocal evidence for mimosoids, with several characters that are thought to be plesiomorphic within the mimosoids, such as spicate inflorescences, actinomorphic bisexual flowers, valvate petal aestivation, tubular stigmas, and ten exserted free stamens clearly visible. This fossil was used by Lavin *et al.* (25) to calibrate the stem node of the mimosoids. However, Crepet & Taylor (35) pointed out the affinities of *P. buchanensis* to members of the Dimorphandra group, traditionally placed in the Caesalpinioideae, since they have similar characters such as sagitate anthers, uneven stamen lengths and distinctive pollen morphology and ultrastructure. This would lead to the possibility of using this fossil to constrain the base of the Dimorphandra group. However, because the Dimorphandra group has now been shown to be polyphyletic (24), this makes placement of this fossil uncertain. One possibility would be to place this fossil at the most recent common ancestor (mrca) of the two clades of the Dimorphandra group, which coincides with node 10 in Bruneau *et al.* (24). These authors argued that this option is preferable and more conservative because this fossil shares characteristics of both mimosoids and caesalpinioids and we have followed that approach here. This was designated as fossil F2.

Table S1. Fossils used to calibrate nodes in the legume dating analysis. Letters used to designate the calibration points follow those of Bruneau *et al.* (24). Calibration points used only in Lavin *et al.* (25) have the digit “2” added after the letter. See these references (24, 25) for original fossil descriptions and further discussion of fossils.

Name	Fossil	Age (Mya)	Node constrained	Reference
A	early fossil record of Leguminosae	60-70	Legume stem node	(25)
C	*Cercis* leaves and pod	34	*Cercis* stem node	(24, 25)
D	*Bauhinia* s.l.	46	*Bauhinia* stem node	(24)
E	*Hymenaea* flower in amber	24	*Hymenaea* stem node	(24, 25)
F	*Prioria* flowers in amber	24	mrca of *Prioria* and *Oxystigma*	(24)
F2	*Protomimosoidea buchanensis* flowers	55	mrca of clades of Dimorphandra group	(24, 25)
G	*Daniellia* wood in amber	53	*Daniellia* stem node	(24)
H	*Aphanocalyx* leaves	46	*Aphanocalyx* stem node	(24)
I	*Crudia* fruits and leaflets	45	*Crudia* stem node	(24)
I2	*Styphnolobium* and *Cladrastis* fruits and leaves	40	Stem node leading to *Styphnolobium* and *Cladrastis*	(25)
J	*Barnebyanthus buchananensis* flowers	55	Papilionoideae stem node	(24, 25)
J2	leaves and pods similar to *Bowdichia* and *Diplotropis*	56	Genistoid crown node	(25)
K	*Swartzia* fruits and leaflets	45	*Swartzia* stem node	(24)
K2	*Machaerium* leaflets	40	*Machaerium* stem node	(25)
L	“*Prosopis linearifolia*” leaves	34	*Arcoa* stem node	(24, 25)
L2	*Tipuana* fruits	10	mrca of *Tipuana* and *Maraniona*	(25)
M	*Acrocarpus* fruit	45	mrca of *Acrocarpus* and *Ceratonia*	(24)
M2	*Robinia zirkelii* wood	34	*Robinia* stem node	(25)
N	*Senna* fruits	45	*Senna* stem node	(24)
O	*Mezoneuron* fruits	45	*Caesalpinia* (subgen. *Mezoneuron*) stem node	(24, 25)
Q	Ingeae / Acacieae fossil pollen	45	mrca of Acacieae / Ingeae	See text
R	*Eumimosoidea plumosa* flowers, leaves and fruits	45	*Dinizia* stem node	(24)
X	*Calliandra* pollen	16	*Calliandra* stem node	(36)

Other relevant early mimosoid fossils are the Eocene flowers, leaves and fruits of *Eumimosoidea plumosa*, first described by Crepet & Dilcher (37) from Tennessee (USA), and later found at other localities in North America (38). These fossils were interpreted as an extinct mimosoid genus with flowers similar to the extant genera *Dinizia* and *Fillaeopsis*, which also have pollen arranged in tetrads (38). Although not included by Lavin *et al.* (25), this fossil was used to constrain the *Dinizia* stem node (*Dinizia* plus a set of sequences labelled “Folli”, in reference to the collector of a new taxon close to *Dinizia*) by Bruneau *et al.* (24), and is interpreted here in the same way.

A fossil leaf described as *Acacia mahengense* from the Eocene of Tanzania (39) was used as a calibration point to constrain the *Acacia* s.l. stem node to a minimum age of 46 Mya in the analysis of Bruneau *et al.* (24). However, in consultation with mimosoid legume specialists (M. Luckow, G. Lewis, L. Rico, pers. comm.), we have concluded that there is not enough evidence to assign this fossil unequivocally to the genus *Acacia* s.l., given that many of its characteristics are shared by other mimosoids, or could belong to an extinct lineage. Hence, it was decided not to use this fossil as a constraint in the analysis. A much more convincing fossil is the *Acacia*-like flower preserved in Dominican Republic amber from the Oligocene-Miocene boundary (40), which shows apomorphic characters such as numerous stamens with free filaments each with an anther bearing a stalked gland and associated leaf pinnae bearing numerous small leaflets, all of which suggest affinities to *Acacia*. Lavin *et al.* (25) used the estimated age of this fossil to constrain the first branching lineage containing an *Acacia*, given that *Acacia*, as traditionally circumscribed is clearly polyphyletic (30, 32, 41, 42). However, we have not used this 20 Mya fossil in the analysis as the same node was constrained by a significantly older fossil pollen that provided a minimum age of 45 Mya (see below).

Recent paleobotanical studies in Mexico (43, 44) have identified a number of Tertiary legume macrofossils (leaf and fruit fragments), and assigned them to extant genera, including the mimosoids *Inga*, *Mimosa*, *Lysiloma*, *Pithecellobium*, *Stryphnodendron*, *Piptadenia*, and *Prosopis*, along with several caesalpinioids and papilionoids. Despite the diversity and quality of these fossils, we consider many of the assignments to extant genera speculative and unjustified given the lack of diagnostic apomorphies, and none of them are compelling enough to include as fossil constraints. For example, the fossil *Inga* leaves described by Calvillo-Canadell & Cevallos-Ferriz (43) are doubtfully attributable to that genus given that one putative apomorphic character used to assign these leaves to *Inga*, the presence of extrafloral nectaries on the adaxial side of the leaf rachis is unconvincing as it is apparently the abaxial leaf surface that is visible. Furthermore, the leaflets are significantly smaller than any known modern *Inga* (T.D. Pennington, pers. comm.). There is no doubt that a diverse assemblage of legumes was present in the Oligocene of Mexico, but the identities of these diverse fossil assemblages in relation to extant groups remain, in most cases, very uncertain.

The two additional mimosoid fossil constraints used in our analysis came from the pollen record. Mimosoid pollen is frequently arranged in polyads, which are never found amongst Papilionoideae and are very rare in Caesalpinioideae, occurring in only a few caesalpinioid genera in the form of tetrads (45). Many mimosoid polyad types possess particular characteristics that are diagnostic of major clades or even genera (46). Consequently, there is clear potential for the fossil pollen record, which is rich in mimosoids, to contribute to understanding the evolutionary history of the legumes, and to provide effective fossil constraints for mimosoid lineages. Many pollen types have been described from the fossil record and related to extant groups based on overall similarity. However, due to the great variation in pollen characters, they rarely reflect pollen characters at the generic level (47), and many specimens described are controversial or misinterpreted (48).

Of particular interest here is pollen ascribed to the Acacieae-Ingeae, which is very distinct from the rest of the Mimosoideae and easily identified by the presence of compound flattened polyads, grain heteromorphy, presence of internal pores and other diagnostic characters (46). The basic pollen type in these groups consists of flattened acalymmated polyads containing 16 grains, usually arranged in 2 rows, but several other types also occur. The oldest fossils of this type of pollen date from the Eocene and have been recorded from sites in Brazil (*Polyadopollenites vancampoi*; ref. 49), Egypt (*Albizia* sp.; ref. 50), Colombia (*Acaciapollenites* sp.; ref. 51), Cameroon (*Polyadopollenites vancampoi*; ref. 52), but see Caccavari (53) for a critical discussion. Other records interpreted as *Acacia* polyads have also been reported from Eocene and younger sediments from Germany, Australia and New Zealand (see refs in Bruneau *et al.* (24). In modern mimosoids, similar circular polyads composed of 16 pollen grains with relatively large diameter are found in several extant taxa such as *Acacia* s.l. (subgenera *Acacia*, *Aculeiferum* and *Phyllodineae*), *Pithecellobium*, *Zapoteca*, *Albizia*, *Zygia* and *Cojoba* (46, 54-57).

Bruneau *et al.* (24) used an *Albizia* type fossil pollen from the Eocene of Egypt (50) to constrain the Ingeae stem node to a minimum age of 45 Mya in their analysis. However, the placement of this fossil is problematic, given that other pollen types sharing a similar set of characters also occur in *Acacia* s.l., thereby affecting the placement of this fossil constraint. The interpretation of these fossil pollen types is often difficult as there has been disagreement about the correct affinities to modern groups, especially between the tribes Acacieae and Ingeae. For example, the fossil pollen referred as *Acaciapollenites* sp. was referred as belonging to the '*Albizia* group' by Guinet & Ferguson (47), whilst Caccavari (53) argued that it has greater affinities with *Acacia* pollen. This lack of agreement regarding fossil affinities and overlap in characteristics is not surprising given that neither of these tribes is monophyletic, with part of the Acacieae now known to be nested within the Ingeae (30, 41).

Adopting a more conservative approach, we assigned the origin of this Acacieae-Ingeae fossil polyad to the node equivalent to the most recent common ancestor of Acacieae and Ingeae. Hence, it is assumed that this characteristic type of pollen originated in this clade comprising the aforementioned groups. Consequently, the set of Eocene Acacieae-Ingeae fossil pollen mentioned above, which are the oldest known fossils for these two tribes, were used to constrain node Q in our analysis. By applying this calibration point to a relatively derived node within the mimosoids, the analysis is reconciled with evidence of Eocene fossils that have been associated with other less derived mimosoid groups such as *Pentaclethra*, *Calpocalyx*, *Xylia*, *Adenanthera*, *Amblygonocarpus* and *Tetrapleura* (47, 50, 53). As a result, the potential for these fossils to constrain the age estimates is enhanced by choice of the Ingeae / Acaciae Eocene fossil pollen, as it provides a more rigorous constraint.

A second mimosoid node was constrained using fossil pollen belonging unequivocally to the genus *Calliandra* from the Middle Miocene of Argentina (36). This specimen has several diagnostic apomorphic characters of the very distinctive pollen of *Calliandra*, including eight grains arranged in a monoplanar, calymmated (a tectum common to all grains) polyad, where one of the cells is strongly modified into an appendix, giving the whole polyad a distinctive dissymmetric shape. This combination of features is unique among the mimosoids, and is believed to be highly specialized within *Calliandra* (46). More recently, Guinet & Hernandez (58) segregated *Calliandra* sensu stricto, which includes all Neotropical species with eight-grain polyads plus two species from Africa, from the remaining species with 16-grained polyads, which were either transferred to *Zapoteca* (Neotropics) or excluded from *Calliandra* (Old World species). Caccavari (36) argued that the Miocene fossil from Argentina represents a transitional form between two types of eight-grained polyad of extant *Calliandra* recognized by Guinet (59). The estimated age of this fossil is 16 Mya based on radiometric dating (see ref. 36), and was used to constrain the *Calliandra* stem node (node X in the phylogeny).

Dating analysis: A relaxed molecular clock approach was implemented in BEAST version 1.4.8 (60) to simultaneously estimate the legume phylogeny and divergence times. An initial tree that was compatible with the priors (age calibrations and group definitions) was specified in order to avoid problems with low likelihood at the start of the analysis as recommended by the program's manual. This initial tree had a topology and branch lengths (node ages) that were compatible with the priors defined, and was obtained as follows. An exploratory run on BEAST under the simplest model of nucleotide substitution with default settings and no fossil calibrations was used to generate an initial topology. This tree then was manipulated in TreeEdit (61) to make branch lengths (node heights) compatible with the constraints imposed by the minimum ages derived from the fossil calibration. This adjusted tree was then incorporated into a BEAST file as a tree block for the full analysis that included all fossil calibrations as described above. Twenty individual chains of 10^7 generations were performed, and after the exclusion of 2×10^6 generations (burn-in from each chain), the results were combined. The final dated legume phylogeny showing the 23 calibration points and the nodes estimated for subsequent phylogenetic analyses of *Mimosa*, *Andira* and *Lupinus* is shown in Fig. S1.

Age estimates, both the mean and 95% credibility intervals (CI), for five nodes (obtained from the legume *matK* analyses were used as calibration constraints for subsequent analyses of the individual legume datasets investigated here (*Mimosa*, *Andira* and *Lupinus*) using a normal statistical distribution prior, with mean and standard deviation set in order to approximate the corresponding estimate. For example, in the family-wide analysis, the age of *Mimosa* crown node was estimated as 24.0, with a 95% credibility interval of 18.1-30.6 Mya. This information (posterior) was provided as a calibration point (prior) in a subsequent analysis of a much more densely sampled *Mimosa* species dataset (*trnD*-*trnT*), using a normal distribution with mean 24.0 and a normal standard deviation of ±3.5 Mya. These nodes (diamonds in Fig. S1) were selected based on a reasonable level of taxon sampling of these genera spanning the root node, and also to match corresponding nodes present in the more densely sampled species-level phylogenies. The points used for secondary calibration (squares in Fig. S2) are as following: 1) *Mimosa* dataset: *Mimosa* crown node (24.0 Mya, CI [18.0, 30.6]) and section *Mimadenia* crown node (16.6 Mya, CI [10.1, 23.6]); 2) *Andira* dastaset: split between *Andira* and *Hymenolobium* (16.3 Mya, CI [5.4, 31.3]); 3) *Lupinus* dataset: *Lupinus* stem node (18.8 Mya, CI [11.9, 24.8]), and the crown node of the clade formed by *Genista*, *Spartium*, *Pterospartum*, *Retama* and *Stauracanthus* (12.8 Mya, CI [6.3-18.0]). The dating analysis for the Microlicieae of the Cerrado was time calibrated using three fossils following the work of Fritsch *et al.* (18). Analyses of the four individual study group datasets comprised three independent runs of 10^7 generations each. Since all independent runs for each dataset converged to the same posterior, the individual runs were combined, resulting in a final aggregate of 2.7×10^7 generations (after the exclusion of burn-in trees). In all analyses all the estimated parameters had sufficient effective sample sizes (ESS), in most cases well above the minimum of 200 recommended (60). Chronograms for all four study groups containing their respective Cerrado lineages are shown in Fig. S2a-d.

3) OPTIMIZATION ANALYSIS

Ancestral character reconstruction analysis was used to identify Cerrado lineages and to infer their putative ancestral biomes, and also to investigate the evolution of fire adaptations. Biome types were coded as a multistate character (see below) and optimized under a maximum parsimony criterion ("Unordered") onto the 50% majority rule consensus tree using Mesquite (62). In order to account for topological uncertainty, the procedure 'Trace over trees' was used to summarize ancestral state reconstructions over a set of 540 Bayesian trees sampled at stationarity. In addition, ancestral area optimization was performed using maximum likelihood (ML) reconstruction methods, which allow the incorporation of branch length information into ancestral state inference. In this analysis we used the Mk1 model of character evolution, which assumes that any particular change between states is equally probable, and the rate of change is given by a single parameter. The likelihood of each state on each node was computed for a set of Bayesian trees using the Trace over trees option as described above. At each node a proportion of each state was given, which corresponds to the number of trees on which the reconstructed state set at the node contains that state as uniquely best according to the reconstruction criteria. However, this procedure does not allow character states to be coded as polymorphic (as is the case here). To overcome this problem, we replaced the polymorphism by the predominant biome in which a particular taxon occurs, or the most typical life form of a given species. For critical nodes, independent analyses were conduced using each character state coded as polymorphic, and the results were compared. In all optimization analyses, multiple accessions of the same taxon were pruned in order to reduce each taxon to only one terminal.

Ancestral biome reconstruction

The biome of occurrence of each species was classified into 9 categories as follows:

Major areas (aggregate biomes):

Code	Area
0	Dry Forest (including the Chaco and arid subtropical desert/matorral)*
1	Rain Forest
2	Wetland
3	Tropical Savanna
4	Subtropical Grasslands
5	Temperate
6	Mediterranean
7	Tropical Montane
W	Widespread across several vegetation types

*These classes merge into each other and this broad definition has been widely used elsewhere (63). Including the Chaco within a broader dry forest concept is more controversial because of its peculiar flora and occurrence of frost, but does not affect our results.

The following sources, in conjunction with the authors' field experience, were used to assemble a species-level matrix of ecological distributions: *Mimosa* dataset (3, 64-68); *Andira* dataset (7, 69, 70); *Lupinus* dataset (14); Microlicieae dataset (2, 71-75), and the virtual herbaria NYBG (http://sciweb.nybg.org/science2/vii2.asp) and MO (http://www.tropicos.org/). Designation of biomes of occurrence for the Microlicieae dataset should be considered tentative. In that dataset, because of the very sparse sampling across the family, we often had to assign areas in a very broad sense to correspond to the biome preference of an entire genus represented in the analysis by only one species.

A more refined ancestral biome reconstruction for the Cerrado lineages was also implemented using a finer categorization of Neotropical biomes (15 minor areas, see below), which were optimized onto the phylogenies of the four study groups after scoring each species' distribution. This analysis could only unequivocally identify ancestral areas for four Cerrado lineages (Caatinga for Mimosa 10 and 11, and Amazon for Andira 1 and 2, Table S2).

Minor areas (biomes):

Code	Area
0	Caatinga
1	Amazon
2	Atlantic forest
3	Andean dry forest
4	Wetland
5	Temperate grassland
6	Cerrado
7	Non Cerrado-savanna
8	Chaco
9	Mexican dry forest (including matorral and North American deserts)
A	Other rain forests (including gallery forests)
B	Other dry forests
C	Temperate forest (including montane forest)
D	Old world dry forests
W	Widespread across many vegetation types

Data on biome of occurrence for *Mimosa, Andira, Lupinus* and Microlicieae are shown in the Appendices S1-4. The results of the both parsimony and ML optimization analyses used to define Cerrado lineages and ancestral areas are shown in Table S2. Ancestral character reconstructions based on parsimony optimization were mapped onto majority rule consensus trees (Fig. S3a-d).

In most cases the ML agreed with parsimony reconstructions. In a few cases where there were divergences (discussed below), the results obtained do not change the main conclusions this study.

According to the ML optimization, a large *Mimosa* lineage would be defined comprising the Mimosa clades 4, 5, 6 and 7, as well as the clade composed by *M. somnians*, *M. brachycarpa* and *M. adenocarpa*. The node that defines this new large clade is present in 91% of the trees, and in 73% of the reconstructions ‘savanna’ is the state with highest probability at that node, although 18% of reconstructions are equivocal. This new clade combining the aforementioned lineages would have an age of 6.7 Mya [4.1-9.4]. Another difference is the inclusion of the wetland species *M. corinadenia* in the lineage Mimosa 8, which would imply an age of 5.4 Mya [3.1-8.7] for this group, slightly older than shown in the main paper (4.1 Mya). The ancestral area of this clade based on ML reconstruction remains equivocal.

Because polymorphic states are not allowed in the ML analysis, a few area reconstructions produced divergent results depending on which state was assumed. Polymorphism in *Lupinus guaraniticus* (a species occurring in both Cerrado and subtropical grasslands) coded as ‘savanna’ had no impact on the results (100% trees assigning the node to Cerrado as in the parsimony optimization), but when this species was assigned to subtropical-grassland, the respective node becomes equivocal, implying two independent colonizations of the Cerrado; one represented only by *L. parvifolius*, estimated at 1.4 Mya [0.6-2.4], and another containing the *L. velutinus*, *L. crotalarioides* and *L. subsessilis* clade estimated at 1.2 Mya [0.4-1.9], but in both cases the ancestral area reconstruction is equivocal. Similarly, within the Microlicieae dataset, coding the polymorphic taxa of *Trembleya* as ‘wetland’ changes the delimitation of the Microlicieae Cerrado lineage by excluding *Trembleya* from this clade. This change would imply an age of 8.0 Mya [4.9-11.6] for this Cerrado lineage, 1.8 Mya younger than shown in Fig. 2. If the polymorphic taxa of *Trembleya* are coded as ‘savanna’, the ancestral node defining the Microlicieae Cerrado clade now includes *Trembleya*, as in the parsimony optimization analysis, and is supported by 97% of the reconstructions in the ML analysis.

Table S2. Area (biome) optimization used to identify Cerrado lineages (Cerrado crown clades) and infer their putative ancestral areas (stem lineages leading to Cerrado crown clades). Analyses performed using parsimony / maximum likelihood reconstructions based on a set of 540 trees. Values are in percentages. Minor biomes found in the secondary ancestral area reconstructions (parsimony) are in parentheses. Cerrado lineages Mimosa 4, 5, 6, and 7 were not found in the ML reconstruction.

Cerrado lineage	**Trees where clade is found**	**Trees supporting Cerrado crown clade***	**Trees supporting Cerrado crown clade****	**Trees containing ancestral node**	**Ancestral area**	**Trees supporting ancestral area***	**Trees supporting ancestral area****
Mimosa 1	100	na	na	100	Equivocal	na	na
Mimosa 2	100	87 / 97	87 / 97	87	Equivocal	na	na
Mimosa 3	99	98 /96	100 / 97	100	Dry Forest / Equivocal	66 / na	66 / na
Mimosa 4	100	87 / 94	88 / 94	83	Equivocal	na	na
Mimosa 5	100	na	na	99	Equivocal	na	na
Mimosa 6	100	100 / 100	100 / 100	65	Equivocal	na	na
Mimosa 7	97	89 / 95	91 / 98	96	Equivocal	na	na
Mimosa 8	92	84 / 92	93 / 100	100	Equivocal	na	na
Mimosa 9	98	83 / 56	85 /57	100	Dry Forest / Equivocal	97 / na	97 / na
Mimosa 10	100	na	na	100	Dry Forest (Caatinga)	100 / 75	100 / 75
Mimosa 11	100	na	na	100	Dry Forest (Caatinga) / Equivocal	100 / na	100 / na
Lupinus	100	92 / 100	92 / 100	99	Grassland	99 / 99	100 / 100
Andira 1	54	35 / 55	65 / 89	100	Rain Forest (Amazon)	100 /99	100 / 99
Andira 2	100	100 / 99	100 / 99	93	Rain Forest (Amazon)	91 / 75	97 / 81
Microlicieae	100	- / 97	- / 97	100	Wetland	91 / 57	91 / 57

na: not applicable, either because lineage is formed by only one species (terminal branch), or because an ancestral area could not be assigned (equivocal).

* percentage of the 540 trees supporting the character state.

** percentage of trees supporting the character state in relation to the subset of trees that contain the node.

Evolution of fire adaptation

A set of diverse fire adaptations, such as the allocation of biomass to underground storage organs coupled with ability of resprout, thick corky bark (insulation that protects internal tissues), thick terminal branches (more resistant to fire), and specialized phenological strategies, are characteristic of many savanna plants (9, 76-78).

Species of *Mimosa* and *Andira* were classified into 7 life history categories based on the literature (3, 7), and coded as follows:

Code	**Habit**
0	Herb
1	Shrub
2	Vine/Liana
3	Functionally herbaceous subshrub with xylopodium
4	Woody shrub with xylopodium
5	Pachycaul treelet
6	Tree

Habits 3, 4, and 5 were considered to be associated with fire adapted species, since they involve the presence of an underground storage ogan (xylopodium) and fire resistance (pachycaul treelet). In addition, the evolution of thick corky bark in *Andira* was also investigated. Data on habit (*Mimosa* and *Andira*) and presence/absence of corky bark (*Andira*) are shown in Appendices S1 and S2.

Fig. S4a shows the hypothesized evolution of life form in *Mimosa*, which probably evolved from a woody shrub ancestor. Fire related life forms in *Mimosa* evolved many times. The occurrence of these habits is strongly associated with distribution of species in the Cerrado. However, some fire adapted life forms are also present in other biome types such as subtropical-grasslands, in which natural fires also occur. Fire adapted life form in *Andira* evolved only once, in *A. humilis*, most likely from a tree ancestor (Fig. S4b). This node is present in 292 of 540 trees, and 222 and 224 optimizations support ‘tree’ as the ancestral state for *A. humilis* based on parsimony and ML reconstructions, respectively.

The occurrence of thick corky bark in *Andira* was coded as present and absent based on (7) and optimized onto the phylogeny (Fig. S4c). Bark type is unknown in *A. grandistipula*, *A. jaliscensis*, *A. praecox* and *A. tervequinata* and was coded as missing for these species. Corky bark is hypothesized to have evolved twice in *Andira* (Fig. S4c): once in clade Andira 1 (*A. cordata* and *A. cujabensis*), where all Bayesian trees assigned an origin of corky bark; and a second time in *A. vermifuga* (clade Andira 2). All the *Andira* species with corky bark grow in the Cerrado.

Overall, highly congruent results were found when using a ML approach for ancestral state reconstruction of habit in *Mimosa* and *Andira*, and corky bark in *Andira*.

4) DESCRIPTION OF 15 CERRADO LINEAGES

Mimosa 1: This lineage is represented by only one species, *M. nuda*, which is sister to *M. debilis*, a widespread species that can also occur in the Cerrado. *Mimosa nuda* comprises an alliance of five infraspecific varieties in the Cerrado (3), extending to open habitats in Paraguay and Argentina. This species is a functionally herbaceous subshrub that grows from a xylopodium, enabling it to resprout after fire.

Mimosa 2: This robustly supported clade includes *M. xanthocentra*, *M. verecunda* and *M. jacobita* (and probably its putative sibling species sensu Barneby (3), *M. bipennatula*, not sampled here). All species are restricted to the Cerrado, except *M. xanthocentra*, which has a broader geographic range across South America. Fire adaptations include annual growth from a xylopodium, and leaves crowded towards the branch tips.

Mimosa 3: This strongly supported clade includes members of Barneby’s (3) subseries *Polycephalae* (20 species), *Dicerastes* (1), *Discobolae* (1), *Hirsutae* (11), and also *M. skinneri*. Most species in this clade are Cerrado endemics. *Mimosa hirsutissima* and *M. skinneri* extend their ranges beyond the Cerrado, while three species grow in dry grasslands in Paraguay and Argentina. The group shows diverse fire adaptations including erect virgate stems arising each year from a xylopodium, and many of them are functionally herbaceous subshrubs. The presence of xylopodium in the sister-group of this clade, as well as at the ancestral node leading to it (see Fig. S4a), suggests that members of clade Mimosa 3 retained this fire adapted condition from their ancestors. In this case, the origin of this fire related morphology seems to predate the origin of this Cerrado lineage, suggesting pre-adaptation to fire. Our sample included 16 species of a probable total of 34. This is the second largest group of *Mimosa* in the Cerrado.

Mimosa 4: This well supported clade comprises part of series *Leiocarpae* (3). Based on morphological affinity, we believe it probably comprises 11 species, eight of them growing in fire prone habitats, and the others in the Caatinga and in Paraguay. Six species (7 accessions) of this group were sampled. The predominant life form is a shrub.

Mimosa 5: This group is formed by *M. interrupta*, a Cerrado endemic, and probably *M. glutinosa* (based on morphological affinity), which grows in open vegetation along the Paraguay river basin. Only the first species was sampled in our study.

Mimosa 6: This small clade of arborescent shrubs and trees, represented here by *M. apodocarpa* but probably also containing *M. xavantinae* based on morphological affinities, grow in woodland savanna.

Mimosa 7: This clade contains species from the series *Neptunioideae* (all four species sampled) and *Rojasianae* (one out of three species sampled), and also the monotypic series *Auriculatae* (3), making a total of eight species of herbs and shrubs, some of them showing fire adaptations such as xylopodia. With the exception of *M. occidentalis*, which grows in Mexico and Central America, all species occur in the Cerrado, and most of them are local endemics.

Mimosa 8: This is the largest Cerrado clade within *Mimosa*, remarkably rich in life forms and taxa. It comprises the series *Setosae* and *Pachycarpae* (3) and a total of around 50 species (probably more to be discovered), of which 26 were sampled. Four new species that are currently being described (Simon & Hughes, unpublished) are included in this group. All species grow in the Cerrado and the vast majority are highly specialized local endemics. Strategies and morphological adaptations to fire in this group are amazingly diverse, and include trees with leaves crowded at the top of the branches, thick terminal branches, persistent stipules to protect the trunk from fire, and prostrate functionally herbaceous subshrubs growing from thick xylopodia.

Mimosa 9: This clade comprises species from series *Paucifoliatae* (17 species), *Campicolae* (3), *Filipedes* (6) and *Echinocaulae* (1), making a total of 27 species (estimate based on Barneby's treatment), ca 80% of these occurring in the Cerrado (most of them endemics). The remaining species grow in coastal and southern Brazil, Belize and Venezuela. One species, *M. diplotricha*, is a global invasive weed in tropical regions. Life forms vary from functionally herbaceous plants growing from a carrot-like xylopodium, to erect shrubs. It is known that taxon under-sampling can cause bias towards younger age estimates (79), and this could be an issue since sampling in this group is less than a third of the total species estimated. However, at least one member of each series has been sampled, which reduces the chances of underestimating the age of this clade due to taxonomic under sampling. This group received high support in the Bayesian analysis.

Mimosa 10: This lineage is represented by only one species, *M. laticifera*, a tree endemic to the Cerrado biome. This species has been recorded in 18 of the 376 sites surveyed by (80). This species is nested in a clade composed by species mostly from South American and Old World dry forests, and has probably originated from a Caatinga ancestor.

Mimosa 11: *Mimosa pithecolobioides* is a treelet that grows in cerrado and campo rupestre, restricted to the Cerrado.

Andira 1: This clade is formed by the Cerrado species *A. humilis* and *A. vermifuga*, and also by the wet forest Mexican endemic *A. galleotiana*. *Andira vermifuga* is common in the Cerrado, being recorded in 148 out of 376 sites (80), but occasionally also occurs in wet forest sites. *Andira humilis* has a geoxylic suffrutex growth habit, a unique morphological fire adaptation in this otherwise arborescent genus (7). It grows in savannas and other fire prone vegetation. This clade, although present in our Bayesian analysis, and also in the majority rule tree of a Bayesian analysis (10), is weakly supported. Estimates from the nearest well supported node provide an age of 2.9 Mya CI [1.1-5.2] for this clade, slightly older than the estimate of 1.8 Mya CI [0.5-3.4] shown in Fig. 2j. A divergent ITS copy from *A. humilis* (RTP268) has been found in our analysis. This might be a remnant of introgressive hybridization, followed by bidirectional, concerted evolution of the ITS region between different accessions of *A. humilis* (a phenomenon documented in other taxa, e.g. ref. 81). *Andira humilis* also shows divergent placements of accessions in a chloroplast gene tree (7). However, incongruent placements of accessions of this species in the nuclear and chloroplast gene trees suggest complexity that merits further studies.

Andira 2: This well supported clade includes two species of trees (occasionally shrubs), *A. cordata* and *A. cujabensis*, that have thick corky bark to protect from fire. Both species are restricted to the Cerrado, occurring in savanna habitats and occasionally in gallery forest (7).

Lupinus: The five Cerrado species sampled here form a well supported clade and comprise 45% of all Cerrado species. Under-sampling of Cerrado taxa should not significantly affect our results, considering that all taxa not sampled are very likely to fall within this same clade in which all species have unifoliolate leaves. If all Cerrado species had been included, the age estimate for this lineage is unlikely to be older than 2.7 Mya (split between *L. paraguariensis* and other unifoliolate species). *Lupinus parvifolius* shows a singular ericoid shrub morphology with imbricate leaves, thought to be an adaptation to fire and which is also found in species of a range of other plant families in the Cerrado.

Microlicieae: The largest Cerrado clade sampled in this study is within the Microlicieae, a well supported clade nested deep within the Melastomataceae (18). This group has an estimated 200 species, many of them narrow endemics, with diverse life forms. Several species show fire adaptations such as the woody rootstock (xylopodium) in *Microlicia*. The genus *Rhyncanthera*, which also belongs to the core Microlicieae was not included in the Cerrado clade, as found by (18). Although *Rhyncanthera* contains a substantial number of species growing within the Cerrado biome, it prefers wetter sites such seasonally flooded marshes with saturated soils, very different from most of the other members of core Microlicieae, which grow mainly in seasonally dry, fire prone habitats (18, 20). The position of *Rhyncanthera* at the base of the clade Microlicieae, and also the fact that some species of *Trembleya* occur in gallery forests and other moist sites, suggest a wetland ancestral biome for this large Cerrado clade (Fig. S3d).

It is interesting to notice that this large fire-adapted clade emerges within a family that predominates in wet, fire-free habitats (see discussion in ref. 18). However, this was not the only incursion of the Melastomataceae into the Cerrado. There is no doubt that there are other fire-adapted lineages in this family, such as within *Miconia*, *Cambessedesia*, and *Tibouchina* that also occur in well drained savanna areas. However, they are yet to be sampled and incorporated into this context. The 3.7 Mya age estimated for the Cerrado core Microlicieae by Fritsch *et al.* (18), and later corroborated by Renner (82), is considerably younger than the one reported here (9.8 Mya). This discrepancy cannot be attributed to the use of different dating methods, since a relaxed molecular clock analysis performed on BEAST using the same calibration points and dataset (with only two species of core Microlicieae) of Fritsch *et al.* (18) found a very similar result (3.5 Mya). The difference between these age estimates can be explained by the fact that under-sampling can bias estimates towards younger ages (79). Since we included a more comprehensive sample of species in the group of interest, the age estimate obtained was significantly older.

5) EVIDENCE FROM OTHER GROUPS

A small number of other published plant phylogenies that include Cerrado taxa were also assessed as part of this study. However, problems with: (i) low sampling of Cerrado species; (ii) inadequate phylogenetic resolution and support; (iii) divergence time estimation (e.g., no fossil calibration available), meant they could not be included in the formal analyses of divergence times and ancestral biome / fire adaptation reconstructions. However, in spite of these limitations, the preliminary results presented in these studies are highly consistent with our conclusions providing compelling additional evidence about the origins of the Cerrado flora (Table S3).

Table S3. Phylogenetic studies including Cerrado taxa not included in the main analysis. The first three columns highlight the limitations of these phylogenies that led to their exclusion from the main analysis. The last four columns outline elements of these studies that corroborate the conclusions of this paper.

Study group [ref.]	**Sampling of Cerrado species***	**Well resolved / strongly supported phylogeny**	**Age estimate provided**	**Cerrado lineges are derived**	**Multiple origins of Cerrado lineages**	**Age of Cerrado lineages (Mya)**	**Evolution of fire adaptation**
Manihot (Euphorbiaceae) [83]	(17/47)	no	yes	yes	yes	<6.6	yes (xylopodium)
Ruellia (Acanthaceae) [84]	(15/52)	yes	no	yes	yes	-	yes (xylopodium)
Styrax (Styracaceae) [85]	(4/16)	yes	no	yes	yes	-	yes (thick corky bark)
Viguiera (Asteraceae) [86]	(9/22)	no	yes	yes	?	<3	yes (xylopodium)

* sampled in the study / total of Cerrado species based on the latest Cerrado checklist (2).

Manihot is a genus richly represented in the Cerrado, and many species are subshrubs with large woody roots. The main limitations of the *Manihot* phylogeny (83) are that the tree too poorly resolved and weakly supported (albeit with a number of robustly supported clades) to provide reliable estimates for the ages of Cerrado lineages or to infer ancestral biomes / fire adaptations of Cerrado lineages. Despite these limitations, a number of features are clear: there is clear evidence for multiple independent Cerrado lineages (at least two Cerrado clades), which are nested within *Manihot* and likely to be recent as the crown node divergence time estimate is 6.6 Mya, making the Cerrado nodes younger than that. Thus, the preliminary *Manihot* phylogeny is in line with our findings in terms of recency, in situ evolution, niche lability (multiple independent Cerrado clades) and a strong probability that these are associated with fire adaptation.

Ruellia is also well represented in the Cerrado, but sparse taxon sampling and lack of resolution in the phylogeny (84) limit conclusions about the evolution of Cerrado *Ruellia*, making it difficult to infer ancestral biomes or indeed to accurately infer how many independent Cerrado recruitments there may have been. Data on fire adaptations are very scattered and no divergence time estimates are avaialable. However, the *Ruellia* phylogeny strongly supports the idea that there are multiple independent Cerrado lineages nested within *Ruellia*, representing up to eight separate lineages that include species that occur in the Cerrado (albeit not necessarily endemic to the Cerrado). This genus shows striking similarities to *Mimosa*, i.e. a genus that spans virtually the complete diversity of Neotropical biomes and that has several independent Cerrado clades, these nested, and at least some of them associated with lignotubers.

The *Styrax* (85) phylogeny is limited by sparse taxon sampling which makes inferences about the number and distribution of Cerrado clades and their probable ancestral biomes problematic. Furthermore, we have not located any information about fire adaptations, but it is known that some Cerrado species such as *S. ferrugineus* can develop thick corky bark. Despite this, the phylogeny provides clear evidence for two independent Cerrado lineages, both nested within the tree. Therefore, *Styrax* phylogeny is consistent with niche lability and relative recency of Cerrado plant lineages.

Taxon sampling in the phylogeny of *Viguiera* (86) is sparse and lack of resolution in the tree limit inferences about the evolution of the Cerrado *Viguiera*. It is not clear how many Cerrado lineages there are, and it is problematic to infer ancestral biomes. Apparently Cerrado lineage(s) are nested within the genus, and crude (based on substitution rates) divergence time estimates suggest South American, and hence Brazilian species are < 3 Mya.

Additional evidence about the timing of diversification of the Cerrado flora and its association with the emergence of frequent fires comes from recently published dated phylogenies of two important herbaceous monocot groups. The first comes from a study of grass diversification (87). Four of the most important grass genera in the Cerrado (88) have age estimates that are compatible with the dates proposed for the origin of the Cerrado: *Axonopus* (stem node 5 Mya), *Paspalum* (crown node 5 Mya), *Tristachya* (stem node 7 Mya), and *Mesosetum* (stem node 4 Mya). All these genera are C4 Panicoid grasses. Another ecologically important group in the Cerrado is *Rhynchospora* (Cyperaceae). The C4 clade of *Rhynchospora* is composed by 21 species that are particularly successful in open and warm habitats (the Cerrado is an important center of diversity), and was estimated to have originated between 4.2 and 7.4 Mya (89), in line with the hypothesis of a recent origin of the Cerrado. Sampling at the species level in these studies is sparse (often using a single species to represent a genus) and therefore it is difficult to determine if these groups originated within the Cerrado, particularly because many of them are widespread in other biomes, and long distance dispersal in these herbaceous groups is frequent. However, the age estimates provided for these typical flammable herbs provide additional support for the timing of origin of the fire adapted flora of the Cerrado.

Supporting References:

1. Simon MF, Proença C (2000) Phytogeographic patterns of *Mimosa* (Mimosoideae, Leguminosae) in the Cerrado biome of Brazil: an indicator genus of high-altitude centers of endemism? *Biol Conservation* 96:279-296.
2. Mendonça RC, *et al.* (2008) in *Cerrado: ecology and flora*, eds Sano SM, Almeida SP, Ribeiro JF (Embrapa Cerrados/Embrapa Informação Tecnológica, Brasília, Brazil), Vol 2, pp 421-1279.
3. Barneby RC (1991) Sensitivae Censitae: a description of the genus *Mimosa* Linnaeus (Mimosaceae) in the New World. *Mem New York Bot Gard* 65:1-835.
4. Shaw J, *et al.* (2005) The tortoise and the hare II: relative utility of 21 noncoding chloroplast DNA sequences for phylogenetic analysis. *Am J Bot* 92:142-166.
5. Thompson JD, Gibson TJ, Plewniak F, Jeanmougin F, Higgins DG (1997) The CLUSTAL_X windows interface: flexible strategies for multiple sequence alignment aided by quality analysis tools. *Nuc Acids Res* 25:4876-4882.
6. Hall TA (1999) BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nuc Acids Symposium Ser* 41:95-98.
7. Pennington RT (2003) Monograph of *Andira* (Leguminosae-Papilionoideae). *Monogr Syst Bot* 64:1-143.
8. Sarmiento G (1983) in *Ecosystems of the world: tropical savannas*, ed Bourlière F (Elsevier, Amsterdam, Netherlands), pp 245-288.
9. Gottsberger G, Silberbauer-Gottsberger I (2006) *Life in the Cerrado, a South American tropical seasonal ecosystem. Vol. 1. Origin, structure, dynamics and plant use* (Reta Verlag, Ulm, Germany).
10. Skema C (2003) Phylogeny and biogeography of *Andira* Lam. *nom. cons.*: a case study in Neotropical speciation. Masters dissertation (Royal Botanic Garden Edinburgh and University of Edinburgh, Edinburgh, UK).
11. Doyle JJ, Doyle JL (1990) Isolation of plant DNA from fresh tissue. *Focus* 12:13-15.
12. Moller M, Cronk QCB (1997) Phylogeny and disjunct distribution: evolution of *Saintpaulia* (Gesneriaceae). *Proc R Soc Lond B* 264:1827-1836.
13. White TJ, Bruns T, Lee S, Taylor JW (1990) in *PCR protocols: a guide to methods and applications*, eds Innis MA, Gelfand D, Sninsky J, White TJ (Academic Press, New York, USA), pp 315-322.
14. Monteiro R, Gibbs PE (1986) A taxonomic revision of the unifoliolate species of *Lupinus* (Leguminosae) in Brazil. *Notes RBG Edinb* 44:71-104.
15. Barneby RC (1991) A new unifoliolate *Lupinus* (Fabaceae, Lupininae) from the Brazilian planalto. *Brittonia* 43:168-170.
16. Hughes C, Eastwood R (2006) Island radiation on a continental scale: exceptional rates of plant diversification after uplift of the Andes. *Proc Natl Acad Sci USA* 103:10334-10339.
17. Almeda F, Martins AB (2001) New combinations and new names in some Brazilian Microlicieae (Melastomataceae), with notes on the delimitation of *Lavoisiera*, *Microlicia*, and *Trembleya*. *Novon* 11:1-7.
18. Fritsch PW, Almeda F, Renner SS, Martins AB, Cruz BC (2004) Phylogeny and circumscription of the near-endemic Brazilian tribe Microlicieae (Melastomataceae). *Am J Bot* 91:1105-1114.
19. Koschnitzke C, Martins AB (2006) Taxonomic revision of *Chaetostoma* DC. (Melastomataceae, Microlicieae) (Translated from Portuguese). *Arquivos do Museu Nacional*, *Rio de Janeiro* 64:95-119.
20. Renner SS (1990) A revision of *Rhynchanthera* (Melastomataceae). *Nordic J Bot* 9:601-630.
21. Romero R (2003) A newly described species of *Microlicia* (Melastomataceae) from Minas Gerais, Brazil. *Novon* 13:116-118.
22. Martins E (1997) Taxonomic revision of the genus *Trembleya* DC. (Melastomataceae) (Translated from Portuguese). PhD thesis (Universidade Estadual de Campinas, Campinas, Brazil).
23. Clausing G, Renner SS (2001) Molecular phylogenetics of Melastomataceae and Memecylaceae: implications for character evolution. *Am J Bot* 88:486-498.
24. Bruneau A, Mercure M, Lewis GP, Herendeen PS (2008) Phylogenetic patterns and diversification in the caesalpinioid legumes. *Botany* 86:697-718.
25. Lavin M, Herendeen PS, Wojciechowski MF (2005) Evolutionary rates analysis of Leguminosae implicates a rapid diversification of lineages during the Tertiary. *Syst Biol* 54:575-594.
26. Jobson RW, Luckow M (2007) Phylogenetic study of the genus *Piptadenia* (Mimosoideae: Leguminosae) using plastid *trnL-F* and *trnK/matK* sequence data. *Syst Bot* 32:569-575.

27. Luckow M, Fortunato RH, Sede S, Livshultz T (2005) The phylogenetic affinities of two mysterious monotypic mimosoids from southern South America. *Syst Bot* 30:585-602.
28. Wojciechowski MF, Lavin M, Sanderson MJ (2004) A phylogeny of legumes (Leguminosae) based on analyses of the plastid *matK* gene resolves many well-supported subclades within the family. *Am J Bot* 91:1846-1862.
29. Miller JT, Bayer RJ (2003) Molecular phylogenetics of *Acacia* subgenera *Acacia* and *Aculeiferum* (Fabaceae: Mimosoideae), based on the chloroplast *matK* coding sequence and flanking *trnK* intron spacer regions. *Austral Syst Bot* 16:27-33.
30. Luckow M, Miller JT, Murphy DJ, Livshultz T (2003) in *Advances in legume systematics, part 10: High level systematics*, eds Klitgaard BB, Bruneau A (Royal Botanic Gardens, Kew, UK), pp 197-220
31. Herendeen PS, Crepet WL, Dilcher DL (1992) in *Advances in legume systematics, part 4: The fossil record*, eds Herendeen PS, Dilcher DL (Royal Botanic Gardens, Kew, UK), pp 303-316.
32. Miller JT, Grimes JW, Murphy DJ, Bayer RJ, Ladiges PY (2003) A phylogenetic analysis of the Acacieae and Ingeae (Mimosoideae: Fabaceae) based on *trnK*, *matK*, *psbA-trnH*, and *trnL/trnF* sequence data. *Syst Bot* 28:558-566.
33. Donoghue PCJ, Benton MJ (2007) Rocks and clocks: calibrating the Tree of Life using fossils and molecules. *Trends Ecol Evol* 22:424-431.
34. Ho SYW (2007) Calibrating molecular estimates of substitution rates and divergence times in birds. *J Avian Biol* 38:409-414.
35. Crepet WL, Taylor DW (1986) Primitive mimosoid flowers from the Paleocene-Eocene and their systematic and evolutionary implications. *Am J Bot* 73:548-563.
36. Caccavari MA, Barreda V (2000) A new calymmate mimosoid polyad from the Miocene of Argentina. *Rev Palaeobot Palynol* 109:197-203.
37. Crepet WL, Dilcher DL (1977) Investigations of angiosperms from Eocene of North America: a mimosoid inflorescence. *Am J Bot* 64:714-725.
38. Herendeen PS, Dilcher DL (1990) Fossil mimosoid legumes from the Eocene and Oligocene of southeastern North America. *Rev Palaeobot Palynol* 62:339-361.
39. Herendeen PS, Jacobs BF (2000) Fossil legumes from the Middle Eocene (46.0 Ma) Mahenge flora of Singida, Tanzania. *Am J Bot* 87:1358-1366.
40. Dilcher DL, Herendeen PS, Hueber F (1992) in *Advances in legume systematics, part 4: The fossil record*, eds Herendeen PS, Dilcher DL (Royal Botanic Gardens, Kew, UK), pp 33-42.
41. Lewis GP, Schrire BD, Mackinder B, Lock JM (2005) *Legumes of the world* (Royal Botanic Gardens, Kew, UK).
42. Seigler DS, Ebinger JE, Miller JT (2006) *Mariosousa*, a new segregate genus from *Acacia* s.l. (Fabaceae, Mimosoideae) from Central and North America. *Novon* 16:413-420.
43. Calvillo-Canadell L, Cevallos-Ferriz SRS (2005) Diverse assemblage of Eocene and Oligocene Leguminosae from Mexico. *Int J Plant Sci* 166:671-692.
44. Magallón-Puebla S, Cevallos-Ferriz S (1994) Fossil legume fruits from Tertiary strata of Puebla, Mexico. *Canad J Bot* 72:1027-1038.
45. Ferguson IK, Banks H (1994) Tetrad pollen in the subfamily Caesalpinioideae (Leguminosae) and its significance. *Rev Palaeobot Palynol* 83:31-42.
46. Guinet P (1981) in *Advances in legume systematics, part 2*, eds Polhill RM, Raven PH (Royal Botanic Gardens, Kew), pp 835-857.
47. Guinet P, Ferguson IK (1989) in *Advances in legume biology*, eds Stirton CH, Zarucchi JL (Monographs in Systematic Botany from the Missouri Botanical Garden 29, St. Louis, USA), pp 77-103.
48. Muller J (1981) Fossil pollen records of extant angiosperms. *Bot Rev* 47:1-142 .
49. Lima MR, Amador ES (1985) Palynological analysis of sediments from the Resende Formation. Teritary of the state of Rio de Janeiro, Brazil (Translated from Portuguese). *VIII Congresso Brasileiro de Paleontologia. MME-DNPM. Seção Paleontologia e Estratigrafia* 2:371-378.
50. Guinet P, El Sabrouty N, Soliman HA, Omran AM (1987) Study of pollen characters of the Leguminosae-Mimosoideae from the Tertiary sediments of the northwest of Egypt (Translated from French). *Mémoires Travaux E.P.H.E., Institute de Montpellier* 17:159-171.
51. Sole de Porta N (1961) Contribution to the palynology of the Tertiary of Colombia (Translated from Spanish). *Boletín Geológico de la Universidad Industrial de Santander* 7:55-81.

52. Salard-Cheboldaeff M (1978) On the palynoflora of the Maestrichtian and Tertiary of the coastal sedimentary basin of Cameroon (Translated from French). *Pollen et Spores* 20:215-260.
53. Caccavari MA (1996) Analysis of the South American fossil pollen record of Mimosoideae (Leguminosae). *Rev Palaeobot Palynology* 94:123-135.
54. Guinet P, Rico L (1988) Pollen characters in the genera *Zygia*, *Marmaroxylon* and *Cojoba* (Leguminosae, Mimosoideae, Ingeae): a comparison with related genera. *Pollen et Spores* 30:313-328.
55. Caccavari MA, Dome EA (2000) Subpseudocolpi in polyads of *Acacia*, subgenus *Aculeiferum*. *Grana* 39:32-38.
56. Caccavari MA (2002) Pollen morphology and structure of tropical and subtropical American genera of the *Piptadenia*-group (Leguminosae: Mimosoideae). *Grana* 41:130-141.
57. Rico-Arce L, Banks H (2001) A preliminary survey of pollen and other morphological characters in neotropical *Acacia* subgenus *Aculeiferum* (Leguminosae: Mimosoideae). *Bot J Linn Soc* 135:263-270.
58. Guinet P, Hernandez HM (1989) Pollen characters in the genera *Zapoteca* and *Calliandra* (Leguminosae, Mimosoideae) their systematic and phylogenetic relevance. *Pollen et Spores* 31:5-22.
59. Guinet P (1965) Study of pollen characters in the genus *Calliandra* (Mimosoideae) (Translated from French). *Pollen et Spores* 7:157-173.
60. Drummond AJ, Rambaut A (2007) BEAST: Bayesian evolutionary analysis by sampling trees. *BMC Evol Biol* 7:214.
61. Rambaut A, Charleston M (2002) TreeEdit: phylogenetic tree editor and manipulator v1.0 (Department of Zoology, University of Oxford, UK).
62. Maddison WP, Maddison DR (2007) Mesquite: A modular system for evolutionary analysis. Version 2.01, http://mesquiteproject.org.
63. Pennington RT, Lavin M, Oliveira-Filho A (2009) Woody plant diversity, evolution and ecology in the tropics: perspectives from seasonally dry tropical forests. *Ann Rev Ecol Evol Syst*. in press.
64. DuPuy DJ, *et al.* (2002) *The Leguminosae of Madagascar* (Royal Botanic Gardens, Kew, UK).
65. Lewis GP (1987) *Legumes of Bahia* (Royal Botanic Gardens, Kew, UK).
66. Lewis GP (1990) Five new taxa of *Piptadenia* (Leguminosae: Mimosoideae) from Brazil. *Kew Bull* 46:159-168.
67. Lima MPM, Lima HC (1984) *Parapiptadenia* Brenan (Leguminosae-Mimosoideae) - a taxonomic study of the Brazilian species (Translated from Portuguese). *Rodriguésia* 36:23-30.
68. Lock JM (1989) *Legumes of Africa: a check-list* (Royal Botanic Gardens, Kew, UK).
69. Lima HC (1982) Taxonomic considerations on the genus *Hymenolobium* Benth. (Leg. Fab.) (Translated from Portuguese). *Acta Amaz* 12:41-48.
70. Lima HC (1988) A new species of *Hymenolobium* (Leguminosae, Papilionoideae) from Central America. *Ann Missouri Bot Gard* 75:1145-1147.
71. Berry PE, *et al.* (2001) in *Flora of the Venezuelan Guayana*, eds Steyermark JA, Berry PE, Yatskievych K, Holst BK (Missouri Botanical Garden Press, St. Louis, USA), Vol 6, pp 236-528.
72. Chen C, Renner SS (2007) in *Flora of China*, eds Wu ZY, Raven PH (Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, USA), Vol 13, pp 360-399.
73. Hansen C (1985) Taxonomic revision of *Driessenia* (Melastomataceae). *Nordic J Bot* 5:335-352.
74. Ionta GM, Judd WS, Williams NH, Whitten WM (2007) Phylogenetic relationships in *Rhexia* (Melastomataceae): evidence from DNA sequence data and morphology. *Int J Plant Sci* 168:1055-1066.
75. Renner SS (1994) A revision of *Pterolepis* (Melastomataceae, Melastomeae). *Nordic J Bot* 14:73-104.
76. Gignoux J, Clobert J, Menaut JC (1997) Alternative fire resistance strategies in savanna trees. *Oecologia* 110:576-583.
77. Miranda H, Bustamante M, Miranda A (2002) in *The Cerrados of Brazil*, eds Oliveira PS, Marquis RJ (Columbia University Press, New York, USA), pp 51-68.
78. Sarmiento G, Monasterio M (1983) in *Ecosystems of the world: tropical savannas*, ed Bourlière F (Elsevier, Amsterdam, Netherlands), pp 79-108.
79. Linder HP, Hardy CR, Rutschmann F (2005) Taxon sampling effects in molecular clock dating: an example from the African Restionaceae. *Mol Phylog Evol* 35:569-582.
80. Ratter JA, Bridgewater S, Ribeiro JF (2003) Analysis of the floristic composition of the Brazilian Cerrado vegetation III: comparison of the woody vegetation of 376 areas. *Edinb J Bot* 60:57-109.

81. Wendel JF, Schnabel A, Seelanan T (1995) Bidirectional interlocus concerted evolution following allopolyploid speciation in cotton (*Gossypium*). *Proc Natl Acad Sci USA* 92:280-284.
82. Renner SS (2004) Bayesian analysis of combined chloroplast loci, using multiple calibrations, supports the recent arrival of Melastomataceae in Africa and Madagascar. *Am J Bot* 91:1427-1435.
83. Chacón J, Madriñán S, Debouck D, Rodriguez F, Tohme J (2008) Phylogenetic patterns in the genus *Manihot* (Euphorbiaceae) inferred from analyses of nuclear and chloroplast DNA regions. *Mol Phylogenet Evol* 49:260-267.
84. Tripp EA (2007) Evolutionary relationships within the species-rich genus *Ruellia* (Acanthaceae). *Syst Bot* 32:628-649.
85. Fritsch PW (2001) Phylogeny and biogeography of the flowering plant genus *Styrax* (Styracaceae) based on chloroplast DNA restriction sites and DNA sequences of the internal transcribed spacer region. *Mol Phylogenet Evol* 19:387-408.
86. Schilling EE, Da Costa FB, Lopes NP, Heise PJ (2000) Brazilian species of *Viguiera* (Asteraceae) exhibit low levels of ITS sequence variation. *Edinb J Bot* 57:323-332.
87. Christin PA, *et al.* (2008) Oligocene CO2 decline promoted C-4 photosynthesis in grasses. *Curr Biol* 18:37-43.
88. Filgueiras TS (2002) in *The Cerrados of Brazil*, eds Oliveira PS, Marquis RJ (Columbia University Press, New York, USA), pp 121-139.
89. Besnard G, *et al.* (2009) Phylogenomics of C4 photosynthesis in sedges (Cyperaceae): multiple appearances and genetic convergence. *Mol Biol Evol* 26: 1909-1919.
90. Holmgren PK, Holmgren NH, Barnett LC (1990) *Index Herbariorum. Part I: the herbaria of the world* (International Association for Plant Taxonomy and the New York Botanical Garden, New York, USA).

Appendix S1. *Mimosa* dataset: species sampled in this study, voucher information, GenBank accession numbers for *trnD-trnT* sequences, biome and habit (see text for coding). Herbarium acronyms follow Holmgren *et al.* (90). * Un-named species for which descriptions are in preparation (Simon & Hughes, unpubl. data; Lewis *et al.*, unpubl. data).

Species	**Voucher**	**Herbarium**	**Country**	**GenBank accession number**	**Biome**	**Habit**
Anadenanthera colubrina (Vell.) Brenan	Hughes CE 2308	FHO	Bolivia	FJ981975	0	6
Microlobius foetidus (Jacq.) M.Sousa & G.Andrade	Hughes CE 2150	FHO	Mexico	FJ981976	0	6
Mimosa acantholoba (Willd.) Poir. var. *acantholoba*	Eastwood RJ 118	FHO	Peru	FJ981977	0,3	1,6
Mimosa acantholoba Poir. var. *eurycarpa* (B.L.Rob.) Barneby	Montaño-Arias S 28	UAMIZ	Mexico	FJ981978	0,3	1,6
Mimosa acapulcensis B.L.Rob.	Otero R R2	MEXU	Mexico	FJ981979	0	1
Mimosa aculeaticarpa Ortega	Simon MF 808	MEXU	Mexico	FJ981980	7	1
Mimosa acutistipula Benth. var. *acutistipula*	Simon MF 705	FHO	Brazil	FJ981981	0	1
Mimosa adenantheroides (Martens & Galleotti) Benth.	Martínez-Bernal A 945	UAMIZ	Mexico	FJ981982	0,7	1
Mimosa adenantheroides (Martens & Galleotti) Benth. var. *hystricosa* (Brandegee) R.Grether, ined.	Tenorio P 21201	MEXU	Mexico	FJ981983	0,7	1
Mimosa adenocarpa Benth.	Simon MF 728	FHO	Brazil	FJ981984	2,3	1
Mimosa adenophylla Taub. ex Glaz.	Simon MF 458	UB	Brazil	FJ981985	3	1
Mimosa adenophylla Taub. ex Glaz. var. *mitis* Barneby	Lima LCL 184	HUEFS	Brazil	FJ981986	0,3	1
Mimosa adenotricha Benth.	Dutra VF 332	VIC	Brazil	FJ981987	3	1
Mimosa aff. *bathyrrhena* Barneby	Simon MF 874	FHO	Brazil	FJ981988	1	1
Mimosa aff. *flagellaris* Benth.	Queiroz LP 12322	HUEFS	Brazil	FJ981989	4	3
Mimosa aff. *weberbaueri* Harms	Pennington TD 17903	K	Peru	FJ981990	4	1
Mimosa aff. *xanthocentra* Mart.	Queiroz LP 10476	HUEFS	Brazil	FJ981991	3	3
Mimosa affinis B.L.Rob.	Simon MF 814	MEXU	Mexico	FJ981992	W	0
Mimosa albida Humb. & Bonpl. ex Willd. var. *albida*	Hughes CE 2083	FHO	Mexico	FJ981993	W	1
Mimosa albolanata Taub.	Simon MF 667	UB	Brazil	FJ981994	3	4
Mimosa antioquensis Killip ex Rudd var. *isthmensis* R.Grether	Simon MF 860	MEXU	Mexico	FJ981995	0,1	2
Mimosa antrorsa Benth.	Fagg CW 1747	UB	Brazil	FJ981996	3	1
Mimosa apodocarpa Benth.	Simon MF 635	UB	Brazil	FJ981997	3	1
Mimosa arenosa (Willd.) Poir. var. *leiocarpa* (DC.) Barneby	Martínez-Bernal A 923	UAMIZ	Mexico	FJ981998	0,3	1
Mimosa artemisiana Heringer & Paula	Faria SM 138	RB	Brazil	FJ981999	1	6
Mimosa aspera M.E.Jones	Simon MF 817	MEXU	Mexico	FJ982000	0	1
Mimosa atlantica Barneby	Ribas OS 4333	HUEFS	Brazil	FJ982001	1	1
Mimosa auriculata Benth.	Hughes CE 2405	FHO	Bolivia	FJ982002	3	1
Mimosa bahamensis Benth.	Way MJ 132	K	Mexico	FJ982003	0	1
Mimosa benthamii Macbride	Simon MF 848	MEXU	Mexico	FJ982004	0	1
Mimosa bifurca Benth.	Dahmer N 4	ICN	Brazil	FJ982005	4	1
Mimosa bimucronata Kuntze	Simon MF 301	UB	Brazil	FJ982006	1	6
Mimosa biuncifera Benth.	Simon MF 805	MEXU	Mexico	FJ982007	0	1
Mimosa blanchetii Benth.	Simon MF 688	FHO	Brazil	FJ982008	0	1
Mimosa boliviana Benth.	Hughes CE 2426	FHO	Bolivia	FJ982009	0	1
Mimosa borealis A.Gray	Simon MF 873	FHO	USA	FJ982010	0	1
Mimosa brachycarpa Benth.	Queiroz LP 10589	HUEFS	Brazil	FJ982011	3	1
Mimosa brevipetiolata Burkart var. *hirtula* (Burkart) Barneby	Queiroz LP 12614	HUEFS	Brazil	FJ982012	4	3
Mimosa busseana Harms	Clarke GP 26	K	Tanzania	FJ982013	0	1
Mimosa caesalpiniifolia Benth.	Simon MF 756	FHO	Brazil	FJ982014	0	6
Mimosa calcicola B.L.Rob.	Simon MF 846	MEXU	Mexico	FJ982015	0	1
Mimosa callidryas Barneby	Cruz JM 94	HUEFS	Brazil	FJ982016	4	1
Mimosa callithrix Malme	Simon MF 684	UB	Brazil	FJ982017	3	1
Mimosa campicola Harms var. *planipes* Barneby	Simon MF 692	FHO	Brazil	FJ982018	3	1
Mimosa camporum Benth.	Faria SM 729	RB	Brazil	FJ982019	W	0
Mimosa candollei R.Grether	Hughes CE 2394	FHO	Bolivia	FJ982020	W	1
Mimosa casta L.	Johnson CD 2189-80	MEXU	Panama	FJ982021	0,1	2
Mimosa ceratonia L. var. *interior* Barneby	Simon MF 727	FHO	Brazil	FJ982022	1	1
Mimosa chartostegia Barneby	Ribas OS 5085	HUEFS	Brazil	FJ982023	4	1
Mimosa cisparanensis Barneby	Simon MF 568	UB	Brazil	FJ982024	3	1
Mimosa claussenii Benth. var. *claviceps* Barneby	Simon MF 766	FHO	Brazil	FJ982025	3	5
Mimosa claussenii Benth. var. *megistophylla* Barneby	Simon MF 768	FHO	Brazil	FJ982026	3	1
Mimosa colombiana Britton & Killip	Torres AM 21343	K	Colombia	FJ982027	1	2
Mimosa coniflora Burkart	Ribas OS 3060	HUEFS	Brazil	FJ982028	1	1
Mimosa cordistipula Benth.	Simon MF 693	FHO	Brazil	FJ982029	0,3	4
Mimosa coruscocaesia Barneby	Martins RC 469	UB	Brazil	FJ982030	3	1
Mimosa corynadenia Britton & Rose	Sousa M 12896	MEXU	Mexico	FJ982031	2	1
Mimosa costenya McVaugh	Simon MF 833	MEXU	Mexico	FJ982032	0	6
Mimosa cruenta Benth.	Queiroz LP 12575	HUEFS	Brazil	FJ982033	4	4

Mimosa crumenarioides L.P.Queiroz & G.P.Lewis	Simon MF 722	FHO	Brazil	FJ982034	3	4
Mimosa cryptothamnos Barneby	Simon MF 738	FHO	Brazil	FJ982035	3	4
Mimosa ctenodes Barneby	Hughes CE 2212	FHO	Peru	FJ982036	0	1
Mimosa cyclophylla Taub.	Simon MF 757	FHO	Brazil	FJ982037	3	3
Mimosa daleoides Benth.	Schinini A 35683	MEXU	Argentina	FJ982038	4	1
Mimosa dalyi Barneby	Wood JRI 16487	K	Bolivia	FJ982039	0	1
Mimosa deamii B.L.Rob.	Martínez-Bernal A 919	UAMIZ	Mexico	FJ982040	0	1
Mimosa debilis Humb. & Bonpl. ex Willd. var. *debilis*	Hughes CE 2393	FHO	Bolivia	FJ982041	W	0,1,3
Mimosa decorticans Barneby	Simon MF 681	UB	Brazil	FJ982042	3	1
Mimosa delicatula Baill.	Sutherland JM 262	K	Madagascar	FJ982043	0	1
Mimosa densa Benth. var. *densa*	Simon MF 870	FHO	Brazil	FJ982044	3	1
Mimosa depauperata Benth.	Simon MF 801	MEXU	Mexico	FJ982045	0	1
Mimosa detinens Benth.	Sanchez 46	MO	Bolivia	FJ982046	0	1
Mimosa dicerastes Barneby	Simon MF 448	UB	Brazil	FJ982047	3	1
Mimosa diminuta sp. nov. ined.*	Simon MF 866A	FHO	Brazil	FJ982048	3	3
Mimosa diplotricha C.Wright ex Sauvalle var. *diplotricha*	Simon MF 600	UB	Brazil	FJ982049	W	0,1
Mimosa diplotricha C.Wright ex Sauvalle var. *diplotricha*	Simon MF 877	FHO	Taiwan	FJ982050	W	0,1
Mimosa discobola Barneby	Simon MF 744	FHO	Brazil	FJ982051	3	1
Mimosa distachya Cav. var. *oligacantha* (DC.) Barneby	Ku F 365	MEXU	Mexico	FJ982052	0	1
Mimosa dolens Vell. var. *rígida* (Benth.) Barneby	Simon MF 879	FHO	Brazil	FJ982053	3,4	3
Mimosa dominarum Barneby	Simon MF 776	FHO	Brazil	FJ982054	3	5
Mimosa domingensis Benth.	Barneby RC 18276	NY	Dominican Republic	FJ982055	0	1
Mimosa dormiens Humb. & Bonpl. ex Willd.	Guadarrama MA 6841	MEXU	Mexico	FJ982056	2	1
Mimosa dryandroides Taub. ex Glaz.	Ribas OS 3449	HUEFS	Brazil	FJ982057	1	1
Mimosa dutrae Malme	Dahmer N 5	ICN	Brazil	FJ982058	4	0
Mimosa dysocarpa Benth.	Newman M 296	K	USA	FJ982059	0	1
Mimosa echinocaula Benth.	Simon MF 679	UB	Brazil	FJ982060	3	1
Mimosa emoryana Benth.	Grether R 2842	UAMIZ	Mexico	FJ982061	0	1
Mimosa ervendbergii A.Gray	Martínez E 35132	MEXU	Mexico	FJ982062	1	2
Mimosa fachinalensis Burkart	Dahmer N 16	ICN	Brazil	FJ982063	1	1
Mimosa fachinalensis Burkart	Dahmer N 20	ICN	Brazil	FJ982064	1	1
Mimosa filipes Mart.	Queiroz LP 10058	HUEFS	Brazil	FJ982065	0,3	1
Mimosa flagellaris Benth.	Queiroz LP 12545	HUEFS	Brazil	FJ982066	4	3
Mimosa flocculosa Burkart	CNPF sn	?	Brazil	FJ982067	1	1
Mimosa foliolosa Benth. var. *pubescens* Benth.	Simon MF 733	FHO	Brazil	FJ982068	3	4
Mimosa galeottii Benth.	Simon MF 840	MEXU	Mexico	FJ982069	0	1
Mimosa gatesiae Barneby	Simon MF 741	FHO	Brazil	FJ982070	3	3
Mimosa gemmulata Barneby var. *gemmulata*	Simon MF 690	FHO	Brazil	FJ982071	0,3	1
Mimosa goldmanii B.L.Rob.	Martínez-Bernal A 921	UAMIZ	Mexico	FJ982072	0	1
Mimosa gracilis Benth. var. *invisiformis* Barneby	Simon MF 762	FHO	Brazil	FJ982073	3	3
Mimosa gracilis Benth. var. *stipitata* Barneby	Simon MF 745	FHO	Brazil	FJ982074	3	3
Mimosa grandidieri Baill.	Du Puy DJ M56	K	Madagascar	FJ982075	0	1
Mimosa guaranitica Chodat & Hassl.	Nascimento JG 474	HUEFS	Brazil	FJ982076	0,3,4	3
Mimosa guatemalensis (Hook. & Arn.) Benth.	Simon MF 831	MEXU	Mexico	FJ982077	0	1
Mimosa guilandinae (DC.) Barneby var. *guilandinae*	Prévost M-F 3958	K	French Guiana	FJ982078	1	2
Mimosa gymnas Barneby	Silva JM 3541	HUEFS	Brazil	FJ982079	1	1
Mimosa hafomantsina Villiers	Lewis GP 2138	K	Madagascar	FJ982080	0	6
Mimosa hamata Willd.	Simon MF 876	FHO	India	FJ982081	0	1
Mimosa heringeri Barneby	Proença C 2138	UB	Brazil	FJ982082	3	1
Mimosa hexandra M.Micheli	Fabian-Martinez K 128	MEXU	Mexico	FJ982083	0	1,6
Mimosa hexandra M.Micheli	Simon MF 711	FHO	Brazil	FJ982084	0	1,6
Mimosa hirsutissima Mart. var. *barbigera* (Benth.) Barneby	Simon MF 765	FHO	Brazil	FJ982085	3	3
Mimosa hirsutissima Mart. var. *grossa* Barneby	Queiroz LP 12854	HUEFS	Brazil	FJ982086	3	3
Mimosa hondurana Britton	Simon MF 858	MEXU	Mexico	FJ982087	1	2
Mimosa honesta Mart.	Simon MF 720	FHO	Brazil	FJ982088	0	3
Mimosa humivagans Barneby	Simon MF 737	FHO	Brazil	FJ982089	3	3
Mimosa hypoglauca Mart. var. *hypoglauca*	Simon MF 723	FHO	Brazil	FJ982090	3	4
Mimosa incana Benth.	Dahmer N 2	ICN	Brazil	FJ982091	4	1
Mimosa incarum Barneby	Hughes CE 2206	FHO	Peru	FJ982092	0	1
Mimosa interrupta Benth.	Queiroz LP 10485	HUEFS	Brazil	FJ982093	3	1,6
Mimosa invisa Mart. ex Colla var. *invisa*	Simon MF 715	FHO	Brazil	FJ982094	0,1,3	1
Mimosa irrigua Barneby	Simon MF 694	FHO	Brazil	FJ982095	0	1
Mimosa jacobita Barneby	Hughes CE 2400	FHO	Bolivia	FJ982096	3	1
Mimosa josephina Barneby	Hughes CE 2398	FHO	Bolivia	FJ982097	3	1
Mimosa kalunga sp. nov. ined.*	Simon MF 866	FHO	Brazil	FJ982098	3	3
Mimosa lacerata Rose	Hughes CE 2057	FHO	Mexico	FJ982099	0	1
Mimosa lactiflua Delile ex Benth.	Hughes CE 2079	FHO	Mexico	FJ982100	0	1

Appendix S1 (cont.)

Mimosa lamolina sp. nov. ined.*	Hughes CE 2648	FHO	Peru	FJ982101	0	1
Mimosa laniceps Barneby	Simon MF 773	FHO	Brazil	FJ982102	3	1
Mimosa lanuginosa Glaz. ex Burkart var. *lanuginosa*	Simon MF 732	FHO	Brazil	FJ982103	3	3
Mimosa laticifera Rizzini & Mattos	Simon MF 599	UB	Brazil	FJ982104	3	6
Mimosa latispinosa Lam.	Sutherland JM 206	K	Madagascar	FJ982105	0	6
Mimosa lepidophora Rizzini	Cardoso D 1747	FHO	Brazil	FJ982106	0	1
Mimosa lepidota Herzog	Hughes CE 2469	FHO	Bolivia	FJ982107	0	1
Mimosa leptantha Benth.	Nascimento JG 471	HUEFS	Brazil	FJ982108	0	1
Mimosa leptocarpa Rose	Rico L 1014	K	Mexico	FJ982109	0	1
Mimosa leucaenoides Benth.	Montaño-Arias S 8	UAMIZ	Mexico	FJ982110	0	1
Mimosa levenensis Drake	Luckow M 4453	FHO	Madagascar	FJ982111	0	1
Mimosa lewisii Barneby	Simon MF 696	FHO	Brazil	FJ982112	0	1
Mimosa loxensis Barneby	Lewis GP 2987	K	Ecuador	FJ982113	0	1
Mimosa luisana Brandegee	Simon, M.F. 844	FHO	Mexico	FJ982114	0	1
Mimosa malacophylla A.Gray	Camargo-Ricalde SL 530	UAMIZ	Mexico	FJ982115	0	2
Mimosa manidea Barneby	Simon MF 760	FHO	Brazil	FJ982116	3	5
Mimosa martindelcampoi Medrano	Camargo-Ricalde SL 527	UAMIZ	Mexico	FJ982117	0	1
Mimosa melanocarpa Benth.	Simon MF 675	UB	Brazil	FJ982118	3	1
Mimosa menabeensis R.Vig. var. *menabeensis*	Sutherland JM 209	K	Madagascar	FJ982119	0	1
Mimosa minarum Barneby	Nascimento JG 495	HUEFS	Brazil	FJ982120	0,3	3
Mimosa minutifolia B.L.Rob. & Greenm.	Simon MF 810	MEXU	Mexico	FJ982121	3	3
Mimosa modesta Mart. var. *modesta*	Simon MF 708	FHO	Brazil	FJ982122	0	3
Mimosa mollis Benth.	Simon MF 850	MEXU	Mexico	FJ982123	0	1
Mimosa monancistra Benth.	Simon MF 809	MEXU	Mexico	FJ982124	0	1
Mimosa montana Kunth. var. *montana*	Hughes CE 2225	FHO	Peru	FJ982125	0	1
Mimosa mossambicensis Brenan	Brummitt RK 8896	K	Malawi	FJ982126	0	1
Mimosa myriadenia (Benth.) Benth. var. *punctulata* (Benth.) Barneby	Acevedó-Rdgz P 7483	K	Ecuador	FJ982127	1	2
Mimosa myriocephala Baker	Rakoto R 329	K	Madagascar	FJ982128	0	2
Mimosa nanchititlana R.Grether & Barneby	Grether R 2938	UAMIZ	Mexico	FJ982129	7	1
Mimosa neptuniodes Harms	Wood JRI 22123	K	Bolivia	FJ982130	2,3	1
Mimosa nossibiensis Benth. var. *nossibiensis*	Du Puy DJ M350	K	Madagascar	FJ982131	0	2
Mimosa nothacacia Barneby	Lewis GP 2353	K	Ecuador	FJ982132	0	6
Mimosa nuda Benth. var. *nuda*	Hughes CE 2396	FHO	Bolivia	FJ982133	3	3
Mimosa nuttallii (DC.) B.L.Turner	Simon MF 875	FHO	USA	FJ982134	0	0
Mimosa oblonga Benth.	Barbosa E 463	HUEFS	Brazil	FJ982135	1	1
Mimosa occidentalis Britton & Rose	Simon MF 821	MEXU	Mexico	FJ982136	1	0
Mimosa oligosperma Barneby	Simon MF 865	FHO	Brazil	FJ982137	3	1
Mimosa onilahensis R.Vig.	Du Puy DJ M899	K	Madagascar	FJ982138	0	1
Mimosa ophthalmocentra Mart. ex Benth.	Way MJ SWM2434	K	Brazil	FJ982139	0	1
Mimosa orthacantha Benth.	Barros JC sn	K	Brazil	FJ982140	1	1
Mimosa orthocarpa Spruce ex Benth.	Simon MF 855	MEXU	Mexico	FJ982141	4	1
Mimosa palmeri Rose	Simon MF 823	MEXU	Mexico	FJ982142	0	1
Mimosa papposa Benth. var. *papposa*	Simon MF 601	UB	Brazil	FJ982143	3	3
Mimosa pectinatipinna Burkart	Hughes CE 2036	FHO	Peru	FJ982144	0	1
Mimosa pedersenii Barneby	Queiroz LP 12645	HUEFS	Brazil	FJ982145	1	1
Mimosa per-dusenii Burkart	Ribas OS 4545	HUEFS	Brazil	FJ982146	4	1
Mimosa pigra L. var. *berlandieri* (A.Gray) B.L.Turner	Camargo-Ricalde SL 531	UAMIZ	Mexico	FJ982147	2	1
Mimosa pigra L. var. *dehiscens* (Barneby) D.Glazier & Mackinder	Hughes CE 2414	FHO	Bolivia	FJ982148	2	1
Mimosa pilulifera Benth.	Dahmer N 3	ICN	Brazil	FJ982149	1	1
Mimosa pilulifera Benth. var. *pseudincana* (Burkart) Barneby	Simon MF 878	FHO	Brazil	FJ982150	1	1
Mimosa pithecolobioides Benth.	Dutra VF 317	VIC	Brazil	FJ982151	3	1
Mimosa platycarpa Benth. var. *platycarpa*	Simon MF 859	MEXU	Mexico	FJ982152	0	1,6
Mimosa polyantha Benth.	Simon MF 829	MEXU	Mexico	FJ982153	0	1
Mimosa polycarpa Kunth var. *subandina* Barneby	Hughes CE 2462	FHO	Bolivia	FJ982154	0,2	1
Mimosa polycephala Benth. var. *polycephala*	Simon MF 400	UB	Brazil	FJ982155	3	3
Mimosa polydactyla Humb. & Bonpl. ex Willd.	Coradin L 8682	CEN	Brazil	FJ982156	1	0
Mimosa polydidyma Barneby	Simon MF 719	FHO	Brazil	FJ982157	3	3
Mimosa prainiana Gamble	Maesen LJG Van der 3834	K	India	FJ982158	0	1
Mimosa pseudocallosa Burkart	Ribas OS 5845	HUEFS	Brazil	FJ982159	4	3
Mimosa pseudoradula Glaz. ex Barneby var. *pseudoradula*	Simon MF 664	UB	Brazil	FJ982160	3	3
Mimosa pseudosepiaria Harms	Simon MF 712	FHO	Brazil	FJ982161	2	6
Mimosa pseudosetosa sp. nov. ined.*	Simon MF 864	FHO	Brazil	FJ982162	3	4
Mimosa psilocarpa B.L.Rob.	Martínez-Bernal A 933	UAMIZ	Mexico	FJ982163	0	1
Mimosa psoralea Benth.	Phillipson PB 3571	K	Madagascar	FJ982164	0	1
Mimosa pteridifolia Benth.	Simon MF 754	FHO	Brazil	FJ982165	3	1

Mimosa pudica L.	Simon MF 669	UB	Brazil	FJ982166	W	0,1
Mimosa purpusii Brandegee	Simon MF 841	MEXU	Mexico	FJ982167	0	1
Mimosa pyrenea Taub.	Simon MF 678	UB	Brazil	FJ982168	3	3
Mimosa quadrivalvis L. var. *quadrivalvis*	Camargo-Ricalde SL 532	UAMIZ	Mexico	FJ982169	2	0
Mimosa radula Benth. var. *imbricata* (Benth.) Barneby	Simon MF 731	FHO	Brazil	FJ982170	3	3
Mimosa ramboi Burkart	Queiroz LP 12530	HUEFS	Brazil	FJ982171	4	1
Mimosa ramulosa Benth.	Queiroz LP 12340	HUEFS	Brazil	FJ982172	4	1
Mimosa regina Barneby	Simon MF 759	FHO	Brazil	FJ982173	3	5
Mimosa revoluta Benth.	Hughes CE 2278	FHO	Bolivia	FJ982174	0	1
Mimosa rhodocarpa (Britton & Rose) R.Grether	Hughes CE 2161	FHO	Mexico	FJ982175	0	6
Mimosa robusta R.Grether	Simon MF 818	MEXU	Mexico	FJ982176	1,2	1
Mimosa rubicaulis Lam. ssp. *himalayana* (Gamble) H.Ohashi	Thomas SM 24/1	K	Nepal	FJ982177	0	1
Mimosa rufescens Benth. var. *rufescens*	Ferreira GC 596	K	Brazil	FJ982178	1	2
Mimosa rupertiana B.L.Turner	Bye R 12884	MEXU	Mexico	FJ982179	0	0
Mimosa rusbyana Barneby & Fortunato	Sarkinen T 2071	FHO	Bolivia	FJ982180	0	1
Mimosa scabrella Benth.	Lima HC 4055	RB	Brazil	FJ982181	1	6
Mimosa schleidenii Herter	Queiroz LP 12348	HUEFS	Brazil	FJ982182	4	1
Mimosa schomburgkii Benth.	Hellin JJ 15	FHO	Honduras	FJ982183	1,2	6
Mimosa sensitiva L. var. *sensitiva*	Almeida D 4	HUEFS	Brazil	FJ982184	W	2
Mimosa sericantha Benth.	Simon MF 410	UB	Brazil	FJ982185	3	1
Mimosa setosa Benth. var. *paludosa* (Benth.) Barneby	Simon MF 725	FHO	Brazil	FJ982186	2	1
Mimosa setosa Benth. var. *urbica* Barneby	Simon MF 730	FHO	Brazil	FJ982187	3	4
Mimosa setosissima Taub.	Simon MF 676	UB	Brazil	FJ982188	3	1
Mimosa setuligera Harms	Simon MF 709	FHO	Brazil	FJ982189	0	3
Mimosa sicyocarpa B.L.Rob.	Calóncio J 4936	MEXU	Mexico	FJ982190	0	1
Mimosa similis Britton & Rose	Simon MF 807	MEXU	Mexico	FJ982191	0	1
Mimosa sinaloensis Britton & Rose	Simon MF 828	MEXU	Mexico	FJ982192	0	2
Mimosa skinneri Benth. var. *desmodioides* (Benth.) Barneby	Simon MF 746	FHO	Brazil	FJ982193	1,3	0
Mimosa somnians Humb. & Bonpl. ex Willd. var. *lasiocarpa* (Benth.) Barneby	Simon MF 736	FHO	Brazil	FJ982194	W	1
Mimosa sousae R.Grether	Martínez-Bernal A 918	UAMIZ	Mexico	FJ982195	0	1
Mimosa sp.	Dahmer N 15	ICN	Brazil	FJ982196	0	1
Mimosa speciosissima Taub.	Simon MF 753	FHO	Brazil	FJ982197	3	4
Mimosa spirocarpa Rose	Simon MF 825	MEXU	Mexico	FJ982198	0	1
Mimosa splendida Barneby	Simon MF 739	FHO	Brazil	FJ982199	3	5
Mimosa sprengelii DC.	Queiroz LP 12469	HUEFS	Brazil	FJ982200	4	1
Mimosa strigillosa Torr. & A.Gray	Lievens AW 2666	MEXU	USA	FJ982201	2	1
Mimosa strobiliflora Burkart	Ribas OS 3600	HUEFS	Brazil	FJ982202	1	1
Mimosa stylosa Barneby	Dutra VF 318	VIC	Brazil	FJ982203	3	1
Mimosa tejupilcana R.Grether & A.Martínez-Bernal	Montaño-Arias S 16	UAMIZ	Mexico	FJ982204	7	1
Mimosa tenuiflora (Willd.) Poir.	Simon MF 698	FHO	Brazil	FJ982205	0	1,6
Mimosa tequilana S.Watson	Simon MF 813	MEXU	Mexico	FJ982206	0	0
Mimosa texana Small var. *filipes* (Britton & Rose) Barneby	Simon MF 845	MEXU	Mexico	FJ982207	0	1
Mimosa texana Small var. *texana*	Simon MF 803	MEXU	Mexico	FJ982208	0	1
Mimosa torresiae R.Grether	Torres-Colin R 10040	MEXU	Mexico	FJ982209	0	1
Mimosa townsendii Barneby	Lewis GP 3025	K	Ecuador	FJ982210	0	6
Mimosa tricephala Cham. & Schltdl. var. *nelsonii* (B.L.Rob.) Chehaibar & R.Grether	Martínez-Bernal A 920	UAMIZ	Mexico	FJ982211	0	1
Mimosa ulbrichiana Harms	Simon MF 710	FHO	Brazil	FJ982212	0	1
Mimosa ulei Taub. var. *grallator* Barneby	Simon MF 777	FHO	Brazil	FJ982213	3	3
Mimosa uliginosa Chod. & Hassl.	Queiroz LP 12608	HUEFS	Brazil	FJ982214	4	1
Mimosa unipinnata B.D.Parfitt & Pinkava	Carranza MA 2355	MEXU	Mexico	FJ982215	0	1
Mimosa uraguensis Hook. & Arn.	Simon MF 862	FHO	cultivated	FJ982216	1	1
Mimosa ursina Mart.	Simon MF 704	FHO	Brazil	FJ982217	0	3
Mimosa velloziana Mart. var. *velloziana*	Simon MF 721	FHO	Brazil	FJ982218	W	2
Mimosa venatorum Barneby	Simon MF 740	FHO	Brazil	FJ982219	3	3
Mimosa verecunda Benth.	Simon MF 749	FHO	Brazil	FJ982220	3	1
Mimosa verrucosa Benth.	Simon MF 706	FHO	Brazil	FJ982221	0	1
Mimosa vestita Benth.	Simon MF 769	FHO	Brazil	FJ982222	3	3
Mimosa vilersii Drake	Labat J-N 3020	K	Madagascar	FJ982223	0	1
Mimosa viperina sp. nov. ined.*	Simon MF 461	FHO	Brazil	FJ982224	3	3
Mimosa virgula Barneby	Silva MA 5134	UB	Brazil	FJ982225	3	3
Mimosa volubilis Villiers	Du Puy DJ M739	K	Madagascar	FJ982226	0	2
Mimosa waterlotii R.Vig.	Schrire BD 2551	K	Madagascar	FJ982227	0	1
Mimosa watsonii B.L.Rob.	Simon MF 857	MEXU	Mexico	FJ982228	1	2
Mimosa weberbaueri Harms	Hughes CE 2043	FHO	Peru	FJ982229	0	1
Mimosa weddelliana Benth.	Ritter N 4604	MO	Bolivia	FJ982230	2	1
Mimosa woodii Atahuachi & C.E.Hughes	Hughes CE 2285	FHO	Bolivia	FJ982231	0	1

Appendix S1 (cont.)

Mimosa xanthocentra Mart. var. *subsericea* (Benth.) Barneby	Hughes CE 2403	FHO	Bolivia	FJ982232	W	3
Mimosa xavantinae Barneby	Farias R 346	UB	Brazil	FJ982233	3	1
Mimosa zygophylla Benth.	Camargo-Ricalde SL 525	UAMIZ	Mexico	FJ982234	0	1
Parapiptadenia excelsa (Griseb.) Burkart	Hughes CE 2425	FHO	Bolivia	FJ982235	0	6
Piptadenia adiantoides (Spreng.) Macbride	Simon MF 726	FHO	Brazil	FJ982236	1	1,2
Piptadenia buchtienii Barneby	Hughes CE 2427	FHO	Bolivia	FJ982237	0	6
Piptadenia gonoacantha (Mart.) Macbride	Simon MF 735	FHO	Brazil	FJ982238	1	6
Piptadenia stipulacea (Benth.) Ducke	Simon MF 702	FHO	Brazil	FJ982239	0	1
Piptadenia trisperma (Vell.) Benth.	Armstrong KE 512	FHO	Brazil	FJ982240	1	1,2
Piptadenia viridiflora Benth.	Hughes CE 1681	FHO	Mexico	FJ982241	0	6
Pityrocarpa moniliformis Benth.	Way MJ SWM2449	K	Brazil	FJ982242	0	6
Pityrocarpa obliqua Macbride	Macqueen DJ 439	K	Mexico	FJ982243	0	6
Stryphnodendron adstringens (Mart.) Coville	Simon MF 734	FHO	Brazil	FJ982244	3	6
Stryphnodendron obovatum Benth.	Hughes CE 2397	FHO	Bolivia	FJ982245	0	6

Appendix S2. *Andira* dataset: species sampled in this study, voucher information, GenBank accession number for ITS sequences, biome, habit and bark type (see text for coding). Herbarium acronyms follow Holmgren *et al.* (90).

Species	**Voucher**	**Herbarium**	**Country**	**GenBank accession number**	**Biome**	**Habit**	**Corky bark**
Andira anthelmia (Vell.) Benth.	Jardin J 568	CEPEC	Brazil	FJ542764	1	6	0
Andira anthelmia (Vell.) Benth.	Pennington RT 227	FHO	Brazil	FJ542763	1	6	0
Andira carvalhoi R.T.Penn. & H.C.Lima (copy 1)	Pennington RT 233	FHO	Brazil	FJ542765	1	1	0
Andira carvalhoi R.T.Penn. & H.C.Lima (copy 2)	Pennington RT 233	FHO	Brazil	FJ542766	1	1	0
Andira cordata Arroyo ex. R.T.Penn. & H.C.Lima	Pennington RT 264	FHO	Brazil	FJ542767	3	6	1
Andira cujabensis Benth.	Pennington RT 503	UB	Brazil	FJ542768	1,3	6	1
Andira fraxinifolia Benth.	Pennington RT 236	FHO	Brazil	FJ542770	1	1	0
Andira fraxinifolia Benth.	Sugiyama M 889	K	Brazil	FJ542769	1	1	0
Andira galeottiana Standl.	Rico L sn	K	Brazil	FJ542762	1,2	6	0
Andira galeottiana Standl.	Lavin M 8214	MEXU	Mexico	US59889	1,2	6	0
Andira grandistipula Amshoff (copy 1)	Hoffman B 1992	US	Brazil	FJ542771	3	6	?
Andira grandistipula Amshoff (copy 2)	Hoffman B 1992	US	Brazil	FJ542772	3	6	?
Andira humilis Mart. ex. Benth.	Pennington RT 239	FHO	Brazil	FJ542773	3	4	0
Andira humilis Mart. ex. Benth.	Pennington RT 246	FHO	Brazil	FJ542774	3	4	0
Andira humilis Mart. ex. Benth.	Pennington RT 268	FHO	Brazil	FJ542776	3	4	0
Andira humilis Mart. ex. Benth.	Pennington RT 269	FHO	Brazil	FJ542775	3	4	0
Andira inermis (W. Wright) DC.	Bridgewater S 347	E	Belize	FJ542781	0,1,2	6	0
Andira inermis (W. Wright) DC. (copy 1)	Cheek M 3579	K	Cameroon	FJ542782	0,1,2	6	0
Andira inermis (W. Wright) DC. (copy 2)	Cheek M 3579	K	Cameroon	FJ542783	0,1,2	6	0
Andira inermis (W. Wright) DC. (copy 1)	Gardener M 6619	E	Mexico	FJ542777	0,1,2	6	0
Andira inermis (W. Wright) DC. (copy 2)	Gardener M 6619	E	Brazil	FJ542778	0,1,2	6	0
Andira inermis (W. Wright) DC.	Hughes CE 1673	FHO	Mexico	FJ542784	0,1,2	6	0
Andira inermis (W. Wright) DC.	Pennington RT 589	E	Costa Rica	FJ542780	0,1,2	6	0
Andira inermis (W. Wright) DC.	Pennington TD 13358	K	Costa Rica	FJ542779	0,1,2	6	0
Andira jaliscensis R.T.Penn. (copy 1)	Magallanes JAS 4404	NY	Mexico	FJ542785	0	6	?
Andira jaliscensis R.T.Penn. (copy 2)	Magallanes JAS 4404	NY	Mexico	FJ542786	0	6	?
Andira legalis (Vell.) Toledo	Pennington RT 307	FHO	Brazil	FJ542787	1	6	0
Andira macrothyrsa Ducke	Pennington RT 1207	E	Peru	FJ542789	1	6	0
Andira macrothyrsa Ducke (copy 1)	Pennington RT 523	E	Peru	FJ542791	1	6	0
Andira macrothyrsa Ducke (copy 2)	Pennington RT 523	E	Peru	FJ542792	1	6	0
Andira macrothyrsa Ducke	Pennington TD 13550	K	Brazil	FJ542790	1	6	0
Andira marauensis N.F.Santos	Carvalho AM sn	CEPEC	Brazil	FJ542788	1	6	0
Andira micrantha Ducke	Rodrigues W 11180	INPA	Brazil	FJ542793	1	6	0
Andira multistipula Ducke	Pennington RT 537	E	Ecuador	FJ542794	1	6	0
Andira nitida Mart. ex. Benth.	Carvalho AM 3309	CEPEC	Brazil	FJ542795	1	1	0
Andira nitida Mart. ex. Benth.	Pennington RT 292	FHO	Brazil	FJ542796	1	1	0
Andira nitida Mart. ex. Benth.	Pennington RT 301	FHO	Brazil	FJ542797	1	1	0
Andira ormosioides Benth.	Lima HC 4831	RB	Brazil	FJ542798	1	6	0
Andira parviflora Ducke	Rodrigues W 11179	INPA	Brazil	FJ542799	1	6	0
Andira praecox Arroyo ex. R.T.Penn.	Rabelo BV 3199	K	Brazil	FJ542800	1	6	?
Andira surinamensis (Bondt) Splitg. ex. Amshoff	Gardener M 6630	E	Trinidad	FJ542801	1,2	6	0
Andira surinamensis (Bondt) Splitg. ex. Amshoff	Pennington RT 433	FHO	Guyana	FJ542802	1,2	6	0
Andira surinamensis (Bondt) Splitg. ex. Amshoff	Pennington RT 463	FHO	Guyana	FJ542803	1,2	6	0
Andira taurotesticulata R.T.Penn.	Pennington RT 525	E	Ecuador	FJ542804	1	6	0
Andira tervequinata R.T.Penn., Aymard & N.Cuello	Liesner R 20674	E	Venezuela	FJ542805	1,3	6	?
Andira trifoliolata Ducke	Coomes D 81	K	Venezuela	FJ542806	1	6	0
Andira unifoliolata Ducke	Rodrigues W 11186	INPA	Brazil	FJ542807	1	6	0
Andira vermifuga (Mart.) Benth.	Pennington RT 271	FHO	Brazil	FJ542808	3	1	1
Hymenolobium alagoanum Ducke	Pennington RT 224	E	Brazil	FJ542758	1	6	0
Hymenolobium flavum Kleinhoonte	Pennington RT 451	K	Guyana	FJ542760	1	6	0
Hymenolobium mesoamericanum H.C.Lima	Pennington RT 614	E	Costa Rica	AF187087	1	6	0
Hymenolobium nitidum Benth.	Rodrigues W 11177	INPA	Brazil	FJ542759	1	6	0
Hymenolobium sp.	Pennington TD 16995	K	Peru	FJ542761	1	6	0

Appendix S3. *Lupinus* dataset: species sampled in this study and biome (see text for coding). Voucher information and GenBank accession numbers are presented in Hughes & Eastwood (16).

Species	Biome
Genista anglica	5
Genista pilosa	5
Genista tenera	6
Genista umbellata	6
Lupinus aff. *bangii*	7
Lupinus aff. *ramossisimus*	7
Lupinus aff. *sarmentosus*	7
Lupinus albescens	4
Lupinus albus	6
Lupinus andersonii	5
Lupinus angustifolius	6
Lupinus arboreus	5
Lupinus argenteus	5
Lupinus arizonicus	6
Lupinus arvensis	7
Lupinus ballianus	7
Lupinus bandelierae	7
Lupinus bangii	7
Lupinus bicolor	5
Lupinus bracteolaris	4
Lupinus breweri	5
Lupinus carpapaticus	7
Lupinus chachas	7
Lupinus chamissonis	5
Lupinus chrysanthus	7
Lupinus concinnus	6
Lupinus cosentinii	6
Lupinus crotalarioides	3
Lupinus cumulicola	4
Lupinus densiflorus	6
Lupinus digitatus	6
Lupinus gibertianus	4
Lupinus grayi	5
Lupinus guaraniticus	3,4
Lupinus harvardii	4
Lupinus hirsutissimus	6
Lupinus hispanicus	6
Lupinus huaronensis	7
Lupinus huigrensis	7
Lupinus lactus	5
Lupinus lanatus	4
Lupinus latifolius	5
Lupinus lepidus	5
Lupinus lindleyanus	7
Lupinus linearis	4
Lupinus luteus	6
Lupinus magnistipulatus	4
Lupinus mantaroensis	7
Lupinus micranthus	6
Lupinus microcarpus	6
Lupinus microphyllus	7
Lupinus misticola	7
Lupinus mollendoensis	0
Lupinus montanus	7
Lupinus multiflorus	4
Lupinus mutabilis	7
Lupinus neomexicanus	5
Lupinus nubigenus	7
Lupinus odoratus	6
Lupinus paraguariensis	4
Lupinus paranensis	4
Lupinus parvifolius	3
Lupinus piurensis	7
Lupinus polyphyllus	5
Lupinus praestabilis	7
Lupinus prostratus	7
Lupinus pubescens	7
Lupinus pulvinaris	7
Lupinus purosericeus	7
Lupinus reitzii	4
Lupinus rivularis	5
Lupinus rubriflorus	4
Lupinus semperflorens	7
Lupinus sericeus	5
Lupinus sierrae-blancae	5
Lupinus solangorum	7
Lupinus sp. CEH2002	7
Lupinus sp. CEH2004	7
Lupinus sp. CEH2005	7
Lupinus sp. CEH2037	7
Lupinus sp. CEH2107	7
Lupinus sp. CEH2117	7
Lupinus sp. CEH2118	7
Lupinus sp. CEH2160	7
Lupinus sp. RJE168	7
Lupinus sp. RJE174	7
Lupinus sp. RJE206	7
Lupinus sp. RJE59	7
Lupinus subacaulis	7
Lupinus subsessilis	3
Lupinus tarapacensis	7
Lupinus texensis	4
Lupinus tominensis	7
Lupinus truncatus	6
Lupinus uleanus	4
Lupinus velutinus	3
Lupinus villosus	4
Lupinus weberbaueri	7
Pterospartum tridentatum	6
Retama monosperma	6
Spartium junceum	6
Stauracanthus genistoides	6

Appendix S4. Microlicieae dataset: species sampled in this study and biome (see text for coding). Voucher information and GenBank accession numbers are presented in Fritsch *et al.* (18).

Species	**Biome**
Amphiblemma cymosum	1
Arthrostemma ciliatum	1
Astronia smilacifolia	1
Bertolonia maculata	1
Blakea trinervia	1
Cambessedesia	2,3
Castratella piloselloides	2
Chaetostoma cupressinum	3
Chaetostoma sp.	3
Clidemia rubra	1
Dichaetanthera asperrima	1
Diplectria divaricata	1
Dissotis rotundifolia	1,2
Driessenia glanduligera	1
Eriocnema fulva	1
Graffenrieda rotundifolia	1
Gravesia sp.	1
Heterocentron subtriplinervium	1
Lavoisiera alba	3
Lavoisiera caryophyllea	3
Lavoisiera confertiflora	3
Lavoisiera cordata	3
Lavoisiera crassifolia	3
Lavoisiera imbricata	3
Lavoisiera mucorifera	3
Lavoisiera subulata	3
Leandra mexicana	1
Macrocentrum repens	2
Maieta guianensis	1
Medinilla humbertiana	1
Melastoma sp.	4
Memecylon edule	1
Meriania nobilis	1
Microlicia aff. *oligantha*	3
Microlicia aff. *tomentella*	3
Microlicia amblysepala	3
Microlicia fasciculata	3
Microlicia juniperina	3
Microlicia minima	3
Microlicia sp.1	3
Microlicia sp.2	3
Microlicia sp.3	3
Microlicia sp.5	3
Microlicia sp.4	3
Monochaetum calcaratum	1
Monolena primuliflora	1
Mouriri helleri	1
Osbeckia chinensis	4
Pternandra caerulescens	1
Pterolepis glomerata	1,2,3
Rhexia virginica	2
Rhynchanthera grandiflora	2
Stenodon suberosus	3
Tetrazygia urbanii	1
Tibouchina urvilleana	1,2,3
Trembleya laniflora	2,3
Trembleya parviflora 1	2
Trembleya parviflora 2	2
Trembleya pentagona	2,3
Triolena sp.	1

Captions for Supporting Figures

Fig. S1. Legume *matK* chronogram from one of the 2000 Bayesian trees sampled at stationarity. Posterior probability values are shown next to nodes. Letters on nodes correspond to calibration points derived from the fossil record. Diamonds are nodes that had the age estimated and were used as secondary calibration points in subsequent evolutionary rates analyses of *Mimosa*, *Andira* and *Lupinus*. Scale bar in million years.

Fig. S2. Chronograms showing one of 540 Bayesian trees sampled at stationarity for *Mimosa* (Fig. S2a), *Andira* (Fig. S2b), *Lupinus* (Fig. S2c) and Microlicieae (Fig. S2d). Posterior probability values are shown next to nodes. Squares correspond to constrained nodes used as calibration points, and red branches to Cerrado lineages. Scale bars in million years.

Fig. S3. Biome optimization in four plant groups (*Mimosa*, *Lupinus*, *Andira*, and Microlicieae). Aggregate biomes were optimized onto the 50% majority rule consensus tree of 540 Bayesian trees sampled at stationarity. Cerrado lineages are indicated on the right. Colour codes as given in Fig. S3a.

Fig. S4. Evolution of fire adapted life forms in *Mimosa* and *Andira* (Fig. S4a-b), and evolution of corky bark in *Andira* (Fig. S4c). Characters were optimized onto the 50% majority rule consensus tree of 540 Bayesian trees sampled at stationarity. Cerrado lineages are indicated on the right. Colour codes for Fig. S4b follow Fig. S4a.

Fig. S1

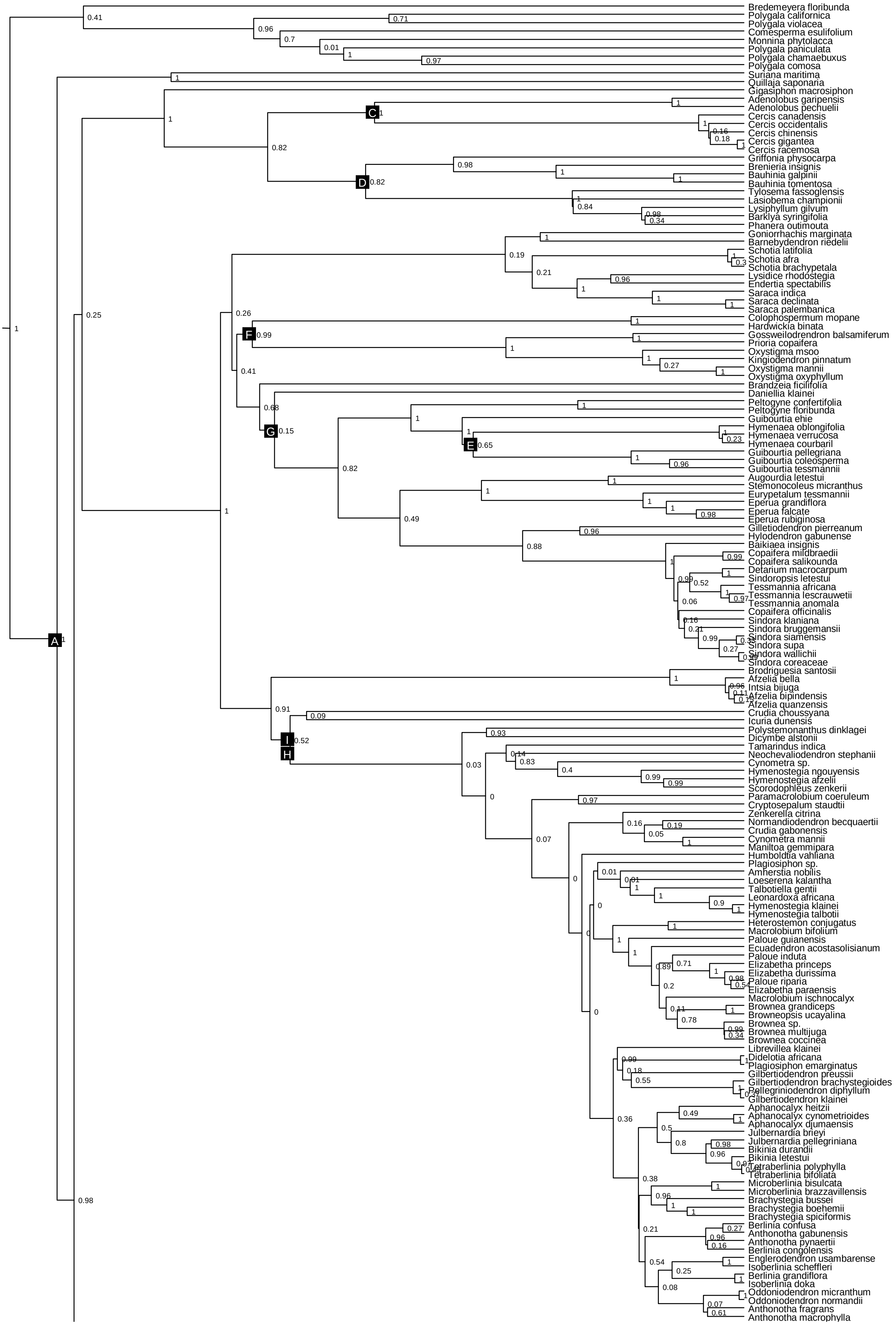

A
C
D
F
G
E
I
H
Bredemeyera floribunda
Polygala californica
Polygala violacea
Comesperma esulifolium
Monnina phytolacca
Polygala paniculata
Polygala chamaebuxus
Polygala comosa
Suriana maritima
Quillaja saponaria
Gigasiphon macrosiphon
Adenolobus garipensis
Adenolobus pechuelii
Cercis canadensis
Cercis occidentalis
Cercis chinensis
Cercis gigantea
Cercis racemosa
Griffonia physocarpa
Brenieria insignis
Bauhinia galpinii
Bauhinia tomentosa
Tylosema fassoglensis
Lasiobema championii
Lysiphyllum gilvum
Barklya syringifolia
Phanera outimouta
Goniorrhachis marginata
Barnebydendron riedelii
Schotia latifolia
Schotia afra
Schotia brachypetala
Lysidice rhodostegia
Endertia spectabilis
Saraca indica
Saraca declinata
Saraca palembanica
Colophospermum mopane
Hardwickia binata
Gossweilodendron balsamiferum
Prioria copaifera
Oxystigma msoo
Kingiodendron pinnatum
Oxystigma mannii
Oxystigma oxyphyllum
Brandzeia filicifolia
Daniellia klainei
Peltogyne confertifolia
Peltogyne floribunda
Guibourtia ehie
Hymenaea oblongifolia
Hymenaea verrucosa
Hymenaea courbaril
Guibourtia pellegriana
Guibourtia coleosperma
Guibourtia tessmannii
Augouardia letestui
Stemonocoleus micranthus
Eurypetalum tessmannii
Eperua grandiflora
Eperua falcate
Eperua rubiginosa
Gilletiodendron pierreanum
Hylodendron gabunense
Baikiaea insignis
Copaifera mildbraedii
Copaifera salikounda
Detarium macrocarpum
Sindoropsis letestui
Tessmannia africana
Tessmannia lescrauwetii
Tessmannia anomala
Copaifera officinalis
Sindora klaniana
Sindora bruggemansii
Sindora siamensis
Sindora supa
Sindora wallichii
Sindora coreaceae
Brodriguesia santosii
Afzelia bella
Intsia bijuga
Afzelia bipindensis
Afzelia quanzensis
Crudia choussyana
Icuria dunensis
Polystemonanthus dinklagei
Dicymbe alstonii
Tamarindus indica
Neochevaliodendron stephanii
Cynometra sp.
Hymenostegia ngouyensis
Hymenostegia afzelii
Scorodophloeus zenkeri
Paramacrolobium coeruleum
Cryptosepalum staudtii
Zenkerella citrina
Normandiodendron becquaertii
Crudia gabonensis
Cynometra mannii
Maniltoa gemmipara
Humboldtia vahliana
Plagiosiphon sp.
Amherstia nobilis
Loeserena kalantha
Talbotiella gentii
Leonardoxa africana
Hymenostegia klainei
Hymenostegia talbotii
Heterostemon conjugatus
Macrolobium bifolium
Paloue guianensis
Ecuadendron acostasolisianum
Paloue induta
Elizabetha princeps
Elizabetha durissima
Paloue riparia
Elizabetha paraensis
Macrolobium ischnocalyx
Brownea grandiceps
Browneopsis ucayalina
Brownea sp.
Brownea multijuga
Brownea coccinea
Librevillea klainei
Didelotia africana
Plagiosiphon emarginatus
Gilbertiodendron preussii
Gilbertiodendron brachystegioides
Pellegriniodendron diphyllum
Gilbertiodendron klainei
Aphanocalyx heitzii
Aphanocalyx cynometrioides
Aphanocalyx djumaensis
Julbernardia brieyi
Julbernardia pellegriniana
Bikinia durandii
Bikinia letestui
Tetraberlinia polyphylla
Tetraberlinia bifoliata
Microberlinia bisulcata
Microberlinia brazzavillensis
Brachystegia bussei
Brachystegia boehmii
Brachystegia spiciformis
Berlinia confusa
Anthonotha gabunensis
Anthonotha pynaertii
Berlinia congolensis
Englerodendron usambarense
Isoberlinia scheffleri
Berlinia grandiflora
Isoberlinia doka
Oddoniodendron micranthum
Oddoniodendron normandii
Anthonotha fragrans
Anthonotha macrophylla

Fig. S1 (cont.)

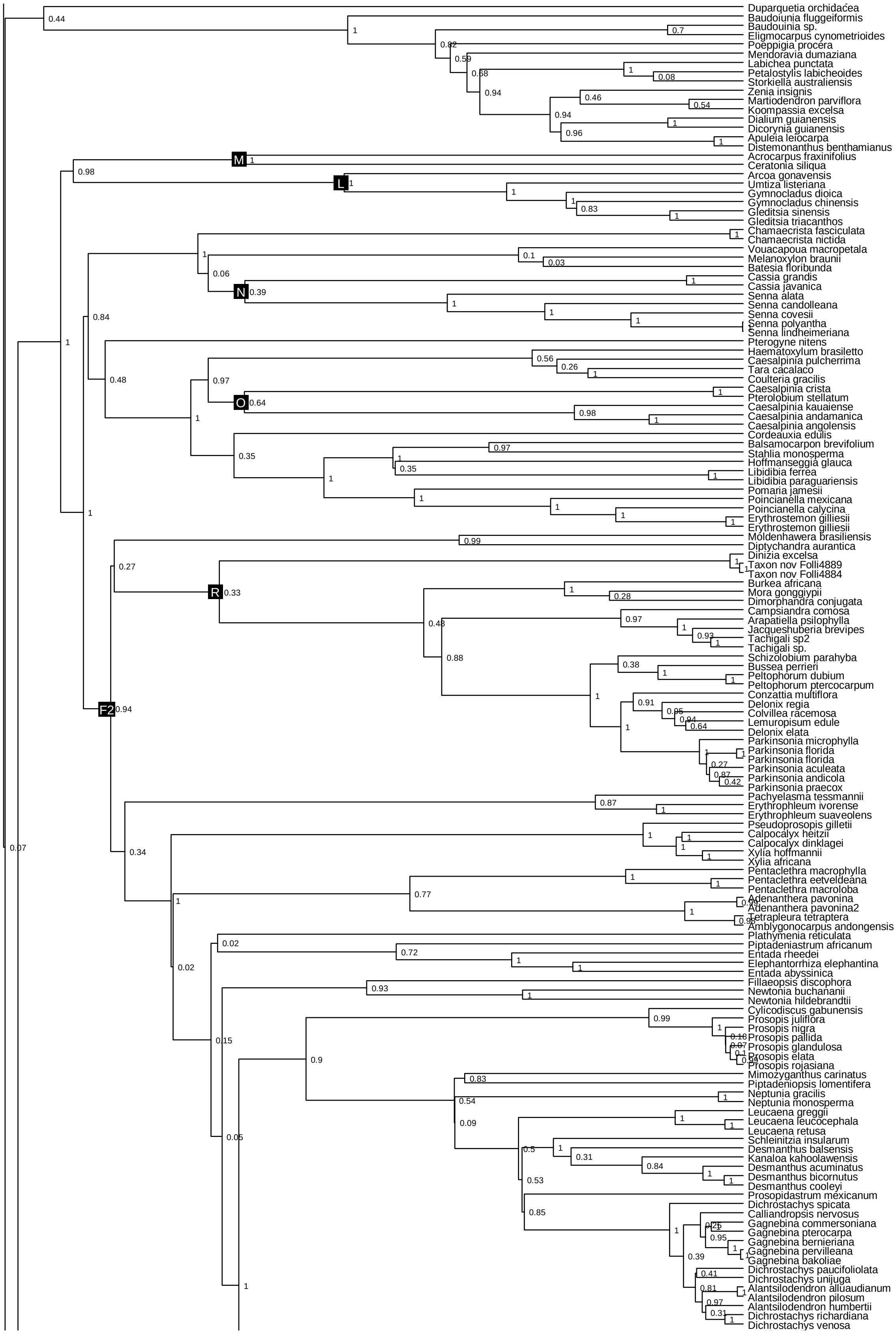

M
L
N
O
R
F2
Duparquetia orchidacea
Baudoiunia fluggeiformis
Baudouinia sp.
Eligmocarpus cynometrioides
Poeppigia procera
Mendoravia dumaziana
Labichea punctata
Petalostylis labicheoides
Storkiella australiensis
Zenia insignis
Martiodendron parviflora
Koompassia excelsa
Dialium guianensis
Dicorynia guianensis
Apuleia leiocarpa
Distemonanthus benthamianus
Acrocarpus fraxinifolius
Ceratonia siliqua
Arcoa gonavensis
Umtiza listeriana
Gymnocladus dioica
Gymnocladus chinensis
Gleditsia sinensis
Gleditsia triacanthos
Chamaecrista fasciculata
Chamaecrista nictida
Vouacapoua macropetala
Melanoxylon braunii
Batesia floribunda
Cassia grandis
Cassia javanica
Senna alata
Senna candolleana
Senna covesii
Senna polyantha
Senna lindheimeriana
Pterogyne nitens
Haematoxylum brasiletto
Caesalpinia pulcherrima
Tara cacalaco
Coulteria gracilis
Caesalpinia crista
Pterolobium stellatum
Caesalpinia kauaiense
Caesalpinia andamanica
Caesalpinia angolensis
Cordeauxia edulis
Balsamocarpon brevifolium
Stahlia monosperma
Hoffmanseggia glauca
Libidibia ferrea
Libidibia paraguariensis
Pomaria jamesii
Poincianella mexicana
Poincianella calycina
Erythrostemon gilliesii
Erythrostemon gilliesii
Moldenhawera brasiliensis
Diptychandra aurantica
Dinizia excelsa
Taxon nov Folli4889
Taxon nov Folli4884
Burkea africana
Mora gonggiypii
Dimorphandra conjugata
Campsiandra comosa
Arapatiella psilophylla
Jacqueshuberia brevipes
Tachigali sp2
Tachigali sp.
Schizolobium parahyba
Bussea perrieri
Peltophorum dubium
Peltophorum ptercocarpum
Conzattia multiflora
Delonix regia
Colvillea racemosa
Lemuropisum edule
Delonix elata
Parkinsonia microphylla
Parkinsonia florida
Parkinsonia florida
Parkinsonia aculeata
Parkinsonia andicola
Parkinsonia praecox
Pachyelasma tessmannii
Erythrophleum ivorense
Erythrophleum suaveolens
Pseudoprosopis gilletii
Calpocalyx heitzii
Calpocalyx dinklagei
Xylia hoffmannii
Xylia africana
Pentaclethra macrophylla
Pentaclethra eetveldeana
Pentaclethra macroloba
Adenanthera pavonina
Adenanthera pavonina2
Tetrapleura tetraptera
Amblygonocarpus andongensis
Plathymenia reticulata
Piptadeniastrum africanum
Entada rheedei
Elephantorrhiza elephantina
Entada abyssinica
Fillaeopsis discophora
Newtonia buchananii
Newtonia hildebrandtii
Cylicodiscus gabunensis
Prosopis juliflora
Prosopis nigra
Prosopis pallida
Prosopis glandulosa
Prosopis elata
Prosopis rojasiana
Mimozyganthus carinatus
Piptadeniopsis lomentifera
Neptunia gracilis
Neptunia monosperma
Leucaena greggii
Leucaena leucocephala
Leucaena retusa
Schleinitzia insularum
Desmanthus balsensis
Kanaloa kahoolawensis
Desmanthus acuminatus
Desmanthus bicornutus
Desmanthus cooleyi
Prosopidastrum mexicanum
Dichrostachys spicata
Calliandropsis nervosus
Gagnebina commersoniana
Gagnebina pterocarpa
Gagnebina bernieriana
Gagnebina pervilleana
Gagnebina bakoliae
Dichrostachys paucifoliolata
Dichrostachys unijuga
Alantsilodendron alluaudianum
Alantsilodendron pilosum
Alantsilodendron humbertii
Dichrostachys richardiana
Dichrostachys venosa

Fig. S1 (cont.)

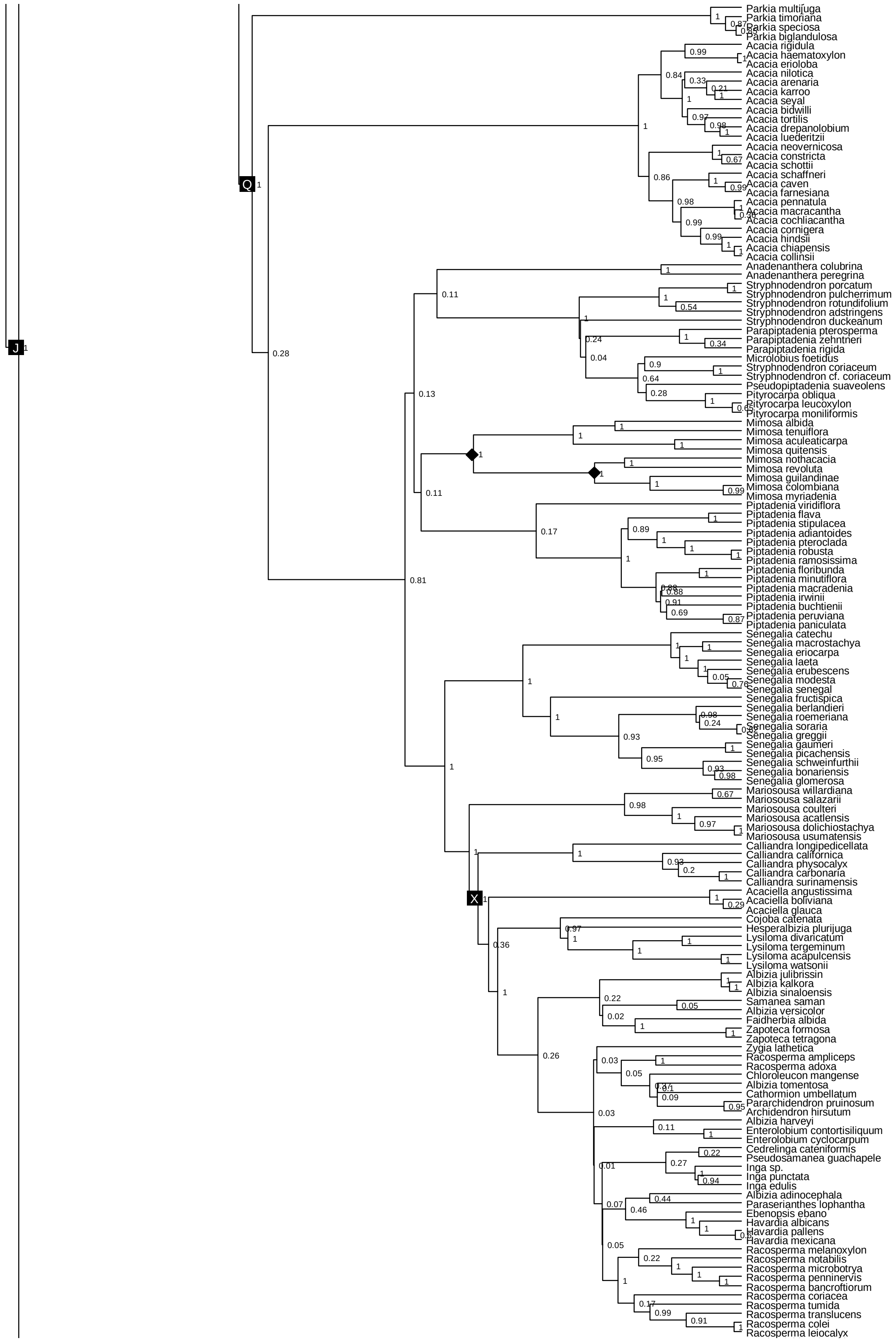

J
Q
X
Parkia multijuga
Parkia timoriana
Parkia speciosa
Parkia biglandulosa
Acacia rigidula
Acacia haematoxylon
Acacia erioloba
Acacia nilotica
Acacia arenaria
Acacia karroo
Acacia seyal
Acacia bidwilli
Acacia tortilis
Acacia drepanolobium
Acacia luederitzii
Acacia neovernicosa
Acacia constricta
Acacia schottii
Acacia schaffneri
Acacia caven
Acacia farnesiana
Acacia pennatula
Acacia macracantha
Acacia cochliacantha
Acacia cornigera
Acacia hindsii
Acacia chiapensis
Acacia collinsii
Anadenanthera colubrina
Anadenanthera peregrina
Stryphnodendron porcatum
Stryphnodendron pulcherrimum
Stryphnodendron rotundifolium
Stryphnodendron adstringens
Stryphnodendron duckeanum
Parapiptadenia pterosperma
Parapiptadenia zehntneri
Parapiptadenia rigida
Microlobius foetidus
Stryphnodendron coriaceum
Stryphnodendron cf. coriaceum
Pseudopiptadenia suaveolens
Pityrocarpa obliqua
Pityrocarpa leucoxylon
Pityrocarpa moniliformis
Mimosa albida
Mimosa tenuiflora
Mimosa aculeaticarpa
Mimosa quitensis
Mimosa nothacacia
Mimosa revoluta
Mimosa guilandinae
Mimosa colombiana
Mimosa myriadenia
Piptadenia viridiflora
Piptadenia flava
Piptadenia stipulacea
Piptadenia adiantoides
Piptadenia pteroclada
Piptadenia robusta
Piptadenia ramosissima
Piptadenia floribunda
Piptadenia minutiflora
Piptadenia macradenia
Piptadenia irwinii
Piptadenia buchtienii
Piptadenia peruviana
Piptadenia paniculata
Senegalia catechu
Senegalia macrostachya
Senegalia eriocarpa
Senegalia laeta
Senegalia erubescens
Senegalia modesta
Senegalia senegal
Senegalia fructispica
Senegalia berlandieri
Senegalia roemeriana
Senegalia soraria
Senegalia greggii
Senegalia gaumeri
Senegalia picachensis
Senegalia schweinfurthii
Senegalia bonariensis
Senegalia glomerosa
Mariosousa willardiana
Mariosousa salazarii
Mariosousa coulteri
Mariosousa acatlensis
Mariosousa dolichiostachya
Mariosousa usumatensis
Calliandra longipedicellata
Calliandra californica
Calliandra physocalyx
Calliandra carbonaria
Calliandra surinamensis
Acaciella angustissima
Acaciella boliviana
Acaciella glauca
Cojoba catenata
Hesperalbizia plurijuga
Lysiloma divaricatum
Lysiloma tergeminum
Lysiloma acapulcensis
Lysiloma watsonii
Albizia julibrissin
Albizia kalkora
Albizia sinaloensis
Samanea saman
Albizia versicolor
Faidherbia albida
Zapoteca formosa
Zapoteca tetragona
Zygia lathetica
Racosperma ampliceps
Racosperma adoxa
Chloroleucon mangense
Albizia tomentosa
Cathormion umbellatum
Pararchidendron pruinosum
Archidendron hirsutum
Albizia harveyi
Enterolobium contortisiliquum
Enterolobium cyclocarpum
Cedrelinga cateniformis
Pseudosamanea guachapele
Inga sp.
Inga punctata
Inga edulis
Albizia adinocephala
Paraserianthes lophantha
Ebenopsis ebano
Havardia albicans
Havardia pallens
Havardia mexicana
Racosperma melanoxylon
Racosperma notabilis
Racosperma microbotrya
Racosperma penninervis
Racosperma bancroftiorum
Racosperma coriacea
Racosperma tumida
Racosperma translucens
Racosperma colei
Racosperma leiocalyx

Fig. S1 (cont.)

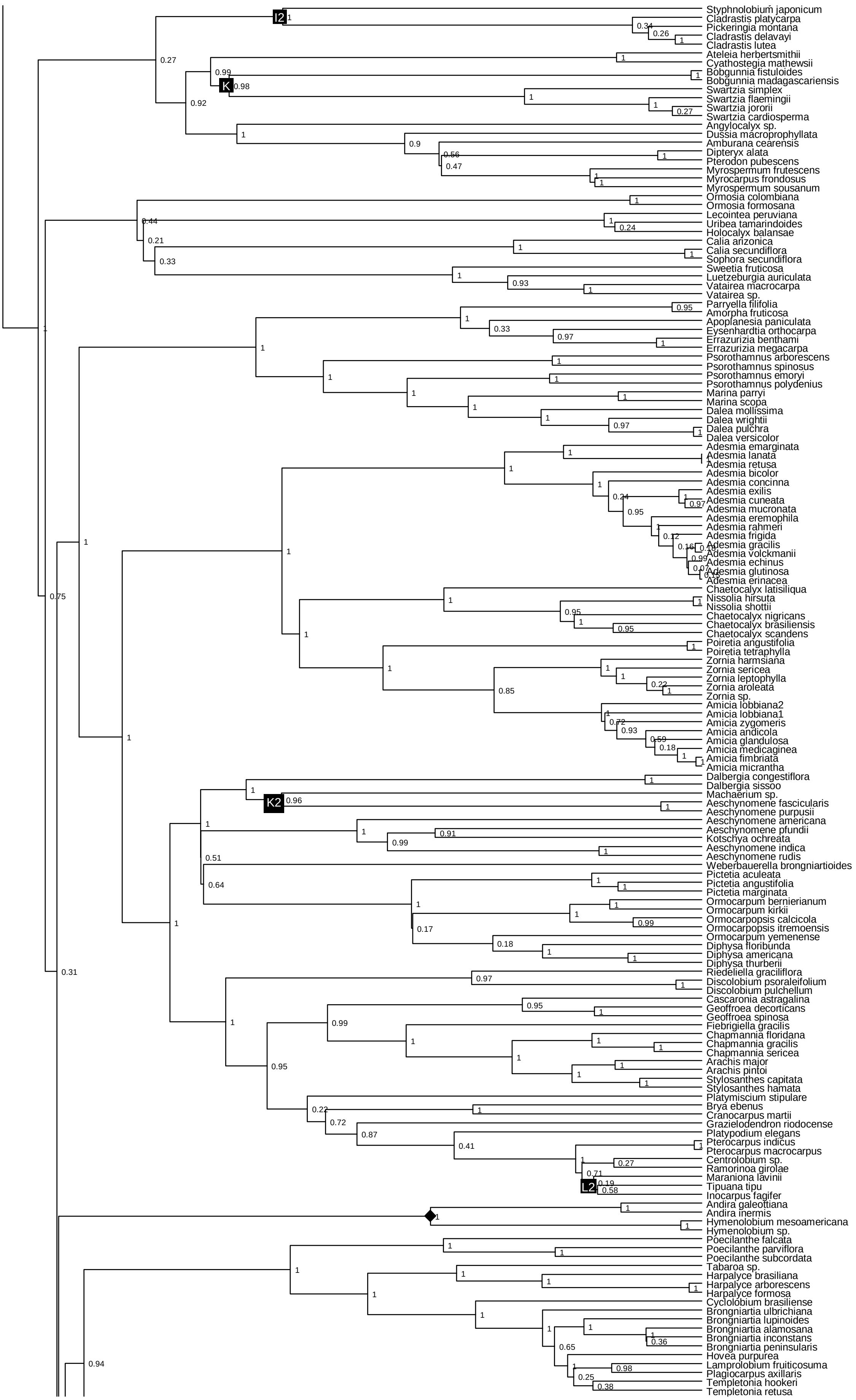

I2
K
K2
L2
Styphnolobium japonicum
Cladrastis platycarpa
Pickeringia montana
Cladrastis delavayi
Cladrastis lutea
Ateleia herbertsmithii
Cyathostegia mathewsii
Bobgunnia fistuloides
Bobgunnia madagascariensis
Swartzia simplex
Swartzia flaemingii
Swartzia jororii
Swartzia cardiosperma
Angylocalyx sp.
Dussia macroprophyllata
Amburana cearensis
Dipteryx alata
Pterodon pubescens
Myrospermum frutescens
Myrocarpus frondosus
Myrospermum sousanum
Ormosia colombiana
Ormosia formosana
Lecointea peruviana
Uribea tamarindoides
Holocalyx balansae
Calia arizonica
Calia secundiflora
Sophora secundiflora
Sweetia fruticosa
Luetzeburgia auriculata
Vatairea macrocarpa
Vatairea sp.
Parryella filifolia
Amorpha fruticosa
Apoplanesia paniculata
Eysenhardtia orthocarpa
Errazurizia benthami
Errazurizia megacarpa
Psorothamnus arborescens
Psorothamnus spinosus
Psorothamnus emoryi
Psorothamnus polydenius
Marina parryi
Marina scopa
Dalea mollissima
Dalea wrightii
Dalea pulchra
Dalea versicolor
Adesmia emarginata
Adesmia lanata
Adesmia retusa
Adesmia bicolor
Adesmia concinna
Adesmia exilis
Adesmia cuneata
Adesmia mucronata
Adesmia eremophila
Adesmia rahmeri
Adesmia frigida
Adesmia gracilis
Adesmia volckmanii
Adesmia echinus
Adesmia glutinosa
Adesmia erinacea
Chaetocalyx latisiliqua
Nissolia hirsuta
Nissolia shottii
Chaetocalyx nigricans
Chaetocalyx brasiliensis
Chaetocalyx scandens
Poiretia angustifolia
Poiretia tetraphylla
Zornia harmsiana
Zornia sericea
Zornia leptophylla
Zornia aroleata
Zornia sp.
Amicia lobbiana2
Amicia lobbiana1
Amicia zygomeris
Amicia andicola
Amicia glandulosa
Amicia medicaginea
Amicia fimbriata
Amicia micrantha
Dalbergia congestiflora
Dalbergia sissoo
Machaerium sp.
Aeschynomene fascicularis
Aeschynomene purpusii
Aeschynomene americana
Aeschynomene pfundii
Kotschya ochreata
Aeschynomene indica
Aeschynomene rudis
Weberbauerella brongniartioides
Pictetia aculeata
Pictetia angustifolia
Pictetia marginata
Ormocarpum bernierianum
Ormocarpum kirkii
Ormocarpopsis calcicola
Ormocarpopsis itremoensis
Ormocarpum yemenense
Diphysa floribunda
Diphysa americana
Diphysa thurberii
Riedeliella graciliflora
Discolobium psoraleifolium
Discolobium pulchellum
Cascaronia astragalina
Geoffroea decorticans
Geoffroea spinosa
Fiebrigiella gracilis
Chapmannia floridana
Chapmannia gracilis
Chapmannia sericea
Arachis major
Arachis pintoi
Stylosanthes capitata
Stylosanthes hamata
Platymiscium stipulare
Brya ebenus
Cranocarpus martii
Grazielodendron riodocense
Platypodium elegans
Pterocarpus indicus
Pterocarpus macrocarpus
Centrolobium sp.
Ramorinoa girolae
Maraniona lavinii
Tipuana tipu
Inocarpus fagifer
Andira galeottiana
Andira inermis
Hymenolobium mesoamericana
Hymenolobium sp.
Poecilanthe falcata
Poecilanthe parviflora
Poecilanthe subcordata
Tabaroa sp.
Harpalyce brasiliana
Harpalyce arborescens
Harpalyce formosa
Cyclolobium brasiliense
Brongniartia ulbrichiana
Brongniartia lupinoides
Brongniartia alamosana
Brongniartia inconstans
Brongniartia peninsularis
Hovea purpurea
Lamprolobium fruiticosuma
Plagiocarpus axillaris
Templetonia hookeri
Templetonia retusa

Fig. S1 (cont.)

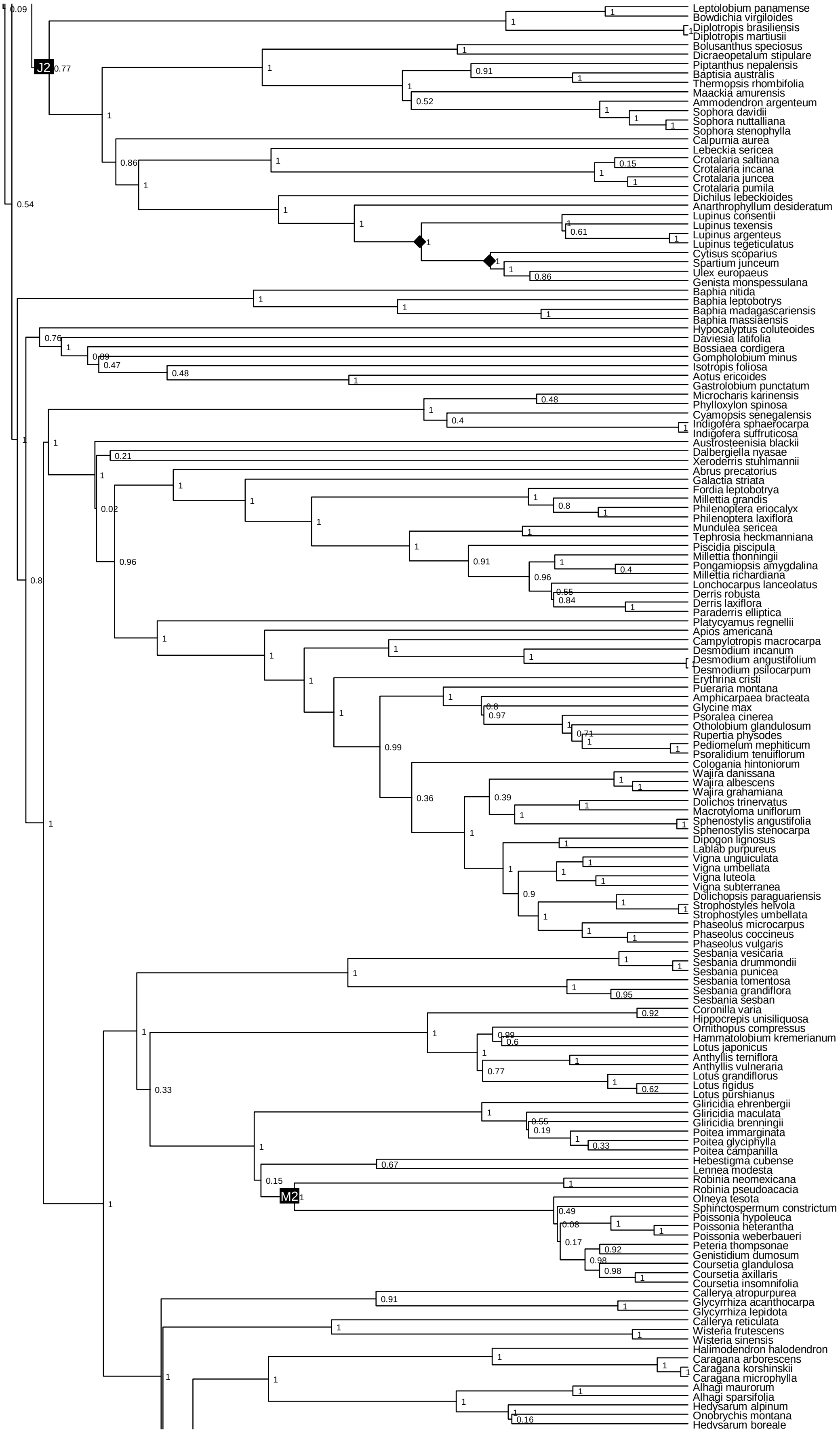

J2
M2
Leptolobium panamense
Bowdichia virgiloides
Diplotropis brasiliensis
Diplotropis martiusii
Bolusanthus speciosus
Dicraeopetalum stipulare
Piptanthus nepalensis
Baptisia australis
Thermopsis rhombifolia
Maackia amurensis
Ammodendron argenteum
Sophora davidii
Sophora nuttalliana
Sophora stenophylla
Calpurnia aurea
Lebeckia sericea
Crotalaria saltiana
Crotalaria incana
Crotalaria juncea
Crotalaria pumila
Dichilus lebeckioides
Anarthrophyllum desideratum
Lupinus consentii
Lupinus texensis
Lupinus argenteus
Lupinus tegeticulatus
Cytisus scoparius
Spartium junceum
Ulex europaeus
Genista monspessulana
Baphia nitida
Baphia leptobotrys
Baphia madagascariensis
Baphia massiaensis
Hypocalyptus coluteoides
Daviesia latifolia
Bossiaea cordigera
Gompholobium minus
Isotropis foliosa
Aotus ericoides
Gastrolobium punctatum
Microcharis karinensis
Phylloxylon spinosa
Cyamopsis senegalensis
Indigofera sphaerocarpa
Indigofera suffruticosa
Austrosteenisia blackii
Dalbergiella nyasae
Xeroderris stuhlmannii
Abrus precatorius
Galactia striata
Fordia leptobotrya
Millettia grandis
Philenoptera eriocalyx
Philenoptera laxiflora
Mundulea sericea
Tephrosia heckmanniana
Piscidia piscipula
Millettia thonningii
Pongamiopsis amygdalina
Millettia richardiana
Lonchocarpus lanceolatus
Derris robusta
Derris laxiflora
Paraderris elliptica
Platycyamus regnellii
Apios americana
Campylotropis macrocarpa
Desmodium incanum
Desmodium angustifolium
Desmodium psilocarpum
Erythrina cristi
Pueraria montana
Amphicarpaea bracteata
Glycine max
Psoralea cinerea
Otholobium glandulosum
Rupertia physodes
Pediomelum mephiticum
Psoralidium tenuiflorum
Cologania hintoniorum
Wajira danissana
Wajira albescens
Wajira grahamiana
Dolichos trinervatus
Macrotyloma uniflorum
Sphenostylis angustifolia
Sphenostylis stenocarpa
Dipogon lignosus
Lablab purpureus
Vigna unguiculata
Vigna umbellata
Vigna luteola
Vigna subterranea
Dolichopsis paraguariensis
Strophostyles helvola
Strophostyles umbellata
Phaseolus microcarpus
Phaseolus coccineus
Phaseolus vulgaris
Sesbania vesicaria
Sesbania drummondii
Sesbania punicea
Sesbania tomentosa
Sesbania grandiflora
Sesbania sesban
Coronilla varia
Hippocrepis unisiliquosa
Ornithopus compressus
Hammatolobium kremerianum
Lotus japonicus
Anthyllis terniflora
Anthyllis vulneraria
Lotus grandiflorus
Lotus rigidus
Lotus purshianus
Gliricidia ehrenbergii
Gliricidia maculata
Gliricidia brenningii
Poitea immarginata
Poitea glyciphylla
Poitea campanilla
Hebestigma cubense
Lennea modesta
Robinia neomexicana
Robinia pseudoacacia
Olneya tesota
Sphinctospermum constrictum
Poissonia hypoleuca
Poissonia heterantha
Poissonia weberbaueri
Peteria thompsonae
Genistidium dumosum
Coursetia glandulosa
Coursetia axillaris
Coursetia insomnifolia
Callerya atropurpurea
Glycyrrhiza acanthocarpa
Glycyrrhiza lepidota
Callerya reticulata
Wisteria frutescens
Wisteria sinensis
Halimodendron halodendron
Caragana arborescens
Caragana korshinskii
Caragana microphylla
Alhagi maurorum
Alhagi sparsifolia
Hedysarum alpinum
Onobrychis montana
Hedysarum boreale

Fig. S1 (cont.)

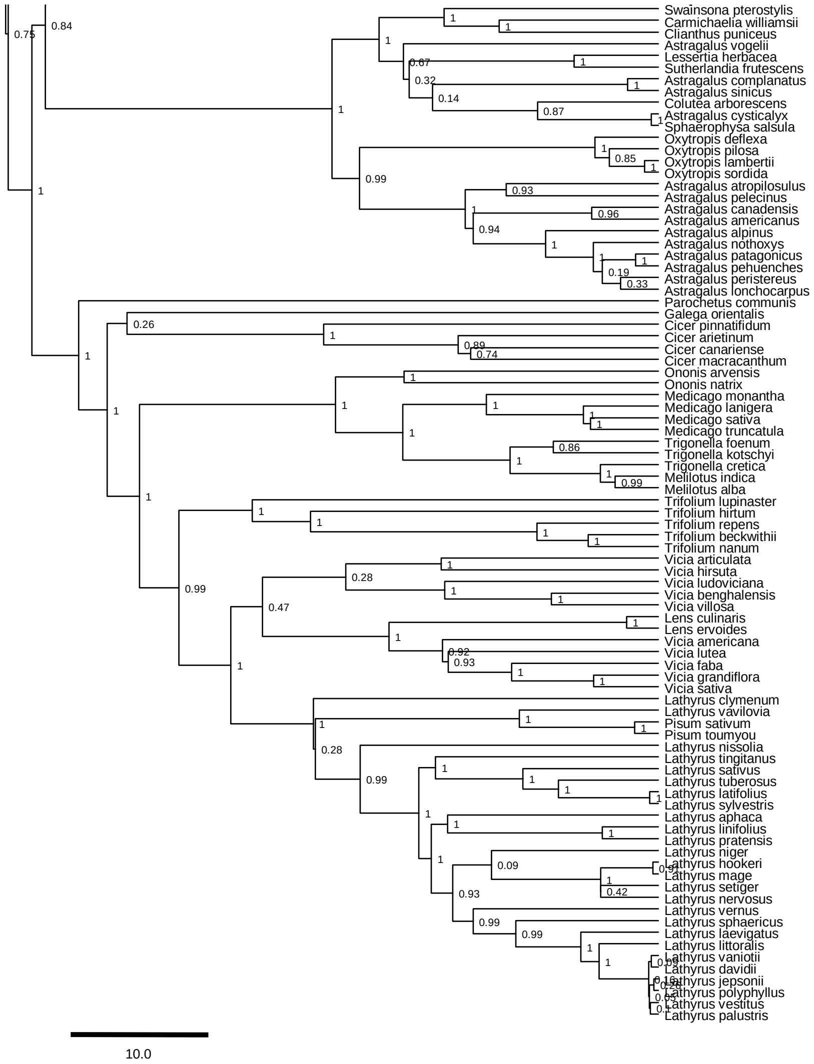

Swainsona pterostylis
Carmichaelia williamsii
Clianthus puniceus
Astragalus vogelii
Lessertia herbacea
Sutherlandia frutescens
Astragalus complanatus
Astragalus sinicus
Colutea arborescens
Astragalus cysticalyx
Sphaerophysa salsula
Oxytropis deflexa
Oxytropis pilosa
Oxytropis lambertii
Oxytropis sordida
Astragalus atropilosulus
Astragalus pelecinus
Astragalus canadensis
Astragalus americanus
Astragalus alpinus
Astragalus nothoxys
Astragalus patagonicus
Astragalus pehuenches
Astragalus peristereus
Astragalus lonchocarpus
Parochetus communis
Galega orientalis
Cicer pinnatifidum
Cicer arietinum
Cicer canariense
Cicer macracanthum
Ononis arvensis
Ononis natrix
Medicago monantha
Medicago lanigera
Medicago sativa
Medicago truncatula
Trigonella foenum
Trigonella kotschyi
Trigonella cretica
Melilotus indica
Melilotus alba
Trifolium lupinaster
Trifolium hirtum
Trifolium repens
Trifolium beckwithii
Trifolium nanum
Vicia articulata
Vicia hirsuta
Vicia ludoviciana
Vicia benghalensis
Vicia villosa
Lens culinaris
Lens ervoides
Vicia americana
Vicia lutea
Vicia faba
Vicia grandiflora
Vicia sativa
Lathyrus clymenum
Lathyrus vavilovia
Pisum sativum
Pisum toumyou
Lathyrus nissolia
Lathyrus tingitanus
Lathyrus sativus
Lathyrus tuberosus
Lathyrus latifolius
Lathyrus sylvestris
Lathyrus aphaca
Lathyrus linifolius
Lathyrus pratensis
Lathyrus niger
Lathyrus hookeri
Lathyrus mage
Lathyrus setiger
Lathyrus nervosus
Lathyrus vernus
Lathyrus sphaericus
Lathyrus laevigatus
Lathyrus littoralis
Lathyrus vaniotii
Lathyrus davidii
Lathyrus jepsonii
Lathyrus polyphyllus
Lathyrus vestitus
Lathyrus palustris
0.84
0.75
1
0.67
0.32
0.14
0.87
0.85
0.99
0.93
0.96
0.94
0.19
0.33
0.26
0.89
0.74
0.86
0.28
0.47
0.92
0.93
0.09
0.91
0.42
0.16
0.26
0.05
0.1
10.0

Fig. S2a

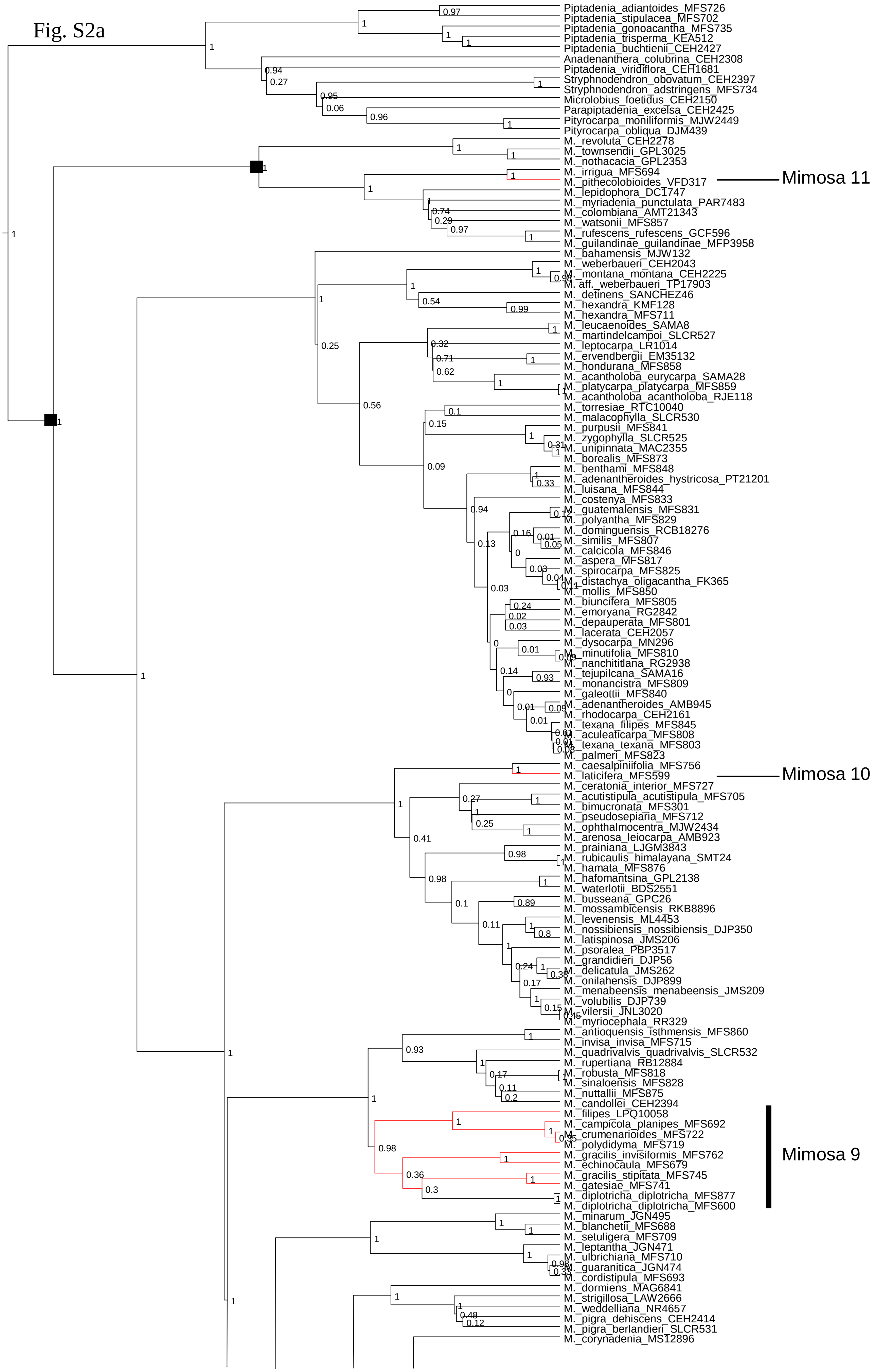

Piptadenia_adiantoides_MFS726
Piptadenia_stipulacea_MFS702
Piptadenia_gonoacantha_MFS735
Piptadenia_trisperma_KEA512
Piptadenia_buchtienii_CEH2427
Anadenanthera_colubrina_CEH2308
Piptadenia_viridiflora_CEH1681
Stryphnodendron_obovatum_CEH2397
Stryphnodendron_adstringens_MFS734
Microlobius_foetidus_CEH2150
Parapiptadenia_excelsa_CEH2425
Pityrocarpa_moniliformis_MJW2449
Pityrocarpa_obliqua_DJM439
M._revoluta_CEH2278
M._townsendii_GPL3025
M._nothacacia_GPL2353
M._irrigua_MFS694
M._pithecolobioides_VFD317
Mimosa 11
M._lepidophora_DC1747
M._myriadenia_punctulata_PAR7483
M._colombiana_AMT21343
M._watsonii_MFS857
M._rufescens_rufescens_GCF596
M._guilandinae_guilandinae_MFP3958
M._bahamensis_MJW132
M._weberbaueri_CEH2043
M._montana_montana_CEH2225
M._aff._weberbaueri_TP17903
M._detinens_SANCHEZ46
M._hexandra_KMF128
M._hexandra_MFS711
M._leucaenoides_SAMA8
M._martindelcampoi_SLCR527
M._leptocarpa_LR1014
M._ervendbergii_EM35132
M._hondurana_MFS858
M._acantholoba_eurycarpa_SAMA28
M._platycarpa_platycarpa_MFS859
M._acantholoba_acantholoba_RJE118
M._torresiae_RTC10040
M._malacophylla_SLCR530
M._purpusii_MFS841
M._zygophylla_SLCR525
M._unipinnata_MAC2355
M._borealis_MFS873
M._benthami_MFS848
M._adenantheroides_hystricosa_PT21201
M._luisana_MFS844
M._costenya_MFS833
M._guatemalensis_MFS831
M._polyantha_MFS829
M._dominguensis_RCB18276
M._similis_MFS807
M._calcicola_MFS846
M._aspera_MFS817
M._spirocarpa_MFS825
M._distachya_oligacantha_FK365
M._mollis_MFS850
M._biuncifera_MFS805
M._emoryana_RG2842
M._depauperata_MFS801
M._lacerata_CEH2057
M._dysocarpa_MN296
M._minutifolia_MFS810
M._nanchititlana_RG2938
M._tejupilcana_SAMA16
M._monancistra_MFS809
M._galeottii_MFS840
M._adenantheroides_AMB945
M._rhodocarpa_CEH2161
M._texana_filipes_MFS845
M._aculeaticarpa_MFS808
M._texana_texana_MFS803
M._palmeri_MFS823
M._caesalpiniifolia_MFS756
M._laticifera_MFS599
Mimosa 10
M._ceratonia_interior_MFS727
M._acutistipula_acutistipula_MFS705
M._bimucronata_MFS301
M._pseudosepiaria_MFS712
M._ophthalmocentra_MJW2434
M._arenosa_leiocarpa_AMB923
M._prainiana_LJGM3843
M._rubicaulis_himalayana_SMT24
M._hamata_MFS876
M._hafomantsina_GPL2138
M._waterlotii_BDS2551
M._busseana_GPC26
M._mossambicensis_RKB8896
M._levenensis_ML4453
M._nossibiensis_nossibiensis_DJP350
M._latispinosa_JMS206
M._psoralea_PBP3517
M._grandidieri_DJP56
M._delicatula_JMS262
M._onilahensis_DJP899
M._menabeensis_menabeensis_JMS209
M._volubilis_DJP739
M._vilersii_JNL3020
M._myriocephala_RR329
M._antioquensis_isthmensis_MFS860
M._invisa_invisa_MFS715
M._quadrivalvis_quadrivalvis_SLCR532
M._rupertiana_RB12884
M._robusta_MFS818
M._sinaloensis_MFS828
M._nuttallii_MFS875
M._candollei_CEH2394
M._filipes_LPQ10058
M._campicola_planipes_MFS692
M._crumenarioides_MFS722
M._polydidyma_MFS719
M._gracilis_invisiformis_MFS762
M._echinocaula_MFS679
M._gracilis_stipitata_MFS745
M._gatesiae_MFS741
M._diplotricha_diplotricha_MFS877
M._diplotricha_diplotricha_MFS600
Mimosa 9
M._minarum_JGN495
M._blanchetii_MFS688
M._setuligera_MFS709
M._leptantha_JGN471
M._ulbrichiana_MFS710
M._guaranitica_JGN474
M._cordistipula_MFS693
M._dormiens_MAG6841
M._strigillosa_LAW2666
M._weddelliana_NR4657
M._pigra_dehiscens_CEH2414
M._pigra_berlandieri_SLCR531
M._corynadenia_MS12896

Fig. S2a (cont.)


M._albolanata_MFS667
M._setosa_urbica_MFS730
M._humivagans_MFS737
M._speciosissima_MFS753
Mimosa_viperina_MFS461
M._setosa_paludosa_MFS725
Mimosa_diminuta_MFS866A
Mimosa_kalunga_MFS866
M._setosissima_MFS676
M._adenotricha_VFD332
M._claussenii_megistophylla_MFS768
M._cryptothamnos_MFS738
M._heringeri_CP2138
M._oligosperma_MFS865
M._melanocarpa_MFS675
M._densa_densa_MFS870
M._antrorsa_CWF1747
M._laniceps_MFS773
M._claussenii_claviceps_MFS766
M._dominarum_MFS776
M._regina_MFS759
M._stylosa_VFD318
M._foliolosa_pubescens_MFS733
M._ulei_grallator_MFS777
M._manidea_MFS760
Mimosa_pseudosetosa_MFS864
M._splendida_MFS739
M._decorticans_MFS681
M._cruenta_LPQ12575
M._uliginosa_LPQ12608
M._bifurca_ND4
M._uraguensis_MFS862
M._strobiliflora_OSR3600
M._lepidota_CEH2469
M._orthocarpa_MFS855
M._cisparanensis_MFS568
M._camporum_SMF729
M._occidentalis_occidentalis_MFS821
M._neptunioides_JRIW22123
M._josephina_CEH2398
M._auriculata_CEH2405
M._apodocarpa_MFS635
M._xavantinae_RF346
M._tenuiflora_MFS698
M._lewisii_MFS696
M._interrupta_LPQ10584
M._dalyi_JRIW16487
M._artemisiana_SMF138
M._schomburgkii_JJH15
M._sericantha_MFS410
M._coruscocaesia_RCM469
M._adenophylla_MFS458
M._gemmulata_gemmulata_MFS690
M._verrucosa_MFS706
M._pteridifolia_MFS754
M._adenophylla_mitis_LCLL184
M._somnians_lasiocarpa_MFS736
M._brachycarpa_LPQ10589
M._adenocarpa_MFS728
M._polydactyla_LC8652
M._pudica_MFS669
M._affinis_MFS814
M._ursina_MFS704
M._honesta_MFS720
M._modesta_modesta_MFS708
M._vestita_MFS769
M._skinneri_desmodioides_MFS746
M._hirsutissima_grossa_LPQ12854
M._hirsutissima_barbigera_MFS765
M._dicerastes_MFS448
M._venatorum_MFS740
M._callithrix_MFS684
M._polycephala_polycephala_MFS400
M._pyrenea_MFS678
M._discobola_MFS744
M._pseudoradula_pseudoradula_MFS664
M._papposa_papposa_MFS601
M._cyclophylla_MFS757
M._radula_imbricata_MFS731
M._lanuginosa_lanuginosa_MFS732
M._hypoglauca_hypoglauca_MFS723
M._virgula_MAS5134
M._verecunda_MFS749
M._xanthocentra_subsericea_CEH2403
M._jacobita_CEH2400
M._aff._xanthocentra_LPQ10476
M._tequilana_MFS813
M._debilis_debilis_CEH2393
M._nuda_nuda_CEH2396
M._albida_albida_CEH2083
M._casta_CDJ2189
M._sensitiva_sensitiva_DA4
M._velloziana_velloziana_MFS721
M._aff._flagellaris_LPQ12322
M._brevipetiolata_hirtula_LPQ12614
M._polycarpa_subandina_CEH2462
M._flagellaris_LPQ12545
M._lactiflua_CEH2079
M._acapulcensis_ROR2
M._sousae_AMB918
M._psilocarpa_AMB933
M._sicyocarpa_JC4936
M._goldmanii_AMB921
M._deamii_AMB919
M._tricephala_nelsonii_AMB920
M._woodii_CEH2285
M._boliviana_CEH2426
M._rusbyana_TS2071
M._pectinatipinna_CEH2036
M._loxoensis_GPL_2987
M._incarum_CEH2206
M._ctenodes_CEH2212
Mimosa_lamolina_CEH2648
M._incana_ND2
M._scabrella_HCL4055
M._aff._bathyrrhena_MFS_874
M._flocculosa_CNPF
M._daleoides_AS35683
M._pilulifera_ND3
M._pilulifera_pseudincana_MFS878
M._pseudocallosa_OSR5845
M._gymnas_JMFS3541
M._orthacantha_JCB_SN
M._chartostegia_OSR5085
Mimosa_sp._ND15
M._schleidenii_LPQ12348
M._pedersenii_LPQ12645
M._fachinalensis_ND16
M._fachinalensis_ND20
M._dutrae_ND5
M._per-dusenii_OSR4545
M._dolens_rigida_MFS879
M._dryandroides_extratropica_OSR3449
M._oblonga_oblonga_EB463
M._ramboi_LPQ12530
M._ramulosa_LPQ12340
M._sprengelii_LPQ12469
M._coniflora_OSR3060
M._callidryas_JMC94
M._atlantica_OSR4333
Mimosa 8
Mimosa 7
Mimosa 6
Mimosa 5
Mimosa 4
Mimosa 3
Mimosa 2
Mimosa 1
3.0

Fig. S2b

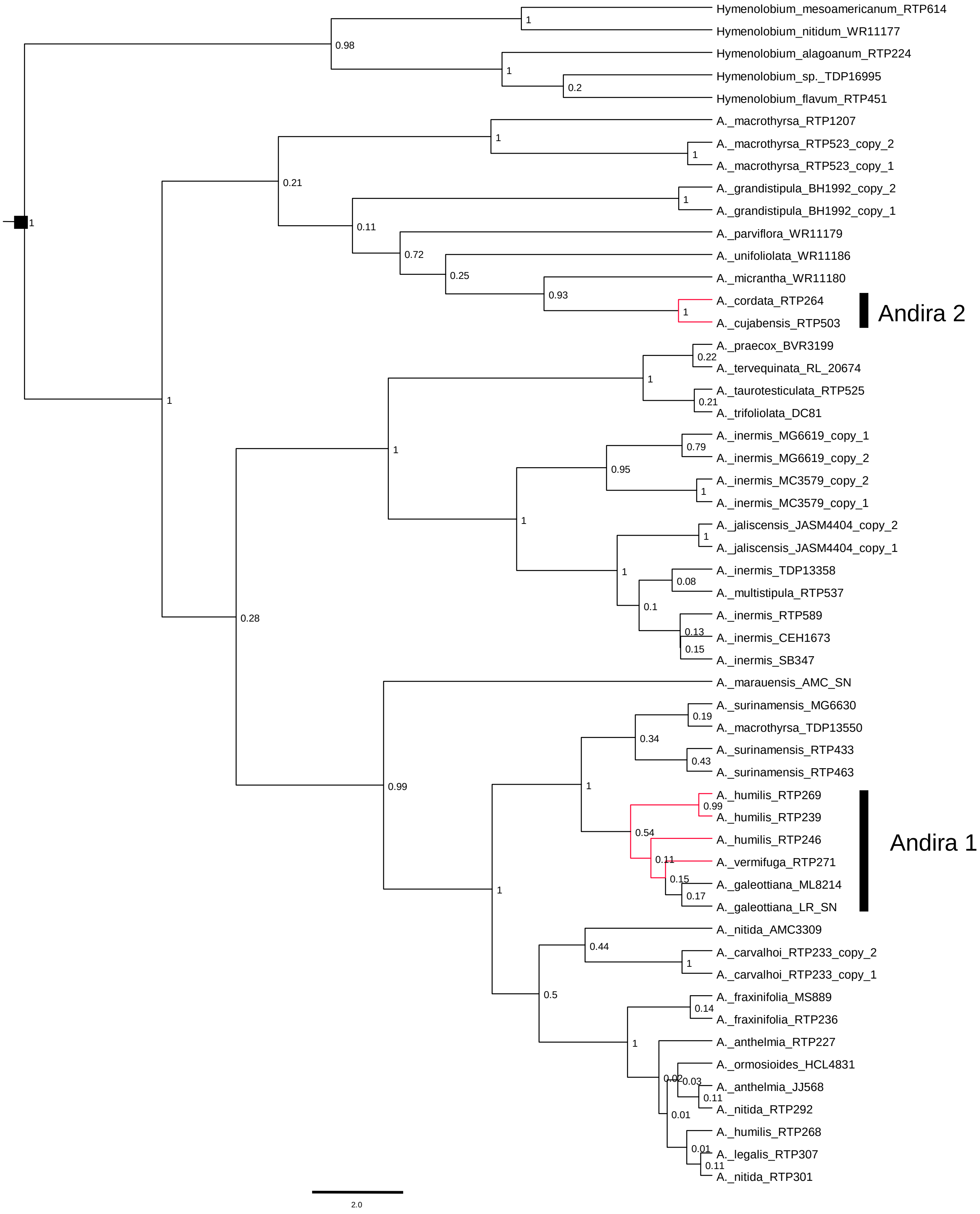

Hymenolobium_mesoamericanum_RTP614
Hymenolobium_nitidum_WR11177
Hymenolobium_alagoanum_RTP224
Hymenolobium_sp._TDP16995
Hymenolobium_flavum_RTP451
A._macrothyrsa_RTP1207
A._macrothyrsa_RTP523_copy_2
A._macrothyrsa_RTP523_copy_1
A._grandistipula_BH1992_copy_2
A._grandistipula_BH1992_copy_1
A._parviflora_WR11179
A._unifoliolata_WR11186
A._micrantha_WR11180
A._cordata_RTP264
A._cujabensis_RTP503
Andira 2
A._praecox_BVR3199
A._tervequinata_RL_20674
A._taurotesticulata_RTP525
A._trifoliolata_DC81
A._inermis_MG6619_copy_1
A._inermis_MG6619_copy_2
A._inermis_MC3579_copy_2
A._inermis_MC3579_copy_1
A._jaliscensis_JASM4404_copy_2
A._jaliscensis_JASM4404_copy_1
A._inermis_TDP13358
A._multistipula_RTP537
A._inermis_RTP589
A._inermis_CEH1673
A._inermis_SB347
A._marauensis_AMC_SN
A._surinamensis_MG6630
A._macrothyrsa_TDP13550
A._surinamensis_RTP433
A._surinamensis_RTP463
A._humilis_RTP269
A._humilis_RTP239
A._humilis_RTP246
A._vermifuga_RTP271
A._galeottiana_ML8214
A._galeottiana_LR_SN
Andira 1
A._nitida_AMC3309
A._carvalhoi_RTP233_copy_2
A._carvalhoi_RTP233_copy_1
A._fraxinifolia_MS889
A._fraxinifolia_RTP236
A._anthelmia_RTP227
A._ormosioides_HCL4831
A._anthelmia_JJ568
A._nitida_RTP292
A._humilis_RTP268
A._legalis_RTP307
A._nitida_RTP301
1
0.98
1
1
0.2
0.21
1
1
0.11
1
0.72
0.25
0.93
1
1
0.22
1
0.21
1
0.79
0.95
1
1
1
1
0.08
0.1
0.13
0.15
0.28
0.99
0.19
0.34
0.43
1
0.99
0.54
0.11
0.15
0.17
1
0.44
1
0.5
0.14
1
0.02
0.03
0.11
0.01
0.01
0.11
2.0

Fig. S2c


Genista_tenera_BG11
Genista_anglica_CEH2339
Pterospartum_tridentatum_CEH2338
Genista_pilosa_CEH2340
Retama_monosperma_CEH2182
Stauracanthus_genistoides_CEH2335
Spartium_junceum_CEH2190
Genista_umbellata_CEH1980
Lupinus_villosus_CEH1987
Lupinus_cumulicola_CEH1983
Lupinus_villosus_CEH1986
Lupinus_cumulicola_CEH1988
Lupinus_micranthus_CEH1982
Lupinus_hispanicus_PAN1
Lupinus_luteus_CEH1973
Lupinus_angustifolius_CEH1972
Lupinus_angustifolius_CEH1976
Lupinus_albus_BG7
Lupinus_albus_CEH1970
Lupinus_cosentinii_CEH1967
Lupinus_cosentinii_BG8
Lupinus_digitatus_BG9
Lupinus_texensis_BG10
Lupinus_texensis_SS
Lupinus_harvardii_USDA930123
Lupinus_harvardii_USDA910433
Lupinus_linearis_MP1798
Lupinus_linearis_MP1813
Lupinus_bracteolaris_MP1810_X
Lupinus_bracteolaris_MP1819
Lupinus_gibertiannus_MP1835
Lupinus_rubriflorus_MP1838
Lupinus_uleanus_MP1848
Lupinus_paranensis_MP218
Lupinus_bandelierae_CEH2301
Lupinus_bandelierae_CEH2310
Lupinus_bandelierae_CEH2318
Lupinus_bandelierae_CEH2327
Lupinus_bandelierae_CEH2321
Lupinus_lanatus_MP1837
Lupinus_lanatus_MP1806
Lupinus_multiflorus_MP1825
Lupinus_albescens_CEH2509
Lupinus_reitzii_MP1846
Lupinus_magnistipulatus_MP1840
Lupinus_magnistipulatus_MP164
Lupinus_paraguariensis_CEH2495
Lupinus_paraguariensis_CEH2496
Lupinus_parvifolius_CEH2480
Lupinus_guaraniticus_Kenicer
Lupinus_guaraniticus_CEH2488
Lupinus_crotalarioides_CEH2483
Lupinus_crotalarioides_CEH2481
Lupinus_crotalarioides_CEH2482
Lupinus_velutinus_CEH2478_2
Lupinus_velutinus_CEH2477
Lupinus_subsessilis_CEH2479
Lupinus_odoratus_CD0311A01
Lupinus_densiflorus_CD0331A02
Lupinus_microcarpus_Gardner1513
Lupinus_densiflorus_MP_BG2
Lupinus_densiflorus_HP_BG1
Lupinus_densiflorus_FP_BG3
Lupinus_densiflorus_TI_BG4
Lupinus_hirsutissimus_SS
Lupinus_hirsutissimus_USDA920120
Lupinus_truncatus_SS
Lupinus_concinnus_Baker10768
Lupinus_concinnus_CDB242
Lupinus_arizonicus_USDA577285
Lupinus_bicolor_USDA284713
Lupinus_polyphyllus_BG6
Lupinus_latifolius_Baker10938
Lupinus_polyphyllus_762
Lupinus_sericeus_777
Lupinus_argenteus_778
Lupinus_sierrae-blancae_Spell13409
Lupinus_argenteus_Spell13448
Lupinus_neomexicanus_Spell13422
Lupinus_andersonii_771
Lupinus_lepidus_USDAPI504439
Lupinus_lepidus_770
Lupinus_arboreus_cultUK
Lupinus_arboreus_BG5
Lupinus_arboreus_Kenicer120
Lupinus_rivularis_784
Lupinus_arboreus_Spell13488
Lupinus_lepidus_CDB254
Lupinus_argenteus_763
Lupinus_lactus_Spell13415
Lupinus_argenteus_761
Lupinus_grayi__793
Lupinus_breweri_764
Lupinus_breweri_792
Lupinus_chamissonis_Kenicer122
Lupinus_chamissonis_Kenicer121
Lupinus_montanus_CEH2174
Lupinus_CEH2160
Lupinus_CEH2117
Lupinus_CEH2107
Lupinus_CEH2118
Lupinus_mutabilis_CEH2291
Lupinus_mutabilis_CEH2009
Lupinus_misticola_RJE144
Lupinus_chrysanthus_CEH2390
Lupinus_chrysanthus_CEH2264
Lupinus_weberbaueri_CEH2233
Lupinus_CEH2005
Lupinus_RJE59
Lupinus_RJE206
Lupinus_semperflorens_CEH2030
Lupinus_arvensis_RJE188
Lupinus_microphyllus_CEH2272
Lupinus_CEH2002
Lupinus_chachas_CEH2027
Lupinus_mantaroensis_CEH2000
Lupinus_CEH2037
Lupinus_aff_ramosissimus_CEH2010
Lupinus_pulvinaris_CEH2273
Lupinus_bangii_CEH2250
Lupinus_piurensis_CEH1997
Lupinus_aff_sarmentosus_CEH2015
Lupinus_aff_bangii_CEH2370
Lupinus_huigrensis_RJE217
Lupinus_solangorum_CEH2014
Lupinus_CEH2004
Lupinus_mollendoensis_Weigend97/703
Lupinus_purosericeus_CEH2248
Lupinus_prostratus_CEH2239
Lupinus_nubigenus_RJE200
Lupinus_lindleyanus_RJE141
Lupinus_carpapaticus_RJE158
Lupinus_semperflorens_CEH2012
Lupinus_semperflorens_RJE219
Lupinus_semperflorens_RJE220
Lupinus_tarapacensis_Gardner6296
Lupinus_pubescens_RJE176
Lupinus_subacaulis_CEH2319
Lupinus_ballianus_CEH2038
Lupinus_huaronensis_CEH2241
Lupinus_tomentosus_CEH2322
Lupinus_piurensis_RJE110
Lupinus_RJE174
Lupinus_tominensis_CEH2294
Lupinus_praestabilis_CEH2353
Lupinus_bangii_CEH2444
Lupinus_RJE168
Lupinus_microphyllus_CEH2238
2.0

Fig. S2d

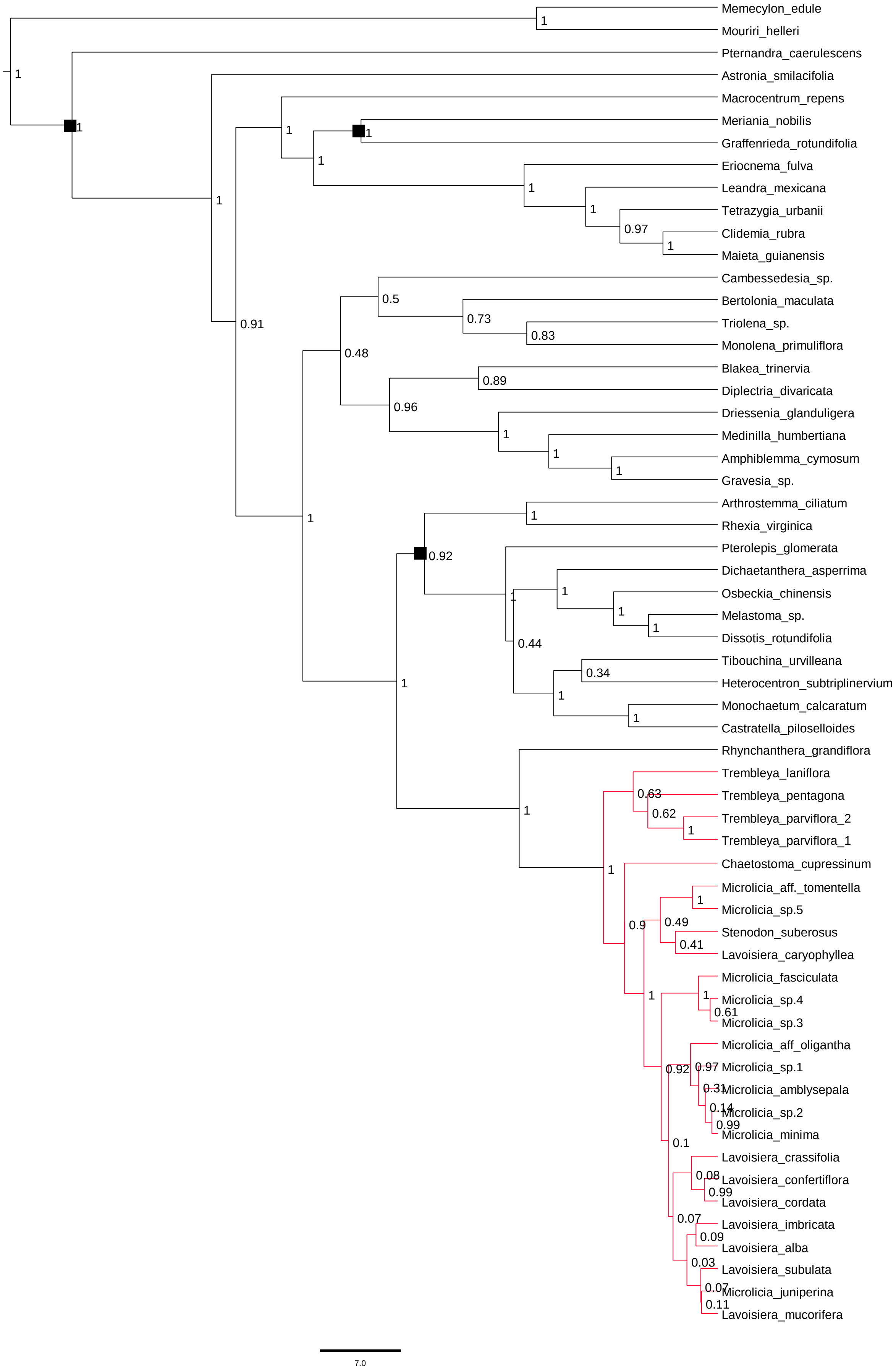

Memecylon_edule
1
Mouriri_helleri
Pternandra_caerulescens
1
Astronia_smilacifolia
Macrocentrum_repens
1
Meriania_nobilis
1
1
Graffenrieda_rotundifolia
1
Eriocnema_fulva
Leandra_mexicana
1
1
1
Tetrazygia_urbanii
0.97
Clidemia_rubra
1
Maieta_guianensis
Cambessedesia_sp.
0.5
Bertolonia_maculata
0.73
Triolena_sp.
0.91
0.83
Monolena_primuliflora
0.48
Blakea_trinervia
0.89
Diplectria_divaricata
0.96
Driessenia_glanduligera
1
Medinilla_humbertiana
1
Amphiblemma_cymosum
1
Gravesia_sp.
Arthrostemma_ciliatum
1
1
Rhexia_virginica
Pterolepis_glomerata
0.92
Dichaetanthera_asperrima
1
Osbeckia_chinensis
1
1
Melastoma_sp.
1
Dissotis_rotundifolia
0.44
Tibouchina_urvilleana
0.34
Heterocentron_subtriplinervium
1
1
Monochaetum_calcaratum
1
Castratella_piloselloides
Rhynchanthera_grandiflora
Trembleya_laniflora
0.63
Trembleya_pentagona
1
0.62
Trembleya_parviflora_2
1
Trembleya_parviflora_1
Chaetostoma_cupressinum
1
Microlicia_aff._tomentella
1
Microlicia_sp.5
0.49
0.9
Stenodon_suberosus
0.41
Lavoisiera_caryophyllea
Microlicia_fasciculata
1
1
Microlicia_sp.4
0.61
Microlicia_sp.3
Microlicia_aff_oligantha
0.97
0.92
Microlicia_sp.1
0.31
Microlicia_amblysepala
0.14
Microlicia_sp.2
0.99
Microlicia_minima
0.1
Lavoisiera_crassifolia
0.08
Lavoisiera_confertiflora
0.99
Lavoisiera_cordata
0.07
Lavoisiera_imbricata
0.09
Lavoisiera_alba
0.03
Lavoisiera_subulata
0.07
Microlicia_juniperina
0.11
Lavoisiera_mucorifera
7.0

Fig. S3a

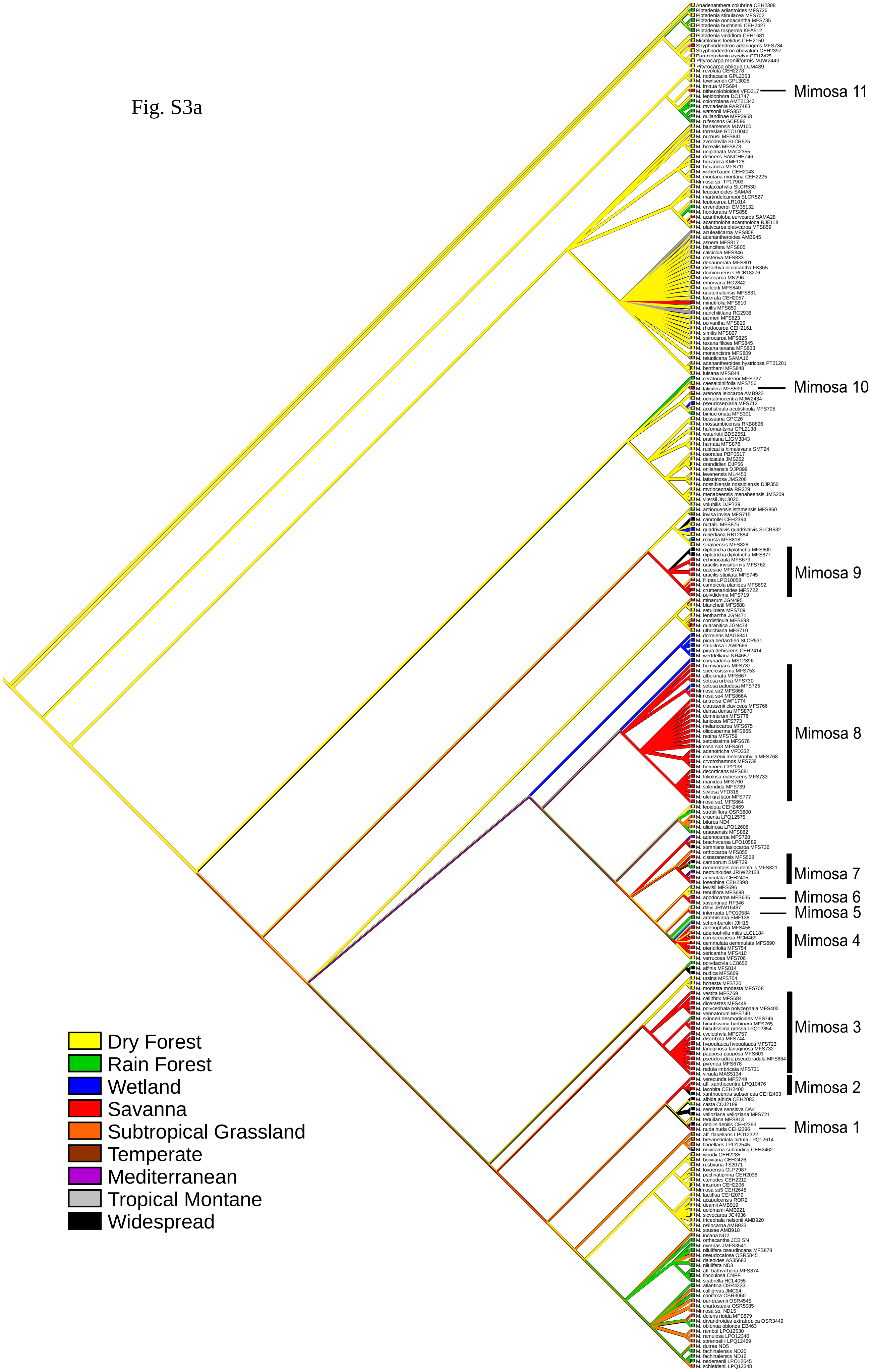

Anadenanthera colubrina CEH2308
Piptadenia adiantoides MFS726
Piptadenia stipulacea MFS702
Piptadenia gonoacantha MFS735
Piptadenia buchtienii CEH2427
Piptadenia trisperma KEA512
Piptadenia viridiflora CEH1681
Microlobius foetidus CEH2150
Stryphnodendron adstringens MFS734
Stryphnodendron obovatum CEH2397
Parapiptadenia excelsa CEH2425
Pityrocarpa moniliformis MJW2449
Pityrocarpa obliqua DJM439
M. revoluta CEH2278
M. nothacacia GPL2353
M. townsendii GPL3025
M. irrigua MFS694
M. pithecolobioides VFD317
Mimosa 11
M. lepidophora DC1747
M. colombiana AMT21343
M. myriadenia PAR7483
M. watsonii MFS857
M. guilandinae MFP3958
M. rufescens GCF596
M. bahamensis MJW100
M. torresiae RTC10040
M. purpusii MFS841
M. zygophylla SLCR525
M. borealis MFS873
M. unipinnata MAC2355
M. detinens SANCHEZ46
M. hexandra KMF128
M. hexandra MFS711
M. weberbaueri CEH2043
M. montana montana CEH2225
Mimosa sp. TP17903
M. malacophylla SLCR530
M. leucaenoides SAMA8
M. martindelcampoi SLCR527
M. leptocarpa LR1014
M. ervendbergii EM35132
M. hondurana MFS858
M. acantholoba eurycarpa SAMA28
M. acantholoba acantholoba RJE118
M. platycarpa platycarpa MFS859
M. aculeaticarpa MFS808
M. adenantheroides AMB945
M. aspera MFS817
M. biuncifera MFS805
M. calcicola MFS846
M. costenya MFS833
M. depauperata MFS801
M. distachya oligacantha FK365
M. dominguensis RCB18276
M. dysocarpa MN296
M. emoryana RG2842
M. galleotti MFS840
M. guatemalensis MFS831
M. lacerata CEH2057
M. minutifolia MFS810
M. mollis MFS850
M. nanchititlana RG2938
M. palmeri MFS823
M. polyantha MFS829
M. rhodocarpa CEH2161
M. similis MFS807
M. spirocarpa MFS825
M. texana filipes MFS845
M. texana texana MFS803
M. monancistra MFS809
M. tejupilcana SAMA16
M. adenantheroides hystricosa PT21201
M. benthami MFS848
M. luisana MFS844
M. ceratonia interior MFS727
M. caesalpiniifolia MFS756
M. laticifera MFS599
Mimosa 10
M. arenosa leiocarpa AMB923
M. ophtalmocentra MJW2434
M. pseudosepiaria MFS712
M. acutistipula acutistipula MFS705
M. bimucronata MFS301
M. busseana GPC26
M. mossambicensis RKB8896
M. hafomantsina GPL2138
M. waterlotii BDS2551
M. prainiana LJGM3843
M. hamata MFS876
M. rubicaulis himalayana SMT24
M. psoralea PBP3517
M. delicatula JMS262
M. grandidieri DJP56
M. onilahensis DJP899
M. levenensis ML4453
M. latispinosa JMS206
M. nossibiensis nossibiensis DJP350
M. myriocephala RR329
M. menabeensis menabeensis JMS209
M. vilersii JNL3020
M. volubilis DJP739
M. antioquensis isthmensis MFS860
M. invisa invisa MFS715
M. candollei CEH2394
M. nuttallii MFS875
M. quadrivalvis quadrivalvis SLCR532
M. rupertiana RB12884
M. robusta MFS818
M. sinaloensis MFS828
M. diplotricha diplotricha MFS600
M. diplotricha diplotricha MFS877
M. echinocaula MFS679
M. gracilis invisiformis MFS762
M. gatesiae MFS741
M. gracilis stipitata MFS745
M. filipes LPO10058
M. campicola planipes MFS692
M. crumenarioides MFS722
M. polydidyma MFS719
Mimosa 9
M. minarum JGN495
M. blanchetii MFS688
M. setuligera MFS709
M. lepthantha JGN471
M. cordistipula MFS693
M. guaranitica JGN474
M. ulbrichiana MFS710
M. dormiens MAG6841
M. pigra berlandieri SLCR531
M. strigillosa LAW2666
M. pigra dehiscens CEH2414
M. weddelliana NR4657
M. corynadenia MS12896
M. humivagans MFS737
M. speciosissima MFS753
M. albolanata MFS667
M. setosa urbica MFS730
M. setosa paludosa MFS725
Mimosa sp2 MFS866
Mimosa sp4 MFS866A
M. antrorsa CWF1774
M. claussenii claviceps MFS766
M. densa densa MFS870
M. dominarum MFS776
M. laniceps MFS773
M. melanocarpa MFS675
M. oligosperma MFS865
M. regina MFS759
M. setosissima MFS676
Mimosa sp3 MFS461
M. adenotricha VFD332
M. claussenii megistophylla MFS768
M. cryptothamnos MFS738
M. heringeri CP2138
M. decorticans MFS681
M. foliolosa pubescens MFS733
M. manidea MFS760
M. splendida MFS739
M. stylosa VFD318
M. ulei grallator MFS777
Mimosa sp1 MFS864
Mimosa 8
M. lepidota CEH2469
M. strobiliflora OSR3600
M. cruenta LPQ12575
M. bifurca ND4
M. uliginosa LPO12608
M. uraguensis MFS862
M. adenocarpa MFS728
M. brachycarpa LPO10589
M. somnians lasiocarpa MFS736
M. orthocarpa MFS855
M. cisparanensis MFS568
M. camporum SMF729
M. occidentalis occidentalis MFS821
M. neptunioides JRIW22123
M. auriculata CEH2405
M. josephina CEH2398
Mimosa 7
M. lewisii MFS696
M. tenuiflora MFS698
M. apodocarpa MFS635
Mimosa 6
M. xavantinae RF346
M. dalyi JRIW16487
M. interrupta LPO10584
Mimosa 5
M. artemisiana SMF138
M. schomburgkii JJH15
M. adenophylla MFS458
M. adenophylla mitis LLCL184
M. coruscocaesia RCM469
M. gemmulata gemmulata MFS690
M. pteridifolia MFS754
M. sericantha MFS410
M. verrucosa MFS706
Mimosa 4
M. polydactyla LC8652
M. affinis MFS814
M. pudica MFS669
M. ursina MFS704
M. honesta MFS720
M. modesta modesta MFS708
M. vestita MFS769
M. callithrix MFS684
M. dicerastes MFS448
M. polycephala polycephala MFS400
M. vennatorum MFS740
M. skinneri desmodioides MFS746
M. hirsutissima barbigera MFS765
M. hirsutissima grossa LPQ12854
M. cyclophyla MFS757
M. discobola MFS744
M. hypoglauca hypoglauca MFS723
M. lanuginosa lanuginosa MFS732
M. papposa papposa MFS601
M. pseudoradula pseudoradula MFS664
M. pyrenea MFS678
M. radula imbricata MFS731
M. virgula MAS5134
Mimosa 3
M. verecunda MFS749
M. aff. xanthocentra LPQ10476
M. iacobita CEH2400
M. xanthocentra subsericea CEH2403
Mimosa 2
M. albida albida CEH2083
M. casta CDJ2189
M. sensitiva sensitiva DA4
M. velloziana velloziana MFS721
M. tequilana MFS813
M. debilis debilis CEH2393
M. nuda nuda CEH2396
Mimosa 1
M. aff. flagellaris LPO12322
M. brevipetiolata hirtula LPQ12614
M. flagellaris LPO12545
M. polycarpa subandina CEH2462
M. woodii CEH2285
M. boliviana CEH2426
M. rusbyana TS2071
M. loxoensis GLP2987
M. pectinatipinna CEH2036
M. ctenodes CEH2212
M. incarum CEH2206
Mimosa sp5 CEH2648
M. lactiflua CEH2079
M. acapulcensis ROR2
M. deamii AMB919
M. goldmanii AMB921
M. sicyocarpa JC4936
M. tricephala nelsonii AMB920
M. psilocarpa AMB933
M. sousae AMB918
M. incana ND2
M. orthacantha JCB SN
M. gymnas JMFS3541
M. pilulifera pseudincana MFS878
M. pseudocalosa OSR5845
M. daleoides AS35683
M. pilulifera ND3
M. aff. bathyrrhena MFS874
M. flocculosa CNPF
M. scabrella HCL4055
M. atlantica OSR4333
M. callidryas JMC94
M. coniflora OSR3060
M. per-dusenii OSR4545
M. chartostegia OSR5085
Mimosa sp. ND15
M. dolens rigida MFS879
M. dryandroides extratropica OSR3449
M. oblonga oblonga EB463
M. ramboi LPQ12530
M. ramulosa LPO12340
M. sprengellii LPQ12469
M. dutrae ND5
M. fachinalensis ND20
M. fachinalensis ND16
M. pedersenii LPQ12645
M. schleidenii LPQ12348
🟨 Dry Forest
🟩 Rain Forest
🟦 Wetland
🟥 Savanna
🟧 Subtropical Grassland
🟫 Temperate
🟪 Mediterranean
⬜ Tropical Montane
⬛ Widespread

Fig. S3b

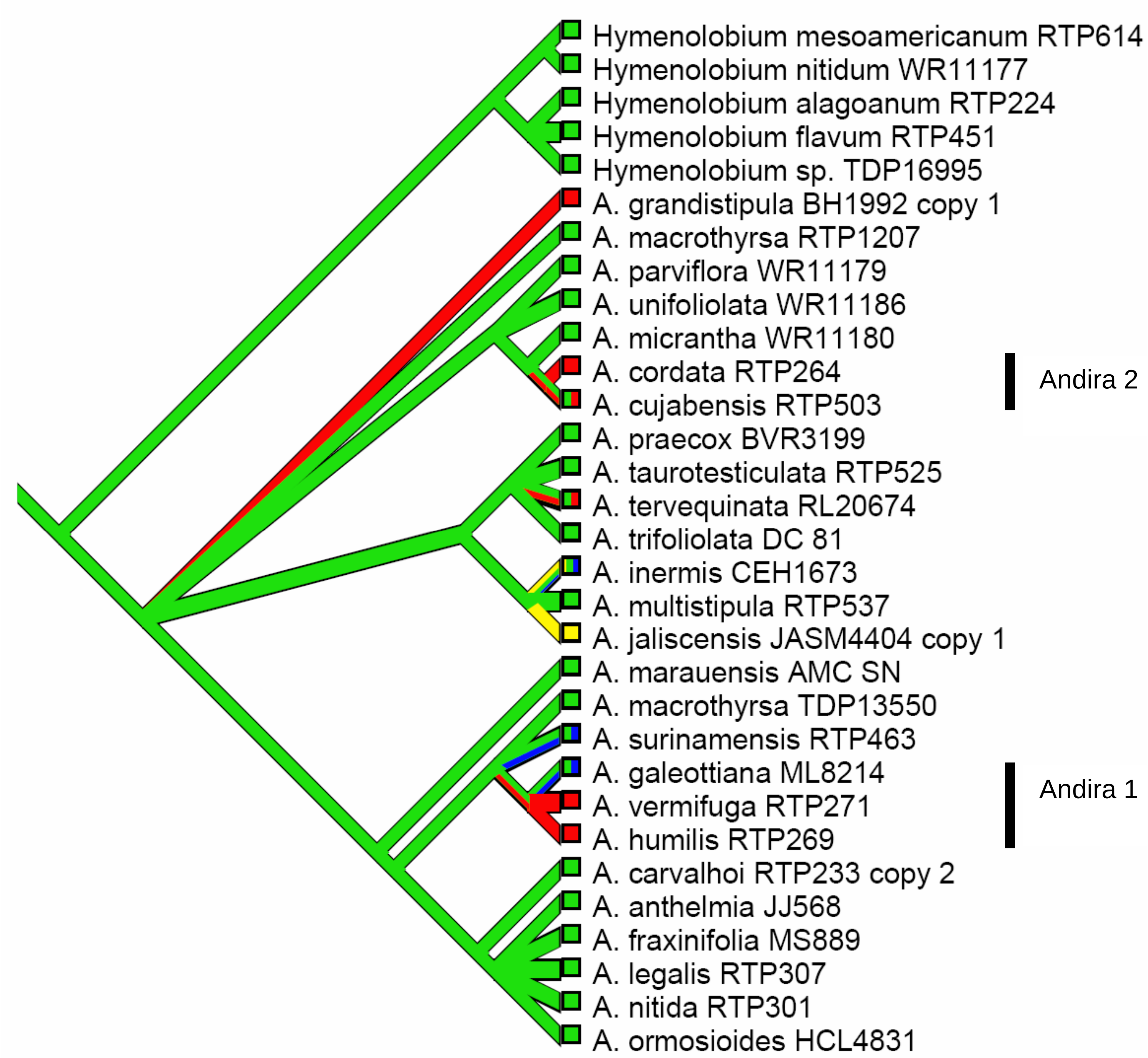

Hymenolobium mesoamericanum RTP614
Hymenolobium nitidum WR11177
Hymenolobium alagoanum RTP224
Hymenolobium flavum RTP451
Hymenolobium sp. TDP16995
A. grandistipula BH1992 copy 1
A. macrothyrsa RTP1207
A. parviflora WR11179
A. unifoliolata WR11186
A. micrantha WR11180
A. cordata RTP264
A. cujabensis RTP503
Andira 2
A. praecox BVR3199
A. taurotesticulata RTP525
A. tervequinata RL20674
A. trifoliolata DC 81
A. inermis CEH1673
A. multistipula RTP537
A. jaliscensis JASM4404 copy 1
A. marauensis AMC SN
A. macrothyrsa TDP13550
A. surinamensis RTP463
A. galeottiana ML8214
A. vermifuga RTP271
A. humilis RTP269
Andira 1
A. carvalhoi RTP233 copy 2
A. anthelmia JJ568
A. fraxinifolia MS889
A. legalis RTP307
A. nitida RTP301
A. ormosioides HCL4831

Fig. S3c

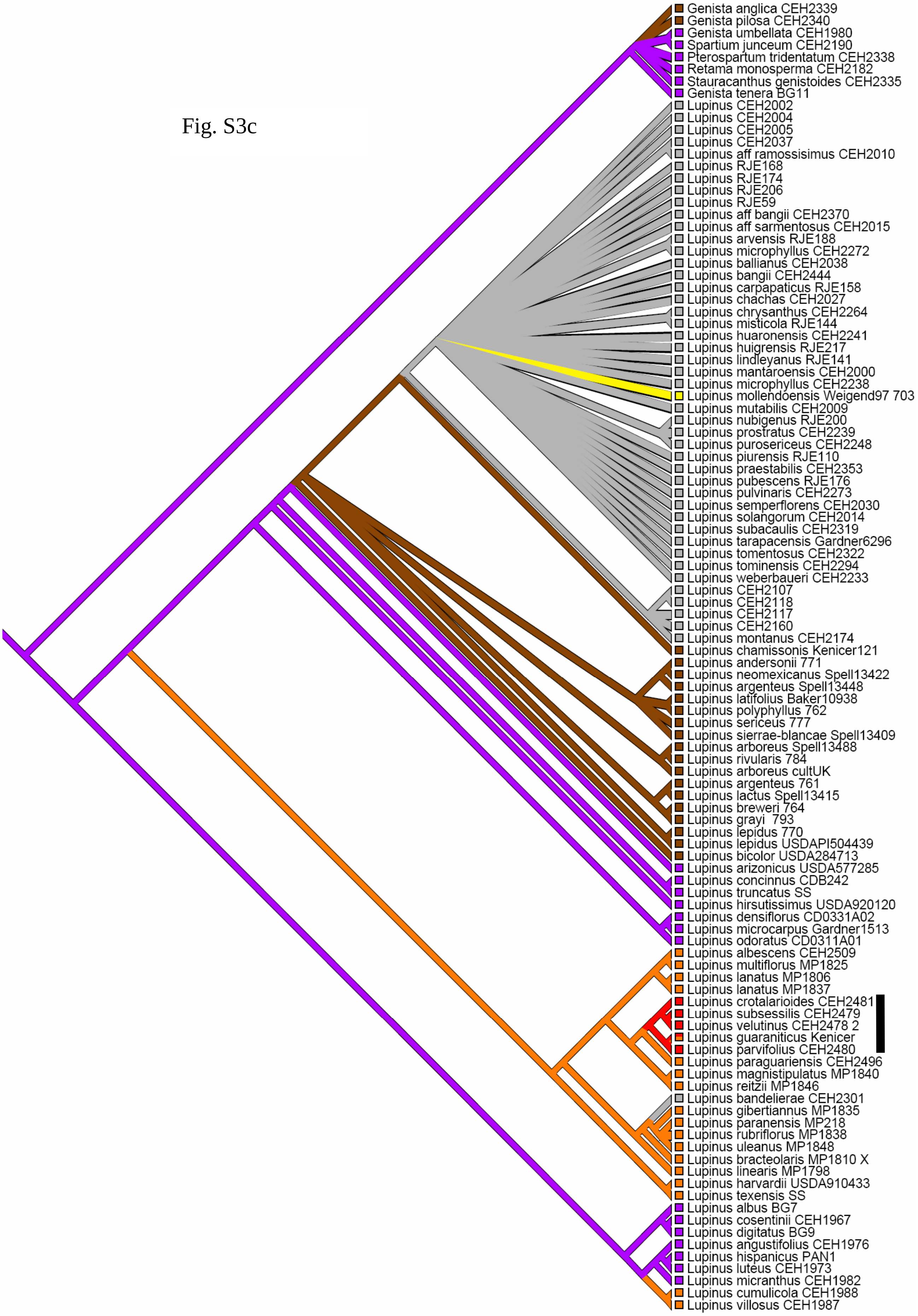

Genista anglica CEH2339
Genista pilosa CEH2340
Genista umbellata CEH1980
Spartium junceum CEH2190
Pterospartum tridentatum CEH2338
Retama monosperma CEH2182
Stauracanthus genistoides CEH2335
Genista tenera BG11
Lupinus CEH2002
Lupinus CEH2004
Lupinus CEH2005
Lupinus CEH2037
Lupinus aff ramossisimus CEH2010
Lupinus RJE168
Lupinus RJE174
Lupinus RJE206
Lupinus RJE59
Lupinus aff bangii CEH2370
Lupinus aff sarmentosus CEH2015
Lupinus arvensis RJE188
Lupinus microphyllus CEH2272
Lupinus ballianus CEH2038
Lupinus bangii CEH2444
Lupinus carpapaticus RJE158
Lupinus chachas CEH2027
Lupinus chrysanthus CEH2264
Lupinus misticola RJE144
Lupinus huaronensis CEH2241
Lupinus huigrensis RJE217
Lupinus lindleyanus RJE141
Lupinus mantaroensis CEH2000
Lupinus microphyllus CEH2238
Lupinus mollendoensis Weigend97 703
Lupinus mutabilis CEH2009
Lupinus nubigenus RJE200
Lupinus prostratus CEH2239
Lupinus purosericeus CEH2248
Lupinus piurensis RJE110
Lupinus praestabilis CEH2353
Lupinus pubescens RJE176
Lupinus pulvinaris CEH2273
Lupinus semperflorens CEH2030
Lupinus solangorum CEH2014
Lupinus subacaulis CEH2319
Lupinus tarapacensis Gardner6296
Lupinus tomentosus CEH2322
Lupinus tominensis CEH2294
Lupinus weberbaueri CEH2233
Lupinus CEH2107
Lupinus CEH2118
Lupinus CEH2117
Lupinus CEH2160
Lupinus montanus CEH2174
Lupinus chamissonis Kenicer121
Lupinus andersonii 771
Lupinus neomexicanus Spell13422
Lupinus argenteus Spell13448
Lupinus latifolius Baker10938
Lupinus polyphyllus 762
Lupinus sericeus 777
Lupinus sierrae-blancae Spell13409
Lupinus arboreus Spell13488
Lupinus rivularis 784
Lupinus arboreus cultUK
Lupinus argenteus 761
Lupinus lactus Spell13415
Lupinus breweri 764
Lupinus grayi 793
Lupinus lepidus 770
Lupinus lepidus USDAPI504439
Lupinus bicolor USDA284713
Lupinus arizonicus USDA577285
Lupinus concinnus CDB242
Lupinus truncatus SS
Lupinus hirsutissimus USDA920120
Lupinus densiflorus CD0331A02
Lupinus microcarpus Gardner1513
Lupinus odoratus CD0311A01
Lupinus albescens CEH2509
Lupinus multiflorus MP1825
Lupinus lanatus MP1806
Lupinus lanatus MP1837
Lupinus crotalarioides CEH2481
Lupinus subsessilis CEH2479
Lupinus velutinus CEH2478 2
Lupinus guaraniticus Kenicer
Lupinus parvifolius CEH2480
Lupinus paraguariensis CEH2496
Lupinus magnistipulatus MP1840
Lupinus reitzii MP1846
Lupinus bandelierae CEH2301
Lupinus gibertiannus MP1835
Lupinus paranensis MP218
Lupinus rubriflorus MP1838
Lupinus uleanus MP1848
Lupinus bracteolaris MP1810 X
Lupinus linearis MP1798
Lupinus harvardii USDA910433
Lupinus texensis SS
Lupinus albus BG7
Lupinus cosentinii CEH1967
Lupinus digitatus BG9
Lupinus angustifolius CEH1976
Lupinus hispanicus PAN1
Lupinus luteus CEH1973
Lupinus micranthus CEH1982
Lupinus cumulicola CEH1988
Lupinus villosus CEH1987

Fig. S3d


Memecylon edule
Mouriri helleri
Pternandra caerulescens
Astronia smilacifolia
Macrocentrum repens
Graffenrieda rotundifolia
Meriania nobilis
Eriocnema fulva
Leandra mexicana
Tetrazygia urbanii
Clidemia rubra
Maieta guianensis
Cambessedesia sp.
Bertolonia maculata
Monolena primuliflora
Triolena sp.
Blakea trinervia
Diplectria divaricata
Driessenia glanduligera
Medinilla humbertiana
Amphiblemma cymosum
Gravesia sp.
Arthrostemma ciliatum
Rhexia virginica
Pterolepis glomerata
Tibouchina urvilleana
Heterocentron subtriplinervium
Castratella piloselloides
Monochaetum calcaratum
Dichaetanthera asperrima
Osbeckia chinensis
Dissotis rotundifolia
Melastoma sp.
Rhynchanthera grandiflora
Trembleya laniflora
Trembleya pentagona
Trembleya parviflora 1
Trembleya parviflora 2
Chaetostoma cupressinum
Lavoisiera caryophyllea
Stenodon suberosus
Microlicia aff. tomentella
Microlicia sp.5
Lavoisiera alba
Lavoisiera crassifolia
Lavoisiera imbricata
Lavoisiera mucorifera
Lavoisiera subulata
Microlicia juniperina
Lavoisiera cordata
Lavoisiera confertiflora
Microlicia fasciculata
Microlicia sp.3
Microlicia sp.4
Microlicia aff. oligantha
Microlicia amblysepala
Microlicia sp.1
Microlicia minima
Microlicia sp.2

Fig. S4a

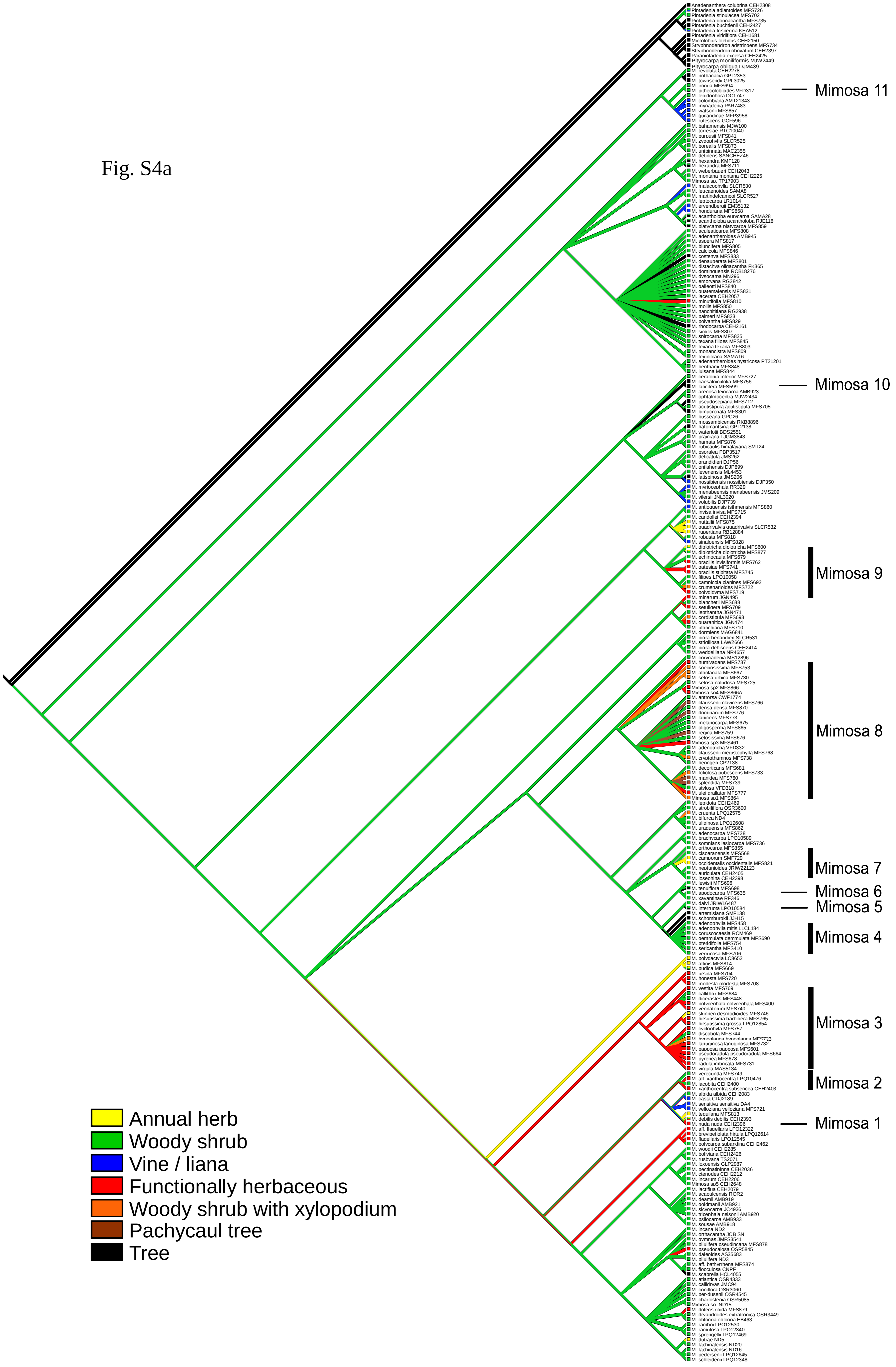

Anadenanthera colubrina CEH2308
Piptadenia adiantoides MFS726
Piptadenia stipulacea MFS702
Piptadenia gonoacantha MFS735
Piptadenia buchtienii CEH2427
Piptadenia trisperma KEA512
Piptadenia viridiflora CEH1681
Microlobius foetidus CEH2150
Stryphnodendron adstringens MFS734
Stryphnodendron obovatum CEH2397
Parapiptadenia excelsa CEH2425
Pityrocarpa moniliformis MJW2449
Pityrocarpa obliqua DJM439
M. revoluta CEH2278
M. nothacacia GPL2353
M. townsendii GPL3025
M. irrigua MFS694
M. pithecolobioides VFD317
M. lepidophora DC1747
M. colombiana AMT21343
M. myriadenia PAR7483
M. watsonii MFS857
M. guilandinae MFP3958
M. rufescens GCF596
M. bahamensis MJW100
M. torresiae RTC10040
M. purpusii MFS841
M. zygophylla SLCR525
M. borealis MFS873
M. unipinnata MAC2355
M. detinens SANCHEZ46
M. hexandra KMF128
M. hexandra MFS711
M. weberbaueri CEH2043
M. montana montana CEH2225
Mimosa sp. TP17903
M. malacophylla SLCR530
M. leucaenoides SAMA8
M. martindelcampoi SLCR527
M. leptocarpa LR1014
M. ervendbergii EM35132
M. hondurana MFS858
M. acantholoba eurycarpa SAMA28
M. acantholoba acantholoba RJE118
M. platycarpa platycarpa MFS859
M. aculeaticarpa MFS808
M. adenantheroides AMB945
M. aspera MFS817
M. biuncifera MFS805
M. calcicola MFS846
M. costenya MFS833
M. depauperata MFS801
M. distachya oligacantha FK365
M. dominguensis RCB18276
M. dysocarpa MN296
M. emoryana RG2842
M. galleotti MFS840
M. guatemalensis MFS831
M. lacerata CEH2057
M. minutifolia MFS810
M. mollis MFS850
M. nanchititlana RG2938
M. palmeri MFS823
M. polyantha MFS829
M. rhodocarpa CEH2161
M. similis MFS807
M. spirocarpa MFS825
M. texana filipes MFS845
M. texana texana MFS803
M. monancistra MFS809
M. tejupilcana SAMA16
M. adenantheroides hystricosa PT21201
M. benthami MFS848
M. luisana MFS844
M. ceratonia interior MFS727
M. caesalpiniifolia MFS756
M. laticifera MFS599
M. arenosa leiocarpa AMB923
M. ophtalmocentra MJW2434
M. pseudosepiaria MFS712
M. acutistipula acutistipula MFS705
M. bimucronata MFS301
M. busseana GPC26
M. mossambicensis RKB8896
M. hafomantsina GPL2138
M. waterlotii BDS2551
M. prainiana LJGM3843
M. hamata MFS876
M. rubicaulis himalayana SMT24
M. psoralea PBP3517
M. delicatula JMS262
M. grandidieri DJP56
M. onilahensis DJP899
M. levenensis ML4453
M. latispinosa JMS206
M. nossibiensis nossibiensis DJP350
M. myriocephala RR329
M. menabeensis menabeensis JMS209
M. vilersii JNL3020
M. volubilis DJP739
M. antioquensis isthmensis MFS860
M. invisa invisa MFS715
M. candollei CEH2394
M. nuttallii MFS875
M. quadrivalvis quadrivalvis SLCR532
M. rupertiana RB12884
M. robusta MFS818
M. sinaloensis MFS828
M. diplotricha diplotricha MFS600
M. diplotricha diplotricha MFS877
M. echinocaula MFS679
M. gracilis invisiformis MFS762
M. gatesiae MFS741
M. gracilis stipitata MFS745
M. filipes LPQ10058
M. campicola planipes MFS692
M. crumenarioides MFS722
M. polydidyma MFS719
M. minarum JGN495
M. blanchetii MFS688
M. setuligera MFS709
M. lepthantha JGN471
M. cordistipula MFS693
M. guaranitica JGN474
M. ulbrichiana MFS710
M. dormiens MAG6841
M. pigra berlandieri SLCR531
M. strigillosa LAW2666
M. pigra dehiscens CEH2414
M. weddelliana NR4657
M. corynadenia MS12896
M. humivagans MFS737
M. speciosissima MFS753
M. albolanata MFS667
M. setosa urbica MFS730
M. setosa paludosa MFS725
Mimosa sp2 MFS866
Mimosa sp4 MFS866A
M. antrorsa CWF1774
M. claussenii claviceps MFS766
M. densa densa MFS870
M. dominarum MFS776
M. laniceps MFS773
M. melanocarpa MFS675
M. oligosperma MFS865
M. regina MFS759
M. setosissima MFS676
Mimosa sp3 MFS461
M. adenotricha VFD332
M. claussenii megistophylla MFS768
M. cryptothamnos MFS738
M. heringeri CP2138
M. decorticans MFS681
M. foliolosa pubescens MFS733
M. manidea MFS760
M. splendida MFS739
M. stylosa VFD318
M. ulei grallator MFS777
Mimosa sp1 MFS864
M. lepidota CEH2469
M. strobiliflora OSR3600
M. cruenta LPQ12575
M. bifurca ND4
M. uliginosa LPQ12608
M. uraguensis MFS862
M. adenocarpa MFS728
M. brachycarpa LPQ10589
M. somnians lasiocarpa MFS736
M. orthocarpa MFS855
M. cisparanensis MFS568
M. camporum SMF729
M. occidentalis occidentalis MFS821
M. neptunioides JRIW22123
M. auriculata CEH2405
M. josephina CEH2398
M. lewisii MFS696
M. tenuiflora MFS698
M. apodocarpa MFS635
M. xavantinae RF346
M. dalyi JRIW16487
M. interrupta LPQ10584
M. artemisiana SMF138
M. schomburgkii JJH15
M. adenophylla MFS458
M. adenophylla mitis LLCL184
M. coruscocaesia RCM469
M. gemmulata gemmulata MFS690
M. pteridifolia MFS754
M. sericantha MFS410
M. verrucosa MFS706
M. polydactyla LC8652
M. affinis MFS814
M. pudica MFS669
M. ursina MFS704
M. honesta MFS720
M. modesta modesta MFS708
M. vestita MFS769
M. callithrix MFS684
M. dicerastes MFS448
M. polycephala polycephala MFS400
M. vennatorum MFS740
M. skinneri desmodioides MFS746
M. hirsutissima barbigera MFS765
M. hirsutissima grossa LPQ12854
M. cyclophyla MFS757
M. discobola MFS744
M. hypoglauca hypoglauca MFS723
M. lanuginosa lanuginosa MFS732
M. papposa papposa MFS601
M. pseudoradula pseudoradula MFS664
M. pyrenea MFS678
M. radula imbricata MFS731
M. virgula MAS5134
M. verecunda MFS749
M. aff. xanthocentra LPQ10476
M. iacobita CEH2400
M. xanthocentra subsericea CEH2403
M. albida albida CEH2083
M. casta CDJ2189
M. sensitiva sensitiva DA4
M. velloziana velloziana MFS721
M. tequilana MFS813
M. debilis debilis CEH2393
M. nuda nuda CEH2396
M. aff. flagellaris LPQ12322
M. brevipetiolata hirtula LPQ12614
M. flagellaris LPQ12545
M. polycarpa subandina CEH2462
M. woodii CEH2285
M. boliviana CEH2426
M. rusbyana TS2071
M. loxoensis GLP2987
M. pectinatipinna CEH2036
M. ctenodes CEH2212
M. incarum CEH2206
Mimosa sp5 CEH2648
M. lactiflua CEH2079
M. acapulcensis ROR2
M. deamii AMB919
M. goldmanii AMB921
M. sicyocarpa JC4936
M. tricephala nelsonii AMB920
M. psilocarpa AMB933
M. sousae AMB918
M. incana ND2
M. orthacantha JCB SN
M. gymnas JMFS3541
M. pilulifera pseudincana MFS878
M. pseudocalosa OSR5845
M. daleoides AS35683
M. pilulifera ND3
M. aff. bathyrrhena MFS874
M. flocculosa CNPF
M. scabrella HCL4055
M. atlantica OSR4333
M. callidryas JMC94
M. coniflora OSR3060
M. per-dusenii OSR4545
M. chartostegia OSR5085
Mimosa sp. ND15
M. dolens rigida MFS879
M. dryandroides extratropica OSR3449
M. oblonga oblonga EB463
M. ramboi LPQ12530
M. ramulosa LPQ12340
M. sprengellii LPQ12469
M. dutrae ND5
M. fachinalensis ND20
M. fachinalensis ND16
M. pedersenii LPQ12645
M. schleidenii LPQ12348
Mimosa 11
Mimosa 10
Mimosa 9
Mimosa 8
Mimosa 7
Mimosa 6
Mimosa 5
Mimosa 4
Mimosa 3
Mimosa 2
Mimosa 1
🟨 Annual herb
🟩 Woody shrub
🟦 Vine / liana
🟥 Functionally herbaceous
🟧 Woody shrub with xylopodium
🟫 Pachycaul tree
⬛ Tree

Fig. S4b

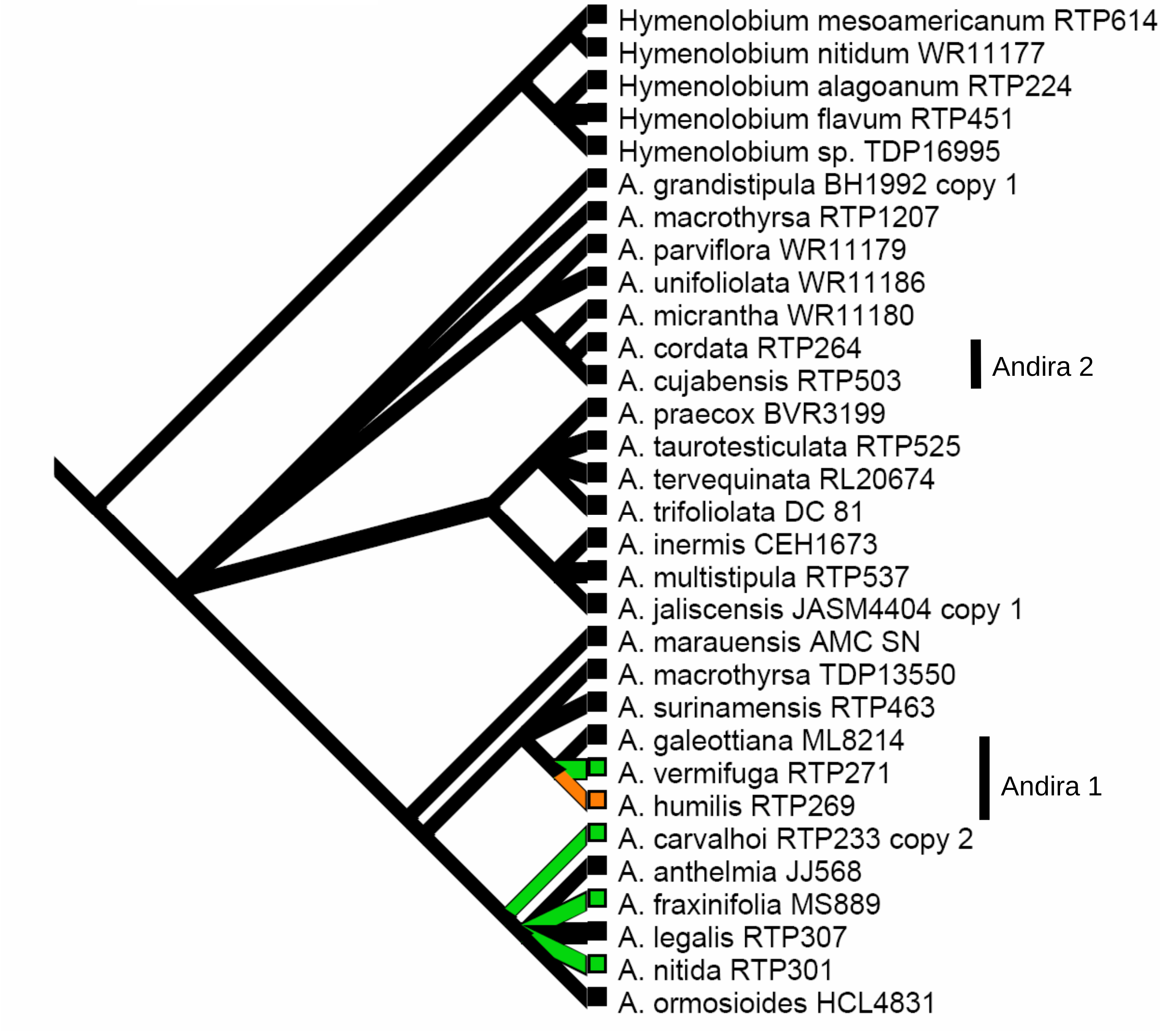
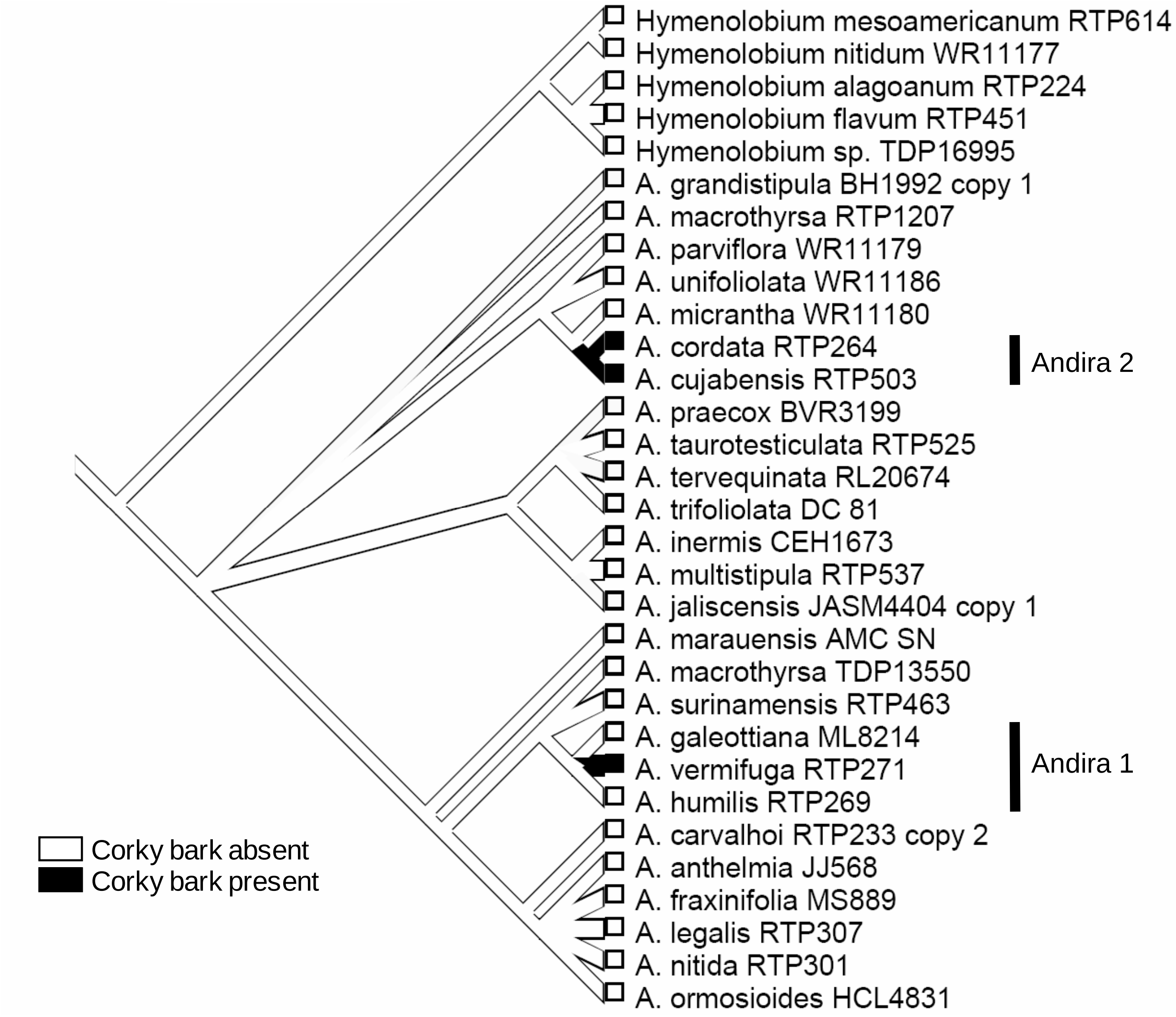

Hymenolobium mesoamericanum RTP614
Hymenolobium nitidum WR11177
Hymenolobium alagoanum RTP224
Hymenolobium flavum RTP451
Hymenolobium sp. TDP16995
A. grandistipula BH1992 copy 1
A. macrothyrsa RTP1207
A. parviflora WR11179
A. unifoliolata WR11186
A. micrantha WR11180
A. cordata RTP264
A. cujabensis RTP503
Andira 2
A. praecox BVR3199
A. taurotesticulata RTP525
A. tervequinata RL20674
A. trifoliolata DC 81
A. inermis CEH1673
A. multistipula RTP537
A. jaliscensis JASM4404 copy 1
A. marauensis AMC SN
A. macrothyrsa TDP13550
A. surinamensis RTP463
A. galeottiana ML8214
A. vermifuga RTP271
A. humilis RTP269
Andira 1
A. carvalhoi RTP233 copy 2
A. anthelmia JJ568
A. fraxinifolia MS889
A. legalis RTP307
A. nitida RTP301
A. ormosioides HCL4831

Fig. S4c


Hymenolobium mesoamericanum RTP614
Hymenolobium nitidum WR11177
Hymenolobium alagoanum RTP224
Hymenolobium flavum RTP451
Hymenolobium sp. TDP16995
A. grandistipula BH1992 copy 1
A. macrothyrsa RTP1207
A. parviflora WR11179
A. unifoliolata WR11186
A. micrantha WR11180
A. cordata RTP264
A. cujabensis RTP503
Andira 2
A. praecox BVR3199
A. taurotesticulata RTP525
A. tervequinata RL20674
A. trifoliolata DC 81
A. inermis CEH1673
A. multistipula RTP537
A. jaliscensis JASM4404 copy 1
A. marauensis AMC SN
A. macrothyrsa TDP13550
A. surinamensis RTP463
A. galeottiana ML8214
A. vermifuga RTP271
A. humilis RTP269
Andira 1
A. carvalhoi RTP233 copy 2
A. anthelmia JJ568
A. fraxinifolia MS889
A. legalis RTP307
A. nitida RTP301
A. ormosioides HCL4831
☐ Corky bark absent
■ Corky bark present