

Additional file 6. The amino acid sequences alignment of the proteins from 133 species used in the phylogenetic analyses.

>Aucuba

MERWWFNSMFFLSKSMDSLGPNIENISE--DPTINDTTKKIHSYSNVDNLFGIKDIGNFIADDT  
FLVRDSNGDSYSIYFDIENQIFEIDNDH--SFLNELESSFYSYRN-----NGSKSDDPYDYDRMY  
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>Bulnesia

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>Dillenia

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>Ehretia

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>Gunnera

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>Ilex

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>Lonicera

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DLFTLSITEP-DLVYHRGFASFIDSYGLDQKQ--FLNEVFNSRDESKKKSL---LVLPPIFY--EEN  
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NVWNRFFLMN---RSDRNFEYGIQ---GDQIGKDTLNHRTIMKYTINQHLSNLKK-SQKRWFD  
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VGK--KKHAFWG-RGTISPIESQVSNIIPNDFPQSGDET-YNLYKS---FHFPSRPDPFVR--RAI  
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SKCLH--QLLLSEEMIHRRNES--PLISTHLRSPNVREF-LYSILFLLLVAGY-LVPTHLLFVSR--  
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>Meliosma

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>Nicotiana

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>Spinacia

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-??

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>Oenothera

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>Lotus

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>Triticum

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>Calycanthus

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>Amborella

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>Nymphaea

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IESD--RFPK--YPSGYS--SMSRLFT-EREKQMNNHLFPEKIEEFL--GNPTRSIRSFSDRW--SE  
LH-LVSNATERFTRDQ---KLLKKQQDVFSFVPSRRSE----KKEMVDIFKIITYLQN--TVSIHPI  
SSDRGCDMVP-KDEPD-MDSSNKISFLNKNPFCD--LFHLFHDRNKGRYTL--HHDFESE--ER  
FQEMADLFTLSITEP-DLVYHKGFAFSIDSYGLDQKK--FLNEVFNSRDESKKNSL---LVLPHI  
FY--EENESFYRRIRKKWVR-ISCRNGLEDPKPKIVVFASNNIMEAVNQYRLIRNLIQIQYSTY  
G--YIRNLSNRFFLM---NRSDRNFEYGIQ--RDQIGNDTLNHITIMKYMINQHLLNVKK-SQK

KWFD---PLISRTERS MN RDPNAYRYKWSNGSKNFQEHLEHFVSEQKN---RFQVVFDRRLRI  
NQHSIDWSKVIDKQDLSKSLHFFLSKS-----LLFLS-----KSL-----TFFFV SIGNIPIHRSE-  
IHYY-ELKGPNDQLCNQLESIGVQIVHLNKLKP--FLLD---DHDT S-QRSKFLINGGTISAF LF  
NKIP-KW-MIDSLHT--RNNRRKFFDNTDSYFSMISHDRDNWLNVPVKPFHRSSLISSFYKANL  
LRFLNPHHFCFY--SNKRFPFY---AEKTRIDNYD--LTY-GQFLHISFIRNK-IFSLCVGK--KK  
HVFL E-RDTISPIESQVSDIFIPNDFPQSGDET-YNLYK-----SQPLS-----T  
YCQPLSDMNLSDSEGKNLHQYLS--FNSNMGLIHTPCSEKDLP--SAK--K-----RNLCLK--  
KCVEKRQMYRAFQRDSAFSNLSKWNLFQTYMPWFLTSAGCKYINFILLDTFSDPL--PILSS  
S-HQFVSFFYDIMHGSDISWSILQIPLW---AILPRWNL-ISEISSKCLQN--ILLPEEMIHRRNES  
PVPLKWLTHLRSPNAREF-LYSILFLLL VAGY-LVRTHLLFISR--VSSELQTELEKIKSLMIPSY  
MIELRKL LDRYPPPELNSFWLKNLFLVALEQLGDSLEEIRSSASGGNMLLSGGP-----TYG-V  
KSIRSKKKDLNINLIDIIYLI-SIIPNPINSITFSRNTRHLSRTSKEIYSLIR--KNVNSDWIDDQIE  
SWVANS DLIDDEEREFLVQFS--TLTT--EKRIDQILLSLT-HSDHLS-----KND SGYQMIEQPGSI  
YLRYLVDIQ--KRYLMNYEFNRSCLAERRIFLAHYQTITY--SQTPCGANSSHFP SHG---KPFS  
LRLALPPS-RGILVIGFIGTGRSYFVKYRV TNSYVPFITVFPNKFLDDN-KGYLID-----DID-ID  
DRDDID---IDDRD-----DDDLDTELLTMPNVL--TMYMT--PKIDQFEITLPLELA  
KAMSPCHWIPNIHDLYVNESNYLSLGLLVNHL P---RDCERCS-TRNILVIAS THIPQKVDPAL  
IAPNKSNTCIKIRLLIPQQRKHFFILSYTRGFRLEKKMSHT--NGFGSITMGSNARDLVALTN  
EVL SISITQKKSII DTNTIRSALHRQTWDLR---SQVRSVQYHEILFYQIGRAVAQNVLLSNCSI  
DPISIYMKKK--SCKEGDSYLSKWFELGTS MKKLTILLYLLSCSAGSVAQDLWSP--GPDE  
Q-NWITSYGFVENDS-DLVHG---LESALVG--YSRTE--CSQFDND--RVTLLLRSEPRN-QLDM  
MQNGSCSIVDQRFLYEK--YESGFEE-GEGETL DLQ---QIEEDE--DLFNH--IVWAP--RLWR  
P---HGNLFDCIERPKKLGFP-YWVRSFR---DKRIIYHKEDKLQENDSEFLRSGTVQYQTRDR  
SSKEQGFFRISQFIWDPADQFFFLFK-DQPFSVFSRRESFADEEMSKGLITSQTNSPTSIIYKR  
WLI--KNTQEKFH FELLIHRQRWLRTN-TNSSLS--NGSFRSN--TLSESYQYLSNLFLSNNGTLL  
DQMTKTLLRKRWLFPEMKHLI--HAPGERFPMPRSR-INGNFIDKTSSIVANILLRIIPTTS  
GEKEAFTY YRDG--MSAQSEGN YAEALQNY YEAMRPEIDPYDRSYILYNIGLIHTSNGEHT  
KALEYYFRALERNPFLPQASNNMAVICHY-RGEEAIRQGDSEIAEAWFDQAAEYWKQAIA  
LTPGNYIEAQNW LKITGRFE--MNWRSEHIWIELITGSRKISNFCWACILFLGSLGFLLVGTS  
SYFGRNLISLFP SQQIVFFPQGIVMCFYGIAGLFISSYLWCTISWSVSGSYDKFDRKEGIVCI  
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KAAESAYFLRVPIEVF

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MATLRVDEINKILRERIEQYNRKVGIENIGRVVQVGDGIA  
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LAVGLASIGPGVGGTAAGQAVEGIARQPEAEGKIRGTL LLSLAFMEALTYGLVVALALLF  
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PVILDTC LKFWVFFCLNRLSPSLVVIYHSISEMPIGV PKVPYRIPGDEEATWVDLYNVMYRE  
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L S T L W F G A L A G L L I E I N R L F P D A L S F P F F -  
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GLPWYRVHTVVLNDPGRLLSVHIMHTALVSGWAGSMALYELAVFDPSDPVLDPMWRQG  
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>Phalaenopsis

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>Glycine

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>Solanum

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TERKEIESG--RFPK--CLSGYS--SMSRLFT-EREKQMINHLFP EEIEEFL--GNPTRSVRSFFSD  
RW--SELH-LGSNPTERSTRDQ---KLLKKQQDLS-FVPSRRSE---KKEMVNIFKIITYLQN--T  
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SE--ERFQEMADLFTLSITEP-DLVYHKGFAFSIDSCGLDQKQ--FLNEARDE---SKKKS---LLV  
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Q I A I S N R N C L Y M I S N E I R K - - - - -  
-??  
??  
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>Helianthus

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>Eucalyptus

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>Liriodendron

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>Citrus

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W P L R K D Y I A P N F Y E I Q D A Y ----- M N S I E F S L L D R T  
T P N S F I S T T S N D L S N W S R L S S L W P L L Y G T S C C F I E F A S L I G S R F D F D R Y G L V P R S S P R Q A D L I L  
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L P G C P P K P E A V I D A I T K L R K K I S R E I Y E D R I R L -- E N R T F T T N H K F R V V C S T N T G N Y D Q G L L Y  
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K G A L N V G A V L I L P E G F E L A P P D R I S P E M K E K I G K L S F Q T Y R P T K K N I L V I G P V P G Q K Y S E I T F  
P I L S P N P A T N K D A Y F L K Y P I Y V G G N R G R G Q I Y P D G N K S N N T V Y N A T S A G I V S K I I R K E K G G Y  
E I T T D A S N G R E V V D I I P P G P E L R V S E G Q S I K L D Q P L T S N P N V G G F G Q A D A E I V L Q D P L R V Q G  
L L F F L A S V V L A Q I F L V L K K K Q F E K V Q L S E M N F L N K V Y D W F E E R L E I Q A I A D D I T S K Y V P P H  
V N I F Y C L G G I T L T C F L V Q V A T G F A M T F Y Y R P T V T E A F A S V Q Y I M T E V N F G W L I R S V H R W S A  
S M M V L M T I L H V F R V Y L T G G F K K P R E L T W V T G V V L A V L T A S F G V T G Y S L P W D Q I G Y W A V K I  
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L E P S M I G E P A D P F A T P L E I L P E W Y F F P V F Q I L R T V P N K L L G V L L M V S V P T G L L T V P F L E N V N K  
F Q N P F R R P V A T T V F L I G T A V A L C L G I G A T L P I E K S L T L G L F M I E V F L F G I V L G L I P I T L A G L F V T  
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D P T T R Y N D L L D R V L R H R D A I I S H L N W V C I F L G F H S F G L Y I H N D T M S A L G R P Q D M F S D T A I Q  
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S I V Q G R A V G V T H Y L L G G I A T T W A F F L A R I I A V G M A L R F P R F S Q G L A Q D P T T R R I W F G I A T A H  
D F E S H D D I T E E R L Y Q N I F A S H F G Q L A I I F L W T S G N L F H V A W Q G N F E A W V Q D P L H V R P I A H A I  
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>Platanus

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>Morus

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>Drimys

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>Coffea

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>Sorghum

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V P T R H F T S Y T R K D T K S R

R

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>Nuphar

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F

>Ranunculus

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>Populus

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>Chloranthus

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EVF

>Dioscorea

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-??

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>Cycas

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>Ipomoea

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>Lolium

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D L V A S A A I R A R C H Y V N K K W F S G M L T N W S I T K T R L S Q F R D L R A E E K M G K F Q H L P K R D V A I  
L K R K L S T L Q R Y L G G I K Y M T R L P D I V I V L D Q Q K E Y I A L R E C A I L G I P T I S L V D T N C D P D L A N I S  
I P A N D D T M T S I R L I L N K L V F A I C E G H S L - Y I R N H M G Q K I N P L G F R L G T T Q K H H S F W F A Q P K N  
Y S E G L Q E D K K I R D C I K N Y I Q K N R K K S S N K L E S I T R I E I Q K E I D T I H V I I H I G F P N - L L K K K G - - - -  
A I E E L E K D L Q K E I H S V N Q R L N I S I E K V K E P Y R E P N I L A E Y I A F Q L K N R V S F R K A M K K A M E L T  
K K A D I K G V K V K I A G R L G G K E I A R A E C I K K G R L P L Q T I R A K I D Y C C Y P I R T I Y G V L G V K I W I F  
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I G G E V L C Y I W M A K A I P K I G S R K K V R I G L R K S A R R I T K G V I H V Q A S F N N T I I T V T D P Q G R V F  
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GNGLVDLQK-----NDDGY---IRNLFNILFLMN---KSDRNFEHRMQ---GDRK  
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>Lemma

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>Manihot

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D??  
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>Guizotia

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>Fagopyrum

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MVTLRAD EISKLIRERIEQYNTEVKIVNTGTVLQVGDGIA  
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>Typha

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>Phoenix

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E A S K S D T K S R

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>Prunus

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>Corynocarpus

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>Rhizanthella

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G L F D P I V P R N L L K N V L N E L F Q L H G F L P L N K D S N  
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>Hevea

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>Jacobaea

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>Olea

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>Nelumbonucifera

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>Wolffia

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>Millettia

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>Silene

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K??  
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>Brassica

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>Ricinus

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>Ginkgo

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>Elaeis

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>Erycina

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S T V R T C M R R L G S E F L E E F F L E E E K Y L S L I F L Q R I W Y L D I F R I N D L V D H

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>Capsicum

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>Fragaria

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EVF

>Pseudophoenix

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>Bismarckia

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>Trithuria

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>Salvia

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>Artemisia

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EEVSKGLLTPQTNPPTS LYKRWFI--KKTQEKHFELLINRQRWLR---TNR-----NGSFRSN--TL  
SESYQYLSNLFLSN-GTLLDQMTKALLRKRWLPDEM QIGF--MEQEKDFPFLMSRSR-ING  
NFIDKTF SIVANILLRIIPTTSGEKEAFTY YRDG--MSAQSEGNYAEALQNY YEAMRLEIDPY  
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CWAVILFLGSLGFLLVGTSSYLGRNLISLFP SQEIVFFPQGIVMSFYGIAGLFISSYLWCTISW  
NVGSGYDRFDRKDGIVCIFRWGFP GKNRVFLRFLIKDIQSVRVEVKEGIYARRVLYMDIK  
GQGAIPLTRTDEN-FTP REMEQKAAELAYFLRVPIEVF

>Cistanche



repeated text block consisting of many lines of identical or similar characters, possibly a placeholder or a corrupted page.

MEVNILAFIDTALFILVPTA







YLSKINRKHHNELISELDIREKKTR--MVKLRLKRCGRKQ-AIYRIVAIIDVRSRREGKDLRK  
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LNNEK--QFERTESTNGATGLRTRNKMIRSLKKNPFVANHLLKKIDKLNKKAKEIIVTWSR  
ASTIIPMIGHTITVHNGKEHLPIYITDYMVGHKLGFEVPTFNFQGHAKSDNRSR  
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????????????MRER-FKSCIFELREVLREIKNSNYLLDSWTQLNSVGSFIYIFFHQRFLKLFDPRI  
FSILLS-RNS--QGSTSNRYFT--IKGVILFVVA-VLIYR----INNRMVERKNLYWRGLLP----I  
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K T L L R K R W L F P D E M K I G F - - M - - - - - - - -  
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>Catharanthus

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>Trochodendron

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>Cymbidium

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>Utricularia

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>Picea

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>Corymbia

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HTR--NNRRKSFNDTDSYFSMISHDQDNWLNVPKPFHRSSLISSFYKANRLRFLNNPHHFC  
FY--CNKRFPF---Y-VERARINNYD--FTYG-QFLNIFIRNK-IFSLCGGK--KKYAFLE-RDTISP  
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>Angophora

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>Allosyncarpia

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>Cocos

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-----  
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>Veratrum

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>Schefflera

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FYRRIRKKRVR-ISCNDLEDPKQKIVVFASNNIMEAVNQYRLIRNLIQIQYSTYG--YIRNVL  
NRFFLMN--RSDRNFEYG---IQRDQIGKDTLNHRTIMKYTINQHLSNLKK-SQKRWFDP--I  
FISRTSMNRDPDAYRYKWSNGSKNFQEHLEHFVSEQKSR---FQVVFDRLRINQYSIDWS  
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PNDQLCNQLESIGLQIVHLKKWKPF--LLDLLDDHDT-SQSKFLINGGTISPFLFNKIP-KW  
-MIDSFHTR--NNRRKSFNDTDSYFSTIFHDQDNWLNVPKPFHRSSLISSFYKANRLRFLNPN  
HHFCFY--CNKRFPFYV---EKARIN--NYDFTYG-QFLNILFIHNK-IFSLCVGK--KKHAFWG-  
RDTISPIESQVSNIFIPNDFPQSGGDETYNLYKS---FHFPSRSDPFVR--RAIYSIADISGTPLTE  
GQIVNFERTYCQPLSDMNLSDSEGKNSHQYLN--FNSNMGLIHTPCSEKYLPEK--RKK-----  
---RSLCLK--KCVEKGQMYRTFQRDSAFSTLSKWNLFQTYMPWFLTSTGYKYLNLIPLDTF  
SDLL--PILSL-SQKFVSIFHDIMHGSDISWRILQKKL-----WTKWNL-ISEISSKCLHN--LLLS  
EERIHRN--NESPLISTHLRSPNVREF-LYSILFLLVAGY-LVCTHLLFVSR--ASSELQTEFEKV  
KSLMIPSSMIELRKLDRYPTSEPNFSLWLNFLVALEQLGDSLEEIRGSASGGNMLLGGDP  
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GDWIDDKIESWVANSIDDEEREFLVQFS--TLTT--EKRTDQILLSLT-HSDHL-----SKNDSG  
YQMIEQPGAIYLRYLVDIH--KKYLMNYEFNTSCLAERRIFLAHYQTITY--SQTSCGANSFN  
FPSHG---KPFSLRLALSPS-RGILVIGSIGTGRSYLVKYLATNSYVPFITVFLNKFLDNKPKGF  
LID-----DSD-IDDSDDIDSDIDASDDIDA-----SDDIDRDLHTEL-ELLTMMNALTMD  
MMPE---IDRFYITLQFELAKAMSPCIIWIPNIHDLVDNESNYFSLGLLVNHLSR--DCERCS-  
TRNILVIASHTIPQKVDPALIAPNKLNTCIKIRLLIPQQRKHFFTLSTYTRGFRLEKMFHT--  
NGFGSITMGSNARDLVALTNEALSISITQKKSIIIDTNTIRSALHRQTWDLR---SQVRSVQDH  
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SPFY--EISGRSRG--LRLLYLSPGRDEYYMLAAGNSLALNQDIQEEQVVPARYRQEFLTIAW  
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S P T H G D L V E L G E A V G I I A G Q S I G E P G T Q L T L R T F H T G G V F T G G T A E H V R A P S N G K I K F N E D L  
V H P T R T R H G H P A F L C S I N L Y V T I E S E D I R H N V N I P P Q S F L L V Q N D Q Y V E S E Q V I A E I R A G T S T -  
L N F K E K V R K H I Y S D S D G E - M H W S T D V Y H A P E F T Y G N V H L L P K T S H L W I L L G G P R R -- S S L V  
S L S L H K D Q D Q T S A Y -- S R S V K R R F T S N L S -- G P N D K - P R Q K F F T S G F S G K D E D R I P D Y - S A L R R  
S L F T G R C N L I D P - T I L Y Q N S -- D L F S K R R R N R F I P L Q S I Q E R A D K R M S P S G I S I E I P -- I N G I L R R K  
S I L A Y F D D P R Y R R K S S G I T K Y G T L E M H S I L K K E D -- L I E Y R G - G K E F R P K Y T Q V D R F F F I P E E V  
H I L P G S S S I M V R N N S I V G V D T Q I T L N I R S R V G G L V R V E R K K K R I E L K I F S G D I H F P G E T D K I S R  
H S G V L I P - P G - T G K Q N S K E S K K -- W K N W I Y V Q R -- I T P S K -- K K Y F V L V R P V V T Y E I T D G I T L A T  
L F P P D L F Q E R D N V Q L Q V V N Y I L Y G N G K P I R G I S D K N I Q L V R T C L V L N W H Q G K K --- S S S S Q E  
A R A S F V E I R S N G L I R H F L R I D L V K S I I S Y I G K R N D P S G S G L L S D - N G S D C T N I N P F S S -- I Y --- S K  
A R I Q Q P L N Q N Q R T I H T L L N R --- N T G F Q S L I L S S S N C F R M G P -- F N D G - K Y H N -- V I K E S D P L I P I

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I H N G K E H L P I Y I T D R M V G H K L G E F V P T L N F R G H A K S D N R S R  
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>Oxalis

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>Phoradendron

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>Staphylea

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>Ximena

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