Supporting Information

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SI Text

Analysis of Chloroplast Donor Sequences. Following upon the second paragraph of Discussion, we elaborate on potential falsenegative (this paragraph) and false-positive (next paragraph) results that may stem from the use of the angiosperm chloroplast consensus sequence in the recombination-detection method developed for and used in this study. The chloroplast region embedded within the Apodanthes mitochondrial atp1 gene shows a noteworthy pattern of variation relative to this consensus sequence. Excluding its historically ambiguous 5'-most 15 NTs, the 79-bp conversion tract breaks down rather neatly into 3 regions with respect to the chloroplast consensus. Two regions, the 14-NT tract at positions 957-970 and the 34-NT tract at 987-1020, each with all 7 chloroplast signatures for the region, are separated by a 10-NT tract (at 975-984) that lacks 3 of the 4 chloroplast consensus signatures and instead possesses the mitochondrial consensus sequence at these 3 positions. There are a variety of possible explanations for this pattern, some involving additional transfer events (from either chloroplast or mitochondrial genes). Most likely, however, is some combination of nucleotide sequence divergence in this region in both the donor chloroplast gene and, following the conversion event, in the Apodanthes mitochondrial gene. With respect to the latter, note that Apodanthes mitochondrial genes have highly elevated rates of synonymous substitutions (1). It is thus not unlikely that 1 or more of the 3 sites may have mutated/converged to the mitochondrial consensus sequence following chloroplast conversion. With respect to the former, note that these 3 aberrant NTs are, as shown in Fig. S2C, located at the most poorly conserved 3 positions among the 120 positions included in Fig. 2B. Moreover, atpA genes from a large and disparate number of chloroplast lineages have the angiosperm mitochondrial consensus sequence at 2 of these 3 sites. Thus, it is not unlikely that the ultimate chloroplast donor to Apodanthes atp1 carried with it the mitochondrial rather than chloroplast consensus at 1 or more of the 3 sites in question. If such a donor engaged in a more typically short-patch conversion event that were centered on the 3 NTs in question, then such a conversion would probably go undetected using the approach used in this study.

As noted obliquely in the first section of Discussion (paragraph 2, sentence 3), the use of the angiosperm *atpA* chloroplast consensus sequence to fix 1 of the 3 sequences used in all comparisons also poses the risk of yielding false positives. This would occur if a particular mitochondrial *atp1* sequence happened by chance to somehow "converge" on the chloroplast consensus sequence despite the donor *atpA* sequence being somewhat divergent from that consensus. We do not, however, see any evidence for such behavior in our data. More importantly, this possibility can be effectively ruled out for those 4 putative conversion lineages for which chloroplast sequences are available from the same or relatively closely related plants. This is because in all 4 cases, the listed *atpA* gene is identical to the putative recombinant *atp1* gene throughout the region in question. The 4 cases are Passiflora suberosa (for which an atpA sequence is available from P. biflora), Ranunculus sp. (R. macranthus), the large Lamiales group (Jasminum nudiflorum), and Myrtus communis (Oenothera biennis).

Alternative Explanations for the Findings of This Study. Here we consider potential alternative molecular mechanisms, experimental artefacts, or selective pressures that could theoretically produce some or all of the 9 cases of putative chloroplast/

mitochondrial gene conversion inferred in this study. First, we consider RNA editing and retroprocessing. Six of the 8 putative conversion sites shown in Fig. 2A for the Lamiales represent C-to-T changes, while a significant number of the sites highlighted in the figure for the other 4 lineages of putatively chimeric genes are also C-to-T changes. Primary transcripts from angiosperm mitochondrial protein genes typically undergo high levels of C-to-U RNA editing (i.e., a significant fraction of sites that are C in the gene and primary transcript are converted to U in the functional mRNA; refs. 2 and 3). It is thus formally possible that the suite of changes highlighted in Fig. 2A results from recurrent mitochondrial retroprocessing (i.e., gene conversion of the mitochondrial *atp1* gene by its edited mRNA) rather than chloroplast conversion. Retroprocessing can, however, be ruled out because none of the 10 diverse angiosperms for which atp1 cDNA sequences are known are edited at any but the last of the 6 relevant C residues (4, 5).

In vitro recombination between mitochondrial and chloroplast copies of *atp1* in the course of PCR amplification could also, in theory, produce the types of putatively chimeric sequences uncovered in this study. This possibility can be ruled out for 2 reasons. First, for 8 of the 9 chimeric lineages (all but Apodanthes), mitochondrial atp1 was sequenced directly from uncloned PCR product; it is extraordinarily unlikely that an inevitably rare chloroplast/mitochondrial recombinant could somehow rise to such dominance in PCR product that it would be the major if not sole sequence detected in the sequence traces resulting from direct DNA sequencing of the PCR product. Second, for 3 of the 9 chimeric lineages the chimeric sequence has been reproducibly obtained from 2 or more members of the lineage (i.e., Lamiales, Empetrum/Rhododendron/Vaccinium from the Ericales, and Clethra from the Ericales; see Fig. 2), while for Cynomorium the same sequence was obtained from 2 different amplifications of the same template DNA (T. Barkman, personal communication).

DNA contamination or misidentification-a constant source of worry in those cases of putative horizontal gene transfer in which an additional, nonchimeric copy of a gene is apparently acquired by the recipient genome-cannot be a primary issue in the present study. This is because contamination alone could not produce these findings, i.e., some additional factor, either biological such as the 2 discussed in this section or artefactual such as PCR recombination (see preceding paragraph), would also have to be involved. Contamination is potentially an issue only secondarily-and only for the 6 cases where the chimeric sequence has not yet been validated by amplification from an independent DNA sample (either identical or closely related to the one examined thus far)—in the sense that 1 or more of these single-DNA cases could reflect contamination with DNA from some other plant, which itself has a mitochondrial atp1 gene of chloroplast chimeric origin. Note, however, that any such cases of contamination are unlikely to reduce the number of inferred cases of chloroplast conversion (and/or mitochondrial horizontal transfer), because no pair of the 6 cases shown in Fig. 2A (or of the 3 shown in Fig. 2B) have identical conversion tracts.

Finally, intense, highly directional purifying selection could in theory lead to convergent, independent evolution of short motifs within homologous, but distantly related genes toward similar or even identical sequences. For 3 reasons, this formal possibility can be entirely dismissed in the present case. First, such unusual, convergent selective pressures in the case of a gene pair such as *atp1/atpA* that has long since saturated at the level of synony-

mous substitutions should lead to similarity/identity at the amino acid but not nucleotide level. Exactly the opposite pattern is seen here (compare Figs. 2A and 2B with Fig. S5A and B, respectively). Second, it is hard to imagine why such acute, convergent selective pressures should be felt only sporadically across the phylogeny of angiosperm mitochondrial atp1 genes. Third, and related, such convergent point-mutational pressures should produce a phylogenetic record in which lineages experiencing this hard-to-imagine sporadic pressure exhibit a more-or-less gradual accumulation of directional substitutions toward the chloroplast sequence in the region in question. Instead, however, within the limits of current taxon sampling, all 9 converted groups show a sharp, entirely or nearly all-or-nothing pattern; by and large, mitochondrial *atp1* genes either have the chloroplast conversion tract or they do not. Only minor traces (i.e., involving but a single NT in all but 1 case) of possible intermediates are apparent for some of the 9 converted lineages (these are all evident in Fig. 2A).

Possible Spread of the Chloroplast Conversion Tract in Parasitic Angiosperms via Mitochondrial Horizontal Gene Transfer. Most relevant, for 2 reasons, to the possibility (see second section of *Discussion*) of a chloroplast-derived conversion tract spreading via mitochondrial-to-mitochondrial horizontal gene transfer are the 2 cases reported here involving nonphotosynthetic, parasitic angiosperms, i.e., Apodanthes and Cynomorium. First, the mitochondrial genomes of parasitic angiosperms have an apparent propensity for acquiring (often from their host plants) foreign mitochondrial genes by horizontal transfer (4, 6, 7). Second, although no studies have yet examined these 2 parasitic lineages to see whether they still possess plastid *atpA* genes, or even plastid genomes at all, what is known about plastid genomes in other nonphosynthetic, parasitic angiosperms (8-10) strongly suggests that the Apodanthes and Cynomorium plastids no longer harbor *atpA*. These 2 observations emphasize the possibility (especially for Apodanthes, whose close relative Pilostyles lacks a chloroplast conversion tract; Fig. 2B) that one or both parasitic genera acquired their chloroplast conversion tract indirectly, via mitochondrial horizontal transfer. On the other hand, it is still entirely possible that the mitochondrial lineages of these parasites acquired *atpA* directly, via intracellular transfer, in a photosynthetic ancestor of the parasites. If so, the conversion event in Apodanthes must have happened millions of years after the transfer event, following the loss of photosynthesis and the divergence of Apodanthes and Pilostyles from a common ancestor.

Mitochondrial Provenance and Copy Number of Chimeric atp1 Genes. The strongest evidence for a mitochondrial provenance of the chimeric atp1 genes comes from the only complete mitochondrial genome sequence available for any members of the 9 chimeric clades. The sequence of atp1 from the mitochondrial genome sequence of *Digitalis purpurea* (J. P. Mower and J. D. Palmer, unpublished results), in the Lamiales (Fig. 2*A*), is identical to the published, PCR-generated sequence of *Digitalis* used in this study. Indirect evidence for a mitochondrial location of the other chimeric atp1 genes is of 2 types. First, apart from the chimeric region itself, these genes generally show the highly conserved properties expected for genes located in the generally low-mutation-rate environment of the mitochondrial genome, as opposed to genes transferred to the plant nuclear genome, where the synonymous substitution rate is usually 10–100 times higher [refs. 1 and 11–13; the only exception relevant to this study is Apodanthes (see ref. 1 and SI Text Analysis of Chloroplast Donor Sequences, whose apparently mitochondrial-genomewide elevation in synonymous substitutions rates is evident throughout its mitochondrial atp1 gene)]. Second, all of the abundant evidence available indicates that atp1 belongs to that class of plant mitochondrial genes that are very rarely, if ever, functionally transferred to the nucleus (14). Given all of the above, and the absolute essentiality of the gene, it is highly likely both that atp1 is functional in all these plants and that the functional *atp1* gene resides in the mitochondrial genome. Furthermore, the possibility that the putatively chimeric and mitochondrial copy of *atp1* in these plants is not itself functional, and that instead there is a second, functional copy of the gene in the mitochondrial genome, is very unlikely for multiple reasons. First, if a second, different copy of *atp1* were present in the high-copy-number environment of the mitochondrial genome, then it should have been PCR amplified just as readily as the chimeric copy, yet there is no indication that any of the PCR-product sequencing traces were suggestive of such evenly mixed products (only for Citrus do we know that the PCR product gave a mixed sequence, of chimeric and nonchimeric atp1 read, but with the dominant signal in the sequencing traces being the chimeric type; T. Barkman, personal communication). Second, taxa representing 6 of the 9 chimeric lineages (all but *Apodanthes*, *Cynomorium*, and *Myrtus*) were included in the Southern blot survey of ref. 14; recent reinspection of the original X-ray films indicates that there is very likely to be only a single, full-length, conserved atp1 gene in the mitochondrial genome for most of these 6 lineages. And for those cases where the blotting patterns are consistent with 2 "copies" of *atp1* being present in the mitochondrial genome, the 2 copies could readily be identical (plant mitochondrial genomes almost always possess large, often genecontaining, identical repeats; ref. 15), or, if there is a second, nonchimeric copy, it could be a pseudogene. Furthermore, the sequenced mitochondrial genome of Digitalis (Lamiales) indisputably contains only a single intact copy of *atp1*, with this gene identical, as noted above, to the PCR sequence for *Digitalis atp1* used in this study.

Functionality of Chimeric *atp1* **Genes**—Evidence of Transcription. To our knowledge, none of the putatively chimeric mitochondrial *atp1* genes have been deliberately assayed (e.g., by sequencing RT-PCR products or by Northern blots) for evidence of in vivo transcriptional activity. However, for 2 members (*Mimulus guttatus* and *Salvia fruticosa*) of the Lamiales clade of chimeric genes (see Fig. 2*A*), multiple (6 and 9) *atp1* EST clones were recovered. The existence of such multiple EST clones and their preferential location at the 3' end of the gene (Fig. S6) are consistent with the clones being derived from bona fide transcripts. In addition, 28 *atp1* EST clones are present among libraries made from 3 species of *Citrus*, while 64 *atp1* clones were identified in an EST library from *Vaccinium corymbosum*.

Sources of the Topologies Shown in Fig. 2. For Fig. 2*A*, the Lamiales et al. topology is from ref. 16 (relationships among the species with the chloroplast-derived segment are deliberately shown unresolved), the Ericales topology is from ref. 17, the *Passiflora* et al. topology is from ref. 18, and the *Cynomorium* et al. topology is from ref. 19. For Fig. 2*B*, the *Apodanthes* et al. topology is from ref. 7, the *Ranunculus* et al. topology is from ref. 20, and the *Myrtus* et al. topology is from ref. 21.

Mower JP, Touzet P, Gummow JS, Delph LF, Palmer JD (2007) Extensive variation in synonymous substitution rates in mitochondrial genes of seed plants. *BMC Evol Biol* 7:135.

Mulligan RM, Chang KLC, Chou CC (2007) Computational analysis of RNA editing sites in plant mitochondrial genomes reveals similar information content and a sporadic distribution of editing sites. *Mol Biol Evol* 24:1971–1981.

Mower J, Palmer JD (2006) Patterns of partial RNA editing in mitochondrial genes of Beta vulgaris. Mol Genet Genomics 276:285–293.

- Barkman TJ, et al. (2007) Mitochondrial DNA suggests at least 11 origins of parasitism in angiosperms and reveals genomic chimerism in parasitic plants. BMC Evol Biol 7:248.
- Brennicke A, Picardi E, Quagliariello C, Regina TMP (2006) RNA Editing Website. Available at http://biologia.unical.it/py_script/cgi-bin/search.py. Accessed July 21, 2009.
- 6. Davis CC, Wurdack KJ (2004) Host-to-parasite gene transfer in flowering plants: Phylogenetic evidence from malpighiales. *Science* 305:676–678.
- Nickrent DL, Blarer A, Qiu YL, Vidal-Russell R, Anderson FE (2004) Phylogenetic inference in Rafflesiales: The influence of rate heterogeneity and horizontal gene transfer. BMC Evol Biol 4:40.
- Wolfe KH, Morden CW, Palmer JD (1992) Function and evolution of a minimal plastid genome from a nonphotosynthetic parasitic plant. *Proc Natl Acad Sci USA* 89:10648– 10652.
- 9. Nickrent DL, Ouyang Y, Duff RJ, dePamphilis CW (1997) Do nonasterid holoparasitic flowering plants have plastid genomes? *Plant Mol Biol* 34:717–729.
- Zhang Y, et al. (2006) Striking convergence of plastid genomes in independent nonphotosynthetic lineages. Available at http://www.2006.botanyconference.org/engine/ search/index.php?func=detail&aid=677. Accessed
- Wolfe KH, Li WH, Sharp PM (1987) Rates of nucleotide substitution vary greatly among plant mitochondrial, chloroplast, and nuclear DNAs. Proc Natl Acad Sci USA 84:9054– 9058.
- Laroche J, Li P, Maggia L, Bousquet J (1997) Molecular evolution of angiosperm mitochondrial introns and exons. Proc Natl Acad Sci USA 94:5722–5727.

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- Adams KL, Daley DO, Qiu YL, Whelan J, Palmer JD (2000) Repeated, recent and diverse transfers of a mitochondrial gene to the nucleus in flowering plants. *Nature* 408:354– 357.
- Adams KL, Qiu YL, Stoutemyer M, Palmer JD (2002) Punctuated evolution of mitochondrial gene content: High and variable rates of mitochondrial gene loss and transfer to the nucleus during angiosperm evolution. *Proc Natl Acad Sci USA* 99:9905– 9912.
- Allen JO, et al. (2007) Comparisons among two fertile and three male-sterile mitochondrial genomes of maize. *Genetics* 177:1173–1192.
- Wortley AH, Rudall PJ, Harris DJ, Scotland RW (2005) How much data are needed to resolve a difficult phylogeny?: Case study in Lamiales. Syst Biol 54:697–709.
- 17. Schonenberger J, Anderberg AA, Sytsma KJ (2005) Molecular phylogenetics and patterns of floral evolution in the Ericales. *Int J Plant Sci* 166:265–288.
- Davis CC, Latvis M, Nickrent DL, Wurdack KJ, Baum DA (2007) Floral gigantism in Rafflesiaceae. Science 315:1812.
- Nickrent DL, Der JP, Anderson FE (2005) (2005) Discovery of the photosynthetic relatives of the "Maltese mushroom" Cynomorium. BMC Evol Biol 5:38.
- Hoot SB (1995) Phylogeny of the Ranunculaceae based on preliminary *atpB*, *rbcL*, and 18S nuclear ribosomal DNA sequence data *Plant Syst Evol* (*Suppl*) 9:241–251.
- 21. Soltis DE, Soltis PS, Endress PK, Chase MW (2005) *Phylogeny and Evolution of Angiosperms* (Sinauer Associates, Sunderland, MA).



Fig. S1. Simulated distribution of calculated *P*-values using the consensus of angiosperm mitochondrial *atp1* genes in the analysis. The 5% critical value (2.2 \times 10⁻⁴) of the calculated *P*-values was used to determine significance (Table 2).

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Fig. 52. Consensus sequences used in this study. Fig. S2 *A* and *B* are the full-length consensus sequences for mitochondrial *atp1* and chloroplast *atpA*, respectively, for all angiosperms and for 5 subgroups of angiosperms. The number of sequences used to generate each consensus is shown in parentheses. Gaps at the end of the alignment were removed, while internal gaps and gaps at the beginning of the alignment were retained to keep the NT coordinates consistent across all relevant figures. Regions shown in Fig. 2 are shaded in gray. Fig. S2C shows histograms displaying the frequency with which the predominant NT occurs at each position for both the angiosperm chloroplast and mitochondrial consensus sequences across the regions shown in Fig. 2 (the *Top* and *Bottom* figures correspond to the regions shown in Figs. 2B and 2A, respectively). The NTs given below each histogram correspond to deviations in the angiosperm chloroplast consensus (see Fig. 2).

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Fig. S2 (continued).





Fig. S3. Protein conservation in 20 protein-coding genes present in both mitochondria and chloroplasts. The plots used a sliding window of 30 aa, slid 3 aa at a time, and with each window labeled according to the amino acid falling in the middle. The *y* axis corresponds to the estimated number of substitutions/ changes per site, with protein distance measured using the JTT matrix. All gaps were removed before analysis.

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Fig. S3 (continued).



Fig. 54. Sequence conservation between 3 pairs of mitochondrial and chloroplast ribosomal RNA and protein genes. The NT plots used a sliding window of 90 NTs, slid 9 NTs at a time, and with each window labeled according to the NT falling in the middle. The amino acid plot used a sliding window of 30 aa, slid 3 aa at a time, and with each window labeled according to the amino acid falling in the middle. The *y* axis corresponds to the estimated number of substitutions/changes per site, with DNA distance measured using the F84 matrix and protein distance using the JTT matrix. All gaps were removed before analysis. Unlike *atp1/atpA*, the rRNA alignments contain many gaps (compare these plots to the % identity and % gap columns in Table 1)



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Fig. S5. Alignments of amino acid sequences corresponding to the region shown in Fig. 2A (A) and in Fig. 2B (B), with gray shading as in these figures. Note that NT 73 in Fig. 2 A is a conserved, C-to-U RNA editing site in angiosperms; the corresponding amino acid (the last one shaded in the Top 4 groups of shaded sequence blocks) is therefore shown as the "edited" S, rather than the "unedited" P.



Fig. S6. Available EST reads for 2 taxa that have the chloroplast conversion tract (*Mimulus* and *Salvia* both belong to the Lamiales group of converted taxa shown in Fig. 2A). Numerous EST reads are also available for 4 other taxa that have the chloroplast conversion tract (see *SI Text Functionality of Chimeric* atp1 *Genes—Evidence of Transcription*).

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PNAS PNAS

mt concensus (angiosperm)		50 		
Syringa vulgaris				5.CT.
Jasminum floridum Jovellana sp.			GGTCGCGTG	
Streptocarpus holstii Epifagus virginiana			GGTCGAGTG	5.CT
Lindenbergia urticifolia			CCTCCACTC	
Parentucellia viscosa Bartsia laticrenata				тт.
Bartsia inaequalis Paulownia tomentosa				
Alonsoa sp. Myoporum sandwicense				
Verbena bonariensis Catalpa bignonioides				
Campsis radicans Sesamum indicum				
Strobilanthes dyeriana				
Digitalis purpurea Veronica incana			GGTCGAGTG	з.с
Stachys officinalis Lamium sp.			CAAGTGGATGAGATCGGTCGAGTG	CT
Mentha spicata Ajuga reptans			GGTCGAGTG	
Gentiana procera Nicotiana tabacum Borago officinalis			GGTCGAGTG	5.C
Empetrum nigrum				
Rhododendron impeditum Vaccinium arboreum				
Vaccinium uliginosum Chimaphila umbellata				cc
Enkianthus campanulatus Cyrilla racemiflora			GGTCGAGTG	5.CA
Clethra arborea Clethra barbinervis Heliamphora sp				5.CAA
Sarracenia flava Actinidia arguta			GGTCGAGTG	5.C
Roridula gorgonias			CGAGTG	G.C
Passiflora suberosa Salix nigra				
Rhizanthes infanticida Rafflesia pricei			ATCGGTCGAGTG	G.CGA
Sapria ram			ATCGGTCGAGTG	G.CGA
Cynomorium coccineum Peridiscus lucidus				G
Vitis sp.			CAAGTGGATGAGATCGGTCGAGTG	δ.C
Rhus glabra Pavonia spinifex			ATCGGTCGAGTG	а.ст
Xanthorhiza simplicissima			GGTCGAGTG	3.C
cp consensus (angiosperm)	CGAGCCGACGAAATTAGTAATATTATC	CGTGAACGTATTGAGCAATATAA	TAGAGAAGTAAAGATTGTAAATACCGGTACCGTA	C. TCAACCTACTC.TG.TAG.AATG
		200 	2	50
mt consensus (angiosperm)	gctggggaaatggtggaatttgccagcggtgtgaaaggaata	200 I I GCCTTGAATCTTGAGAATGAGAA	2! I gtagggattgttgtttggtagtgataccgct, 	50 300 Intranganggagatettgtenagegeaetggatettgtgatettete
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Fig. S7. Complete NT alignments of the mitochondrial *atp1* genes for which partial alignments (shaded in gray) are shown in Fig. 2*A* (*A*) and in Fig. 2*B* (*B*). Gaps at the end of the alignment were removed, whereas internal gaps and gaps at the beginning of the alignment were retained to keep the NT coordinates consistent across all relevant figures. Regions shown in Fig. 2 are shaded in gray.

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Peridiscus lucidus Hamamelis mollis	A	A			GG	
Vitis sp. Citrus sp					G	
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Svringa vulgarie	т	A		CA					
Jasminum floridum	T.A			С					
Jovellana sp. Streptocarpus holstii		A		С					 . A
Epifagus virginiana	<u>T</u>	A		C					•••
Lindenbergia urticifolia	Тт.	A		C					
Lamourouxía viscosa	T	A		C					• •
Bartsia laticrenata	T	A		C					
Bartsia inaequalis Paulownia tomentosa	T	A		C				• • • • • • • • • • • • • • • • • • • •	
Alonsoa sp.	<u>T</u>	A	;	C					
Myoporum sandwicense Verbena bonariensis	T	A		C C					
Catalpa bignonioides	<u>T</u>	A		C					
Sesamum indicum	Тт.	A		CAGGGA		A			
Justicia carnea Strobilanthes dveriana	T	A		CG				G	. A
Globularia punctata	T	A		C					
Digitalis purpurea	T	A		C					• •
Stachys officinalis	T	A		C					
Lamium sp. Mentha spicata	T	A		C					
Ajuga reptans	T	A		C					
Nicotiana tabacum	C		· · · · · · · · · · · · · · · · · · ·	C					
Borago officinalis				c		G		G	• •
Empetrum nigrum				CG				G	
Rhododendron impeditum Vaccinium arboreum	G T			CG			A	G	
Vaccinium uliginosum	GT			G					
Enkianthus campanulatus			A						
Cyrilla racemiflora									•••
Clethra barbinervis									
Heliamphora sp. Sarracenia flava			А						
Actinidia arguta									
koridula gorgonias				•••••				A	• •
Passiflora suberosa	T	A		C					• •
Euphorbia milii				C				A	
Rhizanthes infanticida Rafflesia pricei		A		CC					• •
Sapria ram		A		CC					
Cynomorium coccineum	c			c					.т
Péridiscus lucidus	G			C					• •
Vitis sp.		A		C	т.				
Citrus sp.	G			C				3A	. A
Pavonia spinifex				C					
Xanthorhiza simplicissima				•••••				••••••	• •
cp consensus (angiosperm)						G AAT	ΓΑΤΤ	TAGCATT	
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Verbena bonariensis Catalpa bignonioides Campsis radicans Sesamum indicum Justicia carnea		2 2. 3. 5. 5.	۱۱ ۱۱ ۱۱ ۱۱	ГG Г Г Г Г	A A A A		j ; ; ; ; ;
Strobilanthes dyeriana Globularia punctata Digitalis purpurea Veronica incana Stachys officinalis		2		Г Г Г Г	AA		jj.
Lamium sp. Mentha spicata Ajuga reptans Gentiana procera Nicotiana tabacum Borago officinalis				Г Г Г Г Г	AA		A 3
Empetrum nigrum Rhododendron impeditum Vaccinium arboreum Vaccinium uliginosum Chimaphila umbellata Enkianthus campanulatus Cyrilla racemiflora	A	G			A. A.	.TAT AC .A	
Clethra arborea Clethra barbinervis Heliamphora sp. Sarracenia flava Actinidia arguta Roridula gorgonias	A A A A A A A A A A A A A A A A A A A	AA		т.		A	
Passiflora suberosa Salix nigra Euphorbia milii Rhizanthes infanticida Rafflesia pricei Sapria ram	A	5		гАТ	T AYRN ACG. C C	.T	
Cynomorium coccineum Peridiscus lucidus Hamamelis mollis Vitis sp. Citrus sp. Rhus glabra Pavonia spinifex			C C C.		C C C C C	.A	G
Xanthorhiza simplicissima cp consensus (angiosperm)	A.TCTCTCCA/	ACAATCTC.TC.A	AAGC1	гсаат	ATGAC.	.TG	TT . AGT
mt consensus (angiosperm)	GACCAGACAGGTGCAGGTAGCTTGACCGCCTTACCC	1100 I I I CGTCATTGAAACACAAGCTGGAGACGTATC	 ggcctatattcccacc		1150 Tgatggacaaatctgtttggaaacag		1200 I I I I I I I I I I I I I I I I I I I
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mt consensus (angiosperm) Syringa vulgaris Jasminum floridum Jovellana sp. Tovellana sp. Tovellana sp. Tovellana sp. Tovellana sp. Status viscosa Parentucellia viscosa Parentucellia viscosa Parentucellia viscosa Bartisi alrierenata Bartisi alrierenata Bartisi alrierenata Bartisi alrierenata Satus apuentosa Alonsoa sp. Wyoporum sandwicense Verbena bomariensis Catalpa bignonioides Campsis radicans Sesamu indicum Justicia carnayeriana Globularia punctata Globularia punctata Globularia punctata Globularia punctata Globularia punctata Aluga reptans Aluga reptans Aluga reptans Micotiana tahan me	GACCAGACAGGTGCAGGTAGCTTGACCGCCTTACC 	1100 251CA TTGAAACCAGACGCTGGAGACGTATC 	660CTATATTCCCAC	T T T C. TT T A. TT T A. TT T T. TT T A. TT T T. TT	1159 Талтабаслал ¹ стотттабаласаб 	AGETCHTTATEGE	1296 1266ATTAGACCT
mt consensus (angiosperm) Syringa vulgaris Jasminum floridum Jovellana Sp. Tovellana Sp. Divellana Sp. Tovellana Sp. Tovellana Sp. Status (Sosa Parentucellia viscosa Parentucellia viscosa Parentucellia Viscosa Viscosa Viscosa Seasumu Indicum Seasumu Indicum Stachys officinalis Lamium Sp. Mentha splicata Aentha splicata Senset Indocum Borago officinalis Empetrum nigrum Rhooddendron Impeditum	GACCAGACAGGTGCAGGTAGCT TGACCGCC TTACC 	1100 25TCATTGAAACCAGACGCTGGAGACGTATC 		2AATGTGATECCCATTAC , , , , , , , , , , , , , , , , , , ,	1159 Талтабаслал ¹ стотттабаласаб 		1296 1206ATTAGACCT
mt consensus (angiosperm) Syringa vulgaris Jasminum flöridum Sireptocarpus holstii Epifagus virginiana Orobanche fasciculata Lindenbergia urticifolia Lamourouxia viscosa Parentucellia viscosa Bartisa inkenudis Paulumia tomentosa Alonsoa sp. Wyoporum sandwicense Verbena bonariensis Catalpa bignonioides Sesamun indicum Justicia carnea Strobilanthes dyeriana Gibbularia punctata Digitalis purprea Veronica incana Sistum spicata Ajuga reptans Gentiana procera Nicotiana takacum Borago officinalis Borago officinalis Borago officinalis Borago officinalis Chimaphia un punctata Borago officinalis Borago officinalis Borago officinalis Engetrum nigrum Rhododendron impeditum Vaccinium liginosum chimaphia unbellata	GACCAGACAGGTGCAGGTGAGCTTGACCGCCTTAGC 	1100 26TCATTGAAACCAGACGTGGAGACGTGTC	GGCCTATATTCCCAC	CANFORM TECCATTAC T. C. T. T. T. A. TT. T. A. TT. T	1150 Театебалал стот тебаласаб 		1206 126AATTAGACCT
mt consensus (angiosperm) Syringa vulgaris Jasminum floridum Jovellana sp. Streptocarpus volstii Streptocarpus volstii Streptocarpus volstii Corbanche fasciculata Lindenbergia urticifolia Lamourouxia viscosa Bartsia linaequalis Bartsia linaequalis Bartsia linaequalis Paraluowni tomentosa Myoporum sandwicense Verbena bomariensis Catalpa bignonioides Campsis radicans Sesamu Indicum Justicia carneinsis Catalpa bignonioides Campsis radicans Sesamu Indicum Justicia carneinsis Strobilanthes dyeriana Strobilanthes dyeriana Strobilanthes dyeriana Strobilanthes dyeriana Strobilanthes dyeriana Stachys officinalis Eenetrum njgrum Rhododendron impeditum Vaccinium arboreum Vaccinium glignosum Chimaphila umbellata Clethra arborea Clethra arborea Clethra arborea Clethra arborea Clethra arborea Clethra arborea Sarraenia flava Actinidia arguta	GACCAGACAGGTGCAGGTAGCT TGACCGC TTACC 	1100 CC T. T. T. A. T. T. T. A. T. T. T. A. T. T. T. A. T. T. T. T. T. T. T. T. T.	GGCCTATATTCCCACC T. T. T. G. T	CAATGTGAT CCCATTAC T. C. TT. T. A. TT. T.	1159 Телтебаслалістетттебаласаб 	AGETC	1296 1296ATTAGACCT
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mt consensus (angiosperm) Syringa vulgaris Jasminum floridum Syringa vulgaris Jasminum floridum Sireptocarpus holstii Epifagus virginiana Orobanche fasciculata Lindenbergia urticifolia Lamourouxia viscosa Parentucellia viscosa Bartisa inmegualis Paulumia tomentosa Alonsoa sp. Wyoporum sandwicense Verbena bonariensis Gatalpa bignonioldes Sesamun indicum Justicia carnea Strobilanthes dyeriana Gibbularia punctata Digitalis purprea Veronica incana Strobilanthes dyeriana Gontiana procera Nicotiana thadoum Borago officinalis Enkianthus campanlatus Gentiana procera Nicotiana thadoum Borago officinalis Enkianthus campanlatus Chimaphia undenlata Enkianthus campanlatus Cisthra arboreum Vaccinium iliginosum Chimaphia undersa sp. Sarracenia flava Actinida arguta Rosidonderon impeditum Vaccinium suberosa Salix nigra Euphorbia milii Rhizanthes infanticida Rafflesia pricei Sapria ram Cynamorium coccineum Peridiscus lucidus	GACCAGACAGGTGCAGGTAGCT TBACCBCE TTACC 	1100 26TCATTGAAACCAGACGTGGAGACGTATC 	GGCCTATATTCCCAC T T <th>CANTERENTECCENTIAC T. C. T. T. T. A. TT. T. A. TT. A. TT. A. T. A. T. A. TT. A. T. A. A. T. A.</th> <th>1159 Талтебаллал¹стетттебаласаб </th> <th>AGCTC 11 TATCGC</th> <th>1206 126AATTAGACCT </th>	CANTERENTECCENTIAC T. C. T. T. T. A. TT. T. A. TT. A. TT. A. T. A. T. A. TT. A. T. A. A. T. A.	1159 Талтебаллал ¹ стетттебаласаб 	AGCTC 11 TATCGC	1206 126AATTAGACCT

Fig. S7 (continued).

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mt consensus (angiosperm)	GCTATTAACGTCGGCTTATCT	GTCAGTCGCGTCGGG	стоссостсасттваа	AGCTATGAAACAAGTC	TGCGGTAGTTCA	аластодааттодсасаата	TCGCGAAGTGGCCGCCTTTGC	тсаатттёветсавассттватестесё
Syringa vulgaris Jasminum floridum Jovellana sp	Δ			AA AA		Δ	A	
Streptocarpus holstii Epifagus virginiana				A	GT. GT.	A		CC.
Orobanche fasciculata Lindenbergia urticifolia	A A			GA	T. T.	A	.A.AA	CCCCC.
Lamourouxia viscosa Parentucellia viscosa	A			A		A	AA	c
Bartsia laticrenata Bartsia inaequalis Paulownia tomentosa	A			A	GT. GT.	A	AA	
Alonsoa sp. Myoporum sandwicense	A			A	GT. GT.	A		C
/erbena bonariensis Catalpa bignonioides	A A			A	T. 	A	.A.AA	C
Campsis radicans Besamum indicum		· · · · · · · · · · · · · · · · · · ·		A		C	AA	
Justicia carnea Strobilanthes dyeriana	A			GA A	GT. GT.	C	AA AA	······
Jigitalis purpurea Veronica incana	GAA.			. A	GT. AT.	A	A A	CC.
Stachys officinalis amium sp.	A A	A A		A GA	T. 	G G	A A	CCC.
entha spicata juga reptans	A	T A		A A		A		c
icotiana procera icotiana tabacum				.A			C	
ipetrum nigrum	G			. A	т.			C
hododendron impeditum accinium arboreum				. A . G				C
accinium uliginosum himaphila umbellata			A	. A				c
yrilla racemiflora				.A		A		
lethra barbinervis eliamphora sp.				A	т.			A
arracenia flava ctinidia arguta						т	C	
oridula gorgonias				• • • •			c	
assiriora suberosa alix nigra uphorbia milii		T						
hizanthes infanticida afflesia pricei			.C			т.		
apria ram			.C		т.			
ynomorium coccineum eridiscus lucidus	cc			TA			т.	
dinameris morris ditis sp.		т.с		Δ	т	6	C	
hus glabra avonia spinifex		T			т.		C	
anthorhiza simplicissima					т.			
ovellana sp. treptocarpus holstii treptocarpus holstii pirgus virginiama pirgus virginiama pirgus virginiama amourouxia viscosa artsia inaqualis aulownia tomentosa automia tomentosa aulomia tomentosa aulomia tomentosa aulomia tomentosa aupsis radicans esamum inducense erbena bonariensis atalpa bigononides ampsis radicans esamum inducense erbena bonariensis atalpa bigononides ampsis radicans esamum inducense erbena bonariensis atalpa bigononides ampsis radicans esamum inducense erbena spicata jujialis purpuresa eronica incena tachys officinalis amism sp. entha spicata juga reptans entiana proceran orago officinalis meptrum nigum hododendron impedium accinium uliginosum hododendron impedium accinium pedilatatus yrilla racemiflora	Т. 		A TC 	A T 6 A A T 6 A A A T 6 A A T 6 A A A T 6 A A T 6 A A A A A A A A A A A A A A A A A A A	. А 	6		
Clethra a barbinervis Heliamphora sp. Sarracenia flava Actinidia arguta Roridula gorgonias Passiflora suberosa				A.		GTC		
Salix nigra Suphorbia milii Rhizanthes infanticida Rafflesia pricei Sapria ram				GA				
Peridiscus lucidus Mamamelis mollis						G		
itis sp. itrus sp.			CTG	GGG				
nus glabra avonia spinifex								
anunorniza simplicissima	AATCA T CCCA	CA C AT ACCT	ата тта та	·····		G AA GACT		
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В

PNAS PNAS

	50 100	150
mt consensus (angiosperm)	т	TCAGTTGGAGATGGGATTGCACGTGTTTATGGATTGAACGAGATTCAA
Apodanthes caseariae Pilostyles thurberi	-ATCGGTCGAGTGG.C	GGA
Pisum sativum Begonia sp.	ATGGAATTCTCTGTAAGAGCTGCGGAACTAACAACTCTATTAGAAAGTCGAATTACCAACTTTTACACAAATTTTCAAGTGGATGAGATCGGTCGAGTGG.C	G
Echinocystis lobata Betula nigra Humulus lupulus		
Ranunculus sp.		SAA
Xanthorhiza simplicissima	-GGTCGAGTGG.C	
Podophyllum peltatum	-GGTCGAGTGG.C	2
Myrtus communis Depothera bieppis	ΔΤΩΩΑΛΤΙΓΤΥΓΥΓΥΛΩΑΓΩΑΓΙΑΛΤΑΛΥΔΑΓΙΑΛΤΑΛΙΤΑΓΑΛΑΓΙΑΓΑΛΤΙΓΑΛΑΓΙΑΓΑΛΥΤΙΤΑΓΑΛΩΑΤΙΤΤΑΛΑΓΙΩΑΑΙΑΑΤΑΩΑΙΑ	
Melianthus major Sarcocaulon vanderietiae		G
Erodium pelargoniflorum	- GGCCGAGTGC .A	λΤΤ
cp consensus (angiosperm)	CGAGCCGACGAAATTAGTAATATTATCCGTGAACGTATTGAGCAATATAATAGAGGAAGTAAAGATTGTAAATACCGGTACCGTAC.T	rcaacctactc.tg.tag.aatg
Mit consensus (anglosperm)		
Pilostyles thurberi		
Begonia sp.		
Betula nigra		C
Humulus lupulus		C
Ranunculus sp. Aquilegia canadensis	ACTACTAAAAAAA	
Xanthorhiza simplicissima Berberis bealei	GAAAA	
Podophyllum peltatum	GTAA.	
Myrtus communis Oenothera biennis	TG	
Melianthus major Sarcocaulon vanderietiae		
Erodium pelargoniflorum Hypseocharis pimpinellifo		
cp consensus (angiosperm)	ATT.AAAAGAGACA.TCTTCT.GATCAA.TT.GAT.AA.GGAC.G.TTGATGA	ACGAG.TCAAGCAAAGACTC.GA.AC
	350 400	
mt consensus (angiosperm)	350 400 GCGGGAAAGGCTATGCTAGGGCGTGTGGCGACGCGTTGGGAGTACCTATTGATGGAAGAGGGGCTCTAAGCGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Diour cotinum	350 400 GCGGGAAAGGCTATGCTAGGCGTGTGGTCGACGCGTTGGGAGGAGCTCTATTGATGGAAGAGGGGCCTCAAGCGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp.	350 400 GCGGGAAAGGCTATGCTAGGCGTGGGCGGTCGGACGGCGTTATGGATGG	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia spilobata Bedula nigra	350 400 GCGGGAAAGGCTATGCTAGGGCGTGTGGTCGACGCGTTGGGAGGAGTACCTATTGAT GGAAGAGGGGCCTCA A. T C.	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begoria spilobata Begoria spilobata Betula nigra Humulus lupulus	350 400 GCGGGGAAAGGCGTATGCTAGGGAGGCGGTGGGAGGGGGTGTACTATTGGA- 1	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sy Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis	350 400 всебеблалобстатестабебстер сбасессттебебаетасстаттебат - белабаебебстета абсеат -	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sy Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei	350 400 всевевалаевстатестаевсегтеевсасесттеевсаетстатевсат	450
mt consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum	350 400 0C6666AAA6GCTAT6CTA666CGTGGGCCGAC6GCGTTGGAGAGAGACTATTGAT -	450
mt consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocysciis lobata Betula nigra Humalus luppulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis	350 400 0C6666AAA6GCTAT6CTA666GGTGGTCGAC6GCTTGGAGAGTACCTATTGAT -	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major	350 400 GCGGGAAAGGCTATGCTAGGGGTGGACGGCGTGGGGGCGGTGGGGGGGG	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum	350 400 GCGGGAAAGGCTATGCTAGGGGTGGACGGCGTGGGGGCGGGTGGGGGGGG	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erddium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm)	350 400 GCGGGAAAGCCTATGCTAGGGGTGGGCGCGGCGGGGGGGG	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm)	350 400 GCGGGAAAGCCTATGCTAGGGGTGGGCGCGGCGGGGGGGG	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lopulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniforum Hypseocharis jimpinellifo cp consensus (angiosperm)	350 400 GCGGGAAAGCCTATGCTAGGGGTGGTGGACGCCTTGGGAGGAGTACCTATTGAT GGAAGAGGGGCCTATAGCGAT A. T. C. A. C. A. C. A. A. <td< th=""><th>450 </th></td<>	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm) Auodanthes caseariae	350 400 GCGGGAAAGCCTATGCTAGGGGTGGGTCGACGCGTTGGAGGAGTACCTATTGAT GGAAGAGGGGCTCTA ACCAT A. T GC GC A. T GC GC GC </th <th>450 </th>	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia conadensis Anguilegia conadensis Anguilegia conadensis Melianthus major Sarcocaulon vanderietiae Erddium pelargoniflorum Mytus communis Melianthus major Sarcocaulon vanderietiae Erddium pelargoniflorum Hypsecharis pimpinelifo cp consensus (angiosperm) mt consensus (angiosperm) Apodanthes caseariae Pisum sativum	350 400 GCGGGAAAGCCTATGCTAGGGGTGGTCGACGCCTTGGGAGTACCTATTGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhica simplicissima Berberis bealei Podophyllum pelatum Myrtus communis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. thata	350 400 GCGGGAAAGCCTATGCTAGGGGTGGTCGACGCGTTGGAGTACCTATTGAT	458
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhica simplicissima Berberis bealei Podophyllum pelataum Myrtus communis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pilostyles thurberi Pisum sativum Begonia sp. lobata Bertian nigarus	350 400 GCGGGAAAGCCTATGCTAGGGCGTGGGCGCGACGCCTTGGGAGGACTACCTATTGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhica simplicissima Berberis bealei Podophyllum pelartaum Myrtus communis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo cp consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pilostyles t	350 400 GCGGGGAAAGCGCTATGCTAGGGGGTGGGCGGACGCGTTGGGAGGGGTCTAT-AGCGAT- -	458
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhica simplicismin Berbris bealei Myrtus communis Molianthus major Sarcocauluon vanderietiae Erodium pelargonifiorum Hypseocharis pimpinellifo cp consensus (angiosperm) mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pilostyles thurberi Pilostyle	350 400 оссебелласстатестассестестессасессттессасессттатесат	458
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mt consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystislobata Betula nigra Mumulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Oenothera biennis Melianthus major Oenothera biennis Melianthus major Oenothera biennis Melianthus major Oenothera biennis Melianthus major Oenothera biennis Melianthus major Myrtus communis Oenothera biennis Melianthus major Myrtus communis Oco consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Pilostyles thurberi Pilostyles thurberi Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum	350 400 GCGGGAAAGGCTATGCTAGGGTGGTCGACGGCTTGGAGGGGTCTATGGAT -	450
mt consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Genothera biennis Mellanthus major Sarcocaulon vanderietiae Erodium pelargoniforum Hypseocharis pimpinellifo cp consensus (anglosperm) mt consensus (anglosperm) Apodanthes caseariae Pilsum sativum Begonia sp. Betula rigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis	350 400 GCGGGAAAGCCTATGCTAGGGCGTGGGCGCGGTTGGAAGGCGTCTATTGGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biensis Melianthus major consensus (angiosperm) mt consensus (angiosperm) Apodanthes caseariae Pilosm sativum Begonia sp. Echinocystis lobata Betula nigra Humalus Ipulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Pisum sativum Begonia sp. Echinocystis lobata Betuenis bealei Podophyllum peltatum Myrtus communis Oenothera biensis Melianthus major	350 400 GCGGGAAAGCCTATECTAGGGCTGGGCGCGTTGGAGGCGCTTATGGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Humalus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniforum Hypseocharis pimpinellifo cp consensus (angiosperm) Apodanthes caseariae Pilsum sativum Begonia sp. Echinocystis lobata Betveris bealei Podophyllum peltatum Myrtus communis Oenothera lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniforum Myrseckaris pimpinellifo	350 400 GCGGGAAAGCCTATGCTAGGGGTGGTGGACGCGTTGGAAGAGCGTTTGGAAGAGGGCCTCTAAGCGAT	450
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Fisum sativum Begonia sp. Echinocystis lobata Betula nigra Mumulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorniza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniforum Myrseocharis pimpinellifo cp consensus (angiosperm) Apodanthes caseariae Pilsum sativum Begonia sp. Echinocystis lobata Betveris bealei Podophyllum peltatum Napodanthes caseariae Pilsum sativum Begonia sp. Echinocystis lobata Betveris bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniforum Myrsus communis	350 400 GCGGGAAAGCCTATGCTAGGGGTGGCTCGACGCGTTGGAAGACGTTTGGAAGAGCGCTCTATTGAT	450

Fig. S7 (continued).

		650	700	750
mt consensus (angiosperm)	ААССААААВСАААТБААСТСААББ	GGCACCTCT	GAGAGTGAGACATTGTATTGTGTC	татбтабсбаттббасабааасбстсаастбтб
Apodanthes caseariae Pilostyles thurberi			A	T
Begonia sp. Echinocystis lobata			AA	
Betula nigra Humulus lupulus				
Ranunculus sp.	AG	G	AA. TC	G
Aquilegia canadensis Xanthorhiza simplicissima			A	
Berberis bealei Podophyllum peltatum				
Myrtus communis Oenothera biennis				A
Melianthus major Sarcocaulon vanderietiae		.C		AC
Erodium pelargoniflorum Hypseocharis pimpinellifo	GGA		A	
cp consensus (angiosperm)	TC.AGGTCAAT		G.AATAT	TTAGCATT
		800	850	900
mt consensus (angiosperm)	GCACAATTAGTTCAAATTCTTTCAGAAGCGAATGCTTTGGAATAT	TCCATTCTTGTAGCAGCCACCGCTTCGGATC	CTGCTCCTCTGCAATTTCTGGCCCCATATTCTGGGTGTGCC	I I I ATGGGGGAATATTTCCGCGATAATGGAATGCAC
Apodanthes caseariae	GA	CA	тст	Ст
Pilostyles thurberi Pisum sativum Begonia sp			.AA.	
Echinocystis lobata Betula nigra	TCG.		T	
Humulus lupulus		T		
Ranunculus sp. Aquilegia canadensis	GGAAA.	т	CT	G
Xanthorhiza simplicissima Berberis bealei Bedenbyllum poltatum			т	
Myrtus communis			C	
Oenothera biennis Melianthus major	G		CA	
Sarcocaulon vanderietiae Erodium pelargoniflorum				A
Hypseocharis pimpinellito		001TA33 3 44 0 3 3 T 4		
cp consensus (angrosperm)		A.T		
	1 1 1	950 	1000 	1056
mt consensus (angiosperm)	GCATTAATAATCTATGATGATCTTAGTAAACAGGCGGTGGCATAT	950 CGACAAATGTCATTATTGTTACGCCGACCAC	1000 I I I CAGGCCGTGAGGCTTTTCCCAGGGGAGTTTTTCTATTTACAT	
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum	ССАТТААТААТСАТСАТСАТСАТСАТАСТАССОСССССССАТАТ С	950 I I I CGACAAATGTCATTATTGTTACGCCGACCAC	1990 CCAGGCCGTGAGGCTTTCCCAGGGGGATGTTTCCTATTACAT TAATATG C.	1056
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata		950 I I I I I I I I I I I I I I I I I I I	1999 	1956 1056
mt consensus (anglosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus		950 ICGACAAATGTCATTATTGTTACGCCGACCAC 	1999 	1956 1056
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pissum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranurculus sp. Augilenia canadensis		950 CGACAAATGTCATTATTGTTACGCCGACCACCAC 	1999 CCAGGCCGTGAGGCTTTCCCAGGGGATGTTTTCTATTTACAT TAATATG C	1956 TCCCGTCTCTTAGAAAGAGCCGCTAAACGATCG .AA. 6
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei		950 ССАСААААТGTCATTATTGTTACGCCGACCAC 	1990 ICAGGCCGTGAGGCTTTCCCAGGGGATGTTTTCTATTACAT T. A. AT. ATG C. C. C. C. C. C. C. C.	1956 1056 1 1 1 1 1 1 1 1 1 1 1 1 1
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum	ссаттаатаатстатсатсатсттастаатсаасабссод цесатаа 	950 	1990 	1956 1 TCCCGCTCTCTTABAAAGAGCCGCTAAACGATCG . AA. G
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Genchera biennis	ссаттаатаатстатсатсатсттастаатаасабссоотвесатат ст с	950 	1999 	1956 1056
mt consensus (angiosperm) Apodanthes caseariae Pilostyles thurberi Pisus stativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Eredium pelargonificae	ссаттаатаатстатсатсатсттастаатаасабссостебсатат т	950 CGACAAATGTCATTATTGTTACGCCGACCAC 	1999 	1956 1056
mt consensus (angiosperm) Apodanthes caseriae Pilostyles thurberi Pilostyles thurberi Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifor	Саттаатаатстатсатсатсттастаатаасаббсобтебсатат т. 	950 CGACAAATGTCATTATTGTTACGCCGACCAC 	1999 	1956 1956 1000 100 1000 1
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		1250		1300	1350
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Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus	AAGA.AA	CGAA	A. A. T. A. A. T. A. A. T. A. A. A. T. A.	AA.T.	A
Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum	AC				A
Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo			A	AAT. A.AT. A.AT. A	
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Apodanthes caseariae Pilostyles thurberi Pisum sativum Begonia sp. Echinocystis lobata Betula nigra Humulus lupulus					
Ranunculus sp. Aquilegia canadensis Xanthorhiza simplicissima Berberis bealei Podophyllum peltatum				 	
Myrtus communis Oenothera biennis Melianthus major Sarcocaulon vanderietiae Erodium pelargoniflorum Hypseocharis pimpinellifo			А тт.		
cp consensus (angiosperm)	AATCA.T.GGCACA.C.AT.ACGT	ГGT.G.TTТ.СCAС.	.TCA.GG.GGGAA.GACT		

Table S1. All potential	y chloroplast-derived regions	n mitochondrial atp1 genes with P	v < 0.05 before correction for the second	or multiple tests
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Event	Species	Start	End	<i>P</i> -value
1	Apodanthes caseariae	942	1020	$1.27 imes 10^{-10}$
2	Catalpa bignonioides	1110	1141	$6.87 imes10^{-09}$
	Paulownia tomentosa	1110	1141	$6.87 imes10^{-09}$
	Campsis radicans	1110	1141	$9.73 imes10^{-09}$
	Digitalis purpurea	1110	1141	$9.73 imes10^{-09}$
	Parentucellia viscosa	1110	1141	$1.01 imes10^{-08}$
	Alonsoa sp.	1110	1141	$1.03 imes10^{-08}$
	Globularia punctata	1110	1141	$1.03 imes10^{-08}$
	Sesamum indicum	1110	1141	$1.03 imes10^{-08}$
	Stachys officinalis	1110	1141	$1.03 imes10^{-08}$
	Lamourouxia viscosa	1110	1141	$1.04 imes10^{-08}$
	Orobanche fasciculata	1110	1141	$1.08 imes10^{-08}$
	Bartsia inaegualis	1110	1141	$1.10 imes 10^{-08}$
	Lindenbergia urticifolia	1110	1141	1.48×10^{-08}
	Mentha spicata	1110	1141	1.50×10^{-08}
	Veronica incana	1110	1141	1.50×10^{-08}
	Verbena honariensis	1110	1161	4.59×10^{-08}
	Strobilanthes dveriana	1110	11/1	5.03×10^{-08}
		1110	1141	1.22×10^{-07}
		1110	1141	1.55×10^{-07}
	Ajuga reptans	1110	1141	1.53×10^{-07}
	Bartsia laticrenata	1110	1141	2.13×10^{-07}
	Lamium sp.	1110	1141	$3.00 \times 10^{-0.07}$
	Epifagus virginiana	1110	1141	3.04×10^{-07}
	Myoporum sandwicense	1110	1141	3.11×10^{-07}
	Streptocarpus holstii	1110	1141	5.35×10^{-07}
3	Clethra barbinervis	1119	1141	3.15 × 10 ⁻⁰⁷
	Clethra arborea	1119	1141	$3.30 imes 10^{-07}$
4	Ranunculus sp.	957	970	$3.58 imes 10^{-06}$
5	Myrtus communis	1008	1029	$1.24 imes 10^{-05}$
6	Cynomorium coccineum	1119	1149	$1.66 imes 10^{-05}$
7	Passiflora suberosa	1128	1141	$1.01 imes 10^{-04}$
8	Citrus sp.	1110	1141	$3.98 imes 10^{-04}$
9	Empetrum nigrum	1128	1149	$9.49 imes10^{-05}$
	Rhododendron impeditum	1104	1141	$2.50 imes10^{-04}$
	Chimaphila umbellata	1128	1141	$9.81 imes10^{-04}$
	Vaccinium arboreum	1128	1141	$6.60 imes10^{-03}$
	Vaccinium uliginosum	1128	1141	$8.86 imes10^{-03}$
10	Podophyllum peltatum	1128	1149	$1.16 imes 10^{-03}$
11	Fouquieria sp.	138	145	$1.23 imes10^{-03}$
12	Scaevola plumieri	1110	1215	$2.26 imes10^{-03}$
13	Ternstroemia stahlii	1128	1141	$2.32 imes10^{-03}$
14	Plantago crassifolia	933	1020	$3.46 imes10^{-03}$
	Plantago coronopus	903	970	$1.03 imes10^{-02}$
15	Plantago crassifolia	1104	1164	$4.91 imes10^{-03}$
	Plantago coronopus	1104	1164	$4.75 imes 10^{-02}$
16	Euphorbia milii	1119	1149	$5.29 imes 10^{-03}$
17	Carex interior	519	735	$4.30 imes 10^{-03}$
	Cyperus alternifolius	519	735	6.80×10^{-03}
	Aponogeton crispus	453	618	9.46×10^{-03}
	Juncus bufonius	519	559	9.72×10^{-03}
	luncus turkestanicus	519	559	1.14×10^{-02}
	Tonina fluviatilis	450	787	1.33×10^{-02}
	Egeria naias	544	708	1.55×10^{-02}
	Elodea so	544	708	1.45×10^{-02}
	Bluva aubortii	544	£10	1.00×10^{-02}
	Diyxa duberun Najas guadalunansis	D44	010	1.75×10^{-02}
10	ivajas guauaiuperisis	244	/ /	2.04×10^{-02}
10	Apouantnes casearlae	1119	1107	$\delta.50 \times 10^{-03}$
19	i etramerista sp.	1137	1338	1.35×10^{-02}
	Pentamerista neotropica	1137	1338	2.11×10^{-02}
	Pelliciera rhizophorae	113/	1338	2.18×10^{-02}
20	Dendrophthoe pentandra	1230	1311	1.84×10^{-02}
21	Plantago crassifolia	1230	1242	2.01×10^{-02}

Event	Species	Start	End	<i>P</i> -value
22	Baldellia ranunculoides	1104	1161	2.55 × 10 ⁻⁰²
	Limnobium laevigatum	1140	1164	$2.94 imes10^{-02}$
	Hydrocharis morsus-ranae	1140	1164	$2.96 imes10^{-02}$
	Alisma plantago-aquatica	1140	1161	$3.46 imes10^{-02}$
23	Cercis canadensis	970	1438	$4.95 imes10^{-02}$
24	Leucocrinum montanum	1141	1350	$4.97 imes10^{-02}$

To see how putative conversion events were inferred, please see Fig. 2. Events are grouped from lowest to highest *P*-values, with the lowest *P*-value within an event group determining its position.

Table S2. P-values for chloroplast/mitochondrial recombinant segments measured by GENECONV^a

	P-value		Position	
Species	GENECONV	Bonferroni ^b	Start	End
Lamiales ^c			1105	1162
Mentha spicata	<0.0001	0.00042		
Campsis radicans	0.0001	0.00062		
Empetrum nigrum	_	_	—	_
Rhododendron impeditum	_	_	_	_
Ternstroemia stahlii	_	_	—	_
Vaccinium arboreum	_	_	—	_
Chimaphila umbellata	_	_	_	_
Clethra arborea	<0.0001	0.00039	1114	1162
Clethra barbinervis	<0.0001	0.00050	1114	1162
Passiflora suberosa	_	_	—	_
Cynomorium coccineum	_	_	_	_
Citrus sp.	_	_	_	_
Apodanthes caseariae	0.0076	0.04019	949	974
	0.0375	0.15679	982	1020
Ranunculus sp.	0.0087	0.03626	943	974
Myrtus communis	—	—	—	—

^aAnalyses were performed using mitochondrial *atp1* sequences from each phylogeny in Figure 2 and chloroplast *atpA* sequences from the following six representatives: *Jasminum nudiflorum* (asterids), *Oenothera biennis* (rosids), *Beta vulgaris* (Caryophyllales), *Ranunculus macranthus* (stem eudicots), *Triticum aestivum* (monocots), *Amborella trichopoda* (stem angiosperms). Dashes are shown if no significant region was detected at *P* < 0.05. ^bP-values after Bonferroni correction to the GENECONV data.

^cOf the 27 species of Lamiales examined, only the two with the largest and smallest P-values are shown.

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