

Supplementary Materials

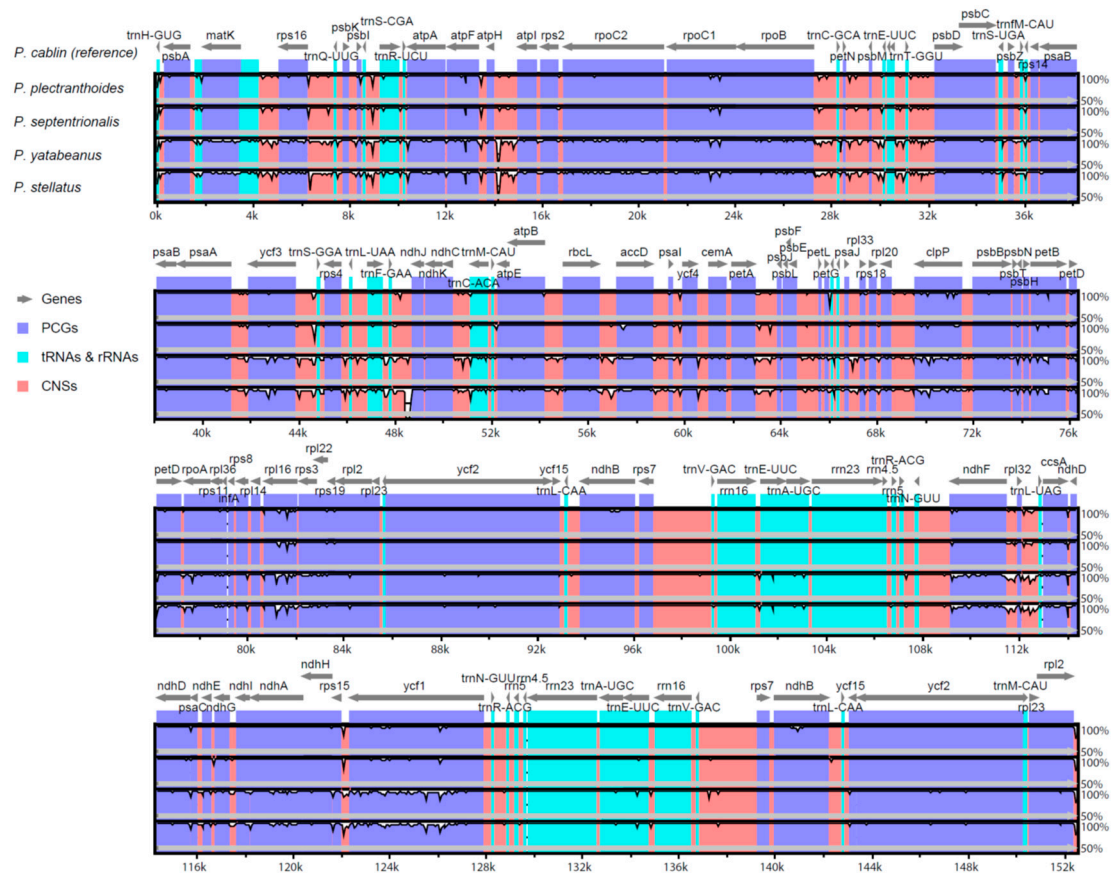


Figure S1. mVISTA plot showing the percent identity of plastid genomes between each of four *Pogostemon* species and the reference *Pogostemon cablin* based on pairwise global sequence alignments. The grey arrows at the top of the graph indicate annotated genes with their locations and orientations. Colored peaks (dark blue, protein-coding gene; light blue, tRNAs and rRNAs; pink, conserved non-coding sequences) indicate regions with at least 50% similarity calculated from 50 bp sliding windows.

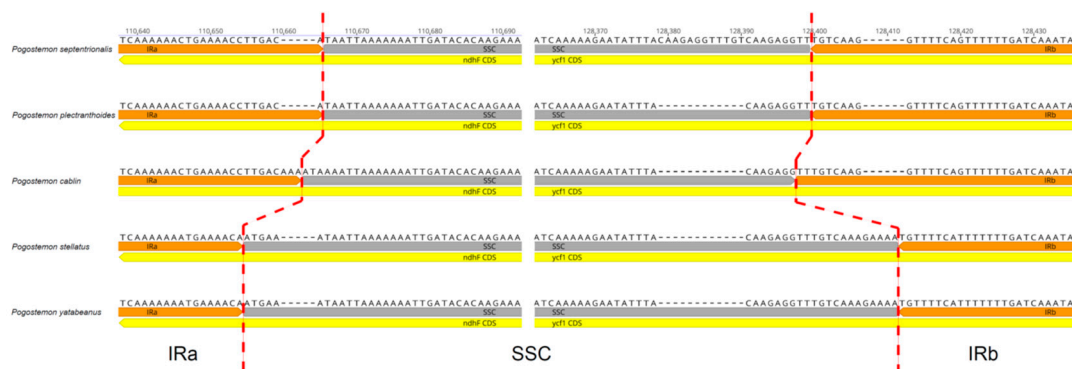


Figure S2. IRA-SSC and SSC-IRb boundaries in five *Pogostemon* chloroplast genomes.

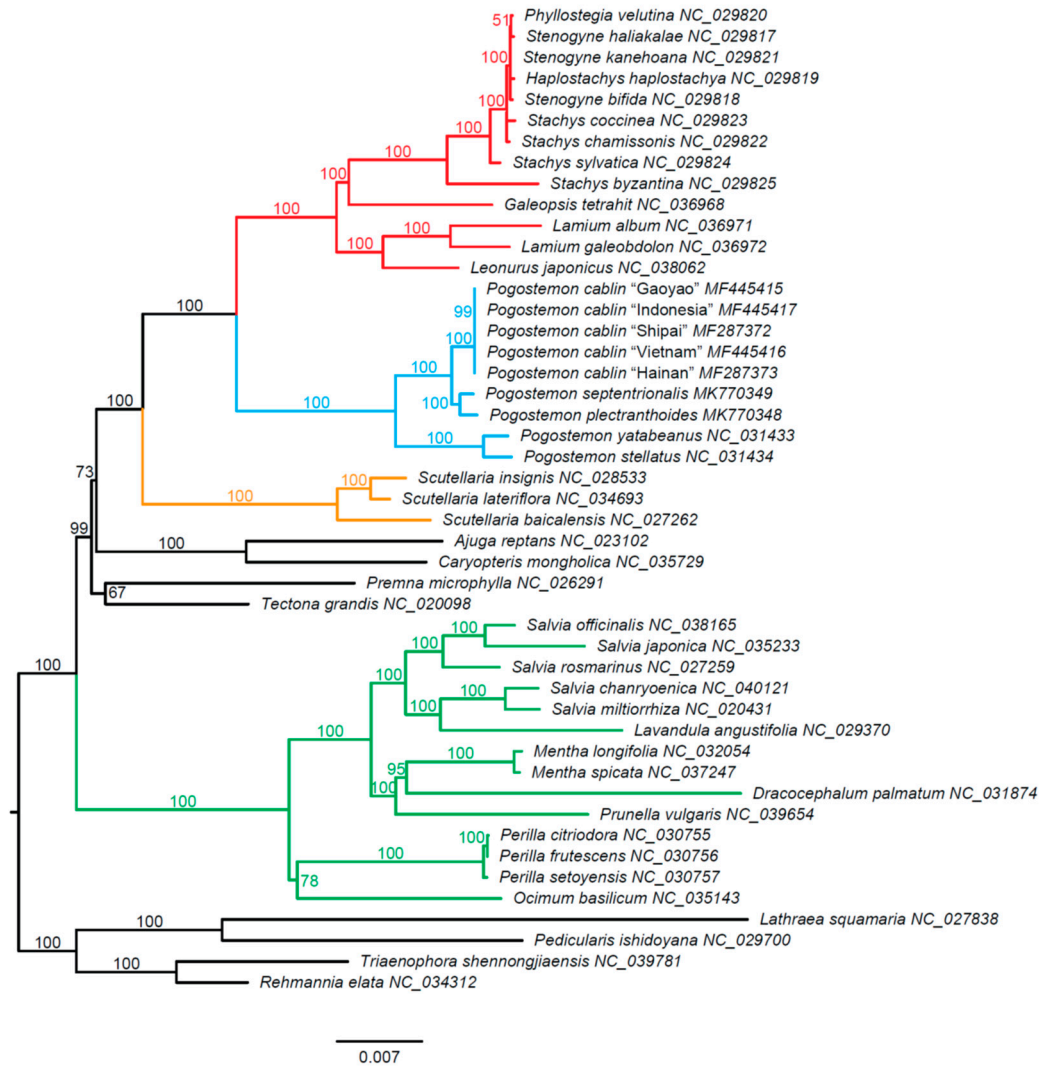


Figure S3. Maximum likelihood tree of 43 Lamiaceae accessions and four outgroups inferred from a concatenated codon matrix of 80 plastid protein-coding genes with gene partitions. Red clade: Stachydeae + *Galeopsis* + Lamieae + Leonureae, blue clade: *Pogostemon*, yellow clade: Scutellarioideae, and green clade: Nepetoideae. The group with red and blue colors is the Lamioideae. Numbers on the branches are bootstrap support values.

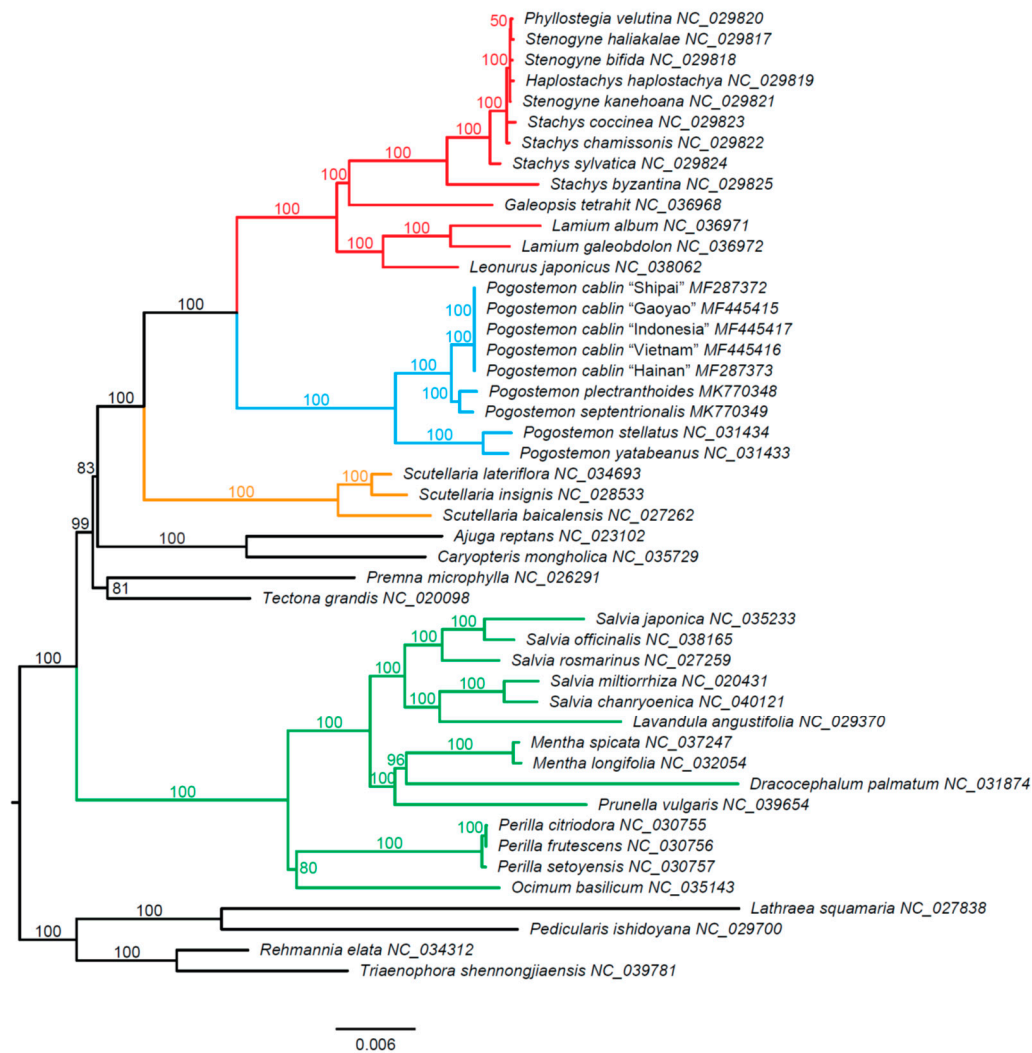


Figure S4. Maximum likelihood tree of 43 Lamiaceae accessions and four outgroups inferred from a concatenated codon supermatrix of 80 plastid protein-coding genes without partitions. Red clade: Stachydeae + *Galeopsis* + Lamieae + Leonureae, blue clade: *Pogostemon*, yellow clade: Scutellarioideae, and green clade: Nepetoideae. The group with red and blue colors is the Lamioideae. Numbers on the branches are bootstrap support values.

Table S1. Number of phylogenetically informative characters (PICs), and d_N , d_s and ω values, for each protein-coding gene.

Gene	PICs	d_N	d_s	ω
<i>accD</i>	18	0.0106	0.0781	0.1356
<i>atpA</i>	14	0.0026	0.0613	0.0417
<i>atpB</i>	12	0.0018	0.0540	0.0341
<i>atpE</i>	4	0.0097	0.0249	0.3901
<i>atpF</i>	11	0.0092	0.0578	0.1600
<i>atpH</i>	0	0	0.0334	0.0001
<i>atpI</i>	3	0.0075	0.0218	0.3414

<i>ccsA</i>	17	0.0321	0.0467	0.6867
<i>cemA</i>	12	0.0221	0.0316	0.7002
<i>clpP</i>	10	0.0121	0.0459	0.2638
<i>infA</i>	3	0	0.1	0.0001
<i>matK</i>	44	0.0341	0.0791	0.4317
<i>ndhA</i>	14	0.0072	0.0655	0.1098
<i>ndhB</i>	1	0.0054	0.0051	1.0682
<i>ndhC</i>	3	0.0099	0.0544	0.1825
<i>ndhD</i>	12	0.0026	0.0561	0.0458
<i>ndhE</i>	1	0.0084	0.0357	0.2351
<i>ndhF</i>	47	0.0283	0.1019	0.2781
<i>ndhG</i>	3	0.016	0.0346	0.4630
<i>ndhH</i>	9	0.0033	0.0621	0.0528
<i>ndhI</i>	7	0.0051	0.0609	0.0832
<i>ndhJ</i>	1	0.0026	0.051	0.0502
<i>ndhK</i>	4	0.0076	0.0222	0.3417
<i>petA</i>	5	0.0041	0.0436	0.0935
<i>petB</i>	4	0.0039	0.0397	0.0991
<i>petD</i>	3	0.0029	0.0425	0.0683
<i>petG</i>	0	0	0	-
<i>petL</i>	1	0	0.042	0.0001
<i>petN</i>	0	0	0	-
<i>psaA</i>	9	0	0.0334	0.0001
<i>psaB</i>	13	0.0012	0.0565	0.0205
<i>psaC</i>	0	0	0	-
<i>psaI</i>	3	0.025	0.0409	0.6101
<i>psaJ</i>	0	0	0.0382	0.0001
<i>psbA</i>	5	0	0.0571	0.0001
<i>psbB</i>	15	0.0061	0.047	0.1294
<i>psbC</i>	12	0	0.0486	0.0001
<i>psbD</i>	6	0.0014	0.0277	0.0490
<i>psbE</i>	0	0	0	-
<i>psbF</i>	1	0.0118	0.0333	0.3558
<i>psbH</i>	7	0.0384	0.0593	0.6482
<i>psbI</i>	1	0	0.0609	0.0001
<i>psbJ</i>	0	0	0	-
<i>psbK</i>	2	0.0124	0.0457	0.2715
<i>psbL</i>	2	0.0149	0.025	0.5955
<i>psbM</i>	1	0	0.0437	0.0001
<i>psbN</i>	1	0	0.0247	0.0001
<i>psbT</i>	0	0	0.0506	0.0001
<i>psbZ</i>	2	0	0.064	0.0001
<i>rbcL</i>	21	0.0078	0.0493	0.1577
<i>rpl14</i>	2	0.0035	0.0275	0.1266

<i>rpl16</i>	6	0.0061	0.0731	0.0836
<i>rpl2</i>	0	0	0.0065	0.0001
<i>rpl20</i>	5	0.0136	0.0736	0.1846
<i>rpl22</i>	10	0.0158	0.1454	0.1089
<i>rpl23</i>	0	0.0044	0	-
<i>rpl32</i>	3	0.0093	0.0937	0.0992
<i>rpl33</i>	0	0.0128	0.0519	0.2470
<i>rpl36</i>	0	0	0.0504	0.0001
<i>rpoA</i>	13	0.0197	0.0623	0.3158
<i>rpoB</i>	30	0.0073	0.0422	0.1733
<i>rpoC1</i>	17	0.0057	0.0425	0.1347
<i>rpoC2</i>	58	0.0179	0.0582	0.3071
<i>rps11</i>	6	0.0032	0.1037	0.0313
<i>rps12</i>	0	0	0.0207	0.0001
<i>rps14</i>	3	0.0044	0.0425	0.1028
<i>rps15</i>	3	0.0043	0.0943	0.0461
<i>rps16</i>	6	0.0224	0.0941	0.2381
<i>rps18</i>	8	0.0124	0.0994	0.1244
<i>rps19</i>	3	0	0.0931	0.0001
<i>rps2</i>	5	0.0096	0.0412	0.2338
<i>rps3</i>	13	0.0098	0.1188	0.0824
<i>rps4</i>	5	0.0089	0.0275	0.3236
<i>rps7</i>	0	0	0.0208	0.0001
<i>rps8</i>	1	0.0157	0	-
<i>ycf1</i>	146	0.0435	0.0605	0.7186
<i>ycf15</i>	1	0.0081	0	-
<i>ycf2</i>	23	0.0057	0.0072	0.7870
<i>ycf3</i>	1	0	0.0168	0.0001
<i>ycf4</i>	4	0.0050	0.0142	0.3542

Table S2. Mean d_N , d_s and ω values for each group of protein-coding genes.

Gene Group	d_N	d_s	ω
All	0.0080	0.0467	0.1704
<i>atp</i>	0.0051	0.0422	0.1216
<i>ndh</i>	0.0088	0.0500	0.1754
<i>pet</i>	0.0018	0.0280	0.0650
<i>psa</i>	0.0052	0.0338	0.1550
<i>psb</i>	0.0057	0.0392	0.1447
<i>rpl</i>	0.0073	0.0580	0.1255
<i>rpo</i>	0.0127	0.0513	0.2466
<i>rps</i>	0.0076	0.0630	0.1200
<i>ycf</i>	0.0125	0.0197	0.6312

Table S3. Samples used for chloroplast phylogenomic analyses in this study.

Species	Taxonomy	GenBank Accession Number
<i>Pogostemon</i>	Lamiaceae; Lamioideae; Pogostemoneae;	MK770348
<i>plectranthoides</i>	Pogostemon	
<i>Pogostemon</i>	Lamiaceae; Lamioideae; Pogostemoneae;	MK770349
<i>septentrionalis</i>	Pogostemon	
<i>Pogostemon stellatus</i>	Lamiaceae; Lamioideae; Pogostemoneae;	KP718620
	Pogostemon	
<i>Pogostemon</i>	Lamiaceae; Lamioideae; Pogostemoneae;	KP718618
<i>yatabeanus</i>	Pogostemon	
<i>Pogostemon cablin</i>	Lamiaceae; Lamioideae; Pogostemoneae;	
“Indonesia”	Pogostemon	MF445417
<i>Pogostemon cablin</i>	Lamiaceae; Lamioideae; Pogostemoneae;	
“Vietnam”	Pogostemon	MF445416
<i>Pogostemon cablin</i>	Lamiaceae; Lamioideae; Pogostemoneae;	
“Gaoyao”	Pogostemon	MF445415
<i>Pogostemon cablin</i>	Lamiaceae; Lamioideae; Pogostemoneae;	
“Shipai”	Pogostemon	MF287372
<i>Pogostemon cablin</i>	Lamiaceae; Lamioideae; Pogostemoneae;	
“Hainan”	Pogostemon	MF287373
<i>Premna microphylla</i>	Lamiaceae; Lamiaceae incertae sedis;	NC_026291.1
	Premna	
<i>Tectona grandis</i>	Lamiaceae; Lamiaceae incertae sedis;	NC_020098.1
	Tectona	

<i>Lamium album</i>	Lamiaceae; Lamioideae; Lamieae; Lamium	NC_036971.1
<i>Lamium galeobdolon</i>	Lamiaceae; Lamioideae; Lamieae; Lamium	NC_036972.1
<i>Galeopsis tetrahit</i>	Lamiaceae; Lamioideae; Lamioideae incertae sedis; Galeopsis	NC_036968.1
<i>Leonurus japonicus</i>	Lamiaceae; Lamioideae; Leonureae; Leonurus	NC_038062.1
<i>Haplostachys haplostachya</i>	Lamiaceae; Lamioideae; Stachydeae; Haplostachys	NC_029819.1
<i>Phyllostegia velutina</i>	Lamiaceae; Lamioideae; Stachydeae; Phyllostegia	NC_029820.1
<i>Stachys byzantine</i>	Lamiaceae; Lamioideae; Stachydeae; Stachys	NC_029825.1
<i>Stachys chamissonis</i>	Lamiaceae; Lamioideae; Stachydeae; Stachys	NC_029822.1
<i>Stachys coccinea</i>	Lamiaceae; Lamioideae; Stachydeae; Stachys	NC_029823.1
<i>Stachys sylvatica</i>	Lamiaceae; Lamioideae; Stachydeae; Stachys	NC_029824.1
<i>Stenogyne bifida</i>	Lamiaceae; Lamioideae; Stachydeae; Stenogyne	NC_029818.1
<i>Stenogyne haliakalae</i>	Lamiaceae; Lamioideae; Stachydeae; Stenogyne	NC_029817.1
<i>Stenogyne kanehoana</i>	Lamiaceae; Lamioideae; Stachydeae; Stenogyne	NC_029821.1

<i>Perilla citriodora</i>	Lamiaceae; Nepetoideae; Elsholtzieae;	NC_030755.1
	Perilla	
<i>Perilla frutescens</i>	Lamiaceae; Nepetoideae; Elsholtzieae;	NC_030756.1
	Perilla	
<i>Perilla setoyensis</i>	Lamiaceae; Nepetoideae; Elsholtzieae;	NC_030757.1
	Perilla	
<i>Lavandula angustifolia</i>	Lamiaceae; Nepetoideae; Lavanduleae;	NC_029370.1
	Lavandula	
<i>Dracocephalum palmatum</i>	Lamiaceae; Nepetoideae; Mentheae;	NC_031874.1
	Dracocephalum	
<i>Mentha longifolia</i>	Lamiaceae; Nepetoideae; Mentheae;	NC_032054.1
	Mentha	
<i>Mentha spicata</i>	Lamiaceae; Nepetoideae; Mentheae;	NC_037247.1
	Mentha	
<i>Prunella vulgaris</i>	Lamiaceae; Nepetoideae; Mentheae;	NC_039654.1
	Prunella	
<i>Salvia japonica</i>	Lamiaceae; Nepetoideae; Mentheae; Salvia	NC_035233.1
<i>Salvia miltiorrhiza</i>	Lamiaceae; Nepetoideae; Mentheae; Salvia	NC_020431.1
<i>Salvia officinalis</i>	Lamiaceae; Nepetoideae; Mentheae; Salvia	NC_038165.1
<i>Salvia rosmarinus</i>	Lamiaceae; Nepetoideae; Mentheae; Salvia;	NC_027259.1
	Rosmarinus	
<i>Salvia chanryoenica</i>	Lamiaceae; Nepetoideae; Mentheae; Salvia;	NC_040121.1
	Salvia unplaced	
<i>Ocimum basilicum</i>	Lamiaceae; Nepetoideae; Ocimeae; Ocimum	NC_035143.1

<i>Scutellaria baicalensis</i>	Lamiaceae; Scutellarioideae; Scutellaria	NC_027262.1
<i>Scutellaria insignis</i>	Lamiaceae; Scutellarioideae; Scutellaria	NC_028533.1
<i>Scutellaria lateriflora</i>	Lamiaceae; Scutellarioideae; Scutellaria	NC_034693.1
<i>Ajuga reptans</i>	Lamiaceae; Teucrioideae; Ajuga	NC_023102.1
<i>Caryopteris mongholica</i>	Lamiaceae; Teucrioideae; Caryopteris	NC_035729.1
<i>Lathraea squamaria</i>	Orobanchaceae; Rhinanthaeae; Lathraea	NC_027838.1
<i>Pedicularis ishidoyana</i>	Orobanchaceae; Pedicularideae; Pedicularis	NC_029700.1
<i>Rehmannia elata</i>	Orobanchaceae; Orobanchaceae incertae sedis; Rehmannia	NC_034312.1
<i>Triaenophora shennongjiaensis</i>	Orobanchaceae; Orobanchaceae incertae sedis; Triaenophora	NC_039781.1
