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Supplementary Table S2: List Convolvulaceae species with Genomic accessions in Genbank

Species	Type of Genome	Accession Number (s)	Citation
Argyreia nervosa (Burm.f.) Bojer	Chloroplast	KF242477	Eserman *et al.* (2014)
Argyreia nervosa (Burm.f.) Bojer	Chloroplast	KF242477	Eserman *et al.* (2014)
Argyreia strigillosa C.Y.Wu	Chloroplast	OR770998	Chen *et al.* (2024)
Argyreia velutina C.Y.Wu	Mitochondrial	MZ240724	Lin *et al.* (2022)
Calystegia soldanella (L.) Roem. & Schult.	Mitochondrial	MZ240725	Lin *et al.* (2022)
Convolvulus arvensis L.	Mitochondrial	BK059236	Lin *et al.* (2022)
Convolvulus tragacanthoides Turcz.	Chloroplast	OR778088	Chen *et al.* (2024)
Cuscuta africana Willd.	Chloroplast	MN464179	Banerjee and Stefanović (2020)
Cuscuta australis R.Br.	Chloroplast	OR778086	Chen *et al.* (2024)
Cuscuta australis R.Br.	Mitochondrial	BK059204	Anderson *et al.* (2021)
Cuscuta australis R.Br.	Nuclear	PRJNA394036	Sun *et al.* (2018)
Cuscuta approximata Bab.	Chloroplast	MN464180	Banerjee and Stefanović (2020)
Cuscuta bonafortunae Costea & I.García	Chloroplast	MK887215	Banerjee and Stefanović (2019)
Cuscuta boldinghii Urb.	Chloroplast	MK881074	Banerjee and Stefanović (2019)
Cuscuta campestris Yunck.	Chloroplast	ENA: PRJEB19879	Chen *et al.* (2024)
Cuscuta campestris Yunck.	Mitochondrial	BK016277	Anderson *et al.* (2021)
Cuscuta carnosa Costea & I.García	Chloroplast	MK887212	Banerjee and Stefanović (2019)
Cuscuta chapalana Yunck.	Chloroplast	MK887214	Banerjee and Stefanović (2019)
Cuscuta chinensis Lam.	Chloroplast	MH780079, OL752638, OR771000	Park *et al.* (2019), Pan *et al.* (2023), Chen *et al.* (2024)
Cuscuta costaricensis Yunck.	Chloroplast	MK881072	Banerjee and Stefanović (2019)
Cuscuta epilinum Weihe	Mitochondrial	BK059237	Lin *et al.* (2022)
Cuscuta epithymum (L.) L.	Chloroplast	OP620588	Pan *et al.* (2023)
Cuscuta erosa Yunck.	Chloroplast	MK881073	Banerjee and Stefanović (2019)
Cuscuta europaea L.	Chloroplast	OP620589, OR770999, OR771001	Pan *et al.* (2023), Chen *et al.* (2024)
Cuscuta europaea L.	Mitochondrial	BK059238	Lin *et al.* (2022)
Cuscuta exaltata Engelm.	Chloroplast	EU189132	McNeal *et al.* (2007)

Species	Type of Genome	Accession Number (s)	Citation
Cuscuta gronovii Willd. ex Schult.	Chloroplast	AM711639, OL752639	Funk *et al.* (2007), Pan *et al.* (2023)
Cuscuta japonica Choisy	Chloroplast	OL752640, OR771002 - OR771012, MH780080	Park and Moon (2019), Pan *et al.* (2023), Chen *et al.* (2024)
Cuscuta japonica Choisy	Mitochondrial	MZ240726	Lin *et al.* (2022)
Cuscuta mexicana Yunck.	Chloroplast	MK887213	Banerjee and Stefanović (2019)
Cuscuta nitida E.Mey. ex Choisy	Chloroplast	MN464178	Banerjee and Stefanović (2020)
Cuscuta obtusiflora Kunth	Chloroplast	EU189133	McNeal *et al.* (2007)
Cuscuta pedicellata Ledeb.	Chloroplast	MN464181	Banerjee and Stefanović (2020)
Cuscuta pentagona Engelm.	Chloroplast	MH121054, OR771013, OR771014	Park *et al.* (2018), Chen *et al.* (2024)
Cuscuta reflexa Roxb.	Chloroplast	OR771015, OR771016	Chen *et al.* (2024)
Cuscuta strobilacea Liebm.	Chloroplast	MK867795	Banerjee and Stefanović (2019)
Dichondra micrantha Urb.	Chloroplast	OR771017	Chen *et al.* (2024)
Dinetus duclouxii (Gagnep. & Courchet) Staples	Chloroplast	OR771018	Chen *et al.* (2024)
Dinetus dinetoides (C.K.Schneid.) Staples	Chloroplast	OR771021	Chen *et al.* (2024)
Dinetus racemosus (Roxb.) Sweet	Mitochondrial	MZ240727	Lin *et al.* (2022)
Distimake quinquefolius (L.) A.R.Simões & Staples	Chloroplast	KF242501	Eserman *et al.* (2014)
Erycibe obtusifolia Benth.	Mitochondrial	MZ240728	Lin *et al.* (2022)
Evolvulus alsinoides (L.) L.	Mitochondrial	NC058741	Lin *et al.* (2022)
Evolvulus nummularius (L.) L.	Chloroplast	OR771019	Chen *et al.* (2024)
Ipomoea alba L.	Chloroplast	ON209203	Sudmoon *et al.* (2024)
Ipomoea amnicola Morong	Chloroplast	KF242478	Eserman *et al.* (2014)
Ipomoea aquatica Forssk.	Mitochondrial	MZ240730	Lin *et al.* (2022)
Ipomoea argillicola R.W.Johnson	Chloroplast	KF242479	Eserman *et al.* (2014)

Species	Type of Genome	Accession Number (s)	Citation
Ipomoea batatas (L.) Lam.	Nuclear	PRJEB14638, PRJNA301667	Yang *et al.* (2017)
Ipomoea batatas (L.) Lam.	Mitochondrial	OL699988	Yang *et al.* (2022)
Ipomoea batatas (L.) Lam.	Chloroplast	KF242473, KF242474, KF242475	Eserman *et al.* (2014)
Ipomoea biflora (L.) Pers.	Mitochondrial	MZ240723	Lin *et al.* (2022)
Ipomoea cairica (L.) Sweet	Chloroplast	KF242480	Eserman *et al.* (2014)
Ipomoea cordatotriloba Dennst.	Chloroplast	KF242497	Eserman *et al.* (2014)
Ipomoea cordatotriloba Dennst.	Chloroplast	MH173254	Chen *et al.* (2024)
Ipomoea cynanchifolia Meisn.	Chloroplast	MH173253	Chen *et al.* (2024)
Ipomoea diamantinensis J.M.Black ex Eardley	Chloroplast	KF242481	Eserman *et al.* (2014)
Ipomoea dumetorum Willd.	Chloroplast	KF242482	Eserman *et al.* (2014)
Ipomoea eriocarpa R.Br.	Chloroplast	KF242483	Eserman *et al.* (2014)
Ipomoea hederifolia L.	Chloroplast	KF242484	Eserman *et al.* (2014)
Ipomoea involucrata P.Beauv.	Chloroplast	KF242485	Eserman *et al.* (2014)
Ipomoea lacunosa L.	Chloroplast	MH173257	Chen *et al.* (2024)
Ipomoea leucantha Jacq.	Chloroplast	MH173263	Chen *et al.* (2024)
Ipomoea minutiflora (M.Martens & Galeotti) House	Chloroplast	KF242498	Eserman *et al.* (2014)
Ipomoea murucoides Roem. & Schult.	Chloroplast	KF242486	Eserman *et al.* (2014)
Ipomoea nil (L.) Roth	Chloroplast	KF242487	Eserman *et al.* (2014)
Ipomoea nil (L.) Roth	Chloroplast	AP017304	Hoshino *et al.* (2016)
Ipomoea nil (L.) Roth	Mitochondrial	NC031158	Yang *et al.* (2022)
Ipomoea nil (L.) Roth	Nuclear	BDFN01000001-BDFN01003416	Hoshino *et al.* (2016)
Ipomoea obscura (L.) Ker Gawl.	Chloroplast	KF242499	Eserman *et al.* (2014)
Ipomoea obscura (L.) Ker Gawl.	Chloroplast	OR995405	Sudmoon *et al.* (2024)
Ipomoea orizabensis (G.Pelletan) Ledeb. ex Steud.	Chloroplast	KF242488	Eserman *et al.* (2014)

Species	Type of Genome	Accession Number (s)	Citation
Ipomoea pedicellaris Benth.	Chloroplast	KF242489	Eserman *et al.* (2014)
Ipomoea pes-caprae (L.) Br.	Chloroplast	KF242490	Eserman *et al.* (2014)
Ipomoea pes-tigridis L.	Chloroplast	KF242500	Eserman *et al.* (2014)
Ipomoea polpha R.W. Johnson	Chloroplast	KF242491	Eserman *et al.* (2014)
Ipomoea quamoclit L.	Mitochondrial	MZ240732	Lin *et al.* (2022)
Ipomoea setosa Ker Gawl.	Chloroplast	KF242492	Eserman *et al.* (2014)
Ipomoea splendor-sylvae House	Chloroplast	KF242493	Eserman *et al.* (2014)
Ipomoea splendor-sylvae House	Chloroplast	MH173259	Chen *et al.* (2024)
Ipomoea tabascana J.A.McDonald & D.F.Austin	Chloroplast	MH173260	Chen *et al.* (2024)
Ipomoea ternifolia Cav.	Chloroplast	KF242494	Eserman *et al.* (2014)
Ipomoea tricolor Cav.	Chloroplast	KF242495	Eserman *et al.* (2014)
Ipomoea trifida (Kunth) G.Don	Chloroplast	KF242496	Eserman *et al.* (2014)
Ipomoea trifida (Kunth) G.Don	Chloroplast	KF242476	Eserman *et al.* (2014)
Ipomoea trifida (Kunth) G.Don	Chloroplast	KF242476.1, MH173261	Pan *et al.* (2023), Chen *et al.* (2024)
Ipomoea trifida (Kunth) G.Don	Nuclear	PRJNA428214	Wu *et al.* (2018)
Ipomoea triloba L.	Chloroplast	MH173262	Chen *et al.* (2024)
Ipomoea triloba L.	Nuclear	PRJNA428241	Wu *et al.* (2018)
Merremia hederacea (Burm. f.) Hall. f.	Mitochondrial	MZ240731	Lin *et al.* (2022)
Merremia hungaiensis (Lingelsh. & Borza) R.C.Fang	Chloroplast	OR771020	Chen *et al.* (2024)
Operculina macrocarpa (L.) Urb.	Chloroplast	KF242502	Eserman *et al.* (2014)
Poranopsis discifera (C.K.Schneid.) Staples	Chloroplast	OR771022	Chen *et al.* (2024)
Stictocardia macalusoi (Mattei) Verdc.	Chloroplast	KF242503	Eserman *et al.* (2014)
Tridynamia sinensis (Hemsl.) Staples	Chloroplast	OR771023	Chen *et al.* (2024)
Turbina corymbosa (L.) Raf.	Chloroplast	KF242504	Eserman *et al.* (2014)

Supplementary Material S3: References for Publications of Genomic Accessions

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Supplementary material S4: Suggested Molecular protocol for DNA extraction

DNA Extraction (modified CTAB protocol, based on Doyle & Doyle, 1987)

CTAB Buffer:

- 10 ml of 1 M Tri-HCl
- 28 ml of 5 M NaCl
- 4 ml of 0.5 M EDTA
- 2% CTAB (2g diluted in 100ml)
- 2% PVP 40 (2g diluted in 100ml)

1. Label 1.5mL eppendorf tubes with sample number.
2. Grind c. 20mg of dried leaf material using a pestle and mortar, or an automatic tissue lyser. Add a small amount of sand or glass beads to help grind fibrous tissue.
3. Transfer all the powdered tissue into 1.5 mL eppendorf tubes using a clean spatula.
4. Turn on heating block (or dry bath) at 65°C.
5. In the fume cupboard: add, to each 1.5mL ep- pendorf tube:
   - 490µl CTAB buffer
   - 50µl Sarkosyl
   - 10µl Proteinase K
6. Place all tubes in the heating block.
7. Leave for 1 hour.
8. Label additional 1.5 mL eppendorf tubes with sample number
9. In the fume cupboard: add 500µl of SEVAC to each sample (1.5 mL eppendorf tube)
10. Centrifuge for 3 minutes at 13,000rpm, to separate phases.
11. Pipette off 250ml of the clear upper aqueous phase into a clean 1.5 mL eppendorf tube.
12. Take care to avoid material at interface.
13. WARNING: all the waste (liquid and solid) must be disposed of in the appropriate waste vessel (inside the fume cupboard)
14. Purification
15. Quantification: use a Spectrophotometer to quantify the DNA concentration in each sample.
16. For blanking the measurement, always use the same substance that you used to elute the DNA in the final step of purification: buffer or water.
17. Annotate values for DNA concentration and A260/A280 (purity), and curve shape.

Supplementary material S5: Markers and PCR conditions for Sanger sequencing
Recommended genetic markers for phylogenetic studies of Convolvulaceae

Genome	Region	Description	Marker	Primer Sequence
Nuclear	ITS	nuclear ribosomal internal transcribed spacer	ITS AB101	ACGAATTCATGGTCCGGTGAAGTGTTCG
			ITS AB102	TAGAATTCCCCGGTTCGCTCGCCGTTAC
Chloroplast	trnL-F	transfer RNA genes	trnL5'^{UAAF}(TabC)	CGA AAT CGG TAGACG CTA CG
			trnF^{GAA}(TabF)	ATT TGA ACTGGT GAC ACG AG
Chloroplast	matK	maturase K gene	matk390F	CGATCTATTCATTCAATATTTC
			matK1326R	TCTAGCACACGAAAGTCGAAGT
Chloroplast	rps16	rps16 gene	rps16x2F2	AAAGTGGGTTTTTATGATCC
			trnK(UUU)x1	TTAAAAGCCGAGTACTCTACC

PCR Conditions (suggested; based on Carine *et al.,* 2004; Shaw *et al.,* 2005)

Nuclear (ITS):

- **Initial denaturation:** 5 min at 94°C
- **Annealing:**

30 cycles of:

- 1 min at 94°C (denaturation)
- 3 min at 49°C (annealing)
- 1 min at 72°C (extension)
- **Final Extension:** 8 min at 72°C

Chloroplast markers (trnL-F, matK, rps16):

- **Initial denaturation:** 5 min at 80°C
- **Annealing:**

30 cycles of:

- 1 min at 95°C (denaturation)
- 1 min at 50°C (annealing)
- ramp: 0.38C/s until 65°C
- 4 min at 65°C (extension)
- **Final Extension:** 5 min at 65°C

Supplementary Table S6: Traditional uses of some Convolvulaceae species.

Species	Use	Part used	Region	Reference
Argyreia nervosa (Burm.f.) Bojer	Medicinal	Seeds	India	Padhi *et al.* (2013)
Bonamia ferruginea (Choisy) Hallier f.	Medicinal	Leaves	Brasil	Rodrigues (2006), Paes and Mendonça (2008)
Cuscuta spp.	Dye	Stem	Mexico	Wallert (1997)
Decalobanthus mammosus (Lour.) A.R.Simões & Staples	Food	Root	India	Staples (2022)
Distimake tuberosus (L.) A.R.Simões & Staples	Medicinal	Root	Mexico, Guinea	Urbina (1906), Mwanga Mwanga *et al.* (2022)
Ipomoea aquatica Forssk.	Food/ Medicinal	Leaves	Tropical Asia	Austin (2007), Malakar Paesand and Choudhury (2015)
Ipomoea asarifolia (Desr.) Roem. & Schult.	Fodder	Leaves	Pakistan	Ekenyem (2006)
Ipomoea batatas (L.) Lam.	Food	Root	Worldwide	Islam (2024)
Ipomoea bracteata Cav.	Food	Root	Mexico	Piedra-Malagón *et al.,* 2022
Ipomoea capillacea (Kunth) G.Don	Food	Root	Mexico	Sandoval-Ortega *et al.* (2023)
Ipomoea caudata Fernald	Fishing	Root	Mexico	Urbina (1906)
Ipomoea corymbosa (L.) Roth	Medicinal	Seeds	Mexico	Schultes & Hofmann (1973)
Ipomoea dumosa (Benth.) L.O. Williams	Food	Leaves	Mexico	Piedra-Malagón *et al.* (2022)
Ipomoea jicama Brandegee	Food	Root	Mexico	Urbina (1906)
Ipomoea longituba Hallier f.	Food	Root	Kenya	Kabuye (1986)
Ipomoea mauritiana Jacq.	Medicinal	Roots	India	Chandira and Jayakar (2010), Jain *et al.* (2011)
Ipomoea oenotherae (Vatke) Hallier f.	Food	Roots	Kenya	Kabuye (1986)
Ipomoea purga (Wender.) Hayne	Medicinal	Root	Mexico	Urbina (1906) Linajes *et al.* (1994)
Ipomoea sinensis (Desr.) Choisy	Food	Root	Kenya	Kabuye (1986)
Ipomoea stans Cav.	Medicinal	Root	Mexico	Díaz (1976)

Supplementary Material S7: References for Traditional Uses of Convolvulaceae Species.

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