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SHORT COMMUNICATION

THE GENUS *GREWIA* (MALVACEAE: GREWIOIDEAE) IN ANDAMAN & NICOBAR ISLANDS, INDIA WITH A CONSERVATION NOTE ON THE ENDEMIC *G. INDANDAMANICA*

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THE GENUS *GREWIA* (MALVACEAE: GREWIOIDEAE) IN ANDAMAN & NICOBAR ISLANDS, INDIA WITH A CONSERVATION NOTE ON THE ENDEMIC *G. INDANDAMANICA*

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Abstract: The genus *Grewia* in Andaman & Nicobar Islands is reviewed with its identification key, descriptions, distribution and photographs. This article provides correct taxonomic identity of *G. laevigata* and *G. multiflora* with comprehensive morphology and conservation assessment for the endemic *G. indandamanica*.

Keywords: Angiosperm, Grewioideae, island biogeography, Red List, taxonomy, threatened.

Grewia L. (Malvaceae-Grewioideae) is a pantropical genus with about 300 recognised species (Bayer & Kubitzki 2003). In India the genus is accountable for c. 31 species (Daniel & Chandrabose 1993) out of which seven are endemic, viz.: *G. gamblei* J.R.Drumm. ex Dunn, *G. heterotricha* Mast., *G. indandamanica* J.L.Ellis & L.N.Ray, *G. kothayarensis* Murugan & Manickam, *G. palodensis* E.S.S.Kumar, A.E.S.Khan, Binu & S.M.Almeida, *G. pandaica* J.R.Drumm. ex Dunn, and *G. umbellifera* Bedd. (Singh et al. 2015). Among the 31 species of *Grewia*, 23 are known to occur in peninsular India (Kumar et al. 2001) and two of the species *G. laevigata* and *G. indandamanica* are reported only from the Andaman & Nicobar Islands. *Grewia indandamanica* is

different from the rest of the *Grewia* species by having solitary flowers. It was described from the Saddle Peak National Park, North Andaman by J.L. Ellis & L.N. Ray (1991) and is not known from elsewhere so far. Since 1991, no further study adds to the distribution and status of *G. indandamanica*. The first ever collection of *G. indandamanica* was made by N.P. Balakrishnan & N.G. Nair in 1976 (PBL3807, PBL3808) from Saddle Peak National Park, but they failed to recognise it as a new species. Later in 1987 J.L. Ellis made further collection from the Saddle Peak and described it as a new species. Though Ellis & Ray (1991) provided an appropriate description, it lacks information on abundance, distribution range and threat assessment. The number of *Grewia* species occurring on the Islands are limited in comparison to the mainland. We recognized three species, viz., *G. laevigata*, *G. multiflora*, and *G. indandamanica* based on the field collections as well as herbarium and literature survey from the Andaman & Nicobar Islands. *Grewia laevigata* Vahl in India was misapplied as *G. multiflora* Juss. by various authors (Masters 1868, 1874; Brandis 1906; Dunn 1915;

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Ramamoorthy 1976; Matthew 1983). Chung (2006) reduced *G. pedicellata* Roxb., *G. umbellata* Roxb. ex DC., and *G. acuminata* Juss. as synonyms of *G. laevigata*. The former three are found conspecific to *G. laevigata* by sharing the similarities in habit, leaf shape, inflorescence pattern and fruit lobes. Similarly, the names *G. serrulata* DC., *G. glabra* Blume, *G. didyma* Roxb. ex G. Don, *G. disperma* Rottler ex Spreng., and *G. diplocarpa* Thwaites are vaguely used for most prior *G. multiflora*, which have been discussed with their detailed nomenclature.

All the three known species of the *Grewia* in Andaman & Nicobar Islands have been keyed out below for easy identification with detailed descriptions, distribution, phenology, and photographs. In addition, a conservation assessment has been conducted for *G. indandamanica* with a detailed geography, abundance, distribution range and population at Saddle Peak National Park.

STUDY AREA AND METHODS

Andaman & Nicobar Islands are an archipelago of islands situated in the Bay of Bengal. They fall under one among the seven union territories of India. For *Grewia indandamanica*, the forest patches from the Saddle Peak National Park (SPNP) were studied in detail. SPNP of North Andaman lies between 13.157°–13.166°N & 093.002°–093.010°E with a total area of 32.54km². It supports stunted, evergreen type of forests along the sea shores to moist deciduous forests and open scrub forests in some pockets on the hill top, the south-west as well as north-east monsoon provide heavy precipitation from June to mid-October. This heavy precipitation supports tropical vegetation and substantial diversity of plants. SPNP exhibits tropical evergreen as well as moist deciduous forests. Many endemics have been recorded from the Island and SPNP alone because of this peculiar habitat (Parkinson 1923; Ellis 1989; Reddy et al. 2004; Ramana et al. 2013). The occurrence and distribution of remaining two species (*G. multiflora* & *G. laevigata*) have been studied based on live plants as well as herbarium specimens placed at CAL, PBL and TCD (Thiers, <http://sweetgum.nybg.org/science/ih/>). *Grewia multiflora* is found throughout the Andaman & Nicobar group of Islands including the foothills of SPNP, whereas *G. laevigata* is found mainly in the Nicobar group of Islands. Protologues were gathered from BHL, the types from C, CAL, P and PBL (Thiers, <http://sweetgum.nybg.org/science/ih/>), JSTOR & Plants of the World Online (<http://www.plantsoftheworldonline.org>) to understand the global distribution range.

GeoCAT, an open source tool has been used for the threat assessment of *Grewia indandamanica*.

(<http://geocat.kew.org/>). The Area of Occupancy (AOO) and Extent of Occurrence (EOO) have been determined by setting the value of cell width during the AOO analysis as standard IUCN value. Distribution and location details of *G. indandamanica* at Saddle Peak National Park are also provided.

Key to *Grewia* in Andaman and Nicobar Islands

1. Small or scandent shrub; leaves ovate, elliptic or oblong, secondary nerves less than 6, apex acute or abruptly acuminate, base rounded or subcordate, or obtuse or truncate; petals oblong or ovate; stigma 4-lobed 2
 1. Large shrub or small tree; leaves lanceolate, elliptic-lanceolate or ovate-lanceolate, secondary nerves 7(–9), apex acuminate, base attenuate; petals broadly elliptic or obovate; stigma usually 5-lobed (rarely 4-lobed)
... *G. multiflora*
 2. Inflorescence axillary or supra axillary, 3–5(–7) flowered; petals oblong; fruit depressed globose, 1–1.3(–2) cm across, frivolously 2–4 lobed *G. laevigata*
 2. Inflorescence axillary, solitary; petals ovate; fruit globose, to 1cm across, deeply 2–4 lobed (rarely unlobed) *G. indandamanica*

TAXONOMIC TREATMENTS

Grewia multiflora Juss.

Ann. Mus. Natl. Hist. Nat. 4: 89. 1804

Image 1 (E–F)

G. serrulata DC., Prodr. 1: 510. 1824

G. glabra Blume, Bijdr. Fl. Ned. Ind. 3: 115. 1825

G. disperma Rottler ex Spreng., Syst. Veg., [ed. 16] 2: 579. 1825, syn. nov.

G. didyma Roxb. ex G. Don, Gen. Hist. 1: 549. 1831

G. diplocarpa Thwaites, Enum. Pl. Zeyl. 31. 1858, syn. nov.

G. laevigata auct. non Vahl 1790: Mast., Fl. Brit India 389. 1874; Cooke, Fl. Pres. Bombay 1: 143. 1901; Duthie, Fl. Gangetic Plain 116. 1903; Brandis, Indian Trees 96. 1906.

Type: PHILIPPINES: *Annon. s.n.* in *Herb. A. de Jussieu* 12554 (Holotype: P-JU).

A much-branched large shrub or small-tree, 3–6 m high. Stem terete, twigs pale green, glabrous, rarely sparsely puberulous, bark grey when mature. Stipules lanceolate, 1.5–2 mm long, base densely puberulous, apex narrow, caducous. Leaves alternate; petiole 0.8–1.2

cm long, puberulous; lamina lanceolate, elliptic, elliptic-lanceolate, rarely oblong-lanceolate, 7–20 × 3–7 cm, adaxial surface glabrous, or sparsely tufted hairy, abaxial surface glabrous; base attenuate, or rarely rounded, apex acuminate, acumen 1–2 cm long, margin serrate or serrulate; 3-nerved, prominent on both surfaces, secondary nerves 7–9 pairs, sparsely puberulous, prominent on both the surfaces. Inflorescences axillary, rarely supra-axillary, triflorous, 1–3 cm long, solitary or in clusters of 2 or 3, pedunculated cymes, peduncles 1–2.5 cm long, densely puberulous. Flowers: bracts narrowly lanceolate, unlobed, 1–2 × 0.5 mm, sparsely puberulous outside, glabrous-glabrescent inside; pedicel 1–1.5(–2) cm long, densely puberulous; sepals linear-lanceolate, ensiform, 8–13 × 2–2.5 mm, densely tufted puberulous outside, glabrous inside, pale green or stramineous, 1–2 grooved, white, margin incurved; petals broadly elliptic or ovate, 2–3.5 × 1.5–1.9 mm, apex sharply acute, margin entire, glabrous outside and inside (densely tufted puberulous around the gland); gland obovoid, c. 2 × 2 mm, densely puberulous; stamens numerous, filaments 2–6 mm long, filiform, glabrous, anthers lemon yellow, reniform, c. 0.5 mm across; androgynophores (torus) 2–4 mm long, cylindrical, lower portion glabrous, upper portion densely tufted puberulous, 5-grooved; ovary globose, 4-locular, c. 1 mm across, densely puberulous; styles 4–7 mm long, slender, glabrous, stigma irregularly 5-lobed (rarely 4-lobed), lobes spreading, recurved. Drupes dark green at young, deep black when dry, 0.7–1.2 cm across, deeply 2-partite, 4-lobed (rarely 2–3-lobed), sparsely puberulous, stone 3–4. Seeds brown, one in each locule, ovoid, obovoid, glabrous, brown.

Phenology: July–November

Traditional Uses: The stem fibres used for cordage and leaves as fodder. The tree is also recorded as one of the hosts of the Indian lac insect (Dagar & Singh 1999).

Distribution & habit: India: throughout mainland and Andaman & Nicobar Islands (North, Middle, South Andaman, Little Andaman, and Little Nicobar, Car Nicobar, Great Nicobar Islands); Thailand, Sumatra, Java, Borneo, and Philippine (fide Chung 2006). It grows along the secondary forest margins, roadsides and open scrub forests.

Specimens examined: INDIA: Andaman & Nicobar Islands. 13.i.1976, N. Bhargava 3428 (PBL); 28.i.1981, R.K. Premanath 8329 (PBL), 30.xi.2015, L. Rasingam 25861 (PBL); 13.xi.2007, R.P. Pandey 26186 (PBL); 25.xi.2009, C. Murugan 27924 (PBL); 5.x.2017, K.C. Kishor & Nandikar 1609 (NGCPR, PBL); 23.xi.1976, N.G. Nair 4886 (PBL); 20.i.1998, G.S. Lakra & M. Tigga 16984

(PBL); 8.x.2017, K.C. Kishor & Nandikar 1611 (NGCPR). Bihar. 14.xi.1963, Shetty 274 (CAL). Kerala. 31.xi.1965, J.L. Ellis 26393 (MH); 16.ii.1982, C.N. Mohanan 73307 (MH); 7.x.1983, A.G. Pandurangan 79277 (CAL); 2.vi.2017, K.C. Kishor 1096 (CAL, NGCPR). Maharashtra. 31.viii.2016, K.C. Kishor 1009 (CAL, NGCPR); 2.xii.2017, K.C. Kishor 1619 (CAL, NGCPR). Uttarakhand. 21.ix.2018, K.C. Kishor 1632 (CAL, NGCPR). West Bengal. 18.xi.1873, J.S. Gamble 1707 (MH); 1879, King s.n. (MH); 28.ix.2018, K.C. Kishor 1635 (CAL, NGCPR). PHILIPPINES: May 1907, A.D.E. Elmer 7923 (L); 12.x.1992, E.B. Barbon 8936 (L). THAILAND: 20.viii.2002, 25.viii.2002, D.J. Middleton, S. Suddee & C. Hemrat 1254, 1295 (L).

Note: *Grewia multiflora* is one taxon highly misinterpreted by different authors. Masters (1868) and Brandis (1906) synonymised *G. multiflora* under *G. laevigata* Vahl. Masters (1874) recognised *G. multiflora* as a distinct species and synonymised *G. serrulata*, he himself, Cooke (1901) and Duthie (1903) have misread the element *G. multiflora* as *G. laevigata*, while Dunn (1915), Ramamoorthy (1976) and Matthew (1983) misinterpreted as *G. disperma* Rottler ex Spreng. Chung (2006) provided clarity to this long-standing complex in his revision of genus *Grewia* for Malaysia and Borneo and raised as distinct species. In addition, based on field survey, literature review, and critical study based on the protologues and types of *G. disperma* and *G. diplocarpa* we have found both to be conspecific with *G. multiflora* in habit, inflorescence and lobed drupe character and are reduced to synonymy in *G. multiflora* here.

Grewia laevigata Vahl

Symb. Bot. 1: 34. 1790.

Image 1 (C–D)

G. acuminata Juss., Ann. Mus. Hist. Nat. Paris 4: 91, t.48, f.2, 1804

G. umbellata Roxb. ex DC., Prodr. 1: 509. 1824

G. pedicellata Roxb. Fl. Ind. 2: 585. 1832

Type: India orientali: Koenig s.n. (Holotype: C [IDC microfiche: Vahl no. 35 II, 2–3], barcode C10019544).

A scandent shrub, to 6m tall. Twigs glabrous or sparsely stellate puberulous. Stipules caducous, narrowly lanceolate, 0.8–1.5 mm long, adaxial glabrous, abaxial sparsely stellate puberulous. Leaves alternate; petiole 0.5–1 cm long, glabrescent, or stellate puberulous; lamina elliptic, oblong, ovate or rarely lanceolate, 7–14 × 4–7cm, glabrous or sparsely stellate puberulous on both surfaces; base obtuse, truncate, margin serrulate, denticulate, or crenate, apex abruptly acuminate, acumen 0.5–1.5 cm long; 3-nerved, prominent on both the surfaces, secondary nerves 4–6 pairs, sparsely

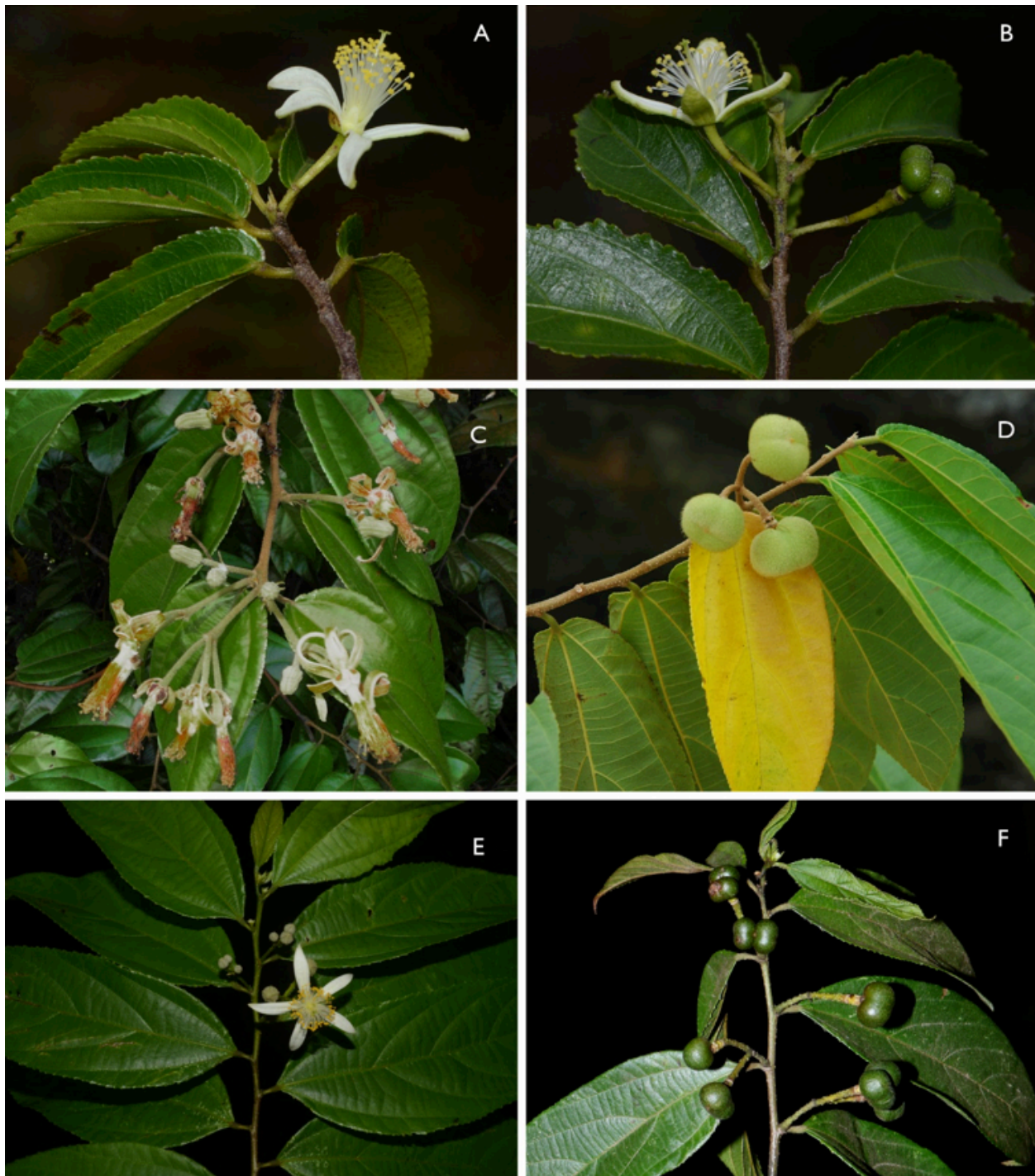


Image 1. The genus *Grewia* from Andaman & Nicobar Island: A–B—*G. indandamanica* flowering & fruiting twig, C–D—*G. laevigata* flowering & fruiting twig, E–F—*G. multiflora* flowering & fruiting twig. © A & B— Mayur D. Nandikar | B & C—Lim and Leonardo | D & E—K.C. Kishor.

puberulous, midrib and secondary nerves prominent and raised on both surfaces. Inflorescences axillary, supra-axillary, leaf opposed, rarely terminal or subterminal, (3–)5–7(–13) flowered cymes, solitary or in 2–3 clusters. Flowers: bracts linear, lanceolate, 2–6 mm long, densely

puberulous outside, glabrous inside; pedicels 7–15 mm long, densely stellate puberulous; sepals linear, lanceolate, 9–15 × 1–2 mm, densely puberulous outside, pale green, glabrous inside, white, deeply reclinate after opening; petals oblong, 5–6 × 1–1.5 mm, apex

acute, lower portion on an orbicular clawed appendage, glabrous outside, sparsely puberulous at base, densely stellate puberulous around the glands; glands ovoid, c. 2 × 2 mm, glabrous; stamens numerous, filaments 5–10 mm long, filiform, glabrous, anther lemon yellow, reniform, c. 0.5mm across; androgynophores (torus) 1.5–3(–4) mm long, slightly grooved, lower portion glabrous, upper portion densely stellate puberulous; ovary globose or subglobose, 1–1.5(–2) mm across, 4-locular, densely stellate puberulous; style 6–8(–10) mm long, glabrous; stigma 4-lobed, narrow depression at the centre. Drupe depressed-globose, 1–1.3(–2) × 1–1.6 cm, sparsely stellate puberulous, glabrescent when mature, frivolously 2–4 lobed, rarely entire, each lobe with single stone (pyrene). Seeds not seen.

Phenology: Throughout the year.

Distribution & habit: So far, the species is recorded from Andaman & Nicobar Islands (Little Andaman, Little Nicobar and Great Nicobar Islands), India, and southeastern Asia (Myanmar, Sumatra, Thailand, Peninsular Malaysia, Java, Borneo, Philippines and Singapore) (fide Chung 2006). The species grows as a straggler or a scandent shrub in the secondary forests.

Traditional Uses: The stem fibres are used for ropes and strings and the leaves are applied to cuts and abrasions. In Nicobar a leaf decoction is given to women after delivery to reduce pain and to clean parturition wastes (Dagar & Singh 1999).

Specimens examined: INDIA: Andaman & Nicobar Islands. Great Nicobar, 20.viii.1975, N.P. Balakrishnan 2991 (PBL); 28.ix.1978, N.G. Nair 71181 (PBL); 27.x.1979, R.P. Dwivedi (PBL); 12.x.1980. D.K. Hore 8284 (PBL); 10.vi.2001, J. Jayanthi 18343 (PBL). Little Nicobar, 13.iv.2001, C. Murugan 28411 (PBL); 27.x.2009, C. Murugan 27771 (PBL). South Nicobar, 28.ix.1989, S.K. Srivastava 14911 (PBL). South Andaman, 26.ii.2004, K. Karthikeyan 21398 (PBL); s. dat, Wallich s.n. in Herb. DC (G-DC barcodes G00209183, G00209184). MALAYSIA: 1822, Wallich 1084 (NY, K, CAL); v.1889, Brutis s.n. (P barcode P05371354). MYANMAR: 1861, Herb. Griffith 626 (P). THAILAND: ix.1923, Kerr 7838 (TCD); v.1928, Kerr 15627 (TCD); vi.1928, Put 1763 (TCD).

Note: *Grewia laevigata* Vahl in India was deliberated as *G. didyma*, *G. disperma* or *G. glabra* (which are now synonyms of *G. multiflora*) by various authors viz., Don (1831), Wight & Arn. (1834), Masters (1874), Cooke (1901), Gamble (1902), Duthie (1903), and Brandis (1906) which is found erroneous after a critical evaluation of type, protologue and herbarium specimens.

In India, the correct use of the name *G. laevigata* was overlooked by many authors. Masters (1874) considered

G. umbellata Roxb. ex DC. and synonymised *G. pedicellata* Roxb. but miscarried the distribution from India. Later, Daniel & Chandrabose (1993) accepted *G. acuminata* Juss. with the extended distribution to Andaman & Nicobar Islands. Subsequently, Debnath (1999) followed Daniel & Chandrabose (1993) and recognised *G. acuminata* from the Andaman & Nicobar Islands. Chung (2006) recognised the priority of *G. laevigata* over the others in his revision. After a thorough investigation of literature and field survey throughout India, we found *G. umbellata*, *G. acuminata* and *G. pedicellata* are agreeing with the type of *G. laevigata* Vahl at Copenhagen (C) and distributed only in Andaman & Nicobar Islands and hence propose the use of *G. laevigata* as the correct name.

Grewia indandamanica J.L. Ellis & L.N. Ray

in Candollea 46(2): 341. 1991.

Image 1 (A–B)

Type: INDIA: Andaman & Nicobar Islands: North Andaman, Saddle Peak National Park, 720m, 18.x.1987, J.L. Ellis 12775 (Holotype: CAL, barcode CAL 6356! isotypes: PBL, barcodes PBL0018, PBL0019! PBL0020!)

A branched shrub or small tree, 1–1.5 m high. Stem terete, bark ashy grey, wrinkled; branches grey, sparsely stellate puberulous. Stipules subulate, to 1mm long, base broad, margin sparsely stellate puberulous. Leaves alternate, faintly conduplicate; petioles 0.4–0.5 cm long, densely pubescent; lamina ovate-elliptic, 3–9 × 2.3–3 cm; base rounded to subcordate, apex acuminate, margin crenate-serrate; 3-nerved, prominent on both surfaces, sparsely stellate puberulous along the veins. Inflorescences axillary, one-flowered, 1–1.5 cm long, pedunculate cymes, peduncle 8–10 mm long, sparsely puberulous. Flowers: bracts linear-lanceolate, c. 2mm long, caducous; pedicel to 1cm long, puberulous with dense ring of stellate puberulous at the apex; sepals linear-lanceolate, 1–1.5 × 0.2–0.3 cm, base truncate, puberulous outside, green, 3–4 grooved, glabrous inside, white, margin incurved, stellate tomentose; petals white, ovate, 4–4.5 × 1–1.5 mm, apex obtuse, margin entire, glabrous outside, densely stellate pubescent along the margin from base to nearly half of the petal length, also around the glands, otherwise sparsely stellate pubescent at rest of the margin; glands obovoid, 2–2.5 × 0.8–1.4 mm, glabrous; stamens numerous, filaments nearly equal, 6–8 mm long, filiform, glabrous, anthers lemon yellow, reniform, c. 0.5mm across; androgynophore (torus) 2–2.5 mm long, lower portion glabrous, upper portion stellate pubescent, slightly 4-grooved; ovary globose, 1–1.5 mm across, 4-locular, 1

ovule in each, densely puberulent; style to 1cm long, slender, densely stellate puberulous at base, sparsely puberulous in middle, glabrous towards apex; stigma 4-lobed, faintly spreading, recurved. Drupe 1cm across, shiny, black when dry, deeply bilobed–tetralobed (rarely entire to trilobed), testa wrinkled, stellate puberulous. Seeds brown, ovoid, one in each locule, glabrous, vestite with papery metallic silver cap, attached to 1mm long funicle.

Phenology: September to November.

Distribution & habit: Endemic to the Saddle Peak National Park, North Andaman. It is distributed in the open, stunted, hilltop forests at an elevation of 600–721 m.

Note: *Grewia indandamanica* is so far recorded only from type locality. It grows as a shrub or small tree to 1.5m high in the open, rocky habitats of Saddle Peak. It can be easily distinguished by faintly conduplicate leaves, acuminate apex and solitary flowers whereas the allied species constitutes flat leaves and three to multi-flowered cymes.

Specimens examined: INDIA: Andaman Islands. North Andaman, Saddle Peak National Park, 02.xii.1976, N.P. Balakrishnan & N.G. Nair 4797 (PBL); 18.x.1987, J.L. Ellis 12775A (CAL); 18.x.1987, J.L. Ellis 12775B-D (PBL); 23.vii.2001, R. Sumathi 17976 (PBL); 7.x.2017, K.C. Kishor & Nandikar 1610A–G (NGCPR), 1610H–I (CAL), 1610J–K (PBL).

CONSERVATION ASSESSMENT

Under the project 'Revision of genus *Grewia* L. (Malvaceae-Grewioideae) from India', the authors surveyed population of *Grewia indandamanica* at its type locality Saddle Peak National Park during October 2017; and it is claimed as endemic to the type locality. The expeditions to other parts of North Andaman also failed to locate any further populations of the species. Many of the localities, however, were inaccessible and also avoided due to local tribal settlements.

The species occurs at the hilltop peak at an elevation range of 600–721 m. It shares a scrub vegetation with other flowering plants like *Murdannia saddlepeakensis* M.V. Ramana & Nandikar, *Sonerila andamanensis* Stapf & King, *Dioscorea pentaphylla* L., *Atalantia monophylla* (Roxb.) DC., *Crotalaria uncinella* Lam. subsp. *elliptica* (Roxb.) Polhil, etc. The plant mostly grows in small open patches along the rocky cliffs. The total number of individuals were counted to be less than 80 from three known localities and their adjacent areas. At one place the species grows in proximity among the rocky boulders. It was also noted that the number of

Table 1. Distribution and location details of *Grewia indandamanica* at Saddle Peak National Park.

	Location	Lat., Long.	Elevation (in m)
1	Saddle Peak National Park Mount Top	13.166°N, 093.002°E	604
2		13.159°N, 093.006°E	721
3		13.157°N, 093.010°E	621

young individuals were less than five which depicts a very low recruitment rate which could be natural or anthropogenic. The previous collections made in 1976 and 1987 (N.P. Balakrishnan & N.G. Nair 4797 [barcodes PBL3807, PBL3808]; J.L. Ellis 12775 [barcodes PBL0018, PBL0019, PBL0020, CAL6356]) also reported the population as scarce.

Based on GeoCAT (Moat 2007), the AOO and EOO were estimated as 8km² and 0.119 km² in the Saddle Peak National Park (Table 1). Although the localities fall within the protected area of National Park, but these habitats lies in close vicinity to the tourist and trekking areas, hence the quality of habitat is degrading. It is also assumed that the population has gone down since the previous collection of this species in 1976 and 1987. The species is highly restricted to its unique habitat of the open stunted forest patch at an elevation of 600–721 m and less than 100 mature individuals are known. Loss of population from any of the three locations will cause a drastic depletion in the population size. Based on these information and IUCN guidelines (IUCN 2019) *G. indandamanica* can be assessed as Endangered (EN) [B1+2ab(i, ii, iii, v)c(i,ii,iii,iv); C2a(i); D].

REFERENCES

- Bayer, C. & K. Kubitzki (2003). Malvaceae: 225–311. In: Kubitzki, K. & C. Bayer. (eds.). *Flowering Plants, Dicotyledons*. Springer-Verlag, Berlin.
- Brandis, D. (1906). *Indian Trees: an account of trees, shrubs, woody climbers, bamboos and palms indigenous or commonly cultivated in the British Indian Empire*, pp. 94–101. Constable, London, 767pp.
- Chung, R.C.K. (2006). Revision of *Grewia* (Malvaceae–Grewioideae) in Peninsular Malaysia and Borneo. *Edinburgh Journal of Botany* 62(1–2): 1–27. <https://doi.org/10.1017/S0960428606000011>
- Cooke, T. (1901). Ranunculaceae to Rubiaceae, pp. 137–146. In: Cooke, T. (ed.) *Flora of Bombay*. Taylor and Francis, London, 645pp.
- Dagar, J.C. & N.T. Singh (1999). *Plant Resources of the Andaman & Nicobar Islands*, pp. 846–847. Bishen Singh Mahendra Pal Singh, Dehra Dun, 987pp.
- Daniel, P. & M. Chandrabose (1993). Tiliaceae, pp. 477–524. In: Sharma, B.D. & M. Sanjappa (ed.) *Flora of India 3: Botanical Survey of India, Calcutta*, Please check the Book at Library.
- Debnath, H.S. (1999). Actinidiaceae to Meliaceae, pp. 177–180. In: Hajra, P.K., P.S.N. Rao & V. Mudgal (ed.) *Flora of Andaman and Nicobar Islands*. Botanical Survey of India, Calcutta, 495pp.
- Don, G. (1831). Thalamiflorae, pp. 547–551. In: Don, G. (ed.) *A General History of the Dichlamydeous Plants*. J. G. & F. Rivington, London,

- 818pp.
- Dunn, S.T. (1915).** Ranunculaceae to Opiliaceae, pp. 116–118. In: Gamble, J.S. (ed.) *Flora of the Presidency of Madras*. Adlard & Son, Ltd. London, 577pp.
- Duthie, J.F. (1903).** Ranunculaceae to Cornaceae, pp. 109–117. In: Duthie, J.F. (ed.) *Flora of the Upper Gangetic Plain and of the Adjacent Siwalik and Sub-Himalayan Tracts*. Botanical Survey of India, Calcutta, 500pp.
- Ellis, J.L. (1989).** Plant diversity in the Andamans with emphasis on endangered and endemic Species, pp. 69–74. In: Saldanha, C.J. (ed.) *Andaman, Nicobar and Lakshadweep: An Environmental Impact Assessment*. Oxford and IBH Publishing House, New Delhi, 114pp.
- Ellis, J.L. & L.N. Ray (1991).** *Grewia indandamanica* Ellis et Ray: a new species from Andaman Islands in the Bay of Bengal, India. *Candollea* 46(2): 341–343.
- Gamble, J.S. (1902).** *A manual of Indian timbers: an account of the growth, distribution, and uses of the trees and shrubs of India and Ceylon, with descriptions of their wood-structure*, pp. 108–112. S. Low, Marston & Company Limited, London, 856pp.
- IUCN Standards and Petitions Committee (2019).** Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Committee. Downloadable from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- Jussieu, A.L. de. (1804).** Memory on the *Grewia*, genus of the family Tiliaceae. *Annales du Muséum d'histoire naturelle* 4: 89.
- Kumar, S.E.S., S.A.E. Khan, S. Binu, & S.M. Almeida (2001).** *Grewia palodensis* (Tiliaceae), a new species from Kerala, India. *Rheedea* 11(1): 41–43.
- Masters, M.T. (1868).** Tiliaceae, pp. 242–254. In: Oliver, D. (ed.) *Flora of Tropical Africa*. L. Reeve & Company, London, 479pp.
- Masters, M.T. (1874).** Tiliaceae, pp. 383–393. In: Hooker, J.D. (ed.) *Flora of British India*. L. Reeve & Company, London, 740pp.
- Matthew, K.M. (1983).** *The Flora of the Tamilnadu Carnatic* Volume 1. Rapinat Herbarium, St. Joseph's College, Tiruchirapalli, India, 2154pp.
- Nandikar, M.D. & M. Janarthnam (2016).** Taxonomic Notes on *Microcos* (Malvaceae-Grewioideae) in India. *Phytotaxa* 272(3): 201–208. <https://doi.org/10.11646/phytotaxa.272.3.4>
- Parkinson, C.E. (1923).** *A Forest Flora of the Andaman Islands*, Govt. of India, Shimla, 325pp.
- Ramamoorthy, T.P. (1976).** Tiliaceae, pp. 134–137. In: Saldanha, C.J. & D.H. Nicolson (ed.). *Flora of Hassan District, Karnataka, India*. Amerind Publishing, New Delhi, 915pp.
- Ramana, M.V., M. Nandikar, R.V. Gurav, J.K. Tagore & M. Sanjappa (2013).** *Murdannia saddlepeakensis* (Commelinaceae) - a new species from Andaman and Nicobar Islands, India. *PhytoKeys* 20: 9–15. <https://doi.org/10.3897/phytokeys.20.3611>
- Reddy, S.C., P.R.C. Prasad., M.S.R. Murthy & C.B.S. Dutt (2004).** Census of endemic flowering plants of Andaman and Nicobar Islands, India. *Journal of Economic and Taxonomic Botany* 28: 712–728.
- Singh, P., K. Karthikeyan., P. Lakshminarasimhan & S.S. Dash (2015).** *Endemic Vascular Plants of India*. Botanical Survey of India, Kolkata, 248pp.
- Thiers, B.** [continuously updated]. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available from: <http://sweetgum.nybg.org/science/ih/>. Accessed 10 December 2018.
- Vahl, M. (1790).** *Symbolae Botanicae*. Volume 1. Hauniae, impremsis auctoris, excudebant N. Möller et filius p. 34.
- Wight, R. & G.A.W. Arnott (1834).** *Prodromus Florae Peninsulae Indiae Orientalis: containing abridged descriptions of the plants found in the peninsula of British India arranged according to the natural system*. Volume 1, pp. 75–81. Parbury, Allen, & Company, 480pp.





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