Flora of Nepal
नेपालका वनस्पति

Cordiaceae

Cordiaceae: Webedition 1 (2023)

https://data.rbge.org.uk/publications/FloraofNepal/library/Cordiaceae/1

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Genera in this account
Cordia (p.1)

Published on 02 June 2023 by Royal Botanic Garden Edinburgh, 20a Inverleith Row, Edinburgh, EH2 5LR, UK

Appendices
1: Illustration plates
2: Format, abbreviations and categories used in Flora of Nepal

See printed volumes of the Flora of Nepal (www.rbge.org.uk/publications/floraofnepal) and the project website (www.floraofnepal.org) for further information on the Flora of Nepal and acknowledgement of the institutes and people involved with this international collaborative project.

Cordiaceae Dumort.

C.A. Pendry

Deciduous trees. Leaves petiolate, alternate, margins entire, cystoliths more or less prominent on the upper surface, venation pinnate. Inflorescences dichotomous cymes, ebracteate. Flowers bisexual or male with a rudimentary ovary. Calyx campanulate, accrescent, dilating and becoming saucer-like in fruit, irregularly lobed. Corolla regular, 4-, 5- or rarely 3-merous, united in a tube for about one third, lobes strap-like, reflexed. Stamens 4 or 5, rarely 3, inserted at the throat of the corolla tube, filaments hairy at the base, anthers medifixed, exserted. Ovary 4-locular, style terminal, twice 2-cleft with long lobes. Fruit a 4-celled drupe with a hard endocarp within fleshy pulp.

Three genera and about 350 species worldwide, in tropical and warm temperate regions. One genus and two species in Nepal.

1. *Cordia* L., Sp. Pl. 1: 190 (1753).

Description as for Cordiaceae.

Key to Species

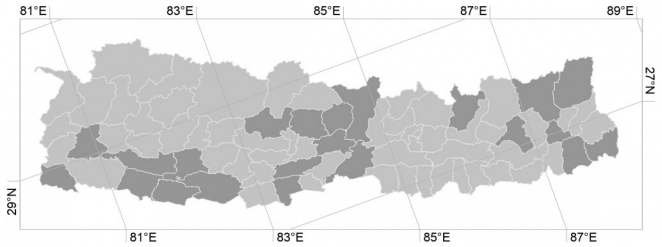
1a Inflorescences up to 8 cm long. Corolla 5-merous, rarely 4-merous. Upper surface of leaves smooth, with or without pale, flat, ca. 0.1 mm cystoliths.....**1. *C. dichotoma***

b Inflorescences 10–20 cm long. Corollas 4-merous, rarely 3-merous. Upper surface of leaves scarbrid with prominent, white, ca. 0.2 mm cystoliths .....**2. *C. grandis***

1. ***Cordia dichotoma*** G.Forst., Fl. Ins. Austr.: 18 (1786).
Cordia indica Lam.; *C. myxa* auct. non L.; *C. obliqua* Willd.

Trees to 8(–10) m. Twigs tomentose, soon glabrescent. Petioles 1–3(–3.5) cm. Leaves broadly elliptic to slightly ovate or slightly obovate, 7–15 × 3–7 cm, base cuneate, apex acute to somewhat acuminate, margin entire, occasionally irrregularly, shallowly lobed in the upper third, glabrous below, with hairs along midvein and especially in the axils of veins, initially minutely hairy above, soon glabrous, cystoliths more or less evident, round, flat, up to 0.1 mm across, veins 4–5 on each side. Inflorescences terminal on short side branches, to 8 cm, sometimes to 13 cm in fruit, axes tomentose, glabrescent in fruit. Calyx campanulate, 4.5–7 mm, tube 3–4 mm, lobes 1.5–3 mm, subglabrous outside, densely appressed pubescent within. Flowers 6–10 mm across, 5-merous, rarely 4-merous, corolla white, glabrous, tube 2.5–4 mm, lobes reflexed, 3.5–6 × 1.5–2(–3) mm. Free part of stamens 2–4 mm, filaments basally more or less densely hairy, anthers 1–2.2 mm. Ovary glabrous, 2 mm in bisexual flowers, rudimentary and to 1 mm in male flowers, style 5.5–6 mm, the lobes to 4 mm. Fruit ripening cream or pinkish, ovoid with the base of the style persisent, to 1 cm.

Distribution: Nepal, W Himalaya, E Himalaya, Assam-Burma, S Asia, E Asia, SE Asia and Australasia.



Altitudinal range: 300–1,600 m.

Ecology: Mixed moist tropical, subtropical and temperate forest.

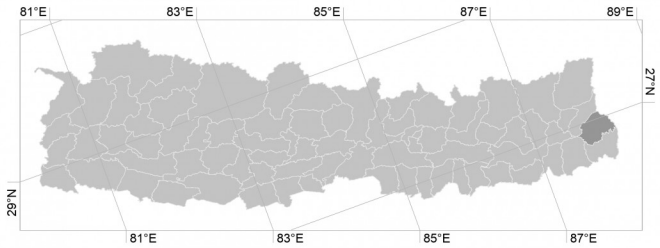
Flowering: March–April. **Fruiting:** June–September.

2. ***Cordia grandis*** Roxb., Fl. Ind. (Roxburgh) 2: 335 (1824).

Trees to 20 m. Twigs appressed pubescent, soon glabrescent. Petioles (1.5–)3–9 cm. Leaves broadly ovate to suborbicular, (6–)13–28 × (5–)8–25 cm, base rounded to truncate, apex acute to slightly acuminate, margins entire, velutinous to subglabrous below, hirsute above, glabrescent, sometimes scabrid, cystoliths prominent, white, raised, ca. 0.2 mm, veins 3–5 on each side. Inflorescences terminal on short side branches, 10–20 mm, axes minutely pubescent, glabrescent. Calyx campanulate, 4.5 mm, tube 3 mm, lobes irregular 1–1.5 mm, subglabrous outside, densely appressed pubescent within. Flowers ca. 5 mm across, 4-merous, rarely 3-merous, corolla white, glabrous, tube 3.5 mm, lobes reflexed, ca. 5 × 2 mm. Free part of stamens 5 mm, filaments densely hairy basally, anthers 1.8 mm. Ovary glabrous, in male flowers

rudimentary, to 1 mm, bisexual flowers not seen. Fruit ripening cream or pinkish, ovoid with the base of the style persisent, to 1 cm.

Distribution: Nepal, W Himalaya, E Himalaya, Assam-Burma, S Asia and SE Asia.



Altitudinal range: 400–1,000 m.

Ecology: Subtropical forest, scrub.

Flowering: January–February. **Fruiting:** February–July.

How to use this pdf web edition

This Web-edition pdf document forms part of a set of Flora accounts for families and genera that have been finalized, including those in volumes yet to be printed. These pdf documents are made accessible via the *Flora of Nepal* website (www.floraofnepal.org) and will be periodically updated in numbered versions, permanently available and citable.

Flora of Nepal takes an innovative approach to Flora writing, with an underlying data base system managing the *Flora of Nepal Knowledge Base* from which the printed volumes and the 'online Flora' (www.floraofnepal.org) are generated. The Internet-accessible dataset augments the printed Flora by presenting all herbarium specimen data, detailed taxonomic information (such as full nomenclatural references and typification), distribution maps with point occurrences and images used when preparing the Flora. Much of this information is accumulated as a normal part of taxonomic working practices when undertaking a floristic revision, but it is usually lost to a wider audience as it is rarely included in the traditional printed Flora.

Flora of Nepal includes all native and fully naturalized vascular plants recorded within the political borders of Nepal, including brief references to agricultural and horticultural plants as appropriate. For pragmatic reasons the arrangement of families in the printed *Flora of Nepal* follows a modified Englerian sequence, closely following that of the *Flora of China* and, to a lesser extent, the *Flora of Bhutan*.[1, 2] In recent years the world view on the arrangement of families has radically changed following overwhelming phylogenetic evidence. The emergent family-level classification, now in its third iteration as APG IV, is reasonably stable and widely accepted.[3] It has not been possible to alter the family sequence in *Flora of Nepal* printed volumes midway through the project, but as the data are stored separately in a database, the families can be reorganized electronically at a later date to reflect alternative classifications. Circumscription of families and genera, however, generally does follow a contemporary understanding of their relationships, except where group experts advise otherwise. Genera and species are treated in taxonomic order, or if there is disagreement then morphologically similar species are usually grouped together or occasionally listed alphabetically. Infraspecific taxa are always presented in alphabetical order. Intermediate ranks, such as subfamily, tribe, subgenus, section and series, are only used when they are useful in the treatment of large families or genera.

Information on nomenclature and classification is given for all accepted scientific names and synonyms pertaining to Nepal and nearby regions. Emphasis is given to those names listed in the primary checklists for Nepal: *Enumeration of the Flowering Plants of* Nepal,[4] *Annotated Checklist of the Flowering Plants of* Nepal,[5] and *Flowering Plants of Nepal (Phanerogams)*.[6] At the generic level, synonyms widely used in the Asian literature are included. Full bibliographic citation with authorship is given for all accepted names and their basionyms at the rank of genus and below. As far as possible, the bibliographic citations of all accepted names and their basionyms have been verified with the original literature. The basionym precedes all other synonyms, which are listed alphabetically. Misapplied names (misidentifications encountered in the literature) are not included in synonymy, but are discussed in the supporting information at the end of a taxon. Authors of plant names follow the standard forms given in *Authors of Plant Names* and its continuously updated online supplement (www.ipni.org).[7] Bibliographic references are given using the standard abbreviations in BPH-2 for serial publications (journals and periodicals) and in TL-2 (and its supplements) for books.[8, 9] In some cases books were published in several fascicles on different dates, sometimes over different years, but not indicated as such in the printed work. Date of publication is critical for establishing nomenclatural priority, and so it is important to be precise when citing names published in such works. The fascicle composition and publication dates of these often complex cases are clearly explained in TL-2, but the standard abbreviation does not differentiate between them. In these instances the TL-2 abbreviation has been amended with brackets to clearly indicate which fascicle is being referred to, for example Wallich, N., Pl. As. Rar. 2[8]. 1831. Books and periodicals not included in these two standard references have been abbreviated according to the recommendation in Appendix A of BPH-2.

Where a taxon has a widely recognized local name this is given in Devanagri script, followed by its transliteration into the Latin alphabet and the language of the vernacular name in parentheses ‘( )’. One local name is given in the printed Flora, whereas multiple alternative vernacular names in different languages may be included in the *Flora of Nepal Knowledge Base* and made available online. Separate indexes to vernacular names in Devanagri, their Latin transliterations and scientific names are included at the end of each volume.

Descriptions are given for all taxa (family, genus, species, infraspecies and occasionally intermediate ranks) and wherever possible are based on primary observations and measurements made on specimens from Nepal. If no such material was available to authors, descriptions are taken from specimens from adjacent countries or secondary sources, and annotated as such. Most descriptions are about 150 words long, but exceptionally they are shorter or longer depending on the complexity of the taxon being described. For species with more than one infraspecific taxon, a full description is given for the species and short diagnoses for the lower taxa. Descriptions aim to be consistent and parallel between taxa of the same rank within a higher taxon. Authors were asked to standardize descriptive terms using the definitions given in *Plant Identification Terminology*.[10] If a single measurement is given it refers to

length, and if width is also given it is in the format length × width. Ranges are separated by an en-dash (–) and discontinuous states by the word 'or'. Exceptional measurements are given in parentheses '( )'. Taxon statistics and short statements on worldwide distribution are provided for families and genera, with summary statistics of lower taxa represented in Nepal.

Identification keys are dichotomous and presented in a bracketed format, with all elements strictly parallel between the two leads of each couplet. Keys are artificial and not intended to reflect any taxonomic classification. There is usually a single key to genera within a family, combining flowering, fruiting and vegetative characters, but where this is unwieldy separate keys are given for flowering and fruiting material (e.g. Cruciferae, Rosaceae). Keys are also given for species within a genus and taxa within a species. Figures are provided to aid identification by illustrating the diagnostic characters of each family and genus, and for large genera variation in major morphological features is represented.

The geographic distribution within Nepal is indicated for each species and infraspecific taxon at the political district level by a shaded distribution map. The distribution maps are evidence-based, produced from the *Flora of Nepal Knowledge Base* using locality information taken from authenticated herbarium specimens and records of plants *in situ* made by credible observers. Ideally all specimens identified by authors should be geo-referenced and databased when they are preparing *Flora of Nepal* accounts, but where this is not possible a minimum of one specimen per district is required. Sometimes the distribution of a species is greater than the sum of the distribution maps of its infraspecific taxa. This is a result of some herbarium specimens only being identifiable to species level. Occasionally species are known only from poorly localised collections, especially those from the early 19th century. For example, Wallich often only gave 'Napalia' as the locality for many of his 1820–1821 collections. These specimens are most likely to have come from the Kathmandu Valley, known as the 'Nepal Valley' or just 'Nepal' at that time, but they might also have been collected during his inward and outward journeys from India via Hetauda, or by pilgrims going north to 'Gossainthan' (Gossainkund). It is therefore impossible to be sure of the correct district and in such cases this is noted in the supporting information and the map omitted. The *Flora of Nepal* website gives access to the underlying distribution and specimen information through an interactive dot map plotting all geo-referenced occurrence records and a listing of all material recorded.

Distribution for species and infraspecific taxa occurring outside Nepal is indicated by a list of geographical regions, with the resolution becoming coarser with increasing distance from Nepal. In order to utilise information contained within other published Floras these areas are defined according to political borders, with countries or provinces grouped to form regions that have some underlying biogeographic basis. For example, although the Tibetan Plateau extends into parts of Sichuan and Yunnan, we limit it to Xizang and Qinghai. *Flora of Nepal* takes no stance on any politically disputed border areas and is following the current international mapping convention of using the 'lines of control' to delineate its regions. The names used for the regions are intended to be descriptive and non-political. The regions are:

W Himalaya	India (Jammu & Kashmir, Himachal Pradesh, Uttarakhand), northern Pakistan (Khyber Pakhtunkhwa, previously known as North West Frontier Province).
E Himalaya	Sikkim, Darjeeling, Bhutan, NE India (Arunachal Pradesh).
Tibetan Plateau	China (Xizang, Qinghai).
Assam-Burma	Assam, Nagaland, Manipur, Myanmar
S Asia	Eastern Pakistan (Punjab, Sind, Islamabad), Peninsular India, Sri Lanka, Bangladesh, Maldives.
E Asia	China (excluding Xizang, Xinjiang, Qinghai), Korea, Japan, Taiwan.
SE Asia	Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines, New Guinea.
N Asia	China (Xinjiang), Russia, Mongolia.
C Asia	Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan.
SW Asia	Afghanistan, western Pakistan (Baluchistan, Federally Administered Tribal Areas), Iran, Middle East, Arabian Peninsula, Turkey, Azerbaijan, Armenia, Georgia.
Asia	collective term for all above areas of Asia.
Europe	includes Ukraine, Belarus, Baltic republics.
Africa	includes Madagascar.
N America	includes C America south to Panama.
S America	south of Panama.
Australasia	Australia, New Zealand, Pacific Islands.
Cosmopolitan	collective term for a generally worldwide distribution.

Altitudes (elevation above sea level) are based on herbarium specimen data or records from credible observers. They are given to the nearest 100 m rounded up or down, with exceptional altitudes given in parentheses '( )'. Likewise, flowering and fruiting times are based on specimens collected from Nepal, or on material from adjacent regions if these data are lacking and a note is provided to explain this. The short statement on the ecological preference of

each species and infraspecific taxon is mostly taken from herbarium specimen data. Currently these often lack detail, a reflection of the shortcomings of poor-quality data recorded by the past collectors of herbarium material, but these will improve with more field studies.

Supplementary information is given at the end of a taxon account discussing taxonomic issues, highlighting spot characters useful for identification, noting similar species that could cause confusion, and detailing the misapplication of names. Summary information is provided for ethnobotanical and other uses, but this is not intended to be exhaustive and is derived from secondary sources, such as *Plants and People of Nepal* and *A Compendium of Medicinal Plants of* Nepal.[11, 12]

Abbreviations

Standard abbreviations for the International System of Units (SI) are used for measurements. Herbaria are cited using the standard abbreviation in *Index Herbariorum*.13 Other abbreviations used in the text include:

C	central.
ca. *circa*	about, approximately.
comb. nov. *combinatio nova*	new combination of name and epithet
dbh	diameter at breast height – measured on tree trunks at 1.3 m above the ground.
E	east, eastern.
et al. *et alia*	and others.
fig.	figure.
N	north, northern.
nom. cons.*nomen conservandum*	name officially conserved in ICBN.14
nom. illegit. *nomen illegitimum*	illegitimate name, according to ICBN.14
nom. inval.*nomen invalidum*	invalid name, according to ICBN.14
nom. nud.*nomen nudum*	name lacking a description, or reference to an effectively published description, and so invalid according to ICBN.14
nom. rej.*nomen rejiciendum*	name officially rejected in ICBN.14
nom. superfl. *nomen superfluum*	name superfluous when published, and so illegitimate according to ICBN.14
pl.	plate.
q.v.*quod vide*	which see.
S	south, southern.
s.l. *sensu lato*	for a taxon treated in a broad sense.
s.s. *sensu stricto*	for a taxon treated in a narrow sense.
sect.	section.
subfam.	subfamily.
subgen.	subgenus.
subsp.	subspecies.
subvar.	subvariety.
syn.	synonym
var.	variety.
W	west, western.
>	greater than
<	less than

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