377. RHAPHIDOPHORA GLAUCA
Araceae

Peter Boyce

Summary. The taxonomic and nomenclatural history, distribution and cultural requirements of *Rhaphidophora glauca* (Wall.) Schott (Araceae), an aroid liane native to the subtropical and warm temperate regions of the eastern Himalaya, are discussed; illustrations and a description of the species are provided together with a brief overview of *Rhaphidophora* in the eastern Himalaya.

Among the climbing Araceae it is generally the Neotropical genera *Philodendron* Schott and *Monstera* Adans. that are best known to horticulturists, even though it is only a handful of species from several hundred that account for their popularity, and despite the fact that most popular species require tropical conditions in order to thrive. There are many other climbing aroid genera, all but unknown by growers, among which there are numerous species that would merit inclusion in a collection of tropical plants. In some instances they would represent an improvement in amenability to cultivation but have yet to gain popularity. *Rhaphidophora glauca* (Wall.) Schott, which is depicted here, is one such species.

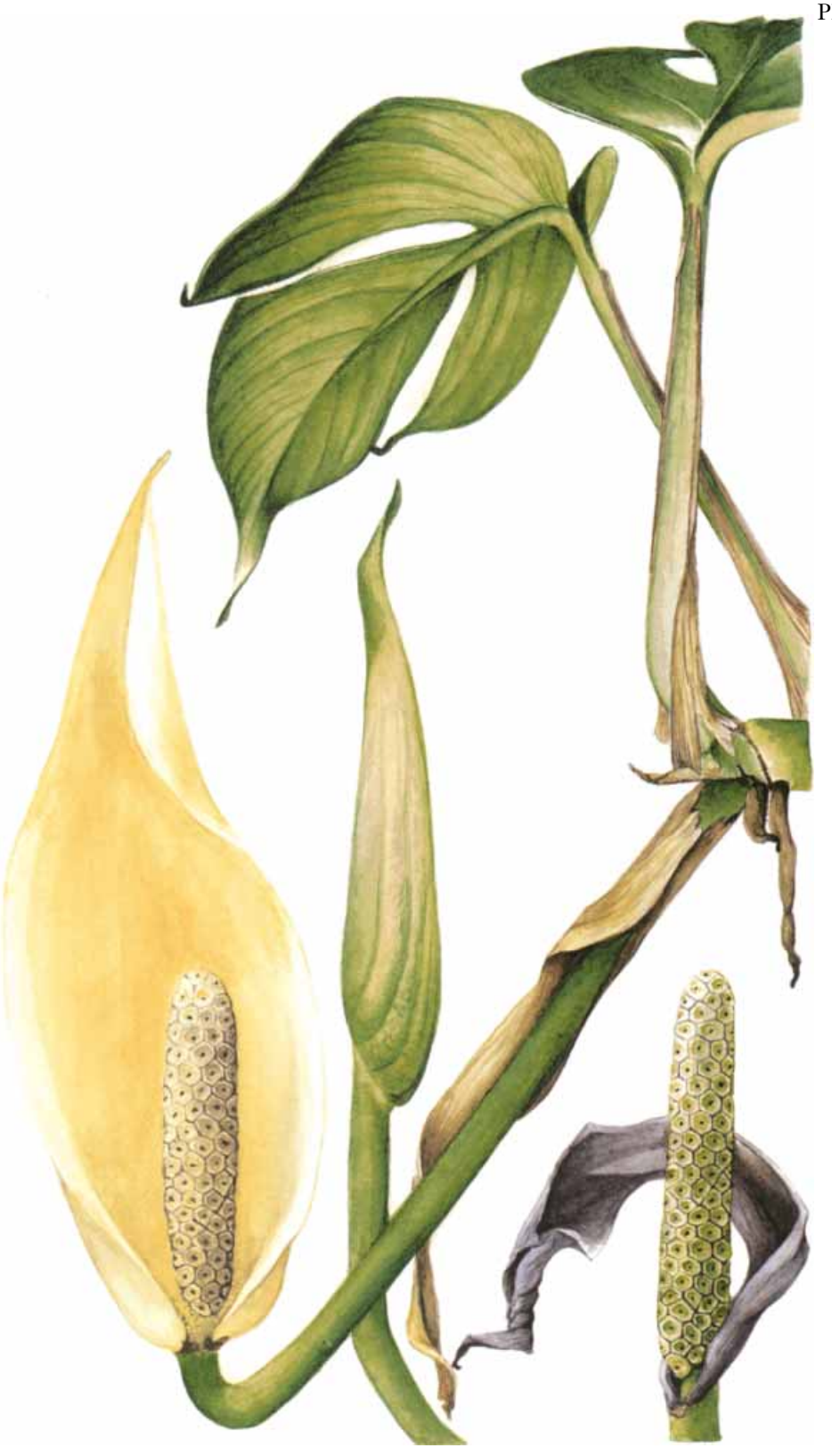
Rhaphidophora Hassk. is a genus of approximately 100 species of lianes and creepers and is one of four similar and related genera in Asia. The others, *Scindapsus* Schott, *Epipremnum* Schott and *Amydrium* Schott are all but unknown in cultivation outside the tropics although *Scindapsus pictus* Hassk. and the golden and white variegated forms of *Epipremnum pinnatum* (L.) Engl., marketed as GOLDEN POTHOS, DEVIL'S IVY, etc., are produced commercially in modest numbers in Europe and North America. The majority of *Rhaphidophora* species are restricted to the tropical south-eastern Asian archipelago with the most species and highest diversity to be found on the huge islands of Borneo and New Guinea. However, the genus is distributed from tropical West Africa to the tropical western Pacific and, although species numbers and diversity drops sharply at either end of the distribution, there are several 'hotspots' with their complement of endemic species throughout the generic distribution. One such hotspot is the eastern Himalaya from Uttar Pradesh and Nepal to south-western China. It is from the western and central part of this region that *R. glauca* originates.

Rhaphidophora glauca is one of eight species in the eastern

Himalaya and, along with *R. decursiva* (Roxb.) Schott, was among the first of the climbing aroids to be described from the Himalaya. Nathaniel Wallich, typically of the time, described *R. glauca* as a species of *Pothos* L., a genus circumscribed by Linnaeus (1753, 1763) as an all encompassing home for climbing aroids with bisexual flowers and subsequently into which diverse species were included to form a heterogeneous assemblage. Early in the nineteenth century Schott (1832) recognized that *Pothos* was, as then defined, 'unnatural' and in a series of papers re-defined bisexual-flowered climbing aroid genera (1856–1857, 1860). One new genus Schott described was *Scindapsus* and it was into this that he transferred Wallich's *Pothos glaucus* in 1832. As more research into tropical aroids was undertaken a Dutch botanist, Hasskarl, decided that while Schott's circumscription of aroid liane genera was an improvement on that of Linnaeus' the genera were still too heterogeneous. To rectify this Hasskarl erected *Rhaphidophora*. Schott transferred *Scindapsus glaucus* into Hasskarl's new genus in 1857. The end result of this accumulative work is that there are four genera of predominantly Asian lianes separated primarily on the number, size and disposition of the ovules (and thus the seeds) in each fruit; *Rhaphidophora* is defined by having fruits with numerous small seeds attached to a placenta running up the wall of the fruit – in botanical parlance, parietal placentation.

Rhaphidophora glauca, R. decursiva [here taken to include *R. affinis* Schott and *R. eximia* Schott – see Boyce, in prep.] and *R. grandis* Schott are the only species from the eastern Himalaya with leaves divided somewhat in the manner of the well-known SWISS CHEESE PLANT, *Monstera deliciosa* Liebm., although lacking the distinctive perforations of that ubiquitous cultivated ornamental. They are distinguished from each other by the size and overall outline of the leaf lamina in mature plants, the number of pinnae on each side and the number of major (primary) veins per pinna, the colour of the lamina undersurface and the size of the spadix at flowering time. On these criteria *R. glauca* is distinguished by having an ovate leaf lamina no more than 42 cm long with between 2–7 pinnae per side, by each pinna having three distinct parallel primary veins, by the lamina undersurface often (but not invariably) glaucous and in having a spadix less than 9 cm long at flowering.

In the wild *R. glauca* is quite variable. While the typical plant has rather small leaves (30 cm long or less) with between two and five



Rhaphidophora glauca

CHRISTI SOBEL

pinnae per side some forms tend towards larger leaves (up to 42 cm long) with more pinnae per side. These larger-leaved plants have been described as var. *khasiana* Hook.f. and are the form that some of the outlying Thai populations most closely resemble. However, almost all climbing aroids tend towards such variation and recognizing formal taxonomic entities on such plastic characters, particularly when the variation is known from only a few specimens, is unnecessarily complicated.

All the other Himalayan species, *R. calophylla* Schott, *R. peepla* (Roxb.) Schott (including *R. lancifolia* Schott), *R. schottii* Hook.f., *R. hookeri* Schott and the little known *R. manipurensis* Engl. & K. Krause, have entire leaf blades and are separated on a combination of stem, leaf lamina and venation characters, inflorescence position, size and colour (Boyce, in prep.). Of these species, *R. peepla* is notable for its glossy deep green leaves and comparatively large apricot to deep salmon-pink inflorescences, while *R. hookeri* has sea-green leaves, densely grey-pubescent stems and nodding greyish white inflorescences that are fruitily scented.

The above discussion might give the impression that the Himalayan Araceae are a well-understood group; this is not so. The only comprehensive treatment for the entire Himalaya are the now outdated account in Hooker's *Flora of British India* (Hooker, 1893) and the accounts produced by Engler (1905–1920a, 1920b) and Engler & Krause (1908, 1920) in *Das Pflanzenreich*. Since then the only critical account has been for Bhutan and the adjacent parts of India by Noltie (1994) and, while a review of the Himalayan *Rhaphidophora* species is in preparation (Boyce, in prep.), much remains to be done before the Himalayan aroids are properly understood.

Cultivation. The plants of *Rhaphidophora glauca* at Kew originate from two collections made in Nepal in 1981. The plant depicted here was collected by Tony Schilling, a former Deputy Curator of Wakehurst Place, in Nepal, where it occurred in south of Yamphudin in warm temperate oak forest. In cultivation these Himalayan rhaphidophoras have proved to be tolerant of much lower temperatures than their more southerly counterparts. All are plants of higher altitudes at rather northern latitudes and all have proven themselves to be of robust constitution, thriving and flowering in temperatures that would cause the more commonly cultivated aroid lianes to shed leaves and rapidly decline. However, given adequate

Rhaphidophora glauca. Habit of mature flowering plant. Drawn by Christi Sobel.

warmth, ideally not below 18°C but not above 28°C, and moderate humidity they grow luxuriantly and flower regularly.

In recent years at Kew there has been a move away from 'traditional' potting media (i.e. peat and loam-based mixes) and a move towards much more open mixes for the epiphytic and liane aroids. Thus there has been a progression away from heavy, slow draining and easily compacted media to ones that are more fibrous and free draining. The difference in plant growth has been remarkable. Kew's standard mix is now an open-textured yet moisture-retentive medium of equal parts bark chips, coir, sphagnum moss and coarse grit. Water is given freely throughout the year with a weekly liquid feed applied to terrestrial and aerial roots and the foliage. A further advantage of these free-draining open mixes is that one can water and feed the plants much more frequently without fear of stagnant conditions developing at the roots. The regular flow through of water and nutrients is much more akin to the plants' natural conditions and they respond accordingly.

Propagation is by means of stem cuttings, naturally occurring or induced layers, or by seed. In most instances cuttings will provide the readiest means of increase. Sections of stem 10 to 15 cm long

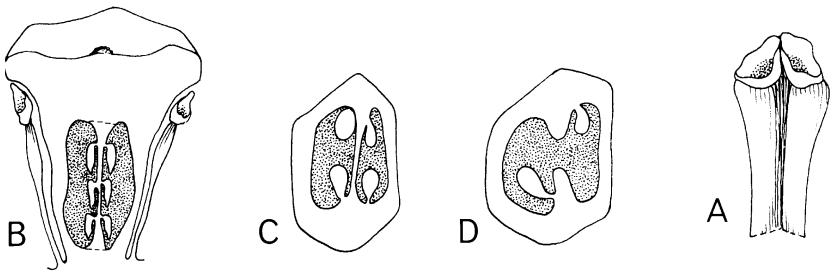
can, after removal or considerable reduction of the size of the leaves, be placed on an open, humus-rich mix in a seed tray in a propagation frame at a minimum of 22°C. Rooting should take place in about two weeks and growth should begin from the nodes in about one month. Once growing strongly the stem can be cut into pieces, each bearing a rooted portion, and potted individually. After a period of re-establishment the plants can be treated in the same manner as mature specimens.

One major problem with growing lianes is how to deal with the long stems. While at Kew every effort is made to plant lianes against suitable climbing surfaces in the public display houses such as the Princess of Wales Tropical Conservatory, space is at a premium. In the past we have resorted to a variety of cane tepees and moss-covered totems with a mixture of success and failure. Although the canes are light, so that the pots are not prone to falling over when the plants are sprayed, this system does not encourage the development of the adhesive clasping roots that are a feature of most aroid lianes (and which function in the same manner as those of *Hedera*); thus one is forever having to tie in the new shoots. Additionally, many climbing aroids will not flower until their stems are attached by these roots to a suitable surface and thus plants grown on a cane tepee rarely bloom. Moss-covered totems, while generally amenable to clasping roots and encouraging at least the more modestly sized species to blossom, are very heavy; plants grown on them usually require over-potting in order to make the pots heavy enough to avoid toppling over. Over-potting itself leads to problems with stagnant compost and subsequent loss of roots. For the research collections a solution has been found in the provision of 4 m high climbing frames covered with sheets of horticultural-grade coir matting and arranged in the manner of a ridge tent. The plants are grown in small pots (since most aroid lianes have modest terrestrial root systems) that are wired on to the base of the frame to prevent movement. The stems are trained on to the coir matting which is kept damp and very soon clasping roots attach themselves to the matting and the plants swiftly become established. The system is still undergoing trials and, while we have not yet flowered any plants using this method, they are certainly responding in a most encouraging way.

Rhaphidophora glauca (Wall.) Schott in Bonplandia 5(2): 45 (1857). Type: Nepal, 1820, *Wallich* 4440 (holotype K!, isotypes L!, LE!).

Pothos glaucus Wall., Pl. Asiat. Rar. 2: 45, t.156 (1831) ('*glauca*').
Scindapsus glaucus (Wall.) Schott in Schott & Endl., Melet. Bot. 121 (1832).
Pothos wallichii Steud., Nomencl. Bot. ed. 2, 2: 391 (1841), *nom. illeg.* based on same type as *Pothos glaucus* Wall.
Monstera glauca (Wall.) C. Koch ex Ender, Index Aroid. 54 (1864).
Rhaphidophora glauca (Wall.) Schott var. *khasiana* Hook.f., Fl. Brit. India 6: 547 (1893). Types: India, Meghalaya, Khasia Hills, Churra, 17 Aug. 1850, *Hooker* & *Thomson s.n.* (K!, P!); Churra, 20 Aug. 1850, *Hooker* & *Thomson s.n.* (K!); Pomrang, 20 Sept. 1850, *Hooker* & *Thomson s.n.* (K!).

Description. *Perennial evergreen liane* to 10 m, but frequently less. *Stem* 0.7–2.5 cm diam., internodes elongated, terete in cross-section. *Leaves* scattered, with one foliage leaf at each node except for at the proximal-most nodes of a branch where the first few nodes have the foliage leaf replaced by a prophyll and one or more cataphylls; lamina 11.5–42 cm long, 7.5–24 cm wide, ovate in outline, ± symmetrical, apex acuminate, base truncate, oblique or shallowly cordate, variously pinnatifid, pinnatipartite or pinnatisectly divided, depending on degree of maturity, pinnae 2–5(–8) per side, each pinna with three conspicuous primary lateral veins, upper surface dull mid-green, lower surface pale to strikingly glaucous-green; petiole 9–33 cm, apical geniculum indistinct; petiolar sheath reaching the base of the leaf lamina. *Inflorescence* solitary, erect, arising from the tips of adherent lateral branches; peduncle 10–25 cm long, spreading, apical portion curved; spathe 4.5–8.5 cm long, 0.8–1.3 cm wide, oblong-ovate, acuminate apically, opening wide, pale glaucous green in bud, opening pale to mid-yellow, waxy; spadix 4.5–8.5 cm long, 0.8–1.3 cm at widest point, cylindrical, sessile, apex truncate-rounded, base slightly tapering, dull cream; stamens four per flower, filaments flat, 2.7–3 mm long, 0.8–1.5 mm wide, not increasing



Rhaphidophora glauca. A, stamen, dorsal view; B, whole flower, gynoecium in longitudinal section; C, gynoecium, transverse section, lower part; D, gynoecium, transverse section, upper part. All parts × 8. Drawn by Christi Sobel.

in length at anthesis, pollen simply expelled from between pistils; pistils 3–5.5 mm long, apex c. 3–4 mm wide, truncate, smooth; stigma flat, 0.6–1 mm, circular to elliptic. *Infructescence* 12–15 cm long, 3–3.5 cm wide when ripe, subtended with persistent withered spathe remains early in development, the mature infructescence surface is comprised of tough thickened stylar tissue that, when the infructescence is ripe, falls as irregular plates to expose the ovary cavity with the seed embedded in copious, pale orange pulp.

Distribution. Eastern Himalaya: Bangladesh, Bhutan, India (Assam, Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal [Darjeeling]), Nepal, Thailand (Chiang Mai, Chiang Rai).

Habitat. Subtropical and warm temperate mixed broad-leaf forest; 300–2130 m.

Flowering Time: September–May.

REFERENCES

Boyce, P.C. (in prep.). Northern Exposure: A review of the Himalayan Rhaphidophora species. To be published in *Aroideana*.

Engler, A. (1905). Araceae-Pothoideae. In Engler, A. (ed.), *Das Pflanzenreich* 21 (IV.23B): 1–330.

Engler, A. (1911). Araceae-Lasioideae. In Engler, A. (ed.), *Das Pflanzenreich* 48 (IV.23C): 1–130.

Engler, A. (1912). Araceae-Philodendroidea-Philodendreae. Allgemeiner Teil, Homalomeninae und Schismatoglottidinae. In Engler, A. (ed.), *Das Pflanzenreich* 55 (IV.23Da): 1–134.

Engler, A. (1915). Araceae-Philodendroideae-Anubiadeae, Aglaonemateae, Dieffenbachieae, Zantedeschieae, Typhonodoreae, Peltandreae. In Engler, A. (ed.), *Das Pflanzenreich* 64 (IV.23Dc): 1–78.

Engler, A. (1920a). Araceae-Aroideae, Araceae-Pistioideae. In Engler, A. (ed.), *Das Pflanzenreich* 73 (IV.23F): 1–274.

Engler, A. (1920b). Araceae-Pars generalis et index familae generalis. In Engler, A. (ed.), *Das Pflanzenreich* 74 (IV.23A): 1–71.

Engler, A. & Krause, K. (1908). Araceae-Monsteroideae. In Engler, A. (ed.), *Das Pflanzenreich* 37 (IV.23B): 4–139.

Engler, A. & Krause, K. (1920). Additamentum ad Araceas-Philodendroideas, Araceae-Colocasioideae. In Engler, A. (ed.), *Das Pflanzenreich* 71 (IV.23E): 3–132.

Hasskarl, J.K. (1842). Plantarum genera et species novae aut reformatae javenses. *Flora* 25(2), Beibl. 1: 1–16.

Hooker, J.D. (1893). Araceae. *The Flora of British India*, 6: 490–556. Reeve & Co., London.

Linnaeus, C. (1753). *Species Plantarum* ed. 1. Stockholm.

Linnaeus, C. (1763). *Species Plantarum* ed. 2. Stockholm.

Noltie, H.J. (1994). Araceae. *Flora of Bhutan* 3(1): 121–161 (1994). R.B.G., Edinburgh.

Schott, H.W. (1832). Araceae. In Schott, H.W. & Endlicher, S., *Meletemata Botanica*, pp. 16–22. Gerold, Vienna.
Schott, H.W. (1856–1857). Pothos. *Aroideae*: 21–25, t.31–56. Gerold, Vienna.
Schott, H.W. (1860). *Prodromus Systematis Aroidearum*. Typis Congregationis Mechitharisticae, Vienna.