

RAMOS ET AL.: TAXONOMY OF ALDINA

**A Taxonomic Synopsis of *Aldina*, a Florally Distinctive and Poorly Collected
Amazonian Genus of Papilionoid Legumes**

**Gustavo Ramos^{1,6}, Charles E. Zartman², Haroldo C. de Lima³, R. Toby
Pennington^{1,4} and Domingos B. O. S. Cardoso⁵**

¹The University of Edinburgh, Old College, South Bridge, Edinburgh, Scotland, UK
Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh, Scotland, UK;

²National Institute for Amazonian Research (INPA), Department of Biodiversity, Av.
André Araújo, 2936, Petrópolis, 69060-001 Manaus, Amazonas, Brazil;

³Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Rua Pacheco Leão 915,
22460-030, Rio de Janeiro, Brazil;

⁴Geography, University of Exeter, Laver Building, North Park Road, Exeter EX4 4QE,
United Kingdom;

⁵Instituto de Biologia, Universidade Federal da Bahia, Rua Barão de Jeremoabo, s/n,
Ondina, 40170-115, Salvador, Bahia, Brazil.

⁶Author for correspondence: (gustavobotanik@gmail.com)

Abstract—We present a taxonomic synopsis of *Aldina* Endl. (Leguminosae, Papilionoideae), a poorly known Neotropical genus of predominantly Amazonian trees with unusual, non-papilionate flowers. *Aldina* is characterized by the combination of odd-pinnate leaves and flowers with radial symmetry, free and undifferentiated petals, an entire calyx, and free, numerous stamens. Difficulty accessing species in remote areas has led to poor representation in herbaria, and species descriptions based on scant material have led to a doubtful and confused taxonomy. Eighteen species are recognized here: *A. aurea*, *A. barnebyana*, *A. berryi*, *A. discolor*, *A. diplogyne*, *A. elliptica*, *A. heterophylla*, *A. insignis*, *A. kunhardtiana*, *A. latifolia*, *A. macrophylla*, *A. microphylla*, *A. occidentalis*, *A. paulberryi*, *A. petiolulata*, *A. polyphylla* e *A. reticulata*. The names *A. amazonica* **syn. nov.**, *A. latifolia* var. *pubescens* **syn. nov.**, *A. insignis* var. *retusa* **syn. nov.**, *A. stergiosii* **syn. nov.**, *A. aquae-negrae* **syn. nov.**, *A. rio-negrae* **syn. nov.**, and *A. speciosa* **syn. nov.** are newly synonymized. We lectotypify *A. discolor*, *A. heterophylla*, *A. macrophylla*, *A. occidentalis*, and *A. polyphylla* and make a new combination, *Aldina auyantepuiensis*. All *Aldina* species are found in the Amazon basin. An identification key for all species, a color plate, diagnostic illustrations, and a map of geographic distribution of the genus are also presented.

Keywords—Amazon, Leguminosae, morphology, Papilionoideae, pea family, taxonomy, tropical rain forest, white sands forest.

Resumo—Este trabalho consiste no tratamento sinóptico de *Aldina* Endl. (Leguminosae, Papilionoideae), um gênero Neotropical de árvores de flores não papilionadas com distribuição predominante na bacia amazônica. *Aldina* é caracterizada pela combinação de folhas imparipinadas e flores com simetria radial, pétalas livres e indiferenciadas, cálice inteiro, e estames livres e numerosos. A dificuldade de acesso a espécies em áreas remotas, como a bacia amazônica, tem levado a uma pobre representação em herbários de gênero de importância ecológica como *Aldina*. Além disso, descrições taxonômicas baseadas em material escasso tem levado a uma taxonomia duvidosa e confusa desses grupos. Neste trabalho são reconhecidas dezoito espécies: *A. aurea*, *A. barnebyana*, *A. berryi*, *A. discolor*, *A. diplogyne*, *A. elliptica*, *A. heterophylla*, *A. insignis*, *A. kunhardtiana*, *A. latifolia*, *A. macrophylla*, *A. microphylla*, *A. occidentalis*, *A. paulberryi*, *A. petiolulata*, *A. polyphylla* e *A. reticulata*. Os nomes *A. amazonica* **syn. nov.**, *A. latifolia* var. *pubescens* **syn. nov.**, *A. insignis* var. *retusa* **syn. nov.**, *A. stergiosii* **syn. nov.**, *A. aquae-negrae* **syn. nov.**, *A. rio-negrae* **syn. nov.**, e *A. speciosa* **syn. nov.** são sinonimizados aqui. Apresentamos também a lectotipificação de *A. discolor*, *A. heterophylla*, *A. occidentalis*, *A. polyphylla* e uma nova combinação em *Aldina auyantepuiensis*. Nesta sinopse apresentamos uma chave de identificação para todas as espécies, pranchas com imagens, ilustrações e um mapa com distribuição geográfica para o gênero.

Palavras-chave—Floresta Amazônica, Leguminosae, morfologia, Papilionoideae, taxonomia, coleções biológicas, campinarana.

Cataloging and describing the plants in species-rich regions such as the vast tropical Amazon lowland rainforest are fundamental to understanding patterns of diversity and are the first step toward conservation prioritization (Hopkins 2007; Cardoso et al. 2017). However, much taxonomy remains to be done in Amazonia, partly because huge remote regions are unexplored (Cardoso et al. 2015a), and when specimens exist, they can remain hidden for decades in herbaria without being studied by taxonomists (Bebber et al. 2010). In the face of accelerating habitat destruction, thorough monographic revisions of plant groups in poorly-collected regions are therefore urgent priorities.

The taxonomy of many Amazonian genera of the early-branching papilionoid legumes remains understudied in the 21st century, despite legumes being the family that dominates Amazonia in terms of species diversity and abundance (ter Steege et al. 2013; Cardoso et al. 2017). Examples of genera that need taxonomic revision include *Dussia* Krug & Urb. ex. Taub, *Dipteryx* Schred., and the little-known neotropical genus *Aldina* Endl. that is the subject of this synopsis.

Preliminary taxonomic studies on *Aldina* (Cowan 1953, 1958, 1961) were based on specimens gathered in Colombia, Venezuela, and Guyana, and less is known about species distributed in Brazil. Since then, more species have been described, increasing our knowledge of the genus (Gontscharov et al. 2006, 2009; Stergios & Aymard 2008; Aymard 1998; Cowan and Steyermark 1984; Steyermark 1967, 1999). However, most of the new names published have been based on single specimens, which often fell under the morphological continuity of previously described species. With the possibility of species number overestimation, a taxonomic revision of the names proved essential.

Here, we have comprehensively revised the taxonomy and nomenclature of all *Aldina* species by analyzing the available collections, including historical specimens and types, as well as newly collected specimens from across the Brazilian Amazon. In this synopsis, we have updated the species delimitation and descriptions, especially for species that were previously understudied and taxonomically confusing because they were represented only by a few specimens or the type. The taxonomic treatment presented here includes an identification key and full synonymy for all *Aldina* species, plus taxonomic comments that include information on how to distinguish morphologically similar species. Our study is a starting point towards a comprehensive taxonomic revision of the entire genus in the Neotropics.

THE GENUS *ALDINA* ENDL.

Aldina is a neotropical genus of 18 species distributed in Amazonia, encompassing regions of Colombia, Venezuela, Guyana, and Brazil (Fig. 1). Collections from the state of Acre, close to Peru and Bolivia, suggest that the genus might have its distribution expanded to those countries when some remote peripheral areas of the Amazon Basin have been explored. *Aldina* species are trees up to 30 m tall, often buttressed, with odd-pinnate leaves, radially symmetric flowers with undifferentiated petals, calyx entire in flower bud and splitting in irregular lobes as the bud opens, free and numerous stamens, and tardily-dehiscent nuroid fruits (Barroso, 2004) with an undifferentiated endocarp, the mesocarp occasionally fibrous or spongy (Fig. 4). In a family largely marked by the evolution of root-symbiotic nitrogen fixation (Werner et al. 2014; Sprent et al. 2017), the genus *Aldina* is among the few ecologically successful lineages that nodulate and also associate with ectomycorrhizae.

Taxonomic History—*Aldina insignis* is the type species and was described in 1840 by Stephan F. L. Endlicher, who named it after the doctor and botanist Tobias Aldinus. In the same year, Bentham (1840) had described the genus *Allania* based on the same plant, naming it after the botanist Allan Cunningham. The name “*Alania*”, a close orthographic variant of *Allania*, however, had been previously assigned by Endlicher (1836) to a species in the family Liliaceae. This apparent ‘slip of the pen’ (Rehder et al. 1935) was corrected by Meisner (1842).

The name *Aldina* has been used by other authors over time. In the Leguminosae, a homonym described by Adanson (1763) was based on material of the papilionoid genus *Brya* P.Browne (Browne 1756). Since Adanson’s (1763) name has not been adopted, it has remained without an associated specific name and was rejected based on the Art. 14 of the International Code of Nomenclature for algae, fungi, and plants (Rehder et al. 1935; Turland et al. 2018).

Rehder et al. (1935) also suggested in the same proposal the rejection of the name *Aldinia* Scop., a synonym of *Justicia* L. (Acanthaceae), which has not been adopted and also remains without a specific name.

In view of the fact that *Aldina* Endl. has been universally accepted and has no synonym to take its place, *Allania* Benth. (1840) being a later homonym of *Alania* Endl. (1836), the former name has been conserved.

Aldina has been classified historically in the tribe Swartzieae which, along with the tribe Sophoreae, comprise genera of Papilionoideae that retain a set of floral traits traditionally considered plesiomorphic in the family, such as buds with an entire calyx splitting into irregular lobes as the flower opens, radially symmetric or non-papilionate flowers with unspecialized or undifferentiated petals, and free and numerous stamens (Polhill 1981; Ireland 2005).

Phylogenetic Affinities—The phylogenetic placement of *Aldina* came into question in molecular phylogenetic studies on the early-branching Papilionoideae (Doyle et al. 1997; Pennington et al. 2001; Cardoso et al. 2012, 2015b), which have consistently diverged from traditional morphology-based classifications. *Aldina* was first sampled in a molecular phylogeny of the Leguminosae based on plastid *rbcL* sequences, which placed the genus in a large clade comprised of genera with a 50-kb inversion in the chloroplast genome (Doyle et al. 1997). Further phylogenetic analysis of plastid *trnL* intron sequences, involving comprehensive sampling of the tribes Sophoreae and Swartzieae, placed *Aldina* among the early-branching Papilionoideae, all of them known for lacking the 50-kb plastid inversion (Ireland et al. 2000; Pennington et al. 2001). Therefore, an Aldinoid clade comprised of *Aldina*, *Amburana* Schwacke & Taub. (2 spp.), and *Mildbraediodrendon* Harms (1 sp.) was defined within the Papilionoideae (Ireland et al. 2000).

The incongruence between the phylogenies derived from *rbcL* (Doyle et al. 1997) and *trnL* intron (Ireland et al. 2000; Pennington et al. 2001) sequences was partially resolved by phylogenetic reassessments of *Aldina* from newly acquired *matK* and *trnL* intron sequences, which led to the conclusion of a sampling error in the previous analysis of *trnL*. These analyses confirmed *Aldina* in the 50-kb inversion clade (Cardoso et al. 2012, 2015b), but the resulting phylogenies remained poorly resolved. *Aldina* has since been placed in a large polytomy with other small clades (*Amphimas*, *Andira*, *Dermatophyllum*, Lecointeoid, Vataireoid), the species-rich lineages Dalbergioid, Genistoid, and the NPAAA (non-protein amino acid accumulating) clade (Cardoso et al. 2012, 2013, 2015b).

In a recent, more comprehensive phylogenetic study of the early-branching papilionoid lineages, more light was shed on the phylogenetic placement of *Aldina* by

analyzing combined data of the plastid loci *rbcL*, *trnL* intron, and *matK* (Ramos et al. 2016). Unexpectedly, in this study, *Aldina* was resolved as sister to the papilionate-flowered genera *Andira* and *Hymenolobium*, which compose the *Andira* clade. Such a relationship was also confirmed by a plastome-scale phylogenetic analysis of the Papilionoideae (Choi et al. 2022). Although *Aldina*'s placement is now resolved in the Papilionoideae phylogeny, no study has considered species relationships within the genus.

Geographic Distribution, Habitat and Ecology—*Aldina* is confined to the Amazon basin, which covers a vast area of relatively poorly-botanized lowland tropical rainforest in Brazil (Hopkins 2007; Cardoso et al. 2017), a country recognized for its high floristic diversity and endemism (Forzza et al. 2012). Although *Aldina* is a poorly collected genus, some species are broadly distributed in the Amazon basin. An example is *Aldina discolor*, found in the patchily distributed white-sand-forests (*campinas* and *campinaranas*) of Brazil, Colombia, and Venezuela. A recent ecological estimate listed *A. discolor* as one of the 227 most dominant species that make up half the individual trees in the Amazon (ter Steege et al. 2013). Moreover, in the Guiana Shield, *Aldina* is listed among the 10 most abundant genera (ter Steege et al. 2006).

Furthermore, other species of *Aldina* can be found in the black water floodplains (*igapós*), upland (*terra-firme*) (Fig. 2), and montane forests of the Amazonian tepuis along the Guiana Shield Region. Although at first sight the Amazon may look like an endless homogeneous type of vegetation, it harbors a mosaic of ecologically distinct vegetation physiognomies that are shaped by many variables such as altitude, river drainage, soil composition, and precipitation (Oliveira-Filho et al. 2021; Pires and Prance 1985). As shown for other Amazonian plant taxa (Fine et al. 2010; Fine and Baraloto 2016; Draper et al. 2016), the distribution of *Aldina* species seems to be

constrained by their preferences for particular habitat types such as the periodically-flooded Amazonian black water forests (*igapós*), which demand physiological and morphological adaptations. For example, *A. latifolia* Spruce ex Benth., a widely distributed species along the Negro and Vaupés Rivers, has evolved a highly specialized, dramatically enlarged nucoid fruit with a spongy mesocarp as an adaptation for flotation along rivers and streams. The combination of such features optimizes dispersal capacities as the seeds germinate only once the fruits have settled on a riverbank during the dry seasons. However, not all species of *Aldina* are adapted to flooded habitats. In fact, most of them are found in non-flooded habitats, from low altitudes to the higher elevations of montane forests. For example, *A. microphylla* M.Yu.Gontsch. & Yakovlev occurs over the Serra do Aracá tepui at elevations reaching 800 m. Other species such as *A. kunhardtiana* R.S.Cowan and *A. polyphylla* Ducke are found in the upland (*terra-firme*) forests: the most predominant vegetation of the Amazon basin, comprising ca. 80% of its total area (Oliveira-Filho et al. 2021).

Aldina heterophylla is also found in white-sand forests, but it is only known from the vicinities of Manaus and Presidente Figueiredo, which makes it difficult to evaluate its actual predominance in these forests. The white-sand forests are patchily distributed through the matrix of the *terra-firme* forests, comprising 5–10% of the entire Amazon's coverage (Stropp et al. 2011). This unusual habitat, regionally called *campina* (open vegetation) or *campinarana* (canopy formed) in Brazil, has the most nutrient-poor soils known (Fine and Baraloto 2016; Janzen 1974) as the result of leaching. Such challenging environmental conditions, along with their island-like configuration, are often invoked to explain the lower species diversity of white-sand forests. Nevertheless, a high proportion of plant species (42%) are restricted to that vegetation type (Oliveira-Filho et al. 2021; Stropp et al. 2011; Vicentini 2016; Fine and

Bruna 2016; Fine and Baraloto 2016). Therefore, white-sand floras have a unique functional composition (Fortunel et al. 2014), suggesting important differences in ecosystem processes related to carbon and nutrient cycles.

Aldina discolor and *A. heterophylla* have achieved ecological success over the nutrient-poor soils of the white-sand forests because of their association with ectomycorrhizal fungi, particularly *Cantharellus* Adans. ex Fr. (Henkel et al. 2002; ter Steege et al. 2006; Smith et al. 2011; Roy et al. 2016). Ectomycorrhizal symbioses are more prevalent on white sands than elsewhere in the lowland Amazon, they confer to the host the ability to acquire more nutrients and water, and hence increase the chances of plant species to thrive (Roy et al. 2016).

Understanding the complex taxonomy of *Aldina* is particularly important because of its ecological importance in the species rich, yet relatively poorly-collected Amazon rain forest: a biome globally recognized by its exceptionally high floristic diversity, endemism, and ecological importance (Cardoso et al. 2017). The taxonomic synopsis of *Aldina* presented here addresses the status of dubious taxa, geographic distribution, and identification of all species in the genus in order to shed light on diversity patterns and as the first step for conservation prioritization.

MATERIALS AND METHODS

A thorough survey of physical herbarium specimens plus virtual specimen images was conducted to gather information for the taxonomic descriptions, flowering and fruiting phenologies, habitat, and geographical distributions. We revised specimens in the following herbaria known to hold significant collections of *Aldina* (acronyms according to Thiers et al. 2015 [continuously updated]): ALCB, COL, E, F, HUEFS,

IAN, INPA, K, MO, NY, OXF, P, R, RB, and US. Other collections were revised from virtual databases such as specieslink.net and plants.jstor.org.

The general terminology for the morphological descriptions (e.g., phyllotaxy, leaf shape, indumentum, venation, and fruit types) is based primarily on Harris and Harris (1994) and Barroso (2004). Specific terminology (e.g., leaf division, flower morphology, and habit) follows LPWG (2017) and other recent taxonomic revisions of papilionoid legume genera (e.g., Klitgaard 2005; Pirie et al. 2009; Cardoso et al. 2014).

We carried out extensive field research in remote and underexplored areas in the upper Rio Negro and Vaupés of western Amazonia, where new records of *Aldina* species were made along with photographs, including of habitats. Preparation of plant specimens followed Mori et al. (2011). All collected material was deposited at ALCB herbarium, Universidade Federal da Bahia (UFBA). Duplicate specimens were sent to HUEFS, INPA, and RB. Flowers and leaves obtained during our fieldwork were fixed in 70% ethanol to enable accurate examination of the specimens for description and illustrations.

For the nomenclatural revision, the type designations and all the nomenclatural decisions followed the International Code of Nomenclature for algae, fungi, and plants (ICN, Turland et al. 2018).

TAXONOMIC TREATMENT

ALDINA Endl., Gen. Pl. 1322. 1840, nom. cons., Bull. Misc. Inform. Kew. 350. 1935.

Allania Benth., J. Bot. (Hooker) 2: 91. 1840.—TYPE: *Aldina insignis* Endl.,

Repert. Bot. Syst. 1(5): 843. 1843; non *Alania* Endl. (1836) (Liliaceae).

Aldina E. Mey., nom. illeg., Comm. Pl. Afr. 171. 1835. = *Vachellia* Wight & Arn.

Aldina Adans., nom. rejec., Civ. Nat. Hist. Jamaica. 299. 1756. = *Brya* P. Browne

Trees, frequently with buttresses. **Roots** nodulating and ectomycorrhizal-associated. **Stems** frequently releasing red sap when cut. **Leaves** odd-pinnate, often 1-foliolate when nearer the inflorescences, commonly 3–9(–11)-foliolate, exstipulate; petiole and rachis terete, commonly green, sometimes darkening; leaflets opposite to subopposite, or sometimes clearly alternate, mostly coriaceous, sometimes chartaceous, base rounded to cordate, a subtle sometimes dense white wax coating beneath; venation brochidodromous. **Inflorescences** terminal or axillary, racemose or paniculate-racemose, densely covered by minute appressed hairs including the outer face of calyx; bracts and bracteoles minute; pedicels short. **Flowers** bisexual, actinomorphic (radially symmetrical), fragrant; calyx glabrous on the inner surface except for crisped villous hairs on tip of the lobes, entire in bud, opening about halfway in 2–4 deflexed, irregular segments, tube turbinate; petals (3–)4–6, imbricate in the bud, white to yellowish, glabrous, oblong, obovate and oblanceolate, usually concave to cucullate with folding impressions from stamens at the tips; stamens numerous, mostly ca. 60, rarely around 36, glabrous, white, essentially free, although commonly with a sheath at the base of ca. 3 mm long, laterally adnate to the hypanthium cup, the anthers large, uniform, narrowly oblong to linear, opening lengthwise by slits; gynoecium 1–3 carpellate, arising from the bottom of hypanthium cup, sessile or more often borne on a distinct stipe, covered with appressed golden hairs or glabrous, swollen-articulate at junction with the somewhat oblong, 2–5-ovulate ovary, covered by golden appressed hairs or entirely glabrous; style glabrous, subulate, straight or usually hooked; stigma punctiform. **Fruit** a nuroid legume, 5–9 cm long, 4–6 cm diameter, tardily dehiscent, thick, spongy when adapted to water dispersal, globose to subglobose, glabrous to tomentose; 1–4-seeded.

1. Leaflets completely glabrous on both surfaces; terminal (occasionally axillary) inflorescence with single racemes growing from the leaf axis or multiple racemes growing from the tip of the branch 2
1. Leaflets pubescent on the lower surface, sometimes obviously but often minutely so; inflorescence in elongated, open, multiple racemes or a terminal panicle 8
2. Flowers showy, calyx tube 2.5–3 cm long, petals 3–4 × 2 cm; gynoecium 2–4-carpellate, i.e., multiple ovaries born on a single stipe; fruits elongated, sausage-shaped to thickly fusiform and noticeably constricted between the 2–4 seeds; leaflets coriaceous, cordate at the base *A. diplogyne*
2. Flowers half as large or smaller than above; gynoecium unicarpellate, i.e. a single ovary born on the stipe (see *A. insignis*); fruits ovoid to oblong, 1–2-seeded; leaflets chartaceous to coriaceous, but not cordate at the base 3
3. Leaflets shiny on the lower surface, broadly ovate to oblong-ovate; calyx and unopened buds sparsely pale yellowish puberulent with appressed trichomes; calyx tube truncate, claviform at the base; fruit semi-globose to ellipsoid *A. latifolia*
3. Leaflets pallid, rarely shiny on the lower surface, oblong to ovate-elliptic, obtuse-mucronate; calyx and unopened buds uniformly densely pubescent; calyx tube truncate, barrel-shaped at the base; fruit ovoid or not as above 4
4. Mature buds 7–8 × 5 mm, apiculate and commonly deflexed with respect to the main inflorescence axis; leaflets shiny on both surfaces; inflorescences in panicles
..... *A. heterophylla*
4. Mature buds 10–20 × 7–10 mm, not apiculate and not deflexed (commonly patent); leaflets pallid on lower surface; racemes 5
5. Ovary mostly glabrous and dark brown; leaflets chartaceous, gray-greenish on lower surface *A. berryi*

5. Ovary pubescent; leaflets subcoriaceous to coriaceous, silvery gray-greenish or opaque-glaucous on lower surface 6
6. Leaves mostly unifoliolate; fruits retaining pubescence in later stages of development *A. auyantepuiensis*
6. Leaves 3–5-foliolate; fruit glabrescent towards late stages of development 7
7. Leaflets subcoriaceous, 8.8–12 × 3.5–4.5 cm, oblong-ovate, base obtuse-cuneate, apex acuminate; inflorescence and flower buds glabrous, stipe 5–12 mm long
..... *A. barnebyana*
7. Leaflets coriaceous, 4.5–7 × 2.2–3.8 cm, elliptic, oblong or ovate, base obtuse to rounded, apex acute to obtuse, acuminate, the acumen 1–1.5 cm long; inflorescence and flower buds tan-brown, appressed-pubescent, stipe 3.5 mm long
..... *A. microphylla*
8. Ovary glabrous or glabrescent 9
8. Ovary uniformly densely pubescent 10
9. Gynoecium as long as or longer than the stamen filaments at anthesis; leaflets appressed-puberulent on lower surface; ovary glabrescent and pale golden; petals 5, 15–20 × 6–8 mm
..... *A. latifolia*
9. Gynoecium noticeably shorter than the stamen filaments at anthesis; leaflets appressed-puberulent, somewhat uniformly glaucous on lower surface; ovary glabrous and dark brown; petals 4, 20–25 × 10 mm *A. macrophylla*
10. Leaflets brown-villous with erect trichomes with an even waxy coat on lower surface; inflorescence notably dark, golden-brown-velutinous; calyx splitting in 2 lobes *A. kunhardtiana*
10. Leaflets appressed-puberulent, either pale or with a pruinose, waxy coat on lower

- surface; inflorescence and flower buds tan-brown, appressed-puberulent; calyx
splitting in 3–5 lobes 11
11. Stipe subsessile, not longer than 1 mm long 12
11. Stipe longer than 1 mm long 13
12. Leaflets 10–12 × 6–7.5 cm, obtuse-mucronulate to rounded, pale on the lower
surface with a pruinulose, waxy coat; calyx tube cupular, 7–8 × 9 mm at anthesis;
petals ca. 15 mm long and strongly cucullate; stipe 1 mm long *A. occidentalis*
12. Leaflets 16–17 × 7–8 cm, obtuse-acuminate, concolorous and slightly shiny, waxy
coat not prominent on lower surface; calyx tube funnel-shaped, 10 × 8–9 mm at
anthesis; petals 20–25 mm long and somewhat flattened; stipe 7–15 mm *A. latifolia*
13. Petals 3 or 4 (6 in *A. elliptica*) 14
13. Petals 5 or 6 15
14. Leaflet venation strongly raised, conspicuous on both surfaces; petals 2–2.5 × 1–1.8
cm; leaflets 7.5–18 × 4.5–9 cm, oblong to oblong-ovate, scantily appressed-
puberulent but shiny and the same color on the lower surface *A. reticulata*
14. Leaflet venation inconspicuous, usually obscure on upper surface; petals 1–2 cm
long; leaflets 8–9 × 5–6 cm, elliptic, obtuse to rounded at the apex, glaucous-
beneath *A. elliptica*
15. Leaflets acute to acuminate apically, markedly discolor 16
15. Leaflets obtuse to rounded-obtuse, concolorous to only slightly discolor 17
16. Leaflets tessellate and glaucous appressed-puberulent on lower surface; petals 5, 2–
2.3 cm long *A. discolor*
16. Leaflets not tessellate, golden-pubescent on lower surface; petals 6, ca. 1.8 cm long .
..... *A. aurea*
17. Branchlets, petioles, rachis, and pulvinules densely golden pubescent, glabrous

- when mature; the pulvinules 10–25 mm long; leaflets broadly ovate to orbicular;
 petals 5 *A. paulberryi*
17. Branchlets, petioles, rachis, and pulvinules glabrous; the pulvinules 8–20 mm long;
 leaflets oblong; petals 5 18
18. Leaflets oblong or oblong-ovate, 11–22 × 5.5–10.5 cm; inflorescences in racemes,
 sometimes with multiple axes growing from the same point, flowers 3–5 × 2.5–5.5
 cm *A. insignis*
18. Leaflets elliptical or lanceolate-oblong, 8.5–10 × 3.5–4.5 cm; inflorescences
 paniculate, flowers 1.5–3 × 1–2.5 cm, elongate 19
19. Leaflets lanceolate-oblong, 8–16 × 3–4 cm; inflorescences loosely paniculate, ca. 30
 cm long, pulvinules 10 mm long *A. polyphylla*
19. Leaflets elliptical, 8.5–10 × 3.5–4.5 cm; inflorescences paniculate, 15–23 cm long,
 pulvinules 15–20 mm long *A. petiolulata*

ALDINA AUREA R.S.Cowan, Mem. New York Bot. Gard. 10 (1): 145. 1958. TYPE:

VENEZUELA. Terr. Amazonas, Along left fork of Caño Yutaje, Cerro Yutaje,
 1250 m, 12 Feb 1953, *B. Maguire & C.K Maguire 35186* (holotype: NY barcode
 NY00231174!; isotypes: F photo barcode F0058821F!, K barcode
 K000500850!, S photo barcode S-R-9321!, US barcode US00002864!, VEN
 photo barcode VEN43757!).

Distribution and Habitat—This species is only known from Venezuela, where
 the type collection was made at the tepui Cerro Yutaje at 1250 m elevation.

Taxonomic Comments—*Aldina aurea* can be readily distinguished from all
 other species in the genus by the conspicuously glaucous lower surface of the leaflets, a
 character that is otherwise only found, though more discretely, in *A. discolor* and *A.*

elliptica. The latter species was described from the same tepui as *A. aurea*. The typical tessellate pattern on the abaxial surface of the broadly oblong leaflets of *A. discolor* is not found in *A. aurea*. *Aldina elliptica* has markedly elliptical leaflets, in comparison to the oblong-lanceolate to somewhat narrowly oblong leaflets of *A. aurea*.

Aldina auyantepuiensis (Pittier ex H.S.Irwin) G.Ramos & D.B.O.S.Cardoso, **comb.**

nov., Third Conf. Interamer. Agric. Caracas, 365. 1945. TYPE: VENEZUELA.

Bolivar: Cumbre del cerro Guaiquinima, a lo largo del afluente del río Carapo, 1 km río arriba del Salto Szczerbanari, 5°44'4"N, 63°4'8"W, parte sur-oriental del cerro, 730–750m, 23-24 May 1978 (fl, fr), *J.A. Steyermark, P. Berry, G.C.K. & Dunsterville 117245* (lectotype [here designated]: US barcode US00459404!; isolectotype: MO barcodes MO2781106 & MO2781107!).

Aldina latifolia Benth. var. *auyantepuiensis* Pittier ex H.S.Irwin, *Acta Bot. Venez.* 2(5–8): 225. 1967. TYPE: VENEZUELA. Bolivar: Auyan-tepui, vecindades de Guayaraca, en la primera (inferior) meseta (hombrilo) arriba del valle de Kamarata, seccion pedregosa, en bosque enano, 1,000 m, 18 May 1964, *J.A. Steyermark 94191* (holotype: NY!; isotypes: F barcode F0058831F photo!, K barcode K000500828!, US barcode US00002859!), **syn. nov.**

Aldina auyantepuiensis Pittier, Third Conf. Interamer. Agric. Caracas, 365. 1945. TYPE: VENEZUELA. Guayana: altiplanice del Auyantepui, 1000 m., sobre arenizcas, 5 May 1937, *F. Cardona 41* (holotype: NY!), nom. nudum.

Aldina auyantepuiensis is a tree up to 20 m tall and is readily distinguished from all other *Aldina* species by the unique combination of unifoliolate, ovate-oblong leaves measuring 8–15 × 3–7.5 cm, these often clustered at the tips of the branchlets, commonly close to the inflorescences; the pubescence of the fruit from development to

maturity is also a noteworthy trait that distinguishes the species from its tepui counterparts.

Distribution and Habitat—This species is known from three tepuis in Venezuela, growing on the summits of Auyan tepui and its two neighboring tepuis Guaiquinima and Acopán at elevations ranging from 730–1600 m elevation.

Representative Specimens Examined—**Venezuela**—BOLIVAR: Cumbre del cerro Guaiquinima, a lo largo del afluente del río Carapo (1 km río arriba del Salto Szczerbanari) y los penascos de arenisa al sur del río, 5°44'4"N, 63°41'8"W, parte sur-oriental del cerro, 730–750 m, 23-24 May 1978 (fl, fr), *J.A. Steyermark, P. Berry, G.C.K. & E. Dunsterville 117301* (US); Mount Auyantepui, among sandstone rocks, 1000 m, 5 May 1937 (fl), *F. Cardona 41* (US); Icabarú, carretera Santa Elena de Uairen, km 90, 14-16 Dec 1969 (fl), *L.M. Berti & J.B.B. 2508* (US); Auyantepui, crece en pequeño bosque en la terasa de Guayaraca, 1100 m, Apr 1956 (fl), *Vareschi & Foldats 4687* (NY); Caroni, Guayana, Cerro Acopán, 1600 m, Oct 1947 (st), *F. Cardona 2258* (US).

Taxonomic Comments—*Aldina auyantepuiensis* was first noted as a distinct species by Pittier et al. (1945). Pittier's binomial is a *nomen nudum* according to Art. 38 of the International Code of Nomenclature for algae, fungi, and plants (Turland et al. 2018), because the publication does not provide a description or diagnosis of the taxon in the protologue nor by reference to a previous valid publication. Therefore, the name *Aldina auyantepuiensis* Pittier is invalid.

Later, Irwin (1967) recognized *A. auyantepuiensis* as the variety *Aldina latifolia* var. *auyantepuiensis* Pittier ex H.S.Irwin and used the combination of unifoliolate leaves and the pubescence of the developing fruit to differentiate the new taxon from the typical variety, *A. latifolia* var. *latifolia*. The glabrescent fruits of *A. latifolia* are only

found in the very early expansion of the ovary towards fruit maturity, whereas the developed fruits of the newly recognized variety have persistent hairs. The clustering of unifoliolate leaves at the branch apices is only seen elsewhere in *A. heterophylla* and *A. berryi*, but these two species are clearly distinct.

We recognize *Aldina auyantepuiensis* at species level based on the unique combination of unifoliolate leaves concentrated at the tip of the branchlets, fruits with an appressed indumentum, and often axillary racemes. *Aldina auyantepuiensis* is morphologically similar to *A. berryi*, also from Guaiquinima tepui, but it can be distinguished by its developing fruits with appressed golden hairs (vs. fruits dark brown and glabrous in *A. berryi*), and its exserted ovary, with golden appressed hairs, and borne on a 12–15 mm long stipe and with appressed golden hairs (vs. ovary non-exserted, glabrous, and borne on ca. 5 mm long, glabrous stipe). Both species have glabrous unifoliolate leaves, but these are more evidently clustered at the branch apices in *A. auyantepuiensis*, which has mostly ovate leaflets (vs. ovate or oblong-ovate in *A. berryi*).

ALDINA BARNEBYANA M. Yu. Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 94(2): 270 (–271). 2009. TYPE: VENEZUELA. Bolivar, Dto Heres. Base central de Guaiquinima-Tepui, bosques húmedos primarios, ao largo de la quebrada, El Trueno 90 km al S de la Paragua. A 500 msnm, aprox. 6°4' ; 63°22'. 6°4', 12 Mai 1987, G. Aymard 5771 (holotype: NY barcode NY00231163!; isotypes: FLAS photo barcode FLAS199545!, MO barcode 3590503!).

Distribution and Habitat—This species is only known from Venezuela, where it grows in primary forest at 500 m elevation on the Guaiquinima tepui.

Taxonomic Comments—*Aldina barnebyana* is only known from its type collection and can be readily distinguished from other tepui species by having oblong-ovate leaflets, a glabrous peduncle and long pedicels and stipe.

ALDINA BERRYI R.S.Cowan & Steyerl., Ann. Missouri Bot. Gard. 71(1): 312–313.

1984. TYPE: VENEZUELA. Bolivar, cumbre, Cerro Guaiquinima, sector suroeste central, bosque de galeria y bosque alto a lo largo del afluyente suroccidental del Rio Carapo, common in the tall forest of trees 20-25 m tall, 950 m, 5°45'N, 63°35'W, 26 May 1978, J.A. Steyerl., P. Berry, G.C.K. Dunserville & E. Dunserville 117468 (holotype: NY barcode NY00215052!; isotypes: NY barcode NY00005016!, MO barcode 3242296!, U photo barcode U0003459!, US barcode US00090965!).

Distribution and Habitat—This species is endemic to the state of Bolivar in Venezuela. The type collection was recorded from Cerro Guaiquinima at 950 m elevation. Two other collections, Cerro Kampe (*O. Huber 12071*) and Cerro Camaron (*G. Aymard & A. Fernandez 7104*), suggest that the species prefers to grow at high altitudes around 850-950 m elevation.

Representative Specimens Examined—**Venezuela.**—BOLIVAR: Distrito Heres, arbustales densos sobre dorso de cuesta inclinado hacia el NW, a aprox. 5 km al WNW del caserío de Chiguao, 06°07'N, 63°05'W, 800 m, 10 May 1987 (fl), *O. Huber 12221* (NY!, US!); Bolivar, Distrito Heres, cumbre del Cerro Kampe, dorso de cuesta ubicado a 25 km al SE de la punta SE del Cerro Guaiquinima, aprox. 70 km al SW del caserío Chiguao, 05°36'N, 63°21'W, 950 m, 04 May 1987 (fl), *O. Huber 12071* (NY!); Arbustales e bosques sobre altiplanice de arenisca de grano grueso en la cumbre del

Cerro Camaron (al S-W del complejo Guaiquinima tepui), 29 Oct 1988 (fl), 850 m, G. Aymard & A. Fernández 7104 (MO!).

Taxonomic Comments—*Aldina berryi* is distinct from the other species in the genus by its unique combination of glabrous vegetative parts and dark brown, glabrous ovary. These features are otherwise only found separately in *A. microphylla* (glabrous leaflets), *A. heterophylla* (glabrous leaflets), *A. latifolia* (glabrous leaflets), and *A. macrophylla* (glabrous and dark brown ovary). The leaflets of *A. berryi* are plain whereas in *A. heterophylla* they are boat-shaped, furthermore the inflorescence of the latter is very distinctive. When compared to *A. microphylla*, the leaflets of *A. berryi* are bigger $7\text{--}9.5 \times 3\text{--}5$ (vs. $4.5\text{--}7 \times 2.2\text{--}3.8$ cm) and different in shape from ovate to oblong-ovate (vs. elliptic, oblong or ovate). The fruits of *A. berryi* are rounded whereas in *A. latifolia* they are found rounded and with a spongy mesocarp adapted to floatation. *A. berryi* is distinguishable from *A. macrophylla* by having a glabrous stipe (vs. appressed pubescent golden stipe) (Fig. 4).

ALDINA DIPLOGYNE Stergios & Aymard, Harvard Papers in Botany, 13(1): 29–33. 2008.

TYPE: VENEZUELA. Bolivar: municipio Heres, cumbre del cerro Kampe; 25 km al SE de la punta y SE del Cerro Guaiquinima, 70 km al SO del caseiro Chiguao, $05^{\circ}87'N$, $63^{\circ}21'W$, 900 m, 14 May 1987, O. Huber 12072 (holotype: NY barcode NY03754824!; isotypes: MO barcode MO3891114!, NY barcodes NY00231161! & NY00231162!).

Distribution and Habitat—This species is endemic to the state of Bolivar in Venezuela. *Aldina diplogyne* is known only from the Guaiquinima tepui, where the species is found in shrubby savannas over sandstone outcrops at 300–900 m elevation.

Representative Specimens Examined—Venezuela.—BOLIVAR: distrito Heres, savanas arboradas sobre areniscas conglomeraticas, 2 km de la margem izquierda del medio Rio Paragua, 102 km al S-M de la Paragua, 06°01'N, 63°47'W, 300 m, 14 May 1987 (fl, fr), *G. Aymard 5959* (NY, MO); Distrito Piar, arbustal sobre dorso de costa en la Serrania Senkopiren, aprox. 5 km al E del Rio Caroni y la 35 km al S de Canaima, 05°55'N, 62°48'W, 900m, Jul 1989 (fl, fr), *O. Huber 12965* (NY); P.N. Canaima, río Cucurital, oeste de la meseta Auyántepeui, 05°54'N, 62°00'W, 430 m, 2 Apr 2000 (st), *R. Duno & R. Riina 1392* (VEN).

Taxonomic Comments—*Aldina diplogyne* is clearly distinct by its large showy flowers with a remarkable multicarpellate gynoecium bearing 2–4 functional pistils per flower (Fig. 4). Although this species resembles *Aldina latifolia* Spruce ex Benth. and *Aldina insignis* Endl. by their large mature flower buds, its multicarpellate gynoecium is enough to separate it from both species. Moreover, the flower pedicels of *A. diplogyne* are longer and strongly vertically striate or wrinkled. There is one collection of *A. insignis* (*N.Y. Sandwith 1574*) with a 2-pistillate gynoecium, reinforcing the similarity with *A. diplogyne*, but new collections are needed to determine if that is a consistent character. The woody fruits of *A. diplogyne* are also unique, having a botuliform shape, sometimes constricted between seeds, densely covered with a short ferrugineous-puberulent indumentum, although glabrescent when mature.

ALDINA DISCOLOR Spruce ex. Benth., Fl. Bras. 15(2): 12. 1870. TYPE: BRAZIL.

Amazonas, “*prope Panuré ad Rio Uaupés*”, Oct 1852–Jan 1853, *R. Spruce 2802* (lectotype [here designated]: K barcode K000500840!; isolectotypes: BM barcode BM000931991 photo!, BR barcodes BR5189557 photo! & BR5189885 photo!, E barcode E00663841!, F barcode F0058822F photo!, GH barcode

GH00057521 photo!, LD barcode LD1757043 photo!, K barcodes K000500841!
& K000500842!, NY barcode NY00231172!, P barcodes P02771882! &
P02771883!, TCD barcode TCD0004615 photo!).

Aldina stergiosii M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 91:
314. 2006. TYPE: BRAZIL. Amazonas: Upper Rio Negro basin. Morro de Seis
Lagos., s.d., A.C. Weber & A. Knob 1717 (holotype: NY barcode
NY01163747!), **syn. nov.**

Distribution and Habitat—This species is widely distributed in the lowland
white-sand forests of the northwestern part of the Amazon basin of Brazil, Venezuela,
and Colombia. Ter Steege et al. (2013) listed *A. discolor* as a hyperdominant species of
the Amazon basin. This was confirmed by our fieldwork along the upper Rio Negro,
where the species is frequent in the region of São Gabriel da Cachoeira and the Vaupés
river system.

Representative Specimens Examined—**Brazil.**—AMAZONAS: São Gabriel da
Cachoeira, Alto Rio Negro, Itacoatiara-mirim, 00°09'56"S, 66°59'54"W, 5 Apr 2013 (fl),
D. Cardoso et al. 3391 (ALCB, HUEFS, INPA); São Gabriel da Cachoeira, Alto Rio
Negro, Serra da Bela Adormecida, 00°16'27"S, 66°50'15"W, 1 Apr 2013 (fl), *D.*
Cardoso et al. 3358 (ALCB, HUEFS, INPA); São Gabriel da Cachoeira, Rio Uaupés,
Ipanuré, caminho para Cova do Diabo, 17 Nov 1987 (fl, fr), *H.C. de Lima et al. 3245*
(NY, RB); São Gabriel da Cachoeira, Lago Amaro, embocadura do igarapé Tuari, 6
Nov 1987 (fr), *C. Farney 1912* (INPA, MO, NY); São Gabriel da Cachoeira, upper Rio
Negro Basin, 00°18'N, 66°42'W, s.d. (fl), *A.C. Weber & A. Knob 1717* (NY!).

Venezuela.—AMAZONAS: Rio Casiquiare, sabanas arbustivas com arena blanca del
Caño Momoni, 10–22 Feb 1989 (fl), *B. Stergios et al. 13238* (US); ANTURES: Santa
Rosa de Ucata, 04°24'N, 67°48'W, Apr 1989 (fr), *G.A. Romero et al. 1869* (NY); San

Francisco del Sipapo, arbustal de areia branca, 04°33'N, 67°38'W, s.d. (fr), *P. Berry et al.* 5455 (MO). **Colombia**.—GUAINIA: Rio Guaviare, 31 May 1976 (st), *R.T. Alvaro* 437 (INPA); Guaviare, Rio Inirida, 31 Mai 1976 (st), *R.T. Alvaro* 396 (INPA).

Taxonomic Comments—This species has been frequently misidentified as *A. heterophylla* (e.g., *Stropp 2014*) when sterile because of their shared distribution in white-sand forests and the superficial similarity of their leaves. However, *A. discolor* is found in the white-sand forests of the upper Rio Negro, extending to western Amazonia whereas *A. heterophylla* is only found in the campinaranas of Manaus, Presidente Figueiredo, and surrounding areas of the lower Rio Negro. Moreover, the leaflets of *A. discolor* are covered by white to golden appressed hairs on the lower surface and are broadly oblong or ovate with a rounded to short-acuminate apex, whilst those of *A. heterophylla* are narrowly ovate to oblong-lanceolate with a short-acuminate apex and are completely glabrous. A subtle to dense white-wax coat can also be found on the lower leaflet surface of *A. discolor*. On the leaflets of *A. heterophylla* the wax is arranged in minute, obscure white dots. Floral morphology also distinguishes the species; *A. heterophylla* bears the smallest flower buds in the genus 0.5–0.8(–1) cm long (vs. 1–2.5 cm long in the other species) that are attached to the inflorescence axis in a nodding position (vs. patently attached in *A. discolor*). In addition, the number of stamens per flower in *A. discolor* is higher than in *A. heterophylla* (ca. 60 vs. ca. 36) (Fig. 3).

Aldina stergiosii is newly synonymized here as it shares with *A. discolor* similar racemose inflorescences, generally with multiple axes growing from a single point, ovate leaflets with rounded bases and short acuminate to rounded apices and somewhat tessellate abaxial surfaces.

ALDINA ELLIPTICA R.S.Cowan, Mem. New York Bot. Gard. 10(1): 146. 1958. TYPE:

VENEZUELA. Terr. Amazonas, near Intermediate Camp, Cerro Yutaje, 1,000 m, 4 Feb 1953, *B. Maguire & C.K. Maguire 35055* (holotype: NY barcode NY00231170!; isotypes: F barcode F0058825F photo!, G barcode G00364668 photo!, K barcodes K000500849! & K000500848, RB barcode RB00539361!, S barcode S-R-9322 photo!, US barcode US00002863!, VEN barcode VEN43758 photo!).

Distribution and Habitat—This species is distributed in Venezuela and was described from the same mountain as *A. aurea*, Cerro Yutaje. In the original publication of *A. elliptica*, the species is described as a dominant tree, growing at 1000 m elevation.

Representative Specimen Examined—**Venezuela.**—AMAZONAS: Antures, 12 km WSW of Cerro Autana, 150 m, 16 Jul 1980 (fl), *O. Huber & S.S. Tillett 5370* (US).

Taxonomic Comments—This distinctive species is similar to *A. discolor* but distinguishable by its elliptical leaflets with rounded to obtuse apices, and smaller petals. Additionally, *A. elliptica* leaflets are evenly glaucous beneath, and not tessellate as in *A. discolor*. *Aldina aurea*, a species from the same tepui complex, also shares the glaucous abaxial leaflet surfaces, but the leaflets of *A. elliptica* are markedly elliptic whereas those of *A. aurea* are oblong-lanceolate.

ALDINA HETEROPHYLLA Spruce ex Benth. Fl. Bras. 15(2):13. 1870. TYPE: BRAZIL.

Amazonas, “*in vicibus Barra, Prov. Rio Negro*”, Feb 1851, *R. Spruce 1369* (lectotype [here designated]: K barcode K000500846!; isolectotypes: BM barcode BM000931996 photo!, E barcode E00663842!, F barcodes F0058826F photo! & F0BN001879F photo!, FI barcode FI004899 photo!, G barcode G00364480 photo!, GH barcode GH00057522 photo!, GOET barcode

GOET004631 photo!, K barcode K000500847!, LD barcode LD1775203 photo!, LE barcode LE00002441 photo!, NY barcode NY00231173!, P barcodes P02771877! & P02771878!, RB barcode RB00539362, TCD barcode TCD0004616 photo!).

Distribution and Habitat—This species is only known from Brazil in the lowland white-sand forests of Manaus, Presidente Figueiredo and their surrounding vicinities in the state of Amazonas. *Aldina heterophylla* is usually found in large populations and in association with ectomycorrhizal fungi of the genus *Cantharellus* sp.

Representative Specimens Examined—**Brazil**.—AMAZONAS: Manaus, Reserva de Desenvolvimento Sustentável do Tupé, margem do Rio Negro, 2°58'56"S, 60°14'27"W, 24 Mar 2013 (fl), *D. Cardoso et al.* 3288 (ALCB, HUEFS, INPA); Manaus, Reserva Floresta Adolpho Ducke, Marco 264, 02°55'46"S, 59°58'29"W, 8 Nov 2008 (st), *L.P. de Queiroz et al.* 13900 (HUEFS); Manaus, Itacoatiara, Reserva Florestal Adolpho Ducke, km 26, 02°53'S, 59°58'W, 12 Feb 1995 (fl), *Hopkins, M.J.G. et al.* 1542 (RB, INPA, IAN, K, MBM, MO, NY, SP, U); Presidente Figueiredo, Rodovia para Balbina, estrada vicinal do km 13, 02°00'58"S, 59°54'26"W, 18 Feb 2016 (fl), *H.C. de Lima & P. Assunção* 8199 (RB); Manaus, Campus do INPA, Reserva Biológica de Campina, BR 174, km 60, 02°38'00"S, 60°01'00"W, 8 Mar 1996 (fl), *C.A.C. Ferreira* 11216 (INPA); Acajatuba, Margem S do Rio Negro, 03°03'S, 60°36'W, 20 Apr 1986 (fl), *G.T. Prance et al.* 29957 (K, NY, US); Presidente Figueiredo, 4 km da margem esquerda do Rio Uatumã, 01°02'S, 59°60'W, 23 Mar 1986 (fl), *C.A.C. Ferreira et al.* 6966 (INPA, K, NY, US); Presidente Figueiredo, Rio Uatumã, Igarapé Capitu, 01°02'S, 59°60'W, 29 Mar 1986 (fl), *C.A.C. Ferreira et al.* 7016 (HUEFS, INPA, K, NY, US).

Taxonomic Comments—When flowering, *A. heterophylla* is distinguished from the other species of the genus by its dense branched panicles, and the attachment of its subglobose small flower buds (ca. 8 mm long) that are deflexed on the inflorescence axes (Fig. 2). Furthermore, the leaflets are generally boat-shaped (navicular) (Fig. 3) with the abaxial face subtly dotted with white wax. *Aldina heterophylla* is morphologically similar to *A. occidentalis* Ducke in inflorescence structure and small flower buds, but the leaflets of *A. heterophylla* are completely glabrous, whereas those of *A. occidentalis* are pubescent abaxially. The differences in flower bud size and vegetative traits are sufficient to separate the two species.

ALDINA INSIGNIS (Benth.) Endl., *Allania insignis* Benth., Repert. Bot. Syst. 1(5): 843.

1843. TYPE: GUYANA. On the upper Essequibo and Rupununi, 1838, *R.H. Schomburgk 524* (holotype: K barcode K000500844!; isotypes: BM barcode BM000931995 photo!, E barcode E00663843!, F barcode V0058827F & V0058828F photos!, G barcode G00364792 photo!, GH barcode GH00057523 photo!, K barcodes K000500843 & K000500845, NL barcode 601280 photo!, NY barcode NY00231168!, P barcode P02771875!, TCD barcode TCD0004619 photo!, US barcodes US00002862 & US00459387!).

Aldina insignis var. *retusa* R.S.Cowan, Mem. New York Bot. Gard. Bot. 8: 105. 1953.

TYPE: GUYANA. Makreba falls, Kurupung river, upper Mazaruni region, 25 Feb 1939, *A.S. Pinkus 266* (holotype: NY barcode NY00231166!; isotypes: MO barcode MO1174963!, US barcodes US00002861 & US00459389!), **syn. nov.**

Distribution and Habitat—This species is only known from Guyana, where specimens have been collected along the riverbanks and rapids of the Essequibo, Ireng, Kurupung, Kuribrong, and Rupununi rivers in the Mazaruni and Potaro-Siparuni region.

Aldina insignis is commonly found along the riverbanks of the Makouria river, a tributary of the Essequibo, and frequently along the Ireng river, between Waipa and Sand Hill rapids. The collection *Pires et al. s.n. US no. 13943* from Roraima, Brazil was originally identified as *A. insignis*, but after analyzing the material we correct its identification to *A. latifolia*.

Representative Specimens Examined—Guyana: Ireng river, between Waipa and Sand Hill rapids, southern Pakaraima mountains, 19 Sep 1961 (fl), *B. Maguire 46236* (US, NY); Sukabi river, affluent of Ireng river, Ando savanna, southern Pakaraima mountains 16 Sep 1961 (fl), *B. Maguire 46212* (US); Essequibo river, Makouria river, frequent on riverbanks, Sep 1937 (fl), *N.Y. Sandwith 1574* (NY); Upper Mazaruni river region, between Kako and Akawaio indian village on the Kako river near its junction with the Mazaruni river and Karowtipu, 05°45'N, 60°35'W, 500 m, s.d. (fl, fr), *B. Boom 7317* (NY); Potaro-Siparuni, Kuribrong river, V-4 8, 05°23'48''N, 59°32'00''W, 01 Apr 2011 (fl), *C.E. Zartman et al. 9420* (INPA).

Taxonomic Comments—The showy, large flowers of *A. insignis* resemble *A. diplogyne*. Indeed, these are the two species with the largest flowers (3–6 cm long) in the genus. However, the flower buds of *A. insignis* are broader, globose and borne on slightly shorter pedicels. Furthermore, *A. insignis* does not have a multicarpellate gynoecium as in *A. diplogyne*.

Aldina insignis var. *retusa* was described based on its retuse leaflet tips, but some specimens have a mixture of acuminate and retuse apices. Also, a second character used to separate the variety, ‘thin walled trichomes collapsing after drying’ (Cowan, 1953), was not consistent, but the result of the drying process of the specimen. In consequence, the variety is placed into synonymy here.

ALDINA KUNHARDTIANA R.S.Cowan, Mem. New York Bot. Gard. 8(2): 106. 1953.

TYPE: VENEZUELA. Territorio Amazonas: Cerro Sipapo (Paráque), small tree in mixed forest, inflorescence and calyx brown, petals and stamens white, Base Camp and Intermediate Camp, 21 Jan 1949, *B. Maguire & L. Politi 28485* (holotype: NY barcode NY00231178!; isotypes: BM barcode BM000931994 photo!, COL barcode COL00001691 photo!, F barcode F0058829F photo!, K barcode K000500830!, MO barcode MO022350!, NY barcode NY00005017!, RB barcodes RB00548722 & RB00549497!, US barcode US00002860!).

Distribution and Habitat—*Aldina kunhardtiana* is distributed in the lowlands of Brazil, Colombia, and Venezuela, in terra-firme forests. It is frequently found in mixed non-inundated forests on red clay soils and occasionally along non-inundated river-banks.

Representative Specimens Examined—**Brazil.**—AMAZONAS: Alto Rio Negro, São Gabriel da Cachoeira, comunidade Itacoatiara-Mirim, 00°09'43"S, 67°00'30"W, 28 Mar 2013 (fl), *D. Cardoso et al. 3300* (ALCB, HUEFS, INPA); Rio Negro, Rio Arary, Cachoeira do Uapuhy, terra alta, argila, 2 Oct 1952 (fl), *R.L. Froés 21317* (IAN, US); São Gabriel da Cachoeira, estrada para Cueui, BR 307, destacamento do Matarucá, 28 Nov 1987 (fl), *H.C. de Lima 3336* (INPA, MO, NY, RB); São Gabriel da Cachoeira, foz do Rio Içana, acima da comunidade Boa Vista, 00°29'18"N, 67°21'20"W, 28 Nov 1987 (fl), *H.C. de Lima 3160* (INPA, RB). **Venezuela.**—AMAZONAS: Yatua-Casiquiare, Rio Pacimoni, 12 Jan 1958 (fl), *B. Maguire 42622* (IAN, NY, RB, US); Yavita-Maroa road, ca. 5 km west of Yavita, 2°53'39"N, 67°27'57"W, 23 May 1996 (st), *G. Aymard et al. 11033* (MO). **Colombia.**—GUAINIA: Guaiania River, along River Maroa and Victorino, 4°57'00"N, 67°24'00"W, 14 Apr 1953 (fr), *B. Maguire & J.J. Wurdack 35714* (NY, US);

Vaupés, Rio Negro, San Felipe, 01°54'47"N, 67°03'39"W, 12 Dec 1947 (fl), *R.E. Schultes & F. López 9345* (US).

Taxonomic Comments—*Aldina kunhardtiana* is distinct by the velvety, brown-colored indumentum of its inflorescences. Furthermore, the species has multi-jugate leaves (up to 11-foliolate) (Figs. 2 and 3) and the leaflets can be easily recognized by the indumentum on the abaxial surface with an even layer of white wax and erect contorted golden-brownish curly hairs (Fig. 4). There are only two other species, *A. insignis* and *A. polyphylla*, that have multi-jugate leaves as in *A. kunhardtiana*, but the indumentum of *A. kunhardtiana* is unique.

ALDINA LATIFOLIA Spruce ex Benth., Fl. Bras. 15(2): 12. 1870. TYPE: BRAZIL.

Amazonas, Manaus, “*in vicinibus Barra, Prov. Rio Negro, high rocky shores*”, 1851, *R. Spruce 1355* [lectotype (designated by Ramos and Cardoso 2016): K barcodes K000500834 & K000500835! [two sheets]; isolectotypes: BM barcode BM000931993 photo!, F barcode F0058830F photo!, FI barcode FI004910 photo!, GH barcode GH00057524 photo!, LD barcode LD1756979 photo!, LE barcode LE00002442 photo!, NY barcode NY00231179!, OXF!, P barcodes P02771864 & P2771872!, TCD barcode TCD0004618 photo!.

Aldina latifolia var. *pubescens* R.S.Cowan, Mem. New York Bot. Gard. 8(2): 107.

1953. TYPE: BRAZIL. Amazonas: “*Prope San Gabriel da Cachoeira, ad Rio Negro, Brasiliae Borealis, Jan-Aug 1852*”, *R. Spruce 2077* (holotype: NY barcode NY00231167!; isotypes: K barcode K000500840!, BM barcode BM000931992 photo!, P barcodes P02771865, P02771866 & P02771867!, TCD barcode TCD0004617 photo!), **syn. nov.**

Aldina amazonica M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 91: 318. 2006. TYPE: BRAZIL. Amazonas: Camanaus, igarapé Caçabu, mata baixa, solo arenoso, 27 Oct 1978, *O.C. Nascimento 813* (holotype: US barcode US00459450!), **syn. nov.**

Aldina rio-negrae M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 94(2): 271. 2009. TYPE: VENEZUELA. Amazonas: Selvas pluviales ribereñas del Rio-Negro, entre S. Carlos de Rio-Negro y la boca de Rio-Cassiquiare. 10-22 Feb 1989, *B. Stergios, G. Aymard, K. Kubitzki & E. Melguera 13096* (holotype: NY barcode NY00231108!), **syn. nov.**

Distribution and Habitat—*Aldina latifolia* is distributed in the lowlands of Brazil, Venezuela, and Colombia. This is the most frequently collected species in the genus, perhaps because of its large and showy inflorescences that stand out against the dark green background of the igapó forests along the Rio Negro, Vaupés, Inírida, Guafnia, Atacavi, and their tributaries. The enlarged hydrochoric fruits of *A. latifolia* have a spongy mesocarp (Fig. 3) to optimize long distance dispersal along rivers and streams. The seeds only germinate once the fruits have settled on a riverbank during the dry season, therefore the species is commonly found along river margins.

Representative Specimens Examined—**Brazil.**—AMAZONAS: São Gabriel da Cachoeira, depois da Ilha das Flores, 00°03'20"N, 67°17'46"W, 8 Apr 2003 (fl), *D. Cardoso et al. 3438* (ALCB, HUEFS, INPA); Manaus, Reserva de Desenvolvimento do Tupé, 03°02'37.1"S, 60°15'12"W, 6 Apr 2018 (fl, fr), *G. Ramos et al. 154* (ALCB, HUEFS, INPA, RB); Manaus, Rio Tarumanzinho, 03°00'52"S, 60°06'01"W, 7 Jul 1976 (fr), *G.T. Prance 23736* (INPA, NY, US). **Venezuela.**—AMAZONAS: San Carlos de Rio Negro, igapó forest along margin of Rio Negro, 0.5 km of Caño Cuweje, 01°56'N, 67°03'W, 2 May 1980 (fr), *J.J. Clark 7556* (MO, NY); Caño Mesaque, a tributary on the

south side of Rio Atacavi, 02°59'50"N, 67°06'05"W, May 1996 (fr), *P. Berry* 6228 (MO); Guaínia River, in forest along Pimichin-Yavita, road near Pimichin, Apr 1953 (fl), *B. Maguire & J.J. Wurdack* 35595 (NY, US). **Colombia.**—VAUPES: Vaupés River, Trubon waterfall, region S-E of Mitu, 01°15'07"N, 70°14'01"W, Nov 1945 (fl), *P.H. Allen* 3404 (US); Mariapiri, Inirida River, Raudal Alto, 02°22'06"N, 69°45'00"W, Feb 1953 (fr), *A. Fernandez* 2080 (US).

Taxonomic Comments—The name *Aldina latifolia* was first used on herbarium labels by Spruce [*Spruce* 1355 (K) and *Spruce* 2077 (OXF)]. Later on, Bentham added another collection by Martius [*Martius s.n.* (M)] to Spruce's collections for the formal description of the species in *Flora Brasiliensis* (1870) with a total of three syntypes. Given the lack of a single type, the name has been recently assigned a lectotype (Ramos and Cardoso 2016).

Cowan (1953) observed that only two species in the genus have glabrous leaflets, *A. latifolia* and *A. heterophylla*, yet he pointed out that these species are so distinct that there is no possibility of confusion. *Aldina latifolia* can be readily distinguished by the combination of its oblong pale yellow flower buds, glabrous leaflets (occasionally pubescent) and hydrochoric fruits with a spongy mesocarp. Cowan described the variety *Aldina latifolia* var. *pubescens* based on a note by Richard Spruce stating that the specimen *Spruce* 2077 might represent a variety based on the longer leaflets and the puberulent indumentum covering the vegetative parts (Cowan 1953). After revision of new collections and comparison with the type material of *A. latifolia* var. *pubescens*, we observed that leaflet size is continuous between the two taxa and the indumentum is ephemeral in the varietal specimens as well as in the typological species, with hairs being naturally caducous or shed after drying. Therefore, these

characters are considered infra-specific variation, and we thus place *A. latifolia* var. *pubescens* in synonymy.

Aldina amazonica M.Yu.Gontsch. & Yakovlev and *Aldina rio-negrae*

M.Yu.Gontsch. & Yakovlev are also synonymized here. *Aldina amazonica* description is based on both collections of *A. latifolia* (*Nascimento 813*) together with *Andira* sp. (*Prance 9049* [fruits], *15011*[leaves]); the two collections of Prance were later on identified as *Andira micrantha* Ducke (Pennington, 2003), therefore the mix of material invalidates the description of *A. amazonica*. *Aldina rio-negrae* is also newly synonymized here given that the characters distinguishing it from *A. latifolia* var. *pubescens* (e.g., leaflet apex attenuate vs. acuminate, flower bud 12 mm long vs. 12–15 mm long, and gynophore 4–5 vs. 2–3 times longer) now fall into a broader concept of *A. latifolia*.

ALDINA MACROPHYLLA Spruce ex Benth., Fl. Bras. 15(2): 13. 1870. TYPE: VENEZUELA.

“*Habitat ad ripas fluminis Pacímoni*”, 1853–1854, *R. Spruce 3349* (lectotype [here designated]: K barcode K000500826!; isolectotypes: BM barcode BM000931990, E barcode E00663845!, F barcodes V0058832F & V28288F, MO barcode MO2840759!, NY barcode NY00231171!, GH barcode GH00057526, LD barcode LD1759076, K barcodes K000500824, K000500825 & K000500827!, P barcodes P02771861, P02771862 & P02771863, RB barcode RB00539364, W barcode W18890004637 photo!).

Aldina aquae-nigrae M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 94(2): 273. 2009. TYPE: VENEZUELA. Amazonas, selva pluviales de rebalse del Bajo Emoni, que desemboca en el Rio Siapa, 18 Feb - 4 Mar 1986, *B. Stergios* & *G. Aymard 9239* (holotype: NY!; isotypes: NY barcodes NY00231160 &

NY00231164!, MO barcode MO5992824!, FLAS barcode FLAS167009

photo!), **syn. nov.**

Aldina yapacanensis R.S.Cowan, Mem. New York Bot. Gard. 8(2): 108. 1953. *Aldina macrophylla* var. *yapacanensis* (R.S.Cowan) Stergios, Fl. Venez. Guayana 5: 248. 1999. TYPE: VENEZUELA. Amazonas, Caño to Cerro Yapacana, along the margin, 6 Jan 1951, *B. Maguire, R.S. Cowan & J. Wurdack 30758* (holotype: NY barcode NY00231176!; isotypes: K barcode K000500829!, US barcode US00002853!, VEN barcode VEN31332 photo!), **syn. nov.**

Distribution and Habitat—*Aldina macrophylla* is only known from Venezuela, occurring in white-sand forests near riverbanks of the rivers Pacimoni, Yatua, Casiquiare, Siapa, and Yapacana and is commonly found in gallery forests on white sand along canyons. The species was previously recorded in Brazil based on the single collection *Schultes 9936*, but after detailed examination this collection is reidentified as *A. latifolia*.

Representative Specimens Examined—**Venezuela.**—AMAZONAS: Rio Pacimoni – Yatua, Casiquiare, occasional on near Rio Yatua, 01°28'32"N, 66°29'00.0"W, 100–140 m, 6 Feb 1954 (fl), *B. Maguire 37553* (RB, NY); Rio Siapa, edge of savanna on left bank of Cano Hechimoni 8 km above mouth, 01°56'24"N, 66°4'20"W, Feb 1954 (fl), *B. Maguire 37620* (NY); Rio Siapa, edge of savanna on left bank of Cano Hechimoni 8 km above mouth, 100–130 m, 01°56'24"N, 66°04'20"W, *B. Maguire 37618* (NY); Along river Yapacana cano from laguna to junction with river, alto rio Orinoco, 150 m, 20 Mar 1953 (fl), *B. Maguire 34586* (US, NY); Rio Siapa, Selvas ribeirinhas do Rio Emoni, afluente do Rio bajo Siapa, 02°10'N, 66°18'W, 22 Jan 1992 (fl), *B. Stergios et al. 15499* (MO, NY); Atabapo, southeastern bank of the middle part of caño yagua at cucurital de yagua, 03°36'N, 66°34'W, 120 m, 8 May 1979 (fl), *G. Davidse 17344* (US);

Rio Cassiquiare, sabana arbustiva de arena blanca, 8 vueltas arriba de la boca en el Caño Chimoni (“Sabana de Basil”), 02°01'60"N, 66°24'00.0"W, 10 to 22 Feb 1989 (fl), *B. Stergios* 13285 (US); Rio Pacimoni, Gallery forest on and around small rock islands, white sand and rocks, 01°44'19"N, 66°30'26"W, 86 m, 26 Jan 2005 (fl), *K.M. Redden* 3342 (US); Rio Dimiti, rio Negro basin, 00°42'37"N, 66°38'28"W, 12 May 1948 (fr), *R.E. Schultes* 9936 (US).

Taxonomic Comments—The glabrous and dark brown ovary of *A. macrophylla* and appressed golden hairs covering the stipe are the strongest distinguishing characters of the species (Fig. 4). A glabrous ovary has also been reported in *A. yapacanensis* (Cowan et al. 1953), although the name was reduced to synonymy of *A. macrophylla* (Cowan et al. 1958) due to the continuous variation in flower parts and leaflets. Later, Stergios (in Steryermark et al. 1999) suggested *A. yapacanensis* should be treated at varietal level within *A. macrophylla* based on the attachment of the bracteoles on the peduncle, the pubescence of the gynophore, and whether it is exserted. However, these characters are not consistent, since they vary according to the developmental stage of the flower, thus we synonymize Stergios’ variety. *Aldina aquae-negrae* M.Yu.Gontsch. & Yakovlev was recognized based on leaflet size and style length. However, both characters vary continuously between it and *A. macrophylla* and are of no taxonomic value. In addition, the glabrescent ovary supports the synonymy of this name under *A. macrophylla*, since the character is only found elsewhere in *A. berryi*, which is not found anywhere else in the genus.

ALDINA MICROPHYLLA M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow &

Leningrad) 91: 319. 2006. TYPE: BRAZIL. Amazonas: Serro Araca, W slope of southern massif, montane humid forest below wall, top of western serra, 800 m,

0°40'N, 63°18'W, 20 Mar 1984, *J. Pipoly & G. Samuels 6846* (holotype: US barcode US00459448!; isotype: INPA barcodes INPA196430 & INPA 134109!).

Distribution and Habitat—This species is only found in Brazil and has been recorded from the Serra do Aracá tepui. The few records of *A. microphylla* indicate that the species occurs at elevations of 800 m elevation in montane humid forest on the slopes and summit of the tepui.

Representative Specimen Examined—**Brazil**.—AMAZONAS: Serra do Aracá, platô (ou encosta?), 200 km ao Norte de Barcelos, Mar 1984 (fl), *M.G. da Silva 7151* (INPA, K, NY).

Taxonomic Comments—This species is vegetatively similar to *A. heterophylla*, especially in its small glabrous leaflets. The inflorescence of *A. microphylla* is racemose whereas *A. heterophylla* has dense panicles. Another difference between the two species is that *A. microphylla* bears larger, patent flower buds (13–20 mm long) versus the small, deflexed buds (5–10 mm long) of *A. heterophylla*. The two species also differ in their ecology; *A. microphylla* is often associated with montane forests while *A. heterophylla* grows in lowland sandy forests.

ALDINA OCCIDENTALIS Ducke, Arq. Inst. Biol. Veg. 4(1): 16–17. 1938. TYPE: BRAZIL.

Amazonas: São Paulo de Olivença, Rio Solimões, “*silva terris altis loco humido prope rivulum*”, 27 Feb 1932, *A. Ducke s.n. RB no. 24051* (lectotype [here designated]: RB barcode RB00539365!; isolectotypes: K barcode K000500833!, P barcode P02771859!, RB barcode RB00545298!, S barcode S-R-9324 photo!, U barcode U0003460 photo!, US barcode US00002858!).

Distribution and Habitat—This species is only known from São Paulo de Olivença in the western Brazilian Amazon. The two known collections of *Aldina occidentalis* describe the species as occurring in non-flooded terra-firme forests on siliceous soil.

Representative Specimen Examined—**Brazil.**—AMAZONAS: São Paulo de Olivença, mata de terra firme silicosa, 12 Apr 1944 (fl), *A. Ducke 1499* (IAN photo!, NY!, R!, RB!, US!).

Taxonomic Comments—*Aldina occidentalis* can be readily distinguished from the other species of the genus by the combination of small subglobose flower buds and a sessile ovary born on a ca. 1 mm long stipe (Fig. 4). Ducke (1939) pointed out the resemblance of this species with *A. heterophylla* because of the shared branched panicles and globose flower buds. However, *A. occidentalis* has an erect indumentum on the leaflet lower surface, whereas *A. heterophylla* has completely glabrous leaflets. Moreover, the difference in the size of the flower buds (5–8 mm long in *A. heterophylla* vs. 10–13 mm long in *A. occidentalis*) and their position on the inflorescence rachis (deflexed vs. patent), as well as the sessile ovary of *A. occidentalis* (1 mm long vs. 6 mm long), adequately support the recognition of two distinct species.

ALDINA PAULBERRYI Aymard, Novon 8(4): 330. 1998. TYPE: VENEZUELA. Amazonas: Rio Orinoco, cerca de Macuruco, bosques húmedos, 200 m, 3 Mar 1976, *P. Berry 2125* (holotype: VEN photo!; isotypes: MO barcodes MO2669869 & MO2737198!, NY!).

Distribution and Habitat—This species is only known from Venezuela from a single collection in lowland humid forest at 200 m elevation.

Taxonomic Comments—*Aldina paulberryi* is most similar morphologically to *A. reticulata* from Venezuelan Amazon montane forest (Cowan, 1953, 1961), but it differs mainly in having broadly ovate to orbicular leaflets with inconspicuous tertiary venation (vs. oblong to oblong-ovate leaflets and prominent, strongly reticulate tertiary venation).

ALDINA PETIOLULATA R.S.Cowan, Mem. New York Bot. Gard. 10 (4): 70. 1961. TYPE: VENEZUELA. Amazonas: frequent in slope forest near Camp 3, alt. 700 – 800 m, Cerro de la Neblina, Río Yatua, 20 Dec 1957, *B. Maguire, J.J. Wurdack & C.K. Maguire 42555* (holotype: US barcode US00002857!; isotypes: COL barcode COL000001692 photo!, F barcode F0058833F, GH barcode GH00257061 photo!, IAN barcode IAN114760 photo!, K barcode K000500823!, LE barcodes LE00002444 photo! & LE00002443 photo!, MICH barcode MICH1107083 photo!, MO barcode MO022351!, NY barcodes NY00231175! & NY00005018!, P barcode P01817989!, RB barcodes RB00545297 & RB00539366!, S barcode S-R-9325 photo!, SP barcode SP000885 photo!, U barcode U0003461 photo!, UC barcode UC1221528 photo!, US barcode US00002857!, VEN barcode VEN52399 photo!).

Distribution and Habitat—This species is known from Venezuela and Colombia based on two collections. The type locality is in Venezuela in slope forests close to the Cerro de la Neblina at 700–800 m elevation, while the second collection is from terra-firme forest in the National Park of Cahuinari, Colombia.

Representative Specimen Examined—**Colombia**.—AMAZONAS: Parque Nacional Cahuinari, Rio Cahuinari, rebalse alto, bosque de tierra firme, 01°28'S, 70°45'W, 26 Feb 1991 (fl), *Fundacion Biológica Puerto Rastrojo 4833* (K).

Taxonomic Comments—The relatively large, 15–20 mm long pulvinules of *A. petiolulata* make it readily distinguishable from the other species of the genus. Cowan (1961) suggested a close similarity of *A. occidentalis* with *A. petiolulata*, both of which share globose flower buds. Nevertheless, *Aldina petiolulata* can be readily distinguished from *A. occidentalis* by its unique longer, slender pulvinules, and in having an ovary stipe ca. 10 mm long (vs. ca. 1 mm long).

ALDINA POLYPHYLLA Ducke, Arqv. Inst. Biol. Veg. 4(1): 17. 1938. TYPE: BRAZIL.

Amazonas, “*loco Uarurá, super Uanuacá, silva non inundabilis*”, 14 Nov 1936, *A. Ducke s.n. RB no. 35083* (lectotype [here designated]: K barcode 000500832!; isolectotypes: K barcodes K000500831! & K000858684!, NY barcode NY00231177!, P barcode P02771858!, RB barcodes RB00539368! & RB00545296!, S barcode S-R-9326 photo!, U barcode U0003462 photo!, US barcodes US00002855!, US00002856! & US00432644!).

Distribution and Habitat—This species is only known from Brazil and has been collected in the vicinities of São Gabriel da Cachoeira and Santa Isabel do Rio Negro. *Aldina polyphylla* is another species from lowland terra-firme forest, rarely occurring in flooded areas.

Representative Specimens Examined—**Brazil**.—AMAZONAS: São Gabriel da Cachoeira, Rio Curicuriari, 00°22'06"S, 67°17'05"W, 29 Jul 1991 (fl), *G. Martinelli & J. Ramos 14601* (ALCB, HUEFS, RB); São Gabriel da Cachoeira, mata de terra firme, 00°07'13"S, 67°02'53"W, 5 Aug 1989 (fl), *L. Coêlho & O.P. Monteiro 12* (INPA); Santa Isabel do Rio Negro, “*silva riparia rarius inunbilis*”, 10 Jun 1936 (fl), *A. Ducke s.n. RB no. 35082* (RB, US).

Taxonomic Comments—The large leaves, up to 36 cm long, with up to 11 leaflets that are narrowly oblong and measure 5–16 × 1.5–4.5 cm readily identify this species.

ALDINA RETICULATA R.S.Cowan, Mem. New York Bot. Gard. 8(2): 107. 1953. TYPE: VENEZUELA. Cerro Sipapo, montane mixed forest above Caño Grande, 1 km NW of Savanna camp, 28 Dec 1948, *B. Maguire & L. Politi* 27973 (holotype: NY barcode NY00231165!; isotypes: BM barcode BM000931989 photo!, F barcode F0058834F photo!, US barcode US00002854!, VEN barcode VEN31739 photo!).

Aldina speciosa M.Yu.Gontsch. & Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 91: 316. 2006. TYPE: VENEZUELA. Amazonas: Sierra Cuao-Sipapo, 16 Feb 1993, *A. Groeger* 754 (holotype: NY barcode NY01546440!; isotype: VEN barcode VEN283603 photo!), **syn. nov.**

Distribution and Habitat—This species is currently only known from Venezuela. *Aldina reticulata* grows in montane forest of Cerro Sipapo (Paráque), savannas, and near the river Guayapo.

Representative Specimens Examined—**Venezuela**—AMAZONAS: Cerro Sipapo, savanna vicinity Base Camp, 30 Dec 1948 (fl), *Maguire & L. Politi* 28046 (NY); savanna near Base Camp, 8 Feb 1949 (fl, fr), *B. Maguire & L. Politi* 28820 (NY); River Guayapo, 4°18'N, 67°28'W, 120 m, s.d. (st), *E. Foldats & J. Velazco* 9321 (NY).

Taxonomic Comments—This species is morphologically similar to *A. latifolia*, but it differs in having strongly reticulate-veined leaflets, a lax racemose inflorescence, the ovary stipe considerably shorter (2–5 mm long in *A. reticulata* vs. 7–15 mm long in *A. latifolia*), and young fruits with pale golden hairs, glabrescent (vs. fruit glabrous

during the first stages of development in *A. latifolia*). *Aldina speciosa* M.Yu.Gontsch. & Yakovlev, another species described from the Cuao-Sipapo mountain range, is newly synonymized here based on its similar oblong leaflets with an acute apex and rounded base, prominent tertiary venation, and relatively short ovary stipe. The racemose inflorescence found in the type collection of *A. speciosa* is more branched than the racemes found in *A. reticulata*, but there is character overlap between the two.

ACKNOWLEDGMENTS

We thank the curators of the cited herbaria for making their collections available; Luciano Paganucci de Queiroz, Juliana Rando and an anonymous reviewer for their critical comments and suggestions on the manuscript. We also thank Honalto (Bire), Moisés, Abraão, and Adriel for invaluable support during fieldwork along the upper Negro and Valpes rivers and for sharing their knowledge of the local flora. The first author thanks Natanael Nascimento for the private lessons on digital botanical illustration, which has added an invaluable contribution for this work and the ones still to come. We also thank Jefferson Valsko da Silva and Briggithe Melchor for support and cheerful company during fieldwork in Manaus, and Rosy, Jorgete, Luke, and Eli for being such amazing hosts. The first author also thanks the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes-Brazil) for the M.Sc. scholarship, The Smithsonian National Museum of Natural History, Washington D.C. for the Cuatrecasas Fellowship Award, which allowed the examination of their *Aldina* collections, and the New York Botanical Garden and Missouri Botanical Garden for access to specimens. DBOSC's research in legume systematics is supported by grants

from CNPq (Research Productivity Fellowship no. 308244/2018-4; Universal no. 422325/2018-0) and FAPESB (Universal no. APP0037/2016).

AUTHOR CONTRIBUTIONS

GR and DBOSC designed the project. DBOSC supervised the study. GR, DBOSC, and CEZ collected specimens in the field. GR and DBOSC revised herbarium specimens. GR prepared morphological descriptions, figures, illustrations, and wrote the first draft of the manuscript. All authors revised and approved the manuscript.

LITERATURE CITED

- Adanson, M. 1763. Familles des Plantes. *Academie des Sciences, de la Société Royale de Londres, Cenfleur Roial* (2): 328.
- Aymard, G. 1998. A new species of *Aldina* (Fabaceae: Caesalpinioideae) from Venezuelan Amazonia. *Novon* 8: 330–331.
- Barroso, G. M., M. P. Morin, A. L. Peixoto, and C. L. F. Ichaso. 2004. *Frutos e sementes: morfologia aplicada à sistemática de dicotiledôneas*. Viçosa: Editora UFV.
- Bebber, D. P., M. A. Carine, J. R. I. Wood, A. H. Wortley, D. J. Harris, G. T. Prance, G. Davidse, J. Paige, T. D. Pennington, N. K. B. Robson, and R. W. Scotland. 2010. Herbaria are a major frontier for species discovery. *Proceedings of the National Academy of Sciences* 107: 22169–22171.
- Bentham, G. 1840. Contributions towards a flora of South America: enumeration of plants collected by Mr. Schomburgk in British Guiana. *The Journal of Botany* 2(10): 91.
- Bentham, G. 1870. Leguminosae, Swartzieae et Caesalpinieae. Pp. 12–13 in *Flora Brasiliensis*, eds. C. F. P. Martius, C. F. P. Eichler, I. Urban.
- Browne, P. 1756. The civil and natural history of Jamaica in three parts. *The civil and natural history of Jamaica*. 299.
- Cardoso, D., L. P. de Queiroz, R. T. Pennington, H. C. de Lima, E. Fonty, M. F. Wojciechowski, and M. Lavin. 2012. Revisiting the phylogeny of papilionoid

- legumes: new insights from comprehensively sampled early-branching lineages. *American Journal of Botany* 99: 1991–2013.
- Cardoso, D., R. T. Pennington, L. P. de Queiroz, J. S. Boatwright, B. E. van Wyk, M. F. Wojciechowski, and M. Lavin. 2013. Reconstructing the deep-branching relationships of the papilionoid legumes. *South African Journal of Botany* 89: 58–75.
- Cardoso, D.B.O.S., L. P. Queiroz, and H. C. Lima. 2014. A taxonomic revision of the South American papilionoid genus *Luetzelburgia* (Fabaceae). *Botanical Journal of the Linnean Society* 175: 328–375.
- Cardoso, D., J. G. Carvalho-Sobrinho, C. E. Zartman, D. L. Komura, and L. P. Queiroz. 2015a. Unexplored Amazonian diversity: rare and phylogenetically enigmatic tree species are newly collected. *Neodiversity* 8: 55–73.
- Cardoso, D., W. M. São-Mateus, D. T. Cruz, C. E. Zartman, D. L. Komura, G. Kite, G. Prenner, J. J. Wieringa, A. Clark, G. Lewis, R. T. Pennington, and L. P. de Queiroz. 2015b. Filling in the gaps of the papilionoid legume phylogeny: the enigmatic Amazonian genus *Petaladenium* is a new branch of the early-diverging Amburaneae clade. *Molecular Phylogenetics and Evolution* 84: 112–124.
- Cardoso, D., T. Särkinen, S. Alexander, A. M. Amorim, V. Bittrich, M. Celis, D. C. Daly, P. Fiaschi, V. A. Funk, L. L. Giacomini, R. Goldenberg, G. Heiden, J. Iganci, C. L. Kelloff, S. Knapp, H. C. de Lima, A. F. P. Machado, R. M. dos Santos, R. Mello-Silva, F. A. Michelangeli, J. Mitchell, P. Moonlight, P. L. R. de Moraes, S. A. Mori, T. S. Nunes, T. D. Pennington, J. R. Pirani, G. T. Prance, L. P. de Queiroz, A. Rapini, R. Riina, C. A. V. Rincon, N. Roque, G. Shimizu, M. Sobral, J. R. Stehmann, W. D. Stevens, C. M. Taylor, M. Trovó, C. van den Berg, H. van der Werff, P. L. Viana, C. E. Zartman, and R. C. Forzza. 2017. Amazon plant diversity revealed by a taxonomically verified species list. *Proceedings of the National Academy of Sciences* 114: 10695–10700.
- Choi I-S, D. Cardoso, L. P. Queiroz, H. C. Lima, C. Lee, T.A. Ruhlman, R. K. Jansen and M. F. Wojciechowski. 2022. Highly resolved papilionoid legume phylogeny based on plastid phylogenomics. *Frontiers in Plant Science* 13: 823190.
- Cowan, R. S. 1953. *Aldina* (Leguminosae, Caesalpinioideae). Pp. 104–108 in *The botany of the Guayana highland*, eds. B. Maguire, R. S. Cowan, and J. J. Wurdack. Memoirs of The New York Botanical Garden vol 8.
- Cowan, R. S. 1958. *Aldina* (Leguminosae, Caesalpinioideae). Pp. 145–147 in *The Botany of the Guayana highland*, eds. B. Maguire, R. S. Cowan, and J. J. Wurdack.

- Memoirs of the New York Botanical Garden, vol 10. Bronx: New York Botanical Garden.
- Cowan, R. S. 1961. *Aldina* (Leguminosae, Caesalpinioideae). Pp. 70–71 in *The botany of the Guayana Highland*, eds. B. Maguire, R. S. Cowan, and J. J. Wurdack. Memoirs of the New York Botanical Garden, vol 10. Bronx: New York Botanical Garden.
- Cowan, R. S. and Steyermark. 1984. *Aldina* (Leguminosae, Caesalpinioideae). *Annals of the Missouri Botanical Garden* 71: 312–313.
- Doyle, J. J., J. L. Doyle, J. A. Ballenger, and J. D. Palmer. 1997. The distribution and phylogenetic significance of a 50-kb chloroplast DNA inversion in the flowering plant family Leguminosae. *Molecular Phylogenetics and Evolution* 5: 429–438.
- Draper, F. C., F. R. C. Costa, G. Arellano, O. L. Phillips, A. Duque, M. J. Macía, H. ter Steege, G. P. Asner, E. Berenguer, J. Schietti, J. B. Socolar, K. G. Dexter, P. M. Jørgensen, J. S. Tello, W. E. Magnusson, T. R. Baker, C. V. Castilho, A. Monteagudo-Mendoza, P. V. A. Fine, K. Ruokolainen, E. N. H. Coronado, G. Aymard, N. Dávila, M. S. Sáenz, M. A. R. Paredes, J. Engel, C. Fortunel, C. E. T. Paine, J.-Y. Goret, A. Dourdain, P. Petronelli, E. Allie, J. E. G. Andino, R. J. W. Brienen, L. C. Pérez, A. G. Manzatto, N. Y. P. Zambrana, J.-F. Mollino, D. Sebatier, J. Chave, S. Fauset, R. G. Villacorta and C. Baraloto. 2021. Amazon tree dominance across forest strata. *Nature Ecology and Evolution* 5: 757–767.
- Endlicher, S. F. L. 1836. *Genera Plantarum Secundum Ordines Naturales Disposita* 151.
- Fine, P. V. A., R. Garcia-Villacorta, N. C. A. Pitman, I. Mesones and S. W. Kembel. 2010. A floristic study of the white-sand forests of Peru. *Annals of Missouri Botanical Garden* 97: 283–305.
- Fine, P. V. A. and C. Baraloto. 2016. Habitat endemism in white-sand forests: insights into the mechanisms of lineage diversification and community assembly of the Neotropical flora. *Biotropica* 48: 24–33.
- Fine, P. V. A. and E. M. Bruna. 2016. Neotropical white-sand forests: origins, ecology and conservation of a unique rain forest environment. *Biotropica* 48: 5–6.
- Fortunel, C., C. E. T. Paine, P. V. A. Fine, N. J. B. Kraft, and C. Baraloto. 2014. Environmental factors predict community functional composition in forests across Amazonia. *Journal of Ecology* 102: 145–155.

- Forzza, R., J. F. A. Baumgratz, C. E. M. Bicudo, D. A. L. Canhos, A. A. Carvalho Jr., M. A. N. Coelho, A. F. Costa, D. P. Costa, M. G. Hopkins, P. M. Leitman, L. G. Lohmann, E. N. Lughadha, L. C. Maia, G. Martinelli, M. Menezes, M. P. Morim, A. L. Peixoto, J. R. Pirani, J. Prado, L. P. de Queiroz, S. Souza, V. C. Souza, J. R. Stehman, L. S. Sylvestre, B. M. T. Walter, and D. C. Zappi. 2012. New Brazilian floristic list highlights conservation challenges. *Bioscience* 62: 39–45.
- Gontscharov, M. Yu., G. P. Yakovlev, and M. N. Povydysh. 2006. On the new subtribe Aldiniinae of the Swartzieae and new species of the genus *Aldina*. *Botanicheskii Zhurnal* 91: 312–321.
- Gontscharov, M. Yu., G. P. Yakovlev, and M. N. Povydysh. 2009. Notes on the genus *Aldina* (Fabaceae). *Botanicheskii Zhurnal* 94: 267–275.
- Harris, J. G. and M. W. Harris. 1994. *Plant identification terminology, an illustrated glossary*. Spring Lake Publishing, Utah.
- Henkel, T. W., J. Terborgh, and R. J. Vilgalys. 2002. Ectomycorrhizal fungi and their leguminous hosts in the Pakaraima Mountains of Guyana. *Mycological Research* 106: 515–531.
- Hopkins, M. J. G. 2007. Modelling the known and unknown plant biodiversity of the Amazon basin. *Journal of Biogeography* 34: 1400–1411.
- Ireland, H. E., R. T. Pennington, and J. Preston. 2000. Molecular systematics of the Swartzieae. Pp. 217–231 in *Advances in Legume Systematics*, eds. P. S. Herendeen and A. Bruneau. Royal Botanic Gardens vol 9. Kew.
- Ireland, H. E. 2005. Swartzieae. Pp. 214–225 in *Legumes of the World*, eds. G. Lewis, B. Schreire, B. Mackinder, and M. Lock. Royal Botanic Gardens. Kew.
- Janzen, D. H. 1974. Tropical blackwater rivers, animals, and mast fruiting by the Dipterocarpaceae. *Biotropica* 6: 69–103.
- Klitgaard, B. B. 2005. *Platymiscium* (Leguminosae: Dalbergieae): biogeography, systematics, morphology, taxonomy and uses. *Kew Bulletin* 60: 321–400.
- LPWG [Legume Phylogeny Working Group]. 2017. A new subfamily classification of the Leguminosae based on a taxonomically comprehensive phylogeny. *Taxon* 66: 44–77.
- Meisner, C. F. 1842. *Plantarium vascularium genera: secundum ordines naturales digestaeorumque differentiae et affinitates tabulis disgnosticis expositae*. 304.
- Mori, S. A., A. Berkov, and C. A. Grace. 2011. *Tropical Plant Collecting: From the Field to the Internet*. NYBG Press.

- Oliveira-Filho, A. T., K. G. Dexter, R. T. Pennington, M. F. Simon, M. L. Bueno, and D. M. Neves. 2021. On the floristic identity of Amazonian vegetation types. *Biotropica* 53: 767–777.
- Pennington, R. T., M. Lavin, H. Ireland, B. Klitgaard, J. Preston, and J. M. Hu. 2001. Phylogenetic relationships of basal papilionoid legumes based upon sequences of the chloroplast *trnL* intron. *Systematic Botany* 26: 537–556.
- Pennington, R. T. 2003. Monograph of *Andira* (Leguminosae-Papilionoideae). *Systematic Botany Monographs* 64: 1–143.
- Pires, J. M. and Prance, G. T. 1985. The vegetation types of the Brazilian Amazon. Pp. 109–144 in *Amazonia: key environment series*, eds. G. T. Prance and T. E. Lovejoy. Pergamon Press.
- Pirie, M. D., B. B. Klitgaard, and R. T. Pennington. 2009. Revision and biogeography of *Centrolobium* (Leguminosae – Papilionoideae). *Systematic Botany* 34: 345–359.
- Polhill, R. M. 1981. Sophoreae. Pp. 213–230 in *Advances in Legume Systematics*, eds. R. M. Polhill and P. H. Raven. Royal Botanic Gardens, Kew.
- Ramos, G., H. C. de Lima, G. Prenner, L. P. de Queiroz, C. E. Zartman, and D. Cardoso. 2016. Molecular systematics of the Amazonian genus *Aldina*, a phylogenetic enigmatic ectomycorrhizal lineage of papilionoid legumes. *Molecular Phylogenetics and Evolution* 97: 11–18.
- Ramos, G. and D. Cardoso. 2016. Towards a taxonomic revision of the papilionoid legume genus *Aldina*: lectotypification of a name published in *Flora Brasiliensis*. *Neodiversity* 9: 1–3.
- Rehder, A., C. A. Weatherby, R. Mansfeld, and M. L. Green. 1935. Conservation of later generic homonyms. *Bulletin of Miscellaneous Information* (6-9): 350.
- Roy, M., H. Schimann, R. Braga-Neto, R. A. E. da Silva, J. Duque, D. Frame, F. Wartchow, and M. A. Neves. 2016. Diversity and distribution of ectomycorrhizal fungi from Amazonian lowland white-sand forests in Brazil and French Guiana. *Biotropica* 48: 90–100.
- Smith, M. E., T. W. Henkel, M. C. M. Aime, A. K. Fremier, K. Alex, and R. Vilgalys. 2011. Ectomycorrhizal fungal diversity and community structure on three co-occurring leguminous canopy tree species in a Neotropical rainforest. *New Phytologist* 192: 699–712.
- Sprent, J., J. Ardley, and E. K. James. 2017. Biogeography of nodulated legumes and their nitrogen fixing symbionts. *New Phytologist* 215: 40–56.

- Stergios, B. D. and G. A. Aymard. 2008. A striking new species of *Aldina* (Fabaceae-Swartzieae-Aldiniinae) from the Venezuelan Guayana Highlands. *Harvard Papers in Botany* 13: 29–33.
- Steyermark, J. A., P. E. Berry, K. Yatskievych, and B. K. Holst. 1967. Flora del Auyan-Tepui. 5: 248.
- Steyermark, J. A. 1999. Fabaceae. Pp. 213–230 in *Flora of the Venezuelan Guayana*, eds. G. A. Aymard et al. Missouri Botanical Garden, Timber Press.
- Stropp, J., P. van der Sleen, P. A. Assunção, A. L. Silva, and H. ter Steege. 2011. Tree communities of white-sand and terra-firme forests of the upper Rio Negro. *Acta Amazonica* 41: 521–544.
- ter Steege, H., N. C. A. Pitman, O. L. Phillips, J. Chave, D. Sabatier, A. Duque, J. F. Molino, M. F. Prévost, R. Spichiger, H. Castellanos, P. von Hildebrand, and R. Vásquez. 2006. Continental-scale patterns of canopy tree composition and function across Amazonia. *Nature* 443: 444–447.
- ter Steege, H., N. C. A. Pitman, D. Sabatier, C. Baraloto, R. P. Salomão, J. E. Guevara, O. L. Phillips, C. V. Castilho, W. E. Magnusson, J. F. Molino, A. Monteagudo, P. N. Vargas, J. C. Montero, T. R. Feldpausch, E. N. Honorio-Coronado, T. J. Killeen, B. Mostacedo, R. Vasquez, R. L. Assis, J. Terborgh, F. Wittmann, A. Andrade, W. F. Laurance, S. G. W. Laurance, B. S. Marimon, B. H. Marimon Jr., I. C. G. Vieira, I. L. Amaral, R. Brienen, H. Castellanos, D. C. López, J. F. Duivenvoorden, H. F. Mogollón, F. D. A. Matos, N. Dávila, R. García-Villacorta, P. R. S. Diaz, F. Costa, T. Emilio, C. Levis, J. Schiatti, P. Souza, A. Alonso, F. Dallmeier, A. J. D. Montoya, M. T. F. Piedade, A. Araujo-Murakami, L. Arroyo, R. Gribel, P. V. A. Fine, C. A. Peres, M. Toledo, G. A. Aymard C., T. R. Baker, C. Cerón, J. Enge, T. W. Henkel, P. Maas, P. Petronell, J. Stropp, C. E. Zartman, D. Daly, D. Neill, Ma. Silveira, M. R. Paredes, J. Chave, D. A. L. Filho, P. M. Jørgensen, A. Fuentes, J. Schöngart, F. C. Valverde, A. Di Fiore, E. M. Jimenez, M. C. P. Mora, J. F. Phillips, G. Rivas, T. R. van Andell, P. von Hildebrand, B. Hoffman, E. L. Zent, Y. Malhi, A. Prieto, A. Rudas, A. R. Ruschell, N. Silva, V. Vos, S. Zent, A. A. Oliveira, A. C. Schutz, T. Gonzales, M. T. Nascimento, H. Ramirez-Angulo, R. Sierra, M. Tirado, M. N. U. Medina, G. van der Heijden, C. I. A. Vela, E. V. Torre, C. Vriesendorp, O. Wang, K. R. Young, C. Baider, H. Balslev, C. Ferreira, I. Mesones, A. Torres-Lezama, L. E. U. Giraldo, R. Zagt, M. N. Alexiades, L. Hernandez, I. Huamantupa-Chuquimaco, W. Milliken, W. P. Cuenca, D. Pauletto, E. V. Sandoval, L. V. Gamarra, K. G. Dexter,

- K. Feeley, G. Lopez- Gonzalez, and M. R. Silman. 2013. Hyperdominance in the Amazonian tree flora. *Science* 342: 1243092.
- Thiers, B. (continuously updated) *Index Herbariorum: a global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available at <<http://sweetgum.nybg.org/ih/>>. Accessed on 31 Aug 2018.
- Turland, N. J., J. H. Wiersema, F. R. Barrie, W. Greuter, D. L. Hawksworth, P. S. Herendeen, S. Knapp, W. -H. Kusber, D. -Z. Li, K. Marhold, T. W. May, J. McNeill, A. M. Monro, J. Prado, M. J. Prince, and G. F. Smith (eds.). 2018. International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. *Regnum Vegetabile* 159.
- Werner, G.D.A., W. K. Cornwell, J. I. Sprent, J. Kattge, and E. T. Kiers. 2014. A single evolutionary innovation drives the deep evolution of symbiotic N₂-fixation in angiosperms. *Nature Communications* 5: 4087.

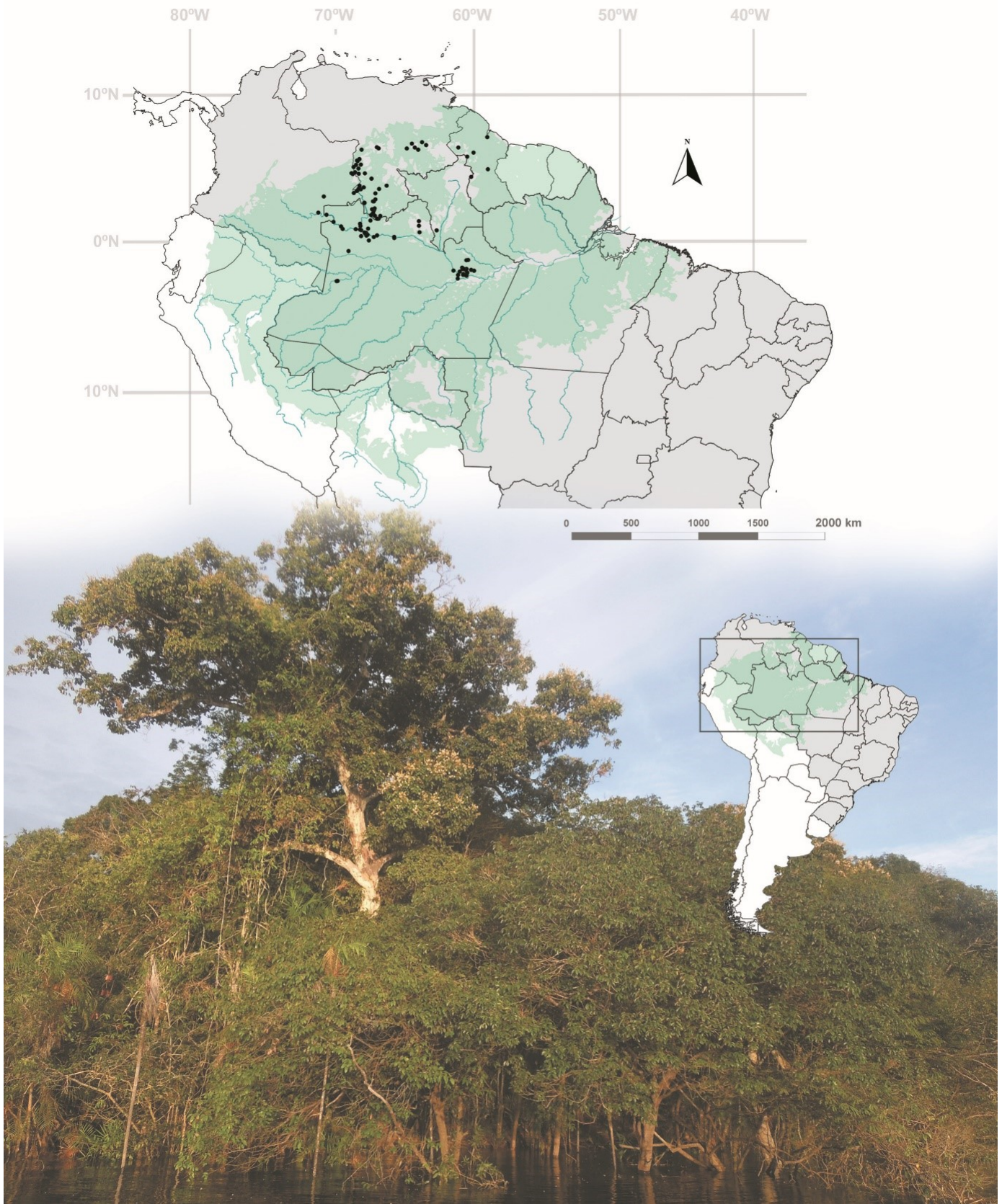


FIG. 1. Distribution of *Aldina* in the Neotropics (Colombia, Brazil, Guyana, and Venezuela). Collections are represented by black dots. The green shaded area represents the limits of the Amazonian lowland rain forest biome as delimited by Cardoso et al. (2017). A flowering individual of *Aldina latifolia* during the rainy season in the Rio Negro is shown in the background.

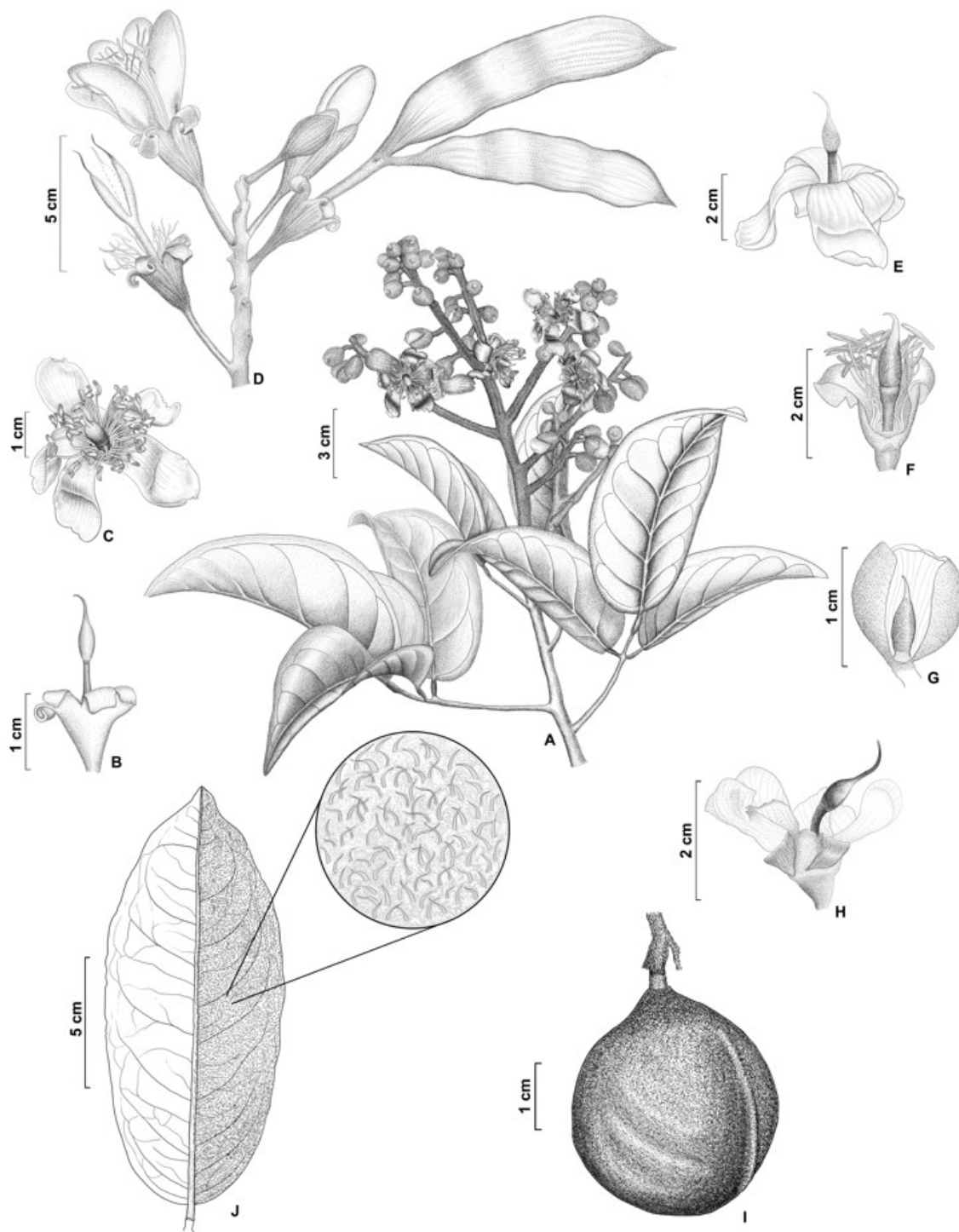


FIG. 2. Diagnostic characters of *Aldina* species. A. *A. heterophylla*. Fertile branch with the typical reflexed flower buds in the inflorescence axes and navicular (boat-shaped) leaves. B–H. Flowers (most of them with petals, stamens, or part of the calyx removed) showing the variation in ovary morphology across the genus. B. *A. berryi* is one of the two species in the genus with glabrous ovary, occasionally with few hairs at its base. C. *A. heterophylla* has short appressed ferruginous hairs covering the stipe, joint, and ovary, whereas the style is glabrous; the species also bears the lowest number of stamens in the genus (ca. 36 vs. ca. 60). D. *A. diplogyne* has the largest flowers in the genus (ca. 6 cm long) and is the only species with multicarpellate gynoeceum, bearing up to (2)3–4 appressed-ferruginous-pubescent functional pistils per flower. E. *A. latifolia* has a gynoeceum in which only the style is glabrous; the stipe, joint, and ovary are covered with appressed-pale golden hairs. F. *A. kunhardtiana* has a calyx with arachnoid hairs on the inner side, the outer side is readily distinguishable by the velutinous dark-brown-ferruginous indumentum; also its gynoeceum is covered with appressed-ferruginous hairs, except for the style which is glabrous and is often recurved at the tip. G. The subsessile ovary of *A. occidentalis* with ca. 1 mm long glabrous stipe readily distinguishes the species from the others in the genus. H. *A. macrophylla* has a unique gynoeceum with a stipe and joint covered with appressed-golden hairs and a glabrous dark brown ovary. I. The glabrous nucoid fruit of *A. heterophylla* often displays a subglobose to globose shape throughout its development. Other species of the genus tend to have oblong fruits in the early developmental stages such as shown here in *A. diplogyne*. J. The leaflet of *A. kunhardtiana* showing the conspicuous venation on the abaxial face and a close-up of the decumbent to erect trichomes intermixed over a flaking coat of white wax.

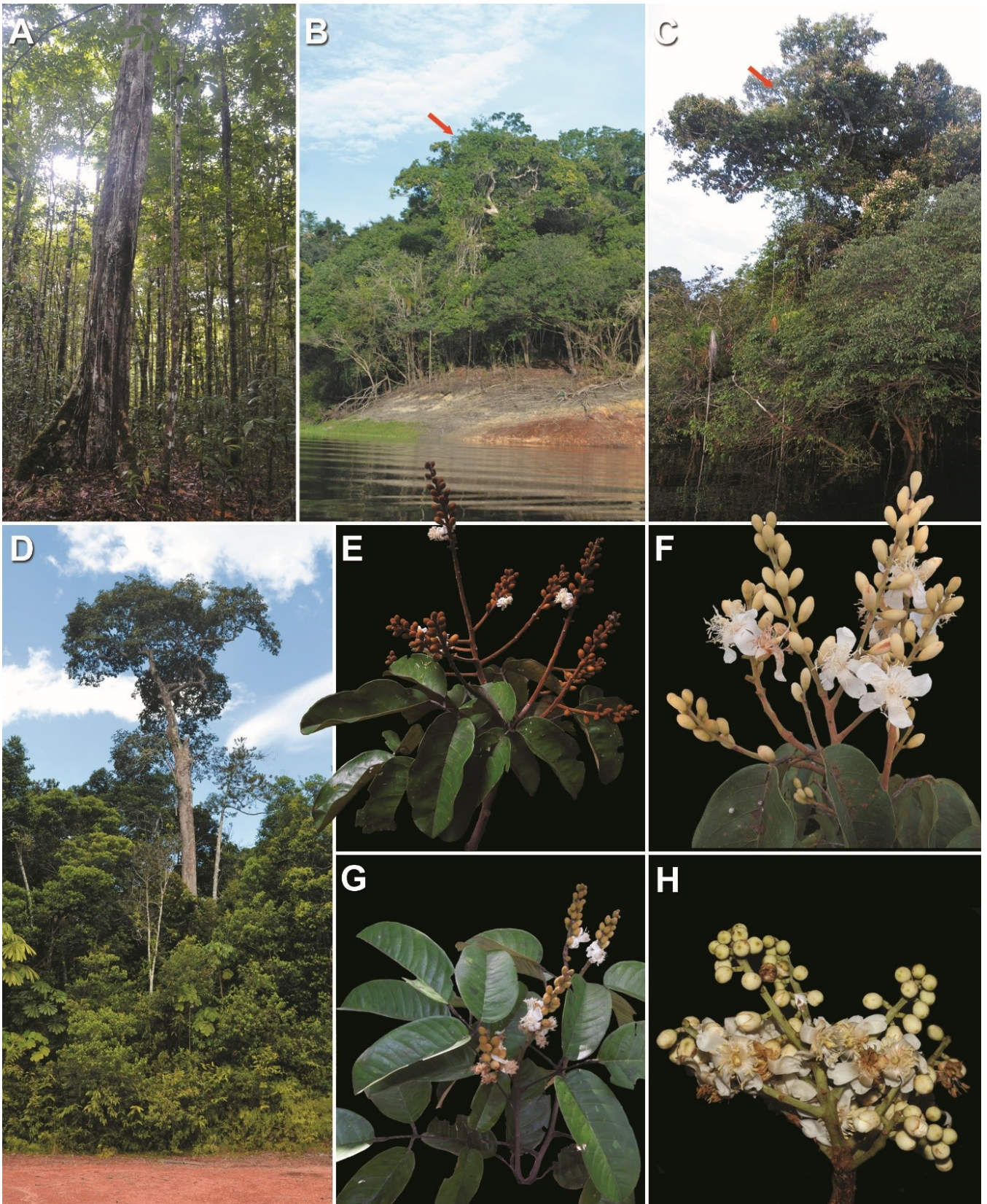


FIG. 3. Habitat and morphological characterization of *Aldina* species. A. White-sand forest (campinarana) with an individual of *A. discolor* at Sao Gabriel da Cachoeira, Brazil. B–C. Seasonally flooded forest (igapo) in the same locality in the dry and rainy season, respectively, from the black waters of Rio Negro in Manaus, Brazil. A flowering individual of *A. latifolia* with pale branches is shown by a red arrow. D. Terra-firme forest at Sao Gabriel da Cachoeira, Brazil, showing its typical clay soil and an outstanding individual of *A. kunhardtiana*. E. Inflorescence of *A. kunhardtiana* showing its typical velvety rusty brown axes. F–G. The pale yellowish flower buds of *A. latifolia* and *A. discolor*, respectively, are readily distinguishable from the green background of the forest. H. Inflorescence of *A. heterophylla* showing its typical deflexed flower buds.

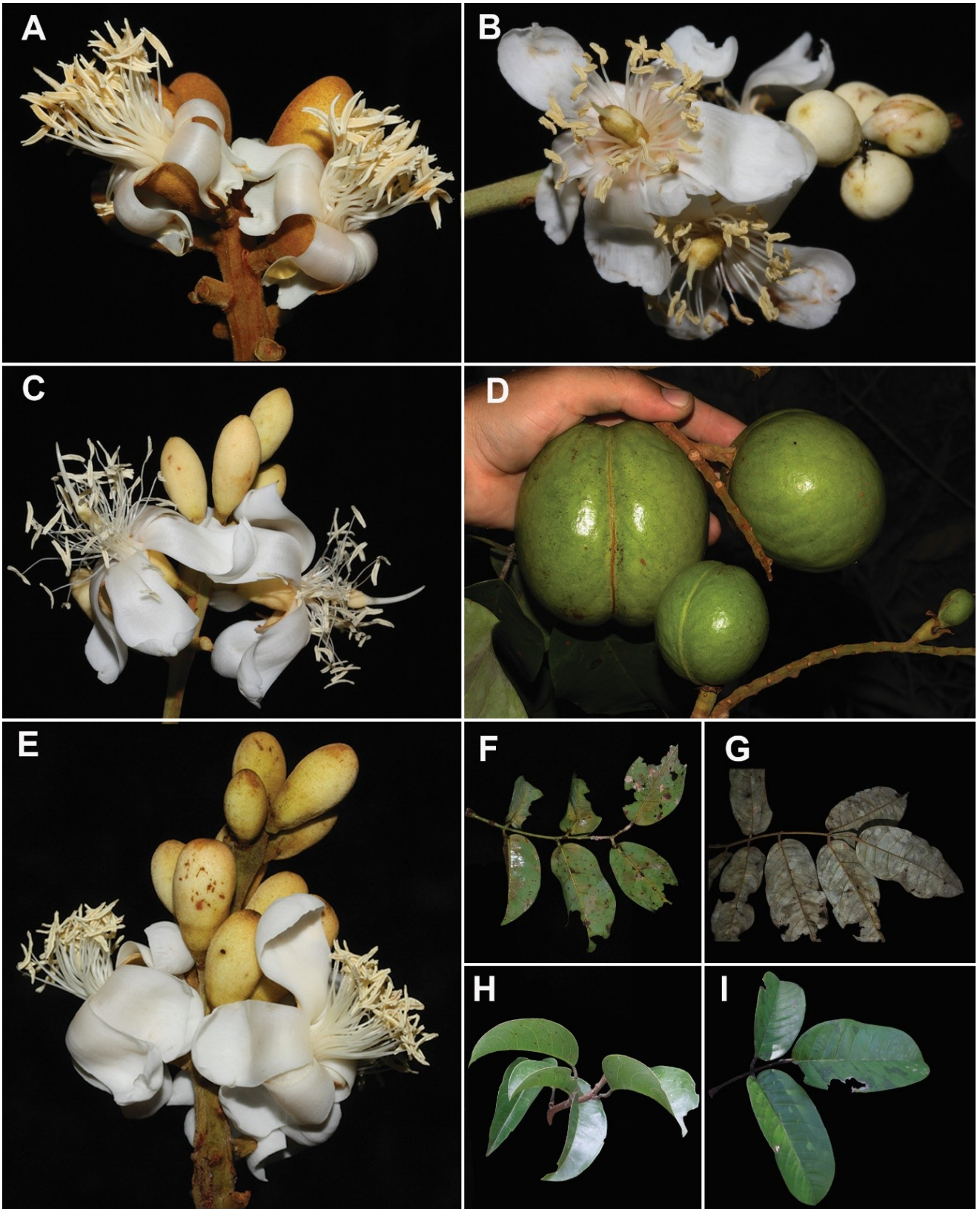


FIG. 4. Morphological diversity of *Aldina*. A, B, C, E. Showy actinomorphic flowers with numerous free stamens of: A. *A. kunhardtiana*. B. *A. heterophylla*. C. *A. latifolia*. E. *A. discolor*. D. Nucoid fruits of *A. latifolia*, the spongy mesocarp (not shown) allows dispersal by flotation along rivers and streams. F–G. Multi-foliolate leaves of: F. *A. latifolia*. G. *A. kunhardtiana*. H–I. 3-foliolate leaves of: H. *A. heterophylla*. I. *A. discolor*.