

Dyckia BROMELIACEAE

F. Krapp and U. Eggli

Dyckia Schultes *fil.* (in Roemer & Schultes, Syst. Veg. 7(2): lxx, 1194, 1830). **Type:** *Dyckia densiflora* Schultes *fil.* [lectotype, designated by L. B. Smith, ING card 00365, 1955]. — **Pitcairnioideae** — **Lit:** Smith & Downs (1974: 500–577, Fl. Neotropica); Krapp (2013: phylogeny); Krapp & al. (2014: phylogeny); Santos-Silva & al. (2015: fruit dehiscence); Pinangé & al. (2017: phylogeny, evolution & biogeography). **Distr:** Brazil, E Bolivia, Paraguay, Uruguay, N Argentina. **Etym:** For Fürst Joseph Salm-Reifferscheid-Dyck (1773–1861), German (Prussian) botanist, botanical artist, horticulturist and succulent plant collector.

Incl. *Garrelia* Gaudichaud (1851). **Type:** *Garrelia encholirioides* Gaudichaud.

Incl. *Prionophyllum* K. Koch (1874). **Type:** *Prionophyllum selloum* K. Koch.

Perennial terrestrial rosette plants, usually with thick and often repent rhizomes or short branches and often forming groups, leaves, inflorescences, bracts and sepals glabrous or variously to completely covered with cinereous scales; **L** in

open to dense rosettes, typically tough and stiff, coriaceous to succulent, with well developed marginal spines; **Inf** lateral, simple to 3 orders of branching, often with extrafloral nectaries, axis sometimes with brilliant colours similar to the flowers; **Fl** sessile or pedicellate, unscented or slightly fragrant, usually hermaphrodite and uniform within the inflorescence or sometimes (species of the “*Prionophyllum* complex”) plants gynomonocious with larger hermaphrodite flowers and smaller female flowers in the same inflorescence (female flowers usually confined to the distal parts of the inflorescence axes); **Per** typically orange, red or yellow, rarely greenish or green, brown or black, tubular or campanulate; **Pet** centrally attached to the **Fil** tube (referred to as “common tube”); **Anth** frequently recurved; **Ov** superior; **Sti** conduplicate-spiral; **Fr** 3-locular septicial xerochastic capsules with additional delayed loculicidal dehiscence resulting in 6 apical teeth; **Se** typically asymmetrical, alate, broad, in some species (“*Prionophyllum* complex”) oblong.

The large genus currently contains 168 species, many of them recently described narrow endemics. Delimitation and identification of *Dyckia* species is extremely difficult due to highly variable and overlapping morphological features. Many of the older names are based exclusively on herbarium material, whereas more recent taxa are based on ample collections, often also including living plants. No modern revision is available, and the key supplied by Smith & Downs (1974) is not reliable.

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Dyckia species are typically strongly xeromorphic plants of the azonal rock vegetation of Neotropical savannas. They are notable for their consistent lateral inflorescence position. It appears that inflorescence origin has not been studied in detail yet, and it is unknown whether inflorescence position is truly lateral, or whether conditions are similar to the species of *Hechtia* with seemingly lateral inflorescences that are, in fact (see Espejo-Serna & al., for the genus *Hechtia* in this volume) terminal, with the flowering rosette becoming pushed in a lateral position before incipient inflorescence growth is noticeable.

The diversity centre of the genus is located in the Brazilian Campos Rupestres, esp. in Minas Gerais (Serra do Espinhaço) and Bahia (Chapada Diamantina). Many species are narrow endemics with small populations. Some species grow in riverbeds with alternating seasons of submergence and desiccation, but the term “rheophyte”, as used in some publications, is hardly justified.

Succulence can be pronounced, and the water storage tissue, devoid of chlorophyll, can account for the major part of the leaf volume (Voltolini & al. 2009). Plants show some plasticity in size, depending on water and nutrient availability. Under optimal cultivation conditions, plants are therefore often larger and the inflorescences may be more branched than under natural conditions.

Fruit Morphology: Fruits are rather uniform throughout the genus, differing only in size among the species. Fruits of 3 species were studied in detail by Santos-Silva & al. (2015): The carpels are incompletely fused with 3 suture lines remaining clearly visible. Opening of the capsules is first septicial, followed by delayed loculicidal dehiscence so that the open fruit presents 6 apical teeth. Santos-Silva & al. (2015) call the capsules “denticidal”, while Fagundes & Mariath (2010) use the term “bicial”. The capsules are xerochastic, i.e. they open when drying out, caused by “lignified sclerenchymatous walls that are oriented in different directions” (Santos-Silva & al. 2015).

Evolution and Phylogeny: Molecular data derived from chloroplast DNA sequences suggest

that the genus is monophyletic and arose from within a paraphyletic genus *Encholirium* (Krapp 2013, Krapp & al. 2014). The phylogeny based on combined chloroplast and nuclear data of Schütz & al. (2016) supports this position. The close relationship between the two genera is also supported by the shared presence of winged seeds (see Fig. 1 in Schütz & al. (2016)).

The impressive species diversity is the result of a recent explosive radiation during the last three million years. Within the genus the genetic diversity is disappointingly low and the resolution of the available phylogenetic trees is limited. The chloroplast DNA sequence data shows a geographic pattern, rather than a clear assignment to particular morphospecies, probably resulting from poor seed dispersal ability. Severe incongruencies between morphologically defined species and nuclear and chloroplast data suggest frequent exchange of genetic material across species borders. Although most morphospecies seem to be cohesive and stable, hybridization and introgression are common events. This may be the primary reason for the pronounced difficulties to reliably delimit and identify *Dyckia* species. In addition, some degree of intercompatibility and introgression between species of *Dyckia* and *Encholirium* appears to exist, explaining the apparent paraphyly of the latter in the molecular studies (Krapp & al. 2014). A subsequent phylogenetic study based on AFLP data and morphological aspects (Pinangé & al. 2017) corroborated the poor resolution along the backbone of the phylogeny, and the likely importance of hybridization and introgression. Character reconstructions supported the geographical structuring found amongst some major clades.

Here, we follow the traditional morphology-based species concept. The taxonomy of Smith & Downs (1974) is largely followed, and subsequently described taxa have been added, recognizing that some appear to differ in minor characters only and are thus candidates for future synonymizations. Moreover, many of the species described in the nineteenth century are still only poorly known and have not been recollected in recent years. Unfortunately, no infrageneric classification is available. Instead, we use a simple

artificial grouping based on inflorescence branching and filament characters:

- [1] Inflorescence compound with up to 3 orders of branching, primary branches spreading.
- [2] Inflorescence compound with 1 order of branching, branches erect.
- [3] Inflorescence simple or pseudosimple:
 - [a] Filaments free above the common tube (= species of subkey 3 of Smith & Downs (1974)).
 - [b] Filaments connate above the common tube (= species of subkey 4 of Smith & Downs (1974)).

Some of the species assigned to subgen. *Prionophyllum* by Smith & Downs (1974), i.e. *D. maritima* and *D. selloa*, are notable for the presence of gynomonoeicy, with some pistillate flowers (smaller in sepal and petal size than the hermaphrodite flowers) in part of their inflorescences. Unisexual flowers are otherwise rare in the family, but some species of *Cryptanthus* are andromonoecious, and *Hechtia* is completely dioecious. In the course of the years, additional species have been assigned to an informal “*Prionophyllum* complex”, most of them with hermaphrodite flowers, however. It remains to be investigated whether gynomonoeicy is a diagnostic character for some species, or a group of species, or whether it occurs sporadically in just some populations.

Ecology: Only few studies have investigated the pollination of *Dyckia* flowers. The conspicuous bright orange flowers conform to the ornithophily syndrome, and for *D. floribunda*, *D. ragonesei* and *D. velascana* Bernardello & al. (1991) indeed observed pollination by hummingbirds in Argentina. These authors also observed a butterfly foraging for nectar on *D. floribunda*, and European honey bees to collect pollen on the same species. In view of the size spectrum of flower size and morphology, other pollinators are to be expected for some species, and indeed, Hmeljevski & al. (2011) found a carpenter bee of the genus *Xylocopa* as pollinator of *D. ibiramensis*, together with hummingbirds.

Horticulture: Species of *Dyckia* in general have little horticultural potential, mainly due to the usually long-elongate inflorescences with generally not very showy flowers, and despite the variability in leaf shapes, colours and armature. An exception is *D. marnier-lapostollei*, which is fairly commonly encountered in the horticultural trade. Hobby growers have produced a considerable number of hybrids and cultivars.

Formally named hybrids are known with *Deuterocohnia* (= ×*Dyckcohnia*), *Hechtia* (= ×*Dycktia*), and *Puya* (= ×*Pukia*), all of which have separate entries in this handbook.

The following names are of unresolved application but are referred to this genus: *Dyckia acrosoma* Rojas (1897); *Dyckia altissima* Lindley (1841); *Dyckia laxiflora* Martius ex Baker (1889) (*nom. inval.*, ICN Art. 36.1c); *Dyckia lemaireana* hort. (1874) (*nom. inval.*, ICN Art. 38.1a); *Dyckia lindaiana* hort. (s.a.) (*nom. inval.*, ICN Art. 29.1); *Dyckia ramosa* hort. ex K. Koch (1874) (*nom. inval.*, ICN Art. 38.1a); *Dyckia schreiteri* Hort. Heidelberg (s.a.) (*nom. inval.*, ICN Art. 29.1); *Puya edulis* E. Morren (1878).

D. acutiflora Leme & Z. J. G. Miranda (Phytotaxa 67: 10–13, ills., 2012). **Type:** Brazil, Goiás (*Miranda* s.n. in Leme 6806 [RB]). — **Dist:** Brazil (Goiás); rock outcrops in Campo Rupestre vegetation.

[2] **Ros** offsetting, densely leaved; **L** 25–30 × 1.1–1.4 cm, thinly coriaceous, sheath wider than the lamina, **L** lamina narrowly triangular, nearly flat, arcuate, apex long acuminate-caudate, acicular, pungent, yellowish-green, veined, subdensely to densely white-lepidote on both faces, margins glabrescent, subdensely spinose, **Sp** 0.5–2 mm, acicular, spreading or nearly so, pale-coloured with yellowish-castaneous tip, glabrous, 3–8 mm apart; **Inf** 90–100 cm; peduncle erect, ±60 cm, green towards the base and orange near the apex, with subdense to sparse glandulose trichomes; peduncular **Bra** narrowly triangular-lanceolate, erect, acuminate, spinescent, 20–45 × 5–7 mm, longer than the internodes except the upper, green to stramineous, veined, inconspicuously white-lepidote to glabrous, densely and inconspicuously

spinulose; fertile **Inf** part simple and 35–46 cm, or with 1–4 **Br**, ± 60 -flowered, subdense to dense, straight, subangulose, orange, densely covered by white glandular trichomes; **Br** suberect, 4–6 cm, densely 5- to 10-flowered; primary **Bra** like the peduncular bracts, distinctly exceeding the sterile branch base; floral **Bra** narrowly triangular to triangular-ovate, acuminate to caudate, ecarinate, spreading to suberect, 8–18 \times 5 mm, from slightly shorter than the sepals to equalling the flowers, thin-textured, soon stramineous, with dense, white, glandular trichomes, densely and remotely denticulate; **Fl** subspreading at anthesis to erect afterwards, ± 15 mm, somewhat tubular, fragrant already at bud-stage; **Ped** 2–3 mm, stout; **Sep** subovate-triangular, acute, 9–10 \times 5 mm, orange; **Pet** spatulate, acute, slenderly apiculate, ecarinate, $\pm 11 \times 6$ mm, orange, glabrous or glabrescent; **St** just included; **Fil** free above the 2 mm high common tube, complanate, 7–8 mm, yellowish; **Anth** subtriangular, strongly recurved at anthesis, ± 2 mm, base obtuse-bilobed, acute; **Ov** ovoid, $\pm 4 \times 2.5$ mm, yellowish; **Sty** ± 4 mm, orange, **Sti** scalloped-lacerate; **Fr** and **Se** unknown.

D. affinis Baker (Handb. Bromel., 133–134, 1889). **Type:** Paraguay, Paraguari (*Balansa* 534 [G [status?], F [photo]]). — **Distr:** Paraguay (Paraguari); ecology not reported.

[2] **Ros** not described; **L** to 50 \times 1.5 cm, sheath not described, **L** lamina sublinear, long-attenuate to an acicular apex, subdensely ferruginous-lepidote abaxially, serrate, **Sp** 2.5–3 mm; **Inf** ± 1 m, peduncle glabrous at maturity; peduncular **Bra** ovate, linear-laminate (lower) to long-acuminate (upper), shorter than the internodes (upper), fimbriate-serrulate; **Inf** paniculate with few ascending branches, **Br** mostly elongate, laxly many-flowered, cinereous-furfuraceous; primary **Bra** like the upper peduncular bracts; floral **Bra** spreading or reflexed, triangular-ovate, acute to acuminate, reaching the middle of the sepals; **Fl** spreading or suberect at anthesis, to 18 mm, orange; **Ped** 3 mm, obconical; **Sep** ovate-elliptic, 7 mm, abruptly acute, carinate, furfuraceous towards the base; **Pet** elliptic-rhombic, 14 mm, obtuse and inflexed, undulate, carinate, suberect;

St distinctly shorter than the petals; **Fil** free above the common tube; **Anth** sagittate, sublinear, apex recurved; **Sty** very short.

Insufficiently known, never illustrated, and not recently recollected.

D. agudensis Irgang & Sobral (Napaea 3: 5–7, figs. 1–3, 1987). **Type:** Brazil, Rio Grande do Sul (Sobral & al. 5581 [ICN, MBM]). — **Lit:** Silva & al. (2007: conservation, propagation). **Distr:** Brazil (Rio Grande do Sul: Agudo); on basalt rocks, very local.

[1] **Ros** 70 cm \varnothing ; **L** 40–50 \times 1–2 cm, succulent, sheath not described, **L** lamina lanceolate, glabrous, densely or sparsely bright-lepidote on both faces, **Sp** antroretroreterly curved or straight, 4–6 mm, dark, ± 10 mm apart; **Inf** to 90 cm; peduncle ± 60 cm; peduncular **Bra** to 50 \times 10 mm, except the lowest shorter than the internodes, glabrous, margins glabrous or brown-floccose, entire, the lower ones soon dry; fertile **Inf** part compound, glabrous, sometimes grey-lepidote; **Br** 1- to 12-flowered, sterile base 5–8 cm, rachis 4–9 cm, terminal part of the main axis longer than the branches; floral **Bra** acuminate, carinate or ecarinate, to 10 \times 8 mm, glabrous, entire; **Ped** absent; **Sep** obtuse, 10 \times 4–5 mm, abaxially dark brown-lanate, floccose, adaxially glabrous; **Pet** rounded or obovate, 13–15 \times 3–5 mm, yellow; **St** 7–8 mm; **Fil** free for 4–6.5 mm above the 8 mm high common tube; **Anth** ovate-lanceolate, to 3 \times 1 mm; **Ov** 4–5 mm; **Sty** 4 mm, shortly fimbriate; **Fr** ovate, apex rostrate, to 12 \times 8 mm, dark brown or black; **Se** with thick regular yellowish-brown margins, unwinged, trigonous to tetragonous, ovoid, asymmetrical, 2.5–3 \times 1–1.2 mm, castaneous.

Growing only on a single hill, and threatened with extinction. Similar to *D. encholirioides*.

D. alba S. Winkler (Doc. Nat. 3: 33–34, Fig. 2, 1982). **Type:** Brazil, Rio Grande do Sul (Winkler 747 [ICN]). — **Distr:** Brazil (Rio Grande do Sul); dry sandstone rocks. – Fig. 1.

[1] **Ros** to 100 cm \varnothing , acaulescent; **L** very numerous, to 60 \times 4 cm, lamina white-tomentose on both faces, strongly spinose, **Sp** to 6 mm; **Inf** to 1.5 m; peduncle glabrous; peduncular **Bra** leaf-

Fig. 1 *Dyckia alba* (Eggl
2470: Brazil; Rio Grande do
Sul; Pedras de Segredo).
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like, with dark brown pungent tip, longer (lower) or shorter (upper) than the internodes, spinose; fertile **Inf** part 3× branched, glabrous; **Br** shortly white-tomentose, densely many-flowered; floral **Bra** small, to 2 mm; **Fl** sessile, widely opening; **Sep** broadly triangular, acute, subcarinate, to 4 mm, abaxially white-tomentose; **Pet** broadly ovate, to 8 mm, yellow; **St** equalling the petals, exerted at anthesis; **Fil** free above the 0.5 mm high common tube; **Sty** exerted for 3 mm; **Fr** and **Se** not described.

D. arenicola Leme (Phytotaxa 67: 13–15, *ills.*, 2012). **Type:** Brazil, Mato Grosso (*Leme & Gonzalez* 6964 [RB, HB]). — **Distr:** Brazil (Mato Grosso); sandstone outcrops.

[3a?] **Ros** solitary or group-forming, densely 30- to 40-leaved; **L** 15–22 × 1–1.3 cm, 2–3 mm thick, coriaceous, sheath wider than the lamina, **L** lamina narrowly triangular, slightly canaliculate towards the apex, arcuate, green to dark reddish, finely veined and obscurely white-lepidote abaxially, less densely lepidote adaxially, apex long-acuminate-caudate, acicular, pungent, margins coarsely white-lepidote to glabrous, subdensely spinose, **Sp** 2.5–4 mm, acicular, spreading to retrorse, pale with yellowish-castaneous tip, glabrous, 3–12 mm apart; **Inf** 30–38 cm, simple; peduncle erect, 20–25 cm, dark reddish to greenish, glabrous, distally sulcate; peduncular **Bra** broadly ovate at the base,

apex narrowly sublinear-triangular to acuminate-caudate, rigid, erect, 8–30 × 3–5 mm, exceeding to equalling (lowest) or shorter (upper) than the internodes, stramineous, veined, glabrous, entire (upper) or remotely spinulose (lowest); fertile **Inf** part 15- to 28-flowered, subdense to dense, suberect, 6–14 cm, rachis straight to flexuous towards the apex, dark to wine-red, glabrous; floral **Bra** like the upper peduncular bracts (lowest) to suborbicular and acute and apiculate (upper), distinctly shorter than the sepals (lowest) or exceeding the pedicel (upper); **Fl** subspreading to suberect at anthesis, 15–16 mm, tubular; **Ped** ±2 mm, stout; **Sep** ovate to suborbicular, convex, apex obtuse to acute and sometimes narrowly emarginate, slightly cucullate, 7–8 × 5–8 mm, red or orange-red, glabrous; **Pet** spatulate from a narrowed base, acute to emarginate, ecarinate, 11–13 × 6–10 mm, orange to reddish-orange; **St** slightly exerted; **Fil** free above the 2–2.5 mm high common tube (data from the protologue, completely connate according to fig. 3 in Pinangé & al. (2017)), 8–10 × 1.5–2 mm, yellowish; **Anth** sublinear, slightly to distinctly recurved, 4–4.5 mm, base bilobed, acuminate; **Ov** suboblong-ovate, ±5 × 2 mm, yellowish; **Sty** ±1 mm, yellowish, **Sti** scalloped-lacerate, orange; **Fr** and **Se** unknown.

Closely related to *D. pumila* according to the protologue, but with broader leaves, longer spines, glabrous inflorescences and more numerous flowers, etc. — [F. Krapp]

D. atratiflora P. J. Braun & al. (Bromeliaceae 2009 (2–3): 83–88, ills.; 2010(1): 46 [erratum], 2009). **Type:** Brazil, Goiás (*Esteves Pereira* 446 [UFG]). — **Distr:** Brazil (Goiás); sandy-loamy soil. **I:** Braun (2018: 77).

[2/3b] **Ros** ± 1.25 m \varnothing , with a stem to 17 \times 9 cm in very old plants, solitary or in small groups; **L** $\pm 80 \times 5.8$ cm, sheath $\pm 3.6 \times 9.5$ cm, whitish-green, **L** lamina suberect or recurved, coriaceous, soft and flexible, spreading radially, narrowly triangular to lanceolate, green or chocolate-brown to brownish-red, both faces strongly veined, adaxially brilliantly glossy, abaxially white-lepidote, margins minutely laxly serrate, **Sp** not pungent, antoretorse, ± 1 mm, brown, 3–7 mm apart; **Inf** to 1.75 m, usually simple or with 1 (–9) **Br** to 19 cm; peduncle erect, terete, glossy, green, silky light-grey-lepidote; peduncular **Bra** subfoliaceous, linear-lanceolate, suberect or sinuous, \pm amplexicaul, 8–14 \times 9 mm (uppermost), green at the base, soon brownish-green, withering stramineous, densely veined, tip hard but not pungent, margins minutely serrate with teeth < 1 mm; fertile **Inf** part sparsely flowered at the base, rachis 29–37 cm, green, silky light-grey-lepidote; primary **Bra** like the upper peduncular bracts but shorter; floral **Bra** triangular to lanceolate, base succulent, $\pm 12 \times 3.5$ mm (lowest) to 2.5–4 mm long (uppermost), very dark pink, densely light grey-lepidote; **Fl** horizontally \pm spreading, 17–21 mm; **Ped** ± 6 mm; **Sep** lanceolate, $\pm 10 \times 5.2$ mm, sometimes obtuse, succulent, rose to blackish-green or pink, densely light grey-lepidote (less dense near the margins); **Pet** obtuse, $\pm 15 \times 11$ mm, blackish to very dark orange or pink, apical margins rosy; **Fil** ± 10.5 mm, apical 0.8–1.7 mm free, yellowish-orange; **Anth** $\pm 3 \times 1.6$ mm, yellow, recurved; **Ov** narrowly subpyramidal, $\pm 7\text{--}19 \times 3\text{--}4.5$ mm, yellow with a slight green hue; **Sty** 2.6 mm, very dark pink; **Sti** yellow, hidden at anthesis; **Fr** ellipsoid to ovoid, acuminate, 16–18 \times 11–14 mm, dark brown, lustrous.

D. aurea L. B. Smith (Phytologia 14: 488, t. 1, figs. 46–49, 1967). **Type:** Brazil, Goiás (*Irwin & al.* 13613 [US, NY]). — **Distr:** Brazil (Goiás); ecology not described, ± 1200 m. **I:** Smith & Downs (1974: 575).

[3b] **Ros** not described; **L** to 23 \times 3 cm, sheath suborbicular, 2–3 cm, stramineous, **L** lamina strongly recurved, narrowly triangular, attenuate to an abruptly acute pungent apex, adaxially glabrous, finely lepidote in the narrow grooves abaxially, margins laxly serrate, **Sp** recurved, 1.5 mm; **Inf** to ± 1 m, simple; peduncle sparsely white-lepidote; peduncular **Bra** broadly ovate, acuminate, $< \frac{1}{2}$ as long as the internodes (upper), entire; fertile **Inf** part laxly many-flowered, 30 cm, sparsely and fugaciously white-lepidote; floral **Bra** broadly ovate, acuminate, exceeding the sepals (lowest), entire; **Ped** 4 mm, subcylindrical, stout; **Sep** ovate, broadly subacute, 8 mm; **Pet** obovate, 12 mm, colour not described but presumably yellow; **St** equalling the petals; **Fil** completely connate above the common tube; **Sty** < 1 mm.

Insufficiently known, though apparently recently recollected as material is included in the study of Pinangé & al. (2017).

D. barthlottii R. Vásquez & Ibisch (Bromeliaceae 2012(3): 123–124, ills. (pp. 124–126), 2012). **Type:** Bolivia, Santa Cruz (*Vásquez & Coimbra* 2010 [LPB, NY, SEL, USZ]). — **Distr:** Bolivia (Santa Cruz); lowland Chaco dry forest; only known from a small region.

[3b] **Ros** 30–40 cm \varnothing , with a short stem to 5 mm \varnothing , offsetting; **L** curved, coriaceous, greyish-green, sheath suborbicular, 3 cm wide, **L** lamina narrowly triangular, 15–20 cm, abaxially finely lepidote, margins serrate, **Sp** black with white base, retrorse, 2–4 mm, $\pm 4\text{--}6$ mm apart; **Inf** to 45 cm, erect, simple; peduncle 23 cm, cinereously lepidote; peduncular **Bra** shorter than the internodes, 10 mm, acuminate; fertile **Inf** part 16 cm, ± 10 -flowered, slightly twisted, rather densely grey-tomentose; floral **Bra** broadly ovate, apiculate, shorter than the sepals, erect and appressed to the axis, rather densely grey-tomentose; **Fl** 10 mm, sessile, diverging-ascending, tubular and narrowed towards the tip, with lemon-like scent; **Ped** none; **Sep** elliptic, 6 \times 3 mm, greenish-brown, convex, grey-tomentose, tip slightly incised; **Pet** rhomboid, 10 \times 8 mm, greenish-yellow, carinate, marginally infolded towards the apex, glabrous; **St** included;

Fil shortly connate above the common tube; **Anth** linear, recurved at anthesis; **Ov** oblong-pyramidal, 3 mm; **Sty** and **Sti** not described; **Fr** dark brown, 20 × 10 mm; **Se** 4 × 5 mm, brownish, winged.

First confused with the long-lost *D. gracilis*, from which it differs by the recurved somewhat greyish leaves, tomentose peduncles, tomentose sepals and greenish-yellow petals. The flower colour is described as sulphur-yellow in the protologue text, but the photographs illustrate distinctly greenish flowers. — [U. Egli]

D. beateae E. Gross & Rauh (Trop. subtrop. Pfl.-welt 79: 7–10, Fig. 2, 1991). **Type:** Brazil, Mato Grosso (*Braun* 560 [HEID]). — **Distr:** Brazil (Matto Grosso); flat sandstone rocks, Cerrado vegetation. **I:** Braun (2018: 73).

[1/2] **Ros** flat, ±60–70 cm Ø, acaulescent; **L** numerous, 43–48 × 2 cm, sheath broadly ovate, 2.5 × 3 cm, pale, lustrous, glabrous, **L** lamina narrowly triangular, acuminate, succulent, becoming reddish-green in the sun, both faces white-lepidote, adaxially soon glabrous, margins serrate, **Sp** predominantly retrorse, to 8 mm, light green, ±10 mm apart; **Inf** ±80 cm, 2× or rarely 3× branched; peduncle erect, terete, 50 cm, green, sparsely white-floccose (denser near the flowering part), soon glabrous; peduncular **Bra** membranous, lanceolate, acuminate, 20 mm, shorter than the internodes, light brown, sparsely lepidote, veined; fertile **Inf** part dense, polystichous; **Br** shortly cylindrical to sessile and globose, terminal part of the inflorescence to 9 cm, narrowly conical to cylindrical in outline; primary **Bra** like the peduncular bracts; lower floral **Bra** shallowly bowl-shaped, long-acuminate, membranous, 15 mm, exceeding the flowers, light brown, upper ones triangular-acuminate, erect, thin, 10 × 5 mm, shorter than the sepals, abaxially white-lanate, veined, with a strong midvein, crenate; **Fl** erect-spreading, 15 mm, subsessile; **Sep** oblong-ovate, 10 × 6 mm, obtuse, carinate, slightly crenate at the tip, light orange-yellow, glabrous to sparsely white-lanate; **Pet** rhombic, 14 × 10 mm, erect, ecarinate, crenate, obtuse, brilliant orange, glabrous; **St** exserted; **Fil** free above the common tube, light orange-yellow; **Anth** curved outwards, golden-

yellow; **Ov** not described; **Sty** 3 mm; **Sti** branches free, papillate, orange, equalling the anthers; **Fr** and **Se** not described.

According to the protologue closely related to *D. microcalyx*. The flowers produce abundant nectar.

D. brachyphylla L. B. Smith (Phytologia 19: 282, t. 1, figs. 1–3, 1970). **Type:** Brazil, Minas Gerais (*Irwin & al.* 22383 [US, NY]). — **Distr:** Brazil (Minas Gerais); quartzite outcrops with Cerrado vegetation, 1300 m. **I:** Smith & Downs (1974: 568).

[3a] **Ros** symmetrical, 8.4 cm Ø, densely leaved; **L** ±9 × 1.2 cm, sheath broad, wholly covered, 15 mm, **L** lamina recurved, broadly canaliculate, soon glabrous adaxially, appressedly whitish-lepidote abaxially, margins very laxly serrate, **Sp** nearly straight to antrorse-uncinate, slender, 0.8–1.1 mm, yellow, 3–10 mm apart; **Inf** to 50 cm, simple; peduncle straight, white-lepidote, soon glabrous; peduncular **Bra** ovate, acuminate, much shorter than the internodes, entire; fertile **Inf** part 7 cm, few-flowered, lax at the base, sparsely white-lepidote when young; floral **Bra** ovate, acuminate, shorter than the sepals, entire; **Fl** subsessile; **Sep** broadly ovate, 4 mm, rounded at the apex and cucullate, ecarinate; **Pet** erect, elliptic, 8 mm, ecarinate, orange; **St** included; **Fil** free above the common tube; **Anth** linear; **Ov** not described; **Sty** 0.7 mm; **Sti** sessile; **Fr** and **Se** not described.

Similar to *D. elongata*, and often confused with *D. macedoi*. The species belongs into the *D. saxatilis* complex (Guarçoni & al. 2014).

D. brachystachya Rauh & E. Gross (Trop. subtrop. Pfl.-welt 65: 8–10, figs. 3 and 4, 1988). **Type:** Brazil, Bahia (*Rauh* 56443a [HEID]). — **Distr:** Brazil (Bahia); quartzitic rocks.

[3b] **Ros** ±7-leaved, with a short stem surrounded by old leaf sheaths; **L** to 17 × 1 cm, sheath broadly ovate, to 2 × 1.8 cm, glabrous adaxially, densely lepidote abaxially, **L** lamina erect (younger) to reflexed (older), sturdy, strongly canaliculate, with pungent tip, reddish-green, adaxially sparsely white-lepidote, abaxially veined and denser white-lepidote, serrate, **Sp**

retorse, 2 mm, brownish; **Inf** to 12 cm, simple, erect; peduncle 6 cm, much shorter than the leaves, olive-green, floccose; peduncular **Bra** triangular, slightly longer (lower) or shorter (upper) than the internodes, appressed, soon drying; fertile **Inf** part 4- to 7-flowered, 2–3 cm; floral **Bra** narrowly-lanceolate from a broad sheath, small, much shorter than the sepals, olive-green, lanate; **Fl** spreading, hardly opening, subsessile; **Sep** free, broadly ovate, 5×5 mm, obtuse, ecarinate, brilliant orange, abaxially sparsely lanate; **Pet** erect, spatulate, 10×5 mm, obtuse, brilliant orange; **Fil** high-connate and forming a tube 5 mm long, yellowish; **Ov** 5 mm, white; **Sty** erect, ± 2 mm; **Sti** surpassed by the anthers; **Fr** and **Se** not described.

Compared with *D. oligantha* (here treated as synonym of *D. saxatilis*) in the protologue, but with shorter inflorescences and subsessile flowers.

D. bracteata (Wittmack) Mez (in Martius, Fl. Bras. 3(3): 470, 1894). **Type:** Brazil, Minas Gerais (*Schenck* 3510 [B]). — **Distr:** Brazil (Minas Gerais); high-altitude grassland, rocky fields, >1900 m. **I:** Machado & al. (2016: 138).

\equiv *Dyckia dissitiflora* var. *bracteata* Wittmack (1891).

[3b] **Ros** solitary or with few offsets; **L** $50 \times \pm 1.5$ cm, sheath not described, lamina narrowly triangular, densely cinereous-lepidote abaxially, **Sp** 1.5–2 mm; **Inf** to 50 cm and more, often appearing simple and spicate but usually paniculately branched from near the base; peduncle ferruginous-tomentulose; peduncular **Bra** ovate, long-attenuate, exceeding the internodes, laxly lacinate-spinulose; fertile **Inf** part densely ferruginous-tomentulose; floral **Bra** spreading, lanceolate-ovate, acuminate, to 25 mm, exceeding the flowers, spinulose-serrate; **Ped** short; **Sep** obtuse, convex, 12 mm, fimbriate; **Pet** lamina large, suborbicular, obtuse, slightly undulate, ecarinate, apparently erect, 16 mm, orange; **St** included, **Fil** 2–6 mm connate above the common tube; **Anth** oblong, acute, recurved; **Sty** $\frac{1}{3}$ as long as the ovary.

Similar to and sometimes misidentified as *D. minarum* or *D. reitzii*. Insufficiently known.

D. brasiliiana L. B. Smith (Phytologia 14: 481, t. 1, figs. 13–15, 1967). **Type:** Brazil, Distrito

Federal (*Irwin & al.* 10268 [US, NY]). — **Distr:** Brazil (Distrito Federal); open Cerrado vegetation. **I:** Smith & Downs (1974: 539).

[3b] **Ros** densely many-leaved; **L** $>30 \times 2$ –3 cm, sheath suborbicular, castaneous, **L** lamina linear-triangular and filiform-attenuate, appressedly white-lepidote abaxially, laxly serrate, **Sp** slender, retrorsely curved, 2.5 mm; **Inf** to 1.5 m, simple; peduncle sparsely and finely white-lepidote, soon glabrous; peduncular **Bra** lanceolate-ovate, acuminate, very irregularly longer and shorter than the internodes, serrulate; fertile **Inf** part elongate, laxly many-flowered, finely and fugaciously white-lepidote; floral **Bra** ovate, acuminate, broad, exceeding the flowers (lowest), serrulate; **Ped** 5–7 mm, subterete; **Sep** suborbicular, 9 mm, cucullate; **Pet** broadly obovate, 15 mm, suberect to spreading, orange; **St** included; **Fil** connate above the common tube; **Sty** very short.

Similar to *D. pseudococcinea*. — [F. Krapp]

D. braunii Rauh (J. Bromeliad Soc. 40(1): 25–26, ill., 1990). **Type:** Brazil, Goiás (*Braun & Esteves* P. 690 [HEID]). — **Distr:** Brazil (N Goiás); rocky exposed areas. **I:** Braun & Esteves Pereira (1991); Braun & al. (2008).

[3a] **Ros** solitary or rarely branched, with 10–15 leaves, to 9×20 cm \varnothing ; **L** to 10×4 cm, 2 mm thick, lamina stiff, adaxially shiny silvery to white-lepidote with the scales arranged in conspicuous rows, marginal **Sp** black to brown, glabrous; **Inf** to 1.2 m but usually less, simple or compound; peduncle to 50 cm, reddish-brown, glabrous; fertile **Inf** part slender, laxly spirally 8- to 12-flowered, 15–30 (–70) cm; floral **Bra** to 4×3 mm, frequently much reduced or absent; **Fl** sessile, erect to suberect, tubular to tubular-urceolate and narrowed towards the throat, $\pm 10 \times 5$ mm, yellow to light orange, unscented; **Sep** thin, hyaline, tough, ovate, $\pm 7 \times 3$ mm, yellowish-orange, glabrous, occasionally with some nectar drops; **Pet** 10–11 \times 7–8 mm, orange; **St** almost included at anthesis; **Fil** 8 mm, free above the common tube; **Sty** ± 1.7 mm; **Fr** sessile, 6–9 \times ± 8 mm, brown; **Se** 1.5–3 mm \varnothing , light brown, chartaceous, thin.

Closely related to *D. joanae-marcoi* with more open flowers. The species is self-fertile according to Braun & al. (2008).

D. brevifolia Baker (Refug. Bot. 4: t. 236 + text, 1871). **Type:** [icono]: l.c. t. 236. — **Lit:** Rogalski & al. (2009: pollination ecology, with ill.). **Distr:** Brazil (Minas Gerais, Rio de Janeiro, São Paulo, Santa Catarina, Rio Grande do Sul), Uruguay (Rivera)?; ledges along streams and rock islands, seasonally inundated. **I:** Smith & Downs (1974: 539); Reitz (1983: t. 44).

Incl. *Dyckia sulphurea* K. Koch (1874); **incl.** *Dyckia gemellaria* E. Morren ex Mez (1894).

[3a] **Ros** dense, many-leaved, in dense groups of 2–5 and more; **L** 10–20 × 2.5–3.5 cm, very thick when living, sheaths suborbicular or reniform, scarcely wider than the lamina, **L** lamina lanceolate-triangular, acute, glabrous adaxially, minutely pale-lepidote between the prominent veins abaxially, evenly laxly serrate, **Sp** hooked, 2 mm; **Inf** 40–110 cm, simple; peduncle stout, soon glabrous; peduncular **Bra** leaf-like and densely imbricate (lower) or much shorter (upper), longer than the internodes, serrulate or sometimes entire (upper); fertile **Inf** part lax or rather dense at anthesis, many-flowered, soon glabrous; floral **Bra** spreading or reflexed, narrowly lanceolate-triangular, entire, the lowest usually exceeding the flowers; **Fl** spreading at anthesis, afterwards erect; **Ped** 2–4 mm at anthesis, elongating in fruit; **Sep** ovate, acute or obtuse, to 8 mm, glabrous; **Pet** lamina spreading, suborbicular, ±10 mm, obtuse or apiculate, ± carinate towards the apex, not undulate, bright yellow; **St** included; **Fil** free above the very short common tube; **Anth** narrowly triangular, acute, recurved; **Sty** ± ½ as long as the ovary.

Winkler (1982: 34) reports the taxon for N-most Rio Grande do Sul from rocks in the river bed of the Rio Uruguay, and it likely also occurs in neighbouring Argentina (Formosa). Whether superficially similar broad-leaved plants from N Uruguay are this species has not yet been clarified. — The main pollinator is the hummingbird *Amazilia versicolor* (Rogalski & al. 2009).

D. burchellii Baker (Handb. Bromel., 131, 1889). **Type:** Brazil, Goiás (*Burchell* 8178 [K, GH [photo]]). — **Distr:** Brazil (Goiás); rocky terrain, 400–800 m.

[3a] **Ros** not described; **L** >40 cm, sheaths broadly ovate, thick, dark, **L** lamina very narrowly triangular, becoming involute, with pungent tip, sharply carinate and appressedly pale-lepidote abaxially, entire (inner) or basally minutely spinose (outer), **Sp** brown, hooked; **Inf** to 50 cm, simple; peduncle ±16 cm, slender, lepidote or glabrous; peduncular **Bra** suborbicular with long linear lamina, slightly shorter than the internodes, entire; fertile **Inf** part lax, 2- to 6-flowered, axis very slender, ± glabrous; floral **Bra** spreading, broadly ovate with 10–13 mm long acuminate tips (lower), exceeding the flowers; **Fl** suberect, subsecund, 9 mm or longer, glabrous, subsessile; **Sep** subelliptic with a minute recurved mucro at the apex; **Pet** erect, lamina large, suborbicular, obtuse, colour not described; **St** included; **Fil** free above the common tube; **Anth** elliptic, acute, straight or slightly recurved; **Sty** very short; **Fr** and **Se** not described.

Insufficiently known and not recently collected.

D. burle-marxii L. B. Smith & Read (Phytologia 38: 137–138, t. 5, 1977). **Type:** Brazil, Bahia (*Burle Marx* s.n. [HB, US [photo]]). — **Distr:** Brazil (Bahia: Chapada Diamantina); ecology not recorded.

[1?] **Ros** not described; **L** >30 × 1.5 cm, sheath not described, **L** lamina very narrowly triangular, between the veins finely pale-lepidote abaxially, soon glabrous and lustrous adaxially except on the spines, laxly spinose-serrate, **Sp** curved, 9 mm; **Inf** 1.7 m or more, compound; peduncle glabrous at least with age; peduncular **Bra** ovate, lamina narrowly triangular (lower) to attenuate (upper), exceeding the internodes but not imbricate, serrulate (lower) or entire (upper); fertile **Inf** part finely cinereous-tomentose; **Br** suberect, slender, ±30 cm; primary **Bra** lanceolate-ovate, attenuate, to 5 cm, serrulate or entire; floral **Bra** broadly ovate, acuminate, nearly equalling the sepals; **Ped** 3 mm, obconical; **Sep** broadly subelliptic, 6 mm, broadly rounded at the apex, ecarinate, cucullate at anthesis; **Pet** lamina spreading, elliptic, 8 mm, broadly rounded, ecarinate, orange; **St** ± equalling the petals; **Fil** high-connate above the common tube; **Ov** broadly ovoid; **Sty** very short.

Probably related to *D. encholirioides*. — [F. Krapp]

D. cabrerae L. B. Smith & Reitz (Sellowia 14: 101, fig. 2, 1962). **Type:** Brazil, Santa Catarina (Smith & al. 9262 [US, HBR]). — **Distr:** Brazil (Santa Catarina); dry open ground and rocks. **I:** Smith & Downs (1974: 523).

[1/2?] **Ros** dense, many-leaved; **L** 31–40 × 1.5 cm, rigid, slightly curved, sheath ovate, 3 × 2–4 cm, glabrous and sublustrous adaxially, densely cinereous-lepidote towards the apex abaxially, **L** lamina linear, canaliculate, acute, abruptly acute and mucronulate, appressedly cinereous-lepidote, soon glabrous adaxially, laxly serrate, **Sp** slender, retrorsely curved, 3 mm, brown; **Inf** to 1.2 m, branched; peduncle ± flattened, ±70 cm, glabrous; peduncular **Bra** broadly ovate, acuminate or the lowest leaf-like, the uppermost remote, cinereous-lepidote towards the apex, glabrous elsewhere; fertile **Inf** part with 1–2 long-stipitate racemes at the base, lax, 38–54 cm, diffusely cinereous-lepidote, soon glabrous; **Br** few-flowered; primary **Bra** like the upper peduncular bracts, to 2 cm, much exceeded by the sterile branch bases; floral **Bra** acuminate from a broadly ovate base, ascending, reaching ± the middle of the sepals, minutely serrulate; **Fil** suberect, to 17 mm, orange; **Ped** 5 mm, slender; **Sep** broadly ovate, 8–13 mm, acute, strongly incurved, subeven, the posterior ones strongly carinate; **Pet** distinctly unguiculate, curved-spreading towards the apex, lamina rhombic, obtuse; **St** slightly shorter than the petals; **Fil** short-connate above the common tube; **Anth** narrowly triangular, 3 mm, recurved towards the apex; **Ov** ovoid; **Sty** short; **Fr** stout-ovoid, acute, 18 mm, dark castaneous, lustrous; **Se** subovate, 4 mm, strongly complanate, wing asymmetrical and circumferential.

D. cangaphila P. J. Braun & al. (Bromeliac 2010(3): 107, ill. (pp. 105–110), 2010). **Type:** Brazil, Goiás (Esteves Pereira 392 [UFG]). — **Distr:** Brazil (SW Goiás); iron-rich gravel deposits (“pedra canga”) on and between sandstone. **I:** Esteves Pereira & Gouda (2017: 180).

[2/3a] **Ros** with up to 70 living leaves, to 35 cm Ø, with a stem to 11 × 4.7 cm; **L** to 19 × 2.6 cm,

sheaths broadly ovate, to 1.8 × 2.8 cm, whitish, glabrous adaxially, **L** lamina arching, very rigid, concave, triangular-lanceolate, brownish-red to purple, sometimes green basally, veined, adaxially glossy and sparsely lepidote basally, abaxially densely light grey-lepidote, serrate, **Sp** strong and claw-like, pungent, brownish; **Inf** to 1.3 m, simple or with up to 3 branches; peduncle ± erect, 85–107 cm, pale green to pale brownish, densely grey-lepidote; peduncular **Bra** leaf-like, triangular-lanceolate, to 65 × 5.5 mm (uppermost only to 17 mm), green to brownish-green (lower) or dull pale green (upper), later stramineous; fertile **Inf** part to 41 cm, 37- to 52-flowered, basally lax, above much denser, rachis initially pale green, towards the apex changing to greenish-orange or orange, grey- or orange-lepidote; **Br** slender, ±15 cm; floral **Bra** ±19 mm, sometimes equalling the petals, smaller higher up, brownish-green, soon stramineous, strongly veined; **Fil** slightly ascending, ±16 × 8 mm; **Ped** absent in bud, to 7 mm at anthesis; **Sep** ±7.7 × 6.5 mm, orange-yellowish, creamish-yellow-lepidote, base succulent; **Pet** obtuse, ±11 × 7.6 mm, emarginate (V-like), orange-yellowish; **St** included at anthesis; **Fil** 7.6 mm, apical 1.4 mm free, yellow; **Anth** yellow, ±3.5 mm, apex curved; **Ov** narrowly pyramidal, ±5.5 × 2.8 mm, yellow to light yellow; **Sty** ±4 mm; **Sti** lobes linear, yellow; **Fr** conically ovoid, to 15 × 12 mm, chestnut-brown to blackish-wine-coloured.

Closely related to *D. pumila*.

D. choristaminea Mez (Repert. Spec. Nov. Regni Veg. 16: 71, 1919). **Type:** Brazil, Rio Grande do Sul (Malme s.n. [B]). — **Distr:** S Brazil (Rio Grande do Sul); open rocky places. **I:** Smith & Downs (1974: 528). — Fig. 2.

[3a] **Ros** solitary or with some congested off-sets, to 15 cm Ø; **L** 7–12 × 0.5 cm, sheath suborbicular, 2 cm, pale, glabrous, **L** lamina linear, deeply canaliculate, both faces cinereous-lepidote, margins laxly serrate, **Sp** slender, curved, 2.5 mm; **Inf** 15–25 cm, simple; peduncle slender, glabrous; peduncular **Bra** densely imbricate, broadly ovate, abruptly acute, somewhat inflated, minutely lepidote; fertile **Inf** part few-flowered, 3–5 cm, rachis densely white-

Fig. 2 *Dyckia choristaminea* (Kirschnek s.n.: Brazil; Rio Grande do Sul, sine loco). (Copyright: U. Eggli)



villous, subterete; floral **Bra** like the peduncular bracts, carinate towards the apex, 15 mm, equaling the sepals, entire; **Ped** short, stout; **Fl** 18–24 mm, \pm funnel-shaped; **Sep** very broadly ovate, acute, 10–11 mm; **Pet** lobes spreading to recurved at anthesis, yellow; **St** included to slightly exserted; **Fil** free above the very short common tube; **Ov** 8 mm; **Sty** very stout, 8 mm.

D. cinerea Mez (in Martius, Fl. Bras. 3(3): 469, 1894). **Type:** Brazil, sine loco (*Glaziou* 18570 [B, K, F [photo]]). — **Distr:** Brazil (Minas Gerais); high-altitude grasslands, rocky fields, on rocks.

[2] **Ros** acaulescent; **L** very numerous, $\pm 50 \times >3$ cm, very rigid, sheath not described, **L** lamina narrowly triangular, densely cinereous-lepidote, laxly serrate, **Sp** stout, curved, 2.5 mm; **Inf** 1 m or more, compound or pseudo-racemose with reduced branches or buds only in the axils of the lower bracts; peduncle stout, cinereous-tomentulose or glabrescent; peduncular **Bra** broadly ovate with narrowly triangular lamina, exceeding the internodes, serrulate; fertile **Inf** part cinereous-tomentulose; floral **Bra** broadly ovate, apiculate, reflexed (upper), equaling the flowers or shorter (lower), serrulate; **Ped** short, stout; **Fl** erect to spreading, 17–18 mm, orange; **Sep** 11 mm, abruptly obtuse, cucullate, obtusely carinate towards the apex, subglabrous, minutely fimbriate; **Pet** erect, elliptical-oblong, 16 mm,

subacute or obtuse, orange; **St** much shorter than the petals; **Fil** 2 mm connate above the common tube; **Anth** sublinear, stout, \pm recurved; **Sty** \pm none.

D. commixta Hassler (Annuaire Conserv. Jard. Bot. Genève 20: 305, 1919). **Type:** Paraguay, Cordillera (*Chodat & Vischer* 97 p.p. [G, F [photo]]). — **Distr:** Brazil (Paraná), Paraguay; ecology not reported.

[3a] Known only from fragments; inner **L** 6 \times 0.5 cm, sheaths triangular-elliptic, 3 \times 1.5 cm, membranous, glabrous adaxially, striate abaxially with whitish scales between the veins, margins entire and hyaline, **L** lamina linear-triangular, attenuate, pungent, \pm glabrate adaxially, like the sheaths abaxially, serrate, **Sp** antroretroscly curved or straight, 1–1.5 mm; **Inf** size unknown, pseudosimple; peduncle flexuous, long, glabrous; peduncular **Bra** broadly ovate, acuminate (lower), much shorter than the internodes, 6–20 mm (lowest), striately immersed-lepidote (lowest), with hyaline margin and \pm finely fimbriate (uppermost); fertile **Inf** part with undeveloped buds in the axils of the lowest bracts, laxly flowered, rachis flexuous, subquadrangular, glabrous; floral **Bra** erect to spreading, broadly ovate, acute and mucronulate, convex, 5–6 mm, \pm $\frac{1}{2}$ as long as the sepals, glabrous; **Fl** 14–15 mm; **Ped** 1–2 mm, rather stout; **Sep** ovate-elliptic, 10 \times 7 mm, subacute, thin, with hyaline margin, glabrous,

rugulose when dry; **Pet** erect, ovate-elliptic, 14 mm, ecarinate, inflexed at the apex, colour not described; **St** included; **Fil** free above the 2 mm high common tube; **Anth** linear-triangular, sagittate at the base, 6 mm; **Ov** trigonous, 10 mm; **Sty** 1 mm.

D. concepcionensis O. B. C. Ribeiro & Leme (J. Bromeliad Soc. 65(1): 15–19, ill., 2015). **Type:** Brazil, Minas Gerais (*Ribeiro* 267 [BHCB]). — **Distr:** Brazil (Minas Gerais: Conceição do Mato Dentro); on iron-rich rock (“pedra canga”) outcrops, ± 1000 m.

[3a] **Ros** ± 20 cm \varnothing ; **L** ± 20 , erect to spreading, straight to arcuate, coriaceous, sheath 1.7–1.9 \times 2–2.2 cm, whitish, glabrous and glossy on both faces, **L** lamina narrowly triangular, 9–10 \times 1.5 cm, canaliculate, dark red to bronze-coloured towards the tip, adaxially glabrous and glossy, abaxially distinctly veined and between the veins rather densely white-lepidote, tip acuminate spine-tipped, pungent, margins laxly spinose, **Sp** retrorse-uncinate, 2.5–3 mm, subtriangular, ± 15 mm apart; **Inf** ± 50 cm, simple, erect; peduncle 30–35 cm, glabrescent, reddish-green; peduncular **Bra** ovate-acuminate, 9–11 \times 5–6 mm, much shorter than the internodes, greenish near the base to ochraceous near the tip, veined and with prominent midvein near the tip, sparsely white-lepidote, margins minutely denticulate to subentire; fertile **Inf** part 18–20 cm, laxly 6- to 20-flowered, rachis reddish, sparsely lepidote; floral **Bra** broadly ovate, 9–10 \times 5–6 mm, acute, remotely denticulate, somewhat spreading; **Fl** 14–15 mm, porrect-spreading, tubular, sessile; **Sep** broadly ovate, 6–7 \times 5–6 mm, orange-red, obtuse-emarginate, convex, sparsely white-lepidote; **Pet** broadly spatulate, 10–11 \times 9 mm, erect, orange, ecarinate, broadly obtuse-emarginate; **St** included; **Fil** yellow, free above the common tube; **Anth** suboblong-lanceolate, straight, base bilobed; **Ov** ± 6 mm, suboblong, yellow; **Sty** ± 1 mm, distinct, orange; **Sti** conduplicate-spiral; **Fr** and **Se** unknown.

A member of the *D. saxatilis* complex, and compared with the similar *D. brachyphylla* in the protologue. — [U. Eggli]

D. consimilis Mez (in Martius, Fl. Bras. 3(3): 479, t. 90, 1894). **Type:** Brazil, Minas Gerais (*Weddell* 1407 [P, GH [photo]]). — **Distr:** Brazil (Minas Gerais); rocky fields, on rocks. **I:** Smith & Downs (1974: 575).

[3b] **Ros** acaulescent, with a basal bulbous part and a short thick rhizome; **L** numerous, densely arranged, $\pm 5 \times 0.7$ cm, sheath broad and conspicuous, depressedly semicircular, glabrous and glossy, abaxially brownish, **L** lamina narrowly triangular, glabrous adaxially, appressedly ferruginous- or canescent-lepidote abaxially, laxly serrate, **Sp** stout, 3 mm; **Inf** < 50 cm, simple; peduncle slender, completely glabrous; peduncular **Bra** ovate, acuminate, much shorter than the internodes, obscurely serrulate; fertile **Inf** part subdense, few-flowered, glabrous or sparsely lepidote; floral **Bra** broadly ovate, long-apiculate, 5 mm, slightly shorter than the sepals; **Fl** spreading or reflexed, ± 8 mm; **Ped** very short; **Sep** broadly ovate, 4 mm or longer, subacute; **Pet** lamina erect, suborbicular, colour not described; **St** included; **Fil** high-connate above the common tube; **Anth** narrowly subtriangular, recurved; **Sty** very short.

Insufficiently known and apparently not recently recollected. Nonetheless, it is compared with *D. nana* in the protologue of the latter, and Guarçoni & al. (2014) place it in the *D. saxatilis* complex.

D. coximensis L. B. Smith & Reitz (Phytologia 19: 282, t. 1, figs. 4–6, 1970). **Type:** Brazil, Mato Grosso (*Reitz* 7365 [HBR, US [photo]]). — **Distr:** Brazil (Mato Grosso); on rocks. **I:** Smith & Downs (1974: 565).

[3a] **Ros** symmetrical; **L** incompletely known, recurved, $> 10 \times 1.5$ cm, sheath suborbicular, 1.5 cm, brown, **L** lamina narrowly triangular, pungent, appressedly cinereous-lepidote on both faces, margins very laxly serrate, **Sp** flat, mostly retrorse, 1 mm; **Inf** 30 cm, simple; peduncle erect, very sparsely and minutely white-lepidote; peduncular **Bra** ovate, acuminate, pungent, small, remote; fertile **Inf** part laxly ± 7 -flowered, rachis slender, 4 cm, very sparsely and minutely lepidote; floral **Bra** broadly ovate, acuminate, the lower \pm equaling the sepals; **Fl** spreading; **Ped** 1 mm, obconical;

Sep triangular-ovate, 5 mm, obtuse, the posterior carinate; **Pet** suborbicular, 10 mm, slightly carinate, orange; **St** slightly exerted; **Fil** free above the short common tube; **Sty** very short.

Similar to *D. pumila*. The recently described *D. secundifolia* is also compared with *D. coximensis* in its protologue.

D. crassifolia Rauh (Trop. subtrop. Pfl.-welt 79: 10–11, fig. 4, 1991). **Type:** Bolivia, Santa Cruz (*Rauh* 40670 [HEID]). — **Distr:** Bolivia (Santa Cruz); dry forest, 1200 m.

[3a] **Ros** few-leaved, to 16 cm Ø, ±8 cm high, acaulescent; **L** 10–16 × 1.2 cm, strongly succulent, sheath 1.5 × 1.3 cm, white, glabrous adaxially, lepidote abaxially, **L** lamina narrowly triangular, with a long pungent tip, pale green to reddish adaxially, densely white-lepidote abaxially, margins spinose, **Sp** strong, retrorse, to 5 mm, dark brown, lepidote, ±10 mm apart; **Inf** to 45 cm, simple; peduncle slender, 30–40 cm, green to reddish, sparsely white-lepidote; peduncular **Bra** oblong-ovate, acuminate, 5 mm, shorter than the internodes, veined, indistinctly serrulate; fertile **Inf** part lax, 10 cm, ±10-flowered, rachis green to reddish, sparsely white-lepidote, slender; floral **Bra** broadly ovate, short-acuminate, very small, 2 mm, brownish, membranous, appressed; **Fl** spreading, 17 mm, narrowly tubular and narrowed towards the throat; **Ped** very short, stout; **Sep** oblong, 7 mm, obtuse, succulent, slightly carinate, orange-red, darker at the tip, sparsely white-lepidote, margins membranous, indistinctly serrulate; **Pet** 15 mm, obtuse, erect, orange-red, margins smooth; **St** slightly exerted; **Fil** free above the very short common tube; **Anth** curved outwards; **Sty** much shorter than the conspicuous **Sti** branches; **Fr** and **Se** not described.

Similar to *D. leptostachya*. Sometimes treated as synonym of *D. pulquinensis*. — [F. Krapp]

D. crocea L. B. Smith (Phytologia 19: 282, t. 1, figs. 7 and 8, 1970). **Type:** Brazil, Paraná (*Hatschbach* 17391 [US]). — **Distr:** Brazil (Paraná); open fields; **I:** Smith & Downs (1974: 575).

[3b] **Ros** many-leaved; **L** to 25 × 0.8–1.3 cm, sheath suborbicular, 3 cm, yellow, glabrous and

lustrous adaxially, **L** lamina very narrowly triangular, soon glabrous adaxially, appressedly pale-lepidote abaxially, laxly serrate, **Sp** recurved or spreading, 1–2.5 mm; **Inf** 60–120 cm, usually simple; peduncle straight or nearly so, glabrous; peduncular **Bra** ovate, acuminate, shorter than most of the internodes, entire or inconspicuously serrulate; fertile **Inf** part laxly many-flowered, 17–32 cm, soon glabrous; floral **Bra** spreading, ovate, acuminate, shorter than the sepals, entire; **Sep** ovate, acute, ± carinate, 8–9 mm; **Pet** lamina elliptic, cucullate, 15 mm, orange; **St** included; **Fil** connate above the common tube; **Sty** ± none.

Similar to *D. aurea*. — [F. Krapp]

D. dawsonii L. B. Smith (Contr. Sci. Nat. Hist. Mus. Los Angeles County 17: 2, figs. 2–4, 1957). **Type:** Brazil, Goiás (*Dawson* 15236 [R, LAM, US]). — **Distr:** Brazil (Goiás); rock outcrops along a canyon, Cerrado vegetation. — Fig. 3.

[3b] **Ros** acaulescent, 30–40 cm Ø, slowly offsetting and forming a dense clump; **L** to 22 × 0.7 cm, mostly spreading, sheath suborbicular, >2 cm wide, stramineous, lustrous, glabrous, **L** lamina linear, appressedly cinereous-lepidote on both faces, laxly serrate, **Sp** slender, curved, 5–7 mm, mostly subopposite; **Inf** ±70 cm, simple; peduncle glabrous; peduncular **Bra** broadly ovate with a linear lamina, thin, all but the lowest much shorter than the internodes, entire; fertile **Inf** part lax, 25–30 cm, glabrous; floral **Bra** suborbicular, apiculate, thin, 4 mm, erose; **Ped** 3 mm, stoutly obconical; **Sep** broadly elliptic, obtuse, thin, ecarinate, 5–6 mm; **Pet** ecarinate, lamina broadly obovate, 9 mm, yellow; **St** exerted; **Fil** 2 mm connate above the 1 mm high common tube; **Sty** ± none.

The protologue description is incomplete; rosette characters have been added from offspring of the type collection cultivated at the Sukkulentent-Sammlung Zürich. The species has recently used for hybridization, with *Dyckia* 'Brittle Star' (likely = *D. fosteriana* × *D. platyphylla*) as second parent, yielding very attractive plants (Saul 2018).

D. delicata Larocca & Sobral (Novon 12(2): 234–236, ill., 2002). **Type:** Brazil, Rio Grande

Fig. 3 *Dyckia dawsonii* (Dawson 15236: Brazil; Goiás, E of Formoso, type collection.). (Copyright: U. Eggli)



do Sul (*Larocca & al.* 96/001 [ICN, MBM, US, ZSS]). — **Lit:** Sachs (2011: with ills.). **Distr:** Brazil (Rio Grande do Sul); basalt outcrops.

[1?] **Ros** 20–60 cm Ø; **L** lamina 5–20 × 0.7–2 cm, succulent, eventually recurved in solitary individuals, cinereous to reddish-cinereous, densely pale-lepidote on both faces, sheath broadly triangular, **L** lamina linear-triangular, apex forming a rigid spine, margins undulate, **Sp** soft, straight, antrorretorse, flexible, 5–7 mm, 3–5 mm apart near the leaf tip; **Inf** ±120 cm, simple or with up to 9 branches to 35 cm long; peduncular **Bra** linear-lanceolate, papyraceous, 30–55 × 6–16 mm, exceeding the internodes (lower) or shorter (upper), with 10–20 parallel veins, glabrous, with teeth to 3 mm (upper); fertile **Inf** part 80- to 150-flowered, erect, rachis softly ridged, glabrous; floral **Bra** elliptic-ovate, rounded or acute, 5.5–8 × 5–6 mm, glabrous; **Sep** ovate-oblong, rounded, 6–7 × 3.5–4 mm, green, margins hyaline for ±1 mm; **Pet** lanceolate-spatulate to oblanceolate, 10–13 × 3–4 mm, yellow; **St** 9–10 mm; **Fil** somewhat unequally fused with the petals, free above the common tube; **Anth** lanceolate-ovate, ±2 × 1 mm; **Ov** triquetrous, oblong-acute, ±7 × 2.5–3 mm; **Sty** 7–10 mm, **Sti** lobes papillose; **Fr** ellipsoid, 9–12 × 3–5 mm; **Se** triangular, with a reduced wing along the longitudinal axis, 1.2–1.7 × 0.5–1 mm.

Similar to *D. hebdingii*. — [F. Krapp]

D. deltoidea (L. B. Smith) L. B. Smith (*Phytologia* 14: 485, 1967). **Type:** Brazil, Paraná (*Dusén* 17357 [GH, S]). — **Distr:** Brazil (Paraná); campo, 740 m.

≡ *Dyckia coccinea* var. *deltoidea* L. B. Smith (1943) ≡ *Dyckia tuberosa* var. *deltoidea* (L. B. Smith) L. B. Smith (1950).

[3a] **Ros** not described; **L** >40 × 1.4 cm, sheath suborbicular, 4 cm, brown, **L** lamina linear, attenuate to a finely subulate rigid apex, flat, glabrous adaxially, closely appressedly brownish-lepidote abaxially, very laxly serrate, **Sp** slender, curved, 2 mm; **Inf** to 80 cm, simple; peduncle soon glabrous; peduncular **Bra** erect, subfoliaceous and imbricate (lowest) to ovate and acuminate, shorter than the internodes, densely lepidote abaxially; fertile **Inf** part lax, 23–28 cm, rachis soon glabrous; floral **Bra** narrowly triangular, to 22 mm, exceeding the lowest flowers, densely appressed-lepidote abaxially, minutely serrulate; **Fl** spreading; **Ped** 5 mm, subcylindrical, stout; **Sep** broadly ovate or elliptic, 10 mm, acuminate, mucronate, smooth except for the strong midvein, slightly if at all carinate, minutely serrulate, white-lepidote, glabrescent; **Pet** lamina suberect to spreading, subrhombic, 17 mm, carinate-complicate, orange-yellow; **St** included; **Fil** free above the common tube; **Sty** ± none. — [F. Krapp]

D. densiflora Schultes *fil.* (in Roemer & Schultes, Syst. Veg. 7(2): 1194, 1830). **Type:** Brazil, Minas Gerais (*Martius* s.n. [M, US [photo]]). — **Distr:** Brazil (Minas Gerais: Diamantina region: Morro de Vila Rica); rocky slopes, 1070–1200 m; only known from the region of the type locality. **I:** Smith & Downs (1974: 535).

[3b] **Ros** not described; **L** to 5 × 0.7 cm, sheath 2 cm wide, dark brown, glabrous, **L** lamina narrowly triangular, soon glabrous adaxially, cinereous-lepidote abaxially, laxly serrate, **Sp** 2 mm; **Inf** to 40 cm, simple; peduncle densely ferruginous-lepidote; peduncular **Bra** ovate, acuminate, equalling the internodes, densely serrulate; fertile **Inf** part subdensely few-flowered, densely tomentose-lepidote; floral **Bra** spreading or reflexed, ovate, acuminate, equalling the sepals (lower) or shorter (upper), serrulate; **Fl** spreading at anthesis and then erect, 10 mm; **Ped** 2 mm; **Sep** ovate, 8 mm, apiculate, fimbriate-serrulate; **Pet** lamina suberect, broadly elliptic, obtusely undulate, barely carinate, orange; **St** slightly shorter than the petals; **Fil** high-connate (to completely connate) above the common tube; **Anth** stout, subacute, ± recurved; **Sty** very short. — [F. Krapp]

D. dissitiflora Schultes *fil.* (in Roemer & Schultes, Syst. Veg. 7(2): 1194, 1830). **Type:** Brazil, Bahia (*Martius* s.n. [M, F [photo]]). — **Distr:** Brazil (Bahia, Minas Gerais, Piauí); on rocks in dense Caatinga vegetation or savanna.

[3b] **Ros** not described; **L** ±20 × ±1 cm, sheath not described, **L** lamina narrowly triangular, densely appressed-lepidote abaxially, serrate, **Sp** slightly >1 mm; **Inf** 50–100 cm, simple; peduncle glabrous; peduncular **Bra** ovate with long-attenuate pungent lamina, much shorter than the internodes, entire; fertile **Inf** part lax, elongate, lepidote; floral **Bra** spreading, lanceolate and acuminate (lower) or broadly ovate and apiculate (upper), equalling or exceeding the sepals (lower) or much shorter (upper); **Fl** 12–13 mm; **Ped** 3–4 mm; **Sep** elliptic, broadly acute and apiculate, straight or nearly so, 7 (–9) mm, furfuraceous esp. towards the base; **Pet** suberect, lamina suborbicular, carinate, when dry brownish-yellow; **St** included; **Fil** completely

connate above the common tube; **Anth** narrowly triangular, acute, nearly or quite straight; **Sty** ⅓ as long as the ovary. — [F. Krapp]

D. distachya Hassler (Annuaire Conserv. Jard. Bot. Genève 20: 308, 1919). **Type:** Paraguay (*Fiebrig* 5648 [G, F [photo]]). — **Lit:** Pompelli & Guerra (2004: conservation); Wiesbauer (2008: biology, conservation); Voltolini & al. (2009: leaf anatomy). **Distr:** Brazil (Santa Catarina), Paraguay; ledges by streams and rock islands, seasonally inundated. **I:** Smith & Downs (1974: 542); Reitz (1983: t. 45).

≡ *Dyckia interrupta* Mez (1919) (*nom. illeg.*, Art. 52.1); **incl.** *Dyckia distachya* fa. *induta* Hassler (1919).

[2] **Ros** acaulescent, ±50-leaved; **L** 14–20 × 2–3.5 cm, thick, rigid, sheath suborbicular, **L** lamina narrowly triangular, pungent, glabrous adaxially, minutely white-lepidote between the prominent veins abaxially, very laxly serrate, **Sp** minute, curved; **Inf** to 1.3 m, simple or few-branched; peduncle soon glabrous; lowest peduncular **Bra** leaf-like, all others much smaller, to 10 mm, shorter than the internodes, entire; fertile **Inf** part to 50 cm, white-furfuraceous, **Br** laxly flowered, divergent; primary **Bra** shorter than the sterile branch base; floral **Bra** broadly ovate, apiculate, shorter than or ± equalling the sepals (lowest), entire; **Ped** 1–1.5 mm; **Sep** elliptic, 6–8 mm, obtuse, ecarinate; **Pet** suborbicular, 12–15 mm, orange or yellow; **St** included; **Fil** free above the common tube; **Sty** ± equalling the ovary; **Fr** trigonous, dark brown, glossy, 17 × 8 mm; **Se** 3 mm.

The disjunct distribution is notable. Reitz (1983) compares the species with *D. brevifolia*. The species appears severely threatened by dam construction, and micropropagation possibilities have been developed (Pompelli & Guerra 2004, Pompelli & Guerra 2005).

D. divaricata Leme & H. Büneker (J. Bromeliad Soc. 65(2): 129–134, ill., 2015). **Type:** Brazil, Mato Grosso do Sul (*Kranz & al.* 426 [RB, HB]). — **Distr:** Brazil (Mato Grosso do Sul: region of Antônio João); on horizontal rock outcrop with disturbed semi-deciduous tropical forest, ±480 m.

[1] **Ros** offsetting and forming large colonies; **L** 20–25, densely rosulate, coriaceous-succulent, suberect to arching, sheath suborbicular, $\pm 5 \times 6$ cm, densely white-lepidote at the apex, glabrous below, at least near the apex castaneous and glossy, **L** lamina narrowly triangular, attenuate, $40\text{--}45 \times 2\text{--}2.3$ cm, vividly green, shallowly canaliculate towards the tip, adaxially densely white-lepidote towards the base but glabrous above, adaxially subdensely white-lepidote along the veins, tip a pungent spine, margins spinose, **Sp** narrowly triangular, 3–6 mm, antrorse-uncinate, 5–20 mm apart; **Inf** ± 1.7 m, ascending-spreading, broadly paniculate; peduncle to 75 cm, erect, glabrescent, densely covered with white wax, pale greenish-bronze-coloured; peduncular **Bra** narrowly triangular, $60\text{--}80 \times 15\text{--}20$ mm, acuminate, spinescent, subdensely white-lepidote; **Br** ± 11 , spreading, 35–47 cm, densely 50- to 85-flowered, rachis straight, densely white-floccose; primary **Bra** similar to the upper peduncular bracts, $40\text{--}45 \times 10$ mm, as long as or shorter than the sterile branch base; floral **Bra** triangular-ovate to broadly ovate, $3\text{--}10 \times 2\text{--}4$ mm, stramineous, densely white-floccose, irregularly dentate to entire; **Fl** 15–17 mm, 16 mm \varnothing , subverticillately arranged, broadly campanulate to substellate, spreading; **Ped** ± 3 mm, stout but inconspicuous, densely white-floccose; **Sep**

broadly elliptic to orbicular, $5\text{--}6 \times 4.5\text{--}5$ mm, green with yellowish apex, strongly convex, densely white-floccose; **Pet** elliptic to obovate, spreading, obtuse-emarginate, $11\text{--}12 \times 7\text{--}7.5$ mm, yellow, ecarinate, basally connate for 2 mm, glabrous; **St** \pm as long as the petals, exposed, erect; **Fil** free above the common tube, yellow; **Anth** sublinear, ± 4 mm, straight, base deeply bilobed; **Ov** slenderly ovoid, $\pm 6 \times 2.5$ mm, yellow; **Sty** 4 mm, yellow; **Sti** conduplicate-spiral, yellow, ± 2 mm; **Fr** subglobose, dark brown, glossy, size not described; **Se** unknown.

Compared with *D. walteriana*, *D. microcalyx* and *D. exserta* in the protologue. The species occurs within 10 km of the border with Paraguay and probably occurs in that country as well. — [U. Eggli]

D. domfelicianensis Strehl (Vidalia 2(2): 30–32, figs. 5–8, 2004). **Type:** Brazil, Rio Grande do Sul (Strehl & Silva 1283 [HAS]). — **Distr:** S Brazil (Rio Grande do Sul); rocky outcrops between grasses. — Fig. 4.

[1] **Ros** very many-leaved (100–300 leaves), 50 cm \varnothing , with a short stem; **L** sheath $\pm 3.5 \times 5.5$ cm, dark brown, glossy on both faces, **L** lamina $23\text{--}25 \times \pm 3.5$ cm, tough and succulent, acuminate, acute, clear green, cinereously white-lepidote, with pungent tip, margin spinose, **Sp** hooked, antrorse, brown; **Inf** to 120 cm, $1\text{--}2 \times$

Fig. 4 *Dyckia domfelicianensis* (Sachs s.n.: Brazil; Rio Grande do Sul; Arroio dos Ratos). (Copyright: U. Eggli)



branched, paniculate; peduncle ± 50 cm, green to brownish, with fine white tomentum; peduncular **Bra** leaf-like (lowest), long-triangular, acuminate, to ± 50 mm, sparsely serrate, laxly arranged; fertile **Inf** part 60–80 cm, lax, white-lepidote; **Br** to 45 cm, rachis slightly angular, white-lepidote; floral **Bra** broadly triangular, acute, $\pm 2 \times \pm 3$ mm, green to brown, abaxially puberulous; **Fl** sessile, narrowly tubular; **Sep** ovate-acuminate, $5\text{--}6 \times 3$ mm, carinate, connate for $\frac{1}{3}$ of their length, abaxially white-lepidote, tip \pm bifid; **Pet** ovate, $9 \times 3\text{--}4$ mm, clear yellow, abaxially white-lepidote; **St** exerted; **Fil** free, ± 6 mm; **Ov** green, $\pm 3\text{--}4$ mm; **Sty** ± 6 mm, yellow; **Fr** and **Se** not described.

Similar to *D. hebdingii*.

D. duckei L. B. Smith (Bol. Mus. Paraense “Emilio Goeldi”, n.s., Bot. 1: 3, fig. k–o, 1958). **Type:** Brazil, Pará (*Ducke* s.n. [US, MG 14856]). — **Distr:** Brazil (Maranhão, Pará); iron-rich rocky (“pedra canga”) fields. **I:** Smith & Downs (1974: 558).

[3a] **Ros** acaulescent, very dense, very many-leaved; **L** to $26\text{--}40 \times 1.5\text{--}2$ cm, arching-recurved, sheath broadly elliptic, 2–3 cm, **L** lamina very narrowly triangular, with pungent tip, soon glabrous adaxially, appressedly cinereous-lepidote abaxially, margins laxly serrate, **Sp** slender, spreading, 2 mm; **Inf** 40–130 cm, simple or subsimple; peduncle very slender, glabrous; peduncular **Bra** ovate, acuminate, very small, entire (except the lowest), remote; fertile **Inf** part lax, 5–26 cm, soon glabrous; floral **Bra** broadly ovate, apiculate, shorter than the pedicels, entire; **Fl** divergent or spreading; **Ped** to 3 mm, slender; **Sep** elliptic, 5.5 mm, obtuse, ecarinate, erose; **Pet** lamina rhomboid, 10 mm, carinate, orange; **St** slightly but distinctly exerted; **Fil** free above the 1 mm high common tube, 10 mm, orange; **Sty** 1 mm; **Fr** subglobose, 10–12 mm, dark castaneous.

Monteiro & Forzza (2016, 1260) describe and illustrate material under this name with rosettes with few erect to spreading leaves only 10–13 cm long, and much smaller inflorescences, but with similar flowers.

D. dusenii L. B. Smith (Contr. Gray Herb. 98: 6, t. 2, 1932). **Type:** Brazil, Paraná (*Dusén* 18081

[S, GH [photo]]). — **Distr:** Brazil (Paraná, Santa Catarina, Rio Grande do Sul); cliffs and dry fields. **I:** Smith & Downs (1974: 539).

[3b] Plants stout; **L** $30\text{--}40 \times 1.5\text{--}2$ cm, sheath broad, suborbicular, dark castaneous, **L** lamina narrowly triangular, attenuate, yellow-green, glabrous adaxially, densely pale-lepidote abaxially, laxly serrate, **Sp** curved, 2–3 mm; **Inf** to 70 cm, simple; peduncle stout, soon glabrous; peduncular **Bra** broadly ovate, acuminate, large, much exceeding the internodes, densely pale-lepidote, entire or minutely denticulate; fertile **Inf** part subdense, many-flowered, 20–30 cm; floral **Bra** broadly ovate, acuminate, exceeding the sepals (all) and the petals (lowest); **Fl** subspreading, soon glabrous; **Ped** 5 mm, stout; **Sep** ovate, 16 mm, acute, strongly alate-carinate, frequently denticulate; **Pet** lamina broadly elliptic, 15–20 mm, obtuse, ecarinate, suberect, yellow; **St** much shorter than the petals; **Fil** shortly connate above the common tube; **Anth** sublinear, acuminate; **Sty** very short.

D. edwardii P. J. Braun & al. (Bromelie 2008 (3): 116–123, ills., 2008). **Type:** Brazil, Goiás (*Esteves Pereira* 467 [UFG]). — **Lit:** Braun & Esteves Pereira (2009a). **Distr:** Brazil (Goiás); granitic rocks and granite-derived soils in very dry Cerrado vegetation. **I:** Braun (2018: 75).

[2] **Ros** with >50 living leaves, to 1 m \emptyset , usually solitary, sometimes forming small groups, with a stem to $50 \times \pm 17$ cm in very old plants, compactly covered by old leaves; **L** $\pm 56 \times$ to 4.3 cm, sheath $\pm 3.2 \times 4.3$ cm, white, apically densely yellowish-lepidote, **L** lamina erect to slightly arching, narrowly triangular to lanceolate, apex a flat brownish pungent tip to 35 mm long, light-green to chocolate-brown, adaxially lustrous, abaxially white-lepidote, strongly veined, sparsely serrate, **Sp** pungent, uncinatate, usually antrorse, retrorse towards the leaf tip, to 5.5 mm, 6–18 mm apart; **Inf** to 1.8 m, compound; peduncle hard and strong, terete, slightly sinuous and sulcate, ± 50 cm, green to reddish-green; peduncular **Bra** linear to lanceolate, acuminate, pungent, exceeding or equalling the internodes, $3.1\text{--}4.4 \times 1$ cm, pale green, soon stramineous, serrate; fertile **Inf** part lax, ± 1.4 m, ascending, below the first

branch with 1–2 dormant buds; **Br** 7–15, ascending, spreading, flexible, 26–53 cm, dark rose, sparsely white-lepidote; primary **Bra** like the upper peduncular bracts but shorter; floral **Bra** narrowly triangular to lanceolate, $\pm 22 \times 7$ mm (lower) to 6 mm (upper), brownish-green, soon stramineous, densely white-lepidote, serrate; **Fl** ascending, $18\text{--}20 \times 7\text{--}9$ mm; **Ped** 0–2 mm; **Sep** lanceolate, $\pm 11 \times 5.9$ mm, yellowish to reddish-orange, scatteredly white-lepidote; **Pet** obtuse, $\pm 11 \times 8$ mm, orange but more yellowish than the sepals, basally light orange to yellow; **Fil** 9 mm, apical 1.8 mm free above the 7 mm high common tube, pale yellow; **Anth** to 2.6×1.2 mm, yellow, recurved at anthesis; **Ov** narrowly subpyramidal, ± 5 mm; **Sty** ± 1.3 mm, yellow, **Sti** ± 2.5 mm, yellowish-orange, hidden at anthesis; **Fr** ellipsoid-ovate, apex acuminate, $15\text{--}16 \times 8\text{--}10$ mm, dark brown, lustrous.

Similar to *D. goiana* and *D. uleana*, but forming extraordinary stems to 50 cm long in old plants.

D. elata Mez (in A. & C. de Candolle, Monogr. Phan. 9: 508, 1896). **Type:** Brazil, Minas Gerais (*Schwacke* 8739 [B, F [photo]]). — **Distr:** Brazil (Minas Gerais); rocky fields.

[2?] Insufficiently described; **L** to 40×1.7 cm, sheath suborbicular, large, **L** lamina narrowly triangular, green, subglabrous adaxially, laxly serrate, **Sp** 4 mm; **Inf** probably >1 m, laxly paniculate; peduncle stout, 50 cm, soon glabrous; peduncular **Bra** subfoliaceous, equalling or exceeding the internodes, sparsely serrulate; fertile **Inf** part many-flowered, narrow, rachis tomentulose but soon glabrous; **Br** elongate, laxly flowered; primary **Bra** much shorter than the sterile branch bases; floral **Bra** reflexed, broadly ovate, acute, shorter than the flowers or equalling the sepals (lowest), finely serrate; **Fl** spreading or reflexed, 12 mm; **Ped** short; **Sep** elliptic, 7 mm, broadly rounded, glabrous; **Pet** erect, lamina large, suborbicular, neither carinate nor undulate when dry, orange; **St** included; **Fil** free above the common tube; **Anth** short, subtriangular, apiculate, scarcely recurved; **Sty** to $\frac{1}{2}$ as long as the ovary. — [F. Krapp]

D. elisabethae S. Winkler (Doc. Nat. 3: 36–37, fig. 3, 1982). **Type:** Brazil, Rio Grande do Sul (*Winkler* 741 [ICN]). — **Distr:** Brazil (E Rio Grande do Sul); barren granite rocks in moist ground.

[1?] **Ros** to 30 cm \emptyset ; **L** 35×3 cm, sheath dark, **L** lamina adaxially light green, abaxially white-lepidote, margins conspicuously serrate, **Sp** curved, to 5 mm, irregularly arranged; **Inf** to 1.7 m, usually branched or rarely simple, branches not further described; peduncle reddish to red (younger parts), white-pubescent; peduncular **Bra** serrate; floral **Bra** elliptic, acuminate, pubescent, to 8 mm; **Fl** sessile; **Sep** lanceolate-ovate, to 12 mm, yellow, white-pubescent, tip rounded; **Pet** orbicular, to 18 mm, light yellow, finely lepidote, ecarinate, margins shortly ciliate; **St** included or equalling the petals; **Fil** free above the common tube; **Ov** 3 mm; **Sty** 3 mm.

The incomplete description from the protologue was expanded on the base of the comparison with *D. pontesii* in the protologue of the latter. The flowers are described as sessile in the protologue, but as pedicellate in the comparison with *D. pontesii*.

D. elongata Mez (in A. & C. de Candolle, Monogr. Phan. 9: 529, 1896). **Type:** Brazil, sine loco (*Sellow* Brom. Paris 58 [P, GH [photo]]). — **Distr:** Brazil (Bahia); on rocks. **I:** Smith & Downs (1974: 568).

[3a] **Ros** not described; **L** to $40 \times \pm 1.5$ cm, sheath broadly ovate, **L** lamina narrowly triangular, appressedly pale-lepidote abaxially, serrate, **Sp** stout, straight or curved, 6 mm; **Inf** almost 1 m, simple; peduncle slender, soon glabrous; peduncular **Bra** ovate-triangular (upper), much shorter than the internodes, ± 10 mm; fertile **Inf** part very laxly few-flowered, soon glabrous; floral **Bra** spreading or subreflexed, ovate-triangular, shorter than the sepals; **Fl** suberect, 11 mm, subsessile; **Sep** broadly ovate, 7–8 mm, obtuse; **Pet** lamina suberect, broadly obovate, obscurely carinate, colour not described; **St** included; **Fil** free above the common tube; **Anth** triangular, acute, straight or slightly recurved; **Sty** very short. — [F. Krapp]

D. eminens Mez (Bot. Jahrb. Syst. 30 (Beiblatt 67): 5, 1901). **Type:** Brazil, Goiás (*Glaziou* 22192-A [B, K, P]). — **Distr:** Brazil (Goiás); ecology not reported.

[3a?] **Ros** not described; **L** $\pm 30 \times > 2$ cm, sheath not described, **L** lamina narrowly triangular, with a strongly pointed hard tip, sparsely appressed-lepidote abaxially, laxly serrate, **Sp** 1 mm, far apart; **Inf** 1 m or more, simple; peduncle stout, soon glabrous; peduncular **Bra** broad with narrowly triangular pungent lamina, exceeding the internodes, serrulate; fertile **Inf** part lax, densely furfuraceous; floral **Bra** reflexed, broadly ovate, acuminate (lower), 20 mm; **Fl** spreading or subreflexed, ± 14 mm; **Ped** < 5 mm; **Sep** broadly elliptic, ± 9 mm obtuse; **Pet** suberect, trapeziform, carinate, slightly undulate, colour not described; **St** much shorter than the petals; **Fil** free or shortly connate above the common tube; **Anth** 3 mm, strongly spirally reflexed; **Sty** very short. — [F. Krapp]

D. encholirioides (Gaudichaud) Mez (in A. & C. de Candolle, Monogr. Phan. 9: 507, 1896). **Type:** Brazil, Santa Catarina (*Gaudichaud* 130 [P, GH [photo]]). — **Lit:** Kriek (2008: pollination ecology, with ill.). **Distr:** Brazil (São Paulo, Paraná, Santa Catarina, Rio Grande do Sul); on rocks and sand, along the coast. **I:** Smith & Downs (1974: 521).

≡ *Garrelia encholirioides* Gaudichaud (1851); **incl.** *Encholirium garrelii* Beer (1857) (*nom. illeg.*, Art. 52.1).

[1] **Ros** to 1.5 m \emptyset , with prostrate branching stems to 2 m \times 10–15 cm; **L** 30–100 \times to 4 cm, sheath not described, **L** lamina narrowly triangular, glabrous adaxially, densely pale-lepidote abaxially, area between the veins broad and shallow, margins laxly serrate, **Sp** coarse, curved, 3–5 mm; **Inf** very variable, to 2 m, simple to paniculate with many long branches; peduncle stout, ferruginous-puberulous; peduncular **Bra** broadly ovate with narrowly triangular lamina, longer than the internodes or sometimes the uppermost slightly shorter, serrulate; fertile **Inf** part many-flowered with 50–100 flowers, ferruginous-tomentulose; primary **Bra** like the peduncular bracts, much shorter than the sterile branch bases; floral **Bra**

ovate or lanceolate, acuminate, varying from shorter than the sepals to longer than the flowers, minutely serrulate; **Fl** spreading; **Ped** 1–2 mm, rather slender; **Sep** broadly ovate, 8 mm, acute and mucronulate, fimbriate; **Pet** lamina elliptic to obovate, 12 mm, apiculate, undulate, carinate, red or yellow; **St** included; **Fil** free to shortly connate above the common tube; **Anth** narrowly triangular, apiculate, recurved; **Sty** $\frac{1}{3}$ as long as the ovary.

As expected for a plant from coastal habitats, seed viability is not reduced by high-salt conditions, but germination only occurs when salt concentrations are low or nil (Pompelli & al. 2006). Flowers are visited by native Brazilian bees of the genera *Xylocopa* and *Trigona*, the introduced honey bee, as well as by hummingbirds (Kriek 2008). The measurements given by these authors indicate that the flowers can be much larger than in the description above (sepals ± 15 mm, petals 15–19 mm).

D. encholirioides var. **encholirioides** — **Distr:** Brazil (São Paulo, Paraná, Santa Catarina, Rio Grande do Sul); on rocks and sand, along the coast. **I:** Reitz (1983: t. 46).

Incl. *Dyckia catharinensis* K. Koch (1874) (*nom. illeg.*, Art. 52.1?) ≡ *Encholirium catharinense* (K. Koch) Benth & Hooker *fil. ex* Mez (1934); **incl.** *Dyckia catharinensis* var. *dentata* Wittmack (1891).

[1] Axes of the **Inf** and the **Sep** yellow. — [F. Krapp]

D. encholirioides var. **rubra** (Wittmack) Reitz (Anais Bot. Herb. “Barbosa Rodrigues” 3: 108, 1951). **Type:** Brazil, Santa Catarina (*Schenck* 619 [not located]). — **Distr:** Brazil (Santa Catarina); on rocks and sand, along the coast.

≡ *Dyckia rubra* Wittmack (1891).

[1] Axes of the **Inf** and the **Sep** red. — [F. Krapp]

D. espiritosantensis Leme & al. (Rodriguésia 61(1): 34–36, figs. 4E–F and 5A–G, 2010). **Type:** Brazil, Espírito Santo (*Leme & al.* 6930 [RB, MBML, VIC]). — **Distr:** Brazil (Espírito Santo); shallow soils.

[3a] **Ros** dense, ± 25 -leaved, with short basal shoots; **L** 23–26 \times 1.5–1.7 cm, strongly coriaceous, slightly succulent, sheath $\pm 2.5 \times 3$ cm, whitish towards the base, \pm glabrous, **L** lamina narrowly triangular, flat, suberect, green to reddish, acuminate, pungent with a nearly subulate tip, adaxially subdensely white-lepidote, abaxially finely veined and densely white-lepidote, margins white-lepidote, laxly spinose, **Sp** triangular, prevailingly antrorse-uncinate, 2–3 mm, subdensely white-lepidote, pale, 8–20 mm apart; **Inf** ± 1 m, erect, simple; peduncle ± 50 cm, greenish to bronze, subdensely white-lepidote to glabrous; peduncular **Bra** subfoliaceous (lowest), erect, narrowly triangular, acuminate, 10–20 \times 4–6 mm, distinctly shorter than the internodes, stramineous at anthesis, subdensely white-lepidote, veined, inconspicuously denticulate to subentire; fertile **Inf** part ± 45 -flowered, lax to subdense, erect, ± 37 cm, rachis \pm straight, pale orange, subdensely pale ferruginous-lepidote to glabrescent; floral **Bra** spreading to reflexed at anthesis, narrowly subtriangular-ovate (lower) or broadly ovate to suborbicular (upper), acuminate, carinate, 7–10 \times 4–5 mm (lower) to $\pm 4 \times 3$ mm (upper), stramineous at anthesis, distinctly veined, densely pale ferruginous-lepidote, remotely denticulate to entire; **Fl** spreading to reflexed at anthesis, ± 15 mm, narrowly campanulate, unscented;

Ped 2.5–3 mm, orange; **Sep** broadly ovate, 5–6 \times ± 5 mm, rounded, ecarinate, convex, orange, densely pale ferruginous-lepidote, entire; **Pet** obovate-spatulate, $\pm 11 \times 7.5$ mm, obtuse-emarginate, ecarinate, orange, \pm glabrous, entire; **St** just included; **Fil** free above the 1 mm high common tube, complanate, ± 8 mm, pale orange towards the apex; **Anth** narrowly subtriangular, ± 2.5 mm, straight at anthesis, base truncate, acute; **Ov** narrowly suboblong, ± 6.5 mm, pale yellow; **Sty** 1–1.5 mm, **Sti** ± 1 mm, orange, margins minutely crenulate.

Closely similar to *D. mello-barretoii*, but also somewhat similar to *D. martinellii*.

D. estevesii Rauh (Trop. subtrop. Pfl.-welt 60: 16–20, ill., 1987). **Type:** Brazil, Goiás (*Esteves Pereira* s.n. in *BG Heidelberg* 67420 [HEID]). — **Distr:** Brazil (Goiás); ecology not recorded. **I:** Braun (2018: 70). — Fig. 5.

[2] **Ros** fan-like, clump-forming, stem to 10 cm \varnothing , thickened towards the base, densely covered by leaf sheaths, branching at the base; **L** numerous, distichous, spreading-recurved, sheath distinct, densely imbricate, to 5 \times 10 cm, green with brown base, soon stramineous, glabrous, upper margins with wing-like scales, sulcate abaxially, persistent, **L** lamina erect (younger) to spreading (older), to $\pm 30 \times 3.5$ cm,

Fig. 5 *Dyckia estevesii*.
(Copyright: U. Eggli)



slightly succulent, narrowly lanceolate, long-attenuate with pungent tip, distinctly sulcate, adaxially dark green to brownish, abaxially greyish-green, sparsely lepidote, margins dentate especially basally, **Sp** hard, retrorse, 5 mm, 10–30 mm apart; **Inf** to 1.2 m, very laxly branched; peduncle slender, erect, to 50 cm, greyish-green, glabrous; peduncular **Bra** narrowly lanceolate (lower) to triangular (upper), to 5 mm, much shorter than the internodes, entire; fertile **Inf** part laxly flowered, rachis very slender, slightly flexuous, greyish-green; **Br** 2–3, 15–25 cm with 2–4 densely rosulate and scale-like bracts; primary **Bra** scale-like, small; floral **Bra** broadly ovate, 2–3 mm, shortly apiculate, reddish-brown, glabrous; **Fl** partially secund, erect to divergent, ± 15 mm; **Ped** ± 5 mm; **Sep** ovoid, $5 \times 2\text{--}3$ mm, obtuse, subcarinate, free, glabrous; **Pet** erect, obtuse, $13\text{--}15 \times 5$ mm, indistinctly carinate, little diverging at the tips, described as reddish-brown but orange in cultivated material; **St** slightly exerted; **Fil** free above the common tube; **Anth** outcurved; **Ov** ± 10 mm; **Sty** short; **Sti** roundly capitate-lobate; **Fr** oblong-globose, 17 mm, blackish-brown.

The leaves are usually arranged distichously, but can also form a regular rosette, and the feature varies even within offsets of a single specimen. Butcher (2010) concluded that the distichous arrangement is an anomaly.

D. excelsa Leme (Pabstia 4(4): 6–7, ills., 1993). **Type:** Brazil, Mato Grosso? (*Burle Marx* s.n. [HB, RB]). — **Lit:** Paggi & al. (2015: with ills.). **Distr:** Brazil (W Mato Grosso do Sul: region of Corumbá and Ladário); granitic and iron-rich rock outcrops.

[3a] **Ros** dense; **L** $\pm 70 \times 4$ cm, rigid, lamina canaliculate, suberect-arcuate, narrowly triangular, long acuminate, apex caudate, green, both faces white-lepidote, margins subdensely spinose, **Sp** 5–9 mm, uncinat, pale brown; **Inf** ± 2 m, erect, simple; peduncle ± 70 cm, lepidote but glabrescent; peduncular **Bra** subfoliaceous; fertile **Inf** part lax (basally) to subdense (apically) at anthesis, ± 120 cm, rachis notably brown-lepidote, towards the apex densely pale brown-sublanate; floral **Bra** spreading or uppermost

recurved, subtriangular and shortly acuminate (lower) or broadly ovate-elliptic and acute (upper), \pm equalling the sepals (lower) to equalling the pedicels (upper), densely pale-lanate, entire; **Fl** suberect, ± 50 mm, vary narrowly urceolate and narrowing towards the throat; **Ped** 6–10 mm, pale brown-lanate; **Sep** suborbicular, $\pm 14 \times 13$ mm, obtuse, when dry distinctly corrugately veined, thick, reddish-orange, pale brown-sublanate; **Pet** narrowly ovate, $\pm 32 \times 16$ mm, rounded, slightly thick, erect at anthesis, reddish-orange, densely pale brown-lanate; **St** barely exerted; **Fil** \pm free above the common tube, ± 33 mm, yellow; **Anth** narrowly triangular, ± 5 mm, recurved; **Ov** subpyramidal, sulcate, ± 20 mm, pale green; **Sty** ± 17 mm, slightly surpassing the anthers, yellow; **Sti** yellow, ± 3 mm; **Fr** and **Se** not described.

Similar to *D. ferruginea*. While the type is said to have been collected in the State of Mato Grosso (but without known locality), Paggi & al. (2015) record the taxon only from Mato Grosso do Sul.

D. exserta L. B. Smith (Revista Argent. Agron. 8: 192, figs. 1–5, 1941). **Type:** Paraguay, Amambay (*Rojas* 7563 [GH]). — **Distr:** Paraguay (Amambay); ecology not recorded.

[1?] **Ros** stout; **L** $> 70 \times 4.5$ cm, lamina narrowly triangular, punctulate and sublustrous adaxially, finely appressedly white-lepidote and striate abaxially, **Sp** slightly curved, to 9 mm, 20–30 mm apart; **Inf** probably 1 m or more, few-branched; peduncle stout, glabrous; peduncular **Bra** broadly ovate, acute, 15–20 mm, upper much shorter than the internodes; fertile **Inf** part lax, glabrous, terminal part to 60 cm; **Br** densely flowered, subspreading, to 16 cm; primary **Bra** like the peduncular bracts, distinctly shorter than the sterile branch bases; floral **Bra** broadly ovate, acute, except for the lowest shorter than the sepals; **Fl** yellowish, subsessile; **Sep** suborbicular or broadly ovate, 6 mm, apiculate; **Pet** elliptic, 11–13 mm, obtuse, not unguiculate, pale-margined when dry, yellowish; **St** long-exserted, slightly exceeding the style; **Fil** free above the 1 mm high common tube; **Anth** straight, 3.5 mm; **Sty** slender, elongate, longer than the ovary; **Se** narrowly winged. — [F. Krapp]

D. ferox Mez (in A. & C. de Candolle, Monogr. Phan. 9: 511, 1896). **Type:** Paraguay (*Kuntze* s.n. [NY]). — **Distr:** Brazil (Mato Grosso), Paraguay, Bolivia (Santa Cruz), Argentina (Chaco, Corrientes, Entre Ríos, Formosa); dry fields and woods. **I:** Smith & Downs (1974: 544).

Incl. *Dyckia meziana* Kuntze (1898); **incl.** *Dyckia hamosa* Mez (1906) \equiv *Dyckia ferox* ssp. *hamosa* (Mez) Hassler (1919) \equiv *Dyckia ferox* fa. *hamosa* (Mez) Castellanos (1933); **incl.** *Dyckia ferox* fa. *vulgaris* Hassler (1919); **incl.** *Dyckia ferox* fa. *australis* Hassler (1919) (*nom. inval.*, Art. 26.2).

[1] **Ros** slowly offsetting and clump-forming; **L** 20–50 \times 0.8–2 cm or longer, sheath suborbicular, \pm 3 cm, **L** lamina narrowly triangular, closely appressedly pale-lepidote abaxially, **Sp** acicular, antroretrorely curved, 4–6 mm; **Inf** 60 cm, simple or few-branched with short branches; peduncle slender, cinereous-tomentose, soon glabrous; peduncular **Bra** very broadly ovate, abruptly acute, shorter than the internodes, entire; fertile **Inf** part lax, cinereous-tomentose to glabrous; primary **Bra** scarcely larger than the floral bracts; floral **Bra** spreading or reflexed, suborbicular-ovate, obtuse or apiculate, much shorter than the sepals, subglabrous; **Fl** subsessile, narrowly funnel-shaped; **Sep** very broadly elliptic, 5–7 mm, very broadly rounded at the apex, subglabrous; **Pet** lamina suberect, subrhombic, to 12 mm, rounded, scarcely undulate, little if at all carinate, yellow; **St** shorter than the petals; **Fil** free above the common tube; **Anth** triangular, subacute, strongly recurved at the apex; **Sty** very short. — [F. Krapp]

D. ferrisicola O. B. C. Ribeiro & Leme (J. Bromeliad Soc. 65(1): 19–22, ills. (incl. p. 18), 2015). **Type:** Brazil, Minas Gerais (*Ribeiro* 249 [BHCB]). — **Distr:** Brazil (C Minas Gerais: Sarzedo); white iron-rich rock outcrop (“canga couraçada”), in full sun, \pm 1200 m; known from the type area only.

[3b] **Ros** \pm 40 cm \varnothing , offsetting; **L** 11–14, suberect to arching-spreading, coriaceous, sheath 3.5–4 \times 4.5–5 cm, distinct from the lamina, whitish, both faces glabrous and glossy, **L** lamina

narrowly triangular, 20–22 \times 2.5–3 cm, strongly canaliculate, mostly wine-red or sometimes green, adaxially glabrous and glossy, abaxially white-lepidote at the base but glabrous further up, distinctly veined, tip acuminate, pungent, margins laxly spinose, **Sp** narrowly subtriangular, spreading to retrorse, 3.5–4 mm, \pm 20 mm apart; **Inf** 60–80 cm, erect, simple; peduncle 35–40 cm, reddish-green, densely white-hairy; peduncular **Bra** broadly triangular with a long lanceolate acuminate-caudate lamina, 15–17 \times 6–8 mm, erect, with prominent midvein and appearing carinate, densely white-lanate; fertile **Inf** part 30–40 cm, laxly 15- to 40-flowered, rachis red, densely white-lanate; floral **Bra** subtriangular, acuminate, 10–11 \times 5–6 mm, with prominent midvein and appearing carinate, stramineous towards the tip, minutely denticulate; **Fl** 15–16 mm, porrect-spreading, tubular, unscented; **Ped** 4–5 mm, white-lanate; **Sep** broadly ovate to suborbicular, 6–7 \times 5–6 mm, convex, ecarinate, reddish, sparsely white-lanate, margins with recurved fimbriate trichomes; **Pet** broadly spatulate, emarginate, 11–12 \times 9–10 mm, orange, basally connate for 2.5 mm, ecarinate; **St** included and distinctly shorter than the petals; **Fil** yellow, connate for \pm 2 mm above the common tube; **Anth** oblong-lanceolate, \pm 2 mm, straight, base bilobed; **Ov** suboblong, \pm 6 \times 2 mm, yellow; **Sty** \pm 2 mm, distinct, orange; **Sti** conduplicate-spiral, yellow, lobes shortly lacerate; **Fr** and **Se** unknown.

A member of the *D. saxatilis* complex, and compared with *D. saxatilis* in the protologue. — [U. Eggli]

D. ferruginea Mez (in A. & C. de Candolle, Monogr. Phan. 9: 533, 1896). **Type:** Brazil, Mato Grosso (*Kuntze* s.n. [NY]). — **Distr:** Brazil (Mato Grosso); vertical walls of red sandstone. **I:** Smith & Downs (1974: 535).

[3a] **Ros** not described; **L** to 80 \times 2.5 cm, sheath suborbicular, 5 cm, castaneous, glabrous, **L** lamina narrowly triangular, soon glabrous adaxially, subappressedly white-lepidote abaxially, margins densely and coarsely serrate, **Sp** curved, 10 mm; **Inf** 1 m or more, simple; peduncle stout, ferruginous-tomentulose or glabrous with age;

peduncular **Bra** leaf-like, imbricate, the upper ones linear-lanceolate, entire; fertile **Inf** part dense or \pm interrupted, many-flowered, rachis stout, densely ferruginous-tomentulose; floral **Bra** divergent to spreading, narrowly triangular, to 7 mm, shorter than the sepals; **Fl** suberect to spreading, to 15 mm; **Ped** very short; **Sep** ovate, 7–8.5 mm, broadly rounded; **Pet** lamina broadly elliptic, 10–14 mm, obtuse, ecarinate, suberect, yellowish-green, ferruginous-tomentulose outside; **St** exserted (\pm equalling the petals according to the protologue); **Fil** free above the common tube; **Anth** linear, obtuse, scarcely recurved; **Ov** sparsely lepidote; **Sty** as long as the ovary.

The protologue is based on immature flowers according to Smith & Downs (1974), and in fresh material, the stamens are exserted.

D. floribunda Grisebach (Gött. Abh. 24: 331, 1879). **Type:** Argentina, Córdoba (*Hieronymus* 566 p.p. [GOET]). — **Lit:** Vesprini & al. (2003: ecology). **Distr:** Argentina (Catamarca, Córdoba, La Rioja, San Luís, San Juan, Jujuy, Salta); dry rocky slopes. **I:** Smith & Downs (1974: 549); Subils (2009: 349, 423).

Incl. *Dyckia gilliesii* Baker (1889); **incl.** *Dyckia chaguar* A. Castellanos (1931).

[1] **Ros** densely many-leaved, acaulescent, with \pm sessile offsets; **L** 20–100 \times 2.5 cm, sheath suborbicular, 3–6 cm, pale, glabrous, **L** lamina attenuate to a pungent tip, white- or cinereous-lepidote esp. abaxially, laxly serrate, **Sp** curved, 4–6 mm; **Inf** 60–100 cm, paniculate; peduncle elongate, glabrescent; peduncular **Bra** broadly triangular-ovate, acuminate, thin, shorter than the internodes; fertile **Inf** part laxly branched, lepidote at least at anthesis, **Br** subspreading, slightly flexuous, laxly to densely flowered; primary **Bra** ovate, apiculate, small; floral **Bra** ovate-triangular, acute or apiculate, much exceeded by the sepals; **Fl** divergent to spreading, orange; **Ped** very short at anthesis, to 4 mm in fruit; **Sep** broad, 7 mm, rounded, obtuse or apiculate, strongly convex; **Pet** obovate-elliptic, 10–14 mm, broadly rounded and emarginate, undulate, carinate; **St** slightly exserted; **Fil** free above the very short common tube; **Anth** sub-linear, acute, \pm recurved; **Sty** free, very short.

D. formosensis Leme & Z. J. G. Miranda (Phytotaxa 67: 15–17, ills., 2012). **Type:** Brazil, Goiás (Leme & Miranda 6451 [RB, HB]). — **Distr:** Brazil (Goiás); open Cerrado vegetation.

[3b] **Ros** solitary, subdense, \pm 18-leaved; **L** 60–65 \times 3.5–4 cm, rigid, thickly coriaceous, sheath wider than the lamina, **L** lamina narrowly triangular, canaliculate, suberect, straight, acuminate and with spinescent tip, green to reddish-ferruginous, veined, adaxially inconspicuously white-lepidote, abaxially densely non-obscuringly white-lepidote, margins glabrescent and laxly spinose, **Sp** shortly acicular, retrorse-uncinate, 1.5–5 mm, pale castaneous, glabrous, 10–20 mm apart; **Inf** 1.9–2 m, simple, erect; peduncle 95–100 cm, reddish-ferruginous, densely white-sublanate; peduncular **Bra** subfoliaceous (lowest) to narrowly triangular-lanceolate (upper), acuminate, with spinescent tip, erect, distinctly shorter than the internodes, stramineous, inconspicuously white-sublanate, veined, densely spinulose, uppermost like the floral bracts; fertile **Inf** part 70- to 75-flowered, lax basally, subdense apically, 90–100 cm, \pm straight, reddish-ferruginous towards the base and orange towards the apex, densely white-sublanate; floral **Bra** suberect to slightly reflexed, ovate-triangular to lanceolate, acuminate-caudate, 15–35 \times 6–15 mm, stramineous, inconspicuously white-sublanate abaxially, veined, densely spinulose; **Fl** spreading to slightly reflexed at anthesis, \pm erect afterwards, 18–22 mm, campanulate, slightly fragrant; **Ped** stout, 3–5 mm; **Sep** broadly ovate, 8–10 \times 7–8 mm, apex obtuse, ecarinate, convex, orange, densely and coarsely white-lepidote, margins with fimbriate trichomes, remotely and densely spinulose-crenulate; **Pet** broadly spatulate, 13–14 \times 8–12 mm, obtuse and emarginate, the base narrower, ecarinate, orange, glabrous; **St** included; **Fil** 5–6 mm connate above the 2–4 mm high common tube, complanate, 9–10 mm, orange; **Anth** subtriangular, 3–5 mm, strongly recurved at anthesis, acute and apiculate, base bilobed; **Ov** narrowly oblong-subpyramidal, yellowish; **Sty** slender, 3–3.5 mm, orange; **Sti** slightly exceeding the anthers after anthesis, \pm 1.5 mm, orange, margins crenulate-lacerate.

Closely related to *D. brasiliana*, and also similar to *D. goiana*. — [F. Krapp]

D. fosteriana L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 107, t. 106, 1943). **Type:** Brazil, Paraná (*Foster* 1154 [GH]). — **Distr:** Brazil (Paraná).

[3b] **Ros** dense, flat, clustering; **L** numerous, 9–17 × 0.8–1.2 cm, arching-recurved, sheath suborbicular, **L** lamina narrowly triangular, covered with a cinereous membrane of fused scales, **Sp** antroretroscely curved, 2–4 mm; **Inf** 10–45 cm, simple; peduncle sparsely flocculose; peduncular **Bra** lanceolate, acuminate, exceeding the internodes or the upper slightly shorter, densely lepidote, serrulate; fertile **Inf** part 3.5–13 cm, densely lepidote; floral **Bra** like the peduncular bracts, carinate towards the apex, lowest ± equalling the flowers, serrulate; **Fl** suberect or spreading; **Ped** ± 2 mm; **Sep** ovate, 6–9 mm, acute, carinate, ferruginous-lepidote; **Pet** lamina spreading, rhombic, 8–10 mm, orange; **St** included; **Fil** short-connate above the common tube; **Sty** very short. — [F. Krapp]

D. fosteriana var. **fosteriana** — **Distr:** Brazil (Paraná); sandstone outcrops. **I:** Smith & Downs (1974: 531).

[3b] **L** lamina 0.8–1 cm wide, repand-serrate with recurved **Sp** 2–3 mm long; **Inf** peduncle slender; **Fl** dense to lax; **Sep** 6 mm. — [F. Krapp]

D. fosteriana var. **robustior** L. B. Smith (Phytologia 19: 283, 1970). **Type:** Brazil, Paraná (*Hatschbach* 17310 [US]). — **Distr:** Brazil (Paraná); in soil.

[3b] **L** lamina 1.2 cm wide, laxly serrate but scarcely repand, the mostly antrorse **Sp** to 4 mm; **Inf** peduncle stout, 6 mm Ø; **Fl** dense; **Sep** to 9 mm. — [F. Krapp]

D. frigida Hooker *fil.* (Curtis's Bot. Mag. 103: t. 6294 + text, 1877). **Type:** Brazil (*Anonymus ex Hort. Linden* s.n. [K, LG [status?]]). — **Distr:** Brazil (Paraná); on rocks. **I:** Smith & Downs (1974: 519).

Incl. *Dyckia regalis* Linden & Morren *ex Baker* (1889) (*nom. inval.*, Art. 34.1a).

[1] **Ros** robust, acaulescent; **L** ± 100 × 3.5 cm, sheath reniform, 9 cm wide, dark castaneous, **L** lamina narrowly triangular, with pungent tip,

pale or glaucescent, densely appressed-lepidote abaxially, **Sp** 2–5 mm; **Inf** ± 1 m, amply paniculate; peduncle ascending, stout, lepidote when young; peduncular **Bra** sparse, acute from a broadly ovate base, exceeding the internodes or the upper shorter, minutely serrulate; fertile **Inf** part many-flowered, subferruginous-tomentellous, **Br** spreading, subdense towards the apex, to 30 cm; primary **Bra** like the upper peduncular bracts, usually shorter than the sterile branch bases; floral **Bra** broadly ovate, abruptly acute, shorter than the flowers, the lower serrulate; **Fl** spreading-ascending, 11–18 mm, narrowly funnel-shaped; **Ped** to 3 mm; **Sep** ovate, 5–8 mm, acute, carinate, fimbriate; **Pet** subovate, rounded, undulate, strongly carinate, spreading-recurved, yellow or pale yellow; **St** much shorter than the petals but well visible in the throat; **Fil** free above the common tube; **Anth** broadly truncate at the base, attenuate, strongly recurved; **Ov** narrowly ovoid; **Sty** very short.

D. glabrifolia Leme & O. B. C. Ribeiro (Phytotaxa 67: 18–20, ill., 2012). **Type:** Brazil, Minas Gerais (*Leme & al.* 7273 [RB, HB]). — **Distr:** Brazil (Minas Gerais); on rocky quartzite outcrops, Campo Rupestre vegetation.

[2] **Ros** solitary or in small groups, 17- to 25-leaved; **L** 25–42 × 2–4 cm, distinctly succulent mainly towards the base, sheath subreniform, ± 3.5 × 7.5 cm, whitish towards the base, green to reddish at the apex, lustrous, glabrous, **L** lamina narrowly triangular, attenuate, flat, suberect-arcuate, acuminate-caudate, with pungent tip, green to reddish, lustrous and veined adaxially, opaque abaxially, glabrous on both faces except adaxially at the base, margins laxly spinose, **Sp** straight to slightly antrorse, narrowly triangular, 1–2 mm, tip castaneous, 7–17 mm apart; **Inf** 90–150 cm, erect, usually simple or sometimes with a short branch near the base; peduncle 36–81 cm, greenish, sparsely white-sublanate, soon glabrous; peduncular **Bra** subfoliaceous (lowest), erect, narrowly ovate-triangular, acuminate, 15–30 × 6–10 mm, from equalling to distinctly shorter than the internodes, green or reddish, stramineous at anthesis, subdensely white-sublanate basally, glabrous apically, veined,

densely and minutely denticulate; fertile **Inf** part ± 50 - to 110-flowered, 33–77 cm, rachis straight, greenish to pale orange, subdensely to densely pale-lanate; floral **Bra** spreading to suberect, narrowly subovate-triangular (lowest), acuminate-caudate, $10\text{--}25 \times 4\text{--}8$ mm, stramineous towards the apex at anthesis, pale-lanate, veined, denticulate to subentire; **Fl** spreading at anthesis, erect afterwards, 16–19 mm, broadly tubular with narrowed throat, unscented; **Ped** 2–4 mm, orange, densely white-sublanate; **Sep** ovate to broadly ovate, $6\text{--}8 \times 6$ mm, convex, apex subacute and apiculate, ecarinate, orange, subdensely white-lanate, fimbriate; **Pet** broadly obovate-spatulate, $12\text{--}13 \times 10\text{--}11$ mm, apex obtuse to subacute and inconspicuously apiculate, ecarinate, orange, glabrous, entire or sometimes irregularly crenulate near the apex; **St** included; **Fil** 9–10 mm, 3–4 mm connate above the 1 mm high common tube (according to the protologue, completely connate according to Fig. 3 in Pinangé & al. (2017)), yellowish towards the apex; **Anth** narrowly subtriangular, ± 4 mm and straight before anthesis, after anthesis distinctly smaller and strongly recurved, base bilobed, acute; **Ov** narrowly suboblong, ± 6.5 mm, pale yellow; **Sty** ± 1 mm, **Sti** ± 1.5 mm, yellow, margins minutely crenulate-lacerate; **Fr** broadly ovoid, beaked, $\pm 15 \times 11$ mm, dark castaneous, lustrous; **Se** flat, asymmetrical, subcuneate, $3\text{--}4 \times 2\text{--}2.5$ mm.

Closely related to *D. trichostachya*, and also similar to *D. weddelliana*.

D. glandulosa L. B. Smith & Reitz (Phytologia 14: 484, t. 1, figs. 20–24, 1967). **Type:** Brazil, Minas Gerais (*Magalhães* 18959 [HB, NY, US [photo]]). — **Distr:** Brazil (Minas Gerais: Diamantina Plateau); among rocks in Campo Rupestre vegetation, 1400–1800 m. **I:** Smith & Downs (1974: 565).

[3a] **Ros** not described; **L** to 23×2.3 cm, sheath suborbicular, 2 cm, **L** lamina narrowly triangular, attenuate to an abruptly acute pungent apex, smooth and glabrous adaxially, appressedly cinereous-lepidote abaxially, laxly serrate, **Sp** antorsely uncinata, 2 mm; **Inf** 70 cm, simple; peduncle laxly glandular-lepidote with yellow trichomes; peduncular **Bra** triangular to linear-

lamine (lowest), small, shorter than the internodes (uppermost), peltate-lepidote (lower) to vestite with glandular trichomes alone, entire; fertile **Inf** part laxly many-flowered, to 27 cm, all parts incl. pedicels and sepals laxly glandular-tomentose; floral **Bra** triangular-ovate, acuminate, the lowest exceeding the sepals, entire; **Fl** spreading; **Ped** 5 mm, subcylindrical; **Sep** ovate, 7 mm, obtuse, cucullate, ecarinate, rugose when dry as if initially fleshy; **Pet** lamina rhombic, 12 mm, obtuse, carinate, orange; **St** included; **Fil** free above the common tube; **Sty** 1 mm. — [F. Krapp]

D. goehringii E. Gross & Rauh (Trop. subtrop. Pfl.-welt 79: 12–14, ill., 1991). **Type:** Brazil, Goiás (*Esteves Pereira* s.n. in *Rauh* 67622 [HB, HEID]). — **Distr:** Brazil (Minas Gerais); rocky fields, on rocks or quartz sand. **I:** Braun & Esteves Pereira (2006b). — Fig. 6.

[3b] **Ros** many-leaved, ± 50 cm \varnothing , ± 30 cm high, with a short stem; **L** to 23×2 cm, reflexed, succulent, sheath broadly ovate, appressed to the stem, 3×3.5 cm, whitish adaxially, castaneous and lustrous abaxially, glabrous, **L** lamina triangular, with pungent tip, both faces appressedly white-lepidote, adaxially with conspicuous imprint from neighbouring leaves, abaxially veined, trichomes arranged in distinct rows, margins spinose, **Sp** strong, antroretorse, white-lepidote, ± 10 mm apart; **Inf** ± 80 cm, usually simple; peduncle ± 50 cm, green, glabrous at the base, upper part white-lepidote; peduncular **Bra** broadly lanceolate, acuminate, 10 mm and much shorter than the internodes (upper), the lowest longer than the internodes, sparsely lepidote, veined, indistinctly serrulate; fertile **Inf** part ± 25 -flowered, lax, 35 cm, rachis green, densely white-lanate, terete; floral **Bra** broadly ovate, acuminate, much shorter than the sepals, $\pm 5 \times 6$ mm, densely white-lanate, indistinctly serrulate; **Fl** spreading, 15 mm, subsessile; **Sep** oblong-ovate, 7 mm, obtuse, ecarinate, slightly succulent, greenish-orange-red, white-floccose, margins hyaline, indistinctly serrulate; **Pet** erect, rhombic, 10×10 mm, obtuse, ecarinate, forming a narrow tube, orange-red, margins indistinctly serrulate; **St** slightly exerted; **Fil** short-connate above the common tube

Fig. 6 *Dyckia goehringii* (Esteves Pereira s.n. in Rauh 67622: Brazil; Goiás, near Portelândia; type collection). (Copyright: U. Eggli)



(or completely free according to Fig. 3 in Pinangé & al. (2017)), basally broadly complanate, attenuate; **Anth** golden-yellow, sagittate; **Sty** very short, **Sti** papillate.

Related to *D. crassifolia* and *D. leptostachya*. — [F. Krapp]

D. goiana L. B. Smith (Phytologia 14: 479, t. 1, figs. 1–5, 1967). **Type:** Brazil, Goiás (Irwin & al. 15163 [US, NY]). — **Distr:** Brazil (Goiás); Cerrado vegetation, 800 m. **I:** Smith & Downs (1974: 528); Esteves Pereira & Gouda (2017: 181).

[1] **Ros** 1.5–1.8 m Ø; **L** 80–100 cm long, adaxially lepidote, margins serrate but apical $\frac{1}{3}$ entire; **Inf** to 2.5 m, laxly compound with up to 8 suberect branches; peduncle stout, soon glabrous; peduncular **Bra** presumably foliaceous (lower) to ovate with a long narrowly triangular apex (upper), exceeding the internodes, serrulate; fertile **Inf** part 100 cm, initially finely cinereous-lepidote, sublax; **Br** slender, slightly flexuous, to 50 cm; primary **Bra** like the upper peduncular bracts, to 70 mm; floral **Bra** broadly ovate, long-acuminate (lower) to apiculate (upper), exceeding the flowers (lower) or shorter than the sepals (upper), serrulate; **Fl** spreading and slightly descending; **Ped** to 4 mm in fruit, stout; **Sep** broadly deltoid-ovate, to 6 mm, ecarinate,

persistently brown-black-lepidote; **Pet** spreading, elliptic, 10–12 mm, rounded, carinate, reddish-orange; **St** ± equalling the petals; **Fil** shortly connate above the common tube; **Sty** 1 mm.

Similar to *D. elata* and compared with *D. edwardii* in the protologue of the latter.

D. gouveiana Leme & O. B. C. Ribeiro (Phytotaxa 67: 21–23, ills., 2012). **Type:** Brazil, Minas Gerais (Leme & al. 8485 [RB]). — **Distr:** Brazil (Minas Gerais: Diamantina Plateau); rock outcrops in Campo Rupestre vegetation, in shallow humus on rocks; only known from the type locality.

[3b] **Ros** dense, 12- to 18-leaved; **L** 12–18 × 2–2.6 cm, strongly coriaceous, sheath inconspicuous, **L** lamina narrowly triangular, strongly canaliculate, suberect to nearly erect and unilaterally curved, acuminate and spine-tipped, light green, obscurely white-lepidote on both faces, veined mainly adaxially, subdensely to densely spinose, **Sp** narrowly triangular, straight to prevailingly antrorse-uncinate, 1–2.5 mm, with pale castaneous tip, 2–7 mm apart; **Inf** 35–60 cm, simple, erect; peduncle 18–30 cm, dark reddish-green, sparsely to subdensely white-lepidote, glabrescent; peduncular **Bra** base suborbicular to subreniform and slightly gibbose, lamina long narrowly triangular and acuminate-spinescent,

ecarinate, to 18–45 × 3–6 mm, longer (lowest) to shorter (uppermost) than the internodes, stramineous towards the apex, veined, subdensely white-lepidote, densely spinulose; fertile **Inf** part 8- to 26-flowered, lax, 13–24 cm, straight, dark reddish, (sub-) densely non-obscuringly white-sublanate; floral **Bra** ovate-triangular, acuminate-caudate, spreading at anthesis, ecarinate with raised midvein, the upper ones convex at the base, 13–19 × 7–10 mm, soon becoming stramineous towards the apex, (sub-) densely white-lepidote, finely veined, densely spinulose to inconspicuously denticulate; **Fl** spreading, 16–17 mm, subtubular, unscented; **Ped** 3–4 mm, stout, red, densely white-lanate; **Sep** broadly ovate, 7–8 × 5–6 mm, acute and apiculate, ecarinate, convex, reddish-orange, densely white-lanate, margins inconspicuously denticulate near the apex; **Pet** broadly spatulate, 11–12 × 9 mm, apex broadly acute, ecarinate, entire, orange, glabrous; **St** included; **Fil** 1 mm connate above the 3 mm high common tube, ±8 mm, pale orange towards the apex; **Anth** narrowly subtriangular, 3.5–4 mm, strongly recurved at anthesis; **Ov** narrowly suboblong, ±5 mm, pale yellow; **Sty** ±2.5 mm; **Sti** ±1.5 mm, orange, margins minutely crenulate.

Compared with *D. mezii* in the protologue (as *D. argentea*). — [F. Krapp]

D. gracilis Mez (in A. & C. de Candolle, Monogr. Phan. 9: 516, 1896). **Type:** Bolivia, Santa Cruz (*d'Orbigny* 1006 [P, F [photo], G, GH [photo]]). — **Distr:** Brazil (Mato Grosso do Sul), Bolivia (Santa Cruz), Argentina (Chaco); seasonally deciduous lowland forests and savannas, dry rocky soil, 230–500 m. **I:** Smith & Downs (1974: 576); Vásquez & Ibsch (2012: 127).

[3b] **Ros** not described; **L** to 30 × 2–2.5 cm, suberect, **L** lamina narrowly triangular, quite green adaxially, closely appressedly pale cinereous-lepidote abaxially, margins serrate, **Sp** 4 mm; **Inf** 50 cm, simple; peduncle very slender, glabrous; peduncular **Bra** remote, very broadly ovate with a short acuminate apex, entire; fertile **Inf** part lax, few-flowered, minutely furfuraceous; floral **Bra** reflexed, suborbicular-ovate, apiculate,

±4 mm, much shorter than the sepals; **Fl** suberect, slender, subsessile; **Sep** very broadly elliptic, 7–9 mm, emarginate, nearly glabrous; **Pet** erect, obovate, 14–18 mm, rounded, scarcely if at all carinate, bright yellow; **St** equalling or slightly exceeding the petals; **Fil** connate above the common tube; **Anth** linear, acute, strongly recurved; **Sty** 2–3 × shorter than the ovary.

Lost for some 180 years before found again in Bolivia (Vásquez & Ibsch 2012). The recently described *D. barthlotii* is similar (see there for differences). Paggi & al. (2015) record the taxon also from the Brazilian state Mato Grosso do Sul.

D. grandidentata P. J. Braun & Esteves (Cact. Succ. J. (US) 80(6): 323, ill. (pp. 322–323), 2008). **Type:** Brazil, Mato Grosso do Sul (*Esteves Pereira & Braun* 659 [UFG, HAL]). — **Distr:** Brazil (Mato Grosso do Sul); on barren reddish-black rocks among shrubs, trees, orchids and cacti.

[2] **Ros** to 37 cm Ø but usually much smaller, stem ±6 × 5–6 cm, forming a small clump; **L** 23–29, to 23 × 3.1 cm, 5 mm thick, sheath to 4 cm wide, **L** lamina recurved, spreading, slightly coriaceous, succulent, glabrous, narrowly triangular to lanceolate, canaliculate, apex a hard brownish spine to 7 mm long, veined on both faces, margins with an inconspicuous pale yellow stripe, serrate, **Sp** pungent, uncinata, predominantly retrorse, 7–11 mm, narrowly triangular, shiny, light green to light yellow, with a brown-reddish tip, 14–23 mm apart towards the leaf tip, basally ± connected; **Inf** to 80 cm, usually simple or rarely with 1–3 branches; peduncle erect or slightly sinuous, ±40 cm, base reddish-green, red distally, shiny green to brownish-green elsewhere, glabrous or partly creamy-lepidote; peduncular **Bra** narrowly triangular to lanceolate, pungent, 58 mm (lowest) to 6 mm (uppermost), green to brownish, finely serrate; fertile **Inf** part erect, to 39 cm, rachis dark rose, distally rose to orange and red; floral **Bra** narrowly triangular to lanceolate, to 4.7 mm, rose, drying parchment-like; **Fl** ±17 × 8 mm, orange to yellowish, subsessile; **Sep** slightly triangular, 7.5 × 6.2 mm, succulent, abaxially carinate, reddish, margins pale; **Pet** 12 × 5–7 mm, orange; **St** exerted; **Fil**

apically free above the common tube, to 9 mm; **Anth** 5 mm, light yellow, strongly curved outwards, acuminate; **Ov** elongate-pyramidal, $\pm 6 \times 2$ mm, light greenish-white; **Sty** 0.7–0.9 mm, orange; **Fr** ovoid, acute, $\pm 13 \times 10$ mm, dark brownish, glossy; **Se** broad, drop-shaped, flattened, with a tiny acute tip towards the hilum, 3–4.5 mm \varnothing — [F. Krapp]

D. granmogulensis Rauh (Trop. subtrop. Pfl.-welt 65: 11–12, fig. 5, 1988). **Type:** Brazil, Minas Gerais (*Rauh* 56484 [HEID]). — **Distr:** Brazil (Minas Gerais); rocky fields, on rocks.

[3a] **Ros** acaulescent, in groups, spreading, many-leaved, 15 cm \varnothing , to 10 cm high; **L** to 18×1.5 cm, sheath 2.5×2.5 cm, with brownish base and green tip abaxially, glabrous, **L** lamina narrowly triangular, long-attenuate, slightly succulent, adaxially dark green and sparsely lepidote, abaxially veined and appressedly white-lepidote, **Sp** retrorse, hard, small, white; **Inf** to 60 cm, simple, erect; peduncle to 40 cm, green, glabrous, sparsely white-lanate-lepidote towards the apex; peduncular **Bra** subfoliaceous (lower) to narrowly triangular-acute (upper), $\frac{1}{2}$ as long as the internodes, sparsely lepidote, slightly serrate; fertile **Inf** part lax, straight, to 20 cm, green, reddish towards the apex, densely lanate; floral **Bra** triangular, acuminate, small, shorter than or equalling the pedicels, inconspicuously serrate (lower); **Fl** spreading to ascending, $8\text{--}10 \times 4\text{--}5$ mm, 3 mm at the throat, in the evening with fishy scent; **Ped** to 5 mm, stout, green to reddish, pubescent; **Sep** ovate, 5×3 mm, obtuse, ecarinate, reddish, densely lanate; **Pet** broadly spatulate, 6×7 mm, broadened towards the tip, obtuse, ecarinate, initially erect, later with reflexed tips, brilliant orange-red; **St** included; **Fil** free above the 2 mm high common tube, narrowing apically; **Anth** centripetally bent; **Sty** 2 mm, yellow.

Compared with *D. oligantha* (here treated as synonym of *D. saxatilis*) in the protologue. — [F. Krapp]

D. hatschbachii L. B. Smith (Phytologia 14: 480, t. 1, figs. 9–12, 1967). **Type:** Brazil, Paraná (*Hatschbach* 2725 [US]). — **Distr:** Brazil

(Paraná); low woods in Restinga vegetation. **I:** Smith & Downs (1974: 535).

[3a] Only known from fragments; **L** to 85×4.5 cm, lamina linear-triangular, with pungent tip, initially or soon glabrous adaxially, appressedly white-lepidote abaxially, laxly serrate, **Sp** antrorsely uncinately, dark, 7 mm; **Inf** to 1.5 m, simple; peduncle slender, ferruginous-tomentose; peduncular **Bra** imbricate, linear-triangular from an ovate base, serrulate; fertile **Inf** part sublax, many-flowered, 40 cm, all parts incl. pedicels and sepals ferruginous-tomentulose; floral **Bra** narrowly triangular, slightly exceeding the pedicels (lower), serrulate; **Fl** spreading; **Ped** to 10 mm, straight, slender; **Sep** ovate, 8 mm, acute, carinate; **Pet** subrhombic, 14 mm, curved-spreading, colour not described; **St** included; **Fil** free above the common tube; **Sty** to 2 mm.

Insufficiently known.

D. hebdingii L. B. Smith (Phytologia 21: 90, t. 2, figs. 1–7, 1971). **Type:** Brazil, Rio Grande do Sul (*Croizat* 22495 [US]). — **Distr:** Brazil (Rio Grande do Sul); on rocks.

[1] **Ros** dense, spreading, many-leaved; **L** $\pm 15 \times > 1.5$ cm, **L** lamina narrowly triangular, appressedly cinereous-lepidote on both faces, subdensely serrate, **Sp** slender, spreading; **Inf** > 1 m, laxly $3 \times$ branched; peduncle erect, slender, ± 45 cm; peduncular **Bra** very narrowly triangular, longer than the internodes, red, serrulate, divergent, wholly exposing the axis; fertile **Inf** part densely cinereous-lepidote, **Br** many-flowered, subdense to lax, to 30 cm; floral **Bra** broadly ovate, apiculate, 5 mm, much exceeded by the sepals; **Fl** suberect to spreading and sometimes slightly secund; **Ped** short; **Sep** ovate, 4.5 mm, broadly subacute; **Pet** spatulate, 7 mm, obtuse, yellow; **St** included; **Fil** free above the 1 mm high common tube; **Sty** slender, elongate; **Fr** 8 mm; **Se** with a narrow apically pointed wing.

Part of the “*Prionophyllum*” complex, and similar to *D. maritima*. — [F. Krapp]

D. hohenbergioides Leme & Esteves (J. Bromeliad Soc. 48(3): 124–126, ill., 1998). **Type:** Brazil, Bahia (*Esteves Pereira* E-385 [HB,

RB]). — **Distr:** Brazil (Bahia); ecology not described.

[1/2] **Ros** ± 30 -leaved; **L** $\pm 60 \times 4\text{--}5$ cm, very rigid, succulent, sheath not described, **L** lamina uberect, very narrowly triangular, attenuate, acuminate, with pungent tip, greenish, finely veined, densely white-lepidote on both faces, laxly spinose, **Sp** triangular-uncinate, 5–9 mm, densely white-lepidote; **Inf** 1.8–2 m, laxly 2–3 \times branched, erect; peduncle sulcate, 80–100 cm, green, white-sublanate, soon glabrous; peduncular **Bra** triangular, acuminate-caudate, ecarinate, erect, 50–100 \times 20–30 mm, equalling to slightly exceeding (lowest) to shorter than the internodes (upper), greenish to ochre, white-lepidote to glabrescent, finely veined, laxly serrulate apically or entire; fertile **Inf** part dense, erect, ± 70 cm, white-sublanate at anthesis, glabrescent; **Br** ± 10 , subsessile, densely strobilate-digitate, 7–10 cm, erect to suberect, axis white-lanate; primary **Bra** like the upper peduncular bracts but gradually reduced towards the apex, distinctly shorter than the branches; floral **Bra** suborbicular to triangular, acuminate, suberect, concave, ecarinate to slightly carinate near the apex, 10–14 \times 13–15 mm, white-lanate at the base, glabrescent, chaffy towards the tip, minutely denticulate-crenulate to entire; **Fl** suberect at anthesis, \pm ovoid-tubular, 16–17 mm, unscented; **Ped** ± 2.5 mm, indistinct, stout; **Sep** suborbicular, 7–8 \times 9 mm, subobtuse to slightly emarginate, very minutely mucronulate, ecarinate, orange-red, sparsely sublanate to glabrescent, entire; **Pet** subcordate, 13 \times 11–12 mm, truncate-emarginate, ecarinate, erect at anthesis, orange-red, glabrous; **St** slightly exerted for $\pm \frac{2}{3}$ of the anther length; **Fil** 10 mm, sometimes connate for ± 1.5 mm above the 1.5 mm high common tube (according to the protologue, completely connate according to Fig. 3 in Pinangé & al. (2017)); **Anth** 3–4 mm, strongly recurved towards the apex, apiculate, base sagittate; **Ov** narrowly subpyramidal, ± 6 mm; **Sty** indistinct, **Sti** orange, ± 1.5 mm, margins irregularly scalloped.

Compared with *D. beateae* in the protologue. — [F. Krapp]

D. horridula Mez (Bot. Jahrb. Syst. 30 (Beiblatt 67): 5, 1901). **Type:** Brazil, Goiás

(*Glaziou* 22194 [B, F [photo], K]). — **Lit:** Leme & Miranda (2009: with ills.). **Distr:** Brazil (Goiás: Santo Antonio do Descoberto); rocky soils in Campo Rupestre vegetation, amongst herbs.

[3b] **Ros** compact, ± 15 cm \varnothing , with a bulbous base formed by old leaf sheaths, probably solitary; **L** 35–40, dense, coriaceous, sheath 4.5–5 \times 4–5 cm, **L** lamina sublinear, 10–12 \times 0.8 cm, (sub-) erect, nearly flat near the base, canaliculate and obtusely carinate above and subulate towards the tip, green basally changing to reddish towards the tip, adaxially sparsely and abaxially densely white-lepidote but scales not obscuring the leaf colour, tip acuminate-caudate, pungent, margins subdensely spinose, **Sp** spreading to retrorse, 1–1.5 mm, reddish-brown, 2–3 mm apart; **Inf** 15–25 cm, simple, erect; peduncle 9–17 cm, subdensely white-furfuraceous to glabrous; peduncular **Bra** 10–20 \times 5 mm, subfoliaceous (lowest) to ovate-subtriangular (upper), erect, stramineous, sparsely white-lepidote; fertile **Inf** part 3–4 cm, 5- to 7-flowered, subdensely to inconspicuously white-furfuraceous (incl. pedicel and sepals); floral **Bra** ovate, $\pm 7 \times 3$ mm, acuminate, veined, stramineous, subspreading to reflexed; **Fl** 12–14 mm long and \varnothing , somewhat campanulate, strongly sweet-fragrant; **Ped** inconspicuous, $\pm 2 \times 3.5\text{--}4$ mm \varnothing ; **Sep** broadly ovate to suborbicular, $\pm 5 \times 4$ mm, ecarinate, yellow with green tip to pale orange; **Pet** broadly obovate-spatulate from narrow base, $\pm 10 \times 6$ mm, upper part spreading to spreading-ascending, yellow; **St** shorter than the petals but distinctly exposed at anthesis, connivent; **Fil** yellow, connate over the whole length and forming a tube ± 8 mm long **Anth** narrowly subtriangular, ± 2 mm, dark purplish-brown, basally connate; **Ov** $\pm 2.5 \times 1$ mm, yellowish-white; **Sty** ± 1 mm, yellowish; **Sti** conduplicate-spiral, yellow; **Fr** and **Se** unknown.

A rarely collected species, easily overlooked due to its small size. — [F. Krapp]

D. ibicuiensis Strehl (Bromélia 4(4): 14–16, ills., 1999). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1098 [HAS 31720]). — **Distr:** Brazil (C Rio Grande do Sul); rocky outcrops, among grasses and herbs.

[2/3b] **Ros** ± 20 -leaved, ± 60 cm \varnothing ; **L** $\pm 40 \times \pm 2$ cm, sheath not described, **L** lamina narrowly triangular, light green, flexible, slightly contorted, the inner ones erect, the outer spreading, glabrous adaxially, striate-lepidote abaxially, margins subentire with widely spaced minute **Sp** only; **Inf** ± 2 m, simple or sometimes branched, erect; peduncle ± 70 (30–140) cm, yellowish-green, glabrous; peduncular **Bra** long-lanceolate, acute, $\pm 150 \times \pm 12$ mm and longer than the internodes (lowest), the others much smaller, lepidote at the base, margins membranous, sparsely irregularly spinose, soon drying; fertile **Inf** part densely to sparsely flowered, robust, ± 55 (40–80) cm, slightly lepidote to glabrous, yellowish-green; floral **Bra** narrow, slightly carinate basally, ending in a long acute pungent tip, ± 40 mm (lowest) or shorter (uppermost), lemon-yellow, finely serrate; **Fl** spreading, tubular with spreading limb, 20–24 mm; **Ped** 6–7 mm; **Sep** narrow, ovate, 10–15 mm, apex rounded, ending in a short spine, slightly carinate, yellow; **Pet** free, tongue-shaped, 15–20 mm, distally spreading, greenish-yellow; **St** included; **Fil** $\frac{1}{3}$ of their length free above the common tube; **Fr** 13–15 \times 10 mm, dark brown at the apex, otherwise almost black, shiny; **Se** base acute, apex rounded, with a lateral wing, ± 4 mm wide, brown.

Similar to *D. dusenii*.

D. ibiramensis Reitz (Sellowia 14: 104, fig. 4, 1962). **Type:** Brazil, Santa Catarina (Reitz & Klein 2635 [HBR, US]). — **Lit:** Hmeljevski & al. (2011: genetics, conservation). **Distr:** Brazil (C-E Santa Catarina: Ibirama); ledges along streams, and rock islands, seasonally inundated; only known from the region of the type locality. **I:** Smith & Downs (1974: 552); Reitz (1983: t. 48).

[1/2] **Ros** solitary or forming small groups with age, acaulescent; **L** 30–40 \times 2.2 cm, rigid, sheath not described, **L** lamina narrowly triangular, glabrous above, cinereous-lepidote abaxially, sinuate-serrate, **Sp** 4 mm; **Inf** 1 m, paniculate; peduncle glabrous; peduncular **Bra** erect, foliaceous (lowest) to 15 mm (upper), serrate; fertile **Inf** part few- to 6-branched, subglabrous or sparsely lanate distally, **Br** ascending, laxly flowered; primary **Bra** like the upper peduncular

bracts, much shorter than the sterile branch bases; floral **Bra** triangular, recurved, pungent, shorter than the sepals, serrate; **Fl** suberect to reflexed; **Ped** 3 (–5) mm; **Sep** broadly elliptic, 7–9 \times 4 mm, rounded, entire, coriaceous, glabrous; **Pet** broadly ovate, 14 \times 8 mm, ecarinate with undulate margins, deep orange; **St** included; **Fil** free above the short common tube; **Sty** 2 mm.

Hmeljevski & al. (2011) studied the genetic diversity and mating system of this rare endemic, which is confined to a 4 km large rocky outcrop along the Rio Itajaí, and which is classified as critically endangered. The flowers are pollinated by the carpenter bee *Xylocopa brasiliatorum* as well as by the hummingbird *Thalurania glaucopsis*.

D. incana O. B. C. Ribeiro & Leme (J. Bromeliad Soc. 65(1): 23–26, ill. (incl. p. 18), 2015). **Type:** Brazil, Minas Gerais (*Ribeiro* 268 [BHCB, HB]). — **Distr:** Brazil (Minas Gerais: Nova Lima); iron-rich rock outcrops in Campo Rupestre vegetation, 1310 m; known only from the region of the type population.

[3a] **Ros** ± 12 cm \varnothing , sometimes asymmetrical, offsetting and forming dense colonies; **L** 8–10, dense and sometimes secund, subspreading to suberect, sheath 1.5–2 \times 3–4 cm, adaxially whitish, adaxially castaneous, glabrous towards the base, **L** lamina narrowly triangular, very succulent and rigid, 4.5–6 \times 1–1.4 cm, densely and coarsely cinereous-tomentose on both faces, tip a pungent spine, margins laxly spinose, **Sp** narrowly triangular, straight to slightly retrorse, 0.5–1 mm, 5–8 mm apart; **Inf** 25–55 cm, erect, simple; peduncle 25–35 cm, sparsely white-lepidote, pale orange to brownish-red; peduncular **Bra** 5–10 \times 5 mm, with suborbicular base and a long lanceolate-caudate lamina, erect, stramineous, veined and with raised midvein; fertile **Inf** part 6–10 cm, subdensely 11- to 16-flowered, rachis reddish, glabrous, distally slightly flexuose; floral **Bra** broadly ovate to triangular, acuminate to acute, 4.5–5 \times 4.5–5 mm, subspreading to suberect, finely veined, stramineous, slightly crenulate; **Fl** 12–13 mm, porrect-spreading, \pm secund, tubular, unscented; **Ped** 3.5–5 mm, stout, yellow-orange, glabrous, curved; **Sep** broadly ovate to

suborbicular, 4–5.5 × 3.5–4 mm, orange to reddish, convex, obtuse and apiculate, ecarinate, glabrous except the margins with recurved fimbriate trichomes; **Pet** broadly obcordate with narrowed base, 7.5 × 6.5–7 mm, orange-yellow, emarginate, ecarinate, (nearly) erect, basally connate for ±1.5 mm; **St** included and much shorter than the petals; **Fil** free above the common tube; **Anth** oblong-ovate, (almost) straight, base bilobed; **Ov** suboblong-ovoid, ±2.5 × 1.5 mm, yellow; **Sty** ±1 mm, distinct, yellow; **Sti** conduplicate-spiral, yellow; **Fr** and **Se** unknown.

Another member of the *D. saxatilis* complex, and compared with *D. brachyphylla*, *D. macedoi* and *D. oligantha* (here treated as synonym of *D. saxatilis*) in the protologue. — [U. Eggl]

D. inflexifolia Guarçoni & M. Sartori (Ann. Bot. Fenn. 49: 407–410, ills., 2012). **Type:** Brazil, Minas Gerais (*Guarçoni & Sartori* 1474 [VIC, R]). — **Lit:** Büneker & al. (2016: with ills.). **Distr:** Brazil (C Minas Gerais: Serro); Campo Rupestre vegetation on iron-rich igneous rocks (“pedra canga”) and rocky soil; only known from the small population at the type locality.

[2/3a] **Ros** solitary, dense, ±40-leaved, ±70 cm Ø, ±40 cm high; **L** 30–35 × 2.4–3 cm, outer reflexed, youngest inflexed, strongly succulent, sheath elliptic, ±3–3.3 × 5.9–6.3 cm, white, yellowish-cream at the apex adaxially, densely white-lepidote at the apex abaxially, dentate at the apex, **L** lamina narrowly triangular, indistinctly canaliculate, acute, with pungent tip, green, adaxially completely glabrous, abaxially densely white-lepidote (basally) to pubescent, margins rather densely spinose, **Sp** irregularly curved, 2.4–3.5 mm, amber with a brown apex, 7–17 mm apart; **Inf** 0.95–1.45 m, erect, simple or with up to 6 branches; peduncle erect, 25–67 cm, red, densely rusty-tomentose; peduncular **Br** linear-triangular to triangular with suborbicular base, erect and acuminate and pungent (upper), carinate, succulent (lowest), 36–65 × 3–6 mm (lowest) to 14–20 × 6–8 mm (upper), margins vinaceous adaxially (lowest), stramineous (upper), margins (lowest) or completely (upper) densely rusty-lepidote abaxially, fimbriate basally, entire apically; main axis of the fertile

Inf part to 45-flowered, 24–56 cm, branches 8- to 10-flowered, subdense, erect, rachis red, densely rusty-tomentose, basal-most branches with delayed development, suberect, curved or not, slightly flexuose, 4.5–21 cm; primary **Bra** similar to the upper peduncular bracts but slightly smaller, 13–15 × 5–6 mm; floral **Bra** carinate, triangular, convex, acuminate, pungent, 11–18 × 5–8 mm, stramineous, densely rusty-tomentose abaxially, entire to inconspicuously fimbriate; **Fl** 18–20 mm, ascending to spreading; **Ped** 5 mm, robust, red; **Sep** ovate to broadly triangular, 7.2–11 × 6.3–8.7 mm, obtuse, convex, strongly succulent, red to orange, densely rusty-tomentose abaxially, fimbriate; **Pet** rhomboid to elliptic, 11–14 × 8–11 mm, obtuse to retuse, strongly succulent, undulate after anthesis, orange, scarcely tomentose, margins in the upper ½ fimbriate; **St** included; **Fil** free above the 1.3–2.9 mm high common tube, 7.4–8.8 mm, yellowish-orange; **Anth** lanceolate to elliptic, yellow, 3–3.4 mm, base sagittate, apex obtusely apiculate; **Ov** pyramidal, 4.9–5.2 mm, yellow to greenish-yellow; **Sty** 0.7–0.8 mm, orange to brownish-orange towards the apex, **Sti** orange, 0.6–0.7 mm; **Fr** ovoid, acute, 14 × 10 mm, dark brown.

Part of the *D. sordida* complex together with *D. nobilis* and *D. ursina* (Büneker & al. 2016).

D. insignis Hassler (Annuaire Conserv. Jard. Bot. Genève 20: 316, 1919). **Type:** Paraguay, Concepción (*Fiebrig* 4615 [G, F [photo]]). — **Distr:** NE Paraguay (Concepción); dry open rocky ground. **I:** Smith & Downs (1974: 515).

≡ *Dyckia grandiflora* Mez (1919) (*nom. illeg.*, Art. 52.1); **incl.** *Dyckia insignis* [?] *flaviflora* Hassler (1919); **incl.** *Dyckia insignis* var. *macrantha* Hassler (1919); **incl.** *Dyckia insignis* var. *obtusiflora* Hassler (1919).

[3a] **Ros** shortly caulescent, stem 6–8 cm; **L** 20–35 × 1.5 cm, sheaths forming a bulb, broad, brown and lustrous abaxially, glabrous, **L** lamina linear-triangular, filiform-attenuate, appressedly white-lepidote, laxly serrate, **Sp** acicular, 3 mm; **Inf** 30–60 cm, simple; peduncle slender, 25–50 cm, striate, glabrous; peduncular **Bra** long-acuminate from a triangular-ovate base, the

lower 6–7 cm, exceeding the internodes, the upper 2 cm, shorter than the internodes, serrate like the leaves; fertile **Inf** part laxly 3- to 7-flowered, all parts including the flowers \pm lepidote; floral **Bra** like the upper peduncular bracts (lower) to triangular-ovate and filiform-attenuate and shorter (upper), entire; **Fl** erect to spreading; **Ped** 7–11 mm; **Sep** oblong-ovate, 10–12 mm, obtuse, finely fimbriate-serrulate; **Pet** erect, elliptic-oblong, 22–28 mm, subacute or obtuse, red to yellowish (brownish-red in the protologue of *D. grandiflora*); **St** exerted 10 mm; **Fil** free above the 1 mm high common tube; **Anth** linear, subsagittate at the base, strongly recurved; **Ov** conical, 10 mm; **Sty** 25 mm; **Fr** stoutly ovoid, long-beaked, 20 \times 14 mm; **Se** with a dorsal falciform hyaline wing, 4 mm.

D. irmgardiae L. B. Smith (Phytologia 15: 150, t. 7, figs. 8 and 9, 1966). **Type:** Brazil, Rio Grande do Sul (*Smith & al.* s.n. [US]). — **Distr:** Brazil (NE Rio Grande do Sul); ecology not recorded. **I:** Smith & Downs (1974: 535).

[3a] **Ros** spreading, very many-leaved, with a short and stout rhizome; **L** to 56 \times 1.8 cm, sub-rigid, sheath not described, **L** lamina very narrowly triangular, soon glabrous adaxially, closely appressedly pale-lepidote abaxially, laxly serrate, **Sp** antrorsely curved, black, 2 mm; **Inf** to 1 m, simple, erect; peduncle densely ferruginous-lanate; peduncular **Bra** densely imbricate, narrowly triangular from a broadly ovate base, ferruginous-lanate, serrulate; fertile **Inf** part densely many-flowered, \pm 30 cm, densely ferruginous-lanate; floral **Bra** like the upper peduncular bracts, mostly exceeding the flowers, serrulate; **Ped** 5 mm, stout, compressed; **Sep** ovate, 10 mm, acuminate, the posterior ones alate-carinate; **Pet** lamina subrhombic, 15 mm, colour not described; **St** included; **Fil** free above the common tube; **Sty** \pm none.

Similar to *D. reitzii*. — [F. Krapp]

D. irwinii L. B. Smith (Phytologia 14: 483, t. 1, figs. 16–19, 1967). **Type:** Brazil, Mato Grosso (*Irwin & al.* 16923 [US, NY]). — **Distr:** Brazil (E Mato Grosso); open Cerrado scrub and border of fields. **I:** Smith & Downs (1974: 552).

[1] **Ros** not described; **L** 60–70 \times 2–2.5 cm, sheaths suborbicular, 4 cm, castaneous with pale margins, **L** lamina linear-triangular, with pungent tip, appressedly whitish-lepidote on both faces, glabrescent adaxially, margins laxly serrate, **Sp** 2 mm, brown; **Inf** to 2.25 m, laxly few-branched; peduncle pale-lepidote, glabrescent; peduncular **Bra** subfoliaceous (lower) to narrowly triangular from a broadly ovate base (upper), much shorter than the internodes, serrulate; fertile **Inf** part 1 m, finely cinereous-lepidote, glabrescent; **Br** sub-erect, slightly flexuous, slender, elongate; primary **Bra** like the upper peduncular bracts, much shorter than the sterile bracteate branch bases; floral **Bra** broadly ovate, apiculate, mostly shorter than the pedicels; **Fl** laxly arranged, secund, curved-ascending; **Ped** to 5 mm, slender; **Sep** broadly ovate, 6–8 mm, obtuse; **Pet** suberect, broadly obovate, 9 mm or more, colour not described; **St** included; **Fil** connate above the common tube; **Sty** \pm none; **Fr** ovoid, acute, 15 mm; **Se** with a broad rounded subfalcate wing.

D. joanae-marcoi P. J. Braun & al. (Bromeliee 2008(1): 33–46, ills., 2008). **Type:** Brazil, Minas Gerais (*Esteves Pereira & Braun* 493 [UFG, HAL]). — **Distr:** Brazil (Minas Gerais: Mato Verde); rocky ground, between shrubs and grasses, \pm 900 m.

[3] **Ros** many-leaved, 20–30 cm \varnothing , 10–15 cm high, usually with some offsets; **L** 8–17 \times 1–2 cm, 5–15 mm thick, lamina succulent, very hard, stiff, breaking, adaxially flat to concave, apex pungent and brown, both faces grey- to sordidly white-lepidote, margins spinose-serrate, **Sp** brown, lower ones white-lepidote; **Inf** to 50 cm but usually shorter, simple, erect to ascending, stout; peduncle reddish, to 32 cm, sparsely white-lepidote; fertile **Inf** part 12–18 cm, 5- to 10-flowered, reddish, sparsely lepidote; floral **Bra** to 6 mm, very soon drying, later translucent; **Fl** erect in bud, then slightly nutant, 15–20 \times 10 mm; **Ped** 3–5 mm, thick; **Sep** broadly spatulate, to 13 \times 5–8 mm, basally connate, apical 7–10 mm free, succulent, convex, red to orange, white-lepidote, compressing the perianth, densely covered with thick nectar drops; **Pet** 16–17 \times 8–10 mm, reddish-orange to dark orange, upper

margins rolled back towards the end of anthesis; **St** included or shortly exerted; **Fil** 7–8 mm, free above the common tube (Pinangé & al. 2017: fig. 3); **Anth** yellow, 3 mm, strongly arching outwards; **Ov** incl. **Sty** 10 mm, light yellow; **Fr** $\pm 13 \times 12$ –15 mm, blackish-brown; **Se** lentiform, slightly flattened in the hilum-micropylar region, 5–6 mm \varnothing , light brown.

Compared with *D. marnier-lapostollei* and *D. braunii*, and very similar. Fruit size has been taken from the table in the protologue, and appears incorrectly given in the description.

D. jonesiana Strehl (Bromeliaceae 42(5): 8–9, figs. 1–4, 2009). **Type:** Brazil, Rio Grande do Sul (*Silva & Strehl* 1172 [HAS]). — **Distr:** Brazil (S-C Rio Grande do Sul: Caçapava do Sul); on or between sandstone.

[3b] **Ros** with only ± 7 leaves, 15 cm \varnothing , with a bulbous base, rhizomatous and forming sparse groups; **L** 10–15 \times 1.2–1.5 cm, sheath ovate, 2 cm wide, white, **L** lamina succulent, triangular-acute, rather recurved, with hard and pungent tip, easily breaking, dark green to copper-coloured, densely white-lepidote esp. abaxially, very laxly serrate, **Sp** slender, 1–2 mm; **Inf** 60–80 cm, simple; peduncle erect, 40–60 cm; peduncular **Bra** triangular, amplexicaul, acute, membranous, longer (lower) or shorter (upper) than the internodes, white-lepidote; fertile **Inf** part lax, 20 cm, rachis slightly lepidote or glabrous, reddish; floral **Bra** membranous, ovate, 5–12 \times 11–13 mm, ecarinate or slightly carinate, orange to castaneous, white-lepidote esp. apically; **Ped** absent or short; **Sep** narrowly ovate, apex acute or roundish, ecarinate, covered by the bracts, 8–16 mm, orange-reddish, glabrous, margins membranous; **Pet** free, tongue-shaped, 20–24 mm, carinate, obtuse; **St** included; **Fil** connate above the ± 7 mm high common tube; **Anth** narrowly triangular, recurved; **Ov** ± 15 mm; **Fr** dehiscent to the base, 13–14 \times 10 mm, dark castaneous to nearly black, shining; **Se** acute at the base, apex rounded, with lateral wing, ± 4 mm, castaneous.

The rather small-sized plants are compared with *D. remotiflora* in the protologue. — [F. Krapp]

D. julianae Strehl (Vidalia 2(2): 2730, figs. 1–4, 2004). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1427 [HAS]). — **Distr:** Brazil (E Rio Grande do Sul); on rock outcrops and stony ground, between grasses.

[3a] **Ros** squarrose, ± 50 - to 80-leaved, 20–30 cm \varnothing , subcaulescent, offsetting and forming dense clumps; **L** to 14–15 \times ± 1.5 cm, sheath 2.5 \times 3 cm, white with brown spots adaxially, both faces glabrous, **L** lamina narrowly acuminate, recurved, with acute pungent tip, somewhat succulent, pale green, white-lepidote on both faces, margins densely regularly spinose, **Sp** 2 mm, antrorse, 10–15 mm apart; **Inf** 80–100 cm, simple or sometimes branched; peduncle 20–30 cm; peduncular **Bra** almost verticillate near the peduncle base, leaf-like (lowest), 2–5 \times 1–1.5 cm, lamina long-triangular, apex long-acuminate, white-tomentose, margins serrate; fertile **Inf** part 20–40 cm, axis white-tomentose; floral **Bra** ovate-triangular, acute, 5–12 \times ± 5 mm, abaxially puberulous, somewhat carinate, (sub-) entire; **Ped** absent and **Fl** sessile, tubular to narrowly funnel-shaped, 16 \times 4 mm; **Sep** narrowly ovate, 6–8 \times 3–4 mm, ecarinate or slightly carinate towards the apex, basally green, distally brown, slightly white-puberulous abaxially; **Pet** ovate, 13–16 \times 5 mm, (sub-) erect, yellow; **St** included; **Fil** yellow, filiform, free above the common tube; **Anth** yellow, visible in the throat; **Ov** $\pm 5 \times 3$ mm, yellow-green or brown; **Sty** ± 6 mm.

D. kranziana Leme (Phytotaxa 16: 12–14, ill., 2011). **Type:** Brazil, Mato Grosso (*Kranz* 122 [RB, HB]). — **Distr:** Brazil (Mato Grosso); Cerrado vegetation, on reddish soil or rocks.

[1/3b?] **Ros** dense, ± 12 -leaved, basally offsetting; **L** 29–32 \times 2–3.5 cm, stiff, slightly succulent, sheath inconspicuous, **L** lamina narrowly triangular, attenuate and strongly canaliculate towards the apex, suberect-arcuate, acuminate and with pungent tip, green, abaxially densely white-lepidote, adaxially subdensely white-lepidote, subdensely to laxly spinose, **Sp** narrowly triangular, straight to slightly retrorse, 2.5–5 mm, with castaneous tip, 6–15 mm apart; **Inf** to 85 cm, simple or sometimes with ± 3 late-developing branches; peduncle erect, ± 65 cm, green, sparsely

white-lanate to glabrous mainly towards the base; peduncular **Bra** acuminate, lowest sublinear and canaliculate-carinate and exceeding the internodes, upper ovate-caudate and shorter than the internodes, 18–25 × 10–12 mm, green, stramineous at anthesis (upper), inconspicuously white-lepidote to glabrous, veined, lowest laxly spinulose, upper densely finely denticulate-crenulate; fertile **Inf** part densely ±38-flowered, 10–30 cm, often deflexed-ascending, greenish to pale orange, densely white-lanate; **Br** when present spicate, 3–6 cm, densely 5- to 11-flowered, 10–12 cm; primary **Bra** narrowly lanceolate, acuminate-caudate, white-lepidote, veined; floral **Bra** ovate, acuminate, 7–15 × 6–8 mm, stramineous at anthesis, white-lepidote, veined, margins remotely denticulate-crenulate to entire; **Fl** suberect, 13–14 mm, narrowly ovate with narrow throat, unscented; **Ped** ±2 mm, pale orange, densely white-lanate; **Sep** broadly ovate, 6–7 × 6 mm, obtuse-emarginate, ecarinate, strongly convex, yellowish-orange, obscurely white-lanate, entire, sparsely fimbriate; **Pet** broadly obovate-spatulate, 10 × 8.5 mm, obtuse-emarginate, ecarinate, orange, glabrous; **St** equalling the petals to slightly exerted; **Fil** 1 mm connate above the 1 mm high common tube, 7.5–8 mm, pale orange; **Anth** narrowly subtriangular-sagittate, ±3 mm, recurved at anthesis, acuminate; **Ov** narrowly suboblong, ±4 mm; **Sty** ±1 mm, pale yellow, **Sti** ±1 mm, orange, margins scalloped; **Fr** subglobose, broadly acute and shortly beaked, 15 × 11 mm, olivaceous-castaneous, lustrous; **Se** nearly circular, obtuse, strongly flattened, 4–5 × 3.5–4.5 mm.

Similar to *D. velascana*.

D. lagoensis Mez (in Martius, Fl. Bras. 3(3): 483, 1894). **Type:** Brazil, Minas Gerais (*Warming* 2171 p.p. [C, F [photo]]). — **Distr:** Brazil (Minas Gerais); open Cerrado scrub and fields, on soil or on rocks. **I:** Smith & Downs (1974: 535).

[3b] **Ros** acaulescent; **L** to 40 × 1.2–1.6 cm, sheath not described, **L** lamina narrowly triangular, green, canescent or fusciscent, sublepidote abaxially, laxly serrate, **Sp** slender, 1–2 mm; **Inf** to 1 m, simple; peduncle lepidote or finally glabrous; peduncular **Bra** broadly ovate with long

narrowly triangular lamina, equalling or exceeding the internodes, serrulate; fertile **Inf** part few-flowered, minutely and fugaciously lepidote; floral **Bra** suberect to spreading, suborbicular, lamina long narrowly triangular, exceeding the sepals and the lowest flowers, fimbriate-serrulate; **Fl** erect or suberect, to 12 mm; **Ped** 1–2 mm, stout; **Sep** ovate, broadly subacute or rounded, mucronulate or obtuse, 6–9 mm, slightly fimbriate; **Pet** erect, lamina broadly obovate, obtuse, slightly undulate, orange, subcarinate, slightly exceeding the sepals; **St** included; **Fil** 7 mm connate above the common tube; **Anth** narrowly triangular, recurved; **Sty** very short.

D. leptostachya Baker (Gard. Chron., ser. nov. 1884(2): 198, 1884). **Type:** Brazil, Paraná (*Anonymus* s.n. [K, GH [photo]]). — **Distr:** Brazil (Minas Gerais, Santa Catarina, Paraná, Mato Grosso, Rio Grande do Sul), Paraguay (Caaguazú, Itapúa), Bolivia (Chuquisaca, Santa Cruz), Argentina (Chaco, Corrientes, Entre Ríos); dry fields or open scrub (Cerrado vegetation). **I:** Smith & Downs (1974: 549); Reitz (1983: t. 51, as *D. remotiflora* var. *montevidensis*).

Incl. *Dyckia leptostachia* Baker (s.a.) (*nom. inval.*, Art. 61.1); **incl.** *Dyckia boliviensis* Mez (1896); **incl.** *Dyckia conspicua* Mez (1896); **incl.** *Dyckia hassleri* Mez (1903); **incl.** *Dyckia apensis* Mez (1919); **incl.** *Dyckia hassleri* fa. *gracilis* Hassler (1919); **incl.** *Dyckia hassleri* ssp. *basispina* Hassler (1919); **incl.** *Dyckia hassleri* var. *arenosa* Hassler (1919); **incl.** *Dyckia hassleri* var. *montana* Hassler (1919); **incl.** *Dyckia longifolia* Mez (1919); **incl.** *Dyckia rojasii* Mez (1919); **incl.** *Dyckia hassleri* var. *typica* Hassler (1919) (*nom. inval.*, Art. 26.1).

[2/3a] Plants very variable as to size; **Ros** ±15-leaved; **L** 40–100 × 1–3 cm, **L** lamina arching, narrowly triangular, long-attenuate, densely white-lepidote, soon glabrous adaxially, **Sp** slender, curved, 3–4.5 mm; **Inf** 50–150 cm, simple or few-branched; peduncle very slender, minutely lepidote or glabrous; peduncular **Bra** very broadly ovate, apiculate, much shorter than the internodes, entire; fertile **Inf** part 12–16 cm, rachis sparsely lepidote or glabrous; floral **Bra** spreading, very broadly ovate, abruptly contracted to an

acuminate point, 3–8 (–12) mm, much exceeded by the sepals; **Fl** suberect to spreading, 13–23 mm; **Ped** very short, stout; **Sep** broadly ovate, 6–12 mm, obtuse, \pm carinate, smooth, soon glabrous; **Pet** erect, broad, obtuse or emarginate, minutely crenulate, red-orange; **St** usually exerted; **Fil** free above the common tube; **Anth** acute, mucronate, recurved; **Sty** sometimes long or partially divided.

D. limae L. B. Smith (Phytologia 20: 179, t. 2, figs. 9–11, 1970). **Type:** Brazil, Pernambuco (*Lima* 61-3996 [IPA, US [photo]]). — **Distr:** Brazil (Pernambuco); in compact nearly barren sandy soil. **I:** Siqueiro Filho & Leme (2007: 315).

[1/2] **Ros** not described; **L** $\pm 24 \times 1.5$ cm, curved, sheath 3.5 cm wide, stramineous to dark brown, densely serrulate at the apex, **L** lamina narrowly triangular, with pungent tip, appressedly pale-lepidote, laxly serrate, **Sp** slender, antroretrorely uncinata, 2 mm, brown; **Inf** 70–80 cm, depauperately compound with 1 or 2 small suberect branches, or simple; peduncle \pm straight, glabrous; peduncular **Bra** except the lowest triangular, remote, small, finely serrulate; fertile **Inf** part lax, rachis slender, flexuous, compressed, to 25 cm, all parts incl. pedicels and sepals appressedly pale-lepidote; floral **Bra** ovate, 6 mm, acuminate, slightly exceeding the pedicels (lowest), serrulate (lowest); **Fl** secund; **Ped** to 5 mm in fruit, rather stout; **Sep** ovate, 7 mm, broadly acute and apiculate, sulcate; **Pet** elliptic-rhomboid, 12 mm, obtuse, carinate, orange; **St** included; **Fil** 7 mm, connate for 2–4 mm with the petals but free above the common tube (or completely connate according to Fig. 3 of Pinangé & al. (2017)); **Sty** ± 1 mm; **Fr** subglobose, 15 mm.

Similar to *D. velascana* in general appearance.

D. lindevaldae Rauh (Trop. subtrop. Pfl.-welt 65: 12–17, figs. 6 and 7, 1988). **Type:** Brazil, Goiás (*Esteves Pereira* s.n. in *Rauh* 67425 [HEID]). — **Distr:** Brazil (N Goiás); terrestrial on weathered soil. **I:** Braun & al. (2008).

[3b] **Ros** many-leaved, 15–20 cm \varnothing , to 4 cm high, acaulescent or shortly caulescent, solitary or usually in groups, often dividing dichotomously;

L to 10 \times 3 cm, sheath to 1.5 \times 3.5 cm, greenish-white, castaneous at the base abaxially, glabrous, entire, **L** lamina narrowly triangular, acuminate, pungent, slightly succulent, strongly reflexed, both faces very densely tomentose (easily wiped away) giving a snow-white overall colour, serrate, **Sp** retrorse, to 4 mm, yellowish-brown, lanate, ± 5 mm apart; **Inf** to 30 cm, simple; peduncle slender, curved-ascending, to 15 cm, brownish-green, glabrous; peduncular **Bra** subfoliaceous (lower) or smaller (upper), oblong, triangular, acuminate, shorter than the internodes, glabrous at the broadened base, elsewhere sparsely lepidote, soon drying; fertile **Inf** part spirally ± 12 -flowered, rachis slender, flexuous, to 20 cm, reddish-brown, sparsely lepidote; floral **Bra** spoon-shaped, acute, carinate, ± 7 mm, equalling or slightly shorter than the sepals, brownish-green, initially sparsely lepidote, later glabrous, veined, slightly serrate; **Fl** erect-spreading, 10–12 mm, subsessile; **Sep** ecarinate, strongly convex, obtuse, 6–7 \times 4 mm, nearly glabrous, margins and tip ciliate; **Pet** broadly round to rhombic, 9–11 mm, erect, ecarinate, obtuse, pale orange-red, yellow towards the base, ciliate at the tip; **St** slightly exerted; **Fil** very shortly connate, white; **Ov** cylindrical, polygonally sulcate, 4 mm; **Sty** short, yellow, **Sti** shortly papillate; **Fr** and **Se** not described.

Similar to *D. marnier-lapostollei* var. *marnier-lapostollei*.

D. linearifolia Baker (Handb. Bromel., 131, 1889). **Type:** Brazil, Minas Gerais (*Saint Hilaire* 1010 [P, GH [photo]]). — **Distr:** Brazil (Minas Gerais, São Paulo); open scrub, savanna.

[3a] **Ros** not described; **L** 40–55 \times 1 cm, sheath suborbicular, 5 cm, dark castaneous, **L** lamina sublinear, strongly appressedly brown- or whitish-lepidote abaxially, laxly serrate towards the base, **Sp** slender, curved, 1.5 mm; **Inf** 40 cm and more, simple; peduncle very slender, glabrous; peduncular **Bra** ovate, acuminate, entire, remote; fertile **Inf** part subdense, many-flowered, completely glabrous; floral **Bra** spreading to reflexed, triangular-ovate, exceeding the pedicels but much shorter than the sepals; **Fl** spreading at anthesis, then erect; **Ped** to 7 mm, rather slender;

Sep broadly ovate, to 8 mm, obtuse; **Pet** lamina suberect, narrowly elliptic, ± 15 mm, obtuse, carinate, colour not described; **St** included; **Fil** free above the common tube; **Anth** linear, mucronulate, nearly straight; **Ov** not described; **Sty** $\pm \frac{1}{3}$ as long as the ovary; **Fr** and **Se** not described. — [F. Krapp]

D. lunaris Leme (Selbyana 30(2): 131–133, fig. 2, 2010). **Type:** Brazil, Goiás (*Leme* 6359 [HB, RB]). — **Distr:** Brazil (Goiás); ecology not recorded.

[3b] **Ros** dense, ± 30 -leaved, with elongated basal shoots; **L** 29–40 \times 2.7–3.4 cm, strongly coriaceous, succulent, sheath wider than the lamina, **L** lamina narrowly triangular, \pm flat to slightly canaliculate, strongly recurved, apex long acuminate, subulate and pungent, green, sometimes yellowish-green basally and apically, adaxially glabrous, abaxially veined and inconspicuously white-lepidote, margins laxly spinose, **Sp** narrowly triangular, \pm straight to antrorsely uncinat, 6–9 mm, glabrous, greenish to reddish with yellowish tip, 10–40 mm apart; **Inf** 55–90 cm, simple, erect; peduncle 25–45 cm, green, subdensely white-lanate to glabrescent; peduncular **Bra** foliaceous to subfoliaceous, strongly recurved to suberect, upper ones long acuminate-caudate from a subtriangular-ovate base, distinctly exceeding the internodes, yellowish-green with red apex, upper ones stramineous at anthesis, densely veined, glabrous, margins laxly spinose; fertile **Inf** part 50- to 80-flowered, subdense to dense, 22–45 cm, rachis straight, (sub-) densely white-lanate; floral **Bra** long acuminate-caudate from an ovate base (lowest) to subtriangular-ovate and acuminate (upper), spreading to suberect-ascending, ecarinate, 30–55 \times 10–14 mm (lowest) to 12–30 \times 7–10 mm (upper), stramineous at anthesis, glabrous to inconspicuously white-lepidote, distinctly veined, subdensely and minutely spinulose; **Fl** spreading to suberect at anthesis, becoming erect afterwards, 19–23 mm, campanulate, unscented; **Ped** 3–7 mm, stout, orange, densely white-lanate; **Sep** ecarinate, \pm acute, adaxial ones asymmetrical-curved, subtriangular-ovate, abaxial one symmetrical, ovate, distinctly convex, 10–11 \times 5–6 mm, orange to

reddish, subobscurely white-lanate, entire, fimbriate; **Pet** broadly obovate, 11–13 \times 7 mm, apex rounded to cucullate, ecarinate, orange, abaxially subdensely white-lepidote; **St** included; **Fil** 4–5 mm connate above the 2 mm high common tube, 6–7 mm, apex pale orange; **Anth** ovate, ± 3 mm, strongly spirally recurved at anthesis, base sagittate, acute; **Ov** narrowly subpyramidal, ± 5.5 mm, yellowish; **Sty** ± 2 mm, **Sti** conduplicate-spiral, ± 1.5 mm, orange, minutely crenulate; **Fr** broadly ellipsoid-ovoid, shortly beaked, 14–15 \times 9–10 mm, dark castaneous, lustrous; **Se** flat, asymmetrical, subcuneate, base obtuse, 4–5 \times ± 3 mm.

Similar to *D. burle-marxii*. The only other species with asymmetrical sepals (and thus somewhat zygomorphic flowers) is *D. pontesii*.

D. lutziana L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 107, t. 107, 1943). **Type:** Brazil, sine loco (*Foster* 1144-B [GH]). — **Distr:** Brazil (without recorded locality); never recollected. **I:** Smith & Downs (1974: 576).

[3b] **Ros** not described; **L** incompletely known, inner leaves to 10 cm, lamina linear, appressedly pale-lepidote on both faces, laxly serrulate; **Inf** to 80 cm, simple, very slender; peduncle glabrous; peduncular **Bra** remote, broadly ovate, acuminate, membranous, small, reddish; fertile **Inf** part lax, straight, to 9 cm, subglabrous; floral **Bra** like the peduncular bracts but apiculate, shorter than to barely exceeding the pedicels; **Fl** suberect to spreading; **Ped** 4–5 mm, slender; **Sep** elliptic, 8–9 mm, obtuse; **Pet** lamina broad, to 12 mm, orange-yellow when dry; **St** slightly exserted; **Fil** high-connate above the common tube; **Ov** not described; **Sty** slender, 2 mm.

D. macedoi L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 2: 195, 1952). **Type:** Brazil, Minas Gerais (*Macedo* 2974 [US]). — **Distr:** Brazil (Minas Gerais); rocky fields.

[3a] **Ros** spreading, with a stout probably short stem; **L** ± 6 –8 \times 1.4 cm, suberect-recurved, sheath broad, > 3 cm wide, **L** lamina narrowly triangular, with pungent tip, adaxially soon glabrous, abaxially appressedly cinereous-lepidote and inconspicuously veined, margins laxly

serrate, **Sp** nearly straight, 1.5 mm, dark; **Inf** 30 cm, simple; peduncle very slender, glabrous; peduncular **Bra** broadly ovate, acuminate, shorter than the internodes, 7 mm (uppermost), serrulate; fertile **Inf** part laxly 10-flowered, 4.5–5.5 cm, glabrous; floral **Bra** like the upper peduncular bracts, \pm equalling the pedicels; **Fl** spreading or reflexed; **Ped** 5 mm, slender; **Sep** oblong-elliptic, 5 mm, broadly obtuse, strongly convex; **Pet** shape not described, 7 mm, reddish drying to golden-yellow; **St** included; **Fil** free above the 0.5 mm high common tube; **Sty** \pm none.

D. nana is compared with this species in its protologue.

D. machrisiana L. B. Smith (Contr. Sci. Nat. Hist. Mus. Los Angeles County 17: 7, fig. 5, 1957). **Type:** Brazil, Goiás (*Dawson* 14153-A [R, US [photo]]). — **Distr:** Brazil (Goiás); fields and open Cerrado scrub.

[3a] **Ros** not described; **L** 25 \times 1.5 cm, sheath suborbicular, 3 cm wide, glabrous, **L** lamina linear-triangular, appressedly white-lepidote on both faces, margins laxly serrulate, **Sp** acicular, 1 mm; **Inf** 80 cm, simple; peduncle size not described, sparsely pale-lepidote; peduncular **Bra** broadly ovate, thin, abruptly contracted into a linear-triangular apex, all but the lowest much shorter than the internodes; fertile **Inf** part lax, slender, flexuose, sparsely pale-lepidote; floral **Bra** broadly ovate, acuminate, to 6 mm; **Fl** spreading or divergent; **Ped** 2–4 mm, stout; **Sep** ovate, 7 mm, obtuse, ecarinate, rather fleshy; **Pet** erect, elliptic, 10 mm, ecarinate, dark blackish, orange externally; **St** included; **Fil** free above the short common tube; **Ov** not described; **Sty** \pm none. — [F. Krapp]

D. macropoda L. B. Smith (Phytologia 14: 485, t. 1, figs. 25–28, 1967). **Type:** Brazil, Minas Gerais (*Pereira* 1622 p.p. [RB, US [photo]]). — **Distr:** Brazil (Minas Gerais: Diamantina region); rocky fields. **I:** Smith & Downs (1974: 568).

[3b] **Ros** not described; **L** 25 \times 1.5 cm, sheath suborbicular, 3 cm, stramineous, **L** lamina narrowly triangular, attenuate to a fine rigid point, smooth and glabrous adaxially, appressedly

whitish-lepidote abaxially (appearing ferruginous from soil deposits), laxly serrate, **Sp** retrorsely uncinata, 1.5 mm; **Inf** \pm 50 cm, simple; peduncle very short, finely ferruginous-lepidote; peduncular **Bra** long-acuminate from an ovate base, much shorter than the internodes (uppermost), subentire; fertile **Inf** part laxly many-flowered, 25 cm, all parts incl. pedicels and sepals finely ferruginous-lepidote; floral **Bra** like the peduncular bracts, exceeding the sepals (lowest), entire; **Fl** spreading; **Ped** to 10 mm, slenderly cylindrical; **Sep** broadly ovate, 7 mm, rounded or apiculate, strongly convex, the posterior \pm carinate; **Pet** broadly rhomboid, 14 mm, carinate, orange; **St** included, **Fil** almost wholly connate; **Ov** not described; **Sty** very short. — [F. Krapp]

D. maracasensis Ule (Bot. Jahrb. Syst. 42: 197–198, 1909). **Type:** Brazil, Bahia (*Ule* 7019 [B, F [photo]]). — **Distr:** Brazil (Bahia: Maracás region); rocks. **I:** Smith & Downs (1974: 542).

[1] **Ros** dense; **L** to 20 cm, sheath suborbicular, short, **L** lamina narrowly triangular, attenuate, with pungent tip, densely lepidote abaxially, margins laxly serrate, **Sp** curved, 2 mm; **Inf** 1 m or more, racemose or paniculate, or simple; peduncle subangular, densely ferruginous-flocculose towards the apex; peduncular **Bra** erect, lanceolate-ovate with long, narrowly triangular, serrulate lamina, foliaceous and imbricate (lower) to shorter than the internodes (upper); fertile **Inf** part ferruginous-flocculose; primary **Bra** like the upper peduncular bracts, much shorter than the long compressed bases of the branches; floral **Bra** broadly ovate, apiculate, slightly exceeding the pedicels, finely serrate; **Fl** suberect or sometimes spreading and secund; **Ped** 5 mm, stout; **Sep** broadly ovate, 6 mm, obtuse; **Pet** broadly elliptic, 9 mm, obtuse, yellow; **Fil** 2 mm connate (or completely connate according to Fig. 3 of Pinangé & al. (2017)) above the common tube; **Ov** 4.5 mm; **Sty** 1.5 mm. — [F. Krapp]

D. maritima Baker (Handb. Bromel., 136, 1889). **Type:** Brazil, Rio Grande do Sul (*Tweedie* s.n. [K, GH [photo]]). — **Lit:** Waldemar & Irgang (2003: ecology). **Distr:** Brazil (S Santa Catarina, E Rio Grande do Sul), open rocky or turfy ground,

mostly near the coast. **I:** Smith & Downs (1974: 510); Reitz (1983: t. 47); Klein V. & Klein (2014: 76–77).

≡ *Prionophyllum maritimum* (Baker) Mez (1896); **incl.** *Dyckia tomentosa* Mez (1896).

[1] **Ros** spreading, many-leaved; **L** ±60× to 4 cm, thick, rigid, sheath suborbicular, dark castaneous, glabrous, **L** lamina narrowly triangular, attenuate, with pungent tip, glabrous adaxially, minutely pale-lepidote abaxially, conspicuously veined, margins very laxly serrate, **Sp** broad, curved, 3–5 mm; **Inf** to 2 m and more, 3× branched; peduncle straight, glabrous; peduncular **Bra** imbricate, foliaceous (lower) to narrowly triangular (upper), much reduced; fertile **Inf** part densely tomentose-lepidote; **Br** broadly spreading, many-flowered, subdense, to 25 cm; floral **Bra** spreading to reflexed, subulate-acuminate from a broad base, scarcely 3 mm; **Fl** perfect and unisexual, suberect to spreading; **Ped** very short; **Sep** broadly ovate, 5 mm, acute, greenish, densely brown-furfuraceous; **Pet** obtuse, 7–8 mm, yellow; **St** hardly exerted; **Fil** free above the very short common tube; **Ov** pyramidal, 3-sulcate; **Sty** longer than the ovary; **Fr** ±5 mm, ovoid, brown to almost black, dehiscing to below ½, shortly rostrate; **Se** oblong with a narrow lateral wing widened at the ends.

Belongs to the “*Prionophyllum*” complex. A naturally-occurring variegated plant was recently described as cultivar ‘Leopoldo Witeck’ (Lawn 2011). Waldemar & Irgang (2003) found a facultative association of the species with termites, and it grows esp. well on termite mounds.

D. marnier-lapostollei L. B. Smith (Bromeliad Soc. Bull. 16: 102, ills., 1966). **Type:** Brazil, Goiás? (*Anonymus ex cult. Marnier-Lapostolle* s.n. [US]). — **Lit:** Rauh (1985: 51–58); Braun & Esteves Pereira (2005). **Distr:** Brazil (SE Goiás).

[3a] **Ros** acaulescent, spreading, ±10-leaved, usually solitary or occasionally in small groups; **L** ±12 × ±4 cm, sheath suborbicular, 2 cm, glabrous, **L** lamina triangular, thick, strongly recurved, densely pale-lepidote on both faces and with silvery appearance, margins densely serrate, **Sp** coarse, retrorsely curved; **Inf** 50–100 cm, simple, erect; peduncle compressed, very slender,

glabrous; peduncular **Bra** broadly ovate, apiculate, small, entire, remote; fertile **Inf** part lax, few-flowered, slender, slightly flexuous, 19 cm, nearly glabrous; floral **Bra** broadly ovate, acuminate, shorter than the sepals, entire; **Fl** subsessile, spreading, 12 mm; **Sep** broadly ovate, 7 mm, rounded, cucullate, ecarinate; **Pet** subrhomboid, 12 mm, limb only slightly distinct from the claw, obtusely carinate, cucullate, orange; **St** equalling the petals; **Fil** free above the common tube; **Ov** not described; **Sty** ± none.

The description has been amended from data provided by Braun & Esteves Pereira (2005). These authors report hybrids with *D. machrisii*, with ± intermediate characters.

D. marnier-lapostollei var. **estevesii** Rauh (Trop. subtrop. Pfl.-welt 53: 55–56, figs. 26–28, 1985). **Type:** Brazil, Goiás (*Esteves Pereira* s.n. in *Horst* 5 [HEID]). — **Distr:** Brazil (E to SE Goiás); rocks, in Campo Rupestre vegetation. — Fig. 7.

[3a] **L** less densely lepidote, bluish-grey, partly glabrous, **Sp** to 6 mm; **Inf** to 80 cm, very slender; **Fl** scent less pronounced; **Anth** visible at anthesis.

D. marnier-lapostollei var. **marnier-lapostollei** — **Distr:** Brazil (E to SE Goiás); rocks, in Campo Rupestre vegetation, 1000 m and more. **I:** Rauh (1985: 51–58); Braun & Esteves Pereira (2005); Braun (2018: 72).

Incl. *Dyckia rauhii* hort. (s.a.) (*nom. inval.*, Art. 29.1).

[3a] **L** densely white-lepidote, silvery, **Sp** to 3 mm; **Inf** to 50 cm; **Fl** scent strong, fish-like; **Anth** included at anthesis.

D. martinellii B. R. Silva & Forzza (Novon 14: 168–170, ills., 2004). **Type:** Brazil, Rio de Janeiro (*Martinelli* 14413 [RB]). — **Distr:** Brazil (Rio de Janeiro: Paratimirim); granitic outcrops; narrowly endemic.

[3b] **Ros** ±60 cm Ø, with stout basal offshoots; **L** 23–38 × 2.2–2.6 cm, suberect-arcuate, sheath elliptic, 2.5–3 × 5–6 cm, castaneous abaxially, whitish adaxially, ± entire, **L** lamina lanceolate, apex attenuate, whitish abaxially, light green adaxially, spinose, **Sp** straight, patent-

Fig. 7 *Dyckia marnier-lapostollei* var. *estesvesii*.
(Copyright: U. Eggli)



antrorse, 3–4 mm, light green with a castaneous apex, 10–15 mm apart; **Inf** 70–100 cm, simple; peduncle erect, 55–70 cm (to 97 cm according to the protologue), green, sparsely white-lepidote; peduncular **Bra** subfoliaceous (lowest) to lanceolate-attenuate (upper), densely arranged, clasping the peduncle, erect, chartaceous, 11–12.5 × 0.9–1.2 mm (lowest), exceeding to rarely equalling the internodes (upper), stramineous, glabrous to sparsely lepidote, spinulose to inconspicuously serrulate; fertile **Inf** part 38- to 65-flowered, lax, straight, 30–43 cm, orange, sparsely white-lepidote; floral **Bra** elliptic to elliptic-attenuate, acuminate, exceeding to equalling the middle of the sepals, 4–12 × 3–6 mm, castaneous, white-lepidote, entire; **Fl** patent at anthesis, suberect afterwards; **Ped** 1–2 mm, to 4 mm in fruit, cylindrical, orange, sparsely lepidote; **Sep** ovate, 7–9 × 4–6 mm, apex rounded, orange, apex castaneous, white-lepidote; **Pet** obtrullate, 9–12 × 9 mm, apex emarginate, erect, orange, glabrous; **St** included; **Fil** ±1.5 mm connate (completely connate according to Fig. 3 of Pinangé & al. (2017)) above the 2.5 mm high common tube; **Anth** slightly sagittate at the base, attenuate and reflexed at the apex, ±3 mm; **Ov** ±7 mm; **Fr** ±15 mm; **Se** alate, ±3 mm.

Similar to *D. pseudococcinea*, and compared with *D. espiritosantensis* in the protologue of the latter.

D. mauriziae Esteves & Hofacker (Bromelie 2011(1): 39–42, ills., 2011). **Type:** Brazil, Goiás (*Carneiro* MBR-41 [UFG]). — **Distr:** Brazil (Goiás); steep slopes in yellow gravelly latosol.

[3b] **Ros** solitary or in small groups, with secund prostrate leaves, stem to 20 × 5 cm; **L** ±39 × 3.7 cm, inner ones straight, soon curved, coriaceous, rigid, succulent, margins narrow, sheath ±2.6 × 4.8 cm, white-yellowish, canescent-lepidote, **L** lamina flat, occasionally slightly concave, apex long-attenuate with a hard, pungent, light-brown, ±9 mm long tip, greenish-grey to pale green, both faces finely veined and with canescent scales, margins greenish-brown, serrate, **Sp** hard, pungent, antroretorse-uncinate, to ±4.8 mm, ±22 mm apart; **Inf** to 1.8 m, usually simple, in cultivation rarely paniculate, stout, erect; peduncle to 110 cm, pale greyish- or brownish-green, sparsely light-brown-lepidote; peduncular **Bra** linear to lanceolate, suberect or curved, foliaceous, long attenuate, acuminate, pungent, ±130 × 17 mm (lower) to 34 × 13 mm (uppermost), pale green to greenish-brown, canescent-lepidote, finely veined, laxly spinose, teeth

0.3–1.8 mm; fertile **Inf** part ± 90 cm, reddish-rose, densely ± 20 -flowered, conspicuously furrowed, with creamy papillae-like trichomes; floral **Bra** like the peduncular bracts but shorter, narrowly triangular, 19×8 mm (lowest) to 4.8×3.8 mm, pale orange, soon stramineous, with dense colourless papillae-like trichomes, finely veined, with ciliate margins; **Fl** pointing slightly side-wards, after pollination directed upwards, 21 mm, smaller towards the inflorescence tip, fragrant with slight sour scent; **Ped** ± 3.7 mm, red; **Sep** lanceolate to ovate, $\pm 9.5 \times 6.5$ mm, succulent, carinate, bright orange-reddish, with papillae-like trichomes; **Pet** oblong, $\pm 11.6 \times 7.2$ mm, obtuse, rigid, carinate apically, orange to orange-red, brilliant; **St** just visible in the throat; **Fil** 4–6 mm connate above the common tube, 9–11 mm, cream-coloured; **Anth** yellow, $\pm 4.6 \times 1.3$ mm, recurved at anthesis; **Ov** narrowly subpyramidal, $\pm 7 \times 3$ mm, whitish-yellow; **Sty** ± 2.3 mm, yellow; **Sti** fringe-like, yellow, ± 1.6 mm; **Fr** ellipsoid to ovoid, acuminate, $12\text{--}15 \times 9\text{--}11$ mm, dark brownish, lustrous.

Similar to *D. estevesii* due to the fan-like and seemingly distichous leaf arrangement, and also compared with *D. mirandana* in the protologue.

D. mello-barretoii L. B. Smith (Phytologia 7: 109, t. 1, figs. 16–19, 1960). **Type:** Brazil, Minas Gerais (*Mello Barreto* 2122 [BHM, US [photo]]). — **Distr:** Brazil (Minas Gerais); sand and rocky fields. **I:** Smith & Downs (1974: 549).

[2/3a?] **Ros** not described; **L** $> 30 \times 1.5$ cm, sheath not described, **L** lamina narrowly triangular, attenuate to an abruptly acute pungent tip, pale-lepidote between the veins, margins very laxly serrate, **Sp** slender, spreading, retrorsely curved, 4 mm; **Inf** probably > 1 m, subsimple to compound; peduncle inconspicuously pale-lepidote at the nodes; peduncular **Bra** ovate, acuminate, the upper remote; fertile **Inf** part with a short 2-flowered **Br** at the base, lax, flexuous, appressedly stellately ferruginous-lepidote, rachis soon \pm glabrous; floral **Bra** reflexed, ovate and acuminate (lower) or suborbicular and apiculate (upper), 11 mm, nearly equalling (lower) to $\frac{1}{2}$ as long (upper) as the sepals; **Fl** spreading; **Ped** 3 mm, stout; **Sep** broadly ovate,

8 mm, obtuse, erose; **Pet** lamina broadly obovate, to 13 mm, emarginate, ecarinate, colour not described; **St** included; **Fil** free above the common tube; **Anth** narrowly triangular, nearly straight, 3 mm; **Ov** not described; **Sty** simple, 2 mm.

Similar to *D. sordida*, and compared with *D. espiritosantensis* in the protologue of the latter. — [F. Krapp]

D. mezii Krapp (Ann. Bot. Fenn. 50(1): 73, 2013). **Type:** Brazil, Minas Gerais (*Glaziou* 17280-A [B, F [photo]]). — **Distr:** Brazil (Minas Gerais); ecology not recorded, not recently recollected.

\equiv *Dyckia argentea* Mez (1894) (*nom. illeg.*, Art. 53.1).

[3a] **Ros** not described; **L** to 30×2 cm, sheath suborbicular, large, **L** lamina narrowly triangular, abruptly acute, with pungent tip, coarsely lustrous-silvery-lepidote, laxly serrate, **Sp** coarse, uncinata, 3.5 mm; **Inf** 50–70 cm, simple; peduncle \pm furfuraceous towards the base, glabrous elsewhere; peduncular **Bra** ovate with acuminate tip, shorter than the internodes, serrulate; fertile **Inf** part sublux, many-flowered, glabrous; floral **Bra** lanceolate-triangular (lower) or ovate and acute (upper), exceeded by the sepals; **Fl** spreading at anthesis, later erect, 11 mm; **Ped** to 5 mm; **Sep** elliptic, 6 mm, obscurely apiculate; **Pet** erect, cuneiform-obovate, broadly rounded, scarcely or not at all carinate, orange; **St** included; **Fil** free above the common tube; **Anth** linear, acuminate, strongly recurved; **Sty** slightly shorter than the ovary.

See Braun & al. (2008) for a discussion of the name (as *D. argentea*) and the possible origin of the material on which it based.

D. microcalyx Baker (Handb. Bromel., 133, 1889). **Type:** Paraguay (*Balansa* 696 [P, GH [photo]]). — **Distr:** S Brazil, Paraguay, NE Argentina; dry rocky slopes and river banks, seasonally inundated.

[1/2] **Ros** not described; **L** 20–150 \times 1.5–3 cm, sheath scarcely wider than the lamina, **L** lamina narrowly triangular, pale-lepidote esp. abaxially, often glabrescent, typically subdensely

serrate but varying to entire, **Sp** 6 mm; **Inf** 40–200 cm, few-branched or rarely simple; peduncle erect, slender, glabrescent; peduncular **Bra** ovate with long acuminate pungent lamina, shorter than the internodes (at least the uppermost); fertile **Inf** part many-flowered, to 80 cm, soon glabrous, **Br** spreading, densely flowered, 6–26 cm; primary **Bra** like the peduncular bracts, small, usually shorter than the sterile branch bases; floral **Bra** broadly ovate or suborbicular, apiculate, 2 mm, much exceeded by the sepals; **Fl** 6–13 mm, subsessile; **Sep** suborbicular, 3–6 mm; **Pet** obovate, suberect, ecarinate, orange; **St** exerted or \pm equalling the petals; **Fil** free above the short common tube; **Sty** \pm equalling the ovary. — [F. Krapp]

D. microcalyx var. **microcalyx** — **Distr:** S Brazil (Mato Grosso, Paraná), Paraguay; dry rocky slopes. **I:** Rauh & Gross (1991: 9).

Incl. *Dyckia microcalyx* var. *inermis* Hassler (1919); **incl.** *Dyckia microcalyx* var. *micrantha* Hassler (1919); **incl.** *Dyckia minutiflora* Mez (1919).

[1/2] **L** to 150 cm, lamina relatively long and narrow; **Inf** mostly compound; **Sep** 3–4 mm. — [F. Krapp]

D. microcalyx var. **ostenii** L. B. Smith (Contr. Gray Herb. 104: 73, t. 3, fig. 16, 1934). **Type:** Argentina, Misiones (*Osten & Rojas* 8097 [MVM, GH [photo]]). — **Distr:** N Argentina (Misiones); rocky banks; only known from the type locality. **I:** Smith & Downs (1974: 549).

[2] **L** scarcely over 20 cm, lamina 3 cm wide, strongly spinose-serrate; **Inf** simple; **Sep** 6 mm. — [F. Krapp]

D. milagrensis Leme (Harvard Pap. Bot. 4(1): 164–166, fig. 21, 1999). **Type:** Brazil, Bahia (*Nahoum* s.n. in *Leme* 3391 [HB]). — **Distr:** Brazil (Bahia); Campo Rupestre vegetation, on rocks. — Fig. 8.

[2/3a] **Ros** propagating by basal shoots, dense, many-leaved; **L** 12–15 \times \pm 1–1.5 cm, thickly succulent, sheath not described, **L** lamina very narrowly triangular, subulate-attenuate, spinescent-acuminate with pungent tip, suberect to spreading,

purplish-green, obscurely white-lepidote on both faces, partially glabrescent adaxially, veined, laxly spinose, **Sp** opposite, narrowly triangular, \pm straight, flat, 4–6 mm, densely white-lepidote; **Inf** \pm 120 cm, simple or with 1 or 2 branches; peduncle erect, \pm 70 cm, ferruginous, inconspicuously white-furfuraceous to glabrescent; peduncular **Bra** foliaceous (lowest) to narrowly triangular and acuminate, erect, 12–20 \times 4–6 mm (upper), white-lepidote, veined, laxly spinulose; fertile **Inf** part \pm 45 cm, \pm 46-flowered, subdense, suberect, subdensely white-furfuraceous; **Br** 10–15 cm, 4- to 7-flowered, \pm red; primary **Bra** like the upper peduncular bracts; floral **Bra** triangular, acuminate, 4–10 \times 3–4 mm, white-furfuraceous, veined, entire; **Fl** subspreading at anthesis, erect afterwards, the upper slightly secund, 15–16 mm, unscented; **Ped** 4–5 mm; **Sep** broadly ovate, \pm 6 \times 6 mm, acute, ecarinate, reddish-orange, subdensely white-furfuraceous, entire with long-fimbriate apex; **Pet** broadly obovate-spatulate, \pm 11 \times 4 mm, rounded, ecarinate, suberect, orange, glabrous; **St** just included; **Fil** free above the 2 mm high common tube (completely connate according to Fig. 3 in Pinangé & al. (2017)), complanate, 6 mm; **Anth** \pm 2 mm, \pm straight, base shortly sagittate, apex obtuse; **Ov** narrowly subpyramidal, \pm 6 mm; **Sty** \pm 8 mm, \pm equalling the anthers, **Sti** orange.

Similar to *D. mezii* and *D. pectinata*. — [F. Krapp]

D. minarum Mez (in Martius, Fl. Bras. 3(3): 483, t. 91, 1894). **Type:** Brazil, Minas Gerais (*Regnell* II-283 [S, US]). — **Distr:** Brazil (Goiás, Minas Gerais, Santa Catarina, São Paulo); on rocks or open rocky ground, 900–1300 m. **I:** Reitz (1983, t. 49).

[3b] **Ros** acaulescent, dense, with bulbous base; **L** numerous, irregularly spreading, sheath suborbicular, large, pale brown, glabrous but apically lepidote, **L** lamina 20–35 \times 1 cm, linear-triangular, abruptly acute with thickened pungent tip, green to brownish-green, canaliculate, rigid, thick, densely pale-lepidote esp. abaxially, laxly serrate, **Sp** curved, 2 mm; **Inf** 25–75 cm, simple, erect; peduncle rather stout, tomentulose, glabrescent; peduncular **Bra** broadly ovate with

Fig. 8 *Dyckia milagrensis*. (Copyright: F. Krapp)



long acuminate tip, equalling or exceeding the internodes, serrulate towards the apex; fertile **Inf** part usually lax at anthesis, ± 30 - to 40-flowered, 7–35 cm, white-furfuraceous; floral **Bra** spreading or reflexed, like the peduncular bracts, equaling or exceeding the flowers (lowest), usually serrulate; **Fl** \pm spreading; **Ped** to 4 mm; **Sep** broadly elliptic, 7–9 mm, acute, densely lanate-lepidote; **Pet** suborbicular, 11–14 mm, carinate, suberect, orange-yellow; **St** included; **Fil** 2 mm connate above the common tube; **Anth** narrowly triangular, acuminate, recurved; **Ov** massively pyramidal-triangular; **Sty** very short; **Fr** trigonous-ellipsoid, 14 mm, almost black, glossy; **Se** 4 mm, basally pointed, alate towards the tip.

D. mirandana Leme & Z. J. G. Miranda (J. Bromeliad Soc. 59(2): 75–78, ill., 2009). **Type:** Brazil, Goiás (*Miranda* s.n. in Leme 6380 [HB]). — **Distr:** Brazil (Goiás); sandy soil accumulating among quartzitic outcrops, Campo Rupestre vegetation.

[3a] **Ros** \pm distichously 10- to 15-leaved, solitary or scarcely offsetting; **L** 28–43 \times ± 1 cm, coriaceous, sheath suborbicular-ovate, 3.4 \times 4–5 cm, dark castaneous, lepidote, **L** lamina sublinear-attenuate, distinctly canaliculate, suberect-arcuate, apex long acuminate-caudate, pungent, green to reddish towards the apex,

abaxially inconspicuously white-lepidote, adaxially glabrescent towards the apex, distinctly veined on both faces, margins glabrous, sparsely spinose, **Sp** uncinata, antoretorse, 0.5–1 mm, castaneous, glabrous, ± 15 mm apart; **Inf** 20–25 cm, simple; peduncle erect with curved apex, ± 8 cm, dark purplish wine-red to blackish, glabrous; peduncular **Bra** erect, subcarinate, narrowly triangular, long acuminate-caudate, 12–18 \times 6–8 mm, exceeding to equalling the internodes, dark purplish wine-coloured, sparsely to densely white-lepidote towards the apex, veined; fertile **Inf** part ± 9 -flowered, deflected but rachis straight, ± 6.5 cm, dark purplish wine-red to blackish, glabrous; floral **Bra** subtriangular, acuminate, subcarinate, membranous, suberect, 7–10 \times 5–6 mm, dark purplish wine-red, sparsely white-lepidote, veined, inconspicuously denticulate to entire; **Fl** suberect, ± 12 mm, tubular, strongly sweet-fragrant; **Ped** ± 1.5 mm, stout; **Sep** acuminate, convex, subcarinate, 6–6.5 \times 3.5–4 mm, dark purplish wine-red, glabrous, entire; **Pet** broadly obovate-spatulate from a narrower base, $\pm 10 \times 7.5$ mm, apex obtuse and apiculate to subacute, ecarinate, yellow; **St** exserted; **Fil** free above the 1.5–3 mm high common tube (according to the protologue, completely connate according to Fig. 3 of Pinangé & al. (2017)), yellow, ± 8 mm; **Anth** narrowly subtriangular, ± 2 mm, base

distinctly sagittate, acute, apically strongly recurved; **Ov** ovoid, $\pm 4 \times 2$ mm, greenish; **Sty** ± 1 mm, yellowish, **Sti** subentire, yellow; **Fr** and **Se** not described. — [F. Krapp]

D. mitis A. Castellanos (Anales Mus. Nac. Hist. Nat. Buenos Aires, ser. 3, 36: 51, t. 2, 1929). **Type:** Argentina, Misiones (*Spegazzini* s.n. [BA]). — **Distr:** N Argentina (Misiones); ecology not recorded. **I:** Smith & Downs (1974: 570).

[3b] **Ros** not described; **L** $\pm 18 \times 1$ cm, lamina attenuate, with pungent tip, laxly serrate, **Sp** curved, 3 mm, 4–6 mm apart; peduncle slender, 27 cm, glabrous; **Inf** 30 cm, simple; peduncular **Bra** amplexicaul at the base, shorter than the internodes; fertile **Inf** part 5–10 cm, rachis furfuraceous; floral **Bra** suborbicular, apiculate, shorter than the sepals, veined, lepidote; **Fl** sessile; **Sep** suborbicular, 6×8 –10 mm, broadly rounded; **Pet** rhombic, 14 mm, rounded at the apex, erect, 14 mm, colour not described; **St** slightly exserted; **Fil** highly connate above the 3 mm high common tube; **Anth** slightly recurved, 3–3.5 mm; **Ov** pyramidal, 5 mm; **Sty** 6 mm.

Insufficiently known. — [F. Krapp]

D. montezumensis Leme (Phytotaxa 67: 23–25, ill., 2012). **Type:** Brazil, Minas Gerais (*Leme & Oliveira* 8315 [RB]). — **Distr:** Brazil (Minas Gerais); shrubby Cerrado vegetation.

[2/3b] **Ros** laxly ± 10 -leaved; **L** 40–53 \times 2.2–2.5 cm, thickly coriaceous, sheath suborbicular, $\pm 2.5 \times 4.5$ cm, whitish towards the base, glabrous, **L** lamina narrowly triangular, distinctly canaliculate, arcuate, apex long acuminate-caudate, dark green to reddish wine-coloured, densely white-lepidote (esp. abaxially), distinctly veined, margins sparsely white-lepidote to glabrous, sparsely spinose, **Sp** narrowly triangular, antroretorse, 1.5–2.5 mm, dark castaneous, glabrous, 7–20 mm apart; **Inf** to 155 cm, simple or branched with 1 branch at the base; peduncle ± 72 cm, dark green to dark purplish wine-red, inconspicuously white-lepidote to glabrous, smooth; peduncular **Bra** broadly ovate to suborbicular at the base, narrowly sublinear-triangular, carinate, acuminate-caudate, erect,

10–40 \times 7–10 mm, much shorter than the internodes, stramineous, inconspicuously white-lepidote, strongly veined, remotely spinulose (lowest) to entire (upper); fertile **Inf** part ± 25 -flowered, lax to subdense, distichous to subpolystichous, rachis straight to flexuous towards the apex, ± 35 cm, dark purplish wine-red, subdensely white-lepidote; **Br** suberect, ± 4 -flowered, \pm polystichous, ± 7.5 cm, rachis flexuous, sterile base ± 4 cm; primary **Bra** like the basal floral bracts; floral **Bra** broadly ovate, acute to acuminate, ecarinate, 3 – 7×2 – 4.5 mm, inconspicuously white-lepidote, veined, entire; **Fl** subspreading, 16–18 mm, campanulate; **Ped** 4 mm, dark purplish wine-red to nigrescent, subdensely white-lepidote; **Sep** ovate, $\pm 6 \times 5$ mm, distinctly convex, apex obtuse to often emarginate, blackish wine-red, white-lepidote with glabrous apex; **Pet** broadly spatulate, 13×9 –11 mm, obtuse-emarginate, ecarinate, orange, apex wine-colored; **St** deeply inserted; **Fil** completely connate above the 2 mm high common tube, ± 9 mm, orange; **Anth** sublinear, ± 4 mm, base bilobed, apiculate; **Ov** suboblong-ovoid, 7 – $8 \times \pm 2.5$ mm, greenish; **Sty** ± 1 mm, yellowish, **Sti** papillose, orange; **Fr** and **Se** unknown.

Closely related to *D. atratiflora*.

D. monticola L. B. Smith & Reitz (Sellowia 14: 104, fig. 3, 1962). **Type:** Brazil, Santa Catarina (*Reitz & Klein* 4789 [US, HBR]). — **Distr:** Brazil (Minas Gerais, Santa Catarina); open slopes, savanna, on rocks, 1250–1500 m. **I:** Smith & Downs (1974: 519).

[1/2?] **Ros** dense, many-leaved; **L** 23–27 \times 1–1.3 cm, \pm curved, sheath 3 cm wide, brown, lustrous and lepidote towards the apex adaxially, dull and glabrous elsewhere, **L** lamina linear, rigid, canaliculate, acute and mucronulate, appressedly cinereous-lepidote, soon glabrous adaxially, margins laxly serrate, **Sp** slender, antroretorse, 2.5 mm, brown; **Inf** ± 70 cm, with 6 basal branches (according to the protologue, simple according to Fig. 5 in Pinangé & al. (2017)); peduncle subterete, 40 cm, very dark when dry, flocculose, glabrescent; peduncular **Bra** broadly ovate, foliaceous-laminate or the uppermost acuminate, \pm equalling the upper

internodes, cinereous-lepidote, serrulate; fertile **Inf** part 28 cm, many-flowered, completely densely ferruginous-flocculose including pedicel and sepals; **Br** few-flowered with long sterile base; primary **Bra** like the upper peduncular bracts, to 17 mm; floral **Bra** acuminate from a broadly ovate base, spreading, slightly shorter than the sepals, serrulate; **Fl** spreading, to 15 mm; **Ped** 5 mm; **Sep** ovate-elliptic, to 10 mm, acute, incurved, rugose when dry, serrulate; **Pet** distinctly unguiculate, obovate, curved-spreading towards the apex, orange; **St** included; **Fil** 3 mm connate (completely connate according to Fig. 3 in Pinangé & al. (2017)) above the common tube; **Anth** narrowly triangular, 3.5 mm, recurved towards the apex; **Ov** slenderly ovoid; **Sty** ± none, **Sti** 3-parted. — [F. Krapp]

D. nana Leme & al. (Rodriguésia 61(1): 36–37, figs. 4G–H and 5H–N, 2010). **Type:** Brazil, Minas Gerais (Leme & al. 7484 [RB, HB]). — **Distr:** Brazil (Minas Gerais: Diamantina); on white quartzite soil in grassy Campo Rupestre vegetation.

[3b] **Ros** dense, 8- to 10-leaved; **L** 6–8 × 1.2–1.4 cm, coriaceous, sheath 2.5–3 × 2.5–3.5 cm, castaneous abaxially, pale adaxially, glabrous towards the base, densely white-lepidote apically, **L** lamina narrowly triangular, distinctly canaliculate, suberect to ± erect and slightly secund, acuminate with pungent tip, green, obscurely white-lepidote, distinctly veined, laxly spinulose, **Sp** subtriangular-acicular, spreading to slightly antrorse, 0.5–1 mm, 4–10 mm apart; **Inf** 19–29 cm, simple, erect; peduncle 15–20 cm, green, glabrous, smooth; peduncular **Bra** erect, subcarinate, long lanceolate-acuminate-caudate from a broadly subtriangular base, 5–11 × 3–3.5 mm, stramineous, sparsely white-lepidote, veined, microscopically denticulate to ± entire; fertile **Inf** part 4- to 6-flowered, subdense to lax, 2.5–5 cm, rachis ± straight, smooth, greenish to orange-yellow, glabrous; floral **Bra** broadly ovate-subtriangular, acuminate-caudate, subcarinate, subspreading to suberect, 4–4.5 × 3.5–4 mm, stramineous towards the apex, finely veined, fimbriate, remotely and irregularly denticulate to entire; **Fl** spreading and secund, 12–13 mm,

subtubular to slightly campanulate, unscented; **Ped** 3.5–5 mm, slender, terete, glabrous, yellow-orange, curved; **Sep** broadly ovate, 4–5.5 × 3.5–4 mm, convex, apex obtuse and remotely and irregularly apiculate, ecarinate, orange, glabrous, retrorsely-curved fimbriate; **Pet** ± broadly obcordate from a distinctly narrowed base, ±7.5 × 6.5–7 mm, apex broadly emarginate, ecarinate, orange; **St** included; **Fil** 1.5 mm connate above the 1.5 mm high common tube, complanate, yellow; **Anth** oblong-ovoid, ±2.5 mm, base sagittate, acute, yellow, ± straight; **Ov** suboblong-ovate, ±2.5 × 1.5 mm, yellow; **Sty** ±1 mm, yellow, **Sti** shortly crenulate, lacerate, yellow.

Similar to *D. consimilis* and *D. macedoi*.

D. nervata Rauh (Trop. subtrop. Pfl.-welt 60: 21–24, figs. 13 and 14, 1987). **Type:** Brazil, Bahia (Rauh 56443 [HEID]). — **Distr:** Brazil (Bahia); quartzitic rocks, 1000 m.

[3a] **Ros** ±7-leaved, solitary or in groups, stem short, surrounded by old sheaths, slightly thickened at the base; **L** to 18 × to 1 cm, sheath broadly ovate, 2 × 1.8 cm, white, densely lepidote abaxially, glabrous adaxially, strongly veined, **L** lamina erect (younger) to recurved (older), sturdy, strongly canaliculate, acute, with pungent tip, reddish-green, adaxially sparsely lepidote, abaxially densely white-lepidote, veined, **Sp** retrorse, 2 mm, brownish; **Inf** to 12 cm, simple; peduncle erect, 6 cm, olive-green, white-lanate-lepidote; peduncular **Bra** amplexicaul at the base, shorter than the internodes, appressed to the peduncle, soon drying; fertile **Inf** part lax, 5- to 7-flowered, erect, 5 cm, white-lanate; floral **Bra** with a broad sheath, lamina narrowly lanceolate, recurved, shorter than the sepals, olive-green, lanate, entire; **Fl** suberect; **Ped** short, stout; **Sep** free, broadly ovate, 5 × 5 mm, obtuse, ecarinate, brilliant orange, abaxially sparsely lanate; **Pet** erect, spatulate, 10 × 5 mm, obtuse, ecarinate, brilliant orange; **St** included; **Fil** free above the 5 mm high common tube, yellowish; **Ov** 5 mm, white; **Sty** ±2 mm, orange; **Sti** erect, shorter than the anthers.

Compared with *D. oligantha* (here treated as synonym of *D. saxatilis*) in the protologue. — [F. Krapp]

D. niederleinii Mez (in Martius, Fl. Bras. 3(3): 474, 1894). **Type:** Argentina, Misiones (*Niederlein* 229 p.p. [B, F [photo]]). — **Distr:** N Argentina (Misiones); open fields, terrestrial or on rocks. **I:** Smith & Downs (1974: 555).

Incl. *Dyckia missionum* Mez (1894); **incl.** *Dyckia missionum* var. *breviflora* Hassler (1919).

[1] **Ros** not described; **L** 25–50 × 1–3.5 cm, sheath not described, **L** lamina narrowly triangular, sparsely pale-appressed-lepidote abaxially, laxly serrate, **Sp** slender, curved, 4 mm; **Inf** 100–120 cm, few-branched, glabrous; peduncle slender; peduncular **Bra** broadly ovate with long-attenuate entire tips, shorter than the internodes; fertile **Inf** part with erect branches, elongate, very laxly flowered; primary **Bra** only a little larger than the floral bracts; floral **Bra** broadly ovate or suborbicular, apiculate, 5–8 mm, those of the branches much shorter than the sepals, those of the main inflorescence axis longer than the sepals, lustrous; **Fl** suberect, 13 mm; **Ped** 2–4 mm, very stout; **Sep** suborbicular, 5–7 mm, obtuse to shortly mucronate, carinate; **Pet** lamina spreading, elliptic, 13–15 mm, obtuse or emarginate, undulate, colour not described; **St** exserted; **Fil** highly connate for 6 mm above the common tube; **Anth** sublinear, 2 mm, acute, recurved; **Sty** ± equalling the ovary.

D. nigrospinulata Strehl (Bromeliaceae 42(5): 9–13, figs. 5–9, 2009). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1602 [HAS]). — **Distr:** Brazil (Rio Grande do Sul); on rocks in a river. **I:** Klein V. & Klein (2014: 80).

[1] **Ros** open, ±60- to 200-leaved, ±1.5 m Ø; **L** 70–80 × 5–6 cm, sheath suborbicular, dark castaneous, glabrous, **L** lamina triangular, attenuate, stiff, with a strong pungent black tip, dark green, centre lighter, adaxially glabrous, abaxially lepidote, striate, **Sp** predominantly antrorsely curved, 5–7 mm, dark, 30–70 mm apart; **Inf** 2–2.5 m, compound, 3–4× branched; peduncle strong, green, glabrous; peduncular **Bra** broadly ovate with long-attenuate tip, 80–100 × 12–20 mm (lower) to 10–40 × 7–10 mm (upper), entire or lower ones with 3 mm long teeth towards the apex; fertile **Inf** part with easily removable white-woolly tomentum, 25–30 cm;

Br laxly many-spiked, at acute angles, somewhat pendent with ascending tip, 50–60 cm, ±2–5 cm apart; floral **Bra** triangular, acute, 1–2 mm, becoming shorter upwards, with brown tips, later stramineous, ± entire; **Fl** pointing upwards in bud but spreading at anthesis, later sometimes turned backwards, sessile, narrowly tubular; **Sep** free, rounded, 5–6 × 1–2 mm, green-yellow with a small spot at the apex; **Pet** free, erect, rounded, 7–10 × 1–2 mm, yellow; **St** exserted; **Fil** free, linear; **Ov** incl. style as long as the stamens; **Fr** 6–8 × 3–4 mm, black, glossy; **Se** elongate, ±3 × 1 mm, light castaneous.

Part of the “*Prionophyllum* complex”, and similar to *D. maritima*. The large size is exceptional for the genus *Dyckia*.

D. nobilis Büneker & al. (Phytotaxa 244(1): 60–63, ill., 2016). **Type:** Brazil, Minas Gerais (*Büneker & al.* 296 [HDCF, RB]). — **Distr:** Brazil (Minas Gerais: Serro); on sedimentary rocks; only known from the type locality.

[2/3b] **Ros** solitary, with short stem, 28–55 cm Ø; **L** 10–30, inner straight, outer suberect to recurved, sometimes secund, sheath ±5 × 4.5 cm, suborbicular, white with brown-greenish base, **L** lamina 25–80 × 2.1–6.2 cm, narrowly triangular, stiff and succulent, upper face flat or canaliculate, reddish-green, densely white-cinereously lepidote on both faces, tip extended into a 6 mm long spine, margins unarmed or serrate with laxly arranged **Sp** to 4 mm; **Inf** 60–170 cm tall, simple or paniculate, erect; peduncle 30–90 cm, reddish, basally white-tomentose, above brownish-ferruginous-tomentose; peduncular **Bra** ±50 mm, shorter than the internodes, basal ones leaf-like, upper ones erect, triangular, 10–25 × 13–26 mm; fertile **Inf** part 25–95 cm, with up to 8 (sub-) erect to upcurved branches at the base, laxly 27- to 110-flowered; primary **Bra** ovate-triangular; floral **Bra** ovate-triangular, 8–15 × 10–21 mm, brownish-ferruginous tomentose-lepidote, entire, basal ones sometimes longer than the flowers, upper ones shorter; **Fl** ±15 mm, porrect or slightly reflexed, tubular; **Ped** 2–3 mm, tomentose; **Sep** ovate-elliptic, convex, 5–7 × 7–9.5 mm, orange with reddish base, thick and succulent, basally

connate for 3 mm, sparsely ferruginous-tomentose; **Pet** suborbicular-rhomboidal, 10–13 × 18–20 (?) mm, orange, sparsely lepidote near the base; **St** included; **Fil** narrowly triangular, yellow-orange, to 9 mm, connate for ±1 mm above the 2 mm long common tube; **Ov** ±5 × 2.5 mm, subcylindrical, yellowish; **Sty** ±2 mm, orange; **Sti** conduplicate-spiral; **Fr** globose-ovoid, glossy brown or black; **Se** discoid, with hyaline wing.

Close to *D. sordida* and *D. inflexifolia*. The basally connate sepals are unusual in the genus. The measurements given in the protologue for the floral bracts and the petals, both described as potentially broader than long, are not supported by the drawings in fig. 2 of the protologue. — [U. Eggli]

D. odorata L. B. Smith (Phytologia 10: 485, t. 2, figs. 8 and 9, 1964). **Type:** Brazil, Goiás (*Dawson* 14578 [US, UC]). — **Distr:** Brazil (Goiás: Chapada de Veadeiros); ecology not recorded; known only from the type collection. **I:** Smith & Downs (1974: 515).

[3b] **Ros** not described; **L** 15 × 0.5 cm, sheath triangular-ovate, stramineous, smooth, sublustrous, sparsely lepidote towards the apex, **L** lamina narrowly triangular, appressedly white-lepidote, soon glabrous adaxially, laxly serrate, **Sp** slender, spreading, pale, 2 mm; **Inf** 10 cm, sessile without peduncle, simple, axis subdensely white-flocculose, with some flowers at the base, then with some aborted flowers in the middle, and well-developed flowers distally; floral **Bra** broadly ovate with long narrowly triangular serrate lamina (lower) to merely apiculate (upper), lower ones exceeding the flowers; **Fl** described as dimerous, spreading, strongly sweet-fragrant; **Ped** 3 mm, slender; **Sep** suborbicular, 5–6 mm, very broadly acute and minutely apiculate, pale-margined when dry; **Pet** lamina spreading, broadly rounded, 10 mm, orange; **St** much shorter than the petals; **Fil** almost completely connate; **Anth** sagittate, curved, 1.5 mm; **Ov** slenderly conical; **Sty** short but obvious and separate.

The sessile inflorescence without distinct peduncle and the dimerous flowers are notable and induce speculations that the taxon might be

based on an aberrant and/or depauperate specimen.

D. orobanchoides Mez (in Martius, Fl. Bras. 3 (3): 475, 1894). **Type:** Brazil, Minas Gerais (*Tamberlik* s.n. [W †, B [lecto]]). — **Distr:** Brazil (Minas Gerais: without exact locality); ecology not recorded; only known from the type collection.

[1?] Only known from the fragmentary lectotype; **L** unknown; peduncle glabrous; peduncular **Bra** ovate, acuminate, much shorter than the internodes, entire; **Inf** few-branched, sparsely short-tomentulose, **Br** ascending, subdensely flowered; floral **Bra** broadly ovate, acute, shorter than the pedicels, fimbriate at the apex; **Fl** spreading; **Ped** 3 mm; **Sep** broadly ovate-elliptic, 7 mm, apiculate, fimbriate, appressed-tomentulose; **Pet** suborbicular, ±11 mm, obtuse, carinate, erect, colour not described; **St** equalling or slightly exceeding the petals; **Fil** free above the common tube; **Anth** sublinear, acuminate, strongly recurved; **Sty** ± none.

Very insufficiently known and apparently never recollected.

D. paraensis L. B. Smith (Phytologia 13: 150, t. 7, figs. 10–12, 1966). **Type:** Brazil, Pará (*Fróes* 30030 [IAN, US [photo]]). — **Distr:** Brazil (Pará: Araguáia region); sandstone ledges, 600 m; only known from the type collection. **I:** Smith & Downs (1974: 576).

[3b] **Ros** subbulbous, many-leaved; **L** 50 × 2.5–3 cm, sheath broad, ±4 cm, **L** lamina recurved-spreading, very narrowly triangular, rigid, soon glabrous adaxially, closely appressedly cinereous-lepidote abaxially, very laxly serrate, **Sp** subspreading, 1.5 mm, black; **Inf** 70 cm, simple; peduncle erect, very slender, soon glabrous; peduncular **Bra** remote, acuminate from a broadly ovate base, very small, entire; fertile **Inf** part very lax, >20 cm, glabrous; floral **Bra** like the upper peduncular bracts but apiculate, to 5 mm; **Fl** spreading; **Ped** 3 mm, rather stout; **Sep** elliptic-oblong, 6 mm, broadly rounded, ecarinate, rather thin; **Pet** very broadly rounded, 10 mm, carinate, colour not described but presumably orange; **St** ± equalling the petals;

Fil shortly (to completely?, Pinangé & al. (2017: fig. 3)) connate above the common tube; **Sty** \pm none.

Compared with *D. duckei* in the protologue.

D. pauciflora L. B. Smith & Read (Phytologia 38: 138, t. 6, 1977). **Type:** Brazil, Goiás (*Hatschbach* 39429 [US, MBM]). — **Distr:** Brazil (Goiás); peak of a rock dome, 800 m.

[3b] **Ros** dense; **L** $\pm 8 \times 1.7$ cm, sheath broad, ± 1.5 cm, **L** lamina recurved-spreading, narrowly triangular, both faces appressedly cinereous-lepidote, glabrescent adaxially, laxly serrate, **Sp** recurved, 3 mm, black; **Inf** 50 cm, stout, simple; peduncle green, glabrous; peduncular **Bra** acuminate or apiculate, very small, slightly longer (lower) to much shorter (upper) than the internodes, many, remote; fertile **Inf** part lax, ± 6 -flowered, rachis geniculate, ± 5 cm, glabrous; floral **Bra** suborbicular, apiculate, 3 mm, \pm equaling the pedicels; **Fl** subspreading; **Ped** slender; **Sep** broadly elliptic, 6 mm, obtuse; **Pet** very broadly rounded, 9 mm, ecarinate, orange; **St** included; **Fil** connate above the common tube; **Sty** \pm none.

Similar to *D. paraensis*. — [F. Krapp]

D. paucispina Leme & Esteves (Vidalia 1(1): 28–30, ill., 2003). **Type:** Brazil, Mato Grosso do Sul (*Esteves Pereira* 378 [HB, UFG]). — **Lit:** Braun & Esteves Pereira (2006a). **Distr:** Brazil (C Mato Grosso do Sul); on rocks in Cerrado vegetation.

[2/3a] **Ros** 10- to 16-leaved, forming small and dense clumps, stem subglobose, 4×3 cm; **L** $10\text{--}18 \times 1.8\text{--}2$ cm, very rigid, succulent, sheath wider than the lamina, broadly subreniform, greenish, inconspicuously lepidote at the apex, **L** lamina narrowly triangular, strongly recurved, \pm slightly canaliculate, subulate towards the very pungent tip, long-acuminate, dark green to reddish, adaxially subdensely white-lepidote, abaxially subobscurely white-lepidote abaxially, veined, margins glabrous to slightly white-floccose, entire or basally irregularly and very remotely spinose, **Sp** slightly uncinata, predominantly retrorse, 2–3 mm; **Inf** 70–105 cm, pseudosimple to laxly $2 \times$ (rarely

$3 \times$) branched, erect; peduncle 45–58 cm, dark green, glabrescent towards the base, subdensely white-lanate towards the apex; peduncular **Bra** narrowly long-triangular to ovate-triangular from a suborbicular base, acuminate to acuminate-caudate, erect, distinctly shorter than the internodes, stramineous, white-floccose to glabrescent, veined, entire; fertile **Inf** part very slightly angled, ± 15 cm (simple) and ± 23 -flowered or to 30 cm (compound), straight, reddish, densely white-lanate at anthesis; primary **Br** 2–7, laxly arranged and late-developing, 7–10 cm, 11- to 15-flowered, subdense to dense mainly towards the apex, suberect, rachis flexuose to geniculate, pale orange, secondary **Br** incompletely known; primary **Bra** like the upper peduncular bracts; floral **Bra** suberect, ecarinate, lowest ovate-acuminate and $6\text{--}7 \times 4\text{--}5$ mm, upper suborbicular-apiculate, to $3\text{--}5 \times 4$ mm, stramineous towards the apex, white-lanate to glabrescent, veined, entire; **Fl** suberect and somewhat upwardly secund, 16–18 mm, tubular with slightly narrowed throat, unscented; **Ped** 2–3 mm, stout; **Sep** broadly ovate to ovate-elliptic, $6\text{--}9 \times 5\text{--}6$ mm, apex obtuse and inconspicuously apiculate, ecarinate, pale orange, densely white-lepidote, fimbriate, entire or minutely crenulate; **Pet** broadly obovate-spatulate, $11\text{--}13 \times 9\text{--}10$ mm, obtuse-emarginate, base very narrow, ecarinate, erect at anthesis, bright orange, abaxially white-floccose towards the base to glabrous; **St** slightly exceeding the petals; **Fil** free above the 2–3 mm high common tube, 10–12 mm, pale orange; **Anth** sublinear to subtriangular, 4–4.5 mm, strongly recurved, distinctly visible at anthesis, base sagittate, apiculate; **Ov** suboblong-ovoid to narrowly pyramidal, 5.5–6 mm, yellowish; **Sty** ± 1 mm, orange, **Sti** ± 0.5 mm, orange, irregularly recurved.

Similar to *D. burchellii* and *D. pulquinensis*. — [F. Krapp]

D. pectinata L. B. Smith & Reitz (Phytologia 14: 486, t. 1, figs. 29–32, 1967). **Type:** Brazil, Minas Gerais (*Pabst* 4129 [HB, US [photo]]). — **Distr:** Brazil (Minas Gerais: Conceição do Rio Verde to Cambuquira); dry sandstone outcrops. **I:** Smith & Downs (1974: 570).

[3b] **Ros** not described; **L** 14 × 0.8 cm, sheath broadly ovate, stramineous basally, **L** lamina very narrowly triangular, subulate-attenuate, appressedly cinereous-lepidote on both faces, ± glabrescent adaxially, subdensely pectinate-serrate, **Sp** flat, spreading, 6 mm; **Inf** 75 cm, simple; peduncle glabrous; peduncular **Bra** subfoliaceous (lower) to narrowly triangular (upper), thin, irregularly shorter than the internodes, serrulate; fertile **Inf** part laxly many-flowered, 21 cm, glabrous; floral **Bra** like the upper peduncular bracts, lowest ones exceeding the sepals, serrulate; **Fl** spreading to reflexed; **Ped** 3 mm, broadly obconical, constricted at the base; **Sep** broadly ovate, 7 mm, rounded, entire or apiculate, rugose when dry as if formerly fleshy, little if at all carinate; **Pet** obovate, 9 mm, carinate, red-orange; **St** included; **Fil** shortly (to completely?, Pinagé & al. (2017: fig. 3)) connate above the short common tube; **Sty** none.

Similar to *D. dawsonii*. — [F. Krapp]

D. pernambucana L. B. Smith (Phytologia 20: 179, t. 2, figs. 12–14, 1970). **Type:** Brazil, Pernambuco (*Lima* 65-4275 [IPA, US [photo]]). — **Lit:** Siqueiro Filho & Leme (2007: 316–318, with ill.). **Distr:** Brazil (Pernambuco); gneiss outcrops.

Incl. *Dyckia rupestris* W. Till & Morawetz (1990).

[2/3b] **Ros** ±30-leaved, dense, with a subglobose base to ±8 × 8 cm; **L** to 33 × 2.1 cm, very rigid and succulent, sheath broadly subreniform, ±2 × 4 cm, dark brown towards the base, subentire, **L** lamina narrowly triangular, nearly flat, arcuate, canaliculate towards the subulate pungent tip, dark greenish wine-red, distinctly veined, adaxially inconspicuously white-lepidote to glabrescent, abaxially densely cinereous-lepidote, margins irregularly densely to laxly serrate, **Sp** antrorse, uncinata, 0.5–1.5 mm, 2–25 mm apart; **Inf** to 80 cm, compound or simple; peduncle ± straight, 39–60 cm, sparsely to subdensely pale lanate; peduncular **Bra** erect, subfoliaceous (lower) or narrowly triangular (upper), shorter than the internodes, (sub-) densely pale-lepidote, serrulate; fertile **Inf** part lax, 25–45 cm, main axis 18- to 37-flowered, suberect, appressedly white-lepidote; primary **Bra** like the upper peduncular

bracts, much shorter than the long sterile branch bases; primary **Br** suberect, 14–21 cm, laxly 8- to 14-flowered, with a 2.5–7 cm long sterile base; floral **Bra** triangular-ovate, acuminate, (sub-) densely lanate, basal ones narrowly triangular, 10–12 × 5–6 mm, minutely denticulate, upper ± triangular, 5–8 × 4–6 mm, entire or microscopically denticulate; **Fl** 16–20 mm, suberect to slightly secund, campanulate, weakly fragrant; **Ped** 3–5 mm, stout; **Sep** broadly ovate, 6.5–9 × 6–7 mm, acute to narrowly obtuse and apiculate, ecarinate, orange, subdensely lanate; **Pet** broadly obovate-spatulate, 10–12 × 8–10 mm, obtuse, ecarinate, reddish-orange; **St** included; **Fil** 2–2.5 mm (to completely?, Pinagé & al. (2017: fig. 3)) connate above the common tube; **Anth** triangular, 2 mm, straight to slightly recurved; **Ov** suboblong, 5 mm, yellow; **Sty** 2 mm; **Sti** conduplicate-spiral, 1 mm, orange; **Fr** subglobose, 12–14 × 12 mm, dark brown, glossy, shortly rostrate; **Se** flat, asymmetrically subcuneate, ±4 × 2.5 mm.

Compared with *D. encholirioides* in the protologue, but the similarity is superficial (Siqueiro Filho & Leme 2007: 318). Rather, it is related to *D. limae* and similar to *D. secunda*. *D. rupestris* is synonymized on the base of Siqueiro Filho & Leme (2007: 316–318), and the description has been amended according to this source.

D. piauiensis Esteves & Gouda (Phytotaxa 164(4): 296–300, figs. 1 and 2A–F, 2014). **Type:** Brazil, Piauí (*Esteves Pereira* 375 [UFG]). — **Distr:** Brazil (Piauí: Canto do Burití); dry Cerrado vegetation, rocky soil or on rocks, in full sun or partial shade, 335 m; only known from the type locality.

[3b] **Ros** acaulescent, densely 19- to 25-leaved, 45–54 cm Ø, with bulbous base, with few basal offsets; **L** coriaceous, succulent, sheath broadly ovate, 2.5 × 3.8–4.6 cm, fairly succulent, both faces white and brilliant, distally somewhat brownish, margins minutely dark-spined, **L** lamina first erect, later curved and spreading, triangular-lanceolate, 21–26 × 2.8–3.4 cm, green, both faces finely veined, basal part densely appressedly furfuraceous-lepidote between the veins, adaxially glabrous distally, margins laxly

serrate, **Sp** mostly retrorsely uncinata, 0.5–4.3 mm, pale yellow and brown-tipped, 3–12 mm apart (distally to 27 mm); **Inf** 35–120 cm, simple, erect to \pm flexuous; peduncle 30–100 cm, sparsely lepidote; lower peduncular **Bra** leaf-like and to 7 cm, upper 0.8–4.2 cm, narrowly triangular to sublinear, with pungent tip, carinate, (pale) green, soon stramineous, sparsely serrulate; fertile **Inf** part 5.5–14 cm, rose-red, 7- to 16-flowered, sparsely white-lepidote; floral **Bra** broadly ovate, $\pm 8 \times 2$ mm, acuminate, rose-red, carinate; **Fl** $\pm 15 \times 8$ mm, spreading and slightly secund, broadly tubular; **Ped** stout, 3 mm (to 8 mm in fruit); **Sep** broadly ovate, $7\text{--}9 \times 7$ mm, rounded or emarginate, strongly convex, incurved, ecarinate, red, smooth, sparsely white-lepidote to glabrous, margins minutely spinose; **Pet** shortly spatulate, $10\text{--}13 \times 9$ mm, rounded or emarginate, slightly cucullate, orange; **St** included; **Fil** highly connate for 7–9 mm above the common tube; **Anth** ± 3 mm, yellow; **Ov** narrowly ovoid, $6\text{--}7 \times \pm 3$ mm, pale yellow; **Sty** ± 1 mm; **Sti** ± 2 mm, crisped, orange with yellow margins; **Fr** ovoid, $14\text{--}17 \times 11\text{--}13$ mm, dark brown, glossy.

Compared with the similar *D. pernambucana*, differing by larger retrorse leaf marginal spines, shorter inflorescences and characters of the flowers. — [F. Krapp]

D. piracanjubensis Esteves & Gouda (J. Bromeliad Soc. 66(3): 172–179, ill., 2017). **Type:** Brazil, Goiás (*Esteves Pereira* 355 [UFG 50537]). — **Distr:** Brazil (S Goiás: along the Rio Piracanjuba); isolated flat limestone rock outcrops, in full sun, 650 m.

[3b] **Ros** ± 67 cm \varnothing , solitary or forming dense clumps; stem to 17×6.5 cm, hidden by the leaf sheaths; **L** ± 40 , spreading, the inner suberect to upward-secund, sheath $2.5\text{--}3.2 \times 3.7$ cm, succulent, both faces glossy, base white, dark honey-coloured above, margins spinose, **L** lamina sublinear-triangular, $35\text{--}53 \times 3$ cm, strongly canaliculate, pale green to brownish-green, finely veined, densely canescent-lepidote esp. abaxially, becoming glabrescent towards the tip, tip flat, dark brown, glossy, margins spinose, **Sp** uncinata, antorse except for the distal ones, to 3.5 mm, becoming smaller upwards, brown from green

base, 3–14 mm apart; **Inf** 1.8–2 m tall, simple; peduncle to 100 cm, straight to slightly sinuous, sparsely cinereous-tomentose; lower peduncular **Bra** leaf-like, to 9.5 cm, upwards becoming smaller, linear-lanceolate, carinate, pungent, serrate; flowering part ± 72 cm, cinereously whitish-lepidote; lower floral **Bra** triangular-lanceolate, $\pm 15 \times 7$ mm, upper only 3 mm, all carinate, veined, serrulate, sparsely cinereous-tomentose, pungent; **Fl** 16×7 mm \varnothing , subsessile to shortly pedicellate, \pm horizontally porrect, cup-shaped with slightly flaring limb; **Sep** triangular-lanceolate, $\pm 7 \times 6$ mm, orange-yellowish, free, fleshy, densely white-tomentose, margins ciliate; **Pet** $\pm 13 \times 9$ mm, orange-red, basally connate for 1–3 mm, entire, rounded or slightly emarginate, glabrous; **St** included; **Fil** whitish to pale yellow, to 7.6 mm, 2–3.5 mm connate above the common tube; **Anth** $\pm 3 \times 1$ mm, dorsifixed near the base, strongly recurved at anthesis; **Ov** $\frac{4}{5}$ superior, narrowly subprismatic, $\pm 6 \times 2.5$ mm, gradually merging into the style; **Sty** yellow basally, orange distally, including stigma 3 mm; **Sti** lobes ± 1.7 mm, orange; **Fr** broadly ovoid, $13\text{--}16 \times 9\text{--}13$ mm \varnothing , glossy dark brown, somewhat beaked; **Se** not described.

Compared with *D. goiana*, but also similar to *D. formosensis* (with fewer leaves, longer fertile inflorescence part, obtuse sepals and longer filaments) and *D. cangaphila* (smaller rosettes and shorter leaves, shorter and occasionally compound inflorescences, and pedicellate smaller flowers). — [U. Eggli]

D. platyphylla L. B. Smith (Phytologia 19: 283, t. 1, figs. 9–11, 1970). **Type:** Brazil, Bahia? (*Foster* 2489 [US]). — **Distr:** Brazil (Bahia?); not known from the wild with certainty. **I:** Smith & Downs (1974: 575).

[3b] **Ros** not described; **L** to 23×5 cm, sheath suborbicular, 5 cm, yellowish, glabrous, **L** lamina narrowly triangular, thick, succulent, glabrous adaxially, appressedly whitish-lepidote abaxially, margins serrate, **Sp** slender, antroretrorsely curved, 3 mm, brown; **Inf** 80 cm, simple; peduncle slender, much compressed at the base, somewhat flexuous, glabrous; peduncular **Bra** broadly ovate and acuminate, small, much shorter than the

internodes, sparsely pale-lepidote, entire or sub-entire; fertile **Inf** part lax, many-flowered, 28 cm, glabrous; floral **Bra** broadly ovate, acuminate, \pm equalling the sepals (lower); **Fl** mostly suberect; **Ped** 1–2 mm, stout; **Sep** broadly ovate, 8 mm, rounded and cucullate, ecarinate; **Pet** elliptic, 11 mm, yellow; **St** included; **Fil** connate above the common tube; **Sty** none.

Similar to *D. aurea*. — [F. Krapp]

D. polyclada L. B. Smith (J. Bromeliad Soc. 39(5): 206–207, figs. 7 and 8, 1989). **Type:** Brazil, Rio Grande do Sul? (*Foster* 3096 [US, B, GH, NY]). — **Distr:** Brazil (Rio Grande do Sul?); ecology not recorded; only known from the type.

[1] **Ros** clustering, acaulescent; **L** $>40 \times 2$ cm, erect to spreading, sheath pale, **L** lamina finely white-lepidote between the veins on both faces, margins laxly serrate, **Sp** curved, 5 mm, 20–25 mm apart; **Inf** to 2 m, seemingly terminal, laxly 2–3 \times branched; peduncle erect, stout; peduncular **Bra** subfoliaceous, exceeding the internodes but exposing most of the axis; fertile **Inf** part densely white-flocculose; **Br** usually with 1 or 2 branches near the base, spreading to recurved, 50 cm, densely many-flowered; primary **Bra** very narrowly triangular, much shorter than the sterile branch bases; floral **Bra** ovate, acute, 4 mm; **Fl** spreading-ascending, narrowly elongately barrel-shaped; **Ped** very short; **Sep** suborbicular, 4 mm; **Pet** spatulate, not further described, yellow; **St** and **Sti** slightly exerted.

Described on the base of cultivated material without clear provenance. Apparently related to *D. selloa* of the “*Prionophyllum* complex”.

D. pontesii Büneker & al. (Rodriguésia 66(2): 500–503, ill., 2015). **Type:** Brazil, Rio Grande do Sul (*Büneker & Witeck* 212 [HDCF, RB, SMDB]). — **Distr:** S Brazil (S Rio Grande do Sul: Pinheiro Machado); conglomerate rock outcrops.

[1/3a?] **Ros** 18–60 cm \varnothing , offsetting and rhizomatous; **L** ± 50 , suberect to spreading, sheath suborbicular, $\pm 3 \times 4.5$ cm, white, glossy, **L** lamina narrowly triangular, 15–35 \times 1.2–3.5 cm, stiff and succulent, straight to curved, adaxially

slightly canaliculate, green, sparsely lepidote only near the base, otherwise (sub-) glabrous, abaxially veined-striate, white-lepidote between the veins, tip a pungent spine to 6 mm, margins serrate-spinose, **Sp** slender and often inconspicuous, curved, 1–4 mm, laxly arranged, brown or yellowish; **Inf** 0.6–1.7 m tall, simple or branched; peduncle robust, 35–75 cm, green, subglabrous to densely white-flocculose-tomentose; basal peduncular **Bra** leaf-like, to 12 cm, as long as or longer than the internodes, erect, serrate, upper ones ovate to broadly elliptic, 2–6.5 \times 1.3–2.6 cm, entire or inconspicuously serrate; fertile **Inf** part 25–75 cm, laxly to subdensely 25- to 150-flowered, axis green or brownish-green, subglabrous to densely white-flocculose-tomentose; **Br** when present 1–7, erect or suberect-arcuate, near the base of the main axis; primary **Bra** like the upper peduncular bracts; floral **Bra** ovate-triangular, 10–21 \times 11–35 mm, the lower as long or longer than the flowers, the upper $\pm \frac{1}{2}$ as long, bulging, basally green, above castaneous, subglabrous to white-tomentose; **Fl** sessile, ± 20 mm, suberect; **Ped** absent; **Sep** ovate-triangular, 6–9 \times 11–15 mm, brownish-yellow with greenish base, glabrous or sparsely tomentose-lepidote towards the tip, the adaxial ones carinate, the abaxial one ecarinate or slightly carinate; **Pet** obtrullate, 18–20 \times 10–13 mm, erect with slightly flaring tips, yellow, glabrous, tip rounded-cucullate; **St** included; **Fil** free above the common tube; **Anth** not described; **Ov** $\pm 7 \times 4$ mm, whitish-yellow; **Sty** ± 11 mm; **Sti** not described; **Fr** ovoid, size not described, castaneous to black, very glossy.

The flowers are slightly asymmetrical (termed “zygomorphic” in the protologue) when observed from the bottom because the adaxial sepals are carinate and closer together than the ecarinate or slightly carinate abaxial sepal. The species is overall similar to *D. dusenii* and *D. elisabethae*. The only other species reported to have asymmetrical sepals (and thus zygomorphic flowers) is *D. lunaris*. — [U. Eggli]

D. pottiorum Leme (Phytotaxa 67: 26–28, ill., 2012). **Type:** Brazil, Mato Grosso do Sul (*Leme & al.* 8579 [RB, HB]). — **Distr:** Brazil

(Mato Grosso do Sul); shallow soil on flat or slightly inclined rock outcrops. **I:** Braun (2018: 71).

[3a] **Ros** distichously 12- to 18-leaved; **L** nearly prostrate, 23–41 × 1.5–2.5 cm, coriaceous, sheath reniform, ±2.5 × 4 cm, with castaneous base, greenish at the apex, base glabrous, towards the apex densely white-lepidote, **L** lamina sublinear-attenuate, strongly U-canaliculate, apical portion recurved, apex long acuminate-caudate, pungent-spinose, green or bronze to reddish, green specimens densely white-lepidote with glabrous apex, bronze and reddish specimens densely and coarsely white-lepidote abaxially and less dense adaxially, veined, margins glabrous, sparsely (apically) to densely spinose, **Sp** narrowly triangular to acicular, straight to prevailingly retrorse-uncinate, 1–3 mm, castaneous, 1–7 mm apart; **Inf** 23–52 cm, simple, erect; peduncle 10–34 cm, green to dark purplish wine-red, glabrous; peduncular **Bra** erect, subcarinate, long acuminate-caudate from a suborbicular base, 8–21 × 3–5 mm, densely white-lepidote to glabrous, veined, minutely spinulose; fertile **Inf** part densely 11- to 18-flowered, 6–11 cm, slightly flexuous, orange towards the apex, glabrous; floral **Bra** subtriangular-ovate, acuminate, ecarinate, suberect to subspreading, 4–8 × 3–4 mm, stramineous, thin-textured, glabrous, veined, inconspicuously denticulate to entire; **Fl** subspreading at anthesis and suberect-secund afterwards, 14–15 mm, subtubular, unscented; **Ped** 2–3 mm, stout; **Sep** ovate, ±6 × 5 mm, rounded and inconspicuously apiculate, ecarinate, orange to yellowish-orange, glabrous, entire; **Pet** broadly spatulate from a narrower base, ±11 × 9 mm, apex truncate and inconspicuously emarginate, ecarinate, orange to yellowish-orange; **St** ± equalling the petals; **Fil** free above the 1.5 mm high common tube, yellowish; **Anth** sublinear, ±4 mm, base distinctly bilobed, apiculate, slightly recurved near the apex; **Ov** ovoid, ±4.5 × 2 mm, yellowish; **Sty** ±1.5 mm, yellowish; **Sti** orange; **Fr** broadly fusiform, 12–15 × 8–10 mm, dark greenish-castaneous; **Se** suborbicular, flat, ±3.5 × 3 mm, castaneous.

Compared with *D. burchellii* and *D. coximensis* in the protologue. — [F. Krapp]

D. princeps Lemaire (Jard. Fleur. 3: tt. 224–225 + text, 1853). **Type:** Brazil, Minas Gerais (*Anonymus* s.n. [[icono] l.c. tt. 224–225]). — **Distr:** Brazil (Minas Gerais); ecology not recorded. **I:** Smith & Downs (1974: 515).

Incl. *Dyckia gigantea* K. Koch (1874) (*nom. illeg.*, Art. 52.1).

[2?] **Ros** dense, many-leaved, with a very short and stout rhizome covered with old sheaths; **L** 35–60 × 3 cm, arching-recurved, sheath suborbicular, large, **L** lamina narrowly triangular, flat, with pungent tip, glabrous adaxially, densely appressedly pale-lepidote abaxially, margins laxly serrate, **Sp** 3 mm; **Inf** 1 m or taller, amply compound; peduncle stout, short, ferruginous-tomentulose; peduncular **Bra** subfoliaceous, much exceeding the internodes, serrulate; fertile **Inf** part ferruginous-tomentulose; **Br** elongate, laxly flowered; primary **Bra** like the upper peduncular bracts, shorter than the sterile branch bases; floral **Bra** spreading, lanceolate-triangular, attenuate, exceeding the sepals; **Fl** spreading; **Ped** to 15 mm, stout; **Sep** broadly ovate, 9–10 mm, acute or apiculate, convex, ecarinate; **Pet** spreading, suborbicular, 25 mm, apiculate, red-orange; **St** included; **Fil** shortly connate above the common tube; **Anth** triangular, acuminate, strongly recurved; **Sty** very short. — [F. Krapp]

D. pseudococcinea L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 108, t. 109, fig. 1, 1943). **Type:** Brazil, Rio de Janeiro (*Foster* 1144 [GH]). — **Lit:** Mendes & al. (2012: conservation). **Distr:** Brazil (Rio de Janeiro, São Paulo, Paraná); swampy meadows, on the ground or on rocks. **I:** Smith & Downs (1974, 542).

[3b] **Ros** dense, many-leaved; **L** 30 × 1–1.2 cm, sheath broadly elliptic, 3 cm, pale, glabrous, **L** lamina linear, attenuate, adaxially glabrous, appressedly whitish-lepidote abaxially, margins laxly serrate, **Sp** slender, spreading or retrorsely curved, 2 mm; **Inf** 60–100 cm, simple; peduncle slender, ± glabrous at anthesis; peduncular **Bra** narrowly triangular from an ovate base, the uppermost slightly shorter than the internodes, minutely serrulate; fertile **Inf** part lax, 17–25 cm, ± glabrous; floral **Bra** ovate, acuminate, ± equalling the sepals (lowest), minutely serrulate; **Fl**

spreading at anthesis, then suberect; **Ped** 3–4 mm; **Sep** ovate, 7–9 mm, acute, cucullate; **Pet** broadly elliptic, 12 mm, obtuse, ecarinate, suberect, orange; **St** much shorter than the petals; **Fil** 2 mm connate above the common tube; **Sty** very short.

Available information on the geographical range of this species is conflicting. Material identified as this species has been extensively reported from the Brazilian states as detailed above, but according to Mendes & al. (2012), as well as the Brazilian Red List for plants, *D. pseudococcinea* is endemic to the restingas of Maricá, Rio de Janeiro, and is classified as critically endangered.

D. pulquinensis Wittmack (Meded. Rijks-Herb. [Leiden] 29: 88, 1916). **Type:** Bolivia, Santa Cruz (*Herzog* 1849 [L, B, F [photo]]). — **Distr:** Bolivia (Santa Cruz); dry rocky slopes, 1900 m. **I:** Smith & Downs (1974: 552).

[2] **Ros** not described; **L** 14–25 × 0.6–1 cm, sheath suborbicular, 3 cm, dark castaneous, **L** lamina linear-triangular, pungent, appressedly cinereous-lepidote, glabrescent adaxially, margins very laxly serrate, **Sp** stout, retrorsely curved, 5 mm; **Inf** 80 cm, few-branched; peduncle very slender, very sparsely white-lepidote; peduncular **Bra** triangular-ovate, acute, much shorter than the internodes, upper ones 8 mm; **Inf** branches flexuous, very slender, laxly and secundly flowered; primary **Bra** like the upper peduncular bracts, much shorter than the sterile bracteate branch bases; floral **Bra** broadly ovate, apiculate, 3 mm; **Fl** 15 mm, glabrous, subsessile; **Sep** broadly ovate-elliptic, 8 mm, apiculate, fuscous when dry; **Pet** broadly obovate, 14 × 6 mm, rounded, golden-yellow; **St** slightly exerted; **Fil** free above the 1.5 mm high common tube; **Anth** narrowly triangular, 4.5 mm, distinctly recurved towards the apex; **Ov** slenderly ellipsoid, 9 mm; **Sty** none.

D. crassifolia is sometimes treated as synonym of this species. — [F. Krapp]

D. pumila L. B. Smith (Phytologia 13: 151, t. 7, fig. 13, 1966). **Type:** Brazil, Goiás (*Irwin & Soderstrom* 7365 [US, NY]). — **Distr:** Brazil (Goiás); steep rocky scree. **I:** Smith & Downs (1974, 565).

[3a] **Ros** nearly acaulescent, densely many-leaved; **L** 13 × 0.7 cm, sheath suborbicular, 2.5 cm wide, brown, glabrous, laxly and minutely serrate apically, **L** lamina linear-triangular, pungent, thick, white-lepidote, glabrous adaxially with age, margins laxly serrate, **Sp** slender, spreading, 2 mm, brown; **Inf** 18 cm, simple; peduncle erect, slender, very finely white-lepidote, soon glabrous; peduncular **Bra** ovate, attenuate, small, much shorter than the internodes, obscurely serrulate; fertile **Inf** part lax, few-flowered, 2–5 cm, very sparsely white-stellate-lepidote; floral **Bra** like the peduncular bracts but entire, to 6 mm; **Ped** 2 mm, broadly obconical; **Sep** broadly elliptic, 6 mm, rounded and apiculate, the posterior ones carinate; **Pet** very broadly subacute, 10 mm, orange; **St** barely exerted; **Fil** free above the short common tube; **Sty** ± none; **Fr** subglobose, apiculate, 13 mm, dark castaneous.

Similar to *D. duckei*. — [F. Krapp]

D. racemosa Baker (Handb. Bromel., 132, 1889). **Type:** Brazil, Goiás (*Gardner* 4015 [K, K [photo]]). — **Distr:** Brazil (Goiás); dry hills.

[3b] **Ros** not described; **L** >40 × >2 cm, sheath not described, **L** lamina narrowly triangular, covered with a membrane of fused scales abaxially, margins laxly serrate, **Sp** 1.5 mm; **Inf** >85 cm, simple; peduncle very slender, glabrous; peduncular **Bra** remote, broadly ovate, acuminate, entire; fertile **Inf** part lax, >15 cm, minutely furfuraceous; floral **Bra** broadly elliptic, obtuse or sometimes minutely mucronate, to 3 mm; **Fl** ascending, 10 mm, glabrous; **Ped** to 6 mm; **Sep** elliptic-ovate, 6 mm, obtuse; **Pet** erect or suberect, subrhombic, obtuse, slightly carinate, red; **St** included; **Fil** high-connate above the common tube; **Anth** narrowly triangular, acuminate, slightly recurved; **Sty** ½ as long as the ovary.

D. racinae L. B. Smith (J. Bromeliad Soc. 38 (6): 248–249, figs. 5 and 6, 1988). **Type:** Brazil, Rio Grande do Sul? (*Foster* 3095 [US, B, GH, NY]). — **Lit:** Dorneles & al. (2014: with ill.). **Distr:** Brazil (Rio Grande do Sul: near São Pedro do Sul); open Pampa vegetation on shallow stony soil.

[1] **Ros** spreading, acaulescent; **L** >55 × 4 cm, sheath pale, **L** lamina obscurely lepidote abaxially between the veins, glabrous adaxially, margins laxly serrate, **Sp** curved, 5 mm; **Inf** to >2 m, seemingly terminal, laxly amply 2× branched; peduncle erect; peduncular **Bra** subfoliaceous, exceeding the internodes but exposing most of the peduncle; **Inf** branches glabrous, lax, somewhat secundly flowered, 50 cm; primary **Bra** very narrowly triangular, much shorter than the sterile branch bases; floral **Bra** attenuate from a broadly ovate base, ± equalling the sepals, enlarging in fruit to 25 mm; **Ped** very short at anthesis, to 6 mm in fruit, stout; **Sep** broadly ovate-lanceolate, 6–7 × 3–4 mm, rounded and apiculate, glabrous to sparsely pilose; **Pet** obovate to spatulate, 12–13 × 5–6 mm, obtuse, glabrous, golden-yellow with paler margins; **St** just included; **Fil** free above the common tube; **Anth** triangular with curved apex and cordate base; **Fr** ovoid, beaked, black; **Se** with asymmetric lateral wings.

Part of the “*Prionophyllum* complex”, and similar to *D. selloa*. Dorneles & al. (2014) provide an amplified description based on recently collected material. They argue that the species is close to *D. cabreræ*, which differs by larger flowers on longer pedicels.

D. ragonesei A. Castellanos (Lilloa 10: 454, fig. 2, 1944). **Type:** Argentina, Santa Fé (Castellanos s.n. [BA 19465, US [photo]]). — **Distr:** N Argentina (Entre Ríos, Santa Fé, Santiago del Estero), Bolivia (Santa Cruz), Paraguay (Boquerón, Amambay, Canindeyú); rocky slopes. **I:** Smith & Downs (1974, 555).

[2/3b?] **Ros** not described; **L** 40 × 1.2 cm, sheath broadly triangular, curved, semi-amplexicaul, 3 × 6 cm, **L** lamina linear-triangular, serrate, **Sp** curved, 4 mm, brown; **Inf** 60–80 cm, paniculate or simple; peduncle elongate, furfuraceous; peduncular **Bra** deltoid, shorter than the internodes; fertile **Inf** part yellow-furfuraceous; **Br** subdensely flowered; floral **Bra** broadly triangular, to 7 mm, tomentose-lepidote; **Fl** ±16 mm, sessile; **Sep** ovate, 8 mm, obtuse, margins hyaline; **Pet** 14–15 mm, broadly and irregularly rounded, undulate, golden-yellow; **St** distinctly exserted; **Fil** 3–5 mm connate above the

2 mm high common tube; **Anth** oblong, apiculate, straight, 5 mm; **Sty** 1 mm; **Fr** pyramidal, 17 × 12 mm; **Se** with a falcate wing, 4–5 × 5 mm.

Usually cited as endemic for Argentina, but also reported from Bolivia and Paraguay as shown above (E. Gouda, pers. comm., Dec. 2016).

D. rariflora Schultes *fil.* (in Roemer & Schultes, Syst. Veg. 7(2): 1195, 1830). **Type:** Brazil, Minas Gerais (Martius s.n. [M, F [photo]]). — **Distr:** Brazil (Minas Gerais); rocky fields, savanna, terrestrial or on rocks; ±1000 m. **I:** Smith & Downs (1974: 552).

[3b] **Ros** not described; **L** to 14 × ±1 cm, sheath broadly ovate, large, **L** lamina narrowly triangular, attenuate, with pungent tip, sparsely pale-appressed-lepidote abaxially, margins laxly serrate, **Sp** stout, curved, 3 mm; **Inf** to 50 cm, simple or branched; peduncle somewhat lepidote; peduncular **Bra** broadly ovate, acuminate, shorter than the internodes, entire or serrulate; fertile **Inf** part with a few short branches at the base, lax or subdense towards the apex, few-flowered, soon glabrous; floral **Bra** reflexed, broadly ovate, apiculate, 7–10 mm, equalling or shorter than the sepals; **Fl** spreading; **Ped** very short but distinct; **Sep** broadly ovate, 6 mm, broadly subacute; **Pet** suberect, broad, 9 mm, obtuse, carinate, orange; **St** included; **Fil** high-connate above the common tube; **Anth** elliptic, apiculate, straight or slightly recurved; **Sty** 1/5 as long as the ovary.

Some early illustrations purporting to represent this species in fact show *D. remotiflora* (Smith & Downs 1974: 526).

D. reitzii L. B. Smith (Anais Bot. Herb. “Barbosa Rodrigues” 2: 14, tt. 1–3, 1950). **Type:** Brazil, Santa Catarina (Reitz 2690 [US, HBR]). — **Distr:** Brazil (Minas Gerais, Paraná, Santa Catarina, Rio Grande do Sul); sandstone ledges and rocky soil, 1500–2500 m. **I:** Reitz (1983: t. 50); Klein V. & Klein (2014: 77, 79).

[3b] **Ros** dense, ±100-leaved; **L** to 38 × 1–2 cm, sheath suborbicular, 3.5 cm wide, brown, soon glabrous, laxly serrulate, **L** lamina triangular-linear, attenuate, with pungent tip, smooth and glabrous adaxially, cinereous and strongly veined abaxially, margins laxly serrate, **Sp** curved,

1.5–3 mm, antrorse, 10 mm apart; **Inf** 50 cm, simple; peduncle slender, ferrugineous-flocculose; peduncular **Bra** densely imbricate, lanceolate, acuminate, cinereous-flocculose, serrulate; fertile **Inf** part densely ± 30 -flowered, 9–12 cm, ferrugineous-flocculose to subglabrous; floral **Bra** like the peduncular bracts, exceeding the flowers; **Fl** subspreading, some with additional petals; **Ped** 5 mm, stout; **Sep** ovate, 8–9 mm, acute and cucullate, densely ferrugineous-tomentose; **Pet** rhomboid, 16 mm, somewhat spreading, yellow or reddish-yellow; **St** included; **Fil** high-connate above the common tube; **Ov** pyramidal; **Sty** short; **Sti** slightly contorted.

D. remotiflora Otto & A. Dietrich (Allg. Gartenzeitung 1: 129, 1833). **Type:** Brazil (*Sellow* s.n. [B, K]). — **Distr:** Brazil (Minas Gerais, Paraná, São Paulo, Santa Catarina, Rio Grande do Sul), Uruguay, N Argentina (Entre Ríos).

\equiv *Dyckia rariflora* var. *remotiflora* (Otto & A. Dietrich) Baker (1889).

[3a] **Ros** offsetting, rhizome short and stout; **L** 10–25 \times 0.8–1.2 cm, arching, flat, sheath broadly ovate or suborbicular, large, **L** lamina narrowly triangular, with pungent tip, evenly dark green, appressedly pale-lepidote esp. abaxially, laxly serrate, **Sp** slender, curved, 1–3 mm; **Inf** to 1 m, simple; peduncle stout, sparsely tomentulose at the nodes; peduncular **Bra** suborbicular, the lowest laminate, all but the lowest much shorter than the internodes; fertile **Inf** part lax, 12–20 cm, sparsely tomentulose when young; floral **Bra** broadly ovate, shorter than the sepals; **Fl** divergent to spreading; **Ped** very short, stout; **Sep** ovate, apiculate, \pm carinate; **Pet** lamina spreading, trapeziform, obtuse, carinate, dark orange; **St** included; **Fil** free above the common tube; **Anth** narrowly triangular, recurved; **Sty** as long as or longer than the ovary.

Some early illustrations labelled *D. rariflora* in fact show *D. remotiflora* (Smith & Downs 1974: 526).

D. remotiflora var. *angustior* L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 108, 1943). **Type:** Brazil, Rio Grande do Sul (*Bornmueller* 351 [GH]). — **Distr:** Brazil (Rio Grande do Sul); ecology not recorded.

[3a] Upper peduncular **Bra** and floral **Bra** acuminate. — [F. Krapp]

D. remotiflora var. *montevidensis* (K. Koch) L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 108, 1943). **Type:** Uruguay, Montevideo (*Sellow* s.n. [B]). — **Distr:** Brazil (Rio Grande do Sul), Uruguay, N Argentina (Entre Ríos); dry open rocky ground, to 50 m.

\equiv *Dyckia montevidensis* K. Koch (1874) \equiv *Dyckia rariflora* var. *montevidensis* (K. Koch) Baker (1889).

[3a] Upper peduncular **Bra** and floral **Bra** with broad apiculate tip; **Sep** nearly or quite straight, 6–8 mm; **Pet** 11–17 mm.

Formerly also cited to occur in Santa Catarina, but the references relate to *D. leptostachya* (Reitz 1983: 516–517). — [F. Krapp]

D. remotiflora var. *remotiflora* — **Distr:** Brazil (Minas Gerais, Paraná, São Paulo, Rio Grande do Sul), Uruguay; rocky fields, savanna, on rocks or terrestrial. — Fig. 9.



Fig. 9 *Dyckia remotiflora* var. *remotiflora* (Birolini s.n.: Uruguay; Maldonado, Punta Ballena). (Copyright: U. Eggli)

Incl. *Dyckia rariflora* var. *cunninghamii* Baker (1889); **incl.** *Dyckia vaginosa* Mez (1894).

[3a] Upper peduncular **Bra** and floral **Bra** with broad apiculate tip; **Sep** cucullate, 8–10 mm; **Pet** 17–23 mm. — [F. Krapp]

D. remotiflora var. **tandilensis** (Spegazzini) Cabrera (Fl. Prov. Buenos Aires 4(1): 449, 1968). **Type:** Argentina, Buenos Aires (*Spegazzini* 219 [LP]). — **Distr:** Argentina (Buenos Aires); ecology not recorded; only known from the type collection and apparently extinct.

≡ *Dyckia montevidensis* var. *tandilensis* Spegazzini (1901).

[3a] Upper peduncular **Bra** and floral **Bra** with broad acuminate tip; **Sep** cucullate; **Pet** <10 mm. — [F. Krapp]

D. retardata S. Winkler (Doc. Nat. 3: 42–43, fig. 4, 1982). **Type:** Brazil, Rio Grande do Sul (*Winkler* 7424 [ICN]). — **Distr:** Brazil (Rio Grande do Sul); dry granitic rocks.

[1] **Ros** to 60 cm Ø, acaulescent or with very short stem, many-leaved; **L** to 35 × 3 cm, sheath not described, **L** lamina glabrous, marginal **Sp** to 4 mm; **Inf** to 1.5 m, 2× branched; peduncle glabrous; peduncular **Bra** foliaceous, acuminate, exceeding the internodes (lower) or shorter (upper), glabrous, entire; **Inf** branches of 2. order often originating pairwise, younger parts of the axes white-furfuraceous; floral **Bra** triangular, small, to 2 mm; **Fl** sessile; **Sep** acuminate, to 8 mm, yellowish, white-lanate; **Pet** with rounded tip, to 10 mm, yellow, abaxially white-lepidote; **St** included and just equalling the petals; **Fil** free above the common tube; **Sty** terminally capitate, exerted for 2 mm.

The protologue has only a short and incomplete description. The species is said to be notable because older inflorescences can simultaneously have flowers and ripe fruits.

D. retroflexa S. Winkler (Doc. Nat. 3: 44, fig. 5, 1982). **Type:** Brazil, Rio Grande do Sul (*Winkler* 7410 [HPA]). — **Distr:** Brazil (Rio Grande do Sul); shady rocks.

[1] **Ros** to 40 cm Ø, acaulescent or with very short stem; **L** to 25 × 3 cm, sheath not described,

L lamina dark green, both faces glabrous, margins with **Sp** to 5 mm; **Inf** to 1.2 m, 2× branched; peduncular **Bra** long-acuminate, exceeding the internodes, tip brown, white-lepidote, finely spinose; floral **Bra** triangular, very small, to 1 mm; **Fl** directed backwards at anthesis, sessile; **Sep** oblong-ovate, to 5 mm, appressedly white-lepidote; **Pet** to 9 mm, with broadly rounded tip, yellow, abaxially villous; **St** slightly exerted, visible at anthesis; **Fil** free above the common tube; **Sty** appearing capitate but 3-fid, distinctly exceeding the petals.

Part of the “*Prionophyllum* complex”, and morphologically similar to *D. rigida*.

D. richardii P. J. Braun & Esteves (Cact. Succ. J. (US) 80(6): 321, ill. (pp. 319–320), 2008). **Type:** Brazil, Goiás (*Esteves Pereira* 366 [UFG]). — **Lit:** Braun & Esteves Pereira (2009b). **Distr:** Brazil (Goiás); outcrops of reddish strongly fragmented sedimentary rocks, in full sun. **I:** Braun (2018: 68).

[3a] **Ros** 19–29 cm Ø, solitary or sometimes forming groups with age, with bulbous base and 17–30 (–57) living leaves, with a stem 1.4–4.3 × 2.4–3.2 cm; **L** 10–18 × 2.3–2.7 cm, fleshy, green to light green, sheath concave, ±2.7 × 4.5 cm, brilliant white, sometimes brownish abaxially, **L** lamina succulent, erect (younger) or recurved (older), narrowly triangular, canaliculate and V-shaped in cross-section, with pungent orange-green to reddish tip, adaxially bright green, sparsely white-lepidote abaxially, strongly veined, margins laxly and irregularly serrate, **Sp** flattened, retrorse, sometimes straight, 3.5–5 mm, brown to dark or reddish-brown, hard, pungent; **Inf** to 30 cm, simple; peduncle slightly thickened at the nodes; peduncular **Bra** leaf-like and slightly secund (lowest) to somewhat leaf-like and lanceolate and acute (upper), lowest to 23 mm, entire, glabrous, lower ones serrate, upper ones soon withering; fertile **Inf** part 7- to 13-flowered, dense apically, 7.5–23 cm, rachis light green at the base, reddish-green in the flowering region, glabrous; floral **Bra** obtuse, mucronate, ±4 × 3.5 mm, reddish-orange, glabrous; **Fl** ±17 mm, sessile; **Sep** to 8 × 5 mm, ecarinate, succulent, reddish to orange-yellow; **Pet** to 12 mm, obtuse,

erect, yellow to orange-yellow; **St** exerted; **Fil** free above the short common tube, white, ± 11 mm; **Anth** light yellow, arching outwards; **Ov** subpyramidal at the base, greenish-white; **Sty** ± 1.5 mm; **Fr** ellipsoid-ovoid, to 14×12 mm, shiny dark brown. — [F. Krapp]

D. rigida Strehl (*Vidalia* 2(2): 32–34, figs. 9–12, 2004). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1502 [HAS]). — **Distr:** Brazil (Rio Grande do Sul); hillsides, slopes and cliffs, 500 m.

[1] **Ros** 50- to 60-leaved, 100 cm \varnothing , caulescent with a stem to 40×10 cm; **L** sheath ovate, $10\text{--}12 \times 8\text{--}10$ cm, glossy, brown, **L** lamina $55\text{--}60 \times 6\text{--}10$ cm, lanceolate-triangular, acuminate, acute with pungent tip, adaxially dark green, abaxially white-veined, margins spinose, **Sp** antrorse, uncinata, 5 mm, black; **Inf** to 1.8 m, $2\text{--}3 \times$ branched; peduncle stout, ± 50 cm, brownish-green; lowest peduncular **Bra** long-triangular, acute, $10\text{--}20 \times 4$ mm, sparsely serrate, shorter than the internodes, laxly arranged, slightly serrate; fertile **Inf** part lax, 50–80 cm, axis brownish-green, finely white-lepidote; **Br** 27–35 cm; floral **Bra** triangular, acute, $1\text{--}2 \times 1$ mm, abaxially puberulous, subtentire; **Fl** irregularly arranged, sometimes \pm verticillate, narrowly tubular with slightly flaring throat; **Ped** 1–2 mm; **Sep** ovate, $3\text{--}4 \times 2$ mm, apiculate to rounded and sometimes apiculate, pale green or pale brown, white-lepidote abaxially; **Pet** spatulate with narrowed base, $\pm 6 \times 3\text{--}4$ mm, rounded, yellow, glabrous; **St** \pm as long as the petals; **Fil** yellow, free; **Anth** just exerted, ± 3 mm, yellow to pale brown; **Ov** $3\text{--}4 \times 2$ mm, green; **Sty** ± 8 mm, white; **Fr** and **Se** not described.

Part of the “*Prionophyllum* complex”, and morphologically similar to *D. retroflexa*. Commonly confused with *D. maritima*.

D. rondonopolitana Leme (*Phytotaxa* 67: 28–30, ill., 2012). **Type:** Brazil, Mato Grosso (*Kranz* 123 [RB]). — **Distr:** Brazil (Mato Grosso); reddish sandstone outcrops, Cerrado vegetation.

[3a] **Ros** densely 20- to 30-leaved, slowly off-setting, acaulescent; **L** $20\text{--}22 \times 1\text{--}1.5$ cm,

$3\text{--}5$ mm thick, coriaceous, sheaths wider than the lamina, **L** lamina narrowly triangular, apically slightly canaliculate, arcuate, apex long acuminate-caudate and recurved, pungent, green to reddish, adaxially (sub-) densely white-lepidote with glabrescent apex, abaxially densely white-lepidote and finely veined, margins subdensely spinose, **Sp** acicular, spreading to retrorse, $3\text{--}6$ mm, densely white-lepidote, $6\text{--}12$ mm apart; **Inf** ± 38 cm, simple; peduncle ± 20 cm, reddish, glabrous; peduncular **Bra** subtriangular-ovate, acuminate-caudate, membranous, erect, $6\text{--}15 \times 5\text{--}8$ mm, greenish-yellow to reddish and soon stramineous towards the apex, white-lepidote to glabrous, veined, lowest ones remotely spinulose; fertile **Inf** part densely ± 40 -flowered, suberect, straight, ± 14 cm, yellowish-orange, glabrous; basal floral **Bra** like the upper peduncular bracts, broadly subtriangular-ovate, acuminate to acute, ecarinate, convex, membranous, $6\text{--}10 \times 5\text{--}9$ mm, distinctly shorter than the sepals, greenish-yellow, glabrous, remotely crenulate to entire; **Fl** subspreading, $17\text{--}18$ mm, \pm barrel-shaped with narrow throat; **Ped** ± 3 mm, stout; **Sep** ovate, $\pm 8 \times 6.5$ mm, convex, apex obtuse or erose, membranous, yellow, glabrous; **Pet** spatulate, $\pm 13 \times 10$ mm, subacute, ecarinate, yellow; **St** slightly exerted; **Fil** free above the 2 mm high common tube, $10\text{--}11$ mm, whitish; **Anth** narrowly subtriangular, recurved at anthesis, ± 4 mm, base bilobed, acuminate; **Ov** suboblong-ovoid, $\pm 3.5 \times 1.5$ mm, yellowish; **Sty** ± 0.5 mm, yellowish; **Sti** distinctly scalloped-lacerate, yellow, ± 1 mm.

Compared with *D. dawsonii* in the protologue, but with broader leaves and different marginal spines, and with shorter inflorescences with more numerous and densely arranged larger flowers.

D. saxatilis Mez (in A. & C. de Candolle, *Monogr. Phan.* 9: 518, 1896). **Type:** Brazil, Minas Gerais (*Schwacke* 8948 [B, F [photo]]). — **Distr:** Brazil (Minas Gerais, Bahia, Goiás, Mato Grosso); rocky fields, savanna, terrestrial or on rocks. **I:** Smith & Downs (1974: 558, 565, 568); Rauh & Gross (1988: 18, as *D. oligantha* var. *crystallina*).

Incl. *Dyckia hilaireana* Mez (1896); **incl.** *Dyckia oligantha* L. B. Smith (1958); **incl.** *Dyckia oligantha* var. *crystallina* Rauh (1988).

[3b] **Ros** symmetrical, 13–46 cm Ø, with a bulbous base densely covered with old leaf sheaths; **L** 15 × 1.1 cm, spreading-arcuate, sheath suborbicular, 4 cm wide, **L** lamina narrowly triangular, flat to slightly canaliculate, pale green abaxially, slightly ribbed, closely appressedly finely-lepidote, margins at least in the apical 1/3 laxly serrate, **Sp** slender, antrorse, 1.5–2.3 mm, 19–30 mm apart; **Inf** 40 cm, simple; peduncle very slender, ± compressed, soon glabrous; peduncular **Bra** ovate to elliptic to oblong, acuminate, shorter than the internodes, entire or upper ones minutely fimbriate; **Inf** simple, lax, to 14 cm, lepidote; floral **Bra** reflexed, broadly ovate, acuminate, equalling or exceeding the sepals, without prominent midrib, minutely fimbriate; **Fl** erect to spreading, 11 mm, orange; **Ped** very short but distinct; **Sep** broadly ovate-elliptic, ±8 mm, obtuse, minutely fimbriate, subglabrous; **Pet** erect, lamina very broadly obovate, emarginate; **St** included; **Fil** 2 mm connate above the common tube; **Anth** triangular-elliptic, subacute, slightly recurved; **Sty** 1–2 mm.

D. saxatilis forms a complex that includes, inter alia, *D. consimilis* and *D. rariflora* as well as the recently described *D. concepcionensis*, *D. ferrisicola* and *D. sulcata*.

D. schwackeana Mez (in Martius, Fl. Bras. 3 (3): 478, 1894). **Type:** Brazil, Minas Gerais (*Schwacke* 5857 [B]). — **Distr:** Brazil (S-C Minas Gerais); rocky fields.

[3b] **Ros** acaulescent, 40- to 50-leaved, slowly offsetting, with a bulbous base and a short thick rhizome; **L** inner erect, outer recurved, sheath depressedly semiorbicular, brown, **L** lamina 6 × 1.2 cm, narrowly triangular, attenuate with strongly pungent tip, appressedly cinereous-lepidote abaxially, margins very laxly serrulate, **Sp** acicular, straight or curved, to 3 mm; **Inf** to 30 cm, erect, simple; peduncle slender, to 20 cm, furfuraceous towards the apex; peduncular **Bra** ovate with linear lamina, exceeding the internodes, obscurely serrulate; fertile **Inf** part ±5 cm, few-flowered, furfuraceous; floral **Bra**

broadly ovate with narrowly triangular lamina, equalling the sepals of the lower flowers; **Fl** lowest erect, upper spreading, 11–12 mm; **Ped** 0.5–1 mm; **Sep** narrowly elliptic, to 7 mm, obtuse or apiculate, abaxially furfuraceous, with narrow pellucid margin; **Pet** to 11 mm, obovate, broadly rounded, erect with slightly flaring limb, obovate, broadly obtuse, obscurely carinate, orange; **St** deeply included; **Fil** 2 mm connate above the common tube; **Anth** short, stout, obtuse, scarcely recurved; **Ov** ellipsoid-trigonal, deeply three-sulcate; **Sty** stout, 1/5 – 1/4 as long as the ovary; **Sti** minute; **Fr** and **Se** not described.

D. secunda L. B. Smith (Phytologia 14: 487, t. 1, figs. 37–41, 1967). **Type:** Brazil, Bahia (*Irwin & al.* 14723 [NY]). — **Distr:** Brazil (Bahia); ecology not described, ±850 m.

[3b] **Ros** not described; **L** >25 × to 2.4 cm, sheath not described, **L** lamina very narrowly triangular, appressedly cinereous-lepidote on both faces but becoming ± glabrous adaxially, margins laxly serrate, **Sp** retrorsely curved, 2 mm, brown; **Inf** 90 cm, simple; peduncle very slender, glabrous; peduncular **Bra** remote, triangular, acuminate, lower ones subfoliaceous, upper ones small, subentire; fertile **Inf** part very laxly secund-flowered, to 23 cm, sparsely and fugaciously pale-lepidote; floral **Bra** acute, distinctly exceeding the pedicels (lowest), entire; **Fl** spreading; **Ped** 3 mm, cylindrical; **Sep** ovate, 7 mm, rounded, thin, brownish; **Pet** apparently rather fleshy, lamina broadly rhomboid, 12 mm, ecarinate, brown; **St** included; **Fil** short-connate above the common tube; **Sty** ±1 mm.

The laxly secund inflorescence and the brown flowers are notable.

D. secundifolia Leme (Phytotaxa 67: 31–33, iils., 2012). **Type:** Brazil, Mato Grosso (*Kranz* 129 [RB, HB]). — **Distr:** Brazil (Mato Grosso); shallow soils in depressions and crevices of sandstone rock outcrops.

[3b] **Ros** dense, 25- to 30-leaved; **L** 8–11 × 1–1.4 cm, coriaceous, sheath suborbicular, **L** lamina narrowly triangular, ± flat, suberect to ± erect and unilaterally curved, acuminate, with pungent tip, light green, adaxially

subdensely to laxly white-lepidote, abaxially subdensely white-lepidote, veined, margins glabrous, laxly to subdensely spinose, **Sp** narrowly triangular, straight or sometimes slightly antrorse, 0.5–1 mm, glabrous, pale castaneous, 4–10 mm apart; **Inf** 55–62 cm, simple, erect; peduncle ± 30 cm, reddish towards the apex, sparsely and inconspicuously white-lepidote to glabrous; peduncular **Bra** erect, obtusely if at all carinate, broadly triangular from a slightly gibbose base, long laminate to acuminate, $10\text{--}21 \times 4\text{--}7$ mm, reddish to stramineous, subdensely white-lepidote to glabrescent, veined, remotely denticulate to entire; fertile **Inf** part 14- to 22-flowered, lax, straight, 23–25 cm, rachis orange-red, subdensely but inconspicuously white-lepidote to glabrescent; floral **Bra** ovate, acuminate-caudate (lowest) to narrowly acute and apiculate (upper), suberect to \pm spreading at anthesis, ecarinate, $5\text{--}9 \times 3.5\text{--}5$ mm, orange-red, apex stramineous, subdensely and inconspicuously white-lepidote, finely veined, subentire to entire; **Fl** suberect to \pm spreading at anthesis, erect afterwards, 16–17 mm, tubular, unscented; **Ped** 2.5–3 mm, orange, sparsely white-lepidote to glabrous; **Sep** broadly ovate, $7\text{--}8 \times 6\text{--}7$ mm, emarginate, ecarinate, strongly convex, orange-red, subdensely white-lepidote to glabrous, entire, densely fimbriate; **Pet** subrhomboid-orbicular, $11\text{--}13 \times 11$ mm, obtuse-emarginate, ecarinate, orange to reddish-orange, glabrous, inconspicuously crenulate; **St** equalling the petals or slightly shorter; **Fil** 8–10 mm, 1.5–2 mm connate above the 2 mm high common tube, pale orange towards the apex; **Anth** narrowly subtriangular, 3–3.5 mm, strongly recurved at anthesis, base bilobed, apiculate; **Ov** narrowly suboblong, ± 6 mm, pale yellow; **Sty** ± 1 mm; **Sti** ± 1.5 mm, orange, minutely crenulate-lacerate.

Compared with *D. coximensis* in the protologue.

D. selloa (K. Koch) Baker (Handb. Bromel., 136, 1889). **Type:** Uruguay? (*Sellow* 3339 [B, GH, NY, US]). — **Distr:** Brazil (Rio Grande do Sul), Uruguay?; sandstone cliffs. **I:** Smith & Downs (1974: 512).

\equiv *Prionophyllum selloum* K. Koch (1874); **incl.** *Dyckia grandifolia* Baker (1889); **incl.** *Dyckia macracantha* Baker (1889); **incl.** *Dyckia myriostachya* Baker (1889).

[1] **Ros** acaulescent; **L** rigid, arching, sheath conspicuous, reniform (outer) to ovate (inner), castaneous abaxially, glossy, glabrous except abaxially near the apex, margins minutely spinose, **L** lamina to 30×3.3 cm, thinly to densely cinereous-lepidote esp. abaxially, with pungent tip, margins laxly serrate, **Sp** stout, deltoid-cuspidate, straight to retrorse, 6 mm; **Inf** > 70 cm, compound and $2\text{--}3 \times$ branched; peduncle 45–60 cm, stout, glabrous; peduncular **Bra** leaf-like, much exceeding the internodes, appressedly lepidote, margins strongly spinose; fertile **Inf** part 30 cm, glabrous, **Br** numerous, spicate, the lowest to 20 cm, those with perfect flowers lax or sometimes flowers subverticillate, those with pistillate flowers dense in the apical $\frac{1}{2}$; primary **Bra** narrowly lanceolate, attenuate, much shorter than the branches, usually entire, quickly deciduous; floral **Bra** broadly ovate, apiculate, 2–3 mm; **Fl** divergent to spreading, sessile, perfect **Fl** to 13 mm, pistillate **Fl** 6 mm; **Sep** suborbicular or broadly ovate, 5 mm (perfect flowers) or 2 mm (pistillate flowers), apiculate, together forming an urceolate structure that embraces the petals; **Pet** obovate to lanceolate, somewhat spreading, 11–12 mm (perfect flowers) or 5–5.5 mm (pistillate flowers), acute or obtuse, yellow; **St** \pm equalling the petals or slightly shorter; **Fil** free above the short common tube; **Anth** 2.5 mm or < 1 mm and sterile in pistillate flowers; **Ov** narrowly pyramidally trigonous in perfect flowers or almost globose in pistillate flowers; **Sty** slender, elongate, $2 \times$ as long as the ovary, **Sti** contorted and forming a club-shaped structure; **Fr** and **Se** not described.

D. selloa is the type species of *Prionophyllum*. The above description is largely based on Mez (1891–1892: 500–501). The dimorphic flowers (perfect, female) are notable and are described in detail by Mez, while Baker (1889) does not mention them. The only other species where similarly dimorphic flowers have been recorded is *D. maritima* Smith & Downs (1974), and it remains unknown whether other species assigned

to the “*Prionophyllum* complex” also show this characteristic.

D. sellowiana Mez (in A. & C. de Candolle, Monogr. Phan. 9: 520, 1896). **Type:** Brazil (*Sellow* Brom. Paris 52 [P, GH [photo]]). — **Distr:** Brazil (Distrito Federal, Minas Gerais); bushy fields, Campo Rupestre vegetation.

[3b] **Ros** not described; **L** $\pm 25 \times 1$ cm, sheath not described, **L** lamina narrowly triangular, with pungent tip, appressedly pale-lepidote abaxially, laxly serrate, **Sp** curved, 2 mm; **Inf** >70 cm, simple; peduncle slender, glabrous; peduncular **Bra** remote, triangular, pungent, serrulate; fertile **Inf** part lax, ± 20 cm, sparsely furfuraceous or glabrous; floral **Bra** spreading to reflexed, ovate with long triangular lamina, 8–10 mm, exceeded by the sepals, minutely puberulent; **Fl** spreading or reflexed at anthesis, 12 mm; **Ped** short but distinct, stout; **Sep** elliptic, 6.5 mm, subobtuse, glabrous; **Pet** lamina erect, obovate, broadly rounded, scarcely if at all carinate, colour not described; **St** included; **Fil** high-connate above the common tube; **Anth** subtriangular, acute, strongly recurved.

Insufficiently known, and described on the base of material without known provenance.

D. sickii L. B. Smith (Arq. Jard. Bot. Rio de Janeiro 15: 330, fig. m–q, 1958). **Type:** Brazil, Pará (*Sick* B-613 [RB, US]). — **Distr:** Brazil (Pará); on rocks. **I:** Smith & Downs (1974: 565).

[3a] **Ros** not described; **L** to 20×0.7 cm, sheath suborbicular, ± 2 cm wide, brown abaxially, soon glabrous, subdensely serrulate, **L** lamina very narrowly triangular, with pungent tip, glabrous adaxially, sulcate when dry, finely appressedly whitish-lepidote abaxially or the veins glabrous, margins laxly serrate, **Sp** slender, curved, 1.5 mm; **Inf** 45 cm, simple; peduncle erect, very slender, glabrous; peduncular **Bra** broadly ovate with a very narrow triangular lamina, very small, entire, remote; fertile **Inf** part very lax, slender, slightly flexuous, 20–22 cm, glabrous; floral **Bra** short-acuminate from a broadly ovate base, 7 mm, entire; **Fl** divergent or more often spreading; **Ped** 4 mm, cylindrical; **Sep**

broadly ovate, 5 mm, sometimes erose at the apex, ecarinate, very obscurely lepidote; **Pet** broadly obovate, 10 mm, obtusely carinate, orange-yellow; **St** very slightly exerted; **Fil** free above the common tube; **Anth** oblong, strongly curved; **Ov** slenderly pyramidal; **Sty** very short. — [F. Krapp]

D. silvae L. B. Smith (Phytologia 13: 151, t. 7, figs. 14 and 15, 1966). **Type:** Brazil, Pará (*Silva* 784 [IAN]). — **Distr:** Brazil (Pará); on rocks in “Campo” vegetation. **I:** Smith & Downs (1974: 542).

[3a] **Ros** spreading, many-leaved, acaulescent; **L** 25×2 cm, rigid, thick, sheath suborbicular, 3 cm wide, brown, nearly glabrous, **L** lamina linear-triangular, filiform-attenuate, appressedly white-lepidote, glabrous adaxially with age, margins laxly serrate, **Sp** slender, spreading, 3 mm, brown; **Inf** 66 cm, simple; peduncle erect, slender, very sparsely white-lepidote, soon glabrous; lower peduncular **Bra** leaf-like, upper broadly ovate-attenuate, small but nearly all exceeding the internodes except the uppermost; fertile **Inf** part subdensely many-flowered, 18 cm, very sparsely white-lepidote; floral **Bra** like the uppermost peduncular bracts, lowest \pm equalling the sepals, serrulate; **Ped** 3 mm, subcylindrical, thick, strongly constricted at the base and appearing articulate; **Sep** 6–7 mm, ovate, obtuse with a wide thin margin; **Pet** to 17×6 mm, broadly rounded, strongly carinate, curved-spreading, yellow; **St** completely included; **Fil** free above the short common tube; **Sty** none. — [F. Krapp]

D. simulans L. B. Smith (Arq. Bot. Estado São Paulo ser. 2, 1: 108, t. 110, 1943). **Type:** Brazil, Minas Gerais (*Foster* 570 [GH]). — **Distr:** Brazil (Minas Gerais); rocky fields, 1300 m. **I:** Smith & Downs (1974: 530).

[3a] **Ros** not described; **L** $7\text{--}8 \times 0.8\text{--}1$ cm, rigid, sheath suborbicular, large, **L** lamina narrowly triangular, with pungent tip, appressedly cinereous-lepidote, margins laxly serrate, **Sp** spreading, 2 mm; **Inf** to 30 cm, simple; peduncle slender, furfuraceous, soon glabrous; peduncular **Bra** ovate, long-acuminate, exceeding the

internodes, serrulate; fertile **Inf** part insufficiently known, probably becoming lax, 4 cm when young, densely furfuraceous; floral **Bra** broadly ovate, acute, \pm equalling the flowers (lowest), minutely serrulate; **Fl** spreading; **Ped** \pm 3 mm, stout; **Sep** broadly ovate, 9–10 mm, obtuse, cucullate; **Pet** suborbicular, slightly exceeding the sepals, reddish, glabrous; **St** included; **Fil** free above the 2 mm high common tube; **Sty** very short. — [F. Krapp]

D. sordida Baker (Handb. Bromel., 132, 1889). **Type:** Brazil, Minas Gerais (*Saint Hilaire* 402 [P, GH [photo]]). — **Lit:** Guarçoni & al. (2012). **Distr:** Brazil (Minas Gerais); rocky slopes, 1300–1400 m.

Incl. *Dyckia duarteana* L. B. Smith (1967).

[3a] **Ros** usually caespitose, 32- to 50-leaved; **L** 50 cm or longer, sheaths suborbicular, 4 cm, dark castaneous, **L** lamina very narrowly triangular, green with reddish margins, adaxially sparsely lepidote, abaxially densely or sparsely and inconspicuously lepidote, margins almost entire, **Sp** only few, 1 mm, almost obsolete; **Inf** to 1 m, simple; peduncle stout, sparsely floccose; peduncular **Bra** subfoliaceous, shorter than the internodes (upper), entire; fertile **Inf** part many-flowered, very lax, \pm 40 cm, densely ferruginous-tomentose; floral **Bra** reflexed, broadly ovate, acute, slightly shorter than the sepals; **Fl** spreading or reflexed, to 18 mm; **Ped** 3–5 (–15) mm; **Sep** broadly elliptic, 8–11 mm, obtuse, free or inconspicuously connate at the base, densely brown-ferruginously lepidote; **Pet** erect, conspicuous, limb suborbicular and slightly flaring, neither undulate nor carinate, colour not described but presumably orange; **St** included; **Fil** free above the common tube; **Anth** short, subtriangular, apiculate, scarcely recurved; **Sty** very short; ovules with narrow asymmetric wings.

The description above was completed from data presented by Büneker & al. (2016), but some doubts persist as to the pedicel length, said to be 3–5 (–15) mm long in the key on p. 58, but the illustrations on p. 64 show almost sessile flowers.

D. sordida forms a complex with *D. inflexifolia* and *D. ursina* (Guarçoni & al. 2012), as well as with *D. nobilis* (Büneker & al. 2016). These last

authors argue that other species such as *D. mello-barretoii* and *D. elata* are also similar. All species are endemic to the Serra do Espinhaço of Minas Gerais. The complex is characterized by peduncles, inflorescence axes and sepals covered with brown-ferruginous trichomes, orange petals, (sub-)triangular antepetalous filaments, and filaments free above the common tube.

D. spinulosa L. B. Smith & Reitz (Phytologia 14: 486–487, t. 1, figs. 33–36, 1967). **Type:** Brazil, Minas Gerais (*Duarte* 7409 [HB, US [photo]]). — **Distr:** Brazil (Minas Gerais); savanna, on rocks; only known from the type collection. **I:** Smith & Downs (1974: 570).

[3b] **Ros** not described; **L** 35 \times 1.6 cm, sheath suborbicular, 3 cm, pale brown, **L** lamina linear-triangular, appressedly cinereous-lepidote on both faces, becoming \pm glabrous adaxially, margins laxly serrate, **Sp** mostly retrorsely uncinata, 1 mm; **Inf** 85 cm, simple; peduncle sparsely and finely pale-lepidote; peduncular **Bra** ovate, the lower ones dense and with long linear lamina, the upper acuminate, shorter than the internodes, serrulate; fertile **Inf** part laxly many-flowered, to 27 cm, finely white-lepidote at first; floral **Bra** like the upper peduncular bracts, equalling the middle of the sepals (lowest), serrulate; **Fl** curved-ascending; **Ped** 5 mm, slender, angled, not constricted; **Sep** ovate, 7 mm, rounded and apiculate, strongly convex; **Pet** rhomboid, 10 mm, colour not described but presumably orange; **St** included; **Fil** short-connate above the common tube; **Sty** \pm none. — [F. Krapp]

D. stenophylla L. B. Smith (Phytologia 14: 487, t. 1, figs. 42–45, 1967). **Type:** Brazil, Goiás (*Irwin & al.* 9728 [US, NY]). — **Distr:** Brazil (Goiás); soil-filled rock crevices, 1175 m. **I:** Smith & Downs (1974: 575).

[3b] **Ros** dense, globose, many-leaved; **L** to 16 \times 0.5 cm, sheath suborbicular, 2 cm, brown, **L** lamina linear, finely subulate-attenuate, appressedly whitish-lepidote on both faces, soon glabrous, margins laxly serrate, **Sp** slender, recurved, 2 mm; **Inf** to 30 cm, simple; peduncle glabrous; peduncular **Bra** broadly ovate, linear-laminate (lowest) or acuminate, remote, small,

microscopically serrulate; fertile **Inf** part laxly few-flowered, to 10 cm, fugaciously white-lepidote; floral **Bra** like the upper peduncular bracts, equalling the sepals (lowest) or shorter, microscopically serrulate; **Ped** ± 1 mm, stout but distinct; **Sep** broadly ovate, 6 mm, rounded; **Pet** lamina broadly elliptic, 8–10 mm, orange; **St** included; **Fil** connate above the common tube; **Sty** none. — [F. Krapp]

D. stolonifera P. J. Braun & Esteves (Cact. Succ. J. (US) 81(6): 301, ill. (p. 303), 2009). **Type:** Brazil, Mato Grosso do Sul (Esteves Pereira 627 [UFG]). — **Distr:** Brazil (Mato Grosso); borders of rock outcrops, ± 150 m.

[3a] **Ros** with ± 19 living leaves, stem $\pm 8 \times 2.9$ cm, semi-underground, with 1–6 stolons emerging above the ground and to 16 cm long, becoming submerged, forming new rosettes 5–16 cm apart from the mother plant; **L** $\pm 38 \times \pm 2.6$ cm, rigid, coriaceous, first slightly erect, later recurved-spreading, sheath $\pm 1.8 \times 4.7$ cm, cream-coloured to brownish adaxially, brilliant dark brownish and apically lepidote abaxially, **L** lamina triangular-lanceolate, olive-green to dark purple-greenish, concave, with blunt yellowish tip, densely veined, adaxially slightly glossy and sparsely lepidote, abaxially greyish-lepidote, **Sp** predominantly retrorse, ± 2.7 mm, \pm cream at the base, dark brown at the tip, 4.3–16 mm apart; **Inf** to 95 cm, simple, erect; peduncle ± 55 cm, pale greyish-green with a brownish hue; peduncular **Bra** hard, carinate, amplexicaul (upper ones semi-amplexicaul), lower ones to 21×8 mm, adaxially scattered-lepidote, veined, margins cream, membranous; fertile **Inf** part slightly contorted, ± 24 cm, rachis rose to reddish, \pm glabrous; floral **Bra** $\pm 4 \times 2.3$ mm, rose, brilliant; **Fl** spreading to erect, ± 20 mm, subsessile; **Sep** elongate-oval, 8–12 \times 7.2 mm, succulent, carinate, reddish-orange, margins pale; **Pet** $\pm 17 \times 11$ mm, abaxially orange, basally more reddish, margins delicately yellow; **St** exserted; **Fil** free above the 5 mm high common tube, erect, to 15 mm, white-yellowish; **Anth** yellow, slightly triangular, 4–5 \times 1.4 mm, acute, recurved; **Ov** slightly triangular-elongate, $\pm 7 \times 2$ mm, white with a very pale yellowish hue; **Sty**

± 1 mm, **Sti** complex, ± 2.9 mm, apex fringed, yellow; **Fr** glossy dark brownish.

D. strehliana H. Büneker & R. Pontes (Revista Brasil. Bioci. 11(3): 284–289, figs. 1–2, 2013). **Type:** Brazil, Rio Grande do Sul (Büneker & al. 101 [HDCF, SMDB, SP]). — **Distr:** Brazil (Rio Grande do Sul); basaltic river banks, periodically flooded.

[2/3a] **Ros** 16- to 54-leaved, 8–19 cm \varnothing , rhizomatous; **L** 6–15 \times 1.1–2.6 cm, rigid, succulent, sheath elliptic to orbicular, 2–3.5 \times 2.5–4.4 cm, white, both faces glossy, **L** lamina triangular, straight or inflexed, with reddish pungent tip, veined abaxially, usually entire, rarely spinose with 1–10 spines per margin; **Inf** 35–120 cm, simple or rarely with 1–4 suberect branches; peduncle erect, slender, 19–60 cm, tomentose; peduncular **Bra** leaf-like, ovate to elliptic, longer (lower) to shorter than the internodes (upper); fertile **Inf** part 13- to 34-flowered (40–60 when branched), 18–40 cm, rachis white-tomentose; floral **Bra** ovate-triangular, slightly carinate, apex attenuate, 11–16 \times 6–11 mm, stramineous; **Fl** suberect at anthesis, ± 20 mm; **Ped** absent or short; **Sep** ovate to elliptic, 8–10 \times 4–8 mm, ecarinate to slightly carinate, yellow or green, tomentose; **Pet** erect, obovate to obtrullate, 14–18 \times 6–11 mm, yellow; **St** included or equaling the petals; **Fil** shortly connate above the common tube; **Ov** $\pm 5 \times 3$ mm, whitish-yellow; **Fr** 15–20 mm.

Similar to *D. brevifolia* and *D. distachya*. Plants are periodically flooded in their native habitat.

D. subinermis Mez (in Martius, Fl. Bras. 3(3): 487, 1894). **Type:** Argentina, Misiones (*Niederlein* 1205 [B, F [photo]]). — **Distr:** N Argentina (Misiones); ecology not described.

[3a] **Ros** acaulescent, densely leaved; **L** to 20 \times 7 cm (inner ones) or wider, sheath broad, dark brown, glabrous, **L** lamina linear, attenuate, subdensely closely appressedly pale-lepidote abaxially, entire or very laxly serrate, **Sp** few, 0.5 mm; **Inf** 50 cm, simple; peduncle rather stout, puberulous towards the apex; peduncular **Bra** long-acuminate from a broadly ovate base,

to 2 cm, shorter than the internodes, entire; fertile **Inf** part lax, puberulous-lepidote; floral **Bra** reflexed, ovate, acuminate, 7 mm, much shorter than the sepals, entire; **Fl** erect, 18 mm, glabrous; **Ped** 4 mm, stout, angled, articulate; **Sep** ovate, 9.5 mm, rounded and mucronate; **Pet** suberect, suborbicular, 17 mm, rounded at the apex, undulate, carinate, yellow when dry; **St** included; **Fil** free above the common tube; **Anth** narrowly triangular, strongly recurved; **Sty** none and **Sti** sessile, strongly spirally contorted; **Fr** subellipsoid-trigonal, $\pm 15 \times 6$ mm, glossy brown, acute; **Se** 2×3 mm, basally somewhat acute, apically broadly rounded, with hyaline wing.

D. sulcata Guarçoni (Phytotaxa 188(3): 170–172, ill., 2014). **Type:** Brazil, Minas Gerais (*Guarçoni & Paixão* 1663 [VIC]). — **Distr:** Brazil (Minas Gerais: Serro); in sand on quartzitic rock outcrops, 1000 m; only known from the type locality.

[3a] **Ros** 20–43 cm \emptyset ; **L** 10–27, asymmetrically spreading-arcuate to erect, sheath suborbicular, $1.5\text{--}4.3 \times 2.3\text{--}6.7$ cm, white to cream, upper $\frac{1}{3}$ of the abaxial face white-lepidote and inconspicuously aculeate, **L** lamina very narrowly triangular, $9.9\text{--}17.8 \times 0.9\text{--}1.4$ cm, flat to shallowly canaliculate, very succulent and rigid, green, or basally rarely wine-red on the upper face, upper face sparsely white-lepidote in the lower $\frac{1}{2}$, lower face strongly ribbed and densely white-lepidote at the base esp. between the ribs, apex acute and pungent, margins spinose except the apical $\frac{1}{3}$, **Sp** patent to slightly retrorse, dark brown, 0.7–1.4 mm, 10–20 (–26) mm apart; **Inf** (24–) 38–62 (–71) cm, simple, erect; peduncle 16–48 cm, green to brown, white-lepidote; peduncular **Bra** shorter than the internodes, lower $8\text{--}60 \times 1\text{--}9$ mm, upper $6\text{--}14 \times 4\text{--}8.6$ mm, ovate, long-acuminate, spine-tipped, carinate, abaxially white-tomentose; fertile **Inf** part laxly 5- to 18-flowered, rachis orange, white- to cinereously tomentose becoming glabrous; floral **Bra** reaching to the middle of the sepals, ovate-triangular and long-acuminate, spine-tipped, $3.8\text{--}7.8 \times 2.8\text{--}5.9$ mm, orange to stramineous with green base, white-tomentose, fimbriate; **Fl** 14–19 mm, slightly reflexed or rarely patent, \pm tubular with flaring mouth; **Ped** 2.4–6.4 mm,

stout, orange, white-tomentose; **Sep** triangular to ovate, $5.9\text{--}8.9 \times 4.4\text{--}6.9$ mm, orange, fleshy, obtuse to acute, white-lepidote, fimbriate; **Pet** obovate to somewhat obtrullate, $9.7\text{--}13.1 \times 6.7\text{--}10.6$ mm, orange, obtuse to slightly emarginate, crenulate; **St** included; **Fil** yellow, to 9.5 mm, free above the 1.6–3.3 mm long common tube; **Anth** elliptic; **Ov** oblong, orange, 5.3–10.3 mm; **Sty** orange, 0.9–2.1 mm; **Sti** conduplicate-spiral, 0.6–0.7 mm, yellow; **Fr** ovoid, dark brown, $11.4\text{--}13.7 \times 9.2\text{--}10.3$ mm; **Se** not described.

Part of the *D. saxatilis* complex, and compared with *D. saxatilis* and *D. brachyphylla* (both with symmetrical rosettes and leaves without spines in the apical $\frac{1}{3}$). — [U. Eggli]

D. tenebrosa Leme & H. Luther (Selbyana 19 (2): 183–184, fig. 1, 1998). **Type:** Brazil, Minas Gerais (*Leme & al.* 2895 [HB, SEL]). — **Distr:** Brazil (Minas Gerais); rocky fields, terrestrial, 1000–1300 m.

[3a] **Ros** not described; **L** $\pm 14 \times \pm 1.5$ cm, rigid, thick, sheath not described, **L** lamina spreading-recurved, very narrowly triangular, attenuate towards the involute-subulate apex, acuminate-caudate, green to reddish, adaxially glabrous, abaxially densely white-lepidote and veined, margins laxly spinose, **Sp** retrorse, uncinate, 1.5–2 mm; **Inf** 30–40 cm, simple, erect; peduncle 20–30 cm, yellowish-green, subdensely white-floccose; peduncular **Bra** linear-triangular from a broadly ovate base, long-acuminate, erect, distinctly carinate, $10\text{--}20 \times 7$ mm, green at the base, reddish at the apex, veined, white-floccose to glabrescent, remotely denticulate-crenulate, apical ones like the floral bracts; fertile **Inf** part 4- to 9-flowered, lax, ± 9 cm, slender, flexuous, completely white-sublanate at anthesis except the petals; floral **Bra** broadly ovate-triangular, subcarinate, acuminate-caudate (lowest) to shortly acuminate (upper), $6\text{--}10 \times 5\text{--}8$ mm, veined, entire but upper ones remotely denticulate near the apex; **Fl** suberect to spreading at anthesis, ± 16 mm; **Ped** 2–3 mm, stout; **Sep** ovate, $7\text{--}8 \times 5$ mm, apex narrowly obtuse, ecarinate, fimbriate, reddish-green, entire; **Pet** broadly spatulate, $\pm 12 \times 9$ mm, narrowly obtuse, base very narrow, ecarinate, subspreading at anthesis,

reddish-brown to wine-red with orange base, glabrous; **St** included; **Fil** free above the 2 mm high common tube, ± 6 mm, pale orange; **Anth** very narrowly triangular, ± 2.5 mm, strongly recurved, base sagittate, acuminate; **Ov** narrowly subpyramidal, ± 5 mm, green; **Sty** 2–4 mm, yellow; **Sti** elliptic, ± 1 mm, wine-red; **Fr** and **Se** not described.

Similar to *D. machrisiana* and compared with *D. oligantha* as well as *D. hilaireana* (here both treated as synonyms of *D. saxatilis*).

D. tenuis Mez (in Martius, Fl. Bras. 3(3): 484, 1894). **Type:** Brazil, Goiás (*Gardner* 3479 [BM, K]). — **Distr:** Brazil (Goiás, Mato Grosso); ecology not recorded.

Incl. *Dyckia morreniana* Mez (1894); **incl.** *Dyckia kuntzeana* Mez (1896).

[2/3a] **Ros** not described; **L** 20–40 \times 1.5–1.7 cm, sheath small, **L** lamina narrowly triangular, attenuate, with pungent tip, appressedly pale-lepidote abaxially, margins laxly serrate, **Sp** slender, spreading to spreading-reflexed, 1.5–2 mm; **Inf** 40–50 cm, simple or racemose; peduncle slender, minutely furfureaceous or soon glabrous; lower peduncular **Bra** subfoliaceous, upper ones \pm as long as the internodes and entire or sparsely serrulate; fertile **Inf** part few-flowered, lax, minutely furfureaceous; floral **Bra** divergent to spreading, (broadly) ovate with narrowly triangular tips, usually \pm equalling the flowers (lower), entire; **Fl** erect or suberect, 10–12 mm; **Ped** to 3 mm, stout; **Sep** ovate-elliptic, 6–7 mm, acute or obtuse, glabrous or subglabrous; **Pet** lamina suberect, broadly acute or obtuse, reddish; **St** exserted; **Fil** free above the common tube; **Anth** recurved; **Sty** very short or none.

Described on the base of incomplete material, and insufficiently known.

D. tobatiensis Hassler (Annuaire Conserv. Jard. Bot. Genève 20: 309, 1919). **Type:** Paraguay, Cordillera (*Hassler* 2099 [G, F [photo]]). — **Distr:** C Paraguay (Cordillera); denuded hill slopes.

[1] **Ros** not described; **L** 40–50 \times 3 cm, thickly fleshy-coriaceous, sheath not described, **L** lamina narrowly triangular, both faces shortly brownish-

furfureaceous-lepidote, margins strongly serrate, **Sp** antrorsely curved, strong, 6–8 mm, wholly lepidote; **Inf** to 95 cm, paniculately branched; peduncle 50–80 cm, glabrous; peduncular **Bra** much shorter than the internodes; fertile **Inf** part glabrous, **Br** 4–5, laxly flowered, divergent, 15 cm; primary **Bra** ovate, mucronulate, 10 mm; floral **Bra** subreflexed, triangular-ovate, apiculate, to 5 mm, \pm equalling or shorter than the pedicels; **Fl** ± 17 mm; **Ped** 4–5 mm; **Sep** ovate, 6.5 mm, evenly rounded at the apex; **Pet** subrhomboid-ovate, 17 \times 8 mm, obscurely carinate, golden-yellow; **St** equalling or slightly exceeding the petals; **Fil** free above the common tube; **Anth** narrowly elliptic, 3.5 \times 1.5 mm, acute, barely recurved; **Ov** pyramidal, 10 mm; **Sty** exserted; **Sti** globose, contorted.

D. tomentella Mez (Repert. Spec. Nov. Regni Veg. 16: 69, 1919). **Type:** Paraguay (*Fiebrig* 4046 [B, GH]). — **Distr:** N Paraguay (Presidente Hayes?, Amambay?); ecology not recorded.

[3a] **Ros** and **L** not described; **Inf** > 80 cm, simple; peduncle erect, very slender, 60 cm; peduncular **Bra** acuminate from a very broadly ovate base, much shorter than the internodes, prominently striate, entire; fertile **Inf** part rather few-flowered, sublax, straight, 20 cm, appressedly cinereous-lepidote; floral **Bra** subspreading, very broadly ovate, 7 mm, apiculate, not much shorter than the sepals, entire; **Fl** suberect to erect, subsessile; **Sep** very broadly elliptic, 6 mm, rounded and emarginate at the apex; **Pet** erect, claws very short, lamina very broadly trapeziform-orbicular, to 10 mm, very broadly rounded and slightly emarginate, ecarinate, golden-yellow, with minutely undulate margins; **St** 2 mm longer than the petals; **Fil** broad, free above the common tube; **Sty** very short.


The original description is based on very incomplete material. Tropicos (accessed Dec. 2016) lists two recent collections from Paraguay, whose collection notes report caespitose rosettes and yellow flowers.

D. trichostachya Baker (Handb. Bromel., 133, 1889). **Type:** Brazil, Minas Gerais (*Sellow* Brom. Paris 59 [P, GH [photo]]). — **Distr:** Brazil

(Minas Gerais); rocky fields, terrestrial or on rocks. **I:** Smith & Downs (1974, 523).

Incl. *Dyckia micracantha* Baker (1889).

[2] **Ros** not described; **L** 50 × >2 cm, sheath not described, **L** lamina narrowly triangular, densely lepidote esp. abaxially, margins laxly serrate, **Sp** 1.5 mm; **Inf** to 1.3 m, few-branched at the base or pseudo-simple with branch buds in the axils of the lower bracts; peduncle stout, 100 cm, soon glabrous; peduncular **Bra** broadly ovate with narrowly triangular acuminate lamina, exceeding the internodes, serrulate; fertile **Inf** part 30 cm, sparsely ferruginous-tomentose; primary **Bra** much shorter than the branches; floral **Bra** broadly ovate, acute, lower ones equalling or exceeding the flowers and serrulate; **Fl** suberect to spreading, 12–13 mm; **Ped** short, stout; **Sep** broadly elliptic, 7–12 mm, obtuse, ± glabrous; **Pet** erect, suborbicular, ecarinate, colour not described; **St** included; **Fil** free above the common tube; **Anth** linear, slightly recurved; **Sty** very short. — [F. Krapp]

D. tuberosa (Vellozo) Beer (Fam. Bromel., 157, 1857). **Type:** Brazil (*Vellozo* s.n. [[]: Vellozo, Fl. Flumin. Icon. 3: t. 136, 1835]). — **Lit:** Vosgueritchian & Buzato (2006: ecology, with ill.). **Distr:** Brazil (Minas Gerais, Paraná, São Paulo, Santa Catarina); dry fields and open scrub, Cerrado vegetation, 800–1300 m. **I:** Smith & Downs (1974: 565); Reitz (1983: t. 52).

≡ *Tillandsia tuberosa* Vellozo (1829); **incl.** *Dyckia coccinea* Mez (1894).

[3a] **Ros** many-leaved, with bulbous base, acaulescent, slowly caespitose; **L** 15–50 × ±1 cm, erect to spreading, sheath broadly ovate or suborbicular, large, persistent and forming a bulb, **L** lamina straight to ± curved, narrowly triangular, abruptly acute and pungent, usually involute, glabrous adaxially, appressedly pale-lepidote abaxially, laxly and evenly serrate, **Sp** curved, dark; **Inf** 35–100 cm, simple; peduncle slender, lepidote or glabrescent; peduncular **Bra** erect, broadly ovate with narrowly triangular thick lamina, much shorter than the internodes (upper), serrulate; fertile **Inf** part lax, few- to many-flowered, ± glabrous; floral **Bra** spreading or reflexed, lancolate-triangular, acuminate, usually

shorter than the sepals, serrulate; **Fl** spreading to slightly downwards-pointing at anthesis, broadly tubular, erect in fruit; **Ped** 2–3 mm; **Sep** ovate, 5–7 mm, acute or obtuse, strongly convex; **Pet** claw broad, lamina suberect, broadly obovate, 9–14 mm, carinate-complicate, reddish or orange; **St** included; **Fil** free above the common tube; **Anth** narrow, recurved; **Ov** ±5 mm, narrowly pyramidal; **Sty** ±1 mm; **Sti** contorted.

Vosgueritchian & Buzato (2006) found 3 species of hummingbirds as pollinators of the flowers. The inflorescences are also visited by several species of ants. Only ±55% of the plants of the study population in São Paulo State flowered, and asexual reproduction appears to be important.

D. tubifilamentosa Wanderley & G. Sousa (Hoehnea 41(2): 315–319, figs. 1–2, 2014). **Type:** Brazil, Piauí (*Wanderley & al.* 2630 [SP, TEPB]). — **Distr:** Brazil (Piauí); rocky soil or rock outcrops in Caatinga and transitions to Cerrado vegetation.

[3b] **Ros** in small clumps or solitary; **L** distichous or secund, 13–17 cm, sheath broad, oval, 2–2.5 × 3–4 cm, fleshy, whitish to greenish, entire, **L** lamina straight to curved, narrowly triangular with mucronate tip, green or brownish to vinaceous, cinereous-lepidote, strongly spinose, **Sp** 1–2 mm, brown and brittle, erect to retrorse; **Inf** 22–58 cm, simple; peduncle 10–50 cm, green to vinaceous, glabrous; lowest peduncular **Bra** subfoliaceous, creamy-green, entire, the remaining peduncular **Bra** 20 × 8–20 mm, shorter than the internodes, ovate to filiform, apex attenuate, reddish-brown, entire; fertile **Inf** part lax, 2- to 10-flowered, secund or rarely distichous, slender, slightly geniculate; floral **Bra** ovate, apex caudate, 3–5 mm, green to reddish-brown, entire; **Fl** sessile to subsessile, 28–32 mm; **Sep** ovate, 8–11 mm, apiculate, green with translucent dots and dark reddish wrinkles at the base, entire; **Pet** oblong-lanceolate, 17–20 mm, acute, slightly cucullate, green or with dark reddish wrinkles at the apex, entire; **St** exerted, 20–28 mm; **Fil** entirely connate above the common tube, white becoming vinaceous to purplish; **Anth** sagittiform, connivent, divergent after anthesis, 5–6 mm,

creamy-yellow; **Ov** ± 10 mm; **Sty** ± 11 mm; **Sti** spirally-conduplicate; **Fr** 14×9 mm, brown; **Se** (round-) ovoid to falciform, 4.2×2.5 mm, light to dark brown, with corky wings.

Unique in the genus by having small green petals, and a long-exserted white staminal tube that becomes wine-red to purplish after anthesis. The spirally-conduplicate stigma lobes, as well as petal colour, are reminiscent of species of *Encholirium*.

D. tweediei Mez (in Martius, Fl. Bras. 3(3): 485, 1894). **Type:** Argentina, Santiago del Estero (*Tweedie* s.n. [K]). — **Distr:** N Argentina (Santiago del Estero, Salta); terrestrial or on rocks.

[3a] **Ros** acaulescent; **L** $50 \times \pm 1.5$ cm or longer, sheath broad, thick, dark brown, **L** lamina narrowly triangular, rigid, canaliculate, densely pale-lepidote abaxially, margins subdensely serrate, **Sp** slender, 2 mm; **Inf** 1 m or more, simple; peduncle slender, subglabrous; peduncular **Bra** very broadly ovate, abruptly acute, much shorter than the internodes, entire; fertile **Inf** part rather lax, subsecund, tomentellous-lepidote; floral **Bra** subspreading, broadly ovate, to 6 mm, abruptly acute or subrounded, shorter than the sepals; **Fl** ascending or the uppermost erect, 19 mm, subsessile; **Sep** elliptic-ovate, to 8 mm, incised-emarginate, lepidote-tomentellous; **Pet** erect, broadly obovate, 15–16 mm, rounded, ecarinate, \pm undulate, yellow; **St** exserted; **Fil** free above the common tube; **Anth** triangular, acute, slightly recurved; **Ov** narrowly bottle-shaped, with six longitudinal furrows; **Sty** thick, $\frac{1}{2}$ as long as the ovary; **Sti** with 3 free spreading lobes; **Fr** not described.

D. uleana Mez (in A. & C. de Candolle, Monogr. Phan. 9: 517, 1896). **Type:** Brazil, Goiás (*Ule* 3134 [Herb. Taubert \dagger ?, B]). — **Distr:** Brazil (Goiás); ecology not recorded.

[3b] **Ros** not described; **L** $\pm 50 \times 3.5$ cm, lamina narrowly triangular, with pungent tip, densely pale-lepidote abaxially, margins densely finely serrate, **Sp** to 2 mm; **Inf** ± 1 m, simple; peduncle stout, furfuraceous-lepidote; peduncular **Bra** broadly ovate, acuminate, with pungent tip, much shorter than the internodes, entire; fertile

Inf part subdense but interrupted at the base, densely ferruginous-lepidote; floral **Bra** spreading or reflexed, ovate, acuminate to acute, to 10 mm, equalling or shorter than the sepals; **Fl** somewhat erect to divergent, to 13 mm, subsessile; **Sep** broadly ovate-elliptic, 7 mm, obtuse, abaxially densely tomentose; **Pet** suberect, rhomboid, subobtuse, carinate, colour not described; **St** included; **Fil** high-connate above the common tube; **Anth** linear, subacute, recurved; **Sty** very short; **Fr** not described.

Compared with *D. edwardii* in the protologue of the latter, and description completed from the tabular comparison.

D. ursina L. B. Smith (Arq. Bot. Estado São Paulo 2(1): 109, t. 111, 1943). **Type:** Brazil, Minas Gerais (*Foster* 636 [GH]). — **Lit:** Büneker & al. (2016: with ill.). **Distr:** Brazil (Minas Gerais: Serra do Cipó); dry open rocky ground, 1100–1400 m; only known from a single population. **I:** Smith & Downs (1974: 517).

[2/3a] **Ros** usually solitary; **L** usually arching and secund, to $60 \times 3\text{--}3.5$ cm, sheath suborbicular, glabrous towards the base, laxly serrulate, **L** lamina very narrowly triangular, margins very laxly serrate, **Sp** slender, curved, 3 mm, lepidote basally, glabrous elsewhere; **Inf** > 1 m, simple or few-branched; peduncle stout, brown-lanate; peduncular **Bra** erect, subfoliaceous (lower) to narrowly triangular (upper), longer or shorter than the internodes; fertile **Inf** part sub-laxly flowered, very densely dark brown-lanate throughout; floral **Bra** broadly ovate, 8–20 mm, short-acuminate, the lower \pm equalling the sepals, entire; **Fl** spreading, (sub-) sessile; **Sep** elliptic, to 15 mm, acute, margins wholly obscured by the brown-lanate indumentum; **Pet** narrowly elliptic and without a distinct claw, only slightly exceeding the sepals, orange, lanate abaxially; **St** included; **Fil** free above the short common tube; **Sty** simple, very short.

The inflorescences are conspicuously densely brown-lanate and typical for the *D. sordida* complex (Büneker & al. 2016).

D. velascana Mez (in Martius, Fl. Bras. 3(3): 476, 1894). **Type:** Argentina, La Rioja (*Hieronymus*

& *Niederlein* 66 [B, CORD]). — **Distr:** N to N-C Argentina (Catamarca, Córdoba, La Rioja, San Luis, San Juan, Tucumán, Jujuy, Salta); rocky slopes, 750–3000 m. **I:** Smith & Downs (1974: 544); Subils (2009: 348).

[1] **Ros** offsetting, forming dense colonies; **L** 23–50 × 4 cm, spreading, sheath suborbicular, 5 cm, pale, **L** lamina narrowly triangular, appressedly pale-lepidote abaxially, margins spinose, **Sp** antrorsely uncinata, 4 mm; **Inf** to 1 m, paniculate, lax; peduncle 60–70 cm, erect, lepidote; peduncular **Bra** erect, broadly ovate, lowest narrowly triangular and serrulate, apical ones apiculate, much shorter than the internodes; **Inf** branches very densely flowered, short; primary **Bra** cinereous-lepidote-pubescent, shorter than the sterile branch base; floral **Bra** reflexed, acuminate from a broadly ovate base, to 5 mm, puberulous; **Fl** subsessile, spreading, to 14 mm; **Sep** ovate, to 8 mm, rounded and mucronulate, glabrous and lustrous with a ferruginous-puberulous base; **Pet** erect, subreniform, 10–12 mm, broadly rounded and minutely emarginate, not undulate, ecarinate, sulphur-yellow; **St** exserted; **Fil** free above the common tube; **Anth** sublinear, acute; **Ov** ±6 mm, oblong and narrowly pyramidal; **Sty** 0.5 mm; **Se** ±2.5 mm, with a circular wing.

No other species of the genus reaches similarly high altitudes.

D. velloziifolia Mez (Repert. Spec. Nov. Regni Veg. 16: 70, 1919). **Type:** Paraguay, Caaguazú (*Hassler* 9576 [B]). — **Distr:** SE Paraguay (Caaguazú); campos.

[3a] Only known from fragmentary material; **Ros** dense; **L** to 12 × 0.4 cm, lamina first erect, then irregularly curved-spreading, subulate to acicular, glabrous, entire or older ones with a few minute **Sp** basally; **Inf** to 50 cm, simple (?); peduncle stout, length not described but much exceeding the leaves, glabrous; peduncular **Bra** very broadly ovate, acuminate, all short-laminate, much shorter than the internodes; fertile **Inf** part very lax at least at the base, stout, glabrous; floral **Bra** like the peduncular bracts but with shorter lamina, suberect to erect, to 12 mm, exceeding the flowers, violet-tinged when dry; **Fl** erect, to

11 mm; **Ped** short; **Sep** very broadly elliptic, 6 mm, rounded and with a few teeth at the apex, submembranous; **Pet** erect, broadly rounded and slightly emarginate, ecarinate, lemon-yellow; **St** much shorter than the petals; **Fil** free above the very short common tube, very broad and almost foliaceous; **Sty** very stout.

D. vestita Hassler (Annuaire Conserv. Jard. Bot. Genève 20: 315, 1919). **Type:** Paraguay, Concepción (*Fiebrig* 5311 [G, F [photo]]). — **Distr:** Paraguay (Concepción); campos.

[1/2?] Only known from fragments; **Ros** and **L** unknown; **Inf** with 7 branches, >60 cm, **Bra** erect or suberect, subaxly flowered, to 30 cm, fulvous-tomentose; primary **Bra** ovate, acuminate, fulvous-tomentose; floral **Bra** ovate, acuminate, to 11 mm, equalling the sepals, fulvous-tomentose; **Fl** erect to spreading, to 20 mm, subsessile; **Sep** oblong-ovate, 11 mm, rounded at the apex, tomentose; **Pet** ovate, 18 mm, subacute, erect, ± carinate, pale yellow; **St** equalling the petals; **Fil** 3.5 mm (to completely?, Pinangé & al. (2017: fig. 3)) connate above the common tube; **Anth** linear, acute, sagittate at the base, strongly recurved; **Ov** pyramidal, 13 mm; **Sty** none. — [F. Krapp]

D. vicentensis Strehl (Bromeliaceae 42(5): 13–15, figs. 10–13, 2009). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1375 [HAS]). — **Distr:** Brazil (C-W Rio Grande do Sul: São Vicente do Sul); on rocks.

[2/3] **Ros** acaulescent, 30- to 40-leaved, 20–25 cm Ø; **L** 8–12 × 1–1.3 cm, recurved to spreading, tough, sheath broad, 1 × 4 cm, white, bright, glabrous, **L** lamina green, sometimes reddish basally, with pungent tip, glabrous and shiny adaxially, cinereous-lepidote abaxially, sometimes densely white-lepidote basally, marginal **Sp** slightly hooked, predominantly retrorse, 2 mm, with brown tip and green base, ±5 mm apart; **Inf** 70–100 cm, simple or rarely branched; peduncle erect, green to reddish, white-lepidote and lanate; peduncular **Bra** long-triangular, asymmetrical, few, concentrated at the base of the stem; primary **Bra** narrowly linear to subtriangular from an ovate base, lower ones longer than the

internodes, veined, slightly serrate, upper ones shorter and \pm inflated and scale-like; floral **Bra** spreading, ovate, acute, never pungent, curved, carinate, longer than the sepals, 10–15 mm, slightly reddish, chaffy-lepidote, entire; **Fl** spreading at anthesis, later erect, 18–20 mm, tubular; **Ped** 3–5 mm; **Sep** oval, 8–10 mm, narrowly marginate, base inflated, ecarinate, appressed to the petals, acute, obtuse to apiculate, orange-reddish; **Pet** free, lamina broad, 18–20 mm, ecarinate, apex roundish, yellow to reddish; **St** included; **Fil** erect, 13 mm, orange-yellow, “joined at the base” according to the protologue but degree of connation with the common tube not described; **Anth** 4 mm, linear, yellow; **Ov** ± 5 mm; **Sty** ± 5 mm; **Sti** 7 mm.

D. virgata Mez (Repert. Spec. Nov. Regni Veg. 16: 68, 1919). **Type:** Paraguay, Presidente Hayes (*Rojas* 46 [B]). — **Distr:** C Paraguay (Presidente Hayes); ecology not recorded. **I:** Smith & Downs (1974: 542).

[3b] Only known from fragments; **Ros** unknown; **L** 120 \times 2.5 cm, coriaceous, lamina attenuate to a slenderly subulate apex, subglabrous, margins densely serrate basally, laxly serrate elsewhere, **Sp** acicular, 1.5 mm; **Inf** >30 cm, simple (?), slenderly virgate, very laxly many-flowered, slender, all parts including bracts, pedicels and sepals brownish-tomentellous, glabrescent; floral **Bra** reflexed, ovate, broadly acute, strongly convex, 4 mm, much shorter than the sepals, entire; **Fl** suberect to subspreading, slender, orange when dry, subsessile; **Sep** broadly elliptic, ± 5 mm, rounded and emarginate; **Pet** erect, 13 mm, broadly subacute, ecarinate; **St** exserted; **Fil** high-connate above the common tube; **Sty** short. — [F. Krapp]

D. waechteri Strehl (Bromeliaceae 42(5): 15–17, figs. 14–19, 2009). **Type:** Brazil, Rio Grande do Sul (*Strehl* 1086 [HAS]). — **Distr:** Brazil (C-W Rio Grande do Sul: São Francisco de Assis); on rocks.

[1?] **Ros** with ± 40 living leaves, to 40 cm \varnothing , caulescent; **L** 33–38 \times 2–2.3 cm, flexuous, long and acute, sheath 3–3.2 \times 2.5–2.7 cm, white, white-lepidote, serrate, **L** lamina arching, with

slightly pungent tip, light green, glabrous adaxially, white-lepidote abaxially, **Sp** antrorse, 3–4 mm, light green with castaneous tip, 10–15 mm apart; **Inf** 1.6–1.7 m, compound or rarely simple; peduncle elliptical in cross section, furfureous to glabrous, brittle, 1.5–1.6 m, green, covered with white powder; peduncular **Bra** amplexicaul, narrowing abruptly, long-acuminate from a wide base, membranous, green at the base, serrate, drying from the tip; fertile **Inf** part lax, reddish-white; **Br** 3–6, at acute angles, 30–70 cm; floral **Bra** triangular, acute, mucronate, 8–10 \times 5–8 mm, base green, apical $\frac{1}{2}$ becoming brown, drying quickly, slightly lepidote; **Fl** erect to subspreading, 20 mm, sessile; **Sep** obovate and roundish, 8–11 \times 8–11 mm, mucronate, sometimes crenate at the apex, carinate, free in the upper $\frac{1}{2}$, green, turning yellow basally and orange or rose towards the apex, thick-textured; **Pet** obovate-rounded, 16–18 \times 5–8 mm, erect and quite recurved, thick-textured, orange-rose; **St** becoming visible in the throat; **Fil** free above the common tube, yellowish; **Anth** orange; **Ov** 6–7 mm; **Sty** 6 mm, orange; **Fr** 18–20 \times 12–15 mm, dark brown, shiny; **Se** discoid, 3 \times 5 mm, 1 mm thick, with a lateral wing. — [F. Krapp]

D. walteriana Leme (Phytotaxa 67: 33–35, ill., 2012). **Type:** Brazil, Paraná (*Kranz* 13 [RB, HB]). — **Distr:** Brazil (Paraná); on almost horizontal granitic rock outcrops; known from a single population only.

[1] **Ros** dense, ± 50 -leaved, propagating by basal shoots; **L** 75–90 \times 3–3.4 cm, ± 5 mm thick, stiffly succulent, sheath inconspicuous, **L** lamina narrowly triangular, attenuate and slightly canaliculate towards the pungent apex, suberect-arcuate, acuminate, green, abaxially finely veined, densely white-lepidote, margins laxly spinose, **Sp** narrowly triangular, predominantly antrorse-uncinate, 3–10 mm, densely white-lepidote, with castaneous tip, 15–25 mm apart; **Inf** ± 2.1 m, broadly 2 \times branched; peduncle erect, ± 80 cm, greenish-purple, subdensely to sparsely pale castaneous-lanate and densely covered with white wax; peduncular **Bra** narrowly triangular, acuminate and spinescent, stramineous,

canaliculate towards the apex, 60–110 × 20–25 mm, subdensely white-lepidote, veined, densely spinulose; fertile **Inf** part dense, ±120 cm, rachis straight to slightly flexuous, greenish-purple, subdensely pale castaneous-lanate to glabrous and densely covered with white wax; **Br** ±12, laxly arranged, densely 100- to 140-flowered, 40–60 cm, with a 4–8 cm long sterile base, straight, greenish to greenish-purple, densely castaneous-lanate, soon glabrous and densely covered with white wax, terminal part of the main axis not distinct from the branches; primary **Bra** like the upper peduncular bracts, subspreading, 30–50 × 10–20 mm; floral **Bra** triangular-ovate to broadly triangular, acute, shorter than the sepals, 3–5 × 3–4 mm, stramineous, densely castaneous-lanate, veined; **Fl** subverticillate, ± spreading, 16–17 mm, broadly campanulate, unscented; **Ped** ±1 mm, green, densely castaneous-lanate; **Sep** orbicular, 3.5–5 × 4–5 mm, obtuse-emarginate, ecarinate, strongly convex, greenish, obscurely castaneous-lanate, entire; **Pet** elliptic to oblong-elliptic, 12 × 6–7 mm, obtuse-emarginate, ecarinate, yellow, glabrous; **St** exerted at anthesis; **Fil** free above the 1–2 mm high common tube, 11–12 mm, yellow; **Anth** suboblong, ±3 mm, slightly recurved at anthesis, base bilobed, acute; **Ov** narrowly ovoid, ±6–7 × 3 mm, yellow; **Sty** 5–7 mm, yellow, **Sti** ±1 mm, yellow, margins crenulate; **Fr** subglobose, acute, 14 × 10 mm, dark castaneous, glossy; **Se** subtriangular, strongly complanate, ±3 × 2 mm.

Compared with *D. agudensis* and *D. selloa* in the protologue.

D. warmingii Mez (in Martius, Fl. Bras. 3(3): 481, 1894). **Type:** Brazil, Minas Gerais (*Warming* s.n. [C, F [photo]]). — **Distr:** Brazil (C Minas Gerais: Lagoa Santa); savanna, terrestrial.

[3b] Only known from fragments; **Ros** and **L** unknown; **Inf** probably >50 cm, simple; peduncular **Bra** remote, broadly ovate, acuminate, entire; fertile **Inf** part lax, finely and fugaciously whitish-furfuraceous; floral **Bra** spreading or reflexed, like the peduncular bracts, nearly equalling the sepals (lower); **Fl** spreading or reflexed at anthesis, to 15 mm; **Ped** 2–3 mm,

stout, articulate; **Sep** broadly ovate, 6–8 mm, acute, ± straight; **Pet** suberect, broadly obovate, obtuse, undulate, ± orange; **St** included; **Fil** high-connate above the common tube; **Anth** triangular, acute, recurved towards the apex; **Sty** short. — [F. Krapp]

D. weddelliana Baker (Handb. Bromel., 132, 1889). **Type:** Brazil, sine loco (*Weddell* 2584 [P, GH [photo]]). — **Distr:** C Brazil (Minas Gerais?, Goiás?); savanna, terrestrial. **I:** Smith & Downs (1974: 542).

[2] **Ros** not described; **L** 30–40 × 2–3 cm, sheath suborbicular, 4 cm, brown, glabrous, **L** lamina narrowly triangular, attenuate, minutely lepidote abaxially, margins laxly serrate, **Sp** straight, slender, 2 mm; **Inf** 1.2–1.5 m, simple or few-branched; peduncle stout, soon glabrous; peduncular **Bra** erect, the upper remote, broadly ovate, acute, entire; fertile **Inf** part elongate, subdensely many-flowered, ferruginous-furfuraceous; floral **Bra** ovate with triangular apices, reflexed, ±9 mm; **Fl** suberect to spreading, 11 mm; **Ped** 3 mm, stout; **Sep** elliptic, 6 mm, obtuse; **Pet** erect or suberect, obovate, broadly rounded, ± carinate, colour not described; **St** included; **Fil** high-connate above the common tube; **Anth** linear, acute, strongly recurved; **Sty** ½ as long as the ovary.

Described on the base of material without origin other than “Central Brazil”, and insufficiently known. — [F. Krapp]

References

- Baker, J. G. (1889) Handbook of the *Bromeliaceae*. London (GB): G. Bell & Sons. <https://doi.org/10.5962/bhl.title.51681>.
- Bernardello, L. M. [et al. 1991], Galetto, L. & Juliani, H. R. (1991) Floral nectar, nectary structure and pollinators in some Argentinean *Bromeliaceae*. *Ann. Bot. (Oxford)*, n.s. 67(4): 401–411. <https://doi.org/10.1093/oxfordjournals.aob.a088174>
- Braun, P. J. [et al. 2008], Esteves Pereira, E. & Scharf, U. (2008) *Dyckia joanae-marcoi*. Eine neue, sukkulente Bromelie aus dem nördlichen Minas Gerais, Brasilien. *Bromelie* 2008(1): 33–46, ill., map.
- Braun, P. J. (2018) Xeromorphe Bromelien aus Brasilien (1)/Xeromorphic Bromeliads from Brazil (1): *Dyckia*. *Bromelie* 2018(2): 68–77, ill.

- Braun, P. J. & Esteves Pereira, E. (1991) *Dyckia braunii* Rauh. Eine neue, weissbereifte Blattsukkulente aus Zentralbrasilien. *Kakt. and. Sukk.* 42(3): 58–60, ills.
- Braun, P. J. & Esteves Pereira, E. (2005) Succulent and xeromorphic Bromeliads of Brazil. Part 1. *Dyckia marnier-lapostollei* L. B. Smith. *Cact. Succ. J. (US)* 77(6): 284–292, ills. [https://doi.org/10.2985/0007-9367\(2005\)77\[284:SAXBOB\]2.0.CO;2](https://doi.org/10.2985/0007-9367(2005)77[284:SAXBOB]2.0.CO;2).
- Braun, P. J. & Esteves Pereira, E. (2006a) Succulent and xeromorphic Bromeliads of Brazil. Part 2. *Orthophytum horridum*, *Dyckia paucispina* and *Bromelia estevesii*. *Cact. Succ. J. (US)* 78(1): 31–35, ills. [https://doi.org/10.2985/0007-9367\(2006\)78\[31:SAXBOB\]2.0.CO;2](https://doi.org/10.2985/0007-9367(2006)78[31:SAXBOB]2.0.CO;2).
- Braun, P. J. & Esteves Pereira, E. (2006b) Succulent and xeromorphic Bromeliads of Brazil. Part 3. *Encholirium maximum*, *Orthophytum burle-marxii* and *Dyckia goehringii*. *Cact. Succ. J. (US)* 78(4): 160–164, ills. [https://doi.org/10.2985/0007-9367\(2006\)78\[160:SAXBOB\]2.0.CO;2](https://doi.org/10.2985/0007-9367(2006)78[160:SAXBOB]2.0.CO;2).
- Braun, P. J. & Esteves Pereira, E. (2009a) *Dyckia edwardii* P. J. Braun & al. *Kakt. and. Sukk.* 60(7): xxv–xxvi (index card 2009/13), ills.
- Braun, P. J. & Esteves Pereira, E. (2009b) *Dyckia richardii* P. J. Braun & Esteves. *Kakt. and. Sukk.* 60(7): xxvii–xxviii (index card 2009/14), ills.
- Büneker, H. M. [& al. 2016], Pureza Soares, K. & Coelho de Assis, L. (2016) The *Dyckia sordida* complex (*Bromeliaceae*, *Pitcairnioideae*) and a new species from Minas Gerais, Brazil. *Phytotaxa* 244(1): 57–68, key, ills. <https://doi.org/10.11646/phytotaxa.244.1.4>.
- Butcher, D. (2010) *Dyckia estevesii* revisited. *J. Bromeliad Soc.* 60(2): 82–84, ills.
- Dorneles, M. P. [& al. 2014], Oliveira, J. M. S. de & Cantorow, T. S. do (2014) *Dyckia racinae* L. B. Sm. (*Bromeliaceae*): Morphological description emphasizing the reproductive structures. *Iheringia, Bot.* 69(2): 397–303, ills.
- Esteves Pereira, E. & Gouda, E. J. (2017) A new *Dyckia* (*Bromeliaceae*) from the south region of Goiás, Brazil: *Dyckia piracanjubensis*. *J. Bromeliad Soc.* 66(3): 172–181, ills.
- Fagundes, N. F. & Mariath, J. E. D. (2010) Morphoanatomy and ontogeny of fruit in *Bromeliaceae* species. *Acta Bot. Brasil.* 24(3): 765–779, ills. <https://doi.org/10.1590/S0102-33062010000300020>.
- Guarçoni, E. A. E. [& al. 2012], Sartori, M. A. & Paula, C. C. de (2012) *Dyckia inflexifolia* (*Bromeliaceae*), a new species from Brazil. *Ann. Bot. Fenn.* 49: 407–411, ills.
- Guarçoni, E. A. E. [& al. 2014], Alves Azevedo, A. & Ferreira da Costa, A. (2014) *Dyckia sulcata* (*Bromeliaceae*), a new species from Minas Gerais, Brazil, with notes on leaf anatomy. *Phytotaxa* 188(3): 169–175, ills. <https://doi.org/10.11646/phytotaxa.188.3.6>.
- Hmeljevski, K. V. [& al. 2011], Reis, A., Montagna, T. & Sedrez dos Reis, M. (2011) Genetic diversity, genetic drift and mixed mating system in small subpopulations of *Dyckia ibiramensis*, a rare endemic bromeliad from southern Brazil. *Conservation Genet.* 12: 761–769. <https://doi.org/10.1007/s10592-011-0183-3>.
- Klein V., L. F. & Klein, J. (2014) Die Bromelien in den atlantischen Wäldern der Nord-Ost-Küste von Rio Grande do Sul/Brasilien — Teil 4/Schluss. *The Bromeliads in the Atlantic forest of the northeast coast of Rio Grande do Sul/Brazil — part 4/final part.* *Bromelie* 2014(2): 74–85, ills.
- Krapp, F. (2013) Phylogenie und Evolution der Gattung *Dyckia* (*Bromeliaceae*). Kassel (DE): Universität Kassel; unpublished Ph.D. thesis.
- Krapp, F. [& al. 2014], Pinangé, D. S. de B., Benko-Iseppon, A. M., Leme, E. M. C. & Weising, K. (2014) Phylogeny and evolution of *Dyckia* (*Bromeliaceae*) inferred from chloroplast and nuclear sequences. *Pl. Syst. Evol.* 300(7): 1591–1614, ills., maps. <https://doi.org/10.1007/s00606-014-0985-0>.
- Kriek, C. (2008) Ecologia reprodutiva de *Dyckia encholirioides* var. *encholirioides* (Gaud.) Mez. (*Bromeliaceae*) em costões oceânicos em Florianópolis, Santa Catarina. Florianópolis (BR): Universidad Federal de Santa Catarina, Departamento de Fitotecnia; unpublished M.Sc. thesis.
- Lawn, G. (2011) *Dyckia* ‘Leopoldo Witeck’. *J. Bromeliad Soc.* 61(3): 136–137, ills.
- Leme, E. M. C. & Miranda, Z. de J. G. (2009) Studies on *Dyckia* from Central Brazil — part II. Two sweetly fragrant species from Goiás. *J. Bromeliad Soc.* 59(2): 71–79, ills.
- Machado, T. M. [& al. 2016], Forzza, R. C. & Stehmann, J. R. (2016) *Bromeliaceae* from Caparaó National Park, Minas Gerais/Espírito Santo states, Brazil, with notes on distribution and conservation. *Oecol. Australis* 20(2): 133–146, ills. <https://doi.org/10.4257/oeco.2016.2002.10>.
- Mendes, S. P. [& al. 2012], Costa, C. G. & Toni, K. L. G. de (2012) Androecium development in the bromeliad *Dyckia pseudococcinea* L. B. Sm. (*Pitcairnioideae* — *Bromeliaceae*), an endangered species endemic to Brazil: Implications for conservation. *Flora (Jena)* 207(8): 622–627, ills. <https://doi.org/10.1016/j.flora.2012.06.016>.
- Mez, C. (1891–1892) *Bromeliaceae*. In: Martius, C. F. P. von & al. (eds.): *Flora Brasiliensis*, 3(3): 173–286, tt. 51–62 (= fasc. 110, 1891); pp. 281 [sic]–430, tt. 63–80 (= fasc. 112, 1892). Leipzig (DE): F. Fleischer. <http://biodiversitylibrary.org/page/136410>.
- Monteiro, R. F. & Forzza, R. C. (2016) Flora das cangas da Serra dos Carajás, Pará, Brasil: *Bromeliaceae*. *Rodriguésia* 67(5): 1253–1265, ills., keys. <https://doi.org/10.1590/2175-7860201667523>.
- Paggi, G. M. [& al. 2015], Louzada, R. B., Ishii, I. H., Takahasi, A., Arruda, R. C. O. & Lorenz-Lemke, A. P. (2015) Rediscovering *Dyckia excelsa* (*Bromeliaceae*) in Mato Grosso do Sul, Brazil: Taxonomy, geographic distribution, and notes on leaf anatomy. *Syst. Bot.* 40(1): 129–135, ills., key. <https://doi.org/10.1600/036364415X686422>.
- Pinangé, D. S. B. [& al. 2017], Krapp, F., Zizka, G., Silvestro, D., Leme, E. M. C., Weising, K. & Benko-Iseppon, A. M. (2017) Molecular phylogenetics, historical biogeography and character evolution in *Dyckia* (*Bromeliaceae*, *Pitcairnioideae*). *Bot. J. Linn. Soc.* 183: 39–56, ills. <https://doi.org/10.1111/boj.12489>.

- Pompelli, M. F. & Guerra, M. P. (2004) Ex situ conservation of *Dyckia distachya*: An endangered Bromeliad from South Brazil. *Crop Breed. Appl. Biotechnol.* 4(3): 273–279, ills., maps.
- Pompelli, M. F. & Guerra, M. P. (2005) Micropropagation enables the mass propagation and conservation of *Dyckia distachya* Hassler. *Crop Breed. Appl. Biotechnol.* 5: 117–126, ills.
- Pompelli, M. F. [et al. 2006], Fernandes, D. & Guerra, M. P. (2006) Germination of *Dyckia encholirioides* (Gaudichaud) Mez var. *encholirioides* under saline conditions. *Seed Sci. Technol.* 34(3): 759–763, ills.
- Rauh, W. (1985) Bromeliestudien. I. Neue und wenig bekannte Arten aus Peru und anderen Ländern (XVII. Mitteilung). *Trop. subtrop. Pfl.-welt* 53: 1–62, ills.
- Rauh, W. & Gross, E. (1988) Bromeliestudien. I. Neue und wenig bekannte Arten aus Peru und anderen Ländern (XX. Mitteilung). *Trop. subtrop. Pfl.-welt* 65: 5–75, ills.
- Rauh, W. & Gross, E. (1991) Bromeliestudien. I. Neue und wenig bekannte Arten aus Peru und anderen Ländern (XXII. Mitteilung). *Trop. subtrop. Pfl.-welt* 79: 1–31, ills.
- Reitz, R. (1983) Bromeliáceas e a malária-bromélia endêmica. In: Reitz, R. (ed.): *Flora ilustrada catarinense, I parte as plantas, fascículo BROM.* Itajaí (BR): Herbario “Barbosa Rodrigues”.
- Rogalski, J. M. [et al. 2009], Reis, A., Reis, M. S. dos & Hmeljevski, K. V. (2009) Biologia reprodutiva da reófita *Dyckia brevifolia* Baker (*Bromeliaceae*), no Rio Itajaí-Açu, Santa Catarina, Brazil. *Revista Brasil. Bot.* 32(4): 691–702, ills. <https://doi.org/10.1590/S0100-84042009000400008>.
- Sachs, H. (2011) Auf der Suche nach/Searching for *Dyckia delicata*. *Bromelie* 2010(3): 118–121, ills.
- Santos-Silva, F. [et al. 2015], Antunes Mastroberti, A. & Araujo Mariath, E. de (2015) Capsule structure in three species of *Dyckia* (*Bromeliaceae*): Ontogenetic and taxonomic issues. *J. Torrey Bot. Soc.* 142(3): 249–257, ills. <https://doi.org/10.3159/TORREY-D-14-00002.1>.
- Saul, J. (2018) Hybriden von der Fensterbank. Hybrids from the window sill. *Bromelie* 2018(2): 65–67, ills.
- Schütz, N. [et al. 2016], Krapp, F., Wagner, N. & Weising, K. (2016) Phylogenetics of *Pitcairnioideae* s.s. (*Bromeliaceae*): Evidence from nuclear and plastid DNA sequence data. *Bot. J. Linn. Soc.* 181(3): 323–342, maps, ills. <https://doi.org/10.1111/boj.12403>.
- Silva, A. L. L. da [et al. 2007], Dornelles, E. B., Bisognin, D. A., Franco, E. T. H. & Horbach, M. A. (2007) Micropropagation of *Dyckia agudensis* Irgang & Sobral — An extinction threatened Bromeliad. *Iheringia, Bot.* 62(1–2): 39–43, ills.
- Siqueiro Filho, J. A. & Leme, E. M. C. (2007) Fragments of the Atlantic forest of Northeast Brazil: Biodiversity, conservation and the Bromeliads. Rio de Janeiro (BR): Andrea Jakobsson Estúdio.
- Smith, L. B. & Downs, R. J. (1974) *Flora Neotropica*. Monograph No. 14 [*Bromeliaceae*]. Part 1: *Pitcairnioideae*. New York (US): Hafner Press & New York Botanical Garden. <http://www.jstor.org/stable/4393694>.
- Subils, R. (2009) *Bromeliaceae*, Bromeliáceas. In: Kiesling, R. (ed.): *Flora de San Juan*, IV: 340–363, ills., keys. Mendoza (AR): Zeta Editores.
- Vásquez, R. C. & Ibisich, P. L. (2012) Die Bromelien Boliviens (XI): *Dyckia barthlottii* — eine neue Art aus dem Chaco-Trockenwald Boliviens. The Bromeliads of Bolivia (XI): *Dyckia barthlottii* — a new species from the Chaco Dry Forest of Bolivia. *Bromelie* 2012(3): 123–127, ills.
- Vesprini, J. L. [et al. 2003], Galetto L. & Bernardello, G. (2003) The beneficial effect of ants on the reproductive success of *Dyckia floribunda* (*Bromeliaceae*), an extrafloral nectary plant. *Canad. J. Bot.* 81(1): 24–27, ills. <https://doi.org/10.1139/b03-003>.
- Voltoini, C. H. [et al. 2009], Reis, A. & Santos, M. (2009) Leaf morphoanatomy of the rheophyte *Dyckia distachya* Hassler (*Bromeliaceae*). *Revista Brasil. Bioci.* 7(4): 335–343, ills.
- Vosgueritchian, S. B. & Buzato, S. (2006) Reprodução sexuada de *Dyckia tuberosa* (Vell.) Beer (*Bromeliaceae*) e interação planta-animal. *Revista Brasil. Bot.* 29(3): 433–442, ills. <https://doi.org/10.1590/S0100-84042006000300010>.
- Waldemar, C. C. & Irgang, B. E. (2003) A ocorrência do mutualismo facultativo entre *Dyckia maritima* Backer [sic!] (*Bromeliaceae*) e o cupim *Cortaritermes silvestrii* (Holmgren), *Nasutitermitinae*, em afloramentos rochosos no Parque Estadual de Itapuã, Viamão, RS. *Acta Bot. Brasil.* 17(1): 37–48, ills., map. <https://doi.org/10.1590/S0102-33062003000100004>.
- Wiesbauer, M. B. (2008) Biologia reprodutiva e diversidade genética de *Dyckia distachya* Hassler (*Bromeliaceae*) como subsídio para conservação e reintrodução de populações extintas na natureza. Florianópolis (BR): Universidade Federal de Santa Catarina, Centro de Ciências Agrárias; unpublished thesis.
- Winkler, S. (1982) Die Bromeliaceae von Rio Grande do Sul (S-Brasilien). *Doc. Nat.* 3: 1–81, keys, 5 tt.