

Juncaceae

(Commelinidae—Juncales)
(Commelinids—Poales)

Glen, R.P. in Leistner: 639 (2000).

Sthn trop. Afr.: genus 1, species 9.

Juncus L.

Adamson: 1 (1935); Carter: 1 (1966); Haines & Lye: 31 (1983); Obermeyer: 73 (1985); Snogerup: 23 (1993); Balslev: 259 (1998); Kirschner *et al.*: 377 (1999); Mapaura (Unpublished).

Sthn trop. Afr. 9, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Juncaginaceae

(Alismatidae—Alismatales)
(Monocots—Alismatales)

Glen, R.P. in Leistner: 639 (2000).

Sthn trop. Afr.: genus 1, species 3.

Triglochin L.

Napper: 1 (1971); Lisowski *et al.*: 2 (1982); Haynes *et al.*: 263 (1998).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Mozambique, and sthn Afr.

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Limnocharitaceae

(Alismatidae—Alismatales)
(Monocots—Alismatales)

Glen, R.P. in Leistner: 642 (2000). General family reference: Haynes *et al.*: 271 (1998).

Butomopsis Kunth

Symoens: 30 (1984); Phiri (Unpublished).

Tenagocharis Hochst.; Carter: 1 (1960) (under Butomaceae).

Monotypic: *Butomopsis latifolia* (D. Don) Kunth, trop. Africa; sthn trop. Afr.: Zambia, Zimbabwe, Mozambique, and sthn Afr.

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Marantaceae

(Zingiberidae—Zingiberales)
(Commelinids—Zingiberales)

Rhizomatous perennial herbs, rosulate or with erect or spreading, sometimes lianescent or bamboo-like, branched or rarely simple aerial stems. **Leaves** distichous, divided into 4 distinct zones: (1) an open sheath, (2) petiole proper, (3) a pulvinus (“calloused portion of petiole”, “superior part of petiole”) and (4) blade with a strong midrib and thin, closely

set, parallel, upward-curved lateral veins fusing marginally, interconnected by closely set, parallel and closely set transverse veinlets. **Inflorescence** simple or complex, usually a spicate or capitate thyrse with distichous or spiral bracts subtending flower clusters composed of 1–several 2-flowered cymules in which the 2 flowers are mirror images. **Flowers** bisexual, irregular. **Calyx**: sepals 3, free, \pm similar, not petaloid. **Petals** 3, fused with androecium and style into a tube, one petal often hood-like and larger. **Androecium** in 2 whorls; outer whorl usually of 1 or 2 petaloid, showy or acicular staminodes; inner whorl of 3 members: 1 fertile stamen with 1 theca and often with a petaloid appendage, 1 hood-shaped staminode, and 1 callose, fleshy staminode often used by insects as landing stage. **Ovary** inferior, 3(1)-locular with 2 locules often empty and compressed; ovules 1 per fertile locule, arising at base, anatropous; style fused basally with floral tube; in mature, untriggered flowers style enclosed in hood of hood-shaped staminode, and bent backwards under tension, when released by a pollinator snapping forward and curling up; stigmatic surface on inner side of funnel-shaped depression in apex of style. **Fruit** a loculicidal capsule, or caryopsis-like. **Seeds** rather large; embryo horseshoe-shaped, embedded in starchy perisperm.

Genera 31, species \pm 550, nearly pantropical but absent from Australia, especially numerous in America; sthn trop. Afr.: genera 10, species 21.

Loesener: 654 (1930); Milne-Redhead: 1 (1952b); Koechlin: 99 (1965); Dhetchuvi & Diafouka: 401 (1993); Mabberley: 438 (1997); Takhtajan: 539 (1997); Andersson: 278 (1998).

Key to genera

[after Hepper (1968)]

- 1a Stems simple, usually bearing 1–3 leaves and an apparently terminal inflorescence; or stem absent with petiole arising from rhizome; petiole without a distinct circular groove at the junction of petiole and calloused portion; ovary and fruit smooth, not muricate:
- 2a Inflorescence arising at ground level, 60–150 mm long:
- 3a Inflorescence arising from same axis as leaves, simple or forked; fruits 3-winged, \pm 30 mm in diameter; leaves very large, up to \pm 0.6 x 0.4 m ..
..... **Thaumatococcus**
- 3b Inflorescence and leaf (leaves) arising separately on rhizome; inflorescence simple; leaves up to \pm 0.35 x 0.1 m **Afrocalathea**
- 2b Inflorescence aerial; fruits \pm rounded or cylindric, not winged:
- 4a Leaves strongly asymmetric with one side nearly straight and the other rounded:
- 5a Fruit 3-seeded, \pm rounded (see also 10a below) **Marantochloa**
- 5b Fruit 1-seeded, cylindric; inflorescence with closely imbricated bracts and erect branches **Halopegia**
- 4b Leaves not strongly asymmetric, both sides rounded:
- 6a Ovary 1-locular with 1 erect ovule; fruit 1-seeded, the seed filling the cavity, arillate; inflorescences lax panicles; plants of open marshes
..... **Thalia**
- 6b Ovary 3-locular; inflorescence borne on a simple stem terminating in a single leaf; shade plants:
- 7a Nodes of inflorescences each with 1 cymule; each bract enclosing the part of the inflorescence above it, caducous at anthesis; each cymule with 1 fleshy bracteole; fruit with well marked sutures; seed arillate **Megaphrynium**
- 7b Nodes of inflorescence each with 2–4 cymules; bracts not enclosing the part of the inflorescence above it, persistent; each cymule with 2 fleshy bracteoles; fruit without obvious sutures; seeds without an aril **Sarcophrynium**
- 1b Stems branched, sometimes repeatedly so to form a scrambling plant; leaves many; ovary and fruit 3-locular, smooth or muricate:
- 8a Junction of petiole with calloused portion marked by a distinct circular groove with thickening; ovary and fruit muricate **Hypselodelphus**
- 8b Junction of petiole with calloused portion not marked by a circular groove, only marked by a change in texture; calloused portion uninterrupted with midrib on lower surface; fruits not muricate:
- 9a Bracts suborbicular; stems often prickly; leaves hardly asymmetric, both sides curved **Haumania**
- 9b Bracts oblong; stems not prickly; leaves strongly asymmetric with one side curved and the other almost straight; cymules without fleshy bracteoles; seeds arillate:
- 10a Bracts acute; flowers borne at different levels; fruit ultimately dehiscent; inflorescence erect **Marantochloa**
- 10b Bracts obtuse; flowers \pm side by side; fruits indehiscent; inflorescence \pm reflexed **Ataenidia**

Afrocalathea K.Schum.

Schumann: 51 (1902); D'Orey: 54 (1981); Dhetchuvi & Diafouka: 406 (1993); Andersson: 290 (1998).

Acaulescent rhizomatous herbs with leaves and inflorescences on separate shoots. **Leaves** 1 or 2; lamina elliptic to lanceolate, glabrous; petiole up to twice as long as lamina, \pm terete. **Inflorescence** a simple thyrse on a short peduncle arising directly on rhizome, 2-flowered cymules supported by 2-keeled bracts; bracteoles absent. **Flowers** sessile on a very short common axis. **Corolla**: tube \pm equalling lobes (\pm 10 times longer than wide). **Androecium**: outer staminodes 2, slightly unequal,

petaloid; hooded staminode with a short, flat appendage near base of lobe. **Ovary** with 3 ovulate locules. **Fruit** and **seed** unknown.

Monotypic genus: *Afrocalathea rhizantha* (K.Schum.) K.Schum. (= *Calathea rhizantha* K.Schum.), W trop. Africa; sthn trop. Afr.: Angola.

Ataenidia Gagnep.

Gagnepain: xli (1908); Milne-Redhead: 168 (1952a); Milne-Redhead: 8 (1952b); D'Orey: 54 (1981); Dhetchuvi & Diafouka: 445 (1993); Andersson: 287 (1998).

Phrynium sensu Schumann: 52 (1902), in part.

Tufted rhizomatous herbs; stems erect or spreading, branched, bearing 1 inflorescence and several leaves. **Leaves:** petiole long, part directly below blade calloused; blade elliptic, asymmetric, acuminate, ± rounded at base. **Inflorescence** terminal, much branched, congested; spathes persistent; branches with few nodes, with up to 4, 2-flowered sessile cymules at each node, each cymule backed by a 2-nerved prophyll; bracteoles absent. **Flowers** in each cyme ± side by side but opening at different times. **Corolla:** tube ± as long as lobes. **Androecium:** outer staminodes 2, petaloid; hooded staminode without appendage near apex. **Ovary** with 3 ovulate locules, pubescent. **Fruit** with papyraceous pericarp, indehiscent, 1–3-seeded. **Seeds** arillate.

Monotypic genus: *Ataenidia conferta* (Benth.) Milne-Redh., trop. Africa; sthn trop. Afr.: Angola.

Halopegia K.Schum.

Schumann: 49 (1902); Hepper: 85 (1968); D'Orey: 54 (1981); Dhetchuvi & Diafouka: 406 (1993); Andersson: 292 (1998).

Rosulate marsh plants with short rhizome and simple stems. **Leaves:** petiole very long, sheathing in lower half, terete towards apex; lamina elongate-oblong. **Inflorescence** a simple or sparsely branched synflorescence; florescence consisting of a single cymule; axes conspicuously flattened and furrowed; bracts persistent, imbricate; bracteoles absent. **Sepals** markedly unequal. **Corolla:** tube very short to absent. **Androecium:** outer staminode(s) 1, or 2 very unequal; callose staminode conspicuous, with narrow petaloid margin; hooded staminode with a simple often ± obsolete appendage near top of lobe. **Ovary** 3-locular, ovulate or 2 of them poorly developed, empty and flattened. **Fruit** caryopsis-like, 1-locular and 1-seeded.

Species 6, tropical Old World: Africa, India, Java; sthn trop. Afr. 1: *Halopegia azurea* (K.Schum.) K.Schum., Angola.

Haumania J.Léonard

Léonard: 453 (1949); Evrard & Bamps: 367 (1959); Milne-Redhead: 161 (1950); Hepper: 89 (1968); D'Orey: 51 (1981) as *Haumannia*; Dhetchuvi & Diafouka: 409 (1993); Andersson: 292 (1998).

Climbing plants with slender, flexible stems. **Leaves** ovate-oblong, lower surface ± pubescent; petiole present or not. **Inflorescence** of composite cymes arranged in spikes; spathes persistent, ± orbicular, white; cymules without bracteoles. **Flowers** large. **Sepals** 3, petaloid. **Petals** 3; tube ± half as long as lobes. **Androecium:** staminodes petaloid, outer staminodes 2. **Ovary** with 3 ovulate locules. **Fruit** indehiscent, globose-depressed; exocarp tuberculate. **Seeds** exarillate.

Species 2, trop. Africa; sthn trop. Africa 1: *Haumania liebrechtsiana* (De Wild. & T.Durand) J.Léonard, Angola.

Hypselodelphys (K.Schum.) Milne-Redh.

Milne-Redhead: 158 (1950); Koechlin: 107 (1965); D'Orey: 50 (1981); Andersson: 289 (1998).

Hybophrynium braunianum K.Schum.: 428 (1892). *Trachyphrynium braunianum* (K.Schum.) Baker; Milne-Redhead: 2 (1952b); D'Orey: 49 (1981); Dhetchuvi & Diafouka: 413 (1993); Andersson: 289 (1998).

Subscandent, much branched perennials with bamboo-like shoots simple below and clothed with sheathing coriaceous cataphylls, branched and leafy above. **Leaves:** petiole jointed shortly above top of sheath; blades asymmetric. **Inflorescence** terminal, simple or sometimes branched at base, spike-like with a jointed rachis and a 2-flowered cymule at each distichous node, each flower subtended by a small fleshy bracteole. **Corolla:** tube ± one-quarter as long as lobes. **Androecium:** outer staminodes 2, petaloid; hooded staminode with a 2-branched appendage. **Ovary** 3-locular, densely muricate. **Fruit** a dehiscent, muricate, 1–3-seeded capsule. **Seed** smooth, with a basal aril.

Species 5, trop. Africa; sthn trop. Afr. 4, Angola. Andersson (1998) notes that the only important difference between this genus and *Trachyphrynium braunianum* (K.Schum.) Baker, the only species of this genus, is in fruit structure, and that this distinction is not very convincing.

Marantochloa Brongn. ex Gris.

Gris: 321 (1860); Milne-Redhead: 5 (1952b); Koechlin: 118 (1965); D'Orey: 51 (1981); Dhetchuvi & Diafouka: 433 (1993); Dhetchuvi: 369 (1996); Andersson: 290 (1998).

Phrynium sensu Schumann: 52 (1902) in part.

Glabrous or pubescent, rhizomatous perennials with ± woody, erect or spreading, usually branched stems. **Leaves** strongly asymmetric. **Inflorescence** lax or congested, each branch with ± 4 nodes, with 1 or 2, 2-flowered cymules, without fleshy bracteoles at each node. **Androecium:** outer staminodes 2, petaloid; hooded staminode with a short flat appendage near middle of lobe. **Ovary** 3-locular, often pilose. **Capsule** tardily dehiscent, smooth, ± pubescent. **Seed** with a small basal aril.

Species ± 15, trop. Africa, Réunion and Comoro Islands; sthn trop. Afr.: 7, Angola.

Megaphrynium Milne-Redh.

Milne-Redhead: 169 (1952a); Milne-Redhead: 4 (1952b); Dhetchuvi & Diafouka: 427 (1993); Andersson: 289 (1998).

Phrynium sensu Schumann: 52 (1902) in part.

Rhizomatous, erect perennial herbs; stems simple, bearing an inflorescence and a single subtending leaf. **Leaves** arising either singly from stem or directly from rhizome; petiole sometimes up to 5 m long; blade elliptic, ± symmetric. **Inflorescence** terminal, more or less branched; branches jointed with many internodes, and a 2-flowered pedunculate cymule at each node, subtended by a caducous sheathing bract enclosing the cymule; bracteole 1(2), glandular, fleshy; spathes caducous. **Corolla:** tube ± half as long as lobes. **Androecium:** outer staminodes 2(1), often markedly uneven, subulate and erect; hooded staminode with 2-branched appendage, branches ± equal, divergent. **Ovary** with 3 ovulate locules. **Fruit** ± globose, somewhat fleshy but with 3 conspicuous sutures and dehiscent. **Seeds** with a laciniated arillus surrounded by copious mucilage.

Species 5, trop. Africa; sthn trop. Afr. 2, Angola.

Sarcophrynium K.Schum.

Schumann: 35 (1902); Gossweiler & Mendonça: 63 (1939); Milne-Redhead:

168 (1952a); Milne-Redhead: 4 (1952b); Hepper: 87 (1968); Dhatchuvi & Diafouka: 420 (1993); Andersson: 290 (1998).

Erect, glabrous or pubescent, rosulate rhizomatous herbs; stem simple, bearing inflorescence and a single subtending leaf surrounded by several leaves arising directly from rhizome or at base of stem. **Leaves** elliptic or oblong-elliptic, slightly asymmetric. **Inflorescence** terminal, branched; branches with few to many nodes, with up to 4, 2-flowered pedunculate cymules at each node subtended by a sheathing bract, each cymule backed by a 2-nerved prophyll. **Flowers** borne at different levels, each subtended by a fleshy, glandular bracteole. **Corolla**: tube \pm half as long as lobes. **Androecium**: outer staminodes 2(1), petaloid, hooded staminode with 2-branched appendage, branches \pm equal, divergent. **Ovary** with 3 ovulate locules, glabrous. **Fruit** fleshy, indehiscent, without obvious sutures. **Seeds** surrounded by a mucilaginous mantle-like aril.

Species \pm 3, trop. Africa; sthn trop. Afr. 2, Angola (Cabinda).

Thalia L.

Linnaeus: 1193 (1753); Schumann: 202 (1903); Loesener: 692 (1930); Koechlin: 142 (1965); Hepper: 85 (1968); Andersson: 48 (1981a); Andersson: 241 (1981b); D'Orey: 55 (1981); Dhetchuvi & Diafouka: 431 (1993); Andersson: 292 (1998).

Erect, perennial marsh plants with a basal rosette of leaves and an often very elaborate synflorescence. **Leaves** ovate-lanceolate, rounded or subcordate at base. **Inflorescence** paniculate, with slender branches; bracts subtending flower pairs boat-shaped, deciduous; bracteoles absent. **Calyx** of 3 very small, similar, hyaline sepals. **Petals** free but adnate to staminal tube for a very short distance, membranous. **Androecium**: outer staminode 1, petaloid, showy; hood-shaped staminode with 2 appendages near middle of lobe, both pointing down into staminal tube; callose staminode firm and fleshy with a petaloid margin; fertile stamen with a petaloid appendage. **Ovary** 1-locular, with a single ovule; style helically twisted when triggered, with a very long, lip-like protrusion from ventral rim of stigmatic orifice. **Fruit** caryopsis-like, with very thin pericarp. **Seed** with a small 2-lobed aril; perisperm canal branched from base.

Species 5–7, tropical America, with 1 species, *Thalia geniculata* L. (= *T. welwitschii* Ridl.) extending to trop. Africa; sthn trop. Afr.: Angola, Zambia, Zimbabwe. Mabblerley (1997) describes pollen transfer as follows: pollen deposited on style in bud, and insect proboscis touching style promotes explosive S-shaped movement; in 0.03 seconds style becomes erect, scrapes pollen from proboscis into stigmatic hollow and deposits home pollen on proboscis.

Thaumatococcus Benth.

Bentham: 652 (1883); Schumann: 40 (1902); Hepper: 81 (1968); D'Orey: 55 (1981); Dhetchuvi & Diafouka: 403 (1993); Andersson: 292 (1998).

Rhizomatous, rosulate perennial herbs with simple stems. **Leaves** asymmetric, \pm broadly ovate-elliptic, shortly acuminate, rounded-truncate at base, with very many parallel nerves diverging from midrib at an angle of \pm 45°; petiole very long, subterete. **Inflorescence** simple or very sparsely branched; spathes caducous; cymules single, very shortly pedicelled;

bracteole solitary, glandular. **Sepals** 3, free, broadly linear. **Corolla**: tube very short. **Androecium**: outer staminodes absent. **Ovary** with 3 ovulate locules, silky. **Fruit** large, fleshy, indehiscent, with 3 thick wings; endocarp mucilaginous. **Seeds** with aril of membranous sheets sticking to testa.

Monotypic genus: *Thaumatococcus daniellii* (Benn.) Benth. (= *Phrynium daniellii* Benn.), trop. Africa; sthn trop. Afr.: Angola (Cabinda).

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Mayacaceae
(Commelinidae—Commelinales)
(Commelinids—Poales)

Freshwater aquatic herbs, submerged, floating or growing in swamps, with slender, densely leafy stems bearing adventitious roots. **Leaves** spirally arranged, sessile, linear to filiform, without basal sheath, bidentate at apex. **Flowers** bisexual, regular, solitary, aerial but without nectarines; pedicels long, in axils of sheathing bracts but may appear to be terminal. **Sepals** 3, free, green, valvate to subvalvate. **Petals** 3, free, shortly clawed, imbricate, white. **Stamens** 3, alternipetalous; filaments filiform, glabrous; anthers basifixed, tetrasporangiate to bisporangiate, opening by apical pores or pore-like slits, covered in young state by a dome-shaped operculum. **Ovary** superior, 1-locular, composed of 3 carpels, with 3 parietal placentas; ovules several to many, in 2 rows on each placenta, bitegmic, orthotropous; style terminal, filiform; stigma entire to slightly divided. **Fruit** a loculicidal capsule opening by 3 valves. **Seeds** ovoid to globose, striate, operculate; embryo small; endosperm copious, containing starch and aleurone.

Genus 1, species 3–9 in tropical America, 1 in tropical W Africa. Formerly widely considered to be closely related to Commelinaceae, but now thought to be closer to Xyridaceae (Stevenson 1998).

Faden: 387 (1985); Takhtajan: 542 (1997); Stevenson: 294 (1998).

Mayaca Aubl.

Aublet: 42 (1775); Brown: 525 (1902); Boutique: 1 (1971a); Boutique: 90 (1971b); Stevenson: 295 (1998).

Description as for family.

Species 4–10, tropical America and tropical W Africa; sthn trop. Afr. 1: *Mayaca baumii* Gürke, Angola, Zambia.

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Musaceae
(Zingiberidae—Zingiberales)
(Commelinids—Zingiberales)

Archer, C. in Leistner: 643 (2000). General family references: Lock: 1 (1993); Anderson: 296 (1998).

Sthn trop. Afr.: genus 1, species 3.

Ensete Horan.

Baker & Simmonds: 405 (1953/1954); Lock: 2 (1993); White *et al.*: 103 (2001); Coates Palgrave: 117 (2002).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, and sthn Afr.

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Najadaceae
(Alismatidae—Najadales)
(Monocots—Alismatales; included in Hydrocharitaceae)

Glen, R.P. in Leistner: 644 (2000).

Sthn trop. Afr.: genus 1, species 4.

Najas L.

Symoens: 64 (1984); Triest: 1 (1987); Triest: 1 (1989); Brummitt: 722 (1992) under Hydrocharitaceae; Haynes *et al.*: 305 (1998).

Sthn trop Afr. 4, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Orchidaceae
(Liliidae—Orchidales)
(Monocots—Asparagales)

Kurzweil, H. in Leistner: 644 (2000).

This account is largely based on La Croix & Cribb (1995/1998).

The classification of the family into subfamilies and tribes follows Dressler (1993).

Genera ± 800, species ± 20 000, cosmopolitan but most numerous in the moist tropics and subtropics; stn trop. Afr.: genera 67, species ± 632.

Key to the subfamilies of Orchidaceae

- 1a Anthers 2 or 3:
- 2a Anther filaments fused to the column near the base only; staminode absent; lip petaloid or nearly so, never saccate **APOSTASIOIDEAE** (not found in Africa)
- 2b Anther filaments fused to the column stalk; staminode present, usually terminal and shield-shaped; lip deeply saccate **CYPRIPEDIOIDEAE** (not found in Africa)
- 1b Anther solitary, although the anther loculi can be well separated:
- 3a Anther attached to the column by the base, the loculi adnate to the column, persistent; pollinia granular or sectile with caudicles and two (rarely one) viscidia; mostly terrestrial with erect leafy stem, terminal inflorescence, and root-stem tuberosids **ORCHIDOIDEAE**
- 3b Anther attached to the column by the apex, usually at the back of the column and either operculate or erect and persistent, caudicle and viscidia then being at the top:
- 4a Pollinia granular, occasionally mealy, or much divided into small masses attached to a common axis; anther opening lengthwise; plants usually terrestrial **SPIRANTHOIDEAE**
- 4b Pollinia waxy, entire, 2, 4 or 8, free or adhering at one end by caudicles or attached to 1 or 2 viscidia; anther operculate; plants terrestrial, epiphytic, lithophytic, or scrambling lianas **EPIDENDROIDEAE & VANDEAE**

Key to the genera of Spiranthoideae

- 1a Plants with woody stems and rhizomes; inflorescences 1–several, branching, glabrous; flowers more than 30 mm long **Corymborkis**
- 1b Plants up to c. 0.5 m; stems and rhizomes fleshy; inflorescence solitary, unbranched, often pubescent or glandular; flowers less than 10 mm long:
- 2a Lip tapering to a blunt apex; sepals and petals 7–9 mm long **Platylepis**
- 2b Lip with a transversely oblong apical lobe; sepals and petals 6 mm long or less:
- 3a Lateral sepals united for about half their length **Cheirostylis**
- 3b Lateral sepals free to the base **Zeuxine**

Key to the genera of Orchidoideae

- 1a Spur formed by the dorsal sepal, not formed by the lip or lateral sepals:
- 2a Lip with lobed or deeply divided margins, appearing bearded; flowers blue, purplish blue or rarely white; leaves grass-like, tufted (=Herschelianthe) **Disa**
- 2b Lip entire; flowers not blue; leaves lanceolate, elliptic or ovate:
- 3a Lateral sepals appressed to the ovary; pollinia attached to a single viscidium (=Monadenia) **Disa**
- 3b Lateral sepals spreading; each pollinium attached to its own viscidium:
- 4a Petals free from the dorsal sepal; anther erect or horizontal **Disa**
- 4b Petals united to the dorsal sepal; anther horizontal **Brownleea**
- 1b Spur or spurs or sacs, if present, formed by the lip or lateral sepals:
- 5a Lip with 1 or 2 distinct, sometimes small, spurs:
- 6a Spurs 2; flowers resupinate with the lip uppermost **Satyrrium**
- 6b Spur single; flowers not resupinate:
- 7a Lip more or less united to the column:
- 8a Leaves 1 or 2, radical, orbicular or ovate **Holothrix**
- 8b Leaves usually several, borne on the stem, not orbicular:
- 9a Stigmas sessile **Schizochilus**
- 9b Stigmas borne on variously lengthened stalks:
- 10a Stigmatic arms divided into 2 elongated branches, the lower fertile and capitate, the upper sterile and horn-like .. **Centrostigma**
- 10b Stigmatic arms unbranched **Habenaria** (in part)
- 7b Lip free from the column:

- 11a Stigmas sessile:
- 12a Flowers usually purple, mauve, white or rarely yellow; sepals and petals more than 3 mm long **Brachycorythis** (in part)
- 12b Flowers tiny, yellow with a green lip; sepals and petals up to 2 mm long **Oligophyton**
- 11b Stigmas borne on, or forming, club-shaped processes, projecting from the front of the column, free or partly united with the lateral lobes of the rostellum:
- 13a Lateral sepals and front lobe of the petals joined to the lip and to the stigmatic arms in their lower parts; tooth in mouth of spur **Bonatea**
- 13b Lateral sepals and front lobe of petals not united at the same time; tooth absent in mouth of spur:
- 14a Stigmas 2-lobed, the lobes projecting in different directions, upwards and downwards **Roepocharis**
- 14b Stigmas simple, not branched:
- 15a Stigmatic processes partly united to the side lobes of the rostellum:
- 16a Flowers pink or mauve; side lobes of lip entire **Cynorkis**
- 16b Flowers green; side lobes of lip fimbriate **Habenaria** (in part)
- 15b Stigmatic processes free from the rostellum:
- 17a Flowers yellow or orange; mid-lobe of rostellum concave, placed in front of the anther **Platycoryne**
- 17b Flowers green or white; mid-lobe of rostellum usually flat or subulate **Habenaria** (in part)
- 5b Lip not spurred, sometimes boat-shaped at the base:
- 18a Lip adnate to the front of the column, bearing incurled lateral appendages:
- 19a Lateral sepals not spurred; petals much wider than long **Corycium**
- 19b Lateral sepals spurred or saccate; petals longer than wide **Disperis**
- 18b Lip not adnate to the front of the column, lateral appendages absent:
- 20a Plant dwarf, leafless **Schwartzkopffia**
- 20b Plant small to large, leafy:
- 21a Margins of lip divided in the apical part **Stenoglottis**
- 21b Margins of lip entire:
- 22a Lip with a basal callus, not boat-shaped at the base **Neobolusia**
- 22b Lip without a basal callus, boat-shaped at the base **Brachycorythis** (in part)

Key to the genera of Epidendroideae

- 1a Plants terrestrial saprophytes, lacking leaves and chlorophyll:
- 2a Lip lacking a spur; pedicels elongating rapidly after fertilization **Didymoplexis**
- 2b Lip with a spur; pedicels not elongating after fertilization:
- 3a Lip entire, lacking longitudinal crests on lip; pollinia soft, sectile **Epipogium**
- 3b Lip 3-lobed, bearing longitudinal crests in basal half; pollinia hard, attached to a noticeable viscidium **Eulophia** (in part)
- 1b Plants terrestrial, epiphytic or lithophytic, usually with green leaves, rarely epiphytic and lacking green leaves but then with green roots:
- 4a Plants terrestrial, scrambling or climbing:
- 5a Plants scrambling or climbing, liana-like **Vanilla**
- 5b Plants terrestrial:
- 6a Inflorescence appearing well before the solitary leaf emerges **Nervilia**
- 6b Inflorescence appearing with the leaves, or sometimes after the leaves have fallen:
- 7a Pollinia 8, clavate; flowers turning blue if bruised:
- 8a Column short, adnate to the lip base; spur as long as or longer than the lip **Calanthe**
- 8b Column elongate, not adnate to the lip except at the base; spur much shorter than the lip **Phaius**
- 7b Pollinia 2 or 4; flowers not turning blue when bruised:
- 9a Inflorescence terminal:
- 10a Flowers pubescent; lip bipartite, the hypochile saccate and articulated to a fleshy epichile **Epipactis**
- 10b Flowers glabrous; lip entire or lobed:
- 11a Inflorescence branching; lip spurred (= *Acrolophia*) **Eulophia**
- 11b Inflorescence simple; lip lacking a spur:
- 12a Column very short, with basal auricles of lip on either side of the column **Malaxis**
- 12b Column elongate, lacking basal auricles around the lip:
- 13a Rostellum short, not flabellate; tubers or pseudobulbs present **Liparis**
- 13b Rostellum elongate and flabellate; tubers or pseudobulbs absent **Orestias**
- 9b Inflorescence lateral or basal:
- 14a Plants with above-ground pseudobulbs:
- 15a Pseudobulbs of one node **Oeceoclades**
- 15b Pseudobulbs of several nodes, or stems caulescent **Eulophia** (in part)
- 14b Plants with underground tubers or swollen rhizomes:
- 16a Lip lacking a spur; column short, lacking a foot **Pteroglossaspis**
- 16b Lip with a spur or saccate base; column with a short to long foot **Eulophia** (in part)
- 4b Plants epiphytic:
- 17a Plants with monopodial growth, always lacking pseudobulbs; leaves when present distichous, fleshy, conduplicate, usually unequally

- 2-lobed at the apex; inflorescences always axillary; pollinia with stipes and viscidium **Tribe VANDEAE** (see key below)
- 17b Plants with sympodial growth, with or without pseudobulbs; leaves plicate to conduplicate or iris-like; pollinia with or without stipes and viscidium:
- 18a Leaves iridiform, bilaterally compressed, distichous; flowers minute, less than 2 mm across, in whorls in a tapering densely-flowered inflorescence **Oberonia**
- 18b Leaves flat, needle-like or terete:
- 19a Flowers with a ± distinct conical to cylindric mentum formed by the lateral sepals and column-foot:
- 20a Pollinia 8 **Stolzia**
- 20b Pollinia 2 or 4:
- 21a Inflorescence terminal **Polystachya**
- 21b Inflorescences lateral, basal:
- 22a Leaves 1 or 2 on pseudobulb **Bulbophyllum**
- 22b Leaves several, pine-needle-like **Chaseella**
- 19b Flowers lacking a mentum; column-foot absent:
- 23a Lip lacking a spur; flowers large, yellow, distinctively spotted with maroon on sepals and petals; pseudobulbs elongate-fusiform
..... **Ansellia**
- 23b Lip spurred at the base; flowers small, yellow, flushed but not spotted with maroon-brown on sepals and petals **Graphorkis**

Key to the genera of Vandaeae

- 1a Leaves reduced to achlorophyllous scales, or absent:
- 2a Stems elongate; roots scattered along the stem **Solenangis** (in part)
- 2b Stems very short; roots clustered:
- 3a Flowers orange; sepals and petals united into a tube in lower part; lip with a hooded apex; pollinia 4 **Taeniophyllum**
- 3b Flowers usually white; sepals and petals free; lip apex not hooded; pollinia 2 **Microcoelia**
- 1b Leaves present, with chlorophyll:
- 4a Sepals and petals pale yellow, blotched or marked with reddish-brown; lip fleshy; pollinia 4 in 2 pairs **Acampe**
- 4b Sepals and petals unicoloured; pollinia 2:
- 5a Flowers borne in a capitate head; rostellum distinctively reflexed in apical half to lie parallel to the basal part **Ancistrorhynchus**
- 5b Flowers solitary or in a lax to dense raceme; rostellum not as above:
- 6a Leaves iris-like:
- 7a Spur shorter than 5 mm, cylindric to conical; inflorescence axis as long as or longer than the leaves **Bolusiella**
- 7b Spur longer than 8 mm, conical, broad at base, constricted in middle and inflated into 2 sacs or lobules at apex; inflorescence axis shorter than leaves **Podangis**
- 6b Leaves flat, semi-terete or terete:
- 8a Rostellum retuse, not projecting beyond the column apex; stipites obscure or apparently absent:
- 9a Column-foot saccate, spurred, the lip articulated below the spur at the apex of the column-foot **Aeranthes**
- 9b Column lacking a foot; lip spurred:
- 10a Lip ovate to cordate with the base enfolding the column **Angraecum**
- 10b Lip lanceolate or subpandurate, the base not enfolding the column **Jumellea**
- 8b Rostellum projecting beyond the column apex, often pendent; stipes 1 or 2, elongate, attached to 1 or 2 viscidia:
- 11a Flowers borne in whorls at the nodes of the inflorescence:
- 12a Lip obscurely 3-lobed, 10 mm or longer, fringed **Diaphanthe** (in part)
- 12b Lip entire; 4 mm long or less, margins entire **Chamaeangis**
- 11b Flowers borne singly at the inflorescence nodes:
- 13a Spur abruptly geniculate in middle and dilated at the apex:
- 14a Lip 3-lobed; rachis markedly zigzag; stem elongate **Calyptrochilum**
- 14b Lip entire; rachis ± straight; stem very short **Eurychone**
- 13b Spur saccate to cylindric, not as above:
- 15a Pollinia attached by a single stipes to a viscidium:
- 16a Lip cordate **Cardiochilus**
- 16b Lip not cordate:
- 17a Lip uppermost in flower; viscidium shoe-shaped **Summerhayesia**
- 17b Lip lowermost in flower:
- 18a Stipes Y-shaped **Ypsilopus**
- 18b Stipes linear or oblanceolate:
- 19a Lip 2- or 3-lobed in apical half, sometimes obscurely so:
- 20a Lip 3-lobed in apical part, lobes triangular, tapering or fimbriate **Tridactyle**
- 20b Lip broadly 2-lobed in apical half **Nephrangis**
- 19b Lip entire, not lobed in apical half:
- 21a Flowers stellate, white, sometimes variously tinged with green or pink on spur; stem usually short; leaves oblanceolate or obovate, flat **Aerangis**

- 21b Flowers white, pale green, yellow or brown; lip with basal auricles; stem usually elongate; leaves linear or oblong, flat or terete:
- 22a Leaf with a distinct ligule borne at top of sheath opposite the lamina **Eggelingia**
- 22b Leaf lacking a ligule:
- 23a Leaves awl-shaped, up to 13 x 1 mm; flowers not opening widely, white; lip lacking basal auricles **Solenangis**
- 23b Leaves linear to oblong, longer than 25 mm; flowers opening widely, not white; lip with basal auricles **Tridactyle** (in part)
- 15b Pollinia attached by two stipites to one or two viscidia:
- 24a Pollinia attached by separate stipes to a separate viscidium:
- 25a Lip strongly 3-lobed in the middle; rostellum of 3 equal lobes **Angraecopsis** (in part)
- 25b Lip entire or obscurely lobed:
- 26a Lip with a small tooth in the mouth of the spur; middle lobe of rostellum fleshy and shortly clavate, the side lobes obscure **Diaphanthe** (in part)
- 26b Lip lacking a tooth in the mouth of the spur; rostellum thick-textured, 3-lobed:
- 27a Rostellar lobes papillate, the outer lobes exceeding the middle lobe **Mystacidium**
- 27b Rostellar lobes glabrous, ± equal **Angraecopsis** (in part)
- 24b Pollinia with stipites attached to a single viscidium:
- 28a Flowers pale translucent yellow or green:
- 29a Lip with a small tooth or fleshy swelling in the mouth of the spur **Diaphanthe** (in part)
- 29b Lip lacking any tooth or swelling in mouth of spur:
- 30a Inflorescences erect, laxly many-flowered; leaves usually longer than 80 mm **Cribbia**
- 30b Inflorescences pendent, of many closely-spaced secund pale green flowers; leaves very small, shorter than 50 mm **Angraecopsis** (in part)
- 28b Flowers white, rarely marked with green on lip:
- 31a Lip lanceolate, similar to sepals and petals; rostellar side arms longer than the column; viscidium linear, saddle-shaped, hyaline or bipartite **Cyrtorchis**
- 31b Lip obscurely 3-lobed, differently shaped from sepals and petals; rostellar side arms shorter than the column; viscidium suboblong, never bipartite **Rangaeris**

Acampe Lindl.

(Epidendroideae—Vandaeae)

La Croix & Cribb: 363 (1995/1998).

Sthn trop. Afr. 1: *Acampe pachyglossa* Rchb.f., Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Aerangis Rchb.f.

(Epidendroideae—Vandaeae)

Schelp: 388 (1976); La Croix & Cribb: 381 (1995/1998); Mapaura & Timberlake: 166 (2002); Msekandiana & Mlangeni: 37 (2002).

Sthn trop. Afr. 16, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Aeranthes Lindl.

(Epidendroideae—Vandaeae)

Lindley: t. 817 (1824); La Croix & Cribb: 365 (1995/1998); Mapaura & Timberlake: 166 (2002).

Epiphytic, monopodial herbs with short stems. **Inflorescence** (floral axis) axillary, branched or unbranched, usually slender and pendent, rarely erect. **Flowers** translucent, green or white; lateral sepals adnate at base to column; lip entire, spur arising from column foot. **Column** long or short; side lobes of rostellum always longer than mid-lobe; pollinia 2, each with its own stipe and viscidium; stipes usually long, often geniculate. **Ovary** often articulated to pedicel.

Species ± 30, Madagascar, Comoro Islands and Mascarene Islands, 2 known from mainland Africa, both in Zimbabwe.

Ancistrohynchus Finet

(Epidendroideae—Vandaeae)

Finet: 44 (1907); Schlechter: 137 (1918); Summerhayes: 203 (1944); La Croix & Cribb: 393 (1995/1998).

Epiphytic monopodial herbs. **Stems** short, covered with old sheathing leaf bases; roots clustered at base of stem. **Leaves** imbricate, ligulate or tapering, unequally 2-lobed at apex, lobes sometimes dentate. **Inflorescences** axillary, from leaf bases or lower leaves, ± sessile, usually in globose or ellipsoid heads; bracts papery, usually as long as flowers. **Flowers** white, sometimes with green on lip. **Sepals** and petals free, subsimilar; lip oblong or orbicular, entire or 3-lobed, ecallose, spurred at base; spur straight, sigmoid or geniculate, sometimes swollen at apex and/or mouth. **Column** short; rostellum projecting down and then abruptly upcurved in apical half, 2-lobed, each lobe falcate and acute; anther cap hemispherical, with a short, truncate appendage in front; pollinia 2, globose; stipes either 2 and subspathulate, or 1 and bifid; viscidium 1.

Species ± 16, trop. Africa, sthn trop. Afr. 1: *Ancistrohynchus tenuicaulis* Summerh., Malawi.

Angraecopsis Kraenzl.

(Epidendroideae—Vandaeae)

Kraenzlin: 171 (1900); Schlechter: 600 (1914); Perrier: 80 (1941); Summerhayes: 242 (1951); Schelp: 393 (1976); La Croix & Cribb: 395 (1995/1998); Mapaura & Timberlake: 166 (2002).

Small, epiphytic, monopodial herbs. **Leaves** distichous, ligulate to oblanceolate, often falcate, unequally 2-lobed at apex. **Inflorescences** axillary, racemose, few- to many-flowered. **Flow-**

Terrestrial herb, occasionally saprophytic, with very short rhizomes, numerous fleshy roots and simple erect leafy stems. **Leaves** ovate or lanceolate, plicate. **Inflorescence** racemose; flowers usually dull reddish or greenish, pedicelled. **Sepals** and **petals** free. **Lip** with no spur, but with hypochile forming a nectar-containing cup; hypochile articulated to epichile by a narrow joint. **Column** short, flat or concave in front, with a shallow cup at apex; anther free, 2-celled, hinged at back of column apex, behind stigma and rostellum; pollinia 2, attached near rostellum apex, each longitudinally divided, caudicles absent; pollen grains in friable masses loosely bound by fine threads. **Stigma** broad, with large, globular rostellum placed centrally above it.

Species ± 25, mostly north temperate regions; sthn trop. Afr. 1: *Epipactis africana* Rendle, Malawi.

Epipogium Borkh.

(Epidendroideae—Gastrodieae)

Borkhausen: 139 (1792); Schelpe: 385 (1976); La Croix & Cribb: 271 (1995/1998).

Leafless, saprophytic herb lacking chlorophyll; rhizome tuberous. **Scape** erect with a few basal sheaths; inflorescence terminal. **Tepals** free, subequal; lip spurred, concave with verrucose crests. **Column** and anther short; pollinia 2, sectile, each with a slender, curved caudicle and a single broad viscidium. **Stigma** broad, prominent; rostellum absent. **Cap-sule** ovoid, pendulous, developing quickly.

Species 2, 1 in temperate Eurasia, 1 in Old World tropics: *Epipogium roseum* (D. Don) Lindl., Angola, Malawi.

Eulophia R.Br. ex Lindl.

(Epidendroideae—Cymbidieae)

Schelpe: 386 (1976); Kidson & Fletcher: 24 (1994); La Croix & Cribb: 458 (1995/1998); Mapaura & Timberlake: 167 (2002).

Acrolophia Pfitzer in part; Williamson: 147 (1977).

Sthn trop. Afr. ± 90, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Eurychone Schltr.

(Epidendroideae—Vandaeae)

Schlechter: 134 (1918); Schelpe: 388 (1976); Wood: 585 (1989); La Croix: 153 (2001).

Epiphytic, monopodial, short-stemmed herbs. **Leaves** broadly oblong-elliptic, obovate or ligulate, unequally bilobed at apex. **Inflorescence** pendent, 2–12-flowered, often shorter than leaves. **Flowers** large, thin-textured, ± translucent, scented. **Sepals** and **petals** subsimilar, erect or spreading. **Lip** funnel-shaped, tapering into a wide-mouthed spur sharply constricted in middle, then recurved and swollen at apex. **Column** short and broad, lacking a foot; rostellum elongated, ligulate; anther cucullate, retuse; pollinia 2, ellipsoid; stipe 1, linear; viscidium 1, oblong or ovate, relatively large. (After La Croix: 156; 2001).

Species 2, trop. Africa; sthn trop. Afr. 1: *Eurychone galeandrae* (Rchb.f.) Schltr., Angola.

Graphorkis Thouars

(Epidendroideae—Cymbidieae)

Thouars: 318 (1809); La Croix & Cribb: 547 (1995/1998).

Epiphytic, sympodial herbs. **Pseudobulbs** clustered, conical-ovoid to cylindrical-fusiform, with several nodes, partly covered by fibrous leaf bases; roots of two types, some attached to substrate and some aerial, erect. **Leaves** developing after flowering, petiolate, narrowly elliptic, acute or acuminate, thin-textured, plicate. **Inflorescence** paniculate, many-flowered; flowers resupinate, yellowish, marked with brown or purple. **Sepals** and **petals** free; lip 3-lobed, spurred at base; disc with 2 keels. **Column** with hirsute basal auricles; rostellum elongate; pollinia 2, waxy, sessile, attached to a solitary viscidium.

Species 5, 4 in Madagascar, 1 in trop. Africa: *Graphorkis lurida* (Sw.) Kuntze, Zambia.

Habenaria Willd.

(Orchidoideae—Orchideae)

Schelpe: 384 (1976); La Croix & Cribb: 59 (1995/1998); Bingham & Smith: 143 (2002); Mapaura & Timberlake: 167 (2002); Msekandiana & Mlangeni: 37 (2002).

Kryptostoma Summerh.; Phiri (Unpublished).

Sthn trop. Afr. ± 120, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Holothrix Rich. ex Lindl.

(Orchidoideae—Orchideae)

Schelpe: 383 (1976); La Croix & Cribb: 34 (1995/1998); Bingham & Smith: 143 (2002).

Sthn trop. Afr. 12, Angola, Zambia, Zimbabwe, Malawi, and sthn Afr.

Jumellea Schltr.

(Epidendroideae—Vandaeae)

La Croix & Cribb: 379 (1995/1998).

Sthn trop. Afr. 2, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Liparis Rich.

(Epidendroideae—Malaxideae)

Schelpe: 386 (1976); La Croix & Cribb: 275 (1995/1998).

Sthn trop. Afr. ± 12, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Malaxis Sol. ex Sw.

(Epidendroideae—Malaxideae)

Swartz: 8, 119 (1788); La Croix & Cribb: 282 (1995/1998).

Microstylis Nutt.

Dwarf terrestrial, lithophytic or epiphytic herbs with creeping rhizomes or fusiform tuberous roots. **Stems** leafy, ± swollen at base; leaves thin-textured, plicate. **Inflorescence** erect, terminal, racemose or subumbellate, few- to many-flowered. **Flowers** small, resupinate, green, yellow-green, buff, orange or purple. **Sepals** and **petals** free, similar or dissimilar,

- WOOD, J.J. 1989. *Eurychone, Podangis. Flora of tropical east Africa. Orchidaceae (Part 3): 585, 489.*
- ZINN, J.G. 1757. *Catalogus plantarum Horti Gottingensis.* Vandenhoeck, Göttingen.

Pandanaceae
(Arecidae—Pandanales)
(Monocots—Pandanales)

Trees or shrubs, dioecious, usually sympodially branched, with leaves crowded towards ends of branches, and often with proproots at base; stems with annulate leaf scars. **Leaves** in 3 ranks appearing as spirals (therefore the common name *screw pines*), simple, glabrous, base sheathing, blade linear-ensiform, entire but armed on margins, and on adaxial face of midrib with prickles. **Inflorescences** terminal, sometimes lateral or axillary, usually unisexual, many-flowered, spicate or capitate spadices subtended by foliaceous bracts. **Flowers** unisexual, very small, sessile, without or with a rudimentary perianth. **Male flowers:** stamens many; filaments free or connate; anthers 2-theous, longitudinally dehiscent. **Female flowers** consisting of 1 or several free or fused carpels; 1-locular; containing 1 or several anatropous, bitegmic ovules; stigma sessile. **Infructescence** composed of many monodrupes (from 1-carpellate flowers) or polydrupes (from several-carpellate flowers) crowded into a large subglobose to ellipsoid structure. **Seeds** straight, with membranous seed coat; embryo small, straight; endosperm copious, oily. $x =$ usually 30.

Genera 3, species 800–900, palaeotropical; sthn trop. Afr.: genus 1, species 8.

Warburg: 1 (1900); Lebrun & Stork: 104 (1995); Stone *et al.*: 397 (1998).

Pandanus Parkinson

Parkinson: 46 (1773); Rendle: 84 (1899); Gossweiler & Mendonça: 115 (1939); White: 431 (1962); Hepper: 170 (1968); Stone: 260 (1974); Huynh: 3 (1986); Huynh: 17 (1988); Huynh: 21 (1989); Beentje: 1 (1993); Huynh: 91 (1997); Stone *et al.*: 402 (1998); Coates Palgrave: 96 (2002); Bingham (Unpublished); Phiri (Unpublished).

Description as for family.

Species \pm 600, palaeotropics and subtropics, \pm 50 in Africa; sthn trop. Afr. 8, Angola, Zambia, ?Zimbabwe (at least very close to Mozambique border), Mozambique.

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Poaceae
(Gramineae)
(Commelinidae—Cyperales/Poales)
(Commelinids—Poales)

Fish, L. in Leistner: 659 (2000).

The classification of genera is according to Clayton & Renvoize (1986). The main reference for this account is *Flora zambesiaca* 10(1–4).

Sthn trop. Afr.: genera 189 (10 exotic), species 870.

Key to tribes

The characters used in this and the following keys are not all applicable to Poaceae outside the area covered by this work. Although morphologically incorrect, in accordance with common usage in agrostological literature the term *pedicelled* is applied to a stalked spikelet. This key and the subsequent keys are based on the following works: Launert (1971), Clayton & Renvoize (1986), Clayton (1989), Cope (1999), Fish (2000) and Clayton (2002).

- 1a Arborescent or shrubby plants, flowering erratically. Culms woody, usually very tall (up to 25 m, 50–125 mm in diameter), hollow but often thick-walled. Leaf lamina finally disarticulating from the sheath, usually constricted at the base into a pseudo-petiole **1. BAMBUSOIDEAE**—1. BAMBUSEAE (p.424)
- 1b Perennial or annual herbs, rarely shrubby, flowering annually. Culms herbaceous, if woody then never more than 25 mm in diameter. Leaf lamina not disarticulating from the sheath, usually sessile, if with pseudopetiole then the other characters not applicable:
- 2a Spikelets unisexual, different in size and shape; the sexes in different inflorescences, in different parts of the same inflorescence or mixed.
Spikelets 1- or 2-flowered:
- 3a Spikelets 2-flowered:
- 4a Rachis of the inflorescence leaf-like, with the margins folding over short racemes inserted along its midrib **1. BAMBUSOIDEAE**—5. PHYLLORHACHIDEAE (p. 425)
- 4b Rachis of the inflorescence triquetrous or cylindric, but not leaf-like **6. PANICOIDEAE**—4. ANDROPOGONEAE (MAYDEAE) (p. 430)
- 3b Spikelets 1-flowered:
- 5a Female spikelets sessile or shortly pedicelled; glumes shorter than the floret, acute or apiculate; lemmas chartaceous, inflated, utriculate-urceolate, closed but for a small circular pore through which the stigmas emerge, covered with hooked hairs. Leaf lamina with the lateral nerves slanting **1. BAMBUSOIDEAE**—2. PHAREAE (p. 425)
- 5b Female spikelets on long, clavate pedicels; glumes much longer than the floret, long-caudate; lemma coriaceous, whitish, glossy, glabrous, open. Leaf lamina with the lateral nerves running parallel to the midrib **1. BAMBUSOIDEAE**—3. OLYREAE (p. 425)
- 2b Spikelets with all the florets bisexual or with some male or sterile and the rest bisexual (the male or sterile floret(s) either below or above the bisexual one(s)). Spikelets 1-many-flowered:
- 6a Spikelets 1-many-flowered, disintegrating at maturity above the usually persistent glumes, if falling entire then not 2-flowered with the superior floret bisexual and the inferior male or sterile. Spikelets usually laterally compressed to a varying degree:
- 7a Lemmas either 9-awned or with 4–6 apical hyaline lobes alternating with 5 awns **5. CHLORIDOIDEAE**—1. PAPPOPHOREAE (p. 426)
- 7b Lemmas 1–3-awned, entire or 2-lobed:
- 8a Leaf lamina with distinct transverse veinlets (usually best observed on the lower surface):
- 9a Ovary glabrous. Spikelets usually more than 4-flowered, if 1–3-flowered then leaves with pseudopetiole. Lemmas 5–7-nerved **3. CENTOTHECOIDEAE**—CENTOTHECEAE (p. 425)
- 9b Ovary with the apex distinctly pilose. Spikelets 1–4-flowered. Lemma 3–± 5-nerved (rarely fully 5-nerved) **2. POOIDEAE**—1. POEAE in part (p. 425)
- 8b Leaf lamina without transverse veinlets:
- 10a Rachilla internodes densely penicillate near the apex; the hairs 4–10 mm long, obscuring the lemma. Robust reedy perennials with bamboo-like culms up to 8 m tall. Panicles large, plumose **4. ARUNDINOIDEAE**—1. ARUNDINEAE (p. 426)
- 10b Rachilla internodes glabrous or pilose, if pilose then hairs not longer than 3 mm. Plants much smaller, not reed-like:
- 11a Spikelets falling off entire at maturity, 1-flowered, arranged solitarily or in groups along the rigid persistent axis of a raceme or spike-like panicle; glumes either covered with 3 conspicuously thickened straight or hooked hairs or drawn out into a long slender awn which is several times as long as the body of the glume **5. CHLORIDOIDEAE**—4. CYNODONTEAE (ZOYSIEAE) (p. 427)
- 11b Spikelets breaking up at maturity leaving the glumes behind, 1-many-flowered, if falling entire then arranged in panicles:
- 12a Spikelets arranged in spikes or racemes, these either solitary, digitate or scattered along a common axis:
- 13a Spikelets sunk into cavities on alternate sides of the rachis of a solitary spike:
- 14a Rachis of the spike fragile, disarticulating between the spikelets **5. CHLORIDOIDEAE**—3. LEPTUREAE (p. 427)
- 14b Rachis of the spike persistent or disarticulating irregularly **5. CHLORIDOIDEAE**—4. CYNODONTEAE (CHLORIDEAE) in part (*Oropetium*) (p. 427)
- 13b Spikelets not sunk into cavities of the rachis:
- 15a Spikelets arranged on opposite sides of the rachis and facing it laterally. Ovary with the apex pilose:
- 16a Spikelets sessile or 1-flowered **2. POOIDEAE**—5. TRITICEAE (p. 425)
- 16b Spikelets shortly pedicelled, many-flowered **2. POOIDEAE**—5. TRITICEAE (BRACHYPODIEAE) (p. 425)
- 15b Spikelets in secund spikes or racemes, if (rarely) on opposite sides then arranged edgeways towards the rachis:
- 17a Spikelets with 1 bisexual floret only, with or without male or sterile florets beneath or above it **5. CHLORIDOIDEAE**—4. CYNODONTEAE (CHLORIDEAE) (p. 427)
- 17b Spikelets with 2-many bisexual florets:
- 18a Spikes or racemes solitary or scattered along a common axis **5. CHLORIDOIDEAE**—2. ERAGROSTIDEAE (p. 426)
- 18b Spikes or racemes digitate:
- 19a Ligule a membrane, glabrous. Spikelets with 2 or 3 (rarely 4) florets usually followed by 2 to several sterile ones **5. CHLORIDOIDEAE**—4. CYNODONTEAE (CHLORIDEAE) in part (*Tetrapogon*) (p. 427)
- 19b Ligule a rim of hairs or a short ciliate membrane **5. CHLORIDOIDEAE**—2. ERAGROSTIDEAE (p. 426)
- 12b Spikelets arranged in open or contracted panicles, or in globose clusters:
- 20a Glumes reduced to minute scales or just represented by a tiny collar at the apex of the pedicel. Stamens 6. Spikelets strongly laterally compressed **1. BAMBUSOIDEAE**—4. ORYZEAE (p. 425)
- 20b Glumes, or at least 1 of them, fully developed. Stamens usually 3:
- 21a Spikelets strictly 1-flowered, but sometimes with the rachilla extended beyond the floret:

- 22a Lemmas subcylindric, indurated at maturity, with a 3-branched awn or rarely (*Aristida diminuta*) with a simple straight 7–10 mm long apical awn **4. ARUNDINOIDEAE**—2. ARISTIDEAE (p. 426)
- 22b Lemmas neither subcylindric nor indurated, awnless or awned, in the latter case the awn shorter than 5 mm or dorsally inserted:
- 23a Lemmas awnless. Glumes usually shorter than the lemmas and similar in texture. Caryopsis with a loose pericarp **5. CHLORIDOIDEAE**—2. ERAGROSTIDEAE (p. 426)
- 23b Lemmas awned or awnless. Glumes usually longer than the lemmas and firmer in texture. Caryopsis not with a loose pericarp **2. POOIDEAE**—3. AVENEAE (AGROSTIDEAE) (p. 425)
- 21b Spikelets 2–many-flowered:
- 24a Spikelets with only 1 bisexual floret:
- 25a Spikelets with 2 florets; the lower one male or sterile; the upper one bisexual. Lemma of the bisexual floret usually awned **6. PANICOIDEAE**—3. ARUNDINELLEAE (p. 429)
- 25b Spikelets with 3 florets; the 1st and 2nd reduced to empty lemmas (sometimes 1 of them completely depressed). Lemma of the 3rd (bisexual) spikelet awnless:
- 26a Upper sterile lemma with a basal hinge-like appendage; both sterile lemmas as long as or longer than the bisexual floret **1. BAMBUSOIDEAE**—6. EHRHARTEAE (p. 425)
- 26b Upper sterile lemma without basal appendage; both sterile lemmas much shorter than the bisexual floret
..... **2. POOIDEAE**—3. AVENEAE (PHALARIDEAE) (p. 425)
- 24b Spikelets with 2–many bisexual florets:
- 27a Spikelets 2-flowered, awnless, with at least 1 of the lemmas coriaceous
..... **6. PANICOIDEAE**—2. ISACHNEAE (p. 429)
- 27b Spikelets 3–many-flowered:
- 28a Glumes usually as long as the spikelet but always longer than the lowermost lemma, if shorter than lemmas then with dorsal or geniculate awns. Lemmas 5–many-nerved:
- 29a Lemmas dorsally awned (sometimes awnless in *Koeleria* but then with the inflorescence conspicuously pubescent or thinly tomentose) **2. POOIDEAE**—3. AVENEAE (p. 425)
- 29b Lemmas awned between 2 apical lobes
..... **4. ARUNDINOIDEAE**—1. ARUNDINEAE (DANTHONIEAE) (p. 426)
- 28b Glumes shorter than the spikelet and almost always shorter than the lowermost lemma. Lemmas 1–many-nerved, awnless or with a straight apical awn:
- 30a Lemmas 1–3-nerved:
- 31a Spikelets awnless **5. CHLORIDOIDEAE**—2. ERAGROSTIDEAE (p. 426)
- 31b Spikelets awned **4. ARUNDINOIDEAE**—1. ARUNDINEAE (DANTHONIEAE) (p. 426)
- 30b Lemmas 5–many-nerved:
- 32a Lemmas awned; the awns 20–43 mm long, twisted, becoming entangled with the awns from the other florets **2. POOIDEAE** —2. MELICEAE (p. 425)
- 32b Lemmas awnless or with much shorter straight awns:
- 33a Ovary crowned by a pilose fleshy appendage above the insertion of the styles
..... **2. POOIDEAE** —4. BROMEAE (p. 425)
- 33b Ovary pilose or glabrous, without a fleshy appendage **2. POOIDEAE** —1. POEAE (p. 425)
- 6b Spikelets typically 2-flowered, falling entire at maturity, usually with the superior floret bisexual and the inferior one male or sterile, if sterile then often greatly reduced. Spikelets frequently dorsally compressed:
- 34a Spikelets usually solitary, sometimes paired, ± similar. Glumes usually membranous; the lower one usually smaller or sometimes absent. Lemma of the lower floret usually similar to the upper glume in texture; lemma of the upper floret hardened, chartaceous, coriaceous or crustaceous, awnless or rarely with a short straight awn **6. PANICOIDEAE**—1. PANICEAE (p. 428)
- 34b Spikelets typically paired, with 1 sessile and the other pedicelled, those of each pair similar or more often dissimilar (the pedicelled sometimes much reduced), rarely with the spikelets all similar. Glumes usually as long as the spikelets and enclosing the florets, somewhat rigid and firmer than the hyaline or membranous lemmas. Lemma of the upper floret often awned; the awn usually geniculate **6. PANICOIDEAE**—4. ANDROPOGONEAE (p. 430)

Keys to genera (arranged according to subfamilies and tribes)

1. Subfamily Bambusoideae

1. Bambuseae

- 1a Inflorescence determinate (semelauctant): a panicle or reduced to a raceme; stigmas 2:
- 2a Shrubs or small trees; anthers 3 **Sinarundinaria**
- 2b Perennial herbs; anthers 6 **Guadua**
- 1b Inflorescence indeterminate (iterauctant): a cluster of pseudospikelets; stigmas 1 or 3:
- 3a Inflorescence a cluster of 1–many pseudospikelets sessile on a node; culm sheath blade very broad; lodicules 2 or 3 ***Bambusa**
- 3b Inflorescence a globose or cup-shaped cluster of pseudospikelets on bare branches; culm sheath blade narrow, apex of leaves pungent; lodicules absent:

4a Filaments united; stigmas 3; glumes 2–4; inflorescence globose, spiky **Oxytenanthera**

4b Filaments free; stigma 1; glume 1; inflorescence cup-shaped, surrounded by bracts forming a pseudo-involucre **Oreobambos**

2. Phareae

Tribe represented only by **Leptaspis**

3. Olyreae

Tribe represented only by ***Olyra**

4. Oryzae

Spikelets with 2 greatly reduced sterile lemmas beneath the fertile floret **Oryza**

Spikelets without sterile lemmas beneath the floret **Leersia**

5. Phyllorhachideae

Tribe represented only by **Phyllorhachis**

6. Ehrharteae

Tribe represented by its only genus: **Ehrharta**

2. Subfamily Pooideae

1. Poeae

1a Inflorescence a spike, with the spikelets arranged in 2 rows on alternate sides of the rachis ***Lolium**

1b Inflorescence a panicle:

2a Lemmas very broad from a distinctly cordate base, not awned; spikelets 3–14 mm wide; annual plants ***Briza**

2b Lemmas lanceolate or ovate-lanceolate, never cordate at the base; spikelets usually smaller than above; perennial plants (except *Poa annua*):

3a Leaf blade with transverse veinlets (= *Pseudobromus*) **Festuca**

3b Leaf blade without transverse veinlets:

4a Lemmas dorsally rounded (rarely slightly keeled towards the apex), awned or awnless **Festuca**

4b Lemmas keeled, laterally compressed, not awned:

5a Spikelets solitary with pedicels swollen at apex **Poa**

5b Spikelets crowded in dense shortly pedicelled clusters at ends of short main branches ***Dactylis**

2. Meliceae

Tribe represented only by **Streblochaete**

3. Aveneae

1a Inflorescence a dense spike-like panicle ***Phalaris**

1b Inflorescence an open or contracted panicle or raceme:

2a Floret 1 per spikelet:

3a Spikelet falling with glumes; lemma awnless or awned, central awn arising at or near apex **Polypogon**

3b Spikelet disarticulating above the glumes; lemma awnless or awned, central awn arising well below the apex or at the base **Agrostis**

2b Florets 2 or more per spikelet:

4a Lemmas awnless, sometimes mucronate; rachis of the (usually contracted) panicle conspicuously tomentose or densely pubescent **Koeleria**

4b Lemmas all, or at least one in a spikelet, awned; rachis of the panicle glabrous or scabrous, if pilose than neither tomentose nor densely pubescent:

5a Lower lemma awnless; upper lemma with short hooked awn from back near apex; spikelets falling with glumes ***Holcus**

5b All lemmas awned; spikelets disarticulating above the glumes:

6a Spikelets strictly 2-flowered, 2.0–4.5 mm long, with both florets bisexual; plants annual ***Aira**

6b Spikelets at least 2–6-flowered, always longer than 5.5 mm; plants perennial or annual:

7a Spikelets with 3 florets; the first and second sterile, reduced to dorsally awned lemmas; the third bisexual, enveloped by the preceding sterile ones **Anthoxanthum**

7b Spikelets with 2–6 florets (the first 3 reduced), with all lemmas awned:

8a Glumes 7–11-nerved, often slightly cross-veined; weak annuals ***Avena**

8b Glumes 1–3-nerved, never cross-veined; perennials **Helictotrichon**

4. Bromeae

Tribe represented only by **Bromus**

5. Triticeae

Tribe represented only by **Brachypodium**

3. Subfamily Centothecoideae

Centothecae

1a Lemmas awned **Bromuniola**

1b Lemmas awnless:

2a Rachilla internodes fused to keels of adjacent palea; robust perennials **Orthoclada**

2b Rachilla internodes free; annuals or short-lived perennials:

3a Spikelets 8–20-flowered, the apical florets similar but smaller **Megastachya**

3b Spikelets 1–4-flowered, the terminal floret rudimentary **Centotheca**

4. Subfamily Arundinoideae

1. Arundineae

- 1a Plants reed-like with distichous cauline leaves **Phragmites**
- 1b Plants growing in tufts with basal leaves, not reed-like:
- 2a Lemma 5- or more-nerved:
- 3a Lemma often pilose on the back or flanks, but hairs not in tufts or lines, sometimes glabrous:
- 4a Inferior glume longer than the lowermost lemma **Pentaschistis**
- 4b Inferior glume shorter than the lowermost lemma:
- 5a Awn much longer than lemma **Piptophyllum**
- 5b Awn shorter than lemma **Stypeioclhoa**
- 3b Lemma with hairs in tufts or lines, rarely with a transverse band of longer hairs:
- 6a Floret callus pungent; lemma hairs in longitudinal lines **Centropodia**
- 6b Floret callus obtuse; lemma hairs not in longitudinal lines:
- 7a Lowermost floret different from the rest, persisting with the glumes and resembling the upper floret, usually imperfect **Alloochaete**
- 7b Lowermost floret similar to the rest, different from the glumes (= *Rytidosperma* in part) **Merxmüllera**
- 2b Lemma 1–3-nerved:
- 8a Inflorescence strongly condensed, the spikelets in dense globular clusters **Elytrophorus**
- 8b Inflorescence open or loosely contracted, the spikelets not in clusters:
- 9a Awn shorter than the lemma **Stypeioclhoa**
- 9b Awn longer than the lemma **Nematopoa**

2. Aristideae

- 1a Awns on lemma all, or only middle one, plumose; palea indurated **Stipagrostis**
- 1b Awns on lemma all glabrous, smooth or scabrid; palea not indurated:
- 2a Upper glume 3–5-nerved; lower glume usually 3-nerved; glumes rounded on back; awns spirally contorted at base; caryopsis deeply grooved ventrally **Sartidia**
- 2b Upper glume 1(3)-nerved; lower glume nearly always 1-nerved; glumes 1-keeled to middle or below; awns not spirally contorted at base; caryopsis not deeply grooved **Aristida**

5. Subfamily Chloridoideae

1. Pappophoreae

- 1a Lemmas with 2(–4) awns **Kaokochloa** (presence in Angola unconfirmed)
- 1b Lemmas with 7–11 awns or lobes:
- 2a Lemma 9-awned, with awns emerging from the apex of 9 hyaline lobes **Enneapogon**
- 2b Lemma 5-awned, with the awns alternating with 4 hyaline lobes **Schmidtia**

2. Eragrostideae

- 1a Lemmas 5–11-nerved in the upper part, the nerves disappearing or confluent below:
- 2a Spikelets disarticulating above the glumes but not between the florets **Lintonia** (Cynodonteae)
- 2b Spikelets falling entire:
- 3a Lower florets sterile **Entoplocamia**
- 3b Lower florets bisexual **Fingerhuthia**
- 1b Lemmas 1–3-nerved throughout (rarely up to 7-nerved but then the spikelets disarticulating between the florets):
- 4a Spikelets with 1 fertile floret embedded in the rachis of a solitary raceme and covered by the upper glume; lower glume small or suppressed **Oropetium**
- 4b Spikelets 1–many-flowered, if 1-flowered then not as above:
- 5a Spikelets strictly 1-flowered or occasionally with a rachilla extension; inflorescence a panicle:
- 6a Lemma with a long awn **Hubbardochloa**
- 6b Lemma awnless:
- 7a Spikelets fusiform; glumes and lemma rounded on the back **Sporobolus**
- 7b Spikelets strongly laterally compressed; glumes and lemmas keeled ***Crypsis**
- 5b Spikelets 2- or more-flowered (if 1-flowered then the inflorescence composed of racemes):
- 8a Tip of lemma emarginate to 2- or 3-lobed, or flanks hairy between the lateral nerves and the margin, or nerves ciliate, or florets conspicuously bearded from the callus:
- 9a Leaf lamina rigid and pungent **Odyssea**
- 9b Leaf lamina not conspicuously pungent though often rather stiff:
- 10a Inflorescence an open or contracted panicle:
- 11a Plants tall, with large plumose panicles:
- 12a Lemma long-ciliate on the lateral nerves **Neyraudia**
- 12b Lemma glabrous or pilose on the back **Phragmites**
- 11b Plants shorter and without large plumose panicles:
- 13a Lemma 3-awned **Triraphis**
- 13b Lemma without or with a single awn, rarely the lateral awns excurrent to a micro:
- 14a Lemma awnless **Eragrostis**

- 14b Lemma awned:
- 15a Awn shorter than the lemma **Tridens**
- 15b Awn longer than the lemma:
- 16a Glumes as long as the spikelet; floret callus square **Habrochloa**
- 16b Glumes shorter than the spikelet, rarely longer but then floret callus linear see ARUNDINEAE (p. 426)
- 10b Inflorescence composed of distinct racemes, these crowded in *Leptocarydion*, sometimes with short secondary branchlets in *Dinebra*:
- 17a Inflorescence of single racemes, these not deciduous **Tripogon**
- 17b Inflorescence of 2–many racemes:
- 18a Racemes not deciduous:
- 19a Inferior glume not or only slightly exceeding the lowermost lemma:
- 20a Spikelets disarticulating above the glumes but not between the florets:
- 21a Lemmas awned from near the apex **Tetrapogon** (Cynodonteae)
- 21b Lemmas awned from the back **Bewisia**
- 20b Spikelets disarticulating between the florets, or rachilla persistent:
- 22a Uppermost floret or rudiment with a substantial terminal awn:
- 23a Inflorescence of digitate racemes **Lophacme**
- 23b Inflorescence a dense feathery head of numerous crowded racemes **Leptocarydion**
- 22b Uppermost floret awnless, rarely submucronate or very shortly awned:
- 24a Florets conspicuously bearded from the callus **Halopyrum**
- 24b Florets not bearded from the callus:
- 25a Rachilla persistent, or upper part of spikelet shed as a whole; pericarp free **Acrachne**
- 25b Rachilla disarticulating between the florets:
- 26a Raceme rachis terminating in a fertile spikelet:
- 27a Lemmas 3-nerved **Leptochloa**
- 27b Lemmas 5–7-nerved **Brachychloa**
- 26b Raceme rachis terminating in a naked bristle:
- 28a Spikelets pedicelled, loose; lemma 3-nerved **Eragrostis**
- 28b Spikelets sessile, imbricate; lemma 1-nerved **Richardsiella**
- 19b Inferior glume much longer than the lowermost lemma, often as long as the spikelet:
- 29a Lateral nerves of the lemma appressed-pubescent or rarely glabrous **Dinebra**
- 29b Lateral nerves of the lemma conspicuously ciliate or villous **Trichoneura**
- 18b Racemes (or secondary branchlets) deciduous:
- 30a Glumes as long as the spikelet, enclosing the florets **Dinebra**
- 30b Glumes not or scarcely exceeding the adjacent lemmas **Brachychloa**
- 8b Tip of lemma entire, the nerves and flanks glabrous (rarely the lemma ciliate on the margin itself); florets not conspicuously bearded from the callus:
- 31a Inflorescence a panicle **Eragrostis**
- 31b Inflorescence composed of 1 or more racemes:
- 32a Raceme a single “bottle brush” with reflexed spikelets **Harpachne**
- 32b Racemes 2 or more:
- 33a Inflorescence digitate or ± whorled; fruit with free pericarp (otherwise see *Leptochloa*)
- 34a Racemes terminating in a fertile spikelet **Eleusine**
- 34b Racemes terminating in an abortive spikelet or naked point:
- 35a Paleas, or some of them, remaining on the rachilla **Acrachne**
- 35b Paleas falling with the lemmas:
- 36a Rachis terminating in abortive spikelets; leaf lamina terete **Sclerodactylon**
- 36b Rachis terminating in a naked point; leaf lamina flat or involute **Dactyloctenium**
- 33b Inflorescence of racemes disposed singly along a central axis:
- 37a Racemes deciduous (if glumes longer than florets see *Dinebra*) **Pogonarthria**
- 37b Racemes persistent **Eragrostis**

3. Leptureae

Tribe represented only by **Lepturus**

4. Cynodonteae

- 1a Spikelet containing 2–5 fertile florets:
- 2a Body of lemma 5–11-nerved **Lintonia**
- 2b Body of lemma 3-nerved **Tetrapogon**
- 1b Spikelets containing 1 fertile floret:
- 3a Racemes persistent; spikelets breaking up at maturity:
- 4a Lemma exposed; one or both glumes shorter than the florets:
- 5a Upper glume with an oblique dorsal awn:
- 6a Fertile floret without sterile lemmas below it **Kamphochloa**

- 6b Fertile floret with 2 sterile lemmas below it **Ctenium**
- 5b Upper glume awnless or awned from near the apex:
- 7a Lemma sinuously awned **Schoenefeldia**
- 7b Lemma awnless or with a straight awn:
- 8a Spikelets 2–several-flowered:
- 9a Lemma and caryopsis dorsally compressed **Enteropogon**
- 9b Lemma laterally compressed; caryopsis trigonous to subterete:
- 10a Racemes solitary **Harpochloa**
- 10b Racemes digitate:
- 11a Lemma awned, pallid; upper glume acute to 2-toothed **Chloris**
- 11b Lemma awnless, dark brown; upper glume obtuse to 2-lobed **Eustachys**
- 8b Spikelets 1-flowered:
- 12a Spikelets dorsally compressed **Willkommia**
- 12b Spikelets laterally compressed:
- 13a Lemmas usually awned; glumes acute to truncate, erose **Daknopholis**
- 13b Lemmas awnless; glumes acute **Cynodon**
- 4b Lemma concealed; both glumes exceeding and closed around the florets:
- 14a Spikelets subterete to dorsally compressed:
- 15a Raceme 1 (rarely 2); rachis semiterete **Microchloa**
- 15b Racemes several; rachis flat **Craspedorhachis**
- 14b Spikelets laterally compressed:
- 16a Racemes borne upon an axis and crowded into a spiciform head **Pogonochloa**
- 16b Racemes single or digitate:
- 17a Glumes thinner in texture than the lemma **Chrysochloa**
- 17b Glumes firmer in texture than the lemma **Brachyachne**
- 3b Racemes deciduous or spikelets falling entire:
- 18a Lower glume very small or suppressed; upper glume with the nerves forming raised ribs:
- 19a Upper glume awned; ribs on upper glume scaberulous **Monelytrum**
- 19b Upper glume awnless; ribs on upper glume spinose **Tragus**
- 18b Lower glume well-developed; upper glume not ribbed as above:
- 20a Racemelets comprising 2 or 3 spikelets separated by short rachis internodes **Dignathia**
- 20b Racemelets comprising a single spikelet **Perotis**

6. Subfamily Panicoideae

1. Paniceae

- 1a Spikelets, at least some, subtended by 1 to many bristles, spines or scales:
- 2a Bristles persisting on the axis after spikelets have fallen **Setaria**
- 2b Bristles or scales falling with the spikelets:
- 3a Spikelets subtended by a single bristle and supported on a slender stipe **Paratheria**
- 3b Spikelet surrounded by an involucre of bristles or scales, or bristle single and spikelet sessile:
- 4a Involucre composed of glumaceous bracts **Anthephora**
- 4b Involucre composed of bristles or spines:
- 5a Bristles free throughout, \pm filiform **Pennisetum**
- 5b Bristles flattened and connate below:
- 6a Inflorescence spiciform **Cenchrus**
- 6b Inflorescence with distant to \pm crowded raceme-like branches **Streptolophus**
- 1b Spikelets not subtended by bristles or scales:
- 7a Leaf surface raised into sinuous lamellae; plant aquatic **Hydrothauma**
- 7b Leaf surface not lamellate:
- 8a Spikelets supported on a globular bead-like callus **Eriochloa**
- 8b Spikelets without a basal bead, though sometimes with a short cylindrical stipe:
- 9a Inflorescence a panicle, occasionally \pm condensed about the primary branches:
- 10a Panicle cylindrical, spiciform **Sacciolepis**
- 10b Panicle open or contracted:
- 11a Spikelets dorsally compressed, rarely slightly gibbous:
- 12a Lower lemma awnless (if upper lemma tipped with a dark green spot or crest see *Acroceras*) **Panicum**
- 12b Lower lemma awned:
- 13a Awn over 5 mm long **Oryzidium**
- 13b Awn up to 1 mm long **Hylebates**
- 11b Spikelets laterally compressed; lower glume absent or minute (up to 0.5 mm in *Sacciolepis*):
- 14a Upper lemma laterally compressed:
- 15a Lower glume reduced to a minute scale or rim or absent **Melinis**

- 15b Lower glume well-developed, acute **Cyrtococcum**
- 14b Upper lemma dorsally compressed:
- 16a Upper glume gibbous, distinctly ribbed **Sacciolepis**
- 16b Upper glume neither gibbous nor ribbed **Tricholaena**
- 9b Inflorescence consisting of 1-sided racemes, these either digitate or scattered along a central axis, rarely solitary; the racemes sometimes with short secondary branchlets (especially *Echinochloa crus-galli* and *Brachiaria malacodes*) or with the spikelets long-pedicelled and distant (*Brachiaria deflexa*):
- 17a Racemes very short, of 1–8 spikelets, ± impressed in a thickened axis **Stenotaphrum**
- 17b Racemes free, appressed or divergent:
- 18a Upper lemma with a tiny green crest at the tip; upper glume and lower lemma ± thickened at the apex **Acroceras**
- 18b Upper lemma not crested (sometimes mucronate or awned):
- 19a Spikelets laterally compressed or the lower glume awned:
- 20a Upper lemma dorsally compressed; lower glume awned **Oplismenus**
- 20b Upper lemma laterally compressed; lower glume usually awnless:
- 21a Upper glume neither gibbous nor armed with hooks; inferior glume shorter than the spikelet **Poecilostachys**
- 21b Upper glume gibbous, armed with hooks at maturity; lower glume ± as long as the spikelet **Pseudechinochloa**
- 19b Spikelets dorsally compressed, the lower glume at most with a short awn-point:
- 22a Upper lemma coriaceous to crustaceous, with narrow inrolled margins clasping only edges of palea; sometimes thinner but then margins inrolled:
- 23a Lower glume absent (rarely represented by a tiny triangular scale on some of the spikelets):
- 24a Back of upper lemma facing the rachis; spikelets strongly plano-convex and often orbicular **Paspalum**
- 24b Back of upper lemma turned away from the rachis **Axonopus**
- 23b Lower glume present:
- 25a Upper lemma hairy **Entolasia**
- 25b Upper lemma glabrous:
- 26a Upper lemma awned, crisply chartaceous **Alloteropsis**
- 26b Upper lemma at most mucronate, coriaceous to crustaceous:
- 27a Spikelets paired or in racemelets:
- 28a Tip of upper palea reflexed and slightly protuberant; spikelets cuspidate to awned, usually in 4 rows **Echinochloa**
- 28b Tip of upper palea not reflexed:
- 29a Upper lemma as long as the spikelet, acute, obtuse or rarely mucronulate; spikelets plump, obtuse to acute **Brachiaria**
- 29b Upper lemma shorter than the spikelet, broadly obtuse with a mucro 0.5–1.0 mm long; spikelets plano-convex, cuspidate **Urochloa**
- 27b Spikelets borne singly:
- 30a Lower glume turned towards the rachis:
- 31a Upper floret sessile **Brachiaria**
- 31b Upper floret stipitate; upper glume and lower lemma resembling woven fabric **Eccoptocarpa**
- 30b Lower glume turned away from the rachis:
- 32a Upper lemma shorter than the spikelet, broadly obtuse, nearly always mucronate **Urochloa**
- 32b Upper lemma as long as the spikelet, acute **Paspalidium**
- 22b Upper lemma cartilaginous, with flat, thin margins covering most of the palea and often overlapping:
- 33a Spikelets awned:
- 34a Racemes digitate **Stereochloa**
- 34b Racemes single or borne along a central axis:
- 35a Racemes single **Baptorhachis**
- 35b Racemes borne along a central axis **Acritochaete**
- 33b Spikelets awnless:
- 36a Lower glume as long as the spikelet **Megaloprotachne**
- 36b Lower glume shorter than the spikelet or suppressed **Digitaria**

2. Isachneae

- 1a Inflorescence of racemes **Heteranthoecia**
- 1b Inflorescence a panicle:
- 2a Upper lemma becoming crisply chartaceous to crustaceous; glumes deciduous **Isachne**
- 2b Upper lemma remaining membranous, thinner than the lower one; glumes persistent **Coelachne**

3. Arundinelleae

- 1a Ligule shortly membranous; hilum round **Arundinella**
- 1b Ligule a line of hairs; hilum linear; upper lemma hairy or quite smooth:
- 2a Lower lemma 3-nerved:
- 3a Lobes of upper lemma awned, with a tuft of hairs below each lobe **Trichopteryx**
- 3b Lobes of upper lemma awnless (if with hair tufts see *Danthoniopsis*):

- 4a Spikelets paired or single, rarely in loose groups of three with long pedicels **Loudetia**
- 4b Spikelets in close triads **Loudetiopsis**
- 2b Lower lemma 5–9-nerved:
- 5a Spikelets in groups of 3 with connate pedicels; if upper lemma hairy then hairs not in tufts:
- 6a Callus of upper floret conical, pungent **Tristachya**
- 6b Callus of upper floret short, broadly rounded **Zonotriche**
- 5b Spikelets with free pedicels; upper lemma with tufts of hair across the back:
- 7a Palea of inferior floret woody at maturity; inferior glume awned **Gilgichloa**
- 7b Palea of inferior floret membranous; inferior glume obtuse to acuminate; hair tufts on upper lemma 6–8 **Danthoniopsis**
- 4. Andropogoneae**
- 1a Inflorescence branches each subtended by a smooth ivory-like bead or cupule enclosing female spikelets; male spikelets on a tassel exerted from the bead; annuals ***Coix**
- 1b Inflorescence branches not subtended by a smooth ivory-like bead or cupule; annuals or perennials:
- 2a Rachis internodes and pedicels slender, filiform or linear, rarely thickening upwards and then the upper lemma awned or the callus fulvously barbate:
- 3a Upper lemma awned from low down on the back **Arthraxon**
- 3b Upper lemma awnless or awned from the apex or from the sinus of a bilobed apex:
- 4a Spikelets all alike or nearly so:
- 5a Inflorescence a panicle with elongated central axis:
- 6a Panicle branches distally fragile; one spikelet of each pair sessile:
- 7a Callus hairs rufous or tawny; racemes short, dense **Eriochrysis**
- 7b Callus hairs silvery; racemes long, loose:
- 8a Callus hairs much longer than the spikelet **Saccharum**
- 8b Callus hairs shorter than the spikelet **Sorghastrum**
- 6b Panicle branches tough; all spikelets pedicelled:
- 9a Callus pubescent, the hairs less than $\frac{1}{4}$ the length of the spikelet **Cleistachne**
- 9b Callus conspicuously barbate, the hairs at least $\frac{1}{4}$ the length of the spikelet:
- 10a Panicle loose, the component racemes distinct **Miscanthus**
- 10b Panicle spiciform **Imperata**
- 5b Inflorescence of 1–many subdigitate racemes:
- 11a Callus acutely conical to pungent; rachis fragile (if tough see *Trachypogon*) **Homoezeugos**
- 11b Callus obtuse:
- 12a Lower glume convex or concave, often villous **Eulalia**
- 12b Lower glume medianly grooved, glabrous or ciliate only at the apex **Microstegium**
- 4b Spikelets of each pair significantly different, sometimes the pedicelled spikelet rudimentary or represented only by its pedicel:
- 13a Sessile spikelet male or sterile, the pedicelled spikelet fertile **Trachypogon**
- 13b Sessile spikelet fertile, the pedicelled spikelet male, sterile or suppressed:
- 14a Inflorescence a panicle with an elongated central axis, not supported by spatheoles:
- 15a Sessile spikelets laterally compressed or terete **Chrysopogon**
- 15b Sessile spikelets dorsally compressed:
- 16a Pedicels sterile **Sorghastrum**
- 16b Pedicels all bearing spikelets:
- 17a Rachis internodes and pedicels solid **Sorghum**
- 17b Rachis internodes and pedicels with a translucent or balsamiferous, sometimes purple-tinged, median line:
- 18a Racemes composed of 1 or 2 sessile spikelets **Capillipedium**
- 18b Racemes composed of 10 or more sessile spikelets **Bothriochloa**
- 14b Inflorescence of single, paired or subdigitate racemes, often supported by spatheoles:
- 19a Fertile lemma awned from its entire apex:
- 20a Racemes composed of a single awned sessile spikelet and 2 pedicelled spikelets, enclosed by an involucre of 4 sterile spikelets **Themeda**
- 20b Racemes composed of many pairs of spikelets:
- 21a Callus pungent **Heteropogon**
- 21b Callus obtuse (but if inflorescence a dense spatheate head see *Cymbopogon densiflorus*):
- 22a Rachis internodes and pedicels solid **Dichanthium**
- 22b Rachis internodes and pedicels with a translucent or balsamiferous, sometimes purple-tinged, median line:
- 23a Racemes erect or divergent, without homogamous pairs **Bothriochloa**
- 23b Racemes nodding, with 1–3 homogamous pairs at the base **Euclasta**
- 19b Fertile lemma awned from the sinus of its bilobed apex, rarely awnless (lemma entire in *Andropogon brazzae* and *Schizachyrium lopollense*):
- 24a Lower glume of sessile spikelet transversely rugose; pedicelled spikelet represented only by a narrow curved pedicel **Thelepogon**

- 24b Lower glume of sessile spikelet smooth, rarely rugose and then the pedicelled spikelet well-developed:
- 25a Callus of sessile spikelet inserted into the crateriform or cupuliform apex of the internode, at least the rim of the internode lapping over and concealing the tip of the callus; lower glume of sessile spikelet 2-keeled or with the margins sharply inflexed and usually depressed between the keels, rarely the flanks abruptly rounded but then deeply grooved between them:
- 26a Lower floret of sessile spikelet male, with a well-developed palea:
- 27a Racemes paired or digitate (rarely single but than the upper glume neither awned nor crested) **Ischaemum**
- 27b Racemes single:
- 28a Glumes inconspicuously winged, the upper one awned **Sehima**
- 28b Glumes with a prominent wing-like crest, muticous **Andropogon**
- 26b Lower floret of sessile spikelet sterile and reduced to a lemma:
- 29a Callus of sessile spikelet acute to pungent, 1–5 mm long **Diheteropogon**
- 29b Callus of sessile spikelet obtuse, usually very short:
- 30a Racemes single; lower glume of sessile spikelet with several intercarinal nerves **Schizachyrium**
- 30b Racemes paired or digitate, rarely single and then the lower glume of the sessile spikelet nerveless between the keels:
- 31a Racemes not deflexed, borne on unequal terete raceme-bases; leaves not aromatic **Andropogon**
- 31b Racemes deflexed at maturity, borne on subequal flattened raceme-bases, seldom longer than the spatheole; rachis internodes and pedicels linear; leaves aromatic; panicle dense, decompound **Cymbopogon**
- 25b Callus of sessile spikelet applied obliquely to the apex of the internode with its tip free, usually acute to pungent; lower glume of sessile spikelet convexly rounded on the back without keels (rarely with a median groove); internodes and pedicels linear:
- 32a Racemes paired, rarely single, but then the pedicelled spikelet without a callus:
- 33a Lower glume of sessile spikelet with a median groove **Hyperthelia**
- 33b Lower glume of sessile spikelet convex on the back:
- 34a Upper glume of sessile spikelet awned **Elymandra**
- 34b Upper glume of sessile spikelet awnless:
- 35a Upper raceme-base up to 10 mm long, but usually much shorter **Hyparrhenia**
- 35b Upper raceme-base 15–25 mm long; homogamous pairs 2 at the base of each raceme, forming an involucre **Exothea**
- 32b Racemes single; pedicelled spikelet with a distinct, narrowly oblong to linear callus:
- 36a Spatheoles linear to narrowly lanceolate; racemes loose, the internode visible **Anadelphia**
- 36b Spatheoles boat-shaped; racemes dense, the internodes concealed **Monocymbium**
- 2b Rachis internodes and pedicels stout, thickening upwards; upper lemma awnless:
- 37a Pedicels distinct:
- 38a Lower glume of sessile spikelet produced into a long flattened tail; spikelets similar **Vossia**
- 38b Lower glume of sessile spikelet without a herbaceous tail:
- 39a Pedicelled spikelet long-awned (10–120 mm) from the lower glume, rarely awnless; racemes obliquely jointed and callus without a central peg **Urelytrum**
- 39b Pedicelled spikelet awnless or with an awnlet up to 5 mm long:
- 40a Racemes many, on a short common axis; callus with a short central peg **Phacelurus**
- 40b Racemes single:
- 41a Jointing of racemes oblique:
- 42a Callus inserted in the crateriform internode, the node fringed with a ring of hairs; lower glume of sessile spikelet usually longitudinally ridged, entire **Loxodera**
- 42b Callus not inserted in the internode; lower glume of sessile spikelet not ridged, often bifid **Elionurus**
- 41b Jointing of racemes transverse:
- 43a Ligule a fringe of hairs; inflorescence axillary; lower floret male **Chasmopodium**
- 43b Ligule membranous:
- 44a Lower glume of sessile spikelet not (or rarely very obscurely) winged **Rhytachne**
- 44b Lower glume of sessile spikelet conspicuously winged **Coelorachis**
- 37b Pedicels fused to the internode, rarely absent:
- 45a Lower glume of sessile spikelet smooth:
- 46a Raceme dorsally compressed, tough **Hemarthria**
- 46b Raceme cylindrical, fragile:
- 47a Pedicelled spikelet present **Rottboellia**
- 47b Pedicelled spikelet absent **Oxyrhachis**
- 45b Lower glume of sessile spikelet rough:
- 48a Sessile spikelet broadly elliptic **Heteropholis**
- 48b Sessile spikelet globose **Hackelochloa**

Brachychloa S.M.Phillips

(Chloridoideae—Eragrostideae—Eleusininae)

Gibbs Russell *et al.*: 69 (1990); Cope: 47 (1999).

Sthn trop. Afr. 2, coastal Mozambique, and sthn Afr.

Brachypodium P.Beauv.

(Pooideae—Triticeae)

Launert: 62 (1971); Simon: 24, 58 (1971); Gibbs Russell *et al.*: 70 (1990).Sthn trop. Afr. 1: *Brachypodium flexum* Nees, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.***Briza** L.

(Pooideae—Poeae)

Launert: 45 (1971); Simon: 36 (1971).

Sthn trop. Afr. 2, introduced into parts of trop. Africa, including Zimbabwe and sthn Afr.

Bromuniola Stapf & C.E.Hubb.

(Centothecoideae—Centothecae)

Stapf & Hubbard: 366 (1926); Launert: 143 (1971); Clayton & Renvoize: 162 (1986); Watson & Dallwitz: 187 (1994).

Caespitose perennials from a creeping rhizome. **Leaf blade** expanded, constricted at base, lanceolate or lanceolate-elliptic, tapering to an acute apex. **Inflorescences** of large panicles with spreading, lax, delicate branches. **Spikelets** long-pedicelled, solitary, laterally compressed, loosely imbricate, 3–7-flowered, awned. **Florets** all fertile, bisexual except for reduced terminal one; rachilla disarticulating above glumes and beneath florets; *glumes* subequal, persistent, keeled, membranous, acute, prominently 5-nerved, with transverse veinlets between nerves, scaberulous along keels, glabrous, often mucronate; *lemmas* similar to glumes, 7-nerved, acute and shortly awned, keeled, glabrous and smooth except for scaberulous keels and awns, membranous with hyaline margins, glabrous, lowermost one sterile; *paleas* slightly shorter than lemmas, 2-keeled, hyaline, compressed, apex obtuse, base bulging out from lemma, ciliate along keels. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** elliptic, glabrous; styles distinct, short; stigmas plumose, laterally exerted. **Caryopsis** free, obliquely ovate in outline, laterally compressed; embryo very small; hilum basal.

Monotypic: *Bromuniola gossweileri* Stapf & C.E.Hubb., trop. Africa; sthn trop. Afr. Angola, Zambia.**Bromus** L.

(Pooideae—Bromeae)

Clayton: 66 (1970); Launert: 59 (1971); Simon: 24 (1971); Gibbs Russell *et al.*: 73 (1990); Chapano: 4 (2002).

Sthn trop. Afr. 6, of which 4 are introduced, Zimbabwe, Malawi, and sthn Afr.

Capillipedium Stapf

(Panicoideae—Andropogoneae—Sorghinae)

Stapf: 11, 169 (1917); Clayton & Renvoize: 343 (1986); Watson & Dallwitz: 202 (1994); Setshogo: 130 (2000); Chapano: 15 (2002); Setshogo: 42 (2002).

Caespitose perennials, mostly rambling; culms mostly with barbate nodes. **Leaf blade** erect and straight, linear, flat, scabrid on margins, finely pointed at apex; sheath tight or eventually slipping from culm, ± covered in tubercle-based hairs and frequently villous on collar; *ligule* a very short, truncate, ciliolate membrane. **Inflorescence** a delicate loose panicle bearing short, 1–5(8)-jointed racemes at ends of capillary branches and branchlets; rachis internodes and pedicels filiform with a translucent longitudinal groove; racemes mostly reduced to a single sessile spikelet. **Sessile spikelet** with obtuse *callus*; *lower glume* cartilaginous, broadly convex to slightly concave, acute or obtuse; *upper lemma* forming the hyaline base to its awn, entire; *awn* glabrous. **Pedicelled spikelet** male or neuter.

Species ± 14, in eastern Africa through tropical Asia to Australia; sthn trop. Afr. 1: *Capillipedium parviflorum* (R.Br.) Stapf, Zambia, Zimbabwe, Malawi, Mozambique.**Cenchrus** L.

(Panicoideae—Paniceae—Cenchrinae)

Stapf & Hubbard: 1070 (1934); Clayton & Renvoize: 691 (1982); Clayton: 186 (1989); Gibbs Russell *et al.*: 79 (1990).

Sthn trop. Afr. 4, Angola, Zambia, Zimbabwe, Mozambique, and sthn Afr.

Centotheca Desv.

(Centothecoideae—Centothecae)

Desvaux: 189 (1810); Clayton: 381 (1972); Clayton & Renvoize: 160 (1986); Phiri (Unpublished).

Annuals. **Leaves**: blades broadly linear to lanceolate, narrowed at base. **Inflorescence** a panicle, or primary branches reduced to racemes. **Spikelets** 1–4-flowered, plus rachilla extension bearing a rudimentary floret, breaking up at maturity; upper florets decreasing in size; lemmas emarginate and apiculate, lowest glabrous, upper one with reflexed, tubercle-based bristles serving as dispersal device. **Stamens** 2.

Species 4, tropics of Old World and Pacific islands; sthn trop. Afr. 1: *Centotheca lappacea* (L.) Desv., Angola, Zambia.**Centropodia** Rchb.

(Arundinoideae—Arundineae)

Cope: 657 (1983a); Ellis: 41 (1989); Gibbs Russell *et al.*: 80 (1990); Scholz: 445 (1990); Cope: 12 (1999).*Asthenatherum* Nevski.Sthn trop. Afr. 1: *Centropodia mossamedensis* (Rendle) T.A.Cope, Angola, and sthn Afr.**Chasmopodium** Stapf

(Andropogoneae—Rottboelliinae)

Stapf: 76 (1917); Clayton: 509 (1972); Clayton: 49 (1973b); Scholz: 5 (1977); Dujardin: 373 (1978); Clayton & Renvoize: 365 (1986).

Rottboellia L.f., in part; *Robynsiochloa* Jac.-Fél.

Robust annuals or perennials, sparingly branched. **Leaves**: blades lanceolate-linear, broad; *ligule* a fringe of hairs. **Inflorescence** axillary, a single subcylindric dorsiventral raceme

Ctenium Panz.

(Chloridoideae—Cynodonteae—Chloridinae)

Simon: 25, 75 (1971); Cope: 226 (1999); Longhi-Wagner & Cope: 229 (2003).

Sthn trop. Afr. 4, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Cymbopogon Spreng.

(Panicoideae—Andropogoneae—Andropogoninae)

Simon: 17, 50 (1971); Clayton & Renvoize: 759 (1982); Gibbs Russell *et al.*: 94 (1990); Sales: 75 (2002); Phiri (Unpublished).

Sthn trop. Afr. 5, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Cynodon Rich.

(Chloridoideae—Cynodonteae—Chloridinae)

Simon: 25, 59 (1971); Gibbs Russell *et al.*: 95 (1990); Cope: 233 (1999); Roodt *et al.*: 117 (2002).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Cyrtococcum Stapf

(Panicoideae—Paniceae—Setariinae)

Koechlin: 76 (1962); Clayton & Renvoize: 499 (1982); Clayton & Renvoize: 279 (1986); Van der Zon: 239 (1993); Watson & Dallwitz: 287 (1994).

Annuals or perennials with decumbent or creeping culms rooting at lower nodes. **Leaf blade** narrowly lanceolate; *ligule* membranous. **Inflorescence** a diffuse panicle with capillary branches; pedicels much longer than spikelets, terete, scaberulous. **Spikelets** obliquely obovate in profile, strongly laterally compressed, hispidulous. **Glumes** thinly membranous, half to almost as long as spikelet, *upper glume* obtuse; *lower glume* acute. **Lower floret** sterile, its lemma as long as spikelet, obtuse or rarely mucronate; *upper lemma* as long as spikelet, subcoriaceous to crustaceous, smooth to punctate, gibbous, distinctly crested, margins inrolled and clasping only edges of palea; tip of palea reflexed. **Caryopsis** laterally compressed, asymmetric.

Species 11, Old World tropics, in shady places; sthn trop. Afr. 1: *Cyrtococcum chaetophoron* (Roem. & Schult.) Dandy, Angola.***Dactylis** L.

(Pooideae—Poeae)

Gibbs Russell *et al.*: 99 (1990); Chapano: 3 (2002).Sthn trop. Afr. 1: **Dactylis glomerata* L., cultivated and sometimes occurring as an escape, also in sthn Afr.**Dactyloctenium** Willd.

(Chloridoideae—Eragrostideae—Eleusininae)

Simon: 26, 60 (1971); Cope: 162 (1999).

Sthn trop. Afr. 4, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Daknopholis Clayton

(Chloridoideae—Cynodonteae—Chloridinae)

Clayton: 102 (1967b); Clayton: 321 (1974); Clayton & Renvoize: 242 (1986);

Watson & Dallwitz: 292 (1994).

Prostrate stoloniferous annuals forming loose mats; flowering culms ascending. **Leaf blades** flat; *ligule* a line of hairs. **Inflorescence** of digitate, 1-sided racemes. **Spikelets** 1-flowered with minute rhachilla-extension, strongly laterally compressed, sessile, alternate in 2 rows on a tough axis, disarticulating above glumes. **Glumes** subequal, thinly membranous, shorter than the floret, 1-nerved, upper one broader than lower one; *lemma* membranous, keeled, acute, long-awned. **Caryopsis** narrowly lanceolate, triquetrous.

Monotypic genus: *Daknopholis boivinii* (A.Camus) Clayton, western Indian Ocean region; sthn trop. Afr.: Mozambique.**Danthoniopsis** Stapf

(Panicoideae—Arundinelleae)

Clayton & Renvoize: 317 (1986); Clayton: 199 (1989); Gibbs Russell *et al.*: 101 (1990); Watson & Dallwitz: 298 (1994); Izidine & Bandeira: 51 (2002).

Sthn trop. Afr. 6, Angola, Zambia, Zimbabwe, Mozambique, and sthn Afr.

Dichanthium Willemet

(Panicoideae—Andropogoneae—Sorghinae)

Stapf: 177 (1917); Clayton & Renvoize: 722 (1982); Setshogo: 131 (2000); Setshogo: 38 (2002).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Digitaria Haller

(Panicoideae—Paniceae—Digitariinae)

Clayton & Renvoize: 619 (1982); Goetghebeur & Van der Veken: 133 (1989); Gibbs Russell *et al.*: 106 (1990); Chapano: 13 (2002); Izidine & Bandeira: 51 (2002).*Digitariella* De Winter: 467 (1961); Simon: 31, 66 (1971). *Digitariopsis* C.E.Hubb.; Simon: 66 (1971).

Sthn trop. Afr. ± 60, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Dignathia Stapf

(Chloridoideae—Cynodonteae—Zoysiinae)

Stapf: t. 2950 (1911b); Clayton: 404 (1974); Clayton & Renvoize: 254 (1986); Watson & Dallwitz: 329 (1994); Cope: 249 (1999).

Wiry, erect annuals. **Leaf blades** lanceolate-linear. **Inflorescence** a cylindrical false raceme; racemelets shortly pedunculate, deciduous, comprising 1 or 2 spikelets plus a rudiment separated by the internodes of a short curvaceous rachis. **Spikelets** 1-flowered, narrowly ovate to orbicular, laterally compressed; *glumes* well-developed, longer than the floret, thickly indurated, ± gibbous, scaberulous to lanose, upper one longer than lower one and caudate to a stiff point or awn; *lemma* membranous, keeled, shortly awned. **Caryopsis** ellipsoid, gibbous, laterally compressed.

Species 5, NE trop. Africa, Arabian Peninsula and India; one species, *Dignathia gracilis* Stapf, extending to Mozambique.

16 (2002); Cope: 95 (2002).

Sthn trop. Afr. ± 33, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Hyperthelia Clayton

(Panicoidae—Andropogoneae—Anthistiriinae)

Clayton: 438 (1967); Simon: 18, 51 (1971); Clayton & Renvoize: 786 (1982); Cope: 136 (2002).

Sthn trop. Afr. 1: *Hyperthelia dissoluta* (Nees ex Steud.) Clayton, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Imperata Cirillo

(Panicoidae—Andropogoneae—Saccharinae)

Clayton & Renvoize: 700 (1982); Clayton: 10 (2002).

Sthn trop. Afr. 1: *Imperata cylindrica* (L.) Raeusch., Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Isachne R.Br.

Brown: 196 (1810); Clayton & Renvoize: 309 (1986); Clayton: 193 (1989); Watson & Dallwitz: 495 (1994).

Rambling perennials; culms up to 0.6 m high, geniculately ascending from a prostrate base rooting at nodes. **Leaves** linear to lanceolate; ligule a line of hairs. **Inflorescence** a panicle. **Spikelets** 2-flowered. **Florets** similar or dissimilar, separated by an abbreviated internode, lower floret sometimes male; rachilla disarticulating below each floret. **Glumes** subequal, $\frac{3}{4}$ to as long as spikelet, 5–9-nerved, membranous, falling soon after florets. **Lemmas** elliptic-oblong to orbicular, obscurely 5–7-nerved, obtuse; lower one membranous to coriaceous; upper one crisply chartaceous to crustaceous. **Stamens** 3. **Caryopsis** ellipsoid to suborbicular, dorsally flattened on one side.

Species ± 100, throughout the tropics, but mainly Asia; sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique.

Ischaemum L.

(Panicoidae—Andropogoneae—Ischaeminae)

Stapf: 28 (1917); Wild: 23 (1961); Clayton & Renvoize: 746 (1982); Cope: 50 (2002).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Kampochloa Clayton

(Chloridoideae—Cynodonteae—Chloridinae)

Clayton 103 (1967b); Simon: 79 (1971); Clayton & Renvoize: 241 (1986); Watson & Dallwitz: 508 (1994); Cope: 223 (1999).

Densely caespitose perennials. **Leaf blade** usually involute, sometimes flat. **Inflorescence** a solitary raceme bearing pectinate spikelets on a puberulous rachis. **Spikelets** 2-flowered, laterally compressed, sessile, alternate in 2 rows on a tough axis, tardily disarticulating above glumes but not between florets. **Glumes** dissimilar, subequal in length, inferior one 1-nerved, minutely 2-toothed at apex with an awnlet in the sinus; upper one nerveless, with an oblique dorsal awn. **Lower floret** fertile; *fertile lemma* hyaline, pilose on keel and ciliate

on lateral nerves, 2-toothed at apex and mucronulate. **Upper floret** male, its *lemma* glabrous, awned from the back; rachilla terminated by a cluster of sterile awns usually accompanied by a very reduced lemma.

Monotypic genus: *Kampochloa brachyphylla* Clayton, only known from Angola and Zambia.

?Kaokochloa De Winter

(Chloridoideae—Pappophoreae)

De Winter: 479 (1961); Clayton & Renvoize: 190 (1986); Gibbs Russell *et al.*: 191 (1990).

Monotypic genus: *Kaokochloa nigrirostris* De Winter, ?Angola, and sthn Afr.; no confirmed record from Angola seen.

Koeleria Pers.

(Pooideae—Aveneae—Aveninae)

Clayton: 79 (1970); Launert: 69 (1971); Chapano: 3 (2002).

Aira L. in part; Chapano: 3 (2002) as synonym.

Sthn trop. Afr. 1: *Koeleria capensis* (Steud.) Nees, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Leersia Sw.

(Bambusoideae—Oryzaceae)

Clayton: 70 (1970); Launert: 26 (1971); Simon: 29, 63 (1971); Terrell *et al.*: 423 (1983); Clayton & Renvoize: 73 (1986); Gibbs Russell *et al.*: 196 (1990); Van der Zon: 44 (1993).

Sthn trop. Afr. 6, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Leptaspis R.Br.

(Bambusoideae—Phareae)

Brown: 211 (1810); Launert: 21 (1971); Simon: 36 (1971); Clayton & Renvoize: 68 (1986); Watson & Dallwitz: 529 (1994).

Perennial rhizomatous bamboo-like grasses. **Leaf blade** large, asymmetric, with a typical slanting venation, tessellate, borne on a twisted (180°) pseudopetiole; ligule scarious, often fringed. **Inflorescence** a loose panicle, usually terminal, containing male and female spikelets, with females in a group at base and male or males terminal on branchlets. **Spikelets** 1-flowered, monoecious, heteromorphous, unisexual; male spikelets usually much smaller and less conspicuous than female ones; *glumes* 2, much smaller than spikelet, subequal, membranous, ovate, 5–7-nerved, usually spreading; *lemma* similar to glumes but with more nerves, cymbiform; *palea* shorter than lemma, membranous, distinctly 2-keeled, 2-nerved, narrowly oblong, with apex bidentate. **Stamens** 6; filaments rather short; anthers linear. **Bisexual spikelets** subsessile, rather conspicuous, ovoid or conchiform, inflated; *glumes* 2, subequal, much shorter than spikelet; lemma with margins connate (thus utricle-like) with an apical or lateral porus, inflated, prominently nerved and usually longitudinally ribbed, ± densely covered with stiff, short, hooked hairs; *palea* completely enclosed by lemma, longer than utricle and often appearing at porus, very delicate, linear, 2-keeled, with apex bidentate. **Lodicules** very small to nil. **Ovary** small, narrowly ovoid, gibbous; style

Paspalidium Stapf

(Panicoideae—Paniceae—Setariinae)

Stapf: 582 (1920); Simon: 33, 69 (1971); Clayton & Renvoize: 291 (1986); Clayton: 109 (1989).

Sthn trop. Afr. 2, Angola, Zambia, Zimbabwe, Mozambique, and sthn Afr. Webster: 439 (1995) sinks *Paspalidium* under *Setaria*.**Paspalum** L.

(Panicoideae—Paniceae—Setariinae)

Clayton: 88 (1989); Cope: 4 (1999).

Sthn trop. Afr. ± 10, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Pennisetum Rich.

(Panicoideae—Paniceae—Cenchrinae)

Clayton & Renvoize: 672 (1982); Clayton: 178 (1989); Joubert & Cunningham: 37 (2002).

Beckeropsis Fig. & De Not.; Simon: 29, 64 (1971).

Sthn trop. Afr. 12, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Pentaschistis (Nees) Spach

(Arundinoideae—Arundineae)

Clayton: 124 (1970); Simon: 25 (1971); Linder & Ellis: 1 (1990); Cope: 4 (1999).

Sthn trop. Afr. 1: *Pentaschistis natalensis* Stapf, Zimbabwe, Malawi, and sthn Afr.**Perotis** Aiton

(Chloridoideae—Cynodonteae—Zoysiinae)

Simon: 38 (1971); Cope: 611 (1995); Cope: 249 (1999).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Phacelurus Griseb.

(Panicoideae—Andropogoneae—Rottboelliinae)

Clayton: 175 (1978b); Clayton & Renvoize: 845 (1982); Cope: 159 (2002).

Jardinea Steud.; Koechlin: 122 (1962); Simon: 53 (1971). *Thyrsia* Stapf; Simon: 53 (1971).

Sthn trop. Afr. 4, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

***Phalaris** L.

(Pooideae—Aveneae—Aveninae)

Launert: 81 (1971); Simon: 36 (1971); Clayton & Renvoize: 133 (1986); Chapano: 3 (2002).

Introduced widespread weeds or escapes from cultivation; **Phalaris minor* Retz. recorded from Zimbabwe and sthn Afr.**Phragmites** Adans.

(Arundinoideae—Arundineae)

Launert: 91 (1971); Clayton & Renvoize: 182 (1986).

Sthn trop. Afr. 2, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Phyllorachis Trimen

(Bambusoideae—Phyllorachideae)

Trimen: 353 (1879); Launert: 37 (1971); Simon: 36 (1971); Clayton & Renvoize: 75 (1986); Watson & Dallwitz: 731 (1994).

Perennial grasses, sometimes of shrubby habit, with branched slender culms. **Leaf blade** lanceolate, narrowly elliptic to oblong-lanceolate; *ligule* small, ciliate. **Inflorescence** spike-like, terminal, consisting of short racemes inserted along a leaf-like rachis; *axillary inflorescences* all bisexual; racemes short, usually not more than 1 or 2; spikelets longer than those of terminal inflorescences, with elongated stigmas protruding from subtending leafsheaths; *terminal inflorescences* bisexual, lowermost spikelet of each raceme female, the following male, sometimes reduced spikelets present; rachilla not extended. **Male spikelets:** *lower glume* rather narrow, almost subulate, acute; *upper one* 1-nerved, ovate-oblong, up to $\frac{2}{3}$ as long as spikelet; *lemma* of inferior floret 3-nerved, coriaceous; *lemma* of upper floret 5–7-nerved, thinly coriaceous, keeled, its *palea* 2-nerved; stamens 6. **Female spikelets:** *lower glume* subulate or even setaceous; *upper one* narrowly ovate to oblong, up to half as long as spikelet, 5–9-nerved; *lemma* of lower floret embracing upper floret, dorsally with a longitudinal furrow, rather rigid, many-nerved; *lemma* of upper floret 11–many-nerved, membranous to thinly coriaceous, its *palea* 8–12-nerved. **Caryopsis** free, elliptic-oblong in outline, with a rather shallow longitudinal furrow; embryo minute; hilum linear, almost as long as caryopsis.

Monospecific: *Phyllorachis sagittata* Trimen, trop. Africa; sthn trop. Afr.: Angola, Zambia, Zimbabwe, Malawi, Mozambique.**Piptophyllum** C.E.Hubb.

(Arundinoideae—Arundineae)

Hubbard: 53 (1957b); Clayton & Renvoize: 171 (1986); Watson & Dallwitz: 737 (1994).

Caespitose perennials with very slender, erect, simple culms densely covered at base with woolly fibrous remains of old leaf sheaths. **Leaf blade** filiform, involute, rigid, at length disarticulating from sheath; *ligule* reduced to a series of short cilia. **Inflorescence** a lanceolate-oblong to narrowly oblong panicle with capillary branches. **Spikelets** oblong to cuneate, laterally compressed, aristate; rachilla disarticulating above glumes and between florets. **Florets** 2, bisexual; *callus* very short, obtuse, densely bearded with short hairs. **Glumes** persistent, slightly unequal, lanceolate to oblong, acute or minutely toothed at apex, membranous, 1-nerved; *lemmas* longer than glumes, usually 5–9-nerved, narrowly ovate to ovate-oblong with bilobed apex, with a slightly twisted awn between lobes; *palea* about as long as lemmas, lanceolate-oblong, obtuse or minutely bifid, 2-keeled, membranous. **Lodicules** 2, cuneate, minute. **Stamens** 3; anthers linear-oblong. **Ovary** glabrous; styles free, terminal, short; stigmas plumose.

Monotypic: *Piptophyllum welwitschii* (Rendle) C.E.Hubb., known only from Angola.**Poa** L.

(Pooideae—Poeae)

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Pontederiaceae

(Liliidae—Haemodorales)
(Commelinids—Commelinales)

Glen, R.P. in Leistner: 726 (2000). General family reference: Cook: 395 (1998).

Sthn trop. Afr.: genera 3, species 4.

Eichhornia Kunth

Rendle: 66 (1899); Wild: 9 (1961); Lawalrée & Bruynseels: 3 (1981); Catarino & Martins: 22 (1996); Lindsey & Hirt: 1 (1999); Simpson & Sanderson: 28 (2002).

Sthn trop. Afr. 2, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

Heteranthera Ruiz & Pav.

Rendle: 67 (1899); Lawalrée & Bruynseels: 7 (1981); Catarino & Martins: 24 (1996).

Sthn trop. Afr. 1: *Heteranthera callifolia* Kunth, Angola, Zambia, Zimbabwe, Malawi, and sthn Afr.

Monochoria C.Presl

Rendle: 67 (1899); Lawalrée & Bruynseels: 2 (1981); Catarino & Martins: 25 (1996); Glen *et al.*: 10 (2001); Phiri (Unpublished).

Sthn trop. Afr. 1: *Monochoria africana* (Solms) N.E.Br., Angola, Zambia, Malawi, Mozambique, and sthn Afr.

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Potamogetonaceae

(Alismatidae—Najadales)
(Monocots—Alismatales)

Glen, R.P. in Leistner: 728 (2000).

Sthn trop. Afr.: genus 1, species 7.

Potamogeton L.

Dandy: 507 (1937); Obermeyer: 60 (1966); Wiegleb: 249 (1988); Hollingsworth *et al.*: 337 (1998); Mapaura (Unpublished).

Sthn trop. Afr. 7, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Restionaceae

(Commelinidae—Restionales)
(Commelinids—Poales)

Archer, C. in Leistner: 729 (2000). General family reference: Linder *et al.*: 653 (2000).

Sthn trop. Afr.: genus 1, species 3.

Restio Rottb.

Linder: 99 (1986); Linder: 623 (1995); Izidine & Bandeira: 59 (2002); Msekandiana & Mlangeni: 37 (2002).

Sthn trop. Afr. 3, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Ruppiaceae

(Alismatidae—Najadales)
(Monocots—Alismatales)

Glen, R.P. in Leistner: 733 (2000).

Ruppia L.

Obermeyer: 70 (1966); Hepper: 18 (1968); Symoens: 1 (1977); Lacroix & Kemp: 253 (1997); Haynes *et al.*: 448 (1998).

Species 7 or 8, cosmopolitan, mainly in temperate regions; sthn trop. Afr. 1: *Ruppia maritima* L. var. *maritima*, Angola, and sthn Afr. Sometimes placed under Potamogetonaceae (Brummitt 1992).

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Smilacaceae

(Liliidae—Dioscoreales)
(Monocots—Liliales)

Meyer, N.L. in Leistner: 734 (2000).

Sthn trop. Afr.: genus 1, species 2.

Smilax L.

Baker: 423 (1898); Burt Davy *et al.*: 95 (1958); White: 15 (1962); Hepper: 111 (1968); Cowley: 1 (1989); Conran: 417 (1998); White *et al.*: 109 (2001); Mapaura (Unpublished).

Sthn trop. Afr. 2, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Strelitziaceae

(Zingiberidae—Zingiberales)
(Commelinids—Zingiberales)

Archer, C. in Leistner: 734 (2000).

Sthn trop. Afr.: genus 1, species 2.

Strelitzia Aiton

Dyer: t. 997 (1946); Manning & Goldblatt: 932 (1989); Andersson: 454 (1998); Coates Palgrave: 118 (2002); Mapaura (Unpublished).

Sthn trop. Afr. 2, Zimbabwe, Mozambique.

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Taccaceae

(Liliidae—Haemodorales)
(Monocots—Dioscoreales; included in Dioscoreaceae)

Perennial herbs with a tuberous or elongated rhizome and 1–3 basal leaves. **Leaves** large, long-petiolate, 3-partite, each part 1–3-pinnatisect; petiole up to 1 m long, longitudinally ridged. **Inflorescence** terminal, usually on a solitary flowering stem, umbellate, surrounded by 4–12 large involucral bracts and by many filiform floral bracts. **Flowers** bisexual, regular, epigynous. **Tepals** 6, petaloid, connate at base, persistent. **Stamens** 6, in 2 whorls, adnate to base of tepals; filaments short, flat, somewhat petaloid, forming together with the broad connective a hood-like structure over the solitary anther; anther 2-locous, introrse, opening by longitudinal slits. **Ovary** inferior, 1-locular, 3-carpellate, 6-ribbed, with 3 parietal placentas, each with many anatropous to campylotropous ovules. **Fruit** a berry. **Seeds** longitudinally ridged, surrounded by a thin fleshy aril when fresh; embryo small, in copious starchless endosperm rich in fat and protein. $x = 15$.

Genus 1, species 10, pantropical Old World, with 1 or more in New World; sthn trop. Afr.: genus 1, species 1.

Carter: 1 (1962); Hepper: 176 (1968); Drenth: 367 (1972); Drenth: 806 (1976); Mabberley: 697 (1997); Kubitzki: 425 (1998).

Tacca J.R.Forst. & G.Forst.

Forster & Forster: 35 (1775), name conserved; Burtt Davy *et al.*: 97 (1958); Carter: 1 (1962); Hepper: 1 (1968); Drenth: 374 (1972); Lisowski *et al.*: 3 (1976); Kubitzki: 425 (1998).

Schizocapsa Hance.

Description as for family.

Species 10, pantropical; sthn trop. Afr. 1: *Tacca leontopetaloides* (L.) Kuntze, Angola, Zambia, Zimbabwe, Malawi, Mozambique.

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Tecophilaeaceae

(Liliidae—Asparagales)
(Monocots—Asparagales)

Archer, R.H. in Leistner: 735 (2000).

Additional family characters: **Tubers** or corms often superposed to form a vertical series. **Roots** emerging from sides of tubers. **Seeds** containing chalazosperm (nutrient tissue developing at chalazal end).

Emended family notes: Genera 8, species 26, Chile, California and tropical and southern Africa; sthn trop. Afr.: genera 3, species 4.

Oliver: t. 1965 (1891); Carter 1: (1966); Dahlgren: 79 (1988) under Cyanastraceae; Mabberley: 202 (1997) under Cyanastraceae; Takhtajan: 494 (1997) under Cyanastraceae; Brummitt *et al.*: 769 (1998); Simpson & Rudall: 429 (1998); Cowley & Brummitt: 18 (2001).

Key to genera

- 1a Plants with leafy stems; flowers \pm solitary in leaf axils; plants perennating by 1–several irregular tubers **Walleria**
 1b Plants without stems; flowers in terminal scapose inflorescences; plants perennating by corms often superposed one on top of the other:
 2a Leaves \pm 4, with bases surrounding the lower part of the scape, attenuate into a \pm indistinctly defined petiole; tepals white; anthers dehiscent by a short, clavate, introrse slit **Kabuyea**
 2b Leaves solitary on upper surface of corm, not surrounding the base of the scape, distinctly petioled; tepals blue; anthers dehiscent by an apical pore **Cyanastrum**

Cyanastrum Oliv.

Oliver: t. 1965 (1891); Carter: 190 (1962); Carter: 1 (1966); Simpson & Rudall: 434 (1998); Brummitt *et al.*: 775 (1998); Cowley & Brummitt: 22 (2001).

Geophytes with annual aerial parts; tubers depressed-globose to disc-like, superposed to forming a vertical series, not tunicated; roots emerging from sides of tuber. **Leaves** basal, petiolate to sessile, rolled in bud, ovate to ovate-orbicular, decurrent to cordate, with schizogenous oil channels. **Inflorescence** racemose, terminating a flowering stem, sometimes appearing before leaves; bracts and bracteoles present or absent. **Perianth**: segments forming a very short tube at base, blue or white. **Stamens** all perfect and similar, arising on perianth at throat of tube. **Seeds** containing chalazosperm (nutrient tissue developing at chalazal end); embryo subglobose, containing starch.

Species 3, trop. Africa from Nigeria to Tanzania and Mozambique; sthn trop. Afr. 1: *Cyanastrum johnstonii* Baker, Zambia, Mozambique.

Kabuyea Brummitt

Brummitt in Brummitt *et al.*: 771 (1998); Simpson & Rudall: 434 (1998); Cowley & Brummitt: 20 (2001).

Perennial acaulescent herbs; corms several, superposed one above the other. **Leaves** basal, \pm 4, closely enfolding base of scape, sheathed by 1 or more outer cataphylls; inner cataphylls present or absent, not sheathing; lamina long-attenuate at base into an indistinctly defined petiole. **Inflorescence** scapose with flowers racemosely arranged. **Tepals** white, \pm free to base. **Stamens**: anther thecae oblong, opening introrsely by an apical pore. **Ovary** half-inferior; ovules 2 per carpel, only 1 developing into a seed. **Capsule** with only 1(2) carpels developing a seed; fertile carpel globose, dehiscent by a complete longitudinal split. **Seeds** globose;

endosperm present; chalazosperm lacking.

Monotypic genus: *Kabuyea hostifolia* (Engl.) Brummitt, eastern trop. Africa; sthn trop. Afr.: Mozambique.

Walleria J.Kirk

Sterling: 115 (1974); Simpson & Rudall: 435 (1998); Cowley & Brummitt: 18 (2001).

Sthn trop. Afr. 2, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Typhaceae

(Commelinidae—Typhales)
(Comelinids—Poales)

Glen, R.P. in Leistner: 736 (2000).

Sthn trop. Afr.: genus 1, species 3.

Typha L.

Anderson: 53 (1966); Hepper: 129 (1968); Napper: 1 (1971); Kubitzki: 460 (1998); Kuehn & White: 906 (1999).

Sthn trop. Afr. 3, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Velloziaceae

(Liliidae—Liliales)
(Monocots—Pandanales)

Archer, R.H. in Leistner: 736 (2000).

Sthn trop. Afr.: genus 1, species 19.

Xerophyta Juss.

Smith & Ayensu: 181 (1974); De Melo *et al.*: 257 (1997); Kubitzki: 459 (1998); White *et al.*: 109 (2001); Behnke *et al.*: 55 (2002).

Vellozia Vand., in part; Burt Davy *et al.*: 100 (1958); White: 17 (1962).

Sthn trop. Afr. 19, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Xyridaceae

(Commelinidae—Commelinales)
(Commelinids—Poales)

Glen, R.P. in Leistner: 737 (2000).

Sthn trop. Afr.: genus 1, species ± 40.

Xyris L.

Rendle: 67 (1899); Lock: 883: (1998); Lock: 301 (1999a); Lock: 1 (1999b); Rudall & Sajo: 795 (1999); Lisowski *et al.*: 1 (2001).

Sthn trop. Afr.: ± 40, Angola, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

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Zannichelliaceae

(Alismatidae—Alismatales)
(Monocots—Alismatales; included in Potamogetonaceae)

Glen, R.P. in Leistner: 738 (2000).

Sthn trop. Afr. (unconfirmed): genus 1, species 1.

Zannichellia L.

Bennett: 224 (1901); Reinecke: 93 (1964); Obermeyer: 77 (1966); Tomlinson & Posluszny: 273 (1976); Cook: 222 (1990); Haynes *et al.*: 473 (1998); Beentje: 1 (2000).

Sthn trop. Afr. ?1: *Zannichellia palustris* L., no firm record for the region was seen. Recorded from sthn Afr.

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Zingiberaceae
(Zingiberidae—Zingiberales)
(Commelinids—Zingiberales)

Archer, C. in Leistner: 739 (2000).

Sthn trop. Afr.: genera 4, species ± 16.

Key to genera

- 1a Style exerted well beyond the anther; the long, subulate anther crest is wrapped around the style ***Zingiber**
- 1b Style not exerted beyond the anther; anther crest, if present, not wrapped around the style:
- 2a Inflorescence a many-flowered panicle with an elongated axis; flowers, including the pedicel, shorter than 25 mm **Renealmia**
- 2b Inflorescence condensed, without an elongated axis or, if the axis is elongated, then each bract subtends only 1 flower, which, with its pedicel, is longer than 25 mm:
- 3a Apex of stamen petaloid, at least twice as long as the basal anther; small plants, often flowering before the leaves are fully developed; leaf sheaths usually not forming a pseudostem, at least at time of flowering **Siphonochilus**
- 3b Apex of stamen 2- or 3-lobed or truncate, shorter than the anther; large plants with leafy shoots fully developed at flowering time; leaf sheaths always forming a distinct pseudostem **Afromomum**

Afromomum K.Schum.

Schumann: 201 (1904); Loesener: 596 (1930); Gossweiler & Mendonça: 82, etc. (1939); Koechlin: 42 (1965); Fanshawe: 151 (1972); Lock: 299 (1980); Lock: 837 (1984); Lock: 22 (1985); Larsen *et al.*: 493 (1998); Phiri (Unpublished).

Perennial herbs with erect leafy stems and extensive rhizome system. **Leaves** with long sheathing bases forming a pseudostem; base of lamina contracted into a pseudopetiole; ligule present. **Inflorescence**: flowers usually clustered at apex of separate leafless shoots, sometimes arising on rhizomes with only apical part showing; flowers each subtended by 2 subopposite bracts. **Flowers** bisexual, large, very irregular. **Calyx**: tube split down one side. **Corolla**: tube narrow, ± as long as calyx; lateral petals narrow; posterior petal larger, forming a hood-like structure; basal half of petals and androecium fused into a tube; labellum broad, petaloid, very delicate and suberect, or narrower, thicker and decurved. **Stamen**: filament strap-shaped, apex usually 3-lobed; thecae 2, subterminal; lateral staminodes small and tooth-like. **Ovary** 3-locular; style filiform; stigma trumpet-shaped, with ciliate margins; stylodes at base of style subulate or contorted. **Fruit** a large indehiscent berry with tough fleshy wall, usually red when ripe, with apical beak formed by persistent calyx. **Seeds** surrounded by white, translucent aril, cohering into 3 masses around delicate axile placenta.

Species ± 50, trop. Africa, Mascarenes and Madagascar; sthn trop. Afr. ± 10, Angola, Zambia, Zimbabwe, Malawi, Mozambique.

Renealmia L.f.

Linnaeus filius: 7, 79 (1782–1781) name conserved; Schumann: 282 (1904); Loesener: 608 (1930); Gossweiler & Mendonça: 60, etc. (1939); Koechlin: 27 (1965); Larsen *et al.*: 490 (1998).

Perennial herbs with leafy pseudostems and well-developed rhizomes. **Leaves** with long, sheathing bases, narrowly ovate to obovate, attenuate at base into a pseudopetiole; ligule very short and stiff. **Inflorescence** paniculate, terminal on a separate leafless shoot, usually lax; bracts ovate, subtending 1- to several-flowered cincinni; bracteoles tubular. **Calyx** tubu-

lar, 3-dentate at apex, persistent in fruit. **Corolla** 3-lobed; tube somewhat longer than calyx; labellum 3-lobed, erect or spreading, longer than petals. **Stamen** subsessile; anther without crest. **Ovary** 3-locular, with several to many ovules; style filiform; stigma bilobed; stylodes forming a solid mass around style base. **Fruit** a fleshy capsule, dehiscing from base to apex. **Seeds** angular, surrounded by a fimbriate aril.

Species ± 55 in tropical America, 10–20 in Africa; sthn trop. Afr. 1: *Renealmia africana* Benth. ex Hook.f., Angola.

Siphonochilus J.M.Wood & Franks

Burt: 369 (1982); Lock: 14 (1985); Larsen *et al.*: 486 (1998); Archer: 739 (2000).

Kaempferia L. subgen. *Cienkowskia* K.Schum.: 67 (1904).

Sthn trop. Afr. 4, Zambia, Zimbabwe, Malawi, Mozambique, and sthn Afr.

***Zingiber** Boehm.

Boehmer: 89 (1760), name conserved; Schumann: 165 (1904); Loesener: 586 (1930); Larsen *et al.*: 488 (1998).

Perennial herbs with creeping, aromatic, fleshy rhizome; leafy stems usually separate from flowering ones. **Inflorescence** cylindrical to ovoid; peduncle long; bracts closely imbricate or with free apices, often brightly coloured, each enclosing a 1(2–4)-flowered cincinnus. **Calyx** tubular, 3-denticulate at apex, split down one side. **Corolla**: tube ± as long as bracts, lateral lobes connate and fused to centre of labellum in lower third; labellum 3-lobed. **Stamen** with short filament connective apically produced into a long, subulate appendage wrapped around style. **Ovary** 3-locular; ovules many; style slender; stigma small, subglobose. **Fruit** a capsule, fleshy at first, later leathery and dehiscent. **Seeds** many, with white, lacerate aril. $x = 11$.

Species 60, Indomalaysia to E Asia and tropical Australia. **Zingiber officinale* Roscoe (Ginger) and **Z. zerumbet* (L.) Sm. are cultivated and may persist as relics of cultivation.

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Zosteraceae

(Alismatidae—Alismatales)

(Monocots—Alismatales)

Glen, R.P. in Leistner: 740 (2000).

Sthn trop. Afr.: genus 1, species 1.

Zostera L.

Bennett: 225 (1901); Obermeyer: 58 (1966); Isaac: 30 (1968); Cook: 224 (1990); Bandeira: 191 (2002).

Sthn trop. Afr. 1: *Zostera capensis* Setch., Angola, Mozambique, and sthn Afr.

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- Podostemaceae).
- anemochoric**: dispersed by wind.
- anemophilous**: pollinated or dispersed by wind (compare **entomophilous**, **hydrophilous**, **ornithophilous**).
- aneuploid**: having a chromosome number that is not an exact multiple of the **haploid** number, because one chromosome set is incomplete.
- angiosperm**: a seed-bearing plant whose ovules, and hence seeds, develop within an ovary (compare **gymnosperm**).
- angustiseptate**: with narrow partitions (compare **latiseptate**).
- anisocytic**: of a **stoma** with three subsidiary cells, one distinctly smaller than the other two, surrounding the stoma.
- anisophyllous**: with the two leaves of a pair of unequal size or shape.
- annual**: a plant whose life span ends within one year after germination.
- annular**: arranged in a circle.
- annulate**: ring-shaped; having an **annulus**.
- annulus**: any ring or ring-like structure.
- anomocytic**: of a **stoma** surrounded by a limited number of cells that are indistinguishable from those of the remainder of the epidermis.
- antepetalous** (e.g. of **stamens**): **opposite** the petals.
- antesepalous** (e.g. of **stamens**): **opposite** the sepals.
- anterior** (applied to floral organs): in a position most remote from the axis (compare **posterior/posticous**).
- anthela** (*adj.* **anthelate**): a **panicle** in which the lateral axes overtop the main axis.
- anther**: the part of the stamen which contains the pollen, usually comprising four **microsporangia** or **pollen sacs**, two in each half or lobe of the anther; the tissue separating the two sacs in each half usually disintegrates before **anthesis**, resulting in a 2-thecous/bitheous/2-locular/2-celled anther.
- anther canal** (in orchids): the narrow **basal** portion of a **pollinium**.
- antherode**: a sterile anther, often rudimentary.
- anther slits**: see **gynostegial grooves**.
- anther wings** (in Asclepiadoideae—Apocynaceae): see **gynostegial grooves**.
- anthesis**: period during which the flower is open.
- anthocarp**: a false fruit formed by the union of floral parts with the fruit (as in Nyctaginaceae).
- anthophore**: a short stalk between calyx and petals (e.g. in *Dianthus*—Caryophyllaceae).
- anticous/antical**: applied to that which is most remote or turned away from the axis; occasionally employed for **introrse**, as applied to anthers (compare **posticous**).
- antrorse**: bent or directed towards the apex or forward (compare **retorse**).
- apex** (*pl.* **apices**): tip; topmost part or terminal end.
- aphlebia**: stipular outgrowths which occur on the **rachis**.
- apicule/apiculum/apiculus** (*adj.* **apiculate**): a short point.
- apocarpous**: with **carpels** free from one another.
- apophysis** (*pl.* **apophyses**): the rounded, exposed thickening on the scales of certain pine cones.
- apotropous**: of an **anatropous** ovule with ventral **raphe**.
- appendiculate/appendaged**: with small appendages; hanging in small fragments.
- appressed**: lying close to and flat along the surface.
- aquatic**: living in water.
- arachnoid**: cobwebby by soft and fine entangled hairs which are longer than in **tomentose**.
- araneose/araneous**: see **arachnoid**.
- arborescent**: having the shape or characteristic of a tree.
- arcuate**: curved like a bow.
- areolate**: divided into distinct spaces.
- areole**: a small pit or raised spot, often bearing a tuft of hairs or spines; a space marked out on a surface; a small area in a leaf between small veins.
- aril**: an appendage covering or partly enclosing the seed and arising from the **funicle** (stalk) of the seed.
- arillode**: a false **aril**; a fleshy coat derived from the orifice or **micro-pylar** rim of the outer **integument** instead of the stalk of an ovule.
- arillus** (*pl.* **arilli**; *adj.* **arillate**): see **aril**.
- arista** (*pl.* **aristae**): a bristle-like appendage as on **glumes** of many Poaceae; a bristly **awn**.
- aristate**: with a long, bristle-like point.
- article**: one of the segments of a jointed fruit, such as a **loment**, or **internodes** of the branchlets of e.g. *Casuarinaceae or Salicorniaceae—Chenopodiaceae.
- articulate(d)**: jointed or separating at a certain point and leaving a clean scar.
- articulation**: a joint, e.g. between the **column** and the lower part of the **lemma** in *Aristida* (Poaceae).
- ascendent/ascending**: growing erect after an oblique or \pm horizontal beginning.
- ascending** (of **aestivation**): sepals or petals arranged in the bud so that the upper margins of the lowest member overlap the lower margin of the member above it.
- asperous**: rough, harsh to the touch.
- asperulate/asperulous**: slightly rough to the touch.
- ategmic** (of a seed): without covering.
- atrocastaneous**: dark chestnut-coloured; dark brown.
- attenuate**: tapering gradually.
- aulacospermous** (of seeds): furrowed.
- auricle** (*adj.* **auricled/auriculate**): an ear-like lobe or appendage at the base of a leaf or other organ.
- autogamous**: self-fertilising.
- awn**: a fine bristle usually terminating an organ, as at the tip of the **glumes** and **lemmas** of many Poaceae.
- axil**: the angle between leaf or bract and the axis bearing it.
- axile placentation**: **placentation** with the **ovules** borne on the axis or the inner angle of the locules of a **syncarpous** ovary (see also **marginal** and **parietal placentation**).
- axillary**: arising from the **axil**.
- axis** (of an inflorescence): that part of the stem or branch on which the individual flowers are borne.

B

- baccate**: berry-like.
- baculate** (of pollen grains): covered with rods that are higher than wide and not constricted at their base.
- barbate**: bearded.
- barbed**: with rigid points or lateral bristles pointing backwards.
- barbellate**: shortly **barbed**.
- basal**: at the base.
- basifixed**: fixed by its base, e.g. of an anther (compare **dorsifixed**, **medifixed**, **versatile**).
- basiscopic**: toward the **basal** or **proximal** (as opposed to **distal**) end; facing basally.
- B-chromosomes** (accessory chromosomes): supernumerary chromosomes occurring in addition to the normal **diploid** complement.
- beak**: a prominent terminal projection, especially of a **carpel** or fruit; a slight narrowing of the **lemma** below the **awns**, as distinct from a longer straight **column**, e.g. in *Aristida* (Poaceae).

bearded: with long awns or with tufts of stiff hairs.

berry: a juicy fruit with soft **pericarp**, the seeds immersed in pulp (compare **drupe**, **pyrene**).

bi- (*prefix*): twice; two; having two.

bicallose: with two **callosities**.

bicarpellate (of an ovary): with two carpels.

bicolorous: two-coloured.

bifacial (of a leaf): **dorsiventral**, having a distinct upper and lower surface.

bifarious(ly): see **distichous**.

bifid: cleft into two parts for \pm half the length.

bifoliate: having two leaves.

bifoliolate: having two **leaflets**.

bilabiate: 2-lipped, as when two or three lobes of a calyx or corolla stand separate as an upper lip from the others forming a lower lip.

bilocular: with two **locules** or compartments.

binate: in pairs.

bipinnate: when the primary divisions (pinnae) of a **pinnate** leaf are themselves pinnate.

biramous: with two branches.

biseriate: arranged in two rows or **whorls**.

bisexual: having both sexes in the same **flower** or **inflorescence**.

bitegmic: of an ovule having two **integuments**.

biterminate (of a leaf): with two orders of leaflets, each **ternately** compound.

bithecate (of an anther): with two **thecae**.

bivalved: having two **valves**.

blade: the expanded part of a leaf or petal (see also **lamina**, **limb**).

bostrychoid: having the form of a **bostryx**

bostryx (**helicoïd cyme**): a spirial inflorescence, with axes on different planes, branching always in the same direction.

bothrospermous (of seeds): pitted.

botryoid: like a cluster of grapes.

brachyblast: a **spur shoot** or short branch.

bract: a leaf-like structure, different in form from the foliage leaves and without an axillary bud, associated with an **inflorescence** or a **flower**.

bracteal cup: cup-shaped structure formed by fused bracts (e.g. in Viscaceae).

bracteate: possessing or bearing **bracts**.

bracteole (*adj.* **bracteolate**): small bract borne on the **pedicel** or **calyx** of a flower.

bractiform: looking like a **bract**.

bristle: a stiff, strong **trichome**, similar to a pig's bristle, as in the **perianth** of some Cyperaceae.

brochidodromous (of a leaf): with a single primary vein, the secondary veins not terminating at the margin but joined together in a series of prominent upward arches or marginal loops on each side of the primary vein.

bud: an undeveloped shoot that can give rise to a branch or flower.

bulb: a storage organ, usually underground, made up of a usually much abbreviated stem and fleshy leaf bases.

bulbil: a small deciduous **bulb** (or **tuber**) formed around the mother bulb or in the **axil** of a leaf, and functioning to propagate the plant vegetatively.

bulbous-based: with an inflated base.

bullate: having a blistered or puckered surface; (of a leaf surface): prominently raised, like a bubble, between the veins.

burr: a rough or prickly **propagule** consisting of a seed or fruit and associated floral parts or bracts.

buttress: a flange of tissue protruding from the base of the main trunk of a tree.

C

caducous: falling off early.

caespitose: growing in tufts.

calcarate: having a spur.

calceiform: shaped like a slipper.

callose/callous: hard and thick in texture; bearing **callosities**.

callosity: a leathery or hard thickening of part of an organ.

callus (*pl.* **calli**): a thickened part, such as the thickened extension at the base of the **lemma** at the point of its attachment to the **rachilla**.

calycine: belonging to the **calyx**.

calyculus (*pl.* **calyculi**; *adj.* **calyculate**): the bracts around the **calyx** or an **involucre** resembling an outer calyx (see also **epicalyx**).

calyx (*pl.* **calyces**): the outer envelope of the flower, consisting of free or united **sepals**.

calyx tube: when the **sepals** are partly united, the lower portion is referred to as the tube and the upper free part as the **limb** usually divided into calyx teeth, lobes or segments (see also **hypanthium**).

campanulate: bell-shaped.

campylotropous: of an **ovule** orientated transversely (i.e. with its axis at right angles to its stalk and with a curved **embryo sac**).

canaliculate: channelled.

canescent: \pm grey-pubescent or hoary.

cano- (*prefix*): greyish white (usually applied to hair covering).

capillary: resembling a hair; very slender.

capitate: (1) like the head of a pin, as the **stigma** of some flowers; (2) collected into compact head-like clusters, as the inflorescences of Asteraceae.

capituliform: shaped like a **capitulum**.

capitulum (*pl.* **capitula**): a dense head-like inflorescence usually of sessile flowers (see also **head**).

capsule: a dry fruit composed of two or more united **carpels** and either splitting when ripe into flaps called **valves** or opening by slits or pores.

carina (*adj.* **carinal**): a keel; the two partially united **anterior** (lowest) petals of a **papilionaceous** flower, or the single, similar-shaped, anterior petal in many Polygalaceae.

carinate: keeled.

carnose: fleshy.

carpel: an organ (generally believed to be a modified foliar unit) at the centre of a flower, bearing one or more **ovules** and having its margins fused together or fused with other carpels to enclose the ovule(s) in an **ovary**, and consisting also of a **stigma** and usually a **style** (see also **suture**).

carpellate: possessing **carpels**.

carphophore: the stalk of a **carpel** or of a **mericarp**.

carrier: see **corpuscle**.

carpopodium: the stalk of a fruit.

cartilaginous: hard and tough, as the skin of an apple-pip.

caruncle (*adj.* **caruncular**/**carunculate**): an outgrowth from **integuments** at or near the **hilum** of certain seeds (see also **strophiole**).

caryopsis: a 1-seeded, dry, indehiscent fruit with the seedcoat adnate to the fruit wall, derived from a 1-loculed **superior ovary** (characteristic of Poaceae) (compare **achene**).

castaneous: chestnut-coloured; dark brown.

cataphyll: small scale leaf, e.g. on **rhizomes** of flowering plants.

catkin: a dense, often pendulous **spike** of small unisexual flowers which have no conspicuous **perianth**.

caudate: abruptly ending in a long tail-like tip or appendage.

caudex: a short, thickened, often woody, vertical or branched perennial stem, usually subterranean or at ground level (e.g. in some

- spp. of *Encephalartos*—Zamiaceae).
- caudicle**: the stalk of a **pollen mass** connecting it to the **corpuscle**, in Asclepiadaceae and Orchidaceae (also known as **translator arm**).
- caulescent**: with an obvious leafy stem; having an evident stem above ground.
- cauliflorous**: producing flowers from old wood (compare **ramiflorous**).
- cauline**: arising from or inserted on the stem.
- centric** (of a leaf): filiform to cylindrical with a ± continuous palisade layer (see also **unifacial**).
- centripetal**: as in **inflorescences**, blooming from the outside inward or from the base upward.
- chalaza** (*adj.* **chalazal**): basal region of the **ovule** where it joins the **funicle**; region of a seed opposite the **micropyle**.
- chamaephyte**: a perennial plant, generally woody or partly woody, with the mean height of the renewal buds less than or equal to 0.7 m from the ground.
- chartaceous**: papery in texture, opaque and thin.
- chasmogamous**: pollinated when the flower is open (compare **cleistogamous**).
- chasmophyte**: plant growing in rock crevices.
- chlrenchyma**: **parenchyma** cells containing chloroplasts.
- choripetalous**: having separate and distinct petals (= **polypetalous**) (compare **gamopetalous**, **sympetalous**).
- cilia** (*sing.* **cilium**): short epidermal outgrowths, such as hairs or scales ± confined to the margins of an organ.
- ciliate**: with a fringe of hairs along the edge.
- ciliolate**: minutely **ciliate**.
- cincinnus** (*pl.* **cincinnati**; *adj.* **cincinnatiate**): a tight, unilateral **scorpioid cyme**.
- circinnate**: spirally coiled, with the tip innermost, as the leaves of *Drosera*—Droseraceae.
- circumscissile**: applied to an organ opening as if cut circularly around the upper part, which then comes off like a lid.
- cirrhiferous**: producing **tendrils**.
- cirrhose**: having **tendrils**.
- cistolith**: see **cystolith**.
- cladode**: a flattened, foliaceous stem having the form and function of a leaf, but arising in the axil of a minute, bract-like caducous, true leaf (compare **phyllode**).
- clathrate**: latticed or pierced with apertures like a trellis.
- clavate**: club-shaped or thickened towards the end.
- clavellate**: diminutive of **clavate**, thickened towards the apex.
- claviform**: club-shaped.
- clavuncula/clavuncle**: the large, variously shaped stigma of certain members of Apocynaceae.
- claw** (*adj.* **clawed**): the narrow base of a petal, sepal or bract.
- cleistogamous**: (of pollination) occurring when the flower is closed (as in *Viola*—Violaceae) (compare **chasmogamous**).
- cleft**: incised almost to the midrib or base.
- club-shaped**: gradually thickened from a slender base.
- coalesce**: to fuse.
- cobwebby**: entangled with fine filaments (see also **arachnoid**).
- coccus** (*pl.* **cocci**; *adj.* **coccous**): a one-carpel unit of a **schizocarp** or lobed fruit, becoming separate at maturity (e.g. in Euphorbiaceae).
- collateral**: standing side by side.
- colleter**: a mucilaginous secretory hair, often occurring in tufts near the base of the leaf **lamina** and on the **calyx** (e.g. in Apocynaceae).
- colliculate**: covered with little rounded elevations.
- colpate** (of a pollen grain): having elongate, longitudinal apertures.
- colporate** (of a pollen grain): having compound apertures (*adj.* of **colporus**).
- colporus** (of a pollen grain): a compound aperture consisting of an ectocolpus with one or more endoapertures.
- colpus** (*pl.* **colpi**) (of a pollen grain): a usually longitudinal, ± distinct aperture (compare **sulcus**).
- column**: (1) the adnate **stamen** and **style** forming a solid central body, as in orchids; (2) the tube of connate **filaments**, as in Malvaceae; (3) a straight structure between the apex of the **lemma** and the branching point of the **awns**, as in *Aristida* and *Stipagrostis* (Poaceae) (see **beak**).
- coma**: a tuft of hairs at the end of some seeds; a terminal crown of leaves or bracts, e.g. in *Eucomis* (Hyacinthaceae).
- commissural**: of a joint or seam, such as that between two adhering **sepals**.
- commissure**: the faces of cohering **carpels** (e.g. in Apiaceae); the place of joining or meeting.
- comose**: bearing a tuft of **trichomes**, usually apically.
- complanate**: flattened; compressed.
- complicate**: folded on itself.
- compound**: the opposite of **simple**; composed of several similar parts, as a leaf of several leaflets; **compound fruit**: the fruits of separate flowers becoming united into a mass; **compound umbel**: each **ray** again bearing an **umbel**.
- compressed**: flattened lengthwise from side to side or from front to back.
- concolor/concolorous**: of uniform colour (e.g. upper and lower leaf surface with the same colour) (compare **discolorous**).
- concescent**: growing/grown together.
- conduplicate**: folded together lengthwise.
- condyle**: an intrusion of the placenta which forms grooves or cavities in the **endocarp** of the developing fruit (e.g. in Menispermaceae).
- confervoid**: composed of threads; (of **pollen**): united in strings.
- conflorescence**: a modified, condensed inflorescence, as found in *Eucalyptus*—Myrtaceae.
- connate**: applied to parts of the same series which are united so closely that they cannot be separated without tearing.
- connective**: the part of an anther which connects its two **thecae**.
- connivent**: applied to parts converging so as to be nearer together above than below.
- conoidal**: ± conical.
- conservation** (of a name): the decision of an International Botanical Congress that a validly published name shall be used even though to do so is contrary to the International Code of Botanical Nomenclature (**I.C.B.N.**).
- contorted** (of **sepals** and **petals**): twisted in the bud so that each overlaps the adjoining one on one side and is overlapped by the other adjoining one on the other side, like a furled umbrella; spirally twisted.
- contractile roots**: a specialised type of root, often found in bulbous plants, that undergoes contraction and thereby pulls the bulb or shoot parts deeper into the soil.
- convexity**: the condition of being convex or having a curvature that bulges towards the point of observation.
- convolute**: rolled up lengthwise (also used in the sense of **contorted**).
- cordate**: applied to the base of a leaf when it is ± deeply notched.
- coriaceous**: firm, tough, of the consistence of leather.
- corm**: a tuberous bulb-like **rootstock**.
- cormous**: possessing a **corm**.
- cornate**: bearing a horn.

dictyostelic: with vascular bundles concentrically arranged with large overlapping **leaf gaps**, in the trunk.

didymous: 2-lobed; (of **anthers**): distinctly 2-lobed but with almost no connective.

didynamous (of **stamens**): with four in two pairs of unequal length, e.g. in Acanthaceae and Lamiaceae.

diffuse: loosely and openly branching or spreading.

digitate: like the fingers of a hand, with the members arising from the same point.

digitiform: shaped like a finger.

dimidiate: having one of two sides or parts more developed than the other.

dimorphic/dimorphous: of two forms.

dioecious: with unisexual flowers, the male and the female flowers on separate plants (compare **monoecious**).

diploid: having two of the basic sets of chromosomes in the nucleus (compare **haploid**).

disarticulate: breaking apart at the joints.

disc: (1) an enlargement of the **receptacle** within the calyx or within the corolla or stamens, usually in the form of a ring, cup or cushion, often lobed or even cut up into so-called (nectary) **glands**; (2) **disc floret**: the central florets as compared with the **ray florets** in a head of the Asteraceae.

disciform (of heads of Asteraceae): with central flowers perfect with tubular **corollas**, and the marginal flowers **pistillate** or neuter but without **ligules**, their corollas tubular or wanting.

discoïd: (1) like a disc or plate; (2) applied to the heads of Asteraceae without **ray** flowers.

discolorous: of a leaf in which the two surfaces are unlike in colour (compare **concolorous**).

dissepiment: a partition (**septum**) within an ovary or fruit, derived from fusion of adjacent **carpels**.

distal: farther from the point of attachment or origin (compare **proximal**).

distichous: regularly arranged one above the other in two opposite rows, one on each side of the stem or **rachis**.

diurnal: happening during the day.

divaricate: widely divergent or spreading in different directions, and often \pm horizontal.

dizonasulcate (of a pollen grain): with two ring-like **sulci** around the equator.

domatium (*pl.* **domatia**): small swelling/pocket on the lower surface of the leaf of some woody dicotyledons in the axils of the primary veins, usually partly enclosed by leaf tissue or hairs.

dorsal: relating to or situated on the face turned away from the axis; (of a leaf): the lower surface; (of a thallus): the upper surface, facing away from the substrate (compare **ventral**).

dorsifixed: attached at or by its back, said e.g. of an **anther** to the **filament**.

dorsiventral: flattened and having distinct **dorsal** and **ventral** surfaces, the two usually different, as in many leaves.

drupe (*adj.* **drupaceous**): an indehiscent, fleshy fruit, usually 1-seeded, in which the **pericarp** is clearly tripartite: a tough **exocarp**, a fleshy **mesocarp** and a hard **pericarp**, found e.g. in plum or cherry, in *Flacourtia* and *Ximena* and in the **aggregate 'fruit'** of e.g. *Rubus* (Rosaceae); **drupaceous** often refers to a fruit that is drupe-like but not strictly a drupe (compare **berry**, **pyrene**).

drupelet: a small **drupe**.

druse: an aggregate of crystals within a cavity.

duplicate: folded twice.

E

e- (*prefix*): often implying absence of something, e.g. in **ebracteate**, **eglandular**.

ebracteate: without **bracts**.

ecalcarate: without a spur.

ecallose: without **callus/calli**.

ecalyculate: without a **calyculus**.

ecaudate: without a tail-like tip or appendage.

echinate: covered with **prickles** like a hedgehog.

echinolphate (of a pollen grain): **lophate** with **echinate** ridges.

echinulate: covered with small, pointed **spines**.

effuse: spreading out loosely, especially of an inflorescence.

efoliate: without leaves.

eglandular: having no glands.

elaiosome: an appendage of a seed, usually rich in oil, attractive to animals (especially ants) and hence an aid to dispersal by such animals.

eligulate: without a **ligule**.

ellipsoid: an elliptic solid.

elliptic: in the form of a flattened circle more than twice as long as broad.

emarginate: notched at the extremity.

embryo: the rudimentary plant still enclosed in the seed, consisting of the **radicle** from which the root develops, the **cotyledons** (one, two, rarely more), which become the earliest leaves, and the **plumule**, the bud from which the stem and further leaves develop.

emergent/emersed: with part of the plant aerial and the rest submerged; with part extending out of the water.

endemic: having a natural distribution confined to a particular geographical region.

endocarp (*adj.* **endocarpal**): the innermost layer of the wall of a fruit.

endosperm: formerly called **albumen**, the nutritive material (mealy, oily, fleshy or horny), formed in the embryo sac after fertilisation and stored within the seed and often surrounding the embryo (compare **perisperm**).

endothecium (*adj.* **endothecial**): the inner lining of the **theca** of an **anther**.

enervate: without **nerves**.

ensiform: sword-shaped.

entire: with an even margin without teeth, lobes, etc.

entomophilous (of pollination): effected by insects (compare **anemophilous**, **hydrophilous**, **ornithophilous**).

epaleate: without **paleae**.

epapillate: without **papillae**.

epappose: without a **pappus**.

epi- (*prefix*): on, upon, above, over.

epicalyx: an **involucre** of **bracts** arising below the flower, resembling an extra **calyx**, as in some Malvaceae (see also **calyculus**).

epicarp: the outer layer of the wall of a fruit (see also **pericarp**).

epichile (of an orchid flower): apical portion of a longitudinally two- or three-partite **lip**.

epidermis (*adj.* **epidermal**): the outermost layer of cells of an organ, usually only one cell thick.

epigeal: describing seed germination in which the **cotyledons** emerge from the seed and are elevated above the soil surface (compare **hypogeal**).

epigynous: applied to the flower when the sepals, petals and stamens are apparently borne above the ovary, the latter being en-

- heteroblastic:** having the adult parts of the plant (especially the leaves) distinctly different in form from the juvenile parts.
- heterocarpic/heterocarpous:** having carpels or fruit of more than one kind.
- heterocarpy:** having two kinds of fruit.
- heterodistylous:** said of a species in which two kinds of plants occur, those with long styles and those with short styles.
- heterogamous:** of different sexes; (of a flowerhead, as in some Asteraceae): having two kinds of **florets**, those of the **ray** florets being neuter or unisexual and those of the **disc** florets bisexual; of **spikelet** pairs in Poaceae: consisting of a sterile and a female-fertile spikelet (compare **homogamous**).
- heteromorphic:** of different forms (compare **homomorphic**).
- heterophyllous:** having leaves of different forms.
- heterosporous:** having two types of **haploid** spores (compare **homosporous**).
- heterostylous:** applied to a species which has flowers with **styles** differing in length or shape (compare **homostylous**).
- heterothetic** (of a compound raceme): composed of a terminal as well as lateral racemes.
- hilum** (*adj.* **hilar**): the scar left on the seed where it was attached to the **funicle** or **placenta**.
- hippocrepiform:** horseshoe-shaped.
- hirsute:** with rather coarse, stiff hairs (compare **villous**).
- hirsutulous:** minutely **hirsute**.
- hispid:** bristly pubescent.
- hispidulous:** minutely **hispid**.
- hoary:** covered with white or greyish white, very short, closely interwoven hairs.
- holonectary** (e.g. in Mesembryanthemaceae): a nectary forming a continuous ring.
- homogamous:** applied to a flowerhead/**capitulum** with all the flowers of the same kind; or to spikelet pairs in Poaceae that are of the same sexuality (compare **heterogamous**).
- homomorphic/homomorphous:** uniform in shape (compare **heteromorphic**).
- homonym** (in nomenclature): a name spelled exactly like a validly published name for a taxon of the same rank based on a different type.
- homosporous:** having only one type of **haploid** spore (compare **heterosporous**).
- homostylous:** species in which the flowers have **stigmas** and **anthers** held at the same level relative to each other on all plants (compare **heterostylous**).
- hood** (in flowers of Asclepiadoideae—Apocynaceae): a concave segment of the **corona**.
- host:** an organism on which a **parasite** lives and by which it is nourished (also applied, loosely, to a plant supporting an **epiphyte**).
- humifuse:** lying or spreading on the ground.
- hyaline:** almost transparent.
- hydathode:** a minute pore or specialised structure through which water is discharged from a leaf by guttation; sometimes differentiated as secretory **trichomes**.
- hydrophily** (*adj.* **hydrophilous**) (of pollination): effected by water.
- hydrophyte** (*adj.* **hydrophytic**): a plant living in water or in a very moist habitat; an aquatic plant.
- hygrochastic:** applied to plants in which opening of the fruit and dispersion of the spores or seeds are caused by absorption of water.
- hygrophytes** (*adj.* **hygrophytic**): marsh plants or plants that need a large supply of moisture for their growth.
- hygroscopic:** readily absorbing and retaining moisture from the atmosphere, resulting in changes in form or position of certain cells or structures.
- hypanthium** (*pl.* **hypanthia**): a cup or tube bearing floral parts above the base, and often above the top of the ovary of a flower, e.g. in many Myrtales or Onagraceae (see also **calyx tube**).
- hypochile** (of an orchid flower): the basal part of a longitudinally two- or three-partite **lip**.
- hypocotyl:** the part of the stem of an **embryo** or young seedling below the cotyledonary node.
- hypocrateriform:** see **salverform**.
- hypogeal:** growing or remaining below ground; describing seed germination in which the **cotyledons** remain below the soil surface (compare **epigeal**).
- hypogynium** (*pl.* **hypogynia**): portion of the **receptacle** below the ovary, e.g. in Cyperaceae.
- hypogynous:** having the flower parts attached below the base of the ovary and free from it; flowers with this arrangement have a **superior** ovary (compare **epigynous**, **perigynous**).
- hypophyll:** leaf borne at the upper level of a plant, as with various floral bracts; some possibly have a protective function.
- hysteranthous** (of leaves): appearing after the flowers (compare **synanthous**).

I

I.C.B.N. = International Code of Botanical Nomenclature.

idioblast: a cell that differs from those around it in the same tissue.

illegitimate (of a validly published name): contrary to one or more articles of the **I.C.B.N.**

imbricate: (1) overlapping like tiles; (2) applied to parts in a flower bud where one **sepal** or **petal** is wholly internal and one wholly external and the others are overlapping at the edge only.

immaculate: without spot or stain; pure, unblemished, undefiled.

immarginate: not **margined** or bordered.

imparipinnate: having an uneven number of **pinnae**, by virtue of having one terminal **pinna**.

imperforate: not perforated.

inaperturate (of a pollen grain): without germinal pores.

incised: margin cut rather deeply and sharply.

included: not projecting (compare **exserted**).

incrassate: thickened.

incumbent: resting or lying (on); (of the orientation of an **embryo**): with the **cotyledons** lying face to face and folded downwards beside the **radicle** (as in some Brassicaceae); (of anthers): lying against the inner face of the **filament**.

incurved: bent or curved inwards or upwards; (of leaf margins): curved towards the **adaxial** surface.

indefinite: variable in number; numerous; many; (of stamens): more than twice as many as the petals or sepals; (of an inflorescence): not terminating in a flower, i.e. having a continuing terminal growing point.

indehiscent: not opening when ripe.

indeterminate: (1) (of an **inflorescence**): the lateral or lower flowers mature first while the primary axis continues to grow, hence the terminal flower is the last to open, therefore a **racemose** inflorescence (compare **cymose**) (2) (of growth): (= **monopodial**) the condition in which the terminal bud persists and produces successive lateral branches.

indumentum: any covering of a surface such as hairs, wool, scales.

induplicate: with margins (of **petals** or **sepals**) folded inwards but not overlapping.

indurated: hardened.

indusium (*pl.* **indusia**): a cup covering the **stigma**, as in

or **sulcus**.

monothecous (of an anther): having one **theca**.

monovalent/univalent: a single, unpaired chromosome during meiosis.

morchelliform: shaped like a morel (a fungus of the genus *Morchella* which has a pitted cap).

mucilage (*adj.* **mucilaginous**): a gelatinous substance which absorbs water and increases in bulk.

mucous: slimy.

mucronate: ending abruptly in a short stiff point which is a continuation of the midrib.

mucronulate: finely **mucronate**.

multifid: divided into many lobes or segments.

muricate: rough, with short hard tubercles or pointed protuberances.

muriculate: finely **muricate**.

muticous: blunt, without a point.

mycorrhiza: a symbiotic union between a fungus and a plant root.

mycotrophic: of a plant possessing mycorrhiza.

myxogenic: capable of forming mucus (when wetted).

N

naked (of seeds): exposed on the surface of a sporophyll (not enclosed within an ovary); (of flowers): without perianth.

-nate (*suffix*): indicating number of parts in a group, e.g. leaves 3-nate = three leaves in a group or cluster.

naturalised: introduced and reproducing itself without human assistance (compare **adventive**, **introduced**).

navicular /naviculate/naviculiform: boat-shaped.

nectar guides: floral orientation cues directing a pollinator to the nectar.

nectary/nectarium (*adj.* **nectariferous**): any structure that secretes nectar.

nerves: the principal or more conspicuous **veins** or ribs of a leaf or other organ.

net-veined: with the smaller veins connected like meshes of a net; reticulate.

nigropunctate: with black dots.

nitid: glossy, lustrous, smooth and clear.

nitrophilous: of a plant that grows well in soil rich in nitrogen.

node: the point on the stem at which a leaf or leaves and accompanying organs arise (compare **internode**).

nodose: having knots or being knobby, usually in reference to roots, especially in the legumes (Fabaceae).

nucellus: the female sporangium (megasporangium) within the ovule.

nut: a one-seeded indehiscent fruit, with a hard, dry **pericarp** (the shell).

nutlet: a little **nut**.

O

ob- (*prefix*): inverse or inversely, e.g. **obovate** = inversely **ovate**.

obconic: inversely **conical**, with the point of attachment at the small end.

obcordate: more or less heart-shaped but with the narrow end below, and the broad end deeply notched.

obdiplostemonous (of a flower): with the stamens in two alternating whorls, the outer whorl opposite the petals and the inner opposite the sepals.

oblanceolate: inversely **lanceolate**; with the broadest portion nearest the apex and tapering toward the base.

oblanceolate: transversely broadly **elliptic**.

obligate (of parasites): unable to survive without the **host** (compare **facultative**).

oblique: of unequal sides, e.g. applied to a leaf with the two sides of the blade unequal at the base.

obloid: a solid, near **elliptic** shape depressed at the poles.

oblong: much longer than broad, with nearly parallel sides.

obovate: **ovate** with the broadest part above.

obovoid: solid shape of **obovate** outline.

obsolete: reduced to a rudiment, or completely lacking (compare **rudimentary**, **vestigial**).

obtrullate: inversely **trullate**; angular-obovate, i.e. shaped like an inverted trowel, broadest above the middle with two equal sides meeting at base and two shorter straight sides meeting at apex.

oburator: a small protuberance, generally of placental origin, which grows into the space between **nucellus** and **integument**, or between the ovule and the ovary wall.

obtuse: blunt or rounded at the end.

obvolute: of a leaf folded along the midline with one margin overlapping one margin of a similarly folded leaf on the opposite side, i.e. half-**equitant**.

ocellate: with a small eye; marked with two-coloured spots having a centre of one colour surrounded by a broad ring of another.

ocrea (*pl.* **ocreae**; *adj.* **ocreate**): a tubular **stipule** sheathing the stem (e.g. in *Polygonum*—Polygonaceae).

-oid (*suffix*): indicates likeness, resemblance or similarity; or something having the form or nature of something else; e.g. **racemoid**: resembling a **raceme**; **petaloid**: resembling a **petal**.

opaque: not transparent; dull, not shining.

operculate: with a cap or lid.

operculum: (1) a lid, cap or cover; (2) the thickened tips of **integuments** of certain angiosperm ovules.

opposite: (1) pertaining to leaves or branches when two are borne at the same **node** on opposite sides of the stem; (2) one part before another, as a stamen in front of a petal.

orbicular: flat with a \pm circular outline.

orifice: opening.

ornithophilous (of pollination): effected by birds.

orthotropous (of an ovule): erect so that the **micropyle** points away from the **placenta**.

osseous: bony.

ostiole: an opening or pore, e.g. at the apex of the figs of *Ficus* (Moraceae).

oval: broadly **elliptic**.

ovary: that part of the **pistil** (the usually enlarged base) which contains the **ovules** and eventually becomes the fruit.

ovate: with the outline of an egg; scarcely twice as long as broad, with the broader end below the middle.

oviform: egg-shaped.

ovoid: solid shape of **ovate** outline.

ovule: the immature seed in the ovary before fertilisation.

ovulode: a sterile **ovule**.

P

palate: in **sympetalous** corollas, the raised projection of the lower lip which closes or very nearly closes the throat.

palea (*pl.* **paleae**; *adj.* **paleate**): (1) one of the chaffy scales or thin colourless bracts amongst the flowers on the **receptacle**, in Asteraceae; (2) the inner of two bracts enclosing the **floret**, in Poaceae.

paleaceous: with small membranous scales; chaffy.

pallid: pale in colour.

palmate (of a leaf): shaped like the palm and fingers of a hand (see **digitate**).

palmatifid (of a leaf): with the margin **palmately cleft** to less than

- halfway to the base.
- palmatilobed** (of a leaf): **palmately** divided to about halfway to the midrib.
- palmatipartite** (of a leaf): **palmately** divided almost to the midrib.
- palmatisect** (of a leaf): **palmately** divided down to the midrib.
- pandurate/panduriform**: fiddle-shaped.
- panicle** (*adj.* **paniculate**): a compound **raceme**; an **indeterminate** inflorescence in which the flowers are borne on branches of the main axis or on further branches of these.
- pantoporate** (of a pollen grain): with apertures scattered over the whole surface.
- papilionaceous/papilionoid**: applied to flowers with a 'butterfly-like' appearance, as in many Papilionoideae—Fabaceae and Polygalaceae.
- papilla** (*pl.* **papillae**): a soft, nipple-shaped protuberance; a type of **trichome**.
- papillate**: having **papillae**.
- papillose**: covered with minute, nipple-like protuberances.
- pappus**: the ring of hairs or scales around the top of the fruit (as in Asteraceae) and perhaps representing the calyx limb.
- papule**: a pimple or small pustule.
- papulose**: covered with **papillae**.
- papyraceous**: (1) papery; (2) white as paper.
- paracarpous** (of an ovary): with **carpels** joined by the margins only.
- paracytic**: of a **stoma** accompanied on either side by one or more subsidiary cells parallel to the long axis of the pore and guard cells.
- paraphyletic** (of a group of taxa): derived from a single ancestral taxon, but which does not contain all the descendants of the most recent ancestor.
- paraphyses**: sterile, hair-like, basally attached structures.
- parasite**: an organism living on or in a different organism and deriving nourishment from it (compare **epiphyte**, **saprophyte**).
- parchment-like**: like skin or leather.
- parenchyma**: plant tissue consisting of mature living cells that are relatively unspecialised in function.
- parietal placentation**: **placentation** with the **ovules** borne on the inner surface of the wall of the **ovary** or on intrusions of the wall that form incomplete partitions or false septa (compare **axile** and **marginal placentation**).
- paripinnate**: of a **pinnate** leaf without an odd terminal leaflet.
- partite** (*suffix*): cleft nearly but not quite to the base.
- patelliform**: shaped like a knee-cap.
- patent**: spreading out widely, e.g. patent branches.
- pauciserrate**: sparsely **serrate**.
- pectinate**: like a comb.
- pedate**: resembling **palmate**, but the side lobes further divided.
- pedicel** (*adj.* **pedicellate/pedicelled**): the stalk of an individual flower.
- peduncle** (*adj.* **pedunculate/peduncled/peduncular**): the stalk of an **inflorescence**; the common stalk (**rachis** or **axis**) of several **pedicellate** or **sessile** flowers.
- pellucid**: translucent.
- petlate**: applied to a leaf, or sometimes some other organ with a stalk, of which the stalk is attached to its undersurface instead of to its edge.
- pendent/pendulous** (of ovules): arising on and hanging down from an apical **placenta**.
- penicillate**: with a tuft of hairs at the end.
- penni-parallel-veined**: **pinnately** parallel-veined.
- penninerved**: **pinnately** nerved.
- pentamerous**: having parts in fives or multiples of five.
- perennial**: a plant whose life span extends over more than two growing seasons.
- perfoliate** (of a sessile leaf or bract): having its base completely wrapped around the stem.
- perforate** (of a pollen grain): with holes less than 1 μm in diameter and generally situated in the **tectum**.
- perianth**: the floral envelope, consisting of **calyx** or **corolla** or both.
- pericarp**: the wall of the ripened ovary; its layers may be fused into one, or \pm divisible into **epicarp**, **mesocarp** and **endocarp**.
- periderm**: secondary protective tissue derived from the **phellogen**, and replacing the epidermis.
- perigone** (*adj.* **perigonal**): see **perianth**.
- perigynium** (*pl.* **perigynia**): the **hypogynous setae** of Cyperaceae; the flask or **utricle** of *Carex* (Cyperaceae); any hypogynous **disc**.
- perigynous**: applied to the flower when the sepals, petals and stamens arise on an open **receptacle** surrounding the ovary but are not **adnate** to it (compare **epigynous**, **hypogynous**).
- perisperm**: nutritive tissue in an **angiosperm** seed, formed from the **nucellus** (compare **endosperm**).
- persistent**: remaining attached to the plant beyond the expected time of falling.
- personate** (of a flower, e.g. in Scrophulariaceae): with a two-lipped corolla in the form of a face, with an arched upper lip and a lower lip that protrudes into and nearly closes the throat of the corolla.
- petal**: see **corolla**.
- petaloid/petaline**: resembling **petals**.
- petiolate**: having a **petiole**.
- petiole** (*adj.* **petiolar**): leaf stalk.
- petioled**: having a **petiole**.
- petiolode**: the axis-like structure below the lamina and petiole (if any); it often bears the inflorescences at its distal end and sometimes shows powers of late elongation; it sometimes also produces roots (*Streptocarpus*—Gesneriaceae).
- petiolule** (*adj.* **petiolulate/petioluled**): the stalk of a **leaflet**.
- phalloid**: resembling a phallus.
- phellem**: cork.
- phellogen**: cork cambium.
- phenotype**: the physical characteristics of an organism; the outward expression of characteristics conferred on an organism by its **genotype**.
- photonastic**: one-sided growth in length of an organ due to the unrestricted action of light.
- phyllary**: an individual **bract** of the **involucre**, e.g. in the inflorescence of Asteraceae.
- phyloclade** (*syn.* **cladode**): a flattened foliaceous stem having the form and function of a leaf but arising in the axil of a minute, bract-like, often caducous, true leaf.
- phyllode**: a flattened **petiole** or leaf **rachis** with the form and functions of a leaf (compare **cladode**).
- phyllotaxy**: the arrangement of leaves on a stem.
- phytomelanous** (especially in seeds): black.
- pilose**: hairy with rather long, soft, simple hairs.
- pin flower**: in **heterostylous** plants, the flower type having the longer style (compare **thrum flower**).
- pinna** (*pl.* **pinnae**): a primary division of a **pinnate** leaf.
- pinnate**: like a feather in appearance; (of a compound leaf): with the leaflets arranged along each side of a common **rachis**; (of the venation of a leaf): with a middle vein and secondary veins arising from it on each side.
- pinnate-parallel** (of the venation of a leaf): **pinnate** with the secondary veins running parallel to each other.

- pinnatifid**: with the margin **pinnately** cleft but not to the midrib.
- pinnatifoliate/pinnatifoliate**: **pinnately** divided to about halfway to the midrib.
- pinnatifid**: **pinnately** divided almost to the midrib.
- pinnatisect**: **pinnately** divided down to the midrib.
- pinnule**: the secondary or tertiary division of a leaf which is twice or thrice **pinnate**.
- pistil**: see **gynoecium**.
- pistil head**: see **style head**.
- pistillate**: pertaining to a flower with one or more **carpels** but no functional stamens; unisexual and female.
- pistillode**: a sterile **pistil**, often rudimentary.
- pitted**: marked with small depressions, punctate.
- placenta**: the part of the ovary, sometimes but not always thickened or raised, to which the ovules are attached (see also **free**).
- placentation**: the arrangement of **placentas**, and hence of ovules, within an ovary.
- placentiferous**: bearing a **placenta**.
- plesiomorphic** (of a character): common to the group under discussion and its ancestors.
- plicate**: folded back and forth longitudinally like a fan.
- plumose**: like a feather; with fine hairs branching from a central axis, e.g. the **pappus** of some Asteraceae.
- plumule**: see **embryo**.
- pluri-** (*prefix*): many-.
- pluriseriate**: in several to many rows.
- pod**: see **legume**.
- polarised** (of **endothelial** tissue of Asteraceae): with thickenings restricted to the horizontal cell walls.
- pollen**: the **microspores** of seed plants shed from **anthers**.
- pollen carrier**: see **corpuscle**.
- pollen mass**: pollen grains cohering into a single body; (= **pollinium**).
- pollen presenter**: a structural modification, usually a swelling, of the style around or below the stigma which enables pollen, shed in the bud, to be retained (e.g. in Proteaceae and Rubiaceae).
- pollen sac**: the chamber in an **anther** in which pollen is formed (see **anther**).
- pollinarium** (*pl.* **pollinaria**): the complex structure found in the flowers of many Apocynaceae where the pollen masses of two adjacent **thecae** are united for dispersal as a unit. The pollinarium consists of a small, \pm globose, sticky body, the **corpuscle** which has two thin, elastic arms, the **caudicles**, each bearing one **pollinium**.
- pollinium** (*pl.* **pollinia**): a cohesive mass of pollen grains which are shed together and transported as a unit during pollination (e.g. in Apocynaceae and Orchidaceae).
- polycarpic**: applied to a plant which flowers and fruits often (compare **monocarpic**).
- polyforate** (of a pollen grain): with many pores.
- polygamo-dioecious**: with bisexual and male flowers on the same plant, and bisexual and female flowers on others.
- polygamo-monoecious**: with bisexual flowers and unisexual flowers of both sexes on the same plant.
- polygamous**: having unisexual and bisexual flowers on the same or on different individuals.
- polymorphic**: having more than two distinct morphological variants.
- polypetalous**: of flowers with petals free from each other (compare **gamopetalous**).
- polyphyletic**: composed of members that originated independently from more than one evolutionary line (compare **monophyletic**).
- polyploid**: having more than two of the basic sets of chromosomes in the nucleus (compare **diploid**, **haploid**).
- pome**: a fleshy (false) fruit, formed from an inferior ovary in which the **receptacle** or **hypanthium** has enlarged to enclose the true fruit.
- porate** (of a pollen grain): with rounded apertures (compare **colpate**, **colporate**).
- pore**: small, \pm round aperture, e.g. on pollen grains.
- poricidal**: opening by pores.
- poriferous**: having many pores.
- porrect**: directed outward and forward; perpendicular to the surface.
- posterior**: in position nearest to the axis (compare **anterior/anticous**).
- posticous**: on the **posterior** side, next to the axis (compare **anticous**).
- pouch**: a bag, sack or receptacle of moderate size.
- praemorse**: apparently bitten off at the end.
- precocious**: appearing or developing early; often used of flowers which appear before the leaves.
- prehensile**: adapted for grasping, especially by wrapping around a support.
- prickle**: a sharp outgrowth from the bark or surface layer containing no conducting tissue.
- primocane**: the first season's shoot or cane of a biennial woody stem, as in many brambles (*Rubus* spp.—Rosaceae).
- procumbent**: trailing or lying on the ground without rooting at the nodes.
- prolate** (of a pollen grain): having a polar axis of greater length than the equatorial diameter.
- proliferous**: bearing **adventitious buds** on the leaves or in the flowers, capable of rooting and forming separate plants.
- propagule**: a structure with the capacity to give rise to a new plant.
- prophyll**: a leaf formed at the base of a shoot, usually smaller than those formed subsequently.
- prostrate** (*syn.* **procumbent**): trailing to lying on the ground without rooting at the nodes.
- protandrous/proterandrous**: with the **anthers** ripening before the **stigmas** (compare **protogynous**).
- proterogynous**: see **protogynous**.
- protogynous**: having the female sex organs maturing before the male ones (compare **protandrous**).
- protrusion**: something that projects or thrusts outwards or forwards.
- protuberance** (*adj.* **protuberant**): a bulge or swelling.
- proximal**: nearer to the point of attachment or origin; the converse of **distal**.
- pruinose**: having a whitish, waxy, powdery bloom on the surface.
- psammophilous**: sand-loving.
- psammophyte**: a plant which grows in sand or sandy soil.
- pseud-/pseudo-** (*prefix*): false, not genuine, not the true or typical.
- pseudanthium**: an inflorescence resembling a single flower (e.g. a **cyathium**).
- pseudo-aril**: false aril; see **arillode**.
- pseudocolpus** (of a pollen grain): a **colpus**-like streak.
- pseudo-indusium**: false indusium.
- pseudobulb**: a solid, above-ground, thickened or bulbiform stem, characteristic of some orchids.
- pseudopetiolate**: subsessile.
- puberulent**: minutely **pubescent**.
- puberulous**: slightly **pubescent**.
- pubescent**: covered with soft, short, erect hairs.
- pulverulent**: powdery.
- pulvinate**: cushion-shaped.
- pulvinus**: a swollen base or apex of the **petiole** or **petiolule**, often

glandular or responsive to touch; a cushion.

punctate: marked with dots or translucent glands.

puncticulate: very finely **punctate**.

punctiform: reduced to a mere point.

pungent: ending in a sharp, rigid point.

pusticulate: finely **pustulate**.

pustule (*adj.* **pustulate**): a slight elevation like a pimple or blister.

putamen: the shell of a **nut**; the hardened **endocarp** of a **drupe**.

pyrene: a nutlet or kernel, the stone (**endocarp** plus seed) of a **drupe** or similar fruit (compare **berry**, **drupe**).

pyriform: pear-shaped.

pyrophyte: a plant adapted to survive severe fires.

Q

quadr-/quadra-/quadri- (*prefix*): four-.

quincuncial (applied to calyx or corolla lobes in the bud): a variant of **imbricate aestivation** with two lobes outside, two lobes inside, and one lobe which is overlapped on one side only.

R

raceme (*adj.* **racemose**): an **indeterminate** inflorescence in which the flowers are borne on **pedicels** along an unbranched axis or **peduncle**, the terminal flowers being the youngest and last to open (centripetal development).

racemiform: having the shape of a **raceme**.

rachilla (*pl.* **rachillae**): (1) the **rachis** (axis) of the spikelet in Cyperaceae and Poaceae; (2) a secondary axis, as in a **compound leaf**.

rachis (*pl.* **rachises** or **rachides**) (= **rhachis**): (1) the axis of an inflorescence in which flower stalks occur at short intervals from each other, as in Poaceae; (2) the axis of a **pinnately** compound leaf, corresponding to the midrib of a simple leaf.

radial (of **endothecial** tissue of Asteraceae): with thickenings ± evenly distributed in the walls of the cells, particularly in the radial walls.

radiate: applied to flowerheads of Asteraceae with **ray** florets.

radical: applied to leaves which arise so close to the base of the stem as to appear to arise on the root.

radicant: rooting, in particular of a stem which produces **adventitious** roots.

radicle: see **embryo**.

radicular: related to the **radicle**.

ramification: the scheme of branching or separation into branches.

ramiflorous (of flowers and fruits): borne below the current leaves on recently formed woody branches (compare **cauliflorous**).

raphe (*adj.* **raphal**): the part of a stalk of an **anatropous ovule** that is fused along the side of the ovule.

raphides: mineral substances in the form of needle-shaped crystals, within the cells of plants.

ray: (1) the florets of the margin of a flowerhead of the Asteraceae when different from those of the centre or disc; (2) one of the radiating branches of an **umbel**.

recaulescence (*adj.* **recaulescent**): a condition where the bract subtending a flower is not situated on the main axis on which the flower arises but on the pedicel.

receptacle (*adj.* **receptacular**; *syn.* **torus**): the extremity of the axis on which the sepals, petals, stamens and pistil, arise..

recurved: curved or curled downwards or backwards.

reduplicate (of sepals or petals): with margins **valvate** and **reflexed**.

reflexed: bent downwards or backwards.

regular (= **actinomorphic**) (of a flower, calyx or corolla): radially symmetrical, i.e. capable of being dissected into similar halves

in more than one vertical plane forming mirror images (compare **irregular**, **zygomorphic**).

reniform: kidney-shaped.

repand: with the margin uneven or wavy, with shallow undulations; not as deep as **sinuate**.

repent: lying or creeping along the ground.

replicate: folded abaxially along the middle, as along the midrib of a leaf.

replum: a longitudinal partition in an ovary, formed between **parietal placentas** (e.g. in Brassicaceae).

resin (*adj.* **resinous**): plant exudate, often sticky, insoluble in water.

resiniferous: yielding **resin**.

resupinate: upside down because the pedicel or ovary is twisted through 180° (as in flowers of Orchidaceae and Lobeliaceae).

reticulate: having a network-like pattern; net-veined, with the smallest veins of a leaf connected together like the meshes of a net.

retinaculum (*pl.* **retinacula**), **retinacle**: (1) the persistent, hook-like **funicle**, as in the fruits of the Acanthaceae; (2) the structure to which the **pollinium** is attached, as in the Asclepiadaceae and Orchidaceae (see **corpuscle**).

retrofracted: bent abruptly backwards.

retorse: bent abruptly backwards, away from the apex (compare **antrorse**).

retuse: notched.

revolute: rolled back from the margin (compare **involute**).

rhachilla: see **rachilla**.

rhachis: see **rachis**.

rhipidium (*pl.* **rhipidia**; *adj.* **rhipidial**): a ± fan-shaped **cyme** with the lateral branches developed alternately on one side and then on the other.

rhizome (*adj.* **rhizomatous**): a rootstock or root-like stem prostrate on or under the ground, sending rootlets downwards, and branches, leaves or flowering shoots upwards, always distinguished from a true root by the presence of buds, leaves or scales.

rhombic/rhomboid: ± diamond-shaped; having straight margins and being widest in the middle.

riparian: of, inhabiting or situated on the bank of a river or stream.

rootstock: a short swollen structure at the junction of the root and the shoot system of a plant.

rosette: a crowded, circular cluster of leaves or other organs.

rostellum (in Orchidaceae): a projection of the upper edge of the **stigma** in front of the **anthers**; a small beak.

rostrate: beaked (see **beak**).

rostrum: any **beak**-like extension.

rosulate: with the leaves in a circle or **rosette**.

rotate: wheel-shaped; of a corolla with a short tube and spreading **limb**.

rotund: with a shape between orbicular and broadly elliptic.

rounded: margins and apex forming a smooth arc.

ruderal: a plant that grows on waste ground.

rudimentary: poorly developed and not functional (compare **obsolete**, **vestigial**).

rufescent: becoming reddish.

rufous: rusty or brownish red.

rugose: wrinkled; covered with coarse **reticulate** lines.

rugula (*pl.* **rugulae**): a fine wrinkle or fold, e.g. in the upper lip of some Acanthaceae.

rugulose: finely wrinkled.

ruminate: mottled in appearance, e.g. of bark, or of the food reserves in a seed.

runcinate: **pinnatifid** with the lobes pointing towards the base.

runner: a slender, prostrate or trailing stem which produces roots

and sometimes erect shoots at its nodes (compare **stolon**).

S

saccate: pouched.

sagittate: applied to the base of a leaf or an anther with two acute, straight lobes directed downwards like in an arrow-head.

saliciform, salicoid: like the genus *Salix* (Salicaceae); willow-like.

salverform/salver-shaped: shaped like a trumpet, e.g. of a **sympetalous corolla**, with a slender tube and an abruptly spreading **limb**.

samara: an indehiscent, 1-seeded fruit or **mericarp** with wings (e.g. *Securidaca* (Polygalaceae) and Malpigiaceae).

samaroid: applied to a fruit resembling a **samara**.

saponins: a group of soap-like, toxic substances.

saprophyte: an organism deriving its nourishment from dead organic matter and usually lacking chlorophyll (compare **epiphyte**, **parasite**).

saprophytic: obtaining food from nonliving organic matter.

sarcotesta: the fleshy outer coat of a seed.

saxicolous: living or growing among or on rocks.

scaberulous/scabrellous: minutely **scabrous**, slightly rough to the touch.

scabrid/scabrous: rough to the touch, usually from the presence of very short harsh hairs.

scabridous/scabridulous: somewhat rough to the touch.

scalariform: having a ladder-like pattern.

scale: (1) reduced or rudimentary leaf, usually **sessile** and **scarious** and seldom green; (2) a kind of **indumentum** in the form of small, flat discs attached by the centre; (3) any thin, usually small and dry structure.

scalloped: see **crenate**.

scandent: climbing.

scape: a naked flower stalk arising from the ground with **radical** or **rosulate** leaves.

scapigerous: possessing a **scape**.

scapose: bearing one or more flowers on a **scape**; in the form of a **scape**.

scarious: thin and dry, not green.

schizocarp (*adj.* **schizocarpic/schizocarpous**): a dry, dehiscent fruit which splits into two or more separate carpels (**mericarps**) at maturity, found e.g. in Apiaceae and Malvaceae.

schizogenous: originating by separation of cell walls along the middle lamella.

scimitar-shaped: see **acinaciform**.

sclemaid: sclerenchyma cell having thick, lignified secondary walls.

scleroid: having a hard texture.

sclerophyllous: with leaves stiffened by sclerenchyma.

sclerotic: having **sclereids**.

scorpioid (of a **cymose** inflorescence): with the main axis coiled in bud, the flowers being usually 2-ranked, i.e. with single flowers alternately right and left (compare **helicoid**).

scrobiculate: pitted; marked by minute or shallow depressions.

scutate: like a small shield.

scutelliform: shaped like a dish.

sectile (of **pollinia**): compartmented.

secund: with parts or organs (branches, leaves or flowers) all directed to one side.

segment: a part or division of an organ.

sepal: see **calyx**.

sepaloid/sepaline: resembling sepals.

septal (of a **nectary**): occurring in the partitions of the ovary where the carpel walls are incompletely fused, especially in monocotyledons.

septate: divided by one or more partitions.

septicidal: referring to the dehiscence of a ripe **capsule** which splits open through the **septa** or **carpel** margins (compare **loculicidal**).

septifragal: referring to the **dehiscence** of a ripe **capsule** where the

valves or backs of the **carpels** break away leaving the **septa** intact.

septum (*pl.* **septa**; *adj.* **septal**): dividing cross wall or partition; an internal partition of an ovary or fruit.

seriate: in rows or whorls.

sericeous: silky, with closely appressed, soft, straight hairs.

serrate: toothed like a saw, with regular, pointed teeth.

serrature: the toothing of a **serrate** leaf.

serrulate: **serrate** with minute teeth.

sessile: without a stalk; (of a **stigma**): the **style** is absent and the stigma is therefore sessile on the ovary).

seta (*pl.* **setae**): a bristle or stiff hair.

setaceous: having bristle-like hairs; bristly.

setiferous: bearing **setae**.

setiform: looking like a **seta**.

setose: beset with bristles.

setulose: a diminutive of **setose**.

sexine: the outer and/or sculptured layer of the **exine** of a pollen grain.

sheath: the (lower) portion of the leaf clasping the stem.

sigmoid/sigmoidal: double-curved in opposite directions, like the letter S.

siliceous: containing silica.

silicula (*pl.* **siliculae**): a short **siliqua**, not much longer than broad.

siliqua/siliquae (*pl.* **siliquae/siliques**): a dry, dehiscent fruit formed from a superior ovary of two carpels, with two parietal placentas, divided into two compartments by a thin partition (**replum**), opening by two **valves** which fall away from a frame on which the seeds are borne (e.g. in Brassicaceae).

simple: of one piece or series, the opposite of **compound**, e.g. simple leaf: not divided into leaflets; (of a hair or inflorescence): not branched.

sinistrorse: turned towards the left (compare **dextrorse**).

sinuate/sinuuous: with the margin uneven, with rather deep undulations (compare **undulate**).

sinus (*pl.* **sinuses**): (1) a curve; (2) a recess between the teeth or lobes on a margin; (3) the recess formed by the basal lobes of a leaf or other organ.

siphonostele (*adj.* **siphonostelic**) (in a dicotyledonous stem): the cylinder of conducting tissue surrounding the central **parenchyma**.

sobole: a shoot, especially from the ground.

soboliferous: bearing **soboles**.

solitary: borne singly or alone.

sorus (*pl.* **sori**; *adj.* **soral**): a cluster of spores and/or **sporangia**.

spadix (*pl.* **spadices**): a flower **spike** with a fleshy or thickened axis, e.g. in Araceae and some palms (Arecaceae).

spathe (*adj.* **spathaceous/spatheate**): a large bract enclosing a **spadix**, or one or more bracts enclosing a flower or inflorescence.

spathella (*pl.* **spathellae**): (1) a capsule-like structure enclosing the flower buds in some Podostemaceae, rupturing irregularly as the pedicel elongates at **anthesis**; (2) formerly used term for the glumes of Poaceae; (3) small bracts as found in the inflorescences of Restionaceae.

spatheole: a secondary **spathe** within a **compound inflorescence** in the Andropogoneae—Poaceae.

spathulate: spoon-shaped, broadly rounded above and long and narrow below.

spatulate: see **spathulate**.

species: a **taxon** comprising one or more populations of individuals capable of interbreeding to produce fertile offspring.

- spheroid/spheroidal**: approximately spherical.
- spicate**: arranged in a **spike**.
- spiciform raceme**: **spike**-like **raceme**.
- spiculate**: having a surface covered with fine points or crystals.
- spicule**: a small **spike**.
- spike**: an inflorescence with the flowers **sessile** along a simple undivided axis or rachis.
- spikelet**: a small **spike** composed of one or more flowers enclosed by **glumes**, in Cyperaceae and Poaceae.
- spine**: a sharp-pointed, hardened structure modified from another organ (leaf, branch, stipule, etc.), or from part of an organ.
- spine shield**: in some Euphorbiae—Euphorbiaceae, the hardened bases along the angles of the stems and branches, from which the **spines** of certain species are produced.
- spinescent**: spine-tipped, having **spines**.
- spinose**: spiny or having **spines**.
- spiral** (of leaves or floral organs): borne at different levels on the axis, in an ascending spiral.
- spiraperturate** (of a pollen grain): with one or more spiral apertures.
- sporangiate** (of an **anther**): containing a given number of **microsporangia/pollen sacs** (e.g. 4-sporangiate: containing four pollen sacs, as commonly found in 2-**thecate** anthers) (see **anther**).
- sporangium** (*pl.* **sporangia**): a hollow, unicellular or multicellular, sac-like, spore-producing structure.
- sporophore**: any structure bearing spores.
- sporophyll**: a modified leaf or leaf-like structure which bears **sporangia**.
- spur**: a slender, usually hollow extension of some part of the flower.
- spurious**: not genuine or real, false.
- spur shoot**: a (very) short lateral branch (= **brachyblast**).
- squama** (*pl.* **squamae**): a scale, usually derived from a leaf.
- squamella**: diminutive of **squama**, a scale of the second order or reduced in size, as in the **disc** of Asteraceae.
- squamiform**: scale-like.
- squarrose**: spreading or recurved at some point above the base, e.g. as in the **phyllaries** of some Asteraceae which are sharply curved downward or outward.
- stamen** (*adj.* **staminal**): in **angiosperms**, the pollen-producing structure in a flower usually consisting of an **anther** and a **filament**.
- staminal column**: see **androphore**.
- staminal corona**: fleshy outgrowth of tissue, attached dorsally to the staminal column at the base of the filament or on the backs of the anthers (compare **gynostegial corona**, **interstaminal corona**).
- staminate**: having stamens (usually implying that **carpels** are absent).
- staminode** (*adj.* **staminodial**): an abortive or vestigial **stamen** without a perfect anther.
- staminophore**: a structure bearing stamens.
- standard**: the large posterior petal (outside in the bud) of a **papilionaceous** corolla (= **vexillum**).
- stele**: the portion of the plant body which comprises the vascular system (xylem and phloem) and its associated ground tissue (e.g. pericycle, interfascicular regions and pith).
- stelidium** (*pl.* **stelidia**): lateral horn- or tooth-like appendages of the **gynostemium** of some Orchidaceae (e.g. *Bulbophyllum* spp.).
- stellate**: resembling a star in shape; (of hairs): with several arms radiating horizontally.
- stereome** (of **involucral bracts** of some Asteraceae): the thickened region in the lower part.
- stigma** (*adj.* **stigmatic/stigmatose**): the point or surface of the **pistil** which receives the pollen, either sessile (when there is no style) or on the top or surface of the **style** or its branches.
- stipe/stipes** (*pl.* **stipites**): the stalk supporting a **carpel** or **gynoeceum**, or (in Orchidaceae) the stalk connecting the **viscidium** with the **caudicles** of the **pollinia**.
- stipel/stipella** (*pl.* **stipellae**): small secondary **stipule** at the base of a leaflet.
- stipitate**: supported on a special stalk, or **stipe**, e.g. an ovary (e.g. in Capparaceae).
- stipi(ti)form**: looking like a **stipe**.
- stipule** (*adj.* **stipular**): leaf-like or scale-like appendage of a leaf, usually at the base of the petiole.
- stipuloid**: **stipule**-like.
- stolon**: a **runner** which roots.
- stoloniferous**: having **stolons**; trailing over the soil surface and rooting at the nodes.
- stoma** (*pl.* **stomata**): a minute pore in the epidermis of leaves, providing for gaseous exchange between the tissues and the atmosphere.
- stomatose**: possessing stomata.
- stone cell**: a ± isodiametric **scelereid**.
- stramineous**: straw-like or straw-coloured.
- stria** (*pl.* **striae**): see **striation**.
- striation** (*adj.* **striate**): one of a number of parallel longitudinal lines, grooves or ridges.
- strigillose**: finely **strigose**.
- strigose**: with short stiff hairs appressed to the surface.
- strigulose**: minutely **strigose**.
- strobiliform**: resembling a **strobilus**.
- strobilus** (*pl.* **strobili**): a cone-like structure containing the reproductive organs of one or both sexes, as in gymnosperms.
- strophiole**: an appendage to the **hilum** of some seeds (see also **caruncle**).
- strumose**: with a swelling.
- strut**: a rod or bar connecting parts of a structure.
- style**: narrow upper part of an **ovary** supporting the **stigma**.
- style head/pistil head**: the dilated apical part of the style or **gynostegium**, particularly in Apocynaceae.
- stylidium/stylodium**: a style-like **stigma**.
- stylopodium**: a disc-like enlargement of the base of the style (e.g. in some Brassicaceae).
- sub-** (*prefix*): implying ‘almost’, e.g. **subacute**: almost acute; **subentire**: having a very slightly uneven margin.
- suberous**: corky.
- subtend**: to have a **bud** or similar part growing in its **axil**.
- subulate**: awl-shaped: narrow and tapering gradually to a fine point.
- succulent**: a plant which accumulates water in fleshy, water-storing stems, leaves or roots; juicy, fleshy in reference to texture or appearance.
- suffrutescent**: like a **suffrutex**.
- suffrutex**: a perennial plant which is slightly woody only at the base.
- suffruticose**: shrubby.
- sulcate**: grooved, furrowed.
- sulculus** (*pl.* **sulculi**; *adj.* **sulculate**) (of a pollen grain): an elongated latitudinal ectoaperture not situated at a pole (compare **sulcus**).
- sulcus** (*pl.* **sulci**) (of a pollen grain): an elongated latitudinal ectoaperture situated at the distal or proximal pole of a pollen grain (compare **colpus**, which is usually a longitudinal aperture; compare **sulculus**, which is not situated at a pole).
- superior**: applied to an **ovary** when the sepals, petals and stamens

are inserted below it (**hypogynous**); also when the **receptacle** bearing the calyx, corolla and stamens is prolonged so as to be separate from the ovary, but forms a cup surrounding it (**perigynous**) (compare **inferior**).

supra (*prefix*): above, on the upper side.

suture: the line of junction or seam of union, commonly used of the line of opening of a **carpel**; the dorsal (outer or anterior) suture of a carpel represents the midrib of the carpellary leaf; the ventral (inner) suture represents the united margins on which the ovules and placentas are borne.

sward: lawn; continuous grass cover produced by stoloniferous species.

syconium: a multiple fruit, or **syncarp**, with a hollow centre, e.g. the figs of *Ficus* (Moraceae).

sympetalous: having petals which are partly or completely fused (*syn. choripetalous, gamopetalous*) (compare **polypetalous**).

sympatric (of two or more taxa): having coincident or overlapping ranges of distribution (compare **allopatric**).

sympodial (of growth): without a single persisting growing point; changing direction by frequent replacement of the growing apex by a lateral growing point below it (compare **monopodial**).

syndrium: an **androecium** of a male flower with united anthers.

synanthous (of leaves): appearing together with the flowers (compare **hysteranthous**).

syncarp/syncarpium: a structure consisting of several united, usually fleshy fruits; (compare **aggregate fruit**).

syncarpous: composed of two or more united **carpels**.

synflorescence: a compound **inflorescence**.

synthecate (of anthers): with the two **thecae** having merged into one, e.g. in some Scrophulariaceae.

T

tannin: a complex yellowish or brownish aromatic compound found in many plants.

tanniferous: producing **tannins**.

taproot: the main, descending root of a plant that has a single dominant root axis.

taxon (*pl. taxa*): a group or category, at any level, in a system for classifying organisms.

tectum (of a pollen grain): the outermost closed layer of the **sexine**, formed by union of the heads of the bacula.

tendril (*adj. tendrillar/tendrillous*): a long, slender, coiling, modified leaf, or rarely stem, by which a climbing plant attaches to its support.

tendrilliform/tendrilloid: resembling a **tendril**.

tenui- (*prefix*): slender, thin.

tenuous: thin or slender in form.

tepal: any of the members of a **perianth** that is not clearly differentiated into **calyx** and **corolla**.

terete: cylindrical, circular in transverse section.

terminal: at the apex or **distal** end.

ternate: arranged in a **whorl** or cluster of three.

ternately compound (of a leaf): with **leaflets** in threes.

terrestrial: on or in the ground.

tessellate: having a checkered pattern, e.g. with depressions.

testa: the outer coat of a seed.

tetra- (*prefix*): four-.

tetrad: a group of four spores or pollen grains derived from a spore mother cell or pollen grain mother cell as a result of meiosis, and remaining fused at maturity, e.g. in Ericaceae (compare **monad**).

tetradynamous: having six **stamens**, two of which are shorter than

the others, as in most Brassicaceae.

tetragonous: 4-angled.

tetramerous: having four members in a whorl.

tetrandrous: having four **stamens**.

tetrasporangiate (of an **anther**): having four **microsporangia** or **pollen sacs**.

thalloid: resembling or shaped like a **thallus**.

thallus: a single plant body not differentiated into stem and leaves, e.g. *Lemna* spp. (Lemnaceae).

theca (*pl. thecae; adj. thecous/thecate*): one half of an **anther**, usually containing two **pollen sacs/microsporangia**.

thorn: a modified plant organ, especially a stem, that is stiffened and ends in a pungent point.

throat (of a tubular **corolla**): the top of the tube, where the lobes arise from the tube.

thrum flower: in **heterostylous** plants, the flower type having the shorter **style** (compare **pin flower**).

thyrsse: a **panicle** with the secondary and ultimate axes **cymose**, i.e. the main axis is **indeterminate** and the lateral branches are **determinate** in their growth.

thyrsoid: like a **thyrsse**.

tiller: a shoot growing from the base of a grass (Poaceae) stem; to produce tillers.

tomentellous/tomentulose: minutely **tomentose**.

tomentellum: a fine, short **tomentum**.

tomentose: densely covered with short, soft, felted hairs.

tomentum: a covering of woolly, densely matted hairs; wool.

toothed: see **dentate**.

tortuous: irregularly twisted or twining.

torulose: cylindrical with contractions or swellings at intervals.

torus: see **receptacle**.

trabeculate: cross-barred.

trace: a strand of vascular tissue connecting the stem with a leaf or reproductive organ.

translator: see **corpusele**.

translator arm: see **caudicle**.

trapeziform: a figure of four straight, unequal sides.

tri- (*prefix*): three; thrice.

triad: a group of three.

trichome: an epidermal outgrowth, such as a hair or scale.

trichotomous: forking regularly into three.

trifid: deeply divided into three parts.

trifoliolate: having three leaves.

trifoliolate: having three **leaflets**.

trigonus: triangular in cross section and with obtuse angles (compare **triquetrous**).

trilete (e.g. of spores): having three scar lines forming a 'Y', or basally tetrahedral.

trimerous: in threes, e.g. of a flower with three sepals, three petals, etc.

tripartite: divided into three parts.

tripinnate (of leaves): thrice **pinnately** divided.

triporate: with three pores.

triquetrous: triangular in cross section and with acute angles, therefore with three distinct longitudinal ridges (compare **trigonus**).

tristichous (of leaves on a stem): arranged in three vertical rows.

tristylous (said of a **heterostylous** species): having three style lengths (short, mid, long); the flowers of any one plant having styles of the same length.

trullate/trulliform: trowel-shaped; having its widest axis below the middle and with straight margins.

truncate: cut off \pm squarely at the end.

tuber: (1) a thickened branch of an underground stem, which produces buds; (2) a swollen root or branch of a root acting as a storage organ.

tubercle: a small, wart-like outgrowth.

tuberculate: covered with wart-like protuberances or knobs.

tuberous: swollen; (of roots): **tuber**-like.

tuft (*adj.* **tufted**): clump, cluster.

tuft domatium: a **domatium** supplied with or consisting of hairs.

tumid: swollen, enlarged.

tumulus (*pl.* **tumuli**): a small mound.

tunic (*adj.* **tunicate**) (of a **bulb** or **corm**): a loose membranous or fibrous outer skin which does not develop from the epidermis.

turbinate/turbiniform: shaped like a top; obconical.

turgid: swollen due to a high water content (compare **flaccid**).

turion: (1) a young shoot or sucker which is produced from an underground stem; (2) a perennating winter bud which is separated from the parent and gives rise to a new plant in spring.

tussocky: tufted as in some grasses or grass-like plants.

U

umbel (*adj.* **umbellate**): a **racemose** inflorescence in which all the divergent pedicels or **rays** arise in a cluster at the top of the peduncle and are of about equal length; **compound umbel**: each ray bears an umbel, each of the latter called a partial umbel; **simple umbel**: each ray terminates in a flower.

umbellule: a secondary **umbel** in a compound umbellate inflorescence.

umbo (*adj.* **umbonate**): a blunt or rounded projection arising from a surface, as on a pine-cone scale.

uncinate: terminating in a hooked point.

undulate: wavy on the margin (compare **sinuate**).

unguiculate (of petals): having a narrow **claw**-like base.

uni- (*prefix*): one-.

unifacial: one-faced; (of leaves): folded sharply in half along the midline so that the adaxial surface is hidden; or filiform to \pm cylindrical with a \pm continuous palisade layer (see also **centric**).

unifarious (of the **indumentum** of a stem): restricted to one side or vertical line.

unifoliate: having only one leaf.

unifoliate: of a **compound** leaf which is reduced to a single, usually terminal, **leaflet**; the **petiolule** is distinct from a **petiole**.

unilateral (of stamens): with **anthers** grouped on one side of the **style**.

unilocular (of an ovary or fruit): having only one internal cavity.

unisexual: bearing only male or only female reproductive organs.

united: fused together.

unitegmic (of an **ovule**): with one **integument**.

unithecate/unitheca (of an **anther**): with one **theca**.

urceolate: urn-shaped, with a short swollen tube contracted near the top and then slightly expanded in a narrow rim.

urticate: to cause a burning or itching sensation.

urtricle: bladder-shaped structure, applied (1) to the traps of *Utricularia* (Lentibulariaceae); (2) to the fruits of e.g. some Cyperaceae, such as *Carex*, and of Lemnaceae.

V

vagina: sheath.

vallecular (of grooves between ridges): e.g. in the fruits of Apiaceae and Asteraceae.

valvate: having the edges of **petals** or **sepals** touching without overlapping

valve (*adj.* **valvar**): one of the parts produced by the splitting of a **capsule** when ripe.

vascular: specialised for the conduction of fluids; **vascular plant**: plant containing specialised conducting tissues.

vegetative (of plant organs or parts): having non-reproductive functions, e.g. leaves, roots, stems, etc.

veins: strands of **vascular** tissue (compare **nerves**).

velamen: water-retaining outer layer of the aerial roots of some epiphytes, especially Orchidaceae.

velum: a veil; a membranous covering.

velutinous: velvety.

velvety: with a coating of fine soft hairs.

venation: the arrangement of **veins** of a leaf or other organ.

venose: having veins.

ventral (of a lateral organ): the upper or inner face or the surface facing the axis; (of a **thallus**): the surface facing the substrate (compare **dorsal**).

ventricidal: of the dehiscence of a fruit which splits down the **ventral** (axile) side of the locules.

ventricose: swollen or bulging on one side; unequally inflated.

vermiform: shaped like a worm.

vernation: the arrangement of unexpanded leaves in a bud (compare **aestivation**).

verruciform: resembling a wart.

verrucose: warty.

verruculose: finely warty.

versatile (of an **anther**): swinging freely about the point of attachment to the **filament** which is \pm in the middle of the back (compare **basifixed**, **dorsifixed**, **medifixed**).

verticil: a whorl or circular arrangement of similar parts around an axis, at the same level.

verticillaster: a false **whorl** of opposed dense **cymes**, especially in Lamiaceae.

verticillate: arranged in one or more **whorls**.

vesicle: a small sac or cavity; a spherical body.

vesicular: pertaining to, having, or composed of, **vesicles**.

vestigial: of an organ now degenerate and of little or no utility (compare **obsolete**, **rudimentary**).

vestiture: any covering on a surface, e.g. plant **trichomes**.

vexillum (*adj.* **vexillary**): the uppermost (or posterior) **petal** of a **papilionaceous** flower (= **standard**).

vibratile: capable of vibration.

villous: beset with long, weak hairs (compare **hirsute**).

virgate: with many long, slender, \pm straight, ascending, almost parallel stems.

viscid: sticky, glutinous.

viscidium (in Orchidaceae): a **viscid** part of the **rostellum**, which is clearly defined and removed with the **pollinia** as a unit, and serves to attach the pollinia to an insect or other pollination agent.

viscidulous: slightly sticky.

viscous (of a liquid): thick and sticky.

vitta (*pl.* **vittae**): aromatic oil tubes in the fruit of some Apiaceae.

viviparous: with seeds or buds germinating or sprouting while attached to the parent plant.

voluble: twining or twisting.

W

whorl (*adj.* **whorled**): (1) a group of three or more parts at a **node**, e.g. leaves or branches; (2) a circle of floral organs, e.g. stamens, petals, carpels.

wing (*adj.* **winged**): (1) any flat membranous expansion; (2) a thin

flange of tissue extended beyond the normal outline of a stem or petiole; (3) one of the two lateral petals of a **papilionaceous** flower; (4) one of the **petaloid** sepals of the flower in Polygalaceae.

X

x/basic chromosome number: the number of chromosomes in the original **genome (haploid set)** from which a **polyploid** or a group of polyploid forms or species is known or postulated to have arisen.

xerochastic: applied to plants of which the fruits burst by desiccation and their seeds or spores are scattered.

xeromorphic (of plants or plant parts): having characteristics that

serve as protection against excessive loss of moisture.

xerophyte (*adj.* **xerophytic**): a plant that is adapted to dry or arid habitats.

Z

zonasulculate (of a pollen grain): with a ring-like **sulcus** around the equator.

zonatriporate (of a pollen grain): with three pores equatorially.

zygomorphic: applied to flowers which are bilaterally symmetrical, i.e. capable of being bisected into identical halves in one plane only, forming mirror images; (= **irregular**) (compare **actinomorphic, regular**).

INDEX TO FAMILIES AND GENERA

Current names of local families are in capital letters; synonyms are in *italic* type. Exotic taxa are marked with an asterisk.

The following symbols and the order are given for current families to indicate their placing in the classification system according to APG II (2002, *Botanical Journal of the Linnean Society* 141: 399–436) outlined on pp. 3–4: A—asterids; Ce—core eudicots; com—commelinids; E—eudicots; Ea—euasterids (I and II); Eur—eurosids (I and II); G—gymnosperms; M—monocots; mag—magnoliids; ?—position uncertain; unplaced families are listed after asterids on p. 4.

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This publication is a product of the Southern African Botanical Diversity Network (SABONET), a programme aimed at strengthening the level of botanical expertise, expanding and improving herbarium and botanic garden collections, and fostering closer collaborative links among botanists in the southern African subcontinent.

The main objective of SABONET is to develop a strong core of professional botanists, taxonomists, horticulturists, and plant diversity specialists within the ten countries of southern Africa (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe). This core group will be competent to inventory, monitor, evaluate, and conserve the botanical diversity of the region in the face of specific development challenges, and to respond to the technical and scientific needs of the Convention on Biological Diversity.

To enhance the human resource capacity and infrastructure available in the region, SABONET offers training courses, workshops, and collaborative expeditions in under-collected areas. The programme produces a newsletter, *SABONET News*, and a series of occasional publications, the Southern African Botanical Diversity Network Report Series, of which this publication is part.

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