

Willner ., Hülber K. & Fischer M. A. (2014): Return of the grades: towards objectivity in evolutionary classification. – Preslia 86: 233–243.

Electronic Appendix 1. – Apomorphies of all clades in the Angiosperm Tree above the level of APG III families. Data from Stevens, Angiosperm Phylogeny Website, Version 12 (accessed September 2013); with some modifications. Structure of the list: Node name – number of apomorphies – apomorphies (separated by semicolons). Sister groups are listed back-to-back. APG III families have been given the value 1 except for APG III orders with only one family.

ORDERS

- AMBORELLALES: 3 (hypanthium +; embryo sac 9-nucleate, with three synergids; endosperm triploid).
- [NYMPHAEALES [AUSTROBAILEYALES [[CHLORANTHALES + MAGNOLIIDS] [MONOCOTS [CERATOPHYLLALES + EUDICOTS]]]]]: 1 (vessels +).
- NYMPHAEALES: 11 (4-celled uniseriate secretory trichomes with a large terminal cell [hydropoten]; trichoblasts in vertical files, proximal cell smaller; diaphragms in root aerenchyma; primary stem with ± scattered vascular bundles; protoxylem lacunae +; vascular cambium 0; stomata anomocytic; pollen boat-shaped, tectum continuous; first division of endosperm transverse, chalazal cell undivided, ± enlarged and elongated, haustorial; operculum +, endotegmic; embryo broad, cotyledons connate, suspensor 0).
- [AUSTROBAILEYALES [[CHLORANTHALES + MAGNOLIIDS] [MONOCOTS [CERATOPHYLLALES + EUDICOTS]]]]]: 2 (essential oils in specialized cells; tectum reticulate).
- AUSTROBAILEYALES: 3 (Tiglic acid +; outer integument 5-7 cells thick; endosperm starchy).
- [[CHLORANTHALES + MAGNOLIIDS] [MONOCOTS [CERATOPHYLLALES + EUDICOTS]]] / **MESANGIOSPERMAE**: 3 (benzylisoquinoline alkaloids +; embryo sac bipolar, 8 nucleate; endosperm triploid).
- CHLORANTHALES: 4 (flowers very small, monosymmetric by reduction; G 1; ovule 1/carpel, straight; endotesta palisade, lignified, crystalliferous).
- [[MAGNOLIALES + LAURALES] [CANELLALES + PIPERALES]] / **MAGNOLIIDS**: 3 (lamina margins entire; A many, extrorse; antipodal cells soon die).
- CERATOPHYLLALES: 10 (Herbaceous, aquatic, roots 0; vascular cambium 0; vessels 0; stomata 0; flowers extra-axillary, alternating with leaves; tapetum amoeboid; pollen inaperturate, pollen tubes branched; **G 1**; ovule 1/carpel, straight, apical, unitegmic; endosperm 0, embryo large, suspensor 0).
- MONOCOTS: 18 (Plant herbaceous, rhizomatous, growth sympodial; benzylisoquinoline alkaloids 0; primary thickening meristem +; vascular bundles in stem scattered, closed, vascular cambium 0; tracheids only in stems and leaves; sieve tube plastids with cuneate protein crystals alone; prophyll single, adaxial; leaf base sheathing, sheath open, petiole 0, blade linear, main venation parallel, margins entire, Vorläuferspitze +; flowers 3-merous, pentacyclic; median member of outer whorl abaxial, aestivation open; stamens = and opposite each T member; endothecium from outer secondary parietal cell layer; **G [3]**; endosperm with distinct nuclear and chalazal chambers; embryo long, cotyledon 1, plumule apparently lateral; primary root unbranched, not very well developed, "adventitious" roots numerous; cotyledon with a closed sheath, unifacial [hyperphyllar], both assimilating and haustorial; duplication producing monocot *LOFSEP* and *FUL3* genes).
- EUDICOTS: 3 (stomata anomocytic; microsporogenesis simultaneous; pollen tricolpate, apertures in pairs at six points of the young tetrad [Fischer's rule]).

MAGNOLIIDS:

- [MAGNOLIALES + LAURALES]: 1 (cuticle waxes as annularly-ridged rodlets, palmitol the main wax).
- [CANELLALES + PIPERALES]: 2 (aporphine alkaloids +; G whorled).
- MAGNOLIALES: 2 (testa vascularized, multiplicative; endosperm irregularly ruminant).
- LAURALES: 5 (sieve tube plastids with polygonal protein crystalloids and starch; leaves opposite; hypanthium +; receptacle ± concave; seed endotestal, endotesta tracheidal).
- CANELLALES: 5 (drimane-type sesquiterpenes +; indumentum 0; sieve tube plastids with starch and protein crystalloids and/or fibres; foliar sclereids +, branched; K and C distinct).

- PIPERALES: 4 (growth sympodial; primary stem with distinct bundles; wood with broad rays, interfascicular cambium lacking fusiform initials; leaves two-ranked, lamina heart-shaped, secondary veins palmate).

MONOCOTS:

- ACORALES: 2 (inflorescence scapose, densely spicate [spadix], with large associated bract [spathe]; perisperm +).
- [ALISMATALES [PETROSAVIALES [[DIOSCOREALES + PANDANALES] [LILIALES [ASPARAGALES + COMMELINIDS]]]]: 4 (ethereal oils 0; raphides +; endothecium develops directly from undivided outer secondary parietal cells; septal nectaries +).
- ALISMATALES: 2 (anthers extrorse; cotyledon large).
- [PETROSAVIALES [[DIOSCOREALES + PANDANALES] [LILIALES [ASPARAGALES + COMMELINIDS]]]]: 1 (leaf blade developing basipetally from hyperphyll/hypophyll junction).
- PETROSAVIALES: 1 (septal nectaries +, position of the septal nectaries in both the ascidiate and plicate zone of the gynoeceium unique).
- [[DIOSCOREALES + PANDANALES] [LILIALES [ASPARAGALES + COMMELINIDS]]]: 0.
- [DIOSCOREALES + PANDANALES]: 0.
- [LILIALES [ASPARAGALES + COMMELINIDS]]: 0.
- DIOSCOREALES: 1 (vascular bundles in rings).
- PANDANALES: 0.
- LILIALES: 2 (tepals nectaries +; anthers extrorse).
- [ASPARAGALES + COMMELINIDS]: 0.
- ASPARAGALES: 0.
- COMMELINIDS: 4 (Unlignified cell walls with UV-fluorescent ferulic and coumaric acids; SiO₂ bodies +, in leaf bundle sheaths; T = calyx + corolla; embryo short, broad).
- ARECALES: 5 (Growth monopodial, plant unbranched, stem well-developed, woody; leaves spiral, massive, venation reduplicate-plicate, pinnately pseudocompound, petiolate, with closed sheath; flowers ± sessile; ovule 1/carpel, sessile; seeds large [>1 cm long]).
- [POALES [COMMELINALES + ZINGIBERALES]]: 1 (endosperm reserves starchy).
- POALES: 3 (SiO₂ epidermal; raphides 0; inflorescence indeterminate).
- [COMMELINALES + ZINGIBERALES]: 1 (inflorescences with many-flowered cincinnal branches [helicoid cymes]).
- ZINGIBERALES: 8 (sieve tube plastids also with starch grains; leaves with distinct petiole, midrib, S-shaped lateral veins and fine cross venation; flowers large, monosymmetric; A 5, adaxial member of inner whorl 0/staminodial; pollen inaperturate; outer intine thick, channeled; G inferior, stigma large, wet; epidermal cells of nucellus apex radially elongated; seeds arillate, operculate).
- COMMELINALES: 0.

EUDICOTS:

- RANUNCULALES: 0.
- [PROTEALES [TROCHODENDRALES [BUXALES + CORE EUDICOTS]]]: 1 (axial/receptacular nectary +).
- PROTEALES: 0.
- [TROCHODENDRALES [BUXALES + CORE EUDICOTS]]: 0.
- TROCHODENDRALES: 4 (G laterally connate; nectariferous abaxially; 5 vascular bundles/carpel; fruit an aggregate of follicles, styles becoming ± basal on the outer surface).
- [BUXALES + CORE EUDICOTS]: 0.
- BUXALES: 2 (Steroidal pregnan pseudoalkaloids +; P members with a single trace).
- CORE EUDICOTS: 2 (ellagic and gallic acids +; palaeohexaploidy [gamma triplication]).

- GUNNERALES: 2 (sieve tube plastids with protein crystalloids and starch; pits with sclerenchymatous diagrams).
- [ROSIDS ET AL. + ASTERIDS ET AL.] / **PENTAPETALAE**: 8 (flowers 5-merous, parts whorled; P = calyx + corolla, the calyx enclosing the flower in bud; stamens = 2x K/C, in two whorls developing internally/adaxially to the corolla whorl and successively alternating; pollen tricolporate; compitum +; style +; endosperm nuclear; floral nectaries with *CRABSCLAW* expression).
- DILLENIALES: 1 (endotesta ± palisade, massively lignified).
- [SAXIFRAGALES [VITALES + ROSIDS]] / SUPERROSIDS: 0.
- [SANTALALES [BERBERIDOPSIDALES [CARYOPHYLLALES + ASTERIDS]]] / SUPERASTERIDS: 0.
- SAXIFRAGALES: 0.
- [VITALES + ROSIDS]: 0.
- VITALES: 6 (sieve tube plastids with protein crystalloids and starch; raphide bundles +; pearl glands + [food bodies]; stamens = and opposite petals; seeds perichalazal, vascular bundle ± surrounding seed, ± ruminant and with Y-shaped dorsal infold; testa multiplicative, endotesta 2-5-layered, lignified, crystalliferous).
- ROSIDS: 0.
- [ZYGOPHYLLALES [the COM clade + the nitrogen-fixing clade]]: 0.
- [[GERANIALES + MYRTALES] [CROSSOSOMATALES [PICRAMNIALES [SAPINDALES [HUERTEALES [MALVALES + BRASSICALES]]]]]]: 0.
- ZYGOPHYLLALES: 0.
- [the COM clade + the nitrogen-fixing clade]: 0.
- [FABALES [ROSALES [CUCURBITALES + FAGALES]]] / the nitrogen-fixing clade: 2 (N-fixing by associated root-dwelling bacteria; seed exotestal).
- [CELASTRALES [OXALIDALES + MALPIGHIALES]] / the COM clade: 0.
- FABALES: 1 (carpels free).
- [ROSALES [CUCURBITALES + FAGALES]]: 1 (ovules 1-2/carpel).
- ROSALES: 2 (hypanthium + ; K valvate).
- [CUCURBITALES + FAGALES]: 3 (ovary inferior; ovules 2/carpel; fruit 1-seeded, indehiscent).
- CUCURBITALES: 1 (styluli +).
- FAGALES: 5 (flowers very small, ± monosymmetric by reduction; nectary 0; inflorescence a spike or catkin; pollen oblate; ovules unitegmic, poorly developed at pollination, fertilisation delayed; testa vascularized).
- CELASTRALES: 1 (distinctive postgenital carpel closure by conspicuously elongated cells).
- [OXALIDALES + MALPIGHIALES]: 0.
- OXALIDALES: 0.
- MALPIGHIALES: 0.
- [GERANIALES + MYRTALES]: 0.
- [CROSSOSOMATALES [PICRAMNIALES [SAPINDALES [HUERTEALES [MALVALES + BRASSICALES]]]]]: 0.
- GERANIALES: 0.
- MYRTALES: 8 (Bark flaky, cork cambium deep seated; pits vestured; secondary phloem stratified, internal phloem + [= intraxylary phloem]; K valvate; A incurved in bud; pollen with pseudocolpi; G inferior; endotesta crystalliferous).

- CROSSOSOMATALES: 3 (hypanthium +; styluli +, postgenital connation +; seed walls of outer layers much thickened).
- [PICRAMNIALES [SAPINDALES [HUERTEALES [MALVALES + BRASSICALES]]]]: 0.
- PICRAMNIALES: 4 (C₁₈ acetylenic tariric acid; petroselenic acid; anthracenone moieties linked to C₅-sugar derivatives; stamens = and opposite petals).
- [SAPINDALES [HUERTEALES [MALVALES + BRASSICALES]]]: 0.
- SAPINDALES: 2 (special secondary compounds; stigmatic head from postgenitally united free carpel tips).
- [HUERTEALES [MALVALES + BRASSICALES]]: 0.
- HUERTEALES: 0.
- [MALVALES + BRASSICALES]: 0.
- MALVALES: 0.
- BRASSICALES: 2 (Glucosinolates +; idioblastic and stomatal myrosin cells +).
- SANTALALES: 5 (polyacetylenes; pericyclic fibres 0; petiole/mesophyll with (astro)sclereids; fruit a drupe, 1-seeded; chalazal endosperm haustoria +).
- [BERBERIDOPSIDALES [CARYOPHYLLALES + ASTERIDS]]: 0.
- BERBERIDOPSIDALES: 1 (stomata cyclocytic).
- [CARYOPHYLLALES + ASTERIDS]: 1 (seed exotestal).
- CARYOPHYLLALES: 4 (Odd ecology and/or physiology; lamina margins entire; anther wall with outer secondary parietal cell layer developing directly into the endothecium; pollen colpate, tectum spinulose).
- **ASTERIDS** / ASTERANAEE: 5 (iridoids +; C enclosing A and G in bud; ovules unitegmic; endothelium +; endosperm cellular).
- CORNALES: 4 (C apparently free; G inferior; ventral carpellary bundles in the carpel wall [transseptal bundles]; fruit drupaceous, with apical germination valves in the stone).
- [ERICALES [ASTERID I + ASTERID II]]: 1 (ovules tenuinucellate).
- ERICALES: 0.
- [ASTERID I + ASTERID II] / CORE ASTERIDS: 2 (ellagic acid 0; A = and opposite sepals or P).
- ASTERID I / LAMIIDAE: 0.
- ASTERID II / CAMPANULIDAE: 0.
- ICACINACEAE: 1 (unplaced family).
- GARRYALES: 2 (gutta +; C valvate).
- [BORAGINACEAE + GENTIANALES + LAMIALES + SOLANALES]: 2 (C forming a distinct tube; A epipetalous).
- BORAGINACEAE: 1 (unplaced family).
- GENTIANALES: 4 (pits vestured; leaves opposite, joined by a line across the stem; endothelium 0; endosperm nuclear).
- SOLANALES: 0.
- LAMIALES: 0.
- AQUIFOLIALES: 3 (C valvate, free; ovules 1-2/carpel, apical; fruit drupaceous).
- [ASTERALES [ESCALLONIALES [BRUNIALES [APIALES [PARACRYPHIALES + DIPSACALES]]]]] / APIIDAE: 3 (C forming a distinct tube, tube initiation early; A epipetalous; G inferior).
- ASTERALES: 1 (apotracheal parenchyma 0).
- [ESCALLONIALES [BRUNIALES [APIALES [PARACRYPHIALES + DIPSACALES]]]]: 0.

- ESCALLONIALES: 1 (only one family; apomorphies?).
- [BRUNIALES [APIALES [PARACRYPHIALES + DIPSACALES]]]: 0.
- BRUNIALES: 0.
- [APIALES [PARACRYPHIALES + DIPSACALES]] / DIPSAPIIDAE: 0.
- APIALES: 3 (flowers small, C apparently free; fruit a drupe, single-seeded; endosperm nuclear).
- [PARACRYPHIALES + DIPSACALES] / DIPSIDAE: 0.
- PARACRYPHIALES: 1 (capsule septicidal).
- DIPSACALES: 3 (leaves opposite, bases \pm confluent; pollen grains trinucleate; testa vascularized).

FAMILIES

NYMPHAEALES:

- Hydatellaceae:1 (family)
- [Cabombaceae + Nymphaeaceae]: 4 (hydrozable [ellagi]tannins +; minute rhombic crystals on stellate cells [astrosclereids, stellate parenchyma cells]; placentation \pm laminar; exotesta with sinuous anticlinal cell walls).
- Cabombaceae:1 (family)
- Nymphaeaceae:1 (family)

AUSTROBAILEYALES:

- Austrobaileyaceae:1 (family)
- [Schisandraceae + Trimeniaceae]: 2 (megaspore mother cells 2-many; exotesta \pm palisade).
- Schisandraceae:1 (family)
- Trimeniaceae:1 (family)

MAGNOLIALES:

- Myristicaceae:1 (family)
- [Magnoliaceae [[Degeneriaceae + Himantandraceae] [Eupomatiaceae + Annonaceae]]]: 6 (wood with broad rays; flowers solitary, large; A many, spiral; filaments with three veins, anther thecae separate, embedded in the broad connective, connective prolonged; tectum imperforate; 10-aa deletion in PI-derived motif in AP3 gene).
- Magnoliaceae:1 (family)
- [[Degeneriaceae + Himantandraceae] [Eupomatiaceae + Annonaceae]]: 4 (flower haplomorphic; anthers valvate, inner staminodes +, secretory; exine thin, infratectum granular; mesotesta fibrous).
- [Degeneriaceae + Himantandraceae]: 1 (nexine foliations absent).
- [Eupomatiaceae + Annonaceae]: 4 (sieve tube plastids also with polygonal protein crystalloids; prophyll single, adaxial; inflorescence +; fruit \pm berry-like).
- Degeneriaceae:1 (family)
- Himantandraceae:1 (family)
- Eupomatiaceae:1 (family)
- Annonaceae:1 (family)

LAURALES:

- Calycanthaceae:1 (family)
- [[Siparunaceae [Gomortegaceae + Atherospermataceae]] [Monimiaceae [Hernandiaceae + Lauraceae]]]: 5 (hippocrepiform sclereids in pericycle; stamens with paired nectaries/glands at base; anthers bisporangiate, monothechal, valvate, valves apically hinged; pollen inaperturate, exine thin, \pm spinulose, intine thick, outer part with radial channels; fruit fleshy).

- [Siparunaceae [Gomortegaceae + Atherospermataceae]]: 3 (acicular crystals +; hypanthium closed by roof; embryo very small).
- [Monimiaceae [Hernandiaceae + Lauraceae]]: 2 (aporphine alkaloids and variants +; ovule apical).
- Siparunaceae:1 (family)
- [Gomortegaceae + Atherospermataceae]: 1 (sieve tube plastids also with peripheral protein fibrils).
- Gomortegaceae:1 (family)
- Atherospermataceae:1 (family)
- Monimiaceae:1 (family)
- [Hernandiaceae + Lauraceae]: 5 (tapetum amoeboid; G 1; ovule pachychalazal; testa thick, multiplicative; endosperm 0).
- Hernandiaceae:1 (family)
- Lauraceae:1 (family)

CANELLALES:

- Canellaceae:1 (family)
- Winteraceae:1 (family)

PIPERALES:

- [Hydnoraceae + Aristolochiaceae]: 4 (P uniseriate, 3, connate, valvate; anthers extrorse, filaments ± 0; ovary inferior; embryo undifferentiated).
- [Piperaceae + Saururaceae]: 6 (stomata tetracytic; lamina vernation supervolute, leaf base ± sheathing stem; flowers small, P 0; microsporogenesis simultaneous; ovules straight; perisperm +, starchy).
- Hydnoraceae:1 (family)
- Aristolochiaceae:1 (family)
- Piperaceae:1 (family)
- Saururaceae:1 (family)

ALISMATALES:

- Araceae:1 (family)
- [Tofieldiaceae [[Alismataceae [Butomaceae + Hydrocharitaceae]] [Aponogetonaceae [Scheuchzeriaceae [Juncaginaceae [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]]]]]]]: 1 (carpels free).
- Tofieldiaceae:1 (family)
- [[[Alismataceae [Butomaceae + Hydrocharitaceae]] [Aponogetonaceae [Scheuchzeriaceae [Juncaginaceae [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]]]]]]]: 5 (plant rooted aquatic; stem with lacunae; raphides and druses 0; pollen grains trinucleate; endosperm 0).
- [Alismataceae [Butomaceae + Hydrocharitaceae]] : 2 (P = K + C; placentation laminar).
- [Aponogetonaceae [Scheuchzeriaceae [Juncaginaceae [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]]]]]: 1 (suspensor unicellular, cell large).
- Alismataceae:1 (family)
- [Butomaceae + Hydrocharitaceae]: 0.
- Butomaceae:1 (family)
- Hydrocharitaceae:1 (family)
- Aponogetonaceae:1 (family)
- [Scheuchzeriaceae [Juncaginaceae [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]]]: 1 (pollen inaperturate).
- Scheuchzeriaceae:1 (family)

- [Juncaginaceae [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]]: 2 (carpels the dispersal unit; endosperm nuclear).
- Juncaginaceae:1 (family)
- [Maundiaceae [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]]: 1 (ovule 1/carpel, straight).
- Maundiaceae:1 (family)
- [[Posidoniaceae [Ruppiaceae + Cymodoceaceae]] [Zosteraceae + Potamogetonaceae]]: 6 (vessels 0; epidermis chlorophyllous, stomata 0; hydrophily + [water pollination]; flowers imperfect; anthers sessile; embryo with massive elongated hypocotyl).
- [Posidoniaceae [Ruppiaceae + Cymodoceaceae]]: 3 (P 0; anthers with apical development of the connective; pollen filiform).
- [Zosteraceae + Potamogetonaceae]: 2 (roots unbranched; leaf with apical pore).
- Posidoniaceae:1 (family)
- [Ruppiaceae + Cymodoceaceae]: 1 (A 2).
- Ruppiaceae:1 (family)
- Cymodoceaceae:1 (family)
- Zosteraceae:1 (family)
- Potamogetonaceae:1 (family)

DIOSCOREALES:

- Nartheciaceae:1 (family)
- [[Taccaceae + Thismiaceae] [Burmanniaceae + Dioscoreaceae]]: 2 (T tube broad; ovary inferior, style short).
- [Taccaceae + Thismiaceae]: 4 (T whorls differentiated, but both well developed and petal-like; A incurved; septal nectaries 0; placentation parietal).
- [Burmanniaceae + Dioscoreaceae]: 1 (fruit winged).
- Taccaceae:1 (family)
- Thismiaceae:1 (family)
- Burmanniaceae:1 (family)
- Dioscoreaceae:1 (family)

PANDANALES:

- Velloziaceae:1 (family)
- [Triuridaceae [Stemonaceae [Pandanaeae + Cyclanthaceae]]]: 1 (septal nectaries 0).
- Triuridaceae:1 (family)
- [Stemonaceae [Pandanaeae + Cyclanthaceae]]: 2 (placentation parietal; style 0).
- Stemonaceae:1 (family)
- [Pandanaeae + Cyclanthaceae]: 6 (stem vascular bundles compound; inflorescence bracts conspicuous, inflorescence a dense spike or head [a spadix]; flowers sessile; pollen porate; ovules apotropous, with radiating subepidermal nucellar/chalazal cells; fruit an indehiscent syncarp [baccate or drupaceous]).
- Pandanaeae:1 (family)
- Cyclanthaceae:1 (family)

LILIALES:

- Corsiaceae:1 (family)
- Campynemataceae:1 (family)
- Melanthiaceae:1 (family)
- [Petermanniaceae [Colchicaceae + Alstroemeriaceae]]: 0.

- [[Philesiaceae + Rhipogonaceae] [Smilacaceae + Liliaceae]]: 2 (leaf with broad lamina, with midrib, venation reticulate, petiolate; fruit a berry).
- Petermanniaceae:1 (family)
- [Colchicaceae + Alstroemeriaceae]: 0.
- Colchicaceae:1 (family)
- Alstroemeriaceae:1 (family)
- [Philesiaceae + Rhipogonaceae]: 2 (testa disintegrates; chromosomes heteromorphic).
- [Smilacaceae + Liliaceae]: 0.
- Philesiaceae:1 (family)
- Rhipogonaceae:1 (family)
- Smilacaceae:1 (family)
- Liliaceae:1 (family)

ASPARAGALES:

- Orchidaceae:1 (family)
- [[Boryaceae et al.] [[Ixoliriaceae + Tecophilaeaceae] [Doryanthaceae [Iridaceae [Xeronemaceae [Xanthorrhoeaceae [Amaryllidaceae + Asparagaceae]]]]]]]: 0.
- [Boryaceae [Blandfordiaceae [Lanariaceae [Asteliaceae + Hypoxidaceae]]]]]: 0.
- [[[Ixoliriaceae + Tecophilaeaceae] [Doryanthaceae [Iridaceae [Xeronemataceae [Xanthorrhoeaceae [Amaryllidaceae + Asparagaceae]]]]]]]: 0.
- Boryaceae:1 (family)
- Blandfordiaceae:1 (family)
- Lanariaceae:1 (family)
- Asteliaceae:1 (family)
- Hypoxidaceae:1 (family)
- Ixoliriaceae:1 (family)
- Tecophilaeaceae:1 (family)
- Doryanthaceae:1 (family)
- Iridaceae:1 (family)
- Xeronemataceae:1 (family)
- [Xanthorrhoeaceae [Amaryllidaceae + Asparagaceae]]: 1 (septal nectaries infralocular).
- Xanthorrhoeaceae:1 (family)
- Amaryllidaceae:1 (family)
- Asparagaceae:1 (family)

POALES:

- [Typhaceae + Bromeliaceae]: 1 (leaf without distinct sheath).
- [Rapateaceae [[[Eriocaulaceae + Xyridaceae] [Mayacaceae [Thurniaceae [Juncaceae + Cyperaceae]]]] [[Anarthriaceae [Restionaceae + Centrolepidaceae]] [Flagellariaceae [[Joinvilleaceae + Ecdeiocoleaceae] Poaceae]]]]]: 0.
- Typhaceae:1 (family)
- Bromeliaceae:1 (family)
- Rapateaceae:1 (family)
- [[[Eriocaulaceae + Xyridaceae] [Mayacaceae [Thurniaceae [Juncaceae + Cyperaceae]]]] [[Anarthriaceae [Restionaceae + Centrolepidaceae]] [Flagellariaceae [[Joinvilleaceae + Ecdeiocoleaceae] Poaceae]]]]]: 2 (pollen trinucleate; septal nectary 0).

- [[Eriocaulaceae + Xyridaceae] [Mayacaceae [Thurniaceae [Juncaceae + Cyperaceae]]]]: 2 (A basifixed; deletions in ORF 2280 region).
- [[Anarthriaceae [Restionaceae + Centrolepidaceae]] [Flagellariaceae [Joinvilleaceae + Ecdeicoleaceae] Poaceae]]: 5 (bracteoles 0; P = T, membranous; pollen monoporate; pollen wall scrobiculate [minute pores penetrating tectum and foot layer]; ovule 1/carpel, straight).
- [Eriocaulaceae + Xyridaceae]: 5 (inflorescence capitate, with involucre bracts, scapose; carinal stylar appendages +; styles/stigmas commissural; ovules straight, operculum +).
- [Mayacaceae [Thurniaceae [Juncaceae + Cyperaceae]]]: 0.
- Eriocaulaceae:1 (family)
- Xyridaceae:1 (family)
- Mayacaceae:1 (family)
- [Thurniaceae [Juncaceae + Cyperaceae]]: 3 (flowers small, P = T, scarious; pollen in tetrads, porate; chromosomes with diffuse centromeres).
- Thurniaceae:1 (family)
- [Juncaceae + Cyperaceae]: 0.
- Juncaceae:1 (family)
- Cyperaceae:1 (family)
- [Anarthriaceae [Centrolepidaceae + Restionaceae]]: 2 (flowers imperfect; A 3, opposite inner P).
- [Flagellariaceae [[Joinvilleaceae + Ecdeicoleaceae] Poaceae]]: 0.
- Anarthriaceae:1 (family)
- [Centrolepidaceae + Restionaceae]: 2 (anthers bisporangiate, monothecal; pollen pore not annulate, margin irregular).
- Centrolepidaceae:1 (family)
- Restionaceae:1 (family)
- Flagellariaceae:1 (family)
- [Joinvilleaceae [Ecdeicoleaceae + Poaceae]]: 2 (stigmatic receptive cells on multicellular branches; 28 and 6.4 kb chloroplast genome inversion).
- Joinvilleaceae:1 (family)
- [Ecdeicoleaceae + Poaceae]: 3 (flowers monosymmetric by reduction, imperfect; pollen with operculum, wall without scrobiculi, with intraaxinous channels; fruit 1-seeded).
- Ecdeicoleaceae:1 (family)
- Poaceae:1 (family)

ZINGIBERALES:

- Musaceae:1 (family)
- Heliconiaceae:1 (family)
- [Strelitziaceae + Lowiaceae]: 3 (T whorls differentiated, 2 abaxial members of inner whorl enclosing stamens, adaxial A of inner whorl staminodial; apex of ovary sterile; aril hairy).
- [Cannaceae + Marantaceae]: 4 (oblique cells in petiole; flowers in pairs, asymmetric; A bisporangiate, monothecal; cells of chalazal intrusion into nucellus degenerate forming chalazal channel).
- Zingiberaceae:1 (family)
- Costaceae:1 (family)
- Strelitziaceae:1 (family)
- Lowiaceae:1 (family)
- Cannaceae:1 (family)
- Marantaceae:1 (family)

COMMELINALES:

- Hanguanaceae:1 (family)
- Commelinaceae:1 (family)
- Philydraceae:1 (family)
- [Haemodoraceae + Pontederiaceae]: 1 (phenylphenalenones +).

- Haemodoraceae:1 (family)
- Pontederiaceae:1 (family)

RANUNCULALES:

- Eupteleaceae:1 (family)
- [Papaveraceae [[Circaeasteraceae + Lardizabalaceae] [Menispermaceae [Berberidaceae + Ranunculaceae]]]: 2 (secondary venation palmate; P differentiated into "K" and "C", C ± petal-like).

- Papaveraceae:1 (family)
- [[Circaeasteraceae + Lardizabalaceae] [Menispermaceae [Berberidaceae + Ranunculaceae]]]: 2 (K with three or more vascular traces, ± petal-like; C nectariferous).

- [Circaeasteraceae + Lardizabalaceae]: 0.
- [Menispermaceae [Berberidaceae + Ranunculaceae]]: 1 (berberine).

- Circaeasteraceae:1 (family)
- Lardizabalaceae:1 (family)

- Menispermaceae:1 (family)
- [Berberidaceae + Ranunculaceae]: 1 (*AP3-III gene expressed in P whorl alone*).

- Berberidaceae:1 (family)
- Ranunculaceae:1 (family)

PROTEALES:

- Sabiaceae:1 (family)
- [Nelumbonaceae [Platanaceae + Proteaceae]]: 1 (connective extended beyond anther loculi).

- Nelumbonaceae:1 (family)
- [Platanaceae + Proteaceae]: 4 (stomata laterocytic; stamens = perianth, opposite them; carpels with 5 vascular bundles; ovules straight).

- Platanaceae:1 (family)
- Proteaceae:1 (family)

BUXALES:

- Buxaceae:1 (family)
- Didymelaceae:1 (family)

GUNNERALES:

- Gunneraceae:1 (family)
- Myrothamnaceae:1 (family)

SAXIFRAGALES:

- Peridiscaceae:1 (family)
- [[Paeoniaceae [Altingiaceae [Hamamelidaceae [Cercidiphyllaceae + Daphniphyllaceae]]]] [[Crassulaceae [Aphanopetalaceae [Tetracarpaeaceae [Haloragaceae + Penthoraceae]]]] [[Iteaceae [Grossulariaceae + Saxifragaceae]]]: 0.

- [Paeoniaceae [Altingiaceae [Hamamelidaceae [Cercidiphyllaceae + Daphniphyllaceae]]]: 2 (buds with scales; stigma ± decurrent).
- [[Crassulaceae [Aphanopetalaceae [Tetracarpaeaceae [Penthoraceae + Haloragaceae]]]] [Iteaceae [Grossulariaceae + Saxifragaceae]]: 2 (petiole bundles arcuate; venation ± pinnate).

- Paeoniaceae:1 (family)
- [Altingiaceae [Hamamelidaceae [Cercidiphyllaceae + Daphniphyllaceae]]]: 2 (flowers sessile; seeds winged).
- Altingiaceae:1 (family)
- [Hamamelidaceae [Cercidiphyllaceae + Daphniphyllaceae]]: 0.
- Hamamelidaceae:1 (family)
- [Cercidiphyllaceae + Daphniphyllaceae]: 2 (flowers small, C 0; endosperm cellular).
- Cercidiphyllaceae:1 (family)
- Daphniphyllaceae:1 (family)
- [Crassulaceae [Aphanopetalaceae [Tetracarpaeaceae [Haloragaceae + Penthoraceae]]]]: 2 (stipules 0; flowers 4-merous).
- [Iteaceae [Grossulariaceae + Saxifragaceae]]: 3 (hypanthium +; stamens = and opposite K; fruit a septicidal capsule).
- Crassulaceae:1 (family)
- [Aphanopetalaceae [Tetracarpaeaceae [Penthoraceae + Haloragaceae]]]: 0.
- Aphanopetalaceae:1 (family)
- [Tetracarpaeaceae [Penthoraceae + Haloragaceae]]: 0.
- Tetracarpaeaceae:1 (family)
- [Penthoraceae + Haloragaceae]: 0.
- Penthoraceae:1 (family)
- Haloragaceae:1 (family)
- Iteaceae:1 (family)
- [Grossulariaceae + Saxifragaceae]: 2 (secondary veins palmate; endosperm ± cellular).
- Grossulariaceae:1 (family)
- Saxifragaceae:1 (family)

ZYGOPHYLLALES:

- Krameriaceae:1 (family)
- Zygophyllaceae:1 (family)

FABALES:

- Quillajaceae:1 (family)
- [Fabaceae [Surianaceae + Polygalaceae]]: 0.
- Fabaceae:1 (family)
- [Surianaceae + Polygalaceae]: 0.
- Surianaceae:1 (family)
- Polygalaceae:1 (family)

ROSALES:

- Rosaceae:1 (family)
- [[Rhamnaceae [Elaeagnaceae [Barbeyaceae + Dirachmaceae]]] [Ulmaceae [Cannabaceae [Moraceae + Urticaceae]]]]: 0.
- [Rhamnaceae [Elaeagnaceae [Barbeyaceae + Dirachmaceae]]]: 3 (stamens = and opposite C/alternate with P; capsule septicidal; coat multiplicative, exotesta palisade, thick-walled).
- [Ulmaceae [Cannabaceae [Moraceae + Urticaceae]]]: 9 (phloem stratified; at least one prominent prophyllar bud; flowers small, P +; stamens equal and opposite P; pollen porate; nectary 0; G [2], abaxial only fertile; ovule single; endosperm scanty).

- Rhamnaceae:1 (family)
- [Elaeagnaceae [Barbeyaceae + Dirachmaceae]]: 0.
- Elaeagnaceae:1 (family)
- [Barbeyaceae + Dirachmaceae]: 1 (connective produced).
- Barbeyaceae:1 (family)
- Dirachmaceae:1 (family)
- Ulmaceae:1 (family)
- [Cannabaceae [Moraceae + Urticaceae]]: 0.
- Cannabaceae:1 (family)
- [Moraceae + Urticaceae]: 2 (latex system +; stamens incurved in bud).
- Moraceae:1 (family)
- Urticaceae:1 (family)

CUCURBITALES:

- Anisophylleaceae:1 (family)
- [[Corynocarpaceae + Coriariaceae] [Cucurbitaceae [Tetramelaceae [Datisceae + Begoniaceae]]]]: 2 (filaments shorter than anthers in bud; nectaries 0).
- [Corynocarpaceae + Coriariaceae]: 3 (sieve tube plastids lacking both starch and protein inclusions; ovule 1/carpel; vascular bundle extending into the outer integument).
- [Cucurbitaceae [Tetramelaceae [Datisceae + Begoniaceae]]]: 4 (placentation parietal; stigmas large, elongated, bilobed; ovules many/carpel; seeds many/fruit).
- Corynocarpaceae:1 (family)
- Coriariaceae:1 (family)
- Cucurbitaceae:1 (family)
- [Tetramelaceae [Datisceae + Begoniaceae]]: 1 (seeds with lid [operculate]).
- Tetramelaceae:1 (family)
- [Datisceae + Begoniaceae]: 0.
- Datisceae:1 (family)
- Begoniaceae:1 (family)

FAGALES:

- Nothofagaceae:1 (family)
- [Fagaceae [Myricaceae [Juglandaceae + Rhoipteleaceae]] [Casuarinaceae [Ticodendraceae + Betulaceae]]]: 0.
- Fagaceae:1 (family)
- [[Myricaceae [Juglandaceae + Rhoipteleaceae]] [Casuarinaceae [Ticodendraceae + Betulaceae]]] / the *Normapolles* group: 2 (pollen pororate, exine of two layers separated by an alveolar zone and obviously expanded around the apertures; fertilization chalazogamous).
- [Myricaceae [Juglandaceae + Rhoipteleaceae]]: 3 (peltate glandular hairs +; 1 flower/bract; ovule single, straight).
- Casuarinaceae [Ticodendraceae + Betulaceae]: 0.
- Myricaceae:1 (family)
- [Juglandaceae + Rhoipteleaceae]: 0.
- Juglandaceae:1 (family)
- Rhoipteleaceae:1 (family)

- Casuarinaceae:1 (family)
- [Ticodendraceae + Betulaceae]: 0.

- Ticodendraceae:1 (family)
- Betulaceae:1 (family)

CELASTRALES:

- Celastraceae:1 (family)
- Lepidobotryaceae:1 (family)

OXALIDALES:

- Huaceae:1 (family)
- [[Connaraceae + Oxalidaceae] [Cunoniaceae [Elaeocarpaceae [Brunelliaceae + Cephalotaceae]]]]: 2 (nectary extrastaminal; testa multiplicative).
- [Connaraceae + Oxalidaceae]: 5 (sieve tube plastids with protein crystalloids; calcium oxalate druses 0; leaflets articulated, pulvinate, margins entire, stipules 0; flowers di- and tristylous; exotesta ± fleshy).
- [Cunoniaceae [Elaeocarpaceae [Brunelliaceae + Cephalotaceae]]]: 0.
- Connaraceae:1 (family)
- Oxalidaceae:1 (family)
- Cunoniaceae:1 (family)
- [Elaeocarpaceae [Brunelliaceae + Cephalotaceae]]: 1 (K/P valvate).
- Elaeocarpaceae:1 (family)
- [Brunelliaceae + Cephalotaceae]: 3 (P uniseriate; G free, styles recurved, stigma decurrent; fruit a follicle).
- Brunelliaceae:1 (family)
- Cephalotaceae:1 (family)

MALPIGHIALES:

- [[Ctenolophonaceae [Erythroxyloaceae + Rhizophoraceae]], [Irvingiaceae + Pandaceae], [Ochnaceae [[Bonnetiaceae + Clusiaceae] [Calophyllaceae [Hypericaceae + Podostemaceae]]]]]: 0.
- [[Lophopyxidaceae + Putranjivaceae], Caryocaraceae, [Centroplacaceae [Elatinaceae + Malpighiaceae]], [Balanopaceae [[Trigonaceae + Dichapetalaceae] [Euphroniaceae + Chrysobalanaceae]]]]]: 0.
- [[Humiriaceae [Achariaceae [[Goupiaceae + Violaceae] [Passifloraceae [Lacistemataceae + Salicaceae]]]]]] [[Peraceae [Rafflesiaceae + Euphorbiaceae]] [[Phyllanthaceae + Picrodendraceae] [Ixonanthaceae + Linaceae]]]]]: 0.

Clade 1 :

- [Ctenolophonaceae [Erythroxyloaceae + Rhizophoraceae]] / rhizophoroids: 3 (leaves opposite, stipules enclosing the terminal bud, interpetiolar; nectary to outside of A; seeds arillate, exotestal).
- [Irvingiaceae + Pandaceae]: 3 (lamina vernation involute; ovule 1/carpel; fruit indehiscent).
- [Ochnaceae [[Bonnetiaceae + Clusiaceae] [Calophyllaceae [Hypericaceae + Podostemaceae]]]]]: 5 (C contorted; A many, basifixed; nectary 0; ovules lacking parietal tissue, endothelium +; fruit a septicidal or -frugal capsule).
- Ctenolophonaceae:1 (family)
- [Erythroxyloaceae + Rhizophoraceae]: 7 (tropane [hygroline] and pyrrolidine alkaloids; sieve tube plastids with protein crystalloids; stomata paracytic; K valvate; petals enclosing a stamen/stamens; fruit a septicidal capsule; endosperm starchy).
- Erythroxyloaceae:1 (family)
- Rhizophoraceae:1 (family)
- Irvingiaceae:1 (family)
- Pandaceae:1 (family)

- Ochnaceae:1 (family)
- [[Bonnetiaceae + Clusiaceae] [Calophyllaceae [Hypericaceae + Podostemaceae]]] / clusioids: 7 (xanthones and dimeric xanthones; polyisoprenylated benzophenones; schizogenous canals or cavities + [plant with exudate]; leaves opposite; lamina margins entire, stipules 0; A fasciculate, fascicles opposite C; exotegmen with low, lignified, sinuous anticlinal cell walls).
- [Bonnetiaceae + Clusiaceae]: 2 (root cork superficial; hypocotyl/radicle long).
- [Calophyllaceae [Hypericaceae + Podostemaceae]]: 0.
- Bonnetiaceae:1 (family)
- Clusiaceae:1 (family)
- Calophyllaceae:1 (family)
- [Hypericaceae + Podostemaceae]: 0.
- Hypericaceae:1 (family)
- Podostemaceae:1 (family)

Clade 2:

- [Lophopyxidaceae + Putranjivaceae] / putranjivoids: 4 (flowers imperfect; sepals not enclosing gynoecium in bud; style 0; fruit 1-seeded).
- Caryocaraceae:1 (family)
- [Centroplacaceae [Elatinaceae + Malpighiaceae]] / malpighioids: 0.
- [Balanopaceae [[Trigoniaceae + Dichapetalaceae] [Euphroniaceae + Chrysobalanaceae]]] / chrysobalanoids: 0.
- Lophopyxidaceae:1 (family)
- Putranjivaceae:1 (family)
- Centroplacaceae:1 (family)
- [Elatinaceae + Malpighiaceae]: 5 (sieve tube plastids lacking starch and protein inclusions; leaves opposite; flowers with inverted orientation; nectary 0; fruit septifragal).
- Elatinaceae:1 (family)
- Malpighiaceae:1 (family)
- Balanopaceae:1 (family)
- [[Trigoniaceae + Dichapetalaceae] [Euphroniaceae + Chrysobalanaceae]]: 4 (vestured pits +; flowers obliquely monosymmetric; fertile stamens abaxial; stigmas commissural).
- [Trigoniaceae + Dichapetalaceae]: 1 (testa multiplicative).
- [Euphroniaceae + Chrysobalanaceae]: 2 (hypanthium +; C clawed, with lignified hairs).
- Trigoniaceae:1 (family)
- Dichapetalaceae:1 (family)
- Euphroniaceae:1 (family)
- Chrysobalanaceae:1 (family)

Clade 3:

- [Humiriaceae [Achariaceae [[Goupiaceae + Violaceae] [Passifloraceae [Lacistemataceae + Salicaceae]]]]]: 1 (nectary outside the stamens).
- [Peraceae [Rafflesiaceae + Euphorbiaceae]]: 2 (ovule 1/carpel; fruit with persistent central column).
- [[Phyllanthaceae + Picrodendraceae] [Ixonanthaceae + Linaceae]]: 0.
- Humiriaceae:1 (family)
- [Achariaceae [[Goupiaceae + Violaceae] [Passifloraceae [Lacistemataceae + Salicaceae]]]]]: 3 (nectary outside A; placentation intrusive parietal; seeds arillate).
- Achariaceae:1 (family)

- [[Goupiaceae + Violaceae] [Passifloraceae [Lacistemataceae + Salicaceae]]]: 1 (stamens = and opposite sepals).
- [Goupiaceae + Violaceae]: 2 (connective ± developed apically; stigma proper ± punctate, receptive area small, appearing recessed/hollow).
- [Passifloraceae [Lacistemataceae + Salicaceae]] / the salicoids: 0.
- Goupiaceae:1 (family)
- Violaceae:1 (family)
- Passifloraceae:1 (family)
- [Lacistemataceae + Salicaceae]: 0.
- Lacistemataceae:1 (family)
- Salicaceae:1 (family)
- Peraceae:1 (family)
- [Rafflesiaceae + Euphorbiaceae]: 0.
- Rafflesiaceae:1 (family)
- Euphorbiaceae:1 (family)
- [Phyllanthaceae + Picrodendraceae]: 2 (nucellar beak + [parietal tissue protruding through micropyle]; fruit with persistent central column).
- [Ixonanthaceae + Linaceae]: 0.
- Phyllanthaceae:1 (family)
- Picrodendraceae:1 (family)
- Ixonanthaceae:1 (family)
- Linaceae:1 (family)

GERANIALES:

- Geraniaceae:1 (family)
- [Melianthaceae [Vivianaceae [Greyiaceae + Francoaceae]]]: 0.
- Melianthaceae:1 (family)
- [Vivianaceae [Greyiaceae + Francoaceae]]: 0.
- Vivianaceae:1 (family)
- [Greyiaceae + Francoaceae]: 0.
- Greyiaceae:1 (family)
- Francoaceae:1 (family)

MYRTALES:

- Combretaceae:1 (family)
- [Onagraceae + Lythraceae]: 1 (exotegmen fibrous).
- [[Vochysiaceae + Myrtaceae] [Melastomataceae [Crypteroniaceae [Alzataeaceae + Penaeaceae]]]]: 0.
- Onagraceae:1 (family)
- Lythraceae:1 (family)
- [Vochysiaceae + Myrtaceae]: 1 (K and C imbricate).
- [Melastomataceae [Crypteroniaceae [Alzataeaceae + Penaeaceae]]]: 3 (connective abaxially much expanded; endothecial thickening absent/atypical; nectary 0).
- Vochysiaceae:1 (family)
- Myrtaceae:1 (family)

- Melastomataceae:1 (family)
- [Crypteroniaceae [Alzateaceae + Penaeaceae]]: 2 (stamens = and opposite petals; endothecium ephemeral).
- Crypteroniaceae:1 (family)
- [Alzateaceae + Penaeaceae]: 0.
- Alzateaceae:1 (family)
- Penaeaceae:1 (family)

CROSSOSOMATALES:

- [Staphyleaceae [Guamatelaceae [Stachyuraceae + Crossosomataceae]]]: 0.
- [Aphloiaceae [Geissolomataceae + Strasburgeriaceae]]: 1 (conspicuous protrusions from pollen apertures ["pollen buds"]).
- Staphyleaceae:1 (family)
- [Guamatelaceae [Stachyuraceae + Crossosomataceae]]: 0.
- Guamatelaceae:1 (family)
- [Stachyuraceae + Crossosomataceae]: 0.
- Stachyuraceae:1 (family)
- Crossosomataceae:1 (family)
- Aphloiaceae:1 (family)
- [Geissolomataceae + Strasburgeriaceae]: 4 (hairs single-celled, lignified and T-shaped; G synascidiate, with dorsal ribs, style long, towards tips twisted, postgenitally united; ovules two/carpel; hilum on seed large).
- Geissolomataceae:1 (family)
- Strasburgeriaceae:1 (family)

SAPINDALES:

- Biebersteiniaceae:1 (family)
- Nitrariaceae:1 (family)
- [Kirkiaceae [Anacardiaceae + Burseraceae]]: 2 (G adnate to central receptacular apex; fruit a schizocarp, with 1 seed/carpel).
- Sapindaceae:1 (family)
- [Simaroubaceae [Rutaceae + Meliaceae]]: 1 (limonoids/protolimonoids +).
- Kirkiaceae:1 (family)
- [Anacardiaceae + Burseraceae]: 5 (biflavonoids; phloem with vertical intercellular secretory canals; phloem surrounded by a light-coloured, sinuous, sclerenchymatous band; ovule pachychalazal; fruit a drupe, operculate).
- Anacardiaceae:1 (family)
- Burseraceae:1 (family)
- Simaroubaceae:1 (family)
- Rutaceae:1 (family)
- Meliaceae:1 (family)

HUERTEALES:

- Dipentodontaceae:1 (family)
- Gerrardinaceae:1 (family)
- Petenaeaceae:1 (family)
- Tapisciaceae:1 (family)

MALVALES:

- Neuradaceae:1 (family)

- [Thymelaeaceae [Sphaerosepalaceae, Bixaceae, [Cistaceae + Sarcolaenaceae + Dipterocarpaceae], [Muntingiaceae + Cytinaceae], Malvaceae]]: 3 (pits vestured; phloem stratified, phloem rays wedge-shaped; exotegmen much thickened and lignified, palisade).
- Thymelaeaceae:1 (family)
- Sphaerosepalaceae:1 (family)
- Bixaceae:1 (family)
- [Cistaceae + Sarcolaenaceae + Dipterocarpaceae]: 2 (plant with secretory canals; K with the two outer members often different from the rest).
- [Cytinaceae + Muntingiaceae]: 1 (seeds mucilaginous, mucilage derived from funicle).
- Malvaceae:1 (family)
- Cistaceae:1 (family)
- Sarcolaenaceae:1 (family)
- Dipterocarpaceae:1 (family)
- Cytinaceae:1 (family)
- Muntingiaceae:1 (family)

BRASSICALES:

- [Akaniaceae + Tropaeolaceae]: 6 (bracteoles 0; flowers obliquely monosymmetric; K/C tube +; A 8; ovules 1-2/carpel; testa vascularized, multiplicative).
- [[Moringaceae + Caricaceae] [Limnanthaceae [Setchellanthaceae [[Koeberliniaceae [Bataceae + Salvadoraceae]] [Emblingiaceae [[Pentadiplandraceae [Gyrostemonaceae [*Borthwickia* + *Stixis* & co. + Resedaceae]]], Tovariaceae, [Capparaceae [Cleomaceae + Brassicaceae]]]]]]]: 0.
- Akaniaceae:1 (family)
- Tropaeolaceae:1 (family)
- [Moringaceae + Caricaceae]: 5 (ovary longitudinally sulcate; placentation parietal; style hollow; micropyle bistomal; testa multiplicative, mesotesta ± lignified).
- [Setchellanthaceae [Limnanthaceae [[Koeberliniaceae [Bataceae + Salvadoraceae]] [Emblingiaceae [[Pentadiplandraceae [Gyrostemonaceae [*Borthwickia* + *Stixis* & co. + Resedaceae]]], Tovariaceae, [Capparaceae [Cleomaceae + Brassicaceae]]]]]]]: 1 (extended 3' terminus of *rbcL* gene).
- Moringaceae:1 (family)
- Caricaceae:1 (family)
- Setchellanthaceae:1 (family)
- Limnanthaceae:1 (family)
- [[Koeberliniaceae [Bataceae + Salvadoraceae]] [Emblingiaceae [[Pentadiplandraceae [Gyrostemonaceae [*Borthwickia* + *Stixis* & co. + Resedaceae]]], Tovariaceae, [Cleomaceae [Capparaceae + Brassicaceae]]]]]: 5 (glucosinolates from chain-elongated branched-chain amino acids; style short to absent; ovules campylotropous; seeds exotegmic, exotegmen fibrous; embryo strongly curved).
- [Koeberliniaceae [Bataceae + Salvadoraceae]]: 4 (idioblastic myrosin cells 0; pits vestured; flowers 4-merous; fruit indehiscent).
- [Emblingiaceae [[Pentadiplandraceae [Gyrostemonaceae [*Borthwickia* + *Stixis* & co. + Resedaceae]]], Tovariaceae, [Capparaceae [Cleomaceae + Brassicaceae]]] / **core Brassicales**: 4 (cisternae of endoplasmic reticulum dilated and vacuole-like; bracteoles 0; nectary outside A; endotesta crystalliferous).
- Koeberliniaceae:1 (family)
- [Bataceae + Salvadoraceae]: 5 (stomata paracytic; leaves opposite, lamina with secondary veins ± palmate; bracts with colleters on their tips; ovules 2/carpel; exotegmen not fibrous).
- Bataceae:1 (family)
- Salvadoraceae:1 (family)
- Emblingiaceae:1 (family)
- Pentadiplandraceae:1 (family)

- [Gyrostemonaceae [*Borthwickia* + *Stixis* & co. + Resedaceae]]: 3 (idioblastic myrosin cells 0; styluli +; seeds arillate).
- Tovariaceae:1 (family)
- [Capparaceae [Cleomaceae + Brassicaceae]]: 6 (stomatal myrosin cells 0; pits vestured; flowers 4-merous; placentation parietal; tegmen multiplicative; radicle in pocket formed by testa).
- Gyrostemonaceae:1 (family)
- Resedaceae:1 (family)
- Capparaceae:1 (family)
- [[Cleomaceae + Brassicaceae]: 2 (A 6; fruit septical, persistent placental strands + [replum]).
- Cleomaceae:1 (family)
- Brassicaceae:1 (family)

SANTALALES:

- Erythralaceae:1 (family)
- Strombosiaceae:1 (family)
- Coulaceae:1 (family)
- [Ximeniaceae [Aptandraceae, Olacaceae [Octoknemaceae [[Loranthaceae [Misodendraceae + Schoepfiaceae]] [Opiliaceae + Santalaceae]]]]: 3 (root hemiparasites; silicification of some foliar mesophyll/epidermal cells; embryo sac curved, with chalazal caecum and ± developed micropylar prolongation).
- Ximeniaceae:1 (family)
- Aptandraceae:1 (family)
- Olacaceae:1 (family)
- Octoknemaceae:1 (family)
- [[Loranthaceae [Misodendraceae + Schoepfiaceae]] [Opiliaceae + Santalaceae]]: 3 (G not septate; ovules undifferentiated, ategmic; testa 0).
- Balanophoraceae [incertae sedis]:1 (family)
- [Loranthaceae [Misodendraceae + Schoepfiaceae]]: 0.
- [Opiliaceae + Santalaceae]: 0.
- Loranthaceae:1 (family)
- [Misodendraceae + Schoepfiaceae]: 0.
- Misodendraceae:1 (family)
- Schoepfiaceae:1 (family)
- Opiliaceae:1 (family)
- Santalaceae:1 (family)

BERBERIDOPSIDALES:

- Aextoxicaceae:1 (family)
- Berberidopsidaceae:1 (family)

CARYOPHYLLALES:

- [[Droseraceae [Nepenthaceae [Drosophyllaceae [Ancistrocladaceae + Dioncophyllaceae]]]] [[Frankeniaceae + Tamaricaceae] [Plumbaginaceae + Polygonaceae]]: 3 (acetogenic naphthoquinones +; pit glands +; endosperm starchy).
- [Rhabdodendraceae [Simmondsiaceae [[Asteropeiaceae + Physenaceae] [Caryophyllaceae, Nyctaginaceae, Cactaceae, etc.]]]]: 1 (fruit 1-seeded).
- [Droseraceae [Nepenthaceae [Drosophyllaceae [Ancistrocladaceae + Dioncophyllaceae]]]]: 4 (plants carnivorous; vascularized multicellular stalked or sessile glands +; anthers extrorse; ovary unilocular).
- [[Frankeniaceae + Tamaricaceae] [Plumbaginaceae + Polygonaceae]]: 2 (sulphated flavonols; ovary 1-locular).

- Droseraceae:1 (family)
- [Nepenthaceae [Drosophyllaceae [Ancistrocladaceae + Dioncophyllaceae]]]: 3 (petiole bundles surrounded by massive sclerenchymatous ring with embedded vascular bundles; leaves abaxially circinate; anthers basifixed).
- Nepenthaceae:1 (family)
- [Drosophyllaceae [Ancistrocladaceae + Dioncophyllaceae]]: 0.
- Drosophyllaceae:1 (family)
- [Ancistrocladaceae + Dioncophyllaceae]: 4 (acetogenic naphthyl isoquinoline alkaloids +; cork deep seated; petiole with inverted bundles in sclerenchyma ring; stomata actinocyclic).
- Ancistrocladaceae:1 (family)
- Dioncophyllaceae:1 (family)
- [Frankeniaceae + Tamaricaceae]: 3 (leaves small, with salt-excreting glands; C with basal adaxial appendages; pollen not spinulose).
- [Plumbaginaceae + Polygonaceae]: 6 (*O*-methylated flavonols; quinones +; cortical and/or medullary vascular bundles +; leaf base broad; ovule single; fruit surrounded by accrescent calyx).
- Frankeniaceae:1 (family)
- Tamaricaceae:1 (family)
- Plumbaginaceae:1 (family)
- Polygonaceae:1 (family)
- Rhabdodendraceae:1 (family)
- [Simmondsiaceae [[Asteropeiaceae + Physenaceae] [Caryophyllaceae, Nyctaginaceae, Cactaceae, etc.]]]: 1 (petals lost).
- Simmondsiaceae:1 (family)
- [Asteropeiaceae + Physenaceae]: 0.
- [Caryophyllaceae, Nyctaginaceae, Cactaceae, etc.] / **Core Caryophyllales**: 10 (plant herbaceous; betalains; ferulic acid ester-linked to primary unligified cell walls; sieve tube plastids with a ring of proteinaceous filaments and a central angular crystalloid; pollen trinucleate; nectaries on adaxial bases of stamens [or hypanthium]; ovules campylotropous; endosperm 0, perisperm +, starchy; embryo curved, not central; no dark reversal $P_{fr} \rightarrow P_r$).
- Asteropeiaceae:1 (family)
- Physenaceae:1 (family)

Core Caryophyllales:

- Microteaceae:1 (family)
- [[Caryophyllaceae [Achatocarpaceae + Amaranthaceae]] [Stegnospermataceae [Limeaceae [[Lophiocarpaceae [*Hypertelis* [Barbeuiaceae [Aizoaceae [Gisekiaceae [Sarcobataceae, Phytolaccaceae, Nyctaginaceae]]]]]] [Molluginaceae [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]]]]]]: 0.
- [Caryophyllaceae [Achatocarpaceae + Amaranthaceae]]: 2 (stamens = and opposite P; ovule single).
- [Stegnospermataceae [Limeaceae [[Lophiocarpaceae [*Hypertelis* [Barbeuiaceae [Aizoaceae [Gisekiaceae [Sarcobataceae, Phytolaccaceae, Nyctaginaceae]]]]]] [Molluginaceae [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]]]]]]: 0.
- Caryophyllaceae:1 (family)
- [Achatocarpaceae + Amaranthaceae]: 1 (pollen porate).
- Achatocarpaceae:1 (family)
- Amaranthaceae:1 (family)
- Stegnospermataceae:1 (family)

- [Limeaceae [[Lophiocarpaceae [*Hypertelis* [Barbeuiaceae [Aizoaceae [Gisekiaceae [Sarcobataceae, Phytolaccaceae, Nyctaginaceae]]]]]] [Molluginaceae [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]]]]: 0.
- Limeaceae:1 (family)
- [[Lophiocarpaceae [*Hypertelis* [Barbeuiaceae [Aizoaceae [Gisekiaceae [Sarcobataceae, Phytolaccaceae, Nyctaginaceae]]]]]] [Molluginaceae [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]]]]: 1 (sieve tube plastids with globular crystalloids).
- [Lophiocarpaceae [*Hypertelis* [Barbeuiaceae [Aizoaceae [Gisekiaceae [Sarcobataceae, Phytolaccaceae, Nyctaginaceae]]]]]]: 0.
- [Molluginaceae [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]]]: 0.
- Lophiocarpaceae:1 (family)
- Barbeuiaceae:1 (family)
- Aizoaceae:1 (family)
- Gisekiaceae:1 (family)
- Sarcobataceae:1 (family)
- Phytolaccaceae:1 (family)
- Nyctaginaceae:1 (family)
- Molluginaceae:1 (family)
- [Montiaceae [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]] / Portulacinae / Cactinae: 4 (phloem parenchyma cells with phytoferritin; two pairs of bracteoles, inner pair in the median plane; pollen pantocolpate; 6-bp deletion in *ndhf* gene).
- Montiaceae:1 (family)
- [[Halophytaceae [Didiereaceae + Basellaceae]] [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]]: 0.
- [Halophytaceae [Didiereaceae + Basellaceae]]: 2 (ovary with single basal ovule; fruit indehiscent).
- [Talinaceae [Anacampserotaceae [Portulacaceae + Cactaceae]]]: 2 (pericyclic fibres 0; pericarp 2-layered, exocarp ± caducous).
- Halophytaceae:1 (family)
- Didiereaceae:1 (family)
- Basellaceae:1 (family)
- Talinaceae:1 (family)
- Anacampserotaceae:1 (family)
- [Portulacaceae + Cactaceae]: 2 (G half inferior; pericarp not 2-layered).
- Portulacaceae:1 (family)
- Cactaceae:1 (family)

CORNALES:

- Cornaceae:1 (family)
- [Grubbiaceae + Curtisiaceae]: 0.
- Nyssaceae:1 (family)
- [Hydrostachyaceae [Hydrangeaceae + Loasaceae]]: 2 (ovary with intrusive parietal placentation; micropylar endosperm haustorium +).
- Grubbiaceae:1 (family)
- Curtisiaceae:1 (family)
- Hydrostachyaceae:1 (family)
- [Hydrangeaceae + Loasaceae]: 1 (similar route I secoiridoids and route II decarboxylated iridoids).

- Hydrangeaceae:1 (family)
- Loasaceae:1 (family)

ERICALES:

- [Marcgraviaceae [Balsaminaceae + Tetrameristaceae]] / **Balsaminoid clade**: 8 (raphide sacs +; druses 0; vessels in radial multiples; ± branched sclereids +; lamina supervolute, elongating in bud, with obscure abaxial lines; nectary outside A; gynoeical nectary 0; style short, stigma little expanded).
- [[Polemoniaceae + Fouquieriaceae], Lecythidaceae, [[Sladeniaceae + Pentaphylacaceae], [Sapotaceae [Ebenaceae + Primulaceae]], [Mitrastemonaceae, Theaceae, [Symplocaceae [Styracaceae + Diapensiaceae]], [[Sarraceniaceae [Roridulaceae + Actinidiaceae] [Clethraceae [Cyrillaceae + Ericaceae]]]]]]: 1 (corolla connate, tube well developed).
- Marcgraviaceae:1 (family)
- [Balsaminaceae + Tetrameristaceae]: 3 (K petal-like, nectariferous; filaments postgenitally united; stylar canal +, 5-radiate).
- Balsaminaceae:1 (family)
- Tetrameristaceae:1 (family)
- [Polemoniaceae + Fouquieriaceae]: 4 (K with scarios margins; A adnate to the corolla; G [3], style hollow, style/stigma branched; seeds winged).
- Lecythidaceae:1 (family)
- [[Sladeniaceae + Pentaphylacaceae], [Sapotaceae [Ebenaceae + Primulaceae]], [Mitrastemonaceae, Theaceae, [Symplocaceae [Styracaceae + Diapensiaceae]], [[Sarraceniaceae [Roridulaceae + Actinidiaceae] [Clethraceae [Cyrillaceae + Ericaceae]]]]]]: 0.
- Polemoniaceae:1 (family)
- Fouquieriaceae:1 (family)
- [Sladeniaceae + Pentaphylacaceae]: 1 (ovules bitegmic).
- [Sapotaceae [Ebenaceae + Primulaceae]]: 0.
- [Mitrastemonaceae, Theaceae, [Symplocaceae [Styracaceae + Diapensiaceae]], [[Sarraceniaceae [Roridulaceae + Actinidiaceae] [Clethraceae [Cyrillaceae + Ericaceae]]]]: 0.
- Sladeniaceae:1 (family)
- Pentaphylacaceae:1 (family)
- Sapotaceae:1 (family)
- [Ebenaceae + Primulaceae]: 1 (ovules bitegmic).
- Ebenaceae:1 (family)
- Primulaceae:1 (family)
- Mitrastemonaceae:1 (family)
- Theaceae:1 (family)
- [Symplocaceae [Styracaceae + Diapensiaceae]]: 0.
- [[Sarraceniaceae [Actinidiaceae + Roridulaceae]] [Clethraceae [Cyrillaceae + Ericaceae]]]: 1 (anthers extrorse, inverting during development).
- Symplocaceae:1 (family)
- [Styracaceae + Diapensiaceae]: 1 (nectary 0).
- Styracaceae:1 (family)
- Diapensiaceae:1 (family)
- [Sarraceniaceae [Actinidiaceae + Roridulaceae]]: 0.
- [Clethraceae [Cyrillaceae + Ericaceae]]: 0.
- Sarraceniaceae:1 (family)
- [Actinidiaceae + Roridulaceae]: 0.

- Actinidiaceae:1 (family)
- Roridulaceae:1 (family)
- Clethraceae:1 (family)
- [Cyrillaceae + Ericaceae]: 0.
- Cyrillaceae:1 (family)
- Ericaceae:1 (family)

GARRYALES:

- Eucommiaceae:1 (family)
- Garryaceae:1 (family)

GENTIANALES:

- Rubiaceae:1 (family)
- [Gentianaceae [Loganiaceae + Gelsemiaceae + Apocynaceae]]: 3 (route I secoiridoids +; internal phloem + [bicollateral vascular bundles]; syncarpy postgenital).
- Gentianaceae:1 (family)
- [Loganiaceae + Gelsemiaceae + Apocynaceae]: 0.
- Loganiaceae:1 (family)
- Gelsemiaceae:1 (family)
- Apocynaceae:1 (family)

SOLANALES:

- [Montiniaceae [Sphenocleaceae + Hydroleaceae]]: 0.
- [Convolvulaceae + Solanaceae]: 6 (tropane [polyhydroxynortropans]; pyrrolidine; acylated anthocyanins +; internal phloem +; flowers with oblique symmetry; C contorted-plicate or induplicate-valvate).
- Montiniaceae:1 (family)
- [Sphenocleaceae + Hydroleaceae]: 0.
- Sphenocleaceae:1 (family)
- Hydroleaceae:1 (family)
- Convolvulaceae:1 (family)
- Solanaceae:1 (family)

LAMIALES:

- Plocospermataceae:1 (family)
- [[[Carlemanniaceae + Oleaceae] [Tetrachondraceae [[Calceolariaceae + Gesneriaceae s.l.] [Plantaginaceae [Scrophulariaceae [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]]]]]: 1 (cells in heads of glandular hairs with vertical walls only).
- [Carlemanniaceae + Oleaceae]: 2 (A 2; pollen tricolpate).
- [Tetrachondraceae [[Calceolariaceae + Gesneriaceae s.l.] [Plantaginaceae [Scrophulariaceae [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]]]]]: 0.
- Carlemanniaceae:1 (family)
- Oleaceae:1 (family)
- Tetrachondraceae:1 (family)
- [[[Calceolariaceae + Gesneriaceae s.l.] [Plantaginaceae [Scrophulariaceae [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae,

Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]] / **Core Lamiales**: 4 (shikimic-acid derived anthraquinones; flowers vertically monosymmetric, C bilabiate, 2-lobed upper lip, 3-lobed lower lip; A 4, didynamous, anthers connivent; ovules many/carpel).

- Calceolariaceae:1 (family)
- Gesneriaceae:1 (family)
- [Plantaginaceae [Scrophulariaceae [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]: 2 (route II decarboxylated iridoids; cornosides 0).
- Plantaginaceae:1 (family)
- [Scrophulariaceae [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]: 0.
- Scrophulariaceae:1 (family)
- [Byblidaceae, Linderniaceae, [Stilbaceae [[Lamiaceae [Mazaceae [Phrymaceae [Paulowniaceae + Orobanchaceae]]]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]]]: 0.
- Byblidaceae:1 (family)
- Linderniaceae:1 (family)
- Stilbaceae:1 (family)
- [[Lamiaceae [Paulowniaceae, Phrymaceae, Orobanchaceae]] [Thomandersiaceae, Verbenaceae, Pedaliaceae, [Schlegeliaceae + Martyniaceae], Bignoniaceae, Acanthaceae, Lentibulariaceae]]]: 0.
- Lamiaceae:1 (family)
- Paulowniaceae:1 (family)
- Phrymaceae:1 (family)
- Orobanchaceae:1 (family)
- Thomandersiaceae:1 (family)
- Verbenaceae:1 (family)
- Pedaliaceae:1 (family)
- Schlegeliaceae:1 (family)
- Martyniaceae:1 (family)
- Bignoniaceae:1 (family)
- Acanthaceae:1 (family)
- Lentibulariaceae:1 (family)

AQUIFOLIALES:

- [Cardiopteridaceae + Stemonuraceae]: 4 (pollen (1-)3(-6)-porate; G [2], adaxial carpel alone fertile; integument vascularized; fruit 1-seeded).
- [Aquifoliaceae [Phyllonomaceae + Helwingiaceae]]: 1 (style 0).
- Cardiopteridaceae:1 (family)
- Stemonuraceae:1 (family)
- Aquifoliaceae:1 (family)
- [Phyllonomaceae + Helwingiaceae]: 3 (stipules fimbriate; inflorescence epiphyllous; ovary inferior).
- Phyllonomaceae:1 (family)
- Helwingiaceae:1 (family)

ASTERALES:

- [Rousseaceae + Campanulaceae]: 0.
- [Pentaphragmataceae [[Alseuosmiaceae [Phellinaceae + Argophyllaceae]] [Stylidiaceae [Menyanthaceae [Goodeniaceae [Calyceraceae + Asteraceae]]]]]]]: 0.

- Rousseeaceae:1 (family)
- Campanulaceae:1 (family)
- Pentaphragmataceae:1 (family)
- [[Alseuosmiaceae [Phellinaceae + Argophyllaceae]] [Stylidiaceae [Menyanthaceae [Goodeniaceae [Calyceraceae + Asteraceae]]]]]: 0.
- [Alseuosmiaceae [Phellinaceae + Argophyllaceae]]: 0.
- [Stylidiaceae [Menyanthaceae [Goodeniaceae [Calyceraceae + Asteraceae]]]]: 0.
- Alseuosmiaceae:1 (family)
- Phellinaceae:1 (family)
- Argophyllaceae:1 (family)
- Stylidiaceae:1 (family)
- [Menyanthaceae [Goodeniaceae [Calyceraceae + Asteraceae]]]: 1 (antiraphal vascular bundle proceeding to the micropyle).
- Menyanthaceae:1 (family)
- [Goodeniaceae [Calyceraceae + Asteraceae]]: 2 (acetylenes +; secondary pollen presentation +).
- Goodeniaceae:1 (family)
- [Calyceraceae + Asteraceae]: 5 (inflorescence capitate, involucrate; flowers small, sessile; ovule single; fruit a cypsela; K persistent, modified, involved in dispersal).
- Calyceraceae:1 (family)
- Asteraceae:1 (family)

BRUNIALES:

- Bruniaceae:1 (family)
- Columelliaceae:1 (family)

APIALES:

- Pennantiaceae:1 (family)
- [Torricelliaceae [Griselinaceae [Pittosporaceae [Araliaceae [Myodocarpaceae + Apiaceae]]]]]: 3 (C apparently free; ovary inferior; style branches/stigmas recurved).
- Torricelliaceae:1 (family)
- [Griselinaceae [Pittosporaceae [Araliaceae [Myodocarpaceae + Apiaceae]]]: 1 (petroselenic acid +).
- Griselinaceae:1 (family)
- [Pittosporaceae [Araliaceae [Myodocarpaceae + Apiaceae]]]: 8 (ethereal oils; acetate-derived anthroquinones; coumarins +; C₁₇ aliphatic acetylene faltarione; lateral roots originating from either side of the xylem poles; schizogenous secretory canals +; pollen trinucleate; G [2]).
- Pittosporaceae:1 (family)
- [Araliaceae [Myodocarpaceae + Apiaceae]]: 7 (polyacetylenes + [mainly aliphatic, C₁₈ tariric fatty acid in seed]; inflorescences terminal, ultimate units umbels; K open; C valvate; nectary continuous with style [stylopodium]; ventral carpel bundles are fused bundles of adjacent placentae; fruits ± laterally flattened).
- Araliaceae:1 (family)
- [Myodocarpaceae + Apiaceae]: 1 (A inflexed in bud).
- Myodocarpaceae:1 (family)
- Apiaceae:1 (family)

DIPSACALES:

- Adoxaceae:1 (family)
- Caprifoliaceae: 1 (family)

