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A new classification and linear sequence of extant gymnosperms

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Abstract

A new classification and linear sequence of the gymnosperms based on previous molecular and morphological phylogenetic and other studies is presented. Currently accepted genera are listed for each family and arranged according to their (probable) phylogenetic position. A full synonymy is provided, and types are listed for accepted genera. An index to genera assists in easy access to synonymy and family placement of genera.

Introduction

Gymnosperms are seed plants with an ovule that is not enclosed in a carpel, as is the case in angiosperms. The ovule instead forms on a leaf-like structure (perhaps homologous to a leaf), or on a scale or megasporophyll (homologous to a shoot) or on the apex of a (dwarf) shoot. Megasporophylls are frequently aggregated into compound structures that are often cone-shaped, hence the colloquial name for some of the group: conifers. Homologies of the ovuliferous structures as yet are not entirely resolved. Seeds of gymnosperms may be enclosed at maturity by fused cone scales or bracts, which are sometimes fleshy causing the fruiting structures (cones) to be confused with berries (e.g. juniper “berries”). In spite of their often slow rates of growth and long periods between pollination and seed maturity, gymnosperms can be dominant in some areas. Some extant cycads and gnetophytes are entirely or primarily insect pollinated, whereas *Ginkgo* and all conifers are wind pollinated. Only a few species are known to be polyploid, and no species are reported to be allopolyploid. Extant gymnosperms are not numerous. There are about 1026 species in all: the three ‘non-conifer’ groups comprise ca 310 species of cycads in 10 genera, one extant ginkgophyte and 80–100 gnetophytes in three genera; according to Farjon (2010) there are a total of ca 615 species of conifers in 70 accepted genera.

Hori *et al.* (1985) were the first to find that extant gymnosperms were sister to the angiosperms, but they included only three genera, *Cycas*, *Ginkgo* and *Metasequoia*, so this was not considered a particularly good evaluation of the topic. Troitsky *et al.* (1991) used ribosomal RNA and also found extant gymnosperms to be monophyletic, but they too sampled taxa thinly; although a total of 11 genera were used (three cycads, two gnetophytes, *Ginkgo* and five conifers), and only up to six genera from the whole set were included in each analysis. Likewise, Hasebe *et al.* (1992) used plastid *rbcL* sequences on a small set of taxa and similarly found extant gymnosperms to be monophyletic. The first broadly sampled molecular phylogenetic study to examine gymnosperm relationships was that of Chaw *et al.* (1997), and like the other studies they found extant gymnosperms to be sister to the angiosperms. Chase *et al.* (1993) assumed that the sister group relationship of

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gymnosperms and angiosperms in these earlier studies was spurious and perhaps due to insufficient taxon-sampling and/or long-branch attraction, so they assigned the cycads the position of sister to the rest. However, molecular studies have continued to demonstrate monophyly for both groups of extant seed plants (Ran *et al.* 2010).

Although the extant taxa are clearly monophyletic, their relationships to the numerous and diverse groups of fossil gymnosperms remain obscure and incompletely understood. We have not provided a formal name for the clade composed of the extant taxa; we may never know their relationships to all groups of fossil gymnosperms, which makes it difficult to know how to classify all groups of gymnosperms, living and extinct, so we have avoided this problem by simply naming only the four extant subclades. Thus, we recognise each of the four extant groups as subclasses of class Equisetopsida (as in Chase & Reveal 2009). This view differs from those favoured by other workers who have separated cycads, *Ginkgo*, gnetophytes and conifers as a whole, or even individual groups within conifers such as pines, Araucariaceae + Cupressaceae, Taxaceae and Podocarpaceae, individual classes, namely Cycadopsida Brongn., Ginkgoopsida Engl., Gnetopsida Eichler ex Kirpotenko, Pinopsida Burnett (Coniferopsida), Araucariopsida A.V.Bobrov & Melikian, Taxopsida Lotsy and Podocarpopsida Doweld & Reveal (cf. Sporne 1965, Bierhorst 1971, Doweld & Reveal 1999, Melikian & Bobrov 2000, Bobrov & Melikian 2006).

Traditionally the cycads, *Ginkgo*, and Araucariaceae have been considered 'primitive' in the sense that they each have a long fossil history extending back to the Permian (cycads) or Jurassic, and extant members of these three groups resemble the fossils (e.g. Passalia *et al.* 2010, Sun *et al.* 2008, Kunzmann 2007), although in each case the extant taxonomic diversity is less than in the past. Gnetidae were often considered as the sister group of angiosperms (Chase *et al.* 1993), and *Gnetum* L. indeed resembles an angiosperm in general habit. For this reason, Araucariaceae were often placed at the beginning of gymnosperms, whereas Gnetidae were placed at the end. Of course, retention of plesiomorphic characters is not necessarily reflected in molecular phylogenetic trees. Early branching groups may have evolved many apomorphic characters, whereas later branching groups may have retained plesiomorphic characters. This is especially the case in ancient groups where many lineages have become extinct, such as lycophytes, ferns, gymnosperms and magnoliids.

The exact position of Gnetidae with respect to the other subclades of extant gymnosperms has been problematic and controversial, particularly in light of studies that indicated them to be embedded in the conifer clade as sister to Pinaceae (the so-called gnepine hypothesis: Qiu *et al.* 1999). Burleigh & Mathews (2004) conducted a long series of experiments that looked at phylogenetic signals in nucleotide positions that varied at different rates in genes from all three genomic compartments, and they found no consistency of position for Gnetidae. Other studies have found Gnetidae as sister to all other extant seed plants (Rydin *et al.* 2002), but this does not fit the fossil record in a stratigraphic sense. Morphologically, a close relationship between Gnetidae and either Pinaceae (gnepine hypothesis) or all conifers (gnetifer hypothesis) seems unlikely, but there have been suggestions in the literature that presaged this molecular result (Bailey 1944, Eames 1952). The basic conclusion of Burleigh & Mathews was that it is difficult to use molecular data to evaluate this question, but the most consistent and perhaps reasonable result supports the gnepine hypothesis. Recently, Braukmann *et al.* (2010) found a large number of structural alterations of the plastid genome that are shared by all conifers and Gnetidae, and in particular Gnetidae and Pinaceae uniquely share the loss of all *ndh* genes in their plastid genomes, which also supports the gnepine relationship. If this relationship continues to gain support, then we would advocate naming of the non-Pinaceae conifers as a new subclass rather than including Gnetidae in Pinidae.

Linear representations of phylogenetic classifications are particularly useful as tools to arrange plant material systematically in herbaria. A linear classification of the angiosperms, primarily for that purpose, was devised according to APG II by Haston *et al.* (2007), and this was updated according to APG III by Haston *et al.* (2009). We here present an analogous linear classification of the extant gymnosperms. Presentation differs from the two papers of Haston *et al.* (2007, 2009) in that our classification includes genera as well as families, and it includes all known synonyms at the ranks of subclass, order, family and genus. For this linear classification we have followed recent phylogenetic results published by Chaw *et al.* (1997, 2000), Ran *et al.*

(2010), and other authors as cited under individual entries. Furthermore, we have placed genera that were not sampled where we think they probably belong. For each name we have indicated its nomenclatural type by "T." followed by the type the taxon name. An alphabetical index to genera is given in Appendix 1.

Linear sequence of extant gymnosperms and bibliography

SUBCLASS I. CYCADIDAE Pax in K.A.E.Prantl, *Lehrb. Bot.* ed. 9: 203 (1894).—T.: Cycadaceae.
Zamiidae Doweld, *Tent. Syst. Pl. Vasc.*: xv (2001).—T.: Zamiaceae.

ORDER A. CYCADALES Pers. ex Bercht. & J.Presl, *Přir. Rostlin*: 262 (1820).—T.: Cycadaceae.
Zamiales Burnett, *Outl. Bot.*: 490 (1835).—T.: Zamiaceae.
Stangeriales Doweld, *Tent. Syst. Pl. Vasc.*: xv (2001).—T.: Stangeriaceae.

Family 1. Cycadaceae Pers., *Syn. Pl.* 2: 630 (1807), *nom. cons.*—T.: *Cycas* L.
1 genus, ca 107 species, East Africa to Japan and Australia.

1.1. *Cycas* L., *Sp. Pl.* 2: 1188 (1753).—T.: *C. circinalis* L.
Todda-Pana Adans., *Fam.* 2: 25. (1763), *nom. illeg.* by typification.—T.: *Cycas circinalis* L.
Dyerocycas Nakai, *Chosakuronbun Mokuroku [Ord. Fam. Trib. Nov.]* 208 (1943).—T.: *D. micholitzii* (Dyer) Nakai (≡ *Cycas micholitzii* Dyer).
Epicycas de Laub. in D.J. de Laubenfels & F.A.C.B. Adema, *Blumea* 43: 388 (1998), *nom. illeg.*—T.: *E. micholitzii* (Dyer) de Laub. (≡ *Cycas micholitzii* Dyer).

Family 2. Zamiaceae Horan., *Prim. Lin. Syst. Nat.*: 45 (1834).—T.: *Zamia* L.
9 genera, ca 206 species, tropical and subtropical Africa, Australia and America. The phylogenetic tree followed here is that of Zgurski *et al.* (2008).
Encephalartaceae Schimp. & Schenk in K.A. Zittel, *Handb. Palaeontol., Palaeophyt.* 2: 215 (1880).—T: *Encephalartos* Lehm.
Stangeriaceae Schimp. & Schenk in K.A. Zittel, *Handb. Palaeontol., Palaeophyt.*: 216 (1880).—T.: *Stangeria* T.Moore
Boweniaceae D.W.Stev., *Amer. J. Bot.* 68: 1114 (1981).—T.: *Bowenia* Hook.f.
Dioaceae Doweld, *Tent. Syst. Pl. Vasc.*: xv. (2001).—T.: *Dioon* Lindl.
Microcycadaceae Tarbaeva, *Anat.-Morf. Str. Sem. Cycad.*: 19 (1991).—T: *Microcycas* (Miq.) A.DC.

2.1. *Dioon* Lindl., *Edwards's Bot. Reg.* 29 (Misc.): 59 (1843), as '*Dion*', *nom. et orth. cons.*—T.: *D. edule* Lindl.
Platyzamia Zucc., *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 4(2): 23 (1845).—T.: *P. rigida* Zucc.

2.2. *Bowenia* Hook.f., *Bot. Mag.* 89: ad t. 5398 (1863).—T.: *B. spectabilis* Hook.f.

2.3. *Macrozamia* Miq., *Monogr. Cycad.* 35 (1842).—T.: *M. spiralis* (Salisb.) Miq. (≡ *Zamia spiralis* Salisb.)

2.4. *Lepidozamia* Regel, *Bull. Soc. Imp. Naturalistes Moscou* 30: 182 (1857).—T.: *L. peroffskyana* Regel.
Catakidozamia W.Hill, *Gard. Chron.* 1865: 1107 (1865).—T.: *C. hopei* W.Hill

2.5. *Encephalartos* Lehm., *Nov. Stirp Pug.* 6: 3 (1834).—T.: *E. caffer* (Thunb.) Lehm. (≡ *Cycas caffra* Thunb.)

2.6. *Stangeria* T.Moore, *Hooker's J. Bot. Kew Gard. Misc.* 5: 228 (1853).—T.: *S. paradoxa* T.Moore

2.7. *Ceratozamia* Brongn., *Ann. Sci. Nat. Bot.*, ser. 3, 5: 7 (1846).—T.: *C. mexicana* Brongn.

2.8. *Microcycas* (Miq.) A.DC., *Prodr.* 16: 538 (1868).—T.: *M. calocoma* (Miq.) A.DC. (≡ *Zamia calocoma* Miq.)

2.9. *Zamia* L., *Sp. Pl.*, ed. 2, 2: 1659 (1763), *nom. cons.*—T.: *Z. pumila* L.
Palma-Filix Adans., *Fam.* 2: 21, 587 (1763), *nom. rej.*
Aulacophyllum Regel, *Gartenflora* 25: 140 (1876).—T.: *A. skinneri* (Warsz.) Regel (≡ *Zamia skinneri* Warsz.)
Palmifolium Kuntze, *Rev. Gen.* 2: 803 (1891), *nom. illeg.* (≡ *Palma-Filix* Adans., *nom. rej.* ≡ *Zamia* L., *nom. cons.*)
Chigua D.W.Stev., *Mem. New York Bot. Gard.* 57: 170 (1990).—T.: *C. restrepoi* D.W.Stev. (≡ *Zamia restrepoi* (D.W.Stev.) A.J.Lindstr.), see Lindstrom (2009).

SUBCLASS II. GINKGOIDAE Engl. in H.G.A. Engler & K.A.E. Prantl, *Nat. Planzenfam. Nacht.*: 341 (1897).—T.: Ginkgoaceae.

ORDER B. GINKGOALES Gorozh., *Lekts. Morf. Sist. Archegon.*: 73 (1904).—T.: Ginkgoaceae.

Family 3. Ginkgoaceae Engl. in H.G.A. Engler & K.A.E. Prantl, *Nat. Pflanzenfam. Nachtr.*: 19 (1897), *nom. cons.*—T.: *Ginkgo* L.

1 genus, 1 extant species, China.

3.1. *Ginkgo* L., *Mant.* 2: 313 (1771).—T.: *G. biloba* L.

Salisburia Sm., *Trans. Linn. Soc. London* 3: 330 (1797), *nom. illeg.*—T.: *S. adiantifolia* Sm. (≡ *Ginkgo biloba* L.)

Pterophyllus J.Nelson, *Pinaceae*: 163 (1866), *nom. illeg.*, non Lév. (1844, Agaricaceae).—T.: *P. salisburiensis* J.Nelson, *nom. illeg.* (≡ *Ginkgo biloba* L.)

SUBCLASS III. GNETIDAE Pax in K.A.E. Prantl, *Lehrb. Bot.*, ed. 9: 203 (1894).—T.: Gnetaceae.

Ephedridae Cronquist, Takht. & Zimmerm. ex Reveal, *Phytologia* 79: 69 (1996).—T.: Ephedraceae.

Welwitschiidae Cronquist, Takht. & Zimmerm. ex Reveal, *Phytologia* 79: 71 (1996).—T.: Welwitschiaceae.

ORDER C. WELWITSCHIALES Skottsb. ex Reveal, *Phytologia* 74: 174 (1993).—T.: Welwitschiaceae.

Family 4. Welwitschiaceae Caruel, *Nuovo Giorn. Bot. Ital.* 11: 16 (1879), *nom. cons.*—T.: *Welwitschia* Hook.f.

Tumboaceae Wettst., *Handb. Syst. Bot.* 2(1): 158 (1903).—T: *Tumboa* Welw., *nom. rej.* (≡ *Welwitschia* Hook.f., *nom. cons.*)

1 genus, 1 species, Namibia, Angola.

4.1. *Welwitschia* Hook.f., *Gard. Chron.* 1862: 71 (1862), *nom. cons.*—T.: *W. mirabilis* Hook.f.

Tumboa Welw., *Gard. Chron.* 1861: 75. (1861), *nom. rej.*

ORDER D. GNETALES Blume in C.F.P. von Martius, *Consp. Regn. Veg.*: 11 (1835).—T.: Gnetaceae.

Family 5. Gnetaceae Blume, *Nov. Pl. Expos.*: 23 (1833), *nom. cons.*—T.: *Gnetum* L.

Thoaceae Kuntze in T.E. von Post & C.E.O. Kuntze, *Lex. Gen. Phan.*: 615 (1903).—T.: *Thoa* Aubl.

1 genus, 30 species, India, Malesia, tropical West Africa, Amazonian South America.

5.1. *Gnetum* L., *Syst. Nat.*, ed. 12, 2: 637; *Mant.* 1: 18, 125 (1767).—T.: *G. gnemon* L.

Thoa Aubl., *Hist. Pl. Guiane*: 874 (1775).—T.: *T. urens* Aubl.

Abutua Lour., *Fl. Cochinch.*: 630 (1790).—T.: *A. indica* Lour.

Gnemon [Rumpf ex] Kuntze, *Rev. Gen.* 2: 796 (1891), *nom. illeg.*—T.: *G. ovalifolia* O.Kuntze (≡ *Gnetum gnemon* L.)

ORDER E. EPHEDRALES Dumort., *Anal. Fam. Pl.*: 11 (1829).—T.: Ephedraceae.

Family 6. Ephedraceae Dumort., *Anal. Fam. Pl.*: 11 (1829), *nom. cons.*—T.: *Ephedra* L.

1 genus, ca 40 species, Mediterranean Europe, North Africa, warm temperate Asia, North America and western South America.

6.1 *Ephedra* L., *Sp. Pl.* 2: 1040 (1753).—T.: *E. distachya* L.

Chaetocladus J.Nelson, *Pinaceae*: 161 (1866), *nom. illeg.*—T.: *C. distachyus* (L.) J.Nelson (as '*distachys*') ≡ *Ephedra distachya* L.

SUBCLASS IV. PINIDAE Cronquist, Takht. & Zimmerm., *Taxon* 15: 134 (1966).—T.: Pinaceae.

Taxidae Ehrend. ex Reveal, *Phytologia* 79: 71 (1996).—T.: Taxaceae.

Podocarpidae Doweld & Reveal, *Phytologia* 84: 366 (1999).—T.: Podocarpaceae.

Araucariidae Doweld, *Tent. Syst. Pl. Vasc.*: xx (2001).—T.: Araucariaceae.
Cupressidae Doweld, *Tent. Syst. Pl. Vasc.*: xix (2001).—T.: Cupressaceae.

Note: —The name 'Coniferales' has been used for this clade but it is not based on an existing genus. The use of names based on 'Conifer-' (e.g. Coniferopsida, Coniferidae, Coniferales etc.) should be avoided.

ORDER F. PINALES Gorozh., *Lekts. Morf. Sist. Archegon.*: 88 (1904).—T.: Pinaceae.
Abietales Link, *Handbuch* 2: 474 (1829).—T.: *Abietaceae*.

Family 7. Pinaceae Spreng. ex F.Rudolphi, *Syst. Orb. Veg.*: 35 (1830), *nom. cons.*—T.: *Pinus* L.
Cedraceae Vest, *Anleit. Stud. Bot.*: 265, 280. 1818.—T.: *Cedrus* Trew
Abietaceae Gray, *Nat. Arr. Brit. Pl.* 2: 222, 223. (1822), *nom. cons.*—T.: *Abies* Mill.
Piceaceae Gorozh., *Lekts. Morf. Sist. Archegon.*: 79. (1904).—T: *Picea* A.Dietr.

11 genera, ca 225 species, Temperate to tropical Eurasia, Sumatra, Philippines, North America south to Nicaragua, West Indies. The phylogenetic tree published by Liston *et al.* (2003) has been used to create this sequence.

7.1. *Cedrus* Trew, *Cedr. Lib. Hist., Apol. Mant.* 1: 6 (1757), *nom. cons.*, non Duhamel (1755, *nom. rej.*), non Mill. (1757, = *Cedrela* P.Browne, Meliaceae).—T.: *C. libani* A.Rich. (≡ *Pinus cedrus* L.)

7.2. *Pinus* L., *Sp. Pl.* 2: 1000 (1753).—T.: *P. sylvestris* L.
Pinea Wolf, *Gen. Pl.*: 156 (1776).—T.: not designated.
Strobus (Sweet ex Spach) Opiz, *Lotos* 4: 94 (1854).—T.: *S. weymouthiana* Opiz (≡ *Pinus strobus* L.)
Caryopitys Small, *Fl. S.E. U.S.*: 29 (1903).—T.: *C. edulis* (Engelm.) Small (≡ *Pinus edulis* Engelm.)
Apinus Neck. ex Rydb., *Bull. Torrey Bot. Club* 32: 597 (1905).—T.: *Pinus cembra* L.
Leucopitys Nieuwl., *Amer. Midl. Naturalist* 3: 69 (1913), *nom. illeg.* (≡ *Strobus* (Sweet ex Spach) Opiz)
Ducampopinus A.Chev., *Rev. Int. Bot. Appl. Agric. Trop.* 24: 30 (1944).—T.: *D. krempfii* (Lecomte) A.Chev. (≡ *Pinus krempfii* Lecomte)

7.3. *Cathaya* Chun & Kuang, *Acta Bot. Sin.* 10: 245 (1962).—T.: *C. argyrophylla* Chun & Kuang

7.4. *Picea* A.Dietr., *Fl. Berlin* 1(2): 794 (1824).—T.: *P. rubra* A.Dietr., *nom. illeg.* (≡ *Picea abies* (L.) H.Karst., ≡ *Pinus abies* L.)
Veitchia Lindl., *Gard. Chron.* 1861: 265 (1861) *nom. rej.* non *Veitchia* H.Wendl., (1868, Arecaceae), *nom. cons.*—T: *V. japonica* Lindl. Note: —This is ambiguously synonymous with *Picea*; the identity of the type species is unknown.

7.5. *Pseudotsuga* Carr., *Traité Conif.*, ed. 2: 256 (1867).—T.: *P. douglasii* (Sabine ex D.Don) Carr. (≡ *Pinus douglasii* Sabine ex D.Don) [correct name *P. menziesii* (Mirb.) Franco]
Abietia A.H.Kent, *Man. Conif.*, ed. 2: 474 (1900), *nom. illeg.*

7.6. *Larix* Mill., *Gard. Dict. Abr.*, ed. 4: [unpaged.] (1754).—T.: *L. decidua* Mill. (≡ *Pinus larix* L.)

7.7. *Pseudolarix* Gordon, *Pinetum*: 292 (1858), *nom. cons.*—T.: *P. kaempferi* Gordon [correct name *P. amabilis* (J.Nelson) Rehder]
Laricopsis A.H.Kent, *Man. Conif.*, ed. 2: 403 (1900), *nom. illeg.*, non Fontaine (1889).—T.: *L. kaempferi* (Gordon) A.H.Kent (≡ *Pseudolarix kaempferi* Gordon)
Chrysolarix H.E.Moore, *Baileya* 13: 133 (1965).—T.: *C. amabilis* (J.Nelson) H.E.Moore (≡ *Larix amabilis* J.Nelson)

7.8. *Tsuga* (Endl.) Carr., *Traité Conif.*: 185 (1855).—T.: *T. sieboldii* Carr. (≡ *Abies tsuga* Siebold & Zucc.)
Hesperopeuce (Engelm.) Lemmon, *Bienn. Rep. Calif. State Board Forest.* 3: 126 (1890).—T.: *H. pattoniana* (J.Jeffrey ex A.Murray) Lemmon (≡ *Abies pattoniana* J.Jeffrey ex A.Murray)

7.9. *Nothotsuga* Hu ex C.N.Page, *Notes Roy. Bot. Gard. Edinburgh* 45: 390 (1989).—T.: *N. longibracteata* (W.C.Cheng) C.N.Page (≡ *Tsuga longibracteata* W.C.Cheng)

7.10. *Keteleeria* Carr., *Rev. Hort.* 37: 449 (1866).—T.: *K. fortunei* (A.Murray) Carr. (≡ *Picea fortunei* A.Murr., as '*fortuni*').

7.11. *Abies* Mill., *Gard. Dict. Abr.*, ed. 4, vol. 1: [unpaged.] (1754).—T.: *A. alba* Mill. (≡ *Pinus picea* L.)
Picea D.Don ex Loud., *Arbor. Frut. Brit.* 4: 2329 (1838), *nom. illeg.*, non A.Dietr. (1824).

ORDER G. ARAUCARIALES Gorozh., *Lekts. Morf. Sist. Archegon.*: 72 (1904).—T.: Araucariaceae.
Podocarpales Pulle ex Reveal, *Novon* 2: 239 (1992).—T.: Podocarpaceae.
Saxegothaeales Doweld & Reveal, *Phytologia* 84: 365 (1999).—T.: Saxegothaeaceae.
Falcatifoliales Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 61 (2000).—T.: Falcatifoliaceae.
Parasitaxales Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 61 (2000).—T.: Parasitaxaceae
Microstrobales Melikian & A.V.Bobrov ex Doweld & Reveal, *Novon* 11: 396 (2001).—T.: Microstrobaceae.

Family 8. Araucariaceae Henkel & W.Hochst., *Syn. Nadelhölz.*: xvii, 1 (1865), *nom. cons.*—T.: *Araucaria* Juss.

Dammaraceae Link, *Abh. Konigl. Akad. Wiss. Berlin* 1827: 157 (1830), *nom. illeg.*—T.: *Dammara* Link.
Agathidaceae (Vierh.) Baum.-Bodenh. ex A.V.Bobrov & Melikian, *Komarovia* 4: 61 (2006).—T.: *Agathis* Salisb.
3 genera, 41 species, Southeast Asia and Philippines to Australasia, Pacific, southern South America.

8.1. *Araucaria* Juss., *Gen.* 413 (1789). T.: *A. imbricata* Pav., *nom. illeg.* (≡ *Pinus araucana* Molina)
Dombeya Lam., *Encycl. Meth., Bot.* 2: 301 (1786), *nom. illeg.*, non L'Hér. (1785), *nom. rej.*—T.: *D. chilensis* Lam., *nom. illeg.* (≡ *Pinus araucana* Molina)
Columbea Salisb., *Trans. Linn. Soc. London* 8: 317 (1807), *nom. illeg.*—T.: *C. quadrifaria* Salisb., *nom. illeg.* (≡ *Pinus araucana* Molina)
Eutassa Salisb., *Trans. Linn. Soc. London* 8: 316 (1807).—T.: *E. heterophylla* Salisb. (= *Araucaria heterophylla*).
Eutacta Link, Linnaea 15: 543 (1842).—T.: *E. cunninghamii* (Aiton ex A. Cunn.) Link (type designated here by Mill & Farjon) (= *Araucaria cunninghamii* Aiton ex A.Cunn.).
Quadrifaria Manetti ex Gordon, *Pinet. Suppl.* 14 (1862).—T.: *Q. imbricata* (Pav.) Manetti ex Gordon (= *Araucaria araucana*).
Marywildea A.V.Bobrov & Melikian, *Komarovia* 4: 57 (2006).—T.: *M. bidwillii* (Hook.) A.V.Bobrov & Melikian (≡ *Araucaria bidwillii* Hook.).
Titanodendron A.V.Bobrov & Melikian, *Komarovia* 4: 60 (2006).—T.: *T. hunsteinii* (K.Schum.) A.V.Bobrov & Melikian (≡ *Araucaria hunsteinii* K.Schum.).

8.2. *Wollemia* W.G.Jones, K.D.Hill & J.M.Allen, *Telopea* 6: 173 (1995).—T.: *W. nobilis* W.G.Jones, K.D.Hill & J.M.Allen

8.3. *Agathis* Salisb., *Trans. Linn. Soc. London* 8: 311 (1807), *nom. cons.*—T.: *A. loranthifolia* Salisb., *nom. illeg.* (≡ *Pinus dammara* (Lamb.) L.C.Rich.)
Dammara Link, *Enum. Pl. Horti Berol.* 2: 411 (1822), *nom. illeg.*, non Gaertner (1790).
Salisburyodendron A.V.Bobrov & Melikian, *Komarovia* 4: 62 (2006).—T.: *S. australis* (Lamb.) A.V.Bobrov & Melikian (≡ *Agathis australis* Salisb.).

Family 9. Podocarpaceae Endl., *Syn. Conif.*: 203 (1847), *nom. cons.*—T.: *Podocarpus* L'Hér. ex Pers.
Phyllocladaceae Bessey, *Nebraska Univ. Stud.* 7: 325 (1907).—T.: *Phyllocladus* Rich. ex Mirb.
Phyllocladaceae E.L.Core ex H.Keng, *Taiwania* 18(2): 142 (1973), *nom, illeg.*—T.: *Phyllocladus* Rich. ex Mirb.
Pherosphaeraceae Nakai, *Tyosen-Sanrin*158: 15 (1938).—T: *Pherosphaera* W.Archer bis
Nageiaceae D.Z.Fu, *Acta Phytotax. Sin.* : 522 (1992).—T: *Nageia* Gaertn.
Acmopylaceae Melikian & A.V.Bobrov, *Proc. Intern. Conf. Plant Anat. Morph. (St. Petersburg)* 1997: 93 (1997).—T: *Acmopyle* Pilg.
Saxegothaeaceae Gaussen ex Doweld & Reveal, *Phytologia* 84: 365. (1999).—T: *Saxegothaea* Lindl., *nom. cons.*
Microcachrydaceae Doweld & Reveal, *Phytologia* 84: 365 (1999).—T.: *Microcachrys* Hook.f.
Bracteocarpaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 60 (2000).—T: *Bracteocarpus* Melikian & A.V.Bobrov
Dacrycarpaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 59 (2000).—T: *Dacrycarpus* de Laub.
Falcatifoliaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 61 (2000).—T: *Falcatifolium* de Laub.
Halocarpaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 60 (2000).—T: *Halocarpus* Quinn
Lepidothamnaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 63 (2000).—T: *Lepidothamnus* Phil.
Microstrobaceae Doweld & Reveal, *Novon* 11: 396 (2001).—T: *Microstrobos* J.Garden & L.A.S.Johnson
Parasitaxaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 61 (2000).—T: *Parasitaxus* de Laub.

Prumnopityaceae Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 58 (2000).—T: *Prumnopitys* Phil.

19 genera, ca 180 species, Tropical African mountains, Japan to Australia and New Zealand, SW Pacific, South America, Central America, Caribbean Islands. Phylogenetic analyses followed here are those of Kelch (1997, 1998), Conran *et al.* (2000) and Sinclair *et al.* (2002).

9.1. *Phyllocladus* Rich. ex Mirb., *Mém. Mus. Hist. Nat.* 13: 48 (1825), *nom. cons.*—T.: *P. billardieri* Mirb, *nom. illeg.* (≡ *Podocarpus aspleniifolius* Labill.) [correct name: *Phyllocladus aspleniifolius* (Labill.) Hook.f.]

Podocarpus Labill., *Novae Holl. Pl. Spec.* 2: 71, t. 221 (1806), *nom. rej.* (≡ *Phyllocladus* by typification)

Thalamia Spreng., *Anleit.*, ed. 2, 2: 218 (1817), *nom. illeg.*—T.: *T. aspleniifolia* (Labill.) Spreng. (≡ *Podocarpus aspleniifolius* Labill.)

Brownetera Rich. ex Tratt., *Gen. Nov. Pl.*: ad *t.* [14] (1825), *nom. illeg.* —T.: *B. aspleniifolia* (Labill.) Tratt. (≡ *Podocarpus aspleniifolius* Labill.)

9.2. *Lepidothamnus* Phil., *Linnaea* 30: 730 (1861).—T.: *L. fonkii* Phil.

9.3. *Prumnopitys* Phil., *Linnaea* 30: 731 (1861).—T.: *P. elegans* Phil. [correct name: *P. andina* (Poepp. ex Endl.) de Laub.]

Stachycarpus (Endl.) Tiegh., *Bull. Soc. Bot. France* 38: 163 (1891).—T.: *S. andinus* (Poepp. ex Endl.) Tiegh., as '*andina*' (≡ *Prumnopitys andina* (Poepp. ex Endl.) de Laub., ≡ *Podocarpus andinus* Poepp. ex Endl., as '*andina*')

Stachypitys A.V.Bobrov & Melikian, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 58 (2000) *nom. illeg.*, non Schenk (1867, fossil).—T.: *S. ferrugineus* (G.Benn. ex D.Don) A.V.Bobrov & Melikian (≡ *Prumnopitys ferruginea* (G.Benn. ex D.Don) de Laub., ≡ *Podocarpus ferrugineus* G.Benn. ex D.Don).

Van-Tieghemia A.V.Bobrov & Melikian, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 58 (2000) *nom. illeg.*, non *Vantieghemia* Kuntze (1891, fungus).—T.: *V. montana* (Humb. & Bonpl. ex Willd.) A.V.Bobrov & Melikian (≡ *Prumnopitys montana* (Humb. & Bonpl. ex Willd.) de Laub., ≡ *Podocarpus montanus* Humb. & Bonpl. ex Willd.).

Botryopitys Doweld, *Turczaninowia* 3(4): 37 (2001).—T.: *B. montana* (Humb. & Bonpl. ex Willd.) Doweld (≡ *Prumnopitys montana* (Humb. & Bonpl. ex Willd.) de Laub., ≡ *Podocarpus montanus* Humb. & Bonpl. ex Willd.). Note:—*Botryopitys* is a new name coined by Doweld for the illegitimate name *Van-Tieghemia* A.V.Bobrov & Melikian.

9.4. *Sundacarpus* (J.Buchholz & N.E.Gray) C.N.Page, *Notes Roy. Bot. Gard. Edinburgh* 45: 378 (1989).—T.: *S. amarus* (Blume) C.N.Page (≡ *Podocarpus amarus* Blume, as '*amara*')

9.5. *Halocarpus* Quinn, *Austral. J. Bot.* 30: 317 (1982).—T.: *H. bidwillii* (Hook.f. ex Kirk) Quinn (≡ *Dacrydium bidwillii* Hook.f. ex Kirk)

9.6. *Parasitaxus* de Laub., *Fl. Nouv. Calédonie* 4: 44 (1972).—T.: *P. usta* (Vieill.) de Laub., as '*ustus*' (≡ *Dacrydium ustum* Vieill.)

9.7. *Lagarostrobos* Quinn, *Austral. J. Bot.* 30: 316 (1982).—T.: *L. franklinii* (Hook.f.) Quinn (≡ *Dacrydium franklinii* Hook.f.)

9.8. *Manoao* Molloy, *New Zealand J. Bot.* 33: 196 (1995).—T.: *M. colensoi* (Hook.) Molloy (≡ *Dacrydium colensoi* Hook.)

9.9. *Saxegothaea* Lindl., *J. Hort. Soc. London* 6: 258 (1851), as '*Saxe-Gothaea*,' *nom. & orth. cons.*—T.: *S. conspicua* Lindl.

Squamataxus J.Nelson, *Pinaceae* 168 (1866), *nom. illeg.*—T.: *S. albertiana* J.Nelson, *nom. illeg.* (= *Saxegothaea conspicua* Lindl.)

9.10. *Microcachrys* Hook.f., *London J. Bot.* 4: 149 (1845).—T.: *M. tetragona* (Hook.) Hook.f. (≡ *Athrotaxis tetragona* Hook.)

9.11. *Pherosphaera* W.Archer bis, *Hooker's J. Bot. Kew Gard. Misc.* 2: 52 (1850).—T.: *P. hookeriana* W.Archer bis

Microstrobos J.Garden & L.A.S.Johnson, *Contr. New South Wales Natl. Herb.* 1: 315 (1951).—T.: *M. fitzgeraldii* (F.Muell.) L.A.S.Johnson (≡ *Pherosphaera fitzgeraldii* F.Muell.)

9.12. *Acmopyle* Pilg. in H.G.A. Engler, *Nat. Pflanzenr.* IV. 5 (Heft 18): 117 (1903).—T.: *A. pancheri* (Brongn. & Gris) Pilger (≡ *Dacrydium pancheri* Brongn. & Gris)

9.13. *Dacrycarpus* de Laub., *J. Arnold Arbor.* 50: 315 (1969).—T.: *D. dacrydioides* (A.Rich.) de Laub. (≡

Podocarpus dacrydioides A.Rich.)

Bracteocarpus A.V.Bobrov & Melikian, *Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol.*, ser. 2, 103(1): 58 (1998).—T.: *B. imbricatus* (Blume) A.V.Bobrov & Melikian (≡ *Dacrycarpus imbricatus* (Blume) de Laub., ≡ *Podocarpus imbricatus* Blume)

Laubenfelsia A.V.Bobrov & Melikian, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 60 (2000).—T.: *L. vieillardii* (Parl.) A.V.Bobrov & Melikian, *non rite publ.* (≡ *Dacrycarpus vieillardii* (Parl.) de Laub.). Note:—Although the name of the single species of *Laubenfelsia* was invalidly published, the generic name *Laubenfelsia* has been considered to be valid (R.K. Brummitt, pers. comm. to Mill, 19 February 2001).

9.14. *Dacrydium* Lamb., *Descr. Pinus* 1: 93 (1807).—T.: *D. cupressinum* Sol. ex Lamb.

Corneria A.V.Bobrov & Melikian, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 62 (2000), *nom. illeg.*, non *Cornera* Furtado (1955, Arecaceae).—T.: *C. elata* (Roxb.) A.V.Bobrov & Melikian (≡ *Dacrydium elatum* (Roxb.) Wall. ex Hook. ≡ *Juniperus elata* Roxb.)

Gaussenia A.V.Bobrov & Melikian, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 62 (2000).—T.: *G. lycopodioides* (Brongn. & Gris) A.V.Bobrov & Melikian (≡ *Dacrydium lycopodioides* Brongn. & Gris)

Metadacrydium M.G.Baum.-Bod. ex Melikian & A.V.Bobrov, *Bot. Zhurn.* (*Moscow & Leningrad*) 85(7): 63 (2000).—T.: *M. araucarioides* (Brongn. & Gris) M.G.Baum.-Bod. ex Melikian & A.V.Bobrov (≡ *Dacrydium araucarioides* Brongn. & Gris)

9.15. *Falcatifolium* de Laub., *J. Arnold Arbor.* 50: 308 (1969).—T.: *F. falciforme* (Parl.) de Laub. (≡ *Podocarpus falciformis* Parl.)

9.16. *Retrophyllum* C.N.Page, *Notes Roy. Bot. Gard. Edinburgh* 45: 379 (1989).—T.: *R. vitiense* (Seem.) C.N.Page (≡ *Podocarpus vitiensis* Seem.)

Decussocarpus de Laub., *J. Arnold Arbor.* 50: 340 (1969), *nom. illeg.*—T.: *D. vitiensis* (Seem.) de Laub. (≡ *Retrophyllum vitiense* (Seem.) C.N.Page ≡ *Podocarpus vitiensis* Seem.) Note:—The name *Decussocarpus* is illegitimate because it included the earlier name *Nageia* Gaertn. The type is not a *Nageia* and was later described as *Retrophyllum*.

9.17. *Nageia* Gaertn., *Fruct. Sem. Pl.* 1: 191 (1788).—T.: *N. japonica* Gaertn., *nom. illeg.* (≡ *N. nagi* (Thunb.) Kuntze, ≡ *Myrica nagi* Thunb.)

9.18. *Afrocarpus* (J.Buchholz & N.E.Gray) C.N.Page, *Notes Roy. Bot. Gard. Edinburgh* 45: 383 (1989).—T.: *A. falcatus* (Thunb.) C.N.Page, as '*falcata*' (≡ *Taxus falcata* Thunb.)

9.19. *Podocarpus* L'Hér. ex Pers., *Syn. Pl.* 2: 580 (1807), *nom. cons.*—T.: *P. elongates* (Aiton) L'Her. ex Pers. (≡ *Taxus elongata* Aiton, *typ. cons.*)

Margbensonia A.V.Bobrov & Melikian, *Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol.*, ser. 2, 103(1): 59 (1998).—T.: *M. macrophylla* (Thunb.) A.V.Bobrov & Melikian (≡ *Podocarpus macrophyllum* (Thunb.) Sweet, ≡ *Taxus macrophylla* Thunb.)

ORDER H. CUPRESSALES Link, *Handbuch* 2: 470 (1829).—T.: Cupressaceae.

Taxales Link, *Handbuch* 2: 470 (1829).—T.: Taxaceae.

Taxodiales Schimp., *Traité Paléont. Vég.* 2: 309 (1870).—T.: Taxodiaceae.

Cephalotaxales Takht. ex Reveal, *Phytologia* 74: 175 (1993).—T.: Cephalotaxaceae.

Sciadopityales Takht. ex Reveal, *Phytologia* 75: 176 (1993).—T.: Sciadopityaceae.

Actinostrobales Doweld, *Tent. Syst. Pl. Vasc*: xx (2001).—T.: Actinostrobaceae.

Athrotaxidales Doweld, *Tent. Syst. Pl. Vasc*: xix (2001).—T.: Athrotaxidaceae.

Cunninghamiales Doweld, *Tent. Syst. Pl. Vasc*: xix (2001).—T.: Cunninghamiaceae.

Family 10. Sciadopityaceae Luerss., *Grundz. Bot.*: 265 (1877)—T.: *Sciadopitys* Siebold & Zucc.

1 genus with a single species in Japan.

10.1. *Sciadopitys* Siebold & Zucc., *Fl. Jap.* 2: 1 (1842).—T.: *S. verticillata* (Thunb.) Siebold & Zucc. (≡ *Taxus verticillata* Thunb.)

Family 11. Cupressaceae Gray, *Nat. Arr. Brit. Pl.* 2: 222. (1822), *nom. cons.*—T.: *Cupressus* L.

Juniperaceae J.Presl & C.Presl, *Delic. Prag.*: 142 (1822).—T.: *Juniperus* L.

Thujaceae Burnett, *Outl. Bot.*: 502, 1149 (1835).—T.: *Thuja* L.

Cunninghamiaceae Siebold & Zucc., *Fl. Jap.* 2: 1, 3 (1842).—T.: *Cunninghamia* R.Br.

Taxodiaceae Saporta, *Ann. Sci. Nat.,Bot.*, ser. 5, 4: 44 (1865), *nom. cons.*—T.: *Taxodium* Rich.
Sequoiaceae C.Koch ex Luerss., *Grundz. Bot.*: 265 (1877).—T.: *Sequoia* Endl.
Cryptomeriaceae Gorozh., *Lekts. Morf. Sist. Archegon.*: 88 (1904).—T.: *Cryptomeria* D.Don
Thujopsidaceae Bessey, *Nebraska Univ. Stud.* 7: 325 (1907).—T.: *Thujopsis* Siebold & Zucc. ex Endl.
Actinostrobaceae Lotsy, *Vortr. Bot. Stammesgesch.* 3: 98 (1911).—T.: *Actinostrobus* Miq.
Callitridaceae Seward, *Fossil Pl.* 4: 124, 151, 336 (1919).—T.: *Callitris* Vent.
Limnopityaceae Hayata, *Bot. Mag. (Tokyo)* 46: 25. 1932.—T.: *Taxodium* Rich.
Taiwaniaceae Hayata, *Bot. Mag.* (*Tokyo*) 46: 26 (1932).—T.: *Taiwania* Hayata
Tetraclinaceae Hayata, *Bot. Mag.* (*Tokyo*) 46: 27 (1932).—T.: *Tetraclinis* Masters
Microbiotaceae Nakai, *Tyosen-Sanrin* 165: 13 (1938).—T.: *Microbiota* Komarov
Metasequoiaceae S.Miki ex Hu & W.C.Cheng, *Bull. Fan Mem. Inst. Biol.*, ser. 2, 1: 154 (1948).—T.: *Metasequoia* Hu & W.C.Cheng
Athrotaxidaceae Doweld, *Prosyllab. Tracheophyt.*: xix (2001).—T.: *Athrotaxis* D.Don
Libocedraceae Doweld, *Novosti Sist. Vyssh. Rast.* 33: 42 (2001).—T.: *Libocedrus* Endl.
Neocallitropsidaceae Doweld, *Prosyllab. Tracheophyt.*: xx (2001).—T.: *Neocallitropsis* Florin
Widdringtoniaceae Doweld, *Prosyllab. Tracheophyt.*: xx (2001).—T.: *Widdringtonia* Endl.
Arceuthidaceae A.V.Bobrov & Melikian, *Komarovia* 4: 79 (2006).—T.: *Arceuthos* Antoine & Kotschy
Diselmaceae A.V.Bobrov & Melikian, *Komarovia* 4: 96 (2006).—T.: *Diselma* Hook.f
Fitzroyaceae A.V.Bobrov & Melikian, *Komarovia* 4: 80 (2006), 'Fitz-Royaceae'.—T.: *Fitzroya* Hook.f. ex Lindl.
Pilgerodendraceae A.V.Bobrov & Melikian, *Komarovia* 4: 87 (2006).—T.: *Pilgerodendron* Florin
Platycladaceae A.V.Bobrov & Melikian, *Komarovia* 4: 97 (2006).—T.: *Platycladus* Spach

29 genera, ca 130 species, nearly cosmopolitan. This sequence is based on the phylogenetic trees of Gadek *et al.* (2000) and Little *et al.* (2004).

11.1. *Cunninghamia* R.Br. in L.C.M. Richard, *Comm. Bot. Conif. Cyca*d. 149 (1826), *nom. cons.*, non Schreb. (1791), *nom. rej.*—T.: *C. sinensis* R.Br., *nom. illeg.* (= *C. lanceolata* (Lamb.) Hook., ≡ *Pinus lanceolata* Lamb.)

Belis Salisb., *Trans. Linn. Soc. London* 8: 315 (1807), *nom. rej.*—T.: *B. jaculifolia* Salisb., *nom. illeg.* (≡ *Pinus lanceolata* Lamb.)

Jacularia Raf., *Gard. Mag. & Reg. Rural Domest. Improv.* 8: 247 (1832), *nom. illeg.*

Raxopitys J.Nelson, *Pinaceae*: 97 (1866) —T.: *R. cunninghamii* J.Nelson, *nom. illeg.* (≡ *Pinus lanceolata* Lamb.)

11.2. *Taiwania* Hayata, *J. Linn. Soc., Bot.* 37: 330 (1906).—T.: *T. cryptomerioides* Hayata

11.3. *Athrotaxis* D.Don, *Ann. Nat. Hist.* 1: 234 (1838).—T.: *A. selaginoides* D.Don

11.4. *Metasequoia* Hu & W.C.Cheng, *Bull. Fan Mem. Inst. Biol.*, ser. 2, 1(2): 154 (1948), *nom. cons.*, non Miki (1941, *nom. rej.* = fossil).—T.: *M. glyptostroboides* Hu & W.C.Cheng, *nom.* & *typ. cons.*

11.5. *Sequoia* Endl., *Syn. Conif.*: 197 (1847), *nom. cons.*—T.: *S. sempervirens* (D.Don) Endl. (≡ *Taxodium sempervirens* D.Don)

11.6. *Sequoiadendron* J.Buchholz, *Amer. J. Bot.* 26: 536 (1939), *nom. cons. prop.*—T.: *S. giganteum* (Lindl.) J.Buchholz (≡ *Wellingtonia gigantea* Lindl.)

Wellingtonia Lindl., *Gard. Chron.* 1853: 823 (1853), *nom. illeg.*, non Meisn. (1840).—T.: *W. gigantea* Lindl.

Americus Hanford, *Great Calif. Tree*: 6 (1854), *nom. rej. prop.*—T.: *A. gigantea* (Lindl.) Hanford (≡ *Sequoiadendron giganteum* (Lindl.) J.Buchholz ≡ *Wellingtonia gigantea* Lindl.)

Washingtonia Winslow, *Calif. Farmer* 2: 58 (1854), *nom. inadmis.*, non Raf. ex J.M.Coulter (1900), *nom. cons.*– T.: *W. californica* (= *Sequoiadendron giganteum* (Lindl.) J.Buchholz ≡ *Wellingtonia gigantea* Lindl.)

11.7. *Cryptomeria* D.Don, *Ann. Nat. Hist.* 1: 233 (1838).—T.: *C. japonica* (Thunb. ex L.f.) D.Don (≡ *Cupressus japonica* Thunb. ex L.f.)

11.8. *Glyptostrobus* Endl., *Syn. Conif.*: 69 (1847).—T.: *Taxodium japonicum* Brongn., *nom. illeg.*, non (L.f.) Brongn. (= *G. pensilis* (Staunton ex D.Don) K.Koch)

11.9. *Taxodium* Rich., *Ann. Mus. Natl. Hist. Nat.* 16: 298 (1810).—T.: *T. distichum* (L.) Rich. (≡ *Cupressus disticha* L.)

Schubertia Mirb., *Nouv. Bull. Sci. Soc. Philom. Paris* 3: 123 (1812), *nom. rej.*—T.: *S. disticha* (L.) Mirb. (≡ *Cupressus disticha* L.)

Cuprespinnata J.Nelson, *Pinaceae*: 61 (1866), *nom. illeg.*—T: *C. disticha* (L.) J.Nelson (≡ *Taxodium distichum* (L.) Rich. ≡ *Cupressus disticha* L.)

11.10. ***Papuacedrus*** H.L.Li, *J. Arnold Arbor*. 34: 25 (1953).—T.: *P. papuana* (F.Muell.) H.L.Li (≡ *Libocedrus papuana* F.Muell.)

11.11. ***Austrocedrus*** Florin & Boutelje, *Acta Horti Berg*. 17(2): 28 (1954).—T.: *A. chilensis* (D.Don) Pic.Serm. & Bizzarri (≡ *Thuja chilensis* D.Don)

11.12. ***Libocedrus*** Endl., *Syn. Conif*.: 42 (1847).—T.: *L. doniana* Endl., *nom. illeg*. (≡ *L. plumosa* (D.Don) Sarg. ≡ *Dacrydium plumosum* D.Don)

Stegocedrus Doweld, *Novit. Syst. Pl. Vasc*. 33: 42 (2001).—T.: *S. austrocaledonica* (Brongn. & Gris) Doweld (≡ *Libocedrus austrocaledonica* Brongn. & Gris).

11.13. ***Pilgerodendron*** Florin, *Svensk Bot. Tidskr*. 24: 132 (1930).—T.: *P. uviferum* (D.Don) Florin (≡ *Juniperus uvifera* D.Don)

11.14. ***Widdringtonia*** Endl., *Gen. Pl. Suppl*. 2: 25 (1842).—T.: *W. cupressoides* (L.) Endl. (≡ *Thuja cupressoides* L.)

Pachylepis Brongn., *Ann. Sci. Nat*. (*Paris*) 30: 189 (1833), *nom. illeg*., non Less. (1832).—T.: *P. cupressoides* (L.) Brongn. (≡ *Widdringtonia cupressoides* (L.) Endl. ≡ *Thuja cupressoides* L.)

Parolinia Endl., *Gen. Pl. Suppl*. 1: 1372 (1841), *nom. illeg*., non Webb (1840, Brassicaceae).—T.: *Thuja cupressoides* L.

11.15. ***Diselma*** Hook.f., *Fl. Tasmaniae* 1(5): 353 (1857).—T.: *D. archeri* Hook.f.

11.16. ***Fitzroya*** Hook.f. ex Lindl., *J. Hort. Soc. London* 6: 264 (1851), as '*Fitz-Roya*', *nom. & orth. cons*.—T.: *F. patagonica* Hook.f. ex Lindl. (= *F. cupressoides* (Molina) I.M.Johnst. ≡ *Pinus cupressoides* Molina)

Cupresstellata J.Nelson, *Pinaceae*: 60 (1866).—T.: *Cupresstellata patagonica* (Hook.f. ex Lindl.) J.Nelson (≡ *Fitzroya patagonica* Hook.f. ex Lindl.)

11.17. ***Callitris*** Vent., *Decas Gen*. 10 (1808).—T.: *C. rhomboidea* R.Br. ex Rich. & A.Rich.

Frenela Mirb., *Mém. Mus. Hist. Nat*. 13: 30, 74 (1825), *nom. illeg*.—T.: *Frenela rhomboidea* (R.Br. ex Rich & A.Rich.) Endl., by typification (≡ *Callitris rhomboidea* R.Br. ex Rich. & A.Rich.)

Cyparissia Hoffmanns., *Preis-Verzeichn. Pfl.*, ed. 7: 20 (1833), *nom. illeg*.—T.: *C. australis* (Pers.) Hoffmanns. (≡ *Cupressus australis* Pers. = *Callitris rhomboidea* R.Br. ex Rich. & A.Rich.)

Octoclinis F.Muell., *Trans. & Proc. Philos. Inst. Victoria* 2(1): 21 (1857).—T.: *O. macleayana* F.Muell.

Laechhardtia Gordon, *Pinetum Suppl*.: 40 (1862).—T.: *L. macleayana* Gordon, *nom. illeg*. (≡ *Frenela variabilis* Carr.)

Nothocallitris A.V.Bobrov & Melikian, *Komarovia* 4: 85 (2006).—T.: *N. sulcata* (Parl.) A.V.Bobrov & Melikian (≡ *Callitris sulcata* Parl.).

11.18. ***Actinostrobus*** Miq. in J.G.C. Lehmann, *Pl. Preiss*. 1: 644 (1845).—T.: *A. pyramidalis* Miq.

11.19. ***Neocallitropsis*** Florin, *Palaeontographica, Abt. B, Paläophytol*. 85B: 590 (1944).—T.: *N. araucarioides* (Compton) Florin (≡ *Callitropsis araucarioides* Compton)

Callitropsis Compton, *J. Linn. Soc., Bot*. 45: 432 (1922), *nom. illeg*., non Oersted (1864).—T.: *C. araucarioides* Compton

11.20. ***Thujopsis*** Siebold & Zucc. ex Endl., *Gen. Suppl*. 2: 24 (1842), *nom. cons*.—T.: *T. dolabrata* (Thunb. ex L.f.) Siebold & Zucc. (≡ *Thuja dolabrata* Thunb. ex L.f.)

Dolophyllum Salisb., *J. Sci. Arts* (*London*) 2: 313 (1817), *nom. rej*.—T.: *Thuja dolabrata* Thunb. ex L.f.

11.21. ***Thuja*** L., *Sp. Pl*. 2: 1002 (1753).—T.: *T. occidentalis* L.

Thya Adans., *Fam. Pl*. 2: 480 (1763), *nom. illeg*.

11.22. ***Fokienia*** A.Henry & H.H.Thomas, *Gard. Chron*., ser. 3. 49: 67 (1911).—T.: *F. hodginsii* (Dunn) A.Henry & H.H.Thomas (≡ *Cupressus hodginsii* Dunn)

11.23. ***Chamaecyparis*** Spach, *Hist. Nat. Vég. Phan*. 11: 329 (1841).—T.: *C. sphaeroidea* Spach, *nom. illeg.* (≡ *C. thyoides* (L.) Britton, Sterns & Poggenb. ≡ *Cupressus thyoides* L.).

Retinispora Siebold & Zucc., *Fl. Jap*. 2: 36 (1844).—T.: *R. obtusa* Siebold & Zucc.

Shishindenia Makino ex Koidz., *Acta Phytotax. Geobot*. 9: 101 (1940).—T.: *S. ericoides* (Boehm.) Makino ex Koidz. (≡ *Chamaecyparis obtusa* var. *ericoides* Boehm.).

Note: —*Chamaecyparis obtusa* 'Ericoides' is a cultivar, not a natural variety of *C. obtusa.*

11.24. ***Cupressus*** L., *Sp. Pl*. 2: 1002 (1753).—T.: *C. sempervirens* L.

Callitropsis Oerst., *Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn* 1864: 32. (1864), *nom. rej. prop.*—T.: *C. nootkatensis* (D.Don) Florin (≡ *Cupressus nootkatensis* D.Don).

Xanthocyparis Farjon & T.H.Nguyên, in Farjon *et al.*, *Novon* 12: 179 (2002), *nom. cons. prop.*—T.: *X. vietnamensis* Farjon & T.H.Nguyên

Tassilicyparis A.V.Bobrov & Melikian, *Komarovia* 4: 72 (2006).—T.: *T. dupreziana* (A.Camus) A.V.Bobrov & Melikian (≡ *Cupressus dupreziana* A.Camus).

Platycyparis A.V.Bobrov & Melikian, *Komarovia* 4: 73 (2006).—T.: *P. funebris* (Endl.) A.V.Bobrov & Melikian (≡ *Cupressus funebris* Endl.).

Hesperocyparis Bartel & R.A.Price, *Phytologia* 91: 179 (2009).—T.: *H. macrocarpa* (Hartw. ex Gordon) Bartel (≡ *Cupressus macrocarpa* Hartw. ex Gordon)

Neocupressus de Laub., *Novon* 19: 301 (2009), *nom. illeg.*—T.: *N. macrocarpa* (Hartw. ex Gordon) de Laub. (≡ *Cupressus macrocarpa* Hartw. ex Gordon)

Note:—Adams *et al.* (2009) showed that *Cupressus* formed two clades: the Old World clade of *Cupressus* was sister to *Juniperus*, whereas the New World clade of *Cupressus* (*Hesperocyparis*) included *Xanthocyparis vietnamensis* and *Callitropsis nootkatensis*. However, Mao *et al.* (2010) showed that *Cupressus* in its broad sense including *Xanthocyparis* and *Callitropsis* is monophyletic with weak support. Until resolution of the phylogenetic position of *Cupressus* is achieved, we take a conservative option and maintain *Cupressus* in a broad sense, including *Callitropsis*, *Hesperocyparis* and *Xanthocyparis*.

11.25. *Juniperus* L., *Sp. Pl.* 2: 1038 (1753).—T.: *J. communis* L.

Sabina Mill., *Gard. Dict. Abr.*, ed. 4, 3 (1754).—T.: *S. vulgaris* Antoine (≡ *Juniperus sabina* L.)

Cedrus Duhamel, *Traité Arb. Arbust.* 1: xxviii, 139. t. 52 (1755), *nom. rej.*—T.: Not designated.

Thujiaecarpus Trautv., *Pl. Imag.*11 (1844).—T.: *T. juniperinus* Trautv., *nom. illeg.* (= *Juniperus oblonga* M.Bieb. = *J. communis* var. *saxatilis* Pall.).

Arceuthos Antoine & Kotschy, *Oesterr. Bot. Wochenbl.* 4: 249 (1854).—T.: *A. drupacea* (Labill.) Antoine & Kotschy (≡ *Juniperus drupacea* Labill.)

Sabinella Nakai, *Tyosen-Sanrin* 165: 14 (1938).—T.: *S. phoenicea* (L.) Nakai (≡ *Juniperus phoenicea* L.)

11.26. *Calocedrus* Kurz, *J. Bot.* 11: 196 (1873).—T.: *C. macrolepis* Kurz

Heyderia C.Koch, *Dendrologie* 2(2): 177 (1873), *nom. illeg.*, non Link (1833, fungus).—T.: *H. decurrens* (Torrey) C.Koch (≡ *Calocedrus decurrens* (Torrey) Florin ≡ *Libocedrus decurrens* Torrey).

11.27. *Tetraclinis* Masters, *J. Roy. Hort. Soc.* 14: 250 (1892).—T.: *T. articulata* (Vahl) Masters (≡ *Thuja articulata* Vahl)

11.28. *Platycladus* Spach, *Hist. Nat. Vég. Phan.* 11: 333 (1841).—T.: *P. stricta* Spach, *nom. illeg.* (= *P. orientalis* (L.) Franco ≡ *Thuja orientalis* L.)

Biota (D.Don) Endl., *Syn. Conif.*: 46 (1847), *nom. illeg.*, non Cass. (1825).—T.: *B. orientalis* (L.) Endl. (≡ *Thuja orientalis* L.)

11.29. *Microbiota* Komarov, *Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR* 4(23/24): 180 (1923).—T.: *M. decussata* Komarov

Family 12. Taxaceae Gray, *Nat. Arr. Brit. Pl.* 2: 222, 226 (1822), *nom. cons.*—T.: *Taxus* L.

Cephalotaxaceae Neger, *Nadelhölzer* 23, 30 (1907).—T.: *Cephalotaxus* Siebold & Zucc. ex Endl.

Amentotaxaceae Kudô & Yamam., in Kudô, *J. Soc. Trop. Agric.* 3: 110 (1931).—T: *Amentotaxus* Pilg.

Austrotaxaceae Nakai, *Tyosen-Sanrin* 158: 14 (1938).—T.: *Austrotaxus* Compton

Torreyaceae Nakai, *Tyosen-Sanrin* 158: 14, 23 (1938).—T: *Torreya* Arnott

6 genera, 28 species, Eurasia to Malesia, North Africa, New Caledonia, North America to Central America. This sequence follows the phylogenenetic trees of Hao *et al.* (2008). Taxaceae are monophyletic when *Cephalotaxus* and *Amentotaxus* are included (Price 2003). One could argue that the phylogenetic results of Hao *et al.* (2008) support an alternative classification of three families (Taxaceae, Cephalotaxaceae and Amentotaxaceae), but we have here opted for a wider circumscription of Taxaceae instead of these small families.

12.1. *Austrotaxus* Compton, *J. Linn. Soc., Bot.* 45: 427 (1922).—T.: *A. spicata* Compton

12.2. *Pseudotaxus* W.C.Cheng, *Res. Notes Forest. Inst. Natl. Centr. Univ. Nanking, Dendrol.*, ser. 1: 1 (1948).—T.: *P. chienii* (W.C.Cheng) W.C.Cheng (≡ *Taxus chienii* W.C.Cheng)

Nothotaxus Florin, *Acta Horti Berg.* 14: 394 (1948), *nom. illeg.*

12.3. *Taxus* L., *Sp. Pl.* 2: 1040 (1753).—T.: *T. baccata* L.

Verataxus J.Nelson, *Pinaceae*: 168 (1866).—T.: *Taxus communis* J.Nelson (≡ *T. baccata* L.)

12.4. *Cephalotaxus* Siebold & Zucc. ex Endl., *Gen. Pl. Suppl.* 2: 27 (1842).—T.: *C. pedunculata* Siebold & Zucc. ex Endl., *nom. illeg.* (= *C. harringtonii* (Knight ex J.Forbes) K.Koch ≡ *Taxus harringtonii* Knight ex J.Forbes)

12.5. *Amentotaxus* Pilger, *Bot. Jahrb. Syst.* 54: 41 (1916).—T.: *A. argotaenia* (Hance) Pilger (≡ *Podocarpus argotaenia* Hance)

12.6. *Torreya* Arnott, *Ann. Nat. Hist.* 1: 130 (1838), *nom. cons.*, non Raf. (1818, *Lamiaceae*), non Raf. (1819, *Cyperaceae*), non Spreng (1820, *Verbenaceae*), non A.Eaton (1929, *Loasaceae*), all *nom. rej.*—T.: *T. taxifolia* Arnott

Tumion Raf., *Good Book*: 63 (1840), *nom. illeg.*—T.: *T. taxifolium* (Arnott) Greene (≡ *Torreya taxifolia* Arnott)

Struvea Rchb., *Deutsche Bot. Herbarienbuch*: 222, 236 (1841), *nom. rej.*—T.: *Torreya taxifolia* Arnott

Caryotaxus Zucc. ex Henkel & Hochst., *Syn. Nadelhölzer*: 365 (1865), *nom. illeg.*—T.: *C. nucifera* (L.) Henkel & W.Hochst. (≡ *Taxus nucifera* L. ≡ *Torreya nucifera* (L.) Siebold & Zucc.)

Foetataxus J.Nelson, *Pinaceae*: 167 (1866), *nom. illeg.*—T.: *F. montana* J.Nelson, *nom. illeg.* (≡ *Torreya taxifolia* Arnott)

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Appendix 1. Index to gymnosperm genera

Below we provide an alphabetic list to the genera of gymnosperms. Accepted genera are printed in bold followed by the family. Synonymous genera are in italics followed by the currently accepted genus and their family.

Abies Mill.—Pinaceae
Abietia A.H.Kent = *Pseudotsuga*—Pinaceae
Abutua Lour. = *Gnetum*—Gnetaceae
Acmopyle Pilg.—Podocarpaceae
Actinostrobus Miq.—Cupressaceae
Afrocarpus (J.Buchholz & N.E.Gray) C.N.Page—Podocarpaceae
Agathis Salisb.—Araucariaceae
Amentotaxus Pilg.—Taxaceae
Americus Hanford = *Sequoiadendron*—Cupressaceae
Apinus Neck. ex Rydb. = *Pinus*—Pinaceae
Araucaria Juss.—Araucariaceae
Arceuthos Antoine & Kotschy = *Juniperus*—Cupressaceae
Athrotaxis D.Don—Cupressaceae
Aulacophyllum Regel = *Zamia*—Zamiaceae
Austrocedrus Florin & Boutelje—Cupressaceae
Austrotaxus Compton—Taxaceae
Belis Salisb. = *Cunninghamia*—Cupressaceae
Biota (D.Don) Endl. = *Platycladus*—Cupressaceae
Botryopitys Doweld = *Prumnopitys*—Podocarpaceae
Bowenia Hook.f.—Zamiaceae
Bracteocarpus A.V.Bobrov & Melikian = *Dacrycarpus*—Podocarpaceae
Brownetera Rich. ex Tratt. = *Phyllocladus*—Podocarpaceae
Callitris Vent.—Cupressaceae
Callitropsis Compton = *Neocallitropsis*—Cupressaceae
Callitropsis Oerst. = *Cupressus*—Cupressaceae
Calocedrus Kurz—Cupressaceae
Caryopitys Small = *Pinus*—Pinaceae
Caryotaxus Zucc. ex Henkel & Hochst. = *Torreya*—Taxaceae
Catakidozamia W.Hill = *Lepidozamia*—Zamiaceae
Cathaya Chun & Kuang—Pinaceae
Cedrus Duhamel = *Juniperus*—Cupressaceae
Cedrus Trew—Pinaceae
Cephalotaxus Siebold & Zucc.—Taxaceae
Ceratozamia Brongn.—Zamiaceae
Chaetocladus J.Nelson = *Ephedra*—Ephedraceae
Chamaecyparis Spach—Cupressaceae
Chigua D.W.Stev. = *Zamia* L.—Zamiaceae
Chrysolarix H.E.Moore = *Pseudolarix*—Pinaceae
Columbea Salisb. = *Araucaria*—Araucariaceae
Corneria A.V.Bobrov & Melikian = *Dacrydium*—Podocarpaceae
Cryptomeria D.Don—Cupressaceae
Cunninghamia R.Br.—Cupressaceae
Cuprespinnata J.Nelson = *Taxodium*—Cupressaceae
Cupresstellata J.Nelson = *Fitzroya*—Cupressaceae
Cupressus L.—Cupressaceae
Cycas L.—Cycadaceae
Cyparissia Hoffmanns. = *Callitris*—Cupressaceae
Dacrycarpus de Laub.—Podocarpaceae
Dacrydium Lamb.—Podocarpaceae
Dammara Link = *Agathis*—Araucariaceae
Decussocarpus de Laub. = *Retrophyllum*—Podocarpaceae
Dioon Lindl.—Zamiaceae
Diselma Hook.f.—Cupressaceae
Dolophyllum Salisb. = *Thujopsis*—Cupressaceae
Dombeya Lam. = *Araucaria*—Araucariaceae
Ducampopinus A.Chev. = *Pinus*—Pinaceae

Dyerocycas Nakai = *Cycas*—Cycadaceae
Encephalartos Lehm.—Zamiaceae
Ephedra L.—Ephedraceae
Epicycas de Laub. = *Cycas*—Cycadaceae
Eutacta Link = *Araucaria*—Araucariaceae
Eutassa Salisb. = *Araucaria*—Araucariaceae
Falcatifolium de Laub.—Podocarpaceae
Fitzroya Hook.f. ex Lindl.—Cupressaceae
Foetataxus J.Nelson = *Torreya*—Taxaceae
Fokienia A.Henry & H.H.Thomas—Cupressaceae
Frenela Mirb. = *Callitris*—Cupressaceae
Gaussenia A.V.Bobrov & Melikian = *Dacrydium*—Podocarpaceae
Ginkgo L.—Ginkgoaceae
Glyptostrobus Endl.—Cupressaceae
Gnemon Kuntze = *Gnetum*—Gnetaceae
Gnetum L.—Gnetaceae
Halocarpus Quinn—Podocarpaceae
Hesperocyparis Bartel & R.A.Price = *Cupressus*—Cupressaceae
Hesperopeuce (Engelm.) Lemmon = *Tsuga*—Pinaceae
Heyderia C.Koch = *Calocedrus*—Cupressaceae
Jacularia Raf. = *Cunninghamia*—Cupressaceae
Juniperus L.—Cupressaceae
Keteleeria Carr.—Pinaceae
Laechhardtia G.Gordon = *Callitris*—Cupressaceae
Lagarostrobos Quinn—Podocarpaceae
Laricopsis A.H.Kent = *Pseudolarix*—Pinaceae
Larix Mill.—Pinaceae
Laubenfelsia A.V.Bobrov & Melikian = *Dacrycarpus*—Podocarpaceae
Lepidothamnus Phil.—Podocarpaceae
Lepidozamia Regel—Zamiaceae
Leucopitys Nieuwl. = *Pinus*—Pinaceae
Libocedrus Endl.—Cupressaceae
Macrozamia Miq.—Zamiaceae
Manoao Molloy—Podocarpaceae
Margbensonia A.V.Bobrov & Melikian = *Podocarpus*—Podocarpaceae
Marywildea A.V.Bobrov & Melikian = *Araucaria*—Araucariaceae
Metadacrydium M.G.Baum.-Bod. ex Melikian & A.V.Bobrov = *Dacrydium*—Podocarpaceae
Metasequoia Hu & W.C.Cheng—Cupressaceae
Microbiota Komarov—Cupressaceae
Microcachrys Hook.f.—Podocarpaceae
Microcycas (Miq.) A.DC.—Zamiaceae
Microstrobos J.Garden & L.A.S.Johnson = *Pherosphaera*—Podocarpaceae
Nageia Gaertn.—Podocarpaceae
Neocallitropsis Florin—Cupressaceae
Neocupressus de Laub. = *Cupressus*—Cupressaceae
Nothocallitris A.V.Bobrov & Melikian = *Callitris*—Cupressaceae
Nothotaxus Florin = *Pseudotaxus*—Taxaceae
Nothotsuga Hu ex C.N.Page—Pinaceae
Octoclinis F.Muell. = *Callitris*—Cupressaceae
Pachylepis Brongn. = *Widdringtonia*—Cupressaceae
Palma–Filix Adans. = *Zamia*—Zamiaceae
Palmifolium Kuntze = *Zamia*—Zamiaceae
Papuacedrus H.L.Li—Cupressaceae
Parasitaxus de Laub.—Podocarpaceae
Parolinia Endl. = *Widdringtonia*—Cupressaceae
Pherosphaera W.Archer bis—Podocarpaceae
Phyllocladus Rich. & Mirb.—Podocarpaceae
Picea A.Dietr.—Pinaceae
Picea D.Don ex Loud. = *Abies*—Pinaceae
Pilgerodendron Florin—Cupressaceae
Pinea Wolf = *Pinus*—Pinaceae

Pinus L.—Pinaceae
Platycladus Spach—Cupressaceae
Platycyparis A.V.Bobrov & Melikian = *Cupressus*—Cupressaceae
Platyzamia Zucc. = *Dioon*—Zamiaceae
Podocarpus L'Hér. ex Pers.—Podocarpaceae
Podocarpus Labill. = *Phyllocladus*—Podocarpaceae
Prumnopitys Phil.—Podocarpaceae
Pseudolarix Gordon—Pinaceae
Pseudotaxus Cheng—Taxaceae
Pseudotsuga Carr.—Pinaceae
Pterophyllus J.Nelson = *Ginkgo*—Ginkgoaceae
Quadrifaria Manetti ex Gordon = *Araucaria*—Araucariaceae
Raxopitys J.Nelson = *Cunninghamia*—Cupressaceae
Retinispora Siebold & Zucc. = *Chamaecyparis*—Cupressaceae
Retrophyllum C.N.Page—Podocarpaceae
Sabina Mill. = *Juniperus*—Cupressaceae
Sabinella Nakai = *Juniperus*—Cupressaceae
Salisburia Sm. = *Ginkgo*—Ginkgoaceae
Salisburyodendron A.V.Bobrov & Melikian = *Agathis*—Araucariaceae
Saxegothaea Lindl.—Podocarpaceae
Schubertia Mirb. = *Taxodium*—Cupressaceae
Sciadopitys Siebold & Zucc.—Sciadopityaceae
Sequoia Endl.—Cupressaceae
Sequoiadendron J.Buchholz—Cupressaceae
Shishindenia Makino ex Koidz. = *Chamaecyparis*—Cupressaceae
Squamataxus J.Nelson = *Saxegothaea*—Podocarpaceae
Stachycarpus (Endl.) Tiegh. = *Prumnopitys*—Podocarpaceae
Stachypitys A.V.Bobrov & Melikian = *Prumnopitys*—Podocarpaceae
Stangeria T.Moore—Zamiaceae
Stegocedrus Doweld = *Libocedrus*—Cupressaceae
Strobus (Sweet ex Spach) Opiz = *Pinus*—Pinaceae
Struvea Reichenb. = *Torreya*—Taxaceae
Sundacarpus (J.Buchholz & N.E.Gray) C.N.Page– Podocarpaceae
Taiwania Hayata—Cupressaceae
Tassilicyparis A.V.Bobrov & Melikian = *Cupressus*—Cupressaceae
Taxodium Rich.—Cupressaceae
Taxus L.—Taxaceae
Tetraclinis Masters—Cupressaceae
Thalamia Spreng. = *Phyllocladus*—Podocarpaceae
Thoa Aubl. = *Gnetum*—Gnetaceae
Thuja L.—Cupressaceae
Thujiaecarpus Trautv. = *Juniperus*—Cupressaceae
Thujopsis Siebold & Zucc. ex Endl.—Cupressaceae
Thya Adans. = *Thuja*—Cupressaceae
Titanodendron A.V.Bobrov & Melikian = *Araucaria*—Araucariaceae
Todda–Pana Adans. = *Cycas*—Cycadaceae
Torreya Arn.—Taxaceae
Tsuga (Endl.) Carr.—Pinaceae
Tumboa Welw. = *Welwitschia*—Welwitschiaceae
Tumion Raf. = *Torreya*—Taxaceae
Van-Tieghemia A.V.Bobrov & Melikian, *nom. illeg.* = *Prumnopitys*—Podocarpaceae
Verataxus J.Nelson = *Taxus*—Taxaceae
Veitchia Lindl. = *Picea?*—Pinaceae
Washingtonia Winslow = *Sequoiadendron*—Cupressaceae
Wellingtonia Lindl. = *Sequoiadendron*—Cupressaceae
Welwitschia Hook.f.—Welwitschiaceae
Widdringtonia Endl.—Cupressaceae
Wollemia W.G.Jones, K.D.Hill & J.M.Allen—Araucariaceae
Xanthocyparis Farjon & T.H.Nguyên = *Cupressus*—Cupressaceae
Zamia L.—Zamiaceae