

Cupressophyta P. D. Cantino and M. J. Donoghue, in
P. D. Cantino et al. 2007:832 [S. W. Graham, P. D. Cantino
and M. J. Donoghue], converted clade name

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Definition: The smallest crown clade containing *Cupressus sempervirens* L. 1753 and *Podocarpus macrophyllus* (Thunb.) Sweet 1818, but not *Gnetum gnemon* L. 1767 or *Pinus strobus* L. 1753. This is a minimum-crown-clade definition with external specifiers. Abbreviated definition: min crown ∇ (*Cupressus sempervirens* L. 1753 & *Podocarpus macrophyllus* (Thunb.) Sweet 1818 ~ *Gnetum gnemon* L. 1767 \vee *Pinus strobus* L. 1753).

Etymology: Derived from *Cupressus* (name of an included taxon), which is the Latin name of the Mediterranean cypress (Eckenwalder, 2009).

Reference Phylogeny: The primary reference phylogeny is Rai et al. (2008: Fig. 2); see also Quinn et al. (2002: Fig. 3), Rydin et al. (2002: Fig. 1), and Leslie et al. (2012: Fig. 1). The species of *Podocarpus* listed as having been used in the primary reference phylogeny, *Podocarpus chinensis* Wall. ex J. Forbes, is a synonym of *P. macrophyllus* (Fu et al., 1999). *Cupressus sempervirens*, the type species of *Cupressus* and used here as an internal specifier, is not present in the primary reference phylogeny but is most closely related to *Juniperus* in that phylogeny (e.g., Mao et al., 2012: Fig. S1; Yang et al., 2012).

Composition: *Araucariaceae*, *Cupressaceae* (including “*Taxodiaceae*”), *Podocarpaceae*, *Sciadopitys verticillata*, and *Taxaceae* (including *Cephalotaxus*) and extinct descendants of their most recent common ancestor.

Diagnostic Apomorphies: A likely synapomorphy is the existence of secondary phloem fibers in the form of regular, uniserial, tangential bands, which are modified to irregular masses or bands in *Araucariaceae* (Doyle, 2006). Hart (1987: Fig. 2) inferred three additional apomorphies for this clade, but Cantino et al. (2007: E21) questioned their validity in the context of current molecular phylogenetic trees.

Synonyms: No scientific names. The informal name “conifer II” has been used as an approximate synonym for this clade in some publications (e.g., Bowe et al., 2000; Gugerli et al., 2001; Rydin et al., 2002).

Comments: The name *Cupressophyta* was formally applied to this clade, with an explicit phylogenetic definition, by Cantino and Donoghue in Cantino et al. (2007: 832 and E21). Most molecular analyses infer this clade with strong support (e.g., Chaw et al., 1997; Stefanovic et al., 1998; Bowe et al., 2000; Gugerli et al., 2001; Quinn et al., 2002; Rydin et al., 2002; Burleigh and Mathews, 2004; Qiu et al., 2006, 2007; Rai et al., 2008; Graham and Iles, 2009; Mao et al., 2012: Fig. S1; Ruhfel et al., 2014; Wickett et al., 2014). Contrary to these results, *Pinaceae* or *Gnetophyta* are nested inside *Cupressophyta* in some optimal or nearly optimal trees in some morphology-based analyses (e.g., Rothwell and Serbet, 1994; Doyle, 1996, 2006, 2008; and Hilton and Bateman, 2006; but not Hart, 1987, who inferred a clade with the composition of *Cupressophyta* as inferred here). We use *Pinus strobus* (*Pinaceae*) and *Gnetum gnemon* (*Gnetaceae*) as external

specifiers, equivalent to a qualifying clause, to render the name *Cupressophyta* inapplicable in the context of any phylogeny in which *Pinaceae* or *Gnetophyta* is more closely related to any of the internal specifiers than the latter are to each other. The definition used here differs from that of Cantino and Donoghue (in Cantino et al., 2007: 832 and E21) by the addition of *Gnetum gnemon* as an external specifier and the removal of *Araucaria araucana* as an internal specifier. Because recent molecular phylogenies (Quinn et al., 2002; Rai et al., 2008; Mao et al., 2012: Fig. S1; Leslie et al., 2012: Fig. 1) have provided very strong support for a sister-group relationship between *Araucariaceae* and *Podocarpaceae*, the inclusion of specifiers representing both taxa is unnecessary.

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