

## A New Conifer Species Affects Taxonomic Classification in the Cupressaceae

submitted by John Russell

The discovery of a new conifer species and its subsequent phylogenetic description has had significant and controversial impacts on classification within the Cupressaceae including yellow cypress (formerly known as *Chamaecyparis nootkatensis*). In this article I will outline the cause of this disagreement and how it is influencing the taxonomic classification of the new world cypresses including yellow cypress, for which I will refer to by various genera as it was then commonly accepted.

In the fall of 1999 a new conifer species was found in a moist forest on limestone karst ridges in northern Vietnam. This species had a morphological resemblance to others in the Cupressoideae subfamily of the Cupressaceae especially *Chamaecyparis* and *Cupressus*. However after a thorough morphological description, the conifer was distinct enough to warrant a new genus and species, and was given the new scientific name *Xanthocyparis* (xantho=yellow, cyparis=cypress) *vietnamensis* Farjon & Hiep (Farjon et al. 2002) with the common name of Vietnamese golden cypress. The most distinct morphological feature of this species is the occurrence of juvenile, intermediate and mature foliage in the upper crown (Farjon et al. 2002). Upon closer examination including molecular data, a number of authors placed *Chamaecyparis nootkatensis* as a sister taxa. Morphological similarities included seed cones with 4 (to 6) bract-scale complexes (Farjon et al. 2002), apically distributed ultimate branchlets and externally dimorphic mature leaves (Farjon et al. 2002, Little et al. 2004). It was proposed initially by Farjon et al. (2002) that *Chamaecyparis nootkatensis* be renamed as *Xanthocyparis nootkatensis*. This genus name was later disputed by Little et al. (2004) in which they proposed the name *Callitropsis* for both species – more on this later.

*Chamaecyparis nootkatensis* has had an interesting taxonomic past being first placed in *Cupressus* in 1824, and later transferred to *Chamaecyparis* in 1842 (Little et al. 2004). To complicate matters further, Orsted created the monotypic genus *Callitropsis* in 1865 for *Chamaecyparis nootkatensis* because of the somewhat unusual ovulate cone

configuration; however this classification did not catch on (Little et al. 2004, Mill and Farjon 2006). Recently, new molecular evidence from Gadek et al. (2000) indicated that *Chamaecyparis nootkatensis* was closely related more to the genus *Cupressus* (<http://en.wikipedia.org/wiki/Cupressus>) than to *Chamaecyparis*. There was also growing evidence that showed the species was unique within the *Chamaecyparis* including duration of seed maturation, seed wing anatomy, wood anatomy and secondary chemistry, fertilization and low cross-compatibility of microsatellite primers among others (citations in Little et al. 2004). *Chamaecyparis nootkatensis* also hybridizes with a number of *Cupressus* species (e.g. Leyland cypress); however there are no documented hybrids with other *Chamaecyparis* species. We have been hybridizing *Chamaecyparis nootkatensis* with both *Chamaecyparis* and *Cupressus* species over the years at Cowichan Lake Research Station and in New Zealand and have had success only with the latter genus.

This leads us to the dilemma of naming *Chamaecyparis nootkatensis*. Compelling evidence has shown that this species is a sister taxa with *Xanthocyparis vietnamensis* (Farjon et al. 2002, Little et al. 2004, Mill and Farjon 2006, Little 2006) coupled with the above evidence that it is unique within *Chamaecyparis*. Farjon et al. (2002) correctly placed both species in a new genus since they were clearly distinct from those in *Cupressus* and *Chamaecyparis*. However it seems that taxonomic precedent favours *Callitropsis* under the rules of the International Code of Botanical Nomenclature ([http://en.wikipedia.org/wiki/International\\_Code\\_of\\_Botanical\\_Nomenclature](http://en.wikipedia.org/wiki/International_Code_of_Botanical_Nomenclature)), as the earlier-published name has priority over *Xanthocyparis* if that genus includes *Chamaecyparis nootkatensis* (Little et al. 2004).

A proposal was put forth by Farjon and others at the 2011 International Botanical Congress to use *Xanthocyparis* but it did not make it to the committee that decides on taxonomic conflicts. Essentially that leaves *Callitropsis* as the genus name we should now use, so following Little (2006) the new scientific name for yellow cypress

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is *Callitropsis nootkatensis* (D. Don in Lambert) along with its sister taxa *Callitropsis vietnamensis* (Farjon&Hiep).

The Cupressaceae taxonomic controversy doesn't end here. Little (2006) states that "classifications within the Cupressoideae have been contradictory as a result of taxonomically incomplete intuitive analyses combined with an emphasis on characteristics of ovulate cones to the exclusion of vegetative, anatomical, and chemical characteristics". Little also presented exhaustive evidence supporting that the New World species of *Cupressus* are more closely related to *Callitropsis* than they are to the Old World *Cupressus* species. Little proposes to restrict *Cupressus* to the Old World species and to expand *Callitropsis* to include New World species currently classified as *Cupressus*. Species from *Juniperus* and *Chamaecyparis* would still be recognized separately. Although compelling, this reclassification is currently not universally accepted mainly because the relationship between *Callitropsis nootkatensis*, *Callitropsis vietnamensis* and the New World species of *Cupressus* has not been resolved. Little (2006) states that this may change in the future based on research currently underway involving additional character data.

On a less significant note, the common name of *Callitropsis nootkatensis* is also being debated. The species has been known under a number of common names including yellow-cedar, Nootka cypress Alaska-cedar and yellow cypress. Given that it is now closely aligned with cypress species and that the description as a false cedar using a hyphen<sup>1</sup> is rather outdated, and yellow is an apt description for its heartwood colour, then yellow cypress seems appropriate. This common name has been used in British Columbia for quite some time along with yellow-cedar.

1. True cedars (*Cedrus* spp.) are in the Pinaceae and convention dictates that any common name referring to a false species should have a hyphen or be one word (e.g. Douglas-fir, western redcedar).

## Literature Citation

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- Mill, R.R. and Farjon, A. 2006. Proposal to conserve the name *Xanthocyparis* against *Callitropsis* Öerst. (Cupressaceae). *Taxon.* 55: 229-231.



Figure 1. Drawing by Jodie Krakowski.

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