The discovery of a new genus of conifer in northern Vietnam

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On a botanical exploration in October 1999 in remote karst limestone mountains NW of Quan Ba close to the Chinese border in the northern Vietnamese province of Ha Giang an unidentified conifer was found growing on the summit ridge of one of these mountains. Subsequently, after collection of more material early in 2001, this conifer was identified and described as a new genus and species in the family Cupressaceae (for a detailed description, see the reference given below). Its taxonomic classification has been placed close to a North American species (heretofore doubtfully assigned to either *Chamaecyparis* or *Cupressus*) based on detailed analyses of morphological data of all representative genera in the family. One of the striking morphological features of the new conifer, which I named *Xanthocyparis vietnamensis*, is the occurrence of two distinct types of leaves on many mature trees. It has both branches with juvenile, needle-like leaves and those with mature, scale-like leaves. Only the latter type bears either male or female cones. The juvenile leaves resemble those of *Cunninghamia*, the mature leaves are similar to those of *Chamaecyparis* or *Thuja* but more acute, while they lack conspicuous white stomata bands. The seed cones are distinct but very similar to the American species (now classified as *X. nootkatensis*) in having only 4-6 decussate cone scales. The existing trees are mostly relatively small, up to 10-15 m tall and with a maximum diameter of 50 cm. They were found on the steep and narrow mountain ridges in association with several other conifers and angiosperms. It was thought that the new conifer was very rare and occurred only very locally on a few of these mountain ridges.

In April 2002 I was asked by the conservation NGO Fauna & Flora International (FFI) to come to Vietnam for a month to advise them on the conservation of some rare and threatened conifers in that country. Besides the new conifer, which I had described from herbarium specimens collected by others, there was the discovery of *Taiwania cryptomerioides* in a remote valley of the Huang Lien Range by Vietnamese botanists in October 2001. I was asked to confirm its status as a truly native tree because introduction of conifers to seemingly unlikely places has a long but unrecorded history in eastern Asia. It would be a wasted effort to protect a tree that had been introduced to Vietnam. And then, of course, could I also look at the situation of the new conifer? These were exciting prospects for me, and I was given permission by RBG Kew to make the trip on FFI's behalf. Thus I arrived in Hanoi on 16th April to plan the necessary field trips with FFI staff. In this article I shall give an account of the journey, in early May, to the location of the new conifer, *Xanthocyparis vietnamensis* and my findings there.

Because I was going to travel to a remote area very near the Chinese border, permission had to be obtained from authorities at all levels of government, which was organised by my FFI counterpart Steven Swan. Without such efforts, there would have been no way of getting there and indeed, after leaving Hanoi on the 350 km road journey to Quan Ba I did not see another westerner for a whole week. Beyond Quan Ba I did not see any more Vietnamese except my two companions and our driver, either, for we entered the homeland of the H'Mong, a mountain people of very different Asian origin. Roads became tracks and these turned into footpaths before we arrived in the rugged and very steep limestone mountains where the conifer was supposed to grow. Because we were not accompanied by any of the original discoverers, we had to go by their directions which turned out to be quite useless in this maze of little valleys and peaks. Our local guide took us on an incredibly steep climb the first day and showed us the wrong conifer, a species of Douglas fir (*Pseudotsuga sinensis*) which dominated the summit ridge. But almost by accident we stumbled on a small and contorted specimen of the new conifer at the point where I was more concerned with the question of how to climb down this horrible precipice before dark without breaking a leg than to find a rare tree. This specimen taught our guide what kind of tree we were really looking for and in the two following days he took us to some other ridges, farther away but somewhat less gruelling to climb, and there we found a good number of them, including young plants and an old, gnarled specimen of near maximum size. At last I could make observations of 'my' new conifer in its native habitat!

Originally the karst limestone mountains and valleys in the area must have been very densely forested. The M'Hong people have completely cleared the forest from the valleys to make room for agriculture, in particular the planting of maize. This crop is now being planted in virtually every bit of soil among the hard marble-like limestone rocks unless slope inclination and/or the rocky terrain make that impossible. This has effectively pushed the forest back to the steepest and/or farthest slopes and the summits and ridges. The conifers are confined to summits and ridges, or sometimes the upper parts of very steep slopes. Dominant on most if not all of the higher ridges and summits is *Pseudotsuga sinensis*. Under its relatively open canopy occurs a mixed assemblage of angiosperms and conifers. The woody angiosperms are mostly small-leaved shrubs and trees, e.g. *Acer*, *Carpinus*, *Lithocarpus*, *Quercus*, *Ulmus*, *Pistacea*, *Schefflera*, *Photinia*, *Sorbus*, *Euonymus*, *Rhododendron*, *Vaccinium* spp; epiphytic and lithophytic orchids and ferns are abundant and conspicuous. The conifers other than *Pseudotsuga* are minor components in the vegetation which occur more or less sporadically or more commonly but do not attain (with a few exceptions) the canopy height of *Pseudotsuga*. I identified *Amentotaxus argotaenia*, *Taxus chinensis* (Taxaceae), *Nageia wallichiana*, *Podocarpus neriifolius*, *P. pilgeri* (Podocarpaceae), *Pseudotsuga sinensis*, *Tsuga chinensis* (Pinaceae) and *Xanthocyparis vietnamensis* (Cupressaceae).

The wood of *Xanthocyparis vietnamensis* is probably valuable, as it belongs with

Fokienia, *Cupressus*, *Taiwania* etc. to a family of conifers with very durable wood which is often fragrant and indeed highly sought after in Asian markets. Incense burning of foliage of *Cupressus*, *Platycladus*, *Juniperus* etc. is also widespread, especially in Buddhist traditions. For the wood to be desirable and worth the considerable effort of getting it off these steep ridges, it has to have some volume at least and also be more or less straight. Few trees of *Xanthocyparis vietnamensis* qualify, and this is largely because they naturally grow contorted as "krummholz" trees. Ecological considerations indicate that the species is likely to be present (but uncommon to rare) on many of the ridges on which its characteristic vegetation type is present. Deforestation for agricultural expansion by the local H'Mong people has essentially reached its physical limits in the presently known area of occurrence of *Xanthocyparis vietnamensis*. Potential threats to the species from harvesting, which would for a slow growing species like this conifer be unsustainable if it occured on a commercial scale, are not unrealistic but there is no solid evidence that this occurs at present. For commercial harvesting most trees seem to be too small or contorted, especially given the difficulties of access and removal, to make it worth-while. This species does not meet the IUCN criteria for Critically Endangered (CR), but under the D-criterion (number of mature individuals in the population) it is possibly Endangered (E) if the estimate turns out to fall below 250. These figures are 50 for CR and 1000 for Vulnerable (VU); it is now certain that there are more than 50 mature trees. No estimates of past or future decline can at this stage be made, due to lack of data. It is therefore necessary to monitor this and to take effective steps to protect both this remarkable conifer and its extremely species-rich natural habitat, for which FFI and other organisations together with the Vietnamese will prepare an action plan.

Reference

Farjon, A., N. T. Hiep, D. K. Harder, P. K. Loc & L. V. Averyanov (2002). A new genus and species in Cupressaceae (Coniferales) from northern Vietnam, *Xanthocyparis vietnamensis*. Novon 12 (2).