



Torrey taxifolia produces seeds in Kalmthout Arboretum

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ABRAHAM RAMMELOO, Curator of the Kalmthout Arboretum, writes about this rare conifer that recently produced seed for the first time.

Torrey is a genus of conifers that comprises four to six species that are native to North America and Asia. It is closely related to *Taxus* and *Cephalotaxus* and is easily confused with the latter. However, it is relatively easy to distinguish them apart by their leaves. *Torrey* has needles with, on the underside, two small edges with stomas giving it a green appearance; *Cephalotaxus* has different rows of stomas, and for this reason the underside is more of a white colour.

It is very rare to find *Torrey taxifolia* in the wild; it is native to a small area in Florida and Georgia. It grows in steep limestone cliffs along the Apalachicola River. These trees come from a warm and humid climate where the temperature in winter occasionally falls below freezing. They grow mainly on north-facing slopes between *Fagus grandifolia*, *Liriodendron tulipifera*, *Acer barbatum*, *Liquidambar styraciflua* and *Quercus alba*. They can grow up to 15 to 20 m high. The needles are sharp and pointed and grow in a whorled pattern along the branches. They are 25 to 35 mm long and stay on the tree for three to four years. If you crush them, they give off a strong, sharp odour.

The health and reproduction of the adult population of this species suffered

Opposite *Torreya taxifolia* 'Argentea' growing at Kalmthout Arboretum in Belgium.

Below *top*, one of the seeds of *Torreya taxifolia* that was harvested at Kalmthout in 2011 and germinated in 2013.

middle, fruit of *Torreya taxifolia* at Kalmthout Arboretum, on the tree and *bottom*, harvested, some having had the seed coat (sarcotesta) removed before being put in damp turf for safekeeping before sowing.

a major setback in the middle of the last century and continues to be a problem today. It is estimated that up to 98% of the population of adult trees have died. Recent observations have revealed that this phenomenon continues unabated; only 500-600 trees have survived, and only around ten of these produce seeds. This species has now been included on the International Union for Conservation of Nature's Red List as 'critically endangered'. One of the most important causes is a fungus that inhibits the formation of the seeds—young plants often die before having produced descendants. Since the 1980s, different introduction programmes have been carried out, but there is still no reversal in sight.

There is a sad scarceness of *Torreya taxifolia* in collections and even specialised growers do not have them in their catalogues. Even rarer is the cultivar 'Argentea'. It is a variety with creamy yellow leaves. This colour is particularly visible in the young shoots in the springtime. At the end of the summer, the needles turn whiter and some take on a burnt look. In the Kalmthout Arboretum, we have a stunning example of this cultivar that is over a hundred years old. It was brought here by the curator of the collections Antoine Kort around 1910 from a nursery close to the Italian Lago Maggiore, which he visited while on his honeymoon. The

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Torrey taxifolia 'Argentea' at the Allard Arboretum in Angers (France).

plant grows in south-facing ground at the edge of the estate, close to the historic Vangeertenhof. A good ten years ago, the surrounding plants were removed so that this very special tree could get a full quota of light and air. A low wall protects the base of the trunk from bright sunlight and strong winds. Since then, the circumference of the tree has almost doubled. The warm sunlight clearly does this Mediterranean species the world of good. Another superb example of this cultivar grows in the Allard Arboretum in Angers (France).

Every so often, Kalmthout's tree reverts back to the species. These branches with green needles have a more robust growth and the leaves are somewhat longer. The gardeners regularly remove the green branches to avoid them taking over the cream-coloured ones. Over the last few years they made a conscious decision to stop doing this and to air layer (marcot) the green branches. Propagation of this plant via cuttings is always very difficult and the success rate is depressingly low! The stems remain green and even form calluses... but even after two growing seasons, it often happens that not one single root has formed. The young stems that do take off are exceptionally slow growing. We are unable to provide any more information at the moment about the success rate of propagation via air layering with this species.

In the autumn of 2011, a few of the reverted branches produced a rich array of fruits, which is quite exceptional when you think that this species is actually dioecious and that there is only one plant in Kalmthout: *Torreya taxifolia* 'Argentea'. Not a thousand miles from there is a magnificent example of *Torreya grandis*, the Belgian champion. Yet this tree also produces a fruit occasionally! Elsewhere in the garden is an old example of *Torreya nucifera* and a few young examples of *Torreya californica*. Perhaps the fruits are the result of cross-fertilisation. But then again, perhaps not. In his manual of cultivated conifers, Gerd Krüssmann announced that *Torreya* can also be monoecious on rare occasions. The volunteers of our 'seed team' collected a total of around 250 seeds; the others were left on the tree and who knows, perhaps we will see a spontaneous burst of seedlings one of these days. The seed coats (sarcotesta) of the seeds that had been collected were immediately removed and the seeds were put into damp turf for safekeeping. We sowed a small percentage of them ourselves; the rest were distributed to other botanical gardens and arboretums. In the first year after sowing, a single seed had germinated. Then almost all the other seeds germinated in the second year—a hopeful and promising sign. However, a certain amount of prudence is required. Because as is the case with many other different species of plants, the most difficult phase is only just beginning: getting the seedlings to grow, getting them through their first winter and keeping them alive when they have been planted in the open. One thing is for sure though, and that is that a good deal of patience is required. To be continued....