

# 12 new flavonoids discovered in Kew tree

January 10 2012, By Dr. Geoffery Kite

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The specimen of *Cladrastis kentukea* at Kew Gardens from which the new flavonoids were obtained. Credit: Geoffery Kite.

Scientists at Kew interested in the classification of legumes have been studying the chemistry of the Kentucky yellow-wood (*Cladrastis kentukea*). Evidence from DNA sequencing suggested that this species is related to the pagoda tree (*Styphnolobium japonicum*), which contains several new flavonoids described recently at Kew. Flavonoids are a well studied group of plant constituents because of their potential health promoting properties. The fruits of *S. japonicum* contain high levels of flavonoids and are used in traditional Chinese medicine. The Kew scientists wanted to know if the flavonoids found in *S. japonicum* also occurred in *C. kentukea*, which would support the relationship between these species.

## Analysis and identification

Geoffrey Kite analysed an extract of the leaves of *C. kentukea* and found several of the flavonoids known from *S. japonicum*, but the overall mixture of flavonoids in *C. kentukea* was much more complicated, consisting of more than 50 compounds. Emily Rowe, a student from the University of Bath who was working at Kew for a year as part of her degree course, was given the task of trying to separate some of the flavonoids from the mixture so that their structures could be determined. She obtained 13 examples, whose structures were elucidated using a technique called [nuclear magnetic resonance spectroscopy](#) (NMR) by Nigel Veitch, who realised that 12 of them were new to science. The structures of these compounds were reported recently in the scientific journal *Phytochemistry*.

With this knowledge, Geoffrey Kite was able to suggest probable structures for another 39 of the flavonoids in the leaf extract using a technique called liquid chromatography-mass spectrometry. Many of these are probably new to science as well, but it was not possible to prove this without first purifying them and determining their structures by NMR.

## **Cladrastis kentukea at Kew**

*Cladrastis kentukea* is a medium-sized tree endemic to eastern North America. The hard, close-grained wood is clear yellow when first cut and was used by early American pioneers to make gunstocks and furniture. Although it is not common in the wild, the species is widely grown for its ornamental value. There are several specimens of *C. kentukea* growing at Kew together with two other *Cladrastis* species, *C. sinensis* and *C. platycarpa*. Most can be found in the 'legume dell' near to the Pavilion Restaurant. One specimen of *C. sinensis* is growing in the corner of the outside seating area of the restaurant, where visitors can enjoy a meal in the shade of a new scientific discovery, since this [species](#) also contains many of the new flavonoids.

**More information:** Kite, G. C., et al.(2011). Acylated flavonol tri- and tetraglycosides in the flavonoid metabolome of *Cladrastis kentukea* (Leguminosae). *Phytochemistry* 72: 372-384.

Provided by Royal Botanic Gardens, Kew

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