

BRIEF COMMUNICATIONS

VISUALISATION OF ANNUAL TREE-RINGS BY A SOYA SAUCE, KETJAP BENTENG MANIS

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During the summer of 1981 we determined the age of trees, mainly of the following species: *Alnus glutinosa*, *Betula sp.*, *Crataegus monogyna*, *Acer pseudoplatanus*, *Euonymus europaeus*, *Fagus sylvatica*, *Frangula alnus*, *Fraxinus excelsior*, *Populus tremula*, *Quercus robur*, *Rhamnus catharticus*, *Salix sp.*, *Sambucus nigra* and *Viburnum opulus*.

The best method of age-determination, when the exact ages are needed, is to use the increment borer and then cut off one side of the core perpendicular to the xylem vessels. Then the annual rings can be counted with the help of a binocular microscope.

As we had to core and determine the age of 1600 trees in a few months, we looked for a simple staining method which would take less time. We tried many of the usual methods, but none of them were satisfactory. At last we found an alternative staining technique.

Method: After coring the piece of wood is placed in a holder with the xylem vessels at right angles to it, in order to cut off the upper side easily with a razor blade. Then the core is stained by putting it in a syrupy soya sauce (with the Indonesian name of “Ketjap benteng manis”, from the Conimex factories, Baarn, The Netherlands) for 2–3 minutes. After washing in water and drying with a tissue the annual rings can be counted very easily, without the use of any other optic instrument, by illuminating the core with a powerful lamp. Sunglasses were used for eye protection and to get sharper contrasts. Results are shown in *fig. 1*.

According to Conimex factories “Ketjap benteng manis” consists of a sugar solution with salt, a hydrolysate of proteins and caramel powder; pH c. 5.2. Staining was tried with sugar solutions with caramel in various concentrations, but the results never equalled those with “Ketjap benteng manis”.

After treatment of the core with this dark brown syrupy soya sauce the spring wood is stained dark brown, while the summer wood remains lighter. A possible explanation is that the viscous liquid can readily be soaked up by the spring wood with its wide xylem vessels, while the xylem vessels of the summer wood are too narrow to absorb it.

The results obtained by this method were checked by also counting the rings with a binocular microscope (unless the exact age of the trees was known from

other sources). Differences of five to ten per cent were found, meaning in our case an accuracy of two to three years. We conclude that our staining method can be useful when the age of a great number of trees has to be determined, e.g. to get an age distribution of trees in a certain area, and an inaccuracy of a few years is acceptable.

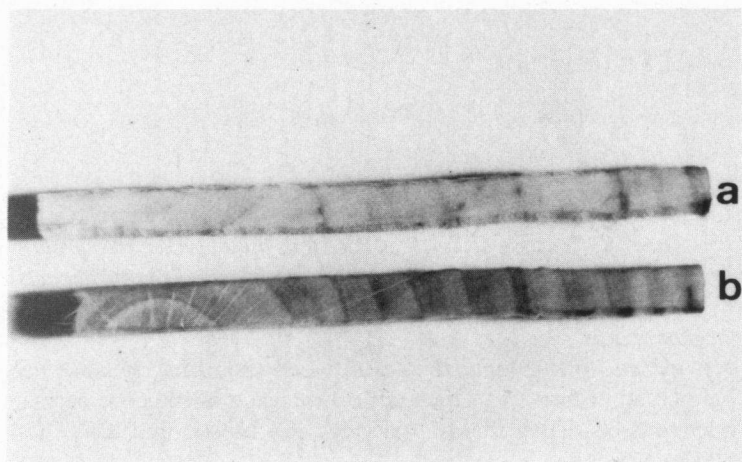


Fig. 1. Cores from *Alnus glutinosa*, a. without, b. with Ketjap staining.