

## ELM CUTTINGS FOR BONSAI TRAINING

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Hortica Gardens is a small mail order nursery selling, primarily, material to be used for bonsai training. All plants are container grown. Generally some preliminary pinching and pruning is done to make them more acceptable as bonsai subjects.

Two popular plants for bonsai training are Chinese elm (*Ulmus parvifolia*) and Catlin Elm (*Ulmus parvifolia* 'Catlin'). Although elms are often propagated by seed, it is more convenient to root cuttings. For the 'Catlin' elm, of course, vegetative propagation is necessary to insure identity of a true cultivar.

Chinese elm cuttings are made in spring and summer. Usually the cuttings are 7.5 to 15 cm long. The bottom two or three leaves are removed, leaving a minimum of 5 leaves at the top. ("three leaf" cuttings will root, however) Cuttings are made from new shoots when they are 15 to 30 cm long. Longer shoots may be made into two or three cuttings. If the tip growth is very soft, it's best to cut it off, since it will probably wilt and die back in the cutting box. Very sharp pruning shears are recommended for making elm cuttings because of the tendency for the bark to peel off in long strips when the cutting edge is dull.

Cuttings are collected in the growing area during the early morning hours. They are cut to length and the bottom leaves are removed before putting them in a closed can with a moist atmosphere. (Provided by a piece of wet paper towel)

Usually within an hour the cuttings are taken to a cool shady area for insertion in the rooting medium. Cuttings are treated with 0.4% alpha naphthyl acetamide in talc and inserted into a mixture of 50% perlite and 50% vermiculite. Propagating boxes 43 × 63 × 13 cm are used. Each hold about 300 cuttings. After filling the box, a removable top section and filon cover are put in place and the assembly is set outside in partial shade. Even in hot summer weather watering is only necessary every three or four days. Elm cuttings have also been rooted in flats under intermittent mist. However, there seems to be no great advantage in using mist, so most of our elm cuttings are rooted in propagating boxes.

Cuttings are ready to be potted up from 60 to 90 days after insertion. Usually they are put in 7.5 × 10 cm cans. Over a period of two weeks they are gradually shifted from full shade to 40% shade and then moved to the growing area which is par-

tially shaded by deciduous oak trees. The rooted cuttings are pruned every few weeks during the growing season to insure a compact "twiggy" plant with reduced leaves 1.5 cm long, or less. New shoots, 7.5 to 15 cm long, are cut back so that one to three leaves remain.

After six months to a year in the can, the roots are pruned to encourage the development of a flat, bushy system, suitable for planting in a shallow container. The trees are then repotted in the same can, a bigger can, or a smaller can. Care is taken to plant the tree so that the top of the root system is at or slightly above soil level. This pruning and repotting procedure is continued from two to five years, resulting in a final product which varies from 5 to 40 cm in height.

The intensive pruning carried out on these trees results in a very dense, twiggy top growth which may cause some problems. Undirected overhead water tends to slide off to the side and may largely miss the pot. Hand watering with a hose overcomes this. If the cans are closely spaced, the lower limbs may not get enough light and die back. Obviously, spacing the cans and occasional rotation will fix this problem.

Catlin elm cuttings are taken any time during the year. However, those taken in the winter don't grow very much until the weather warms up. Other elms that have been grown as cuttings include the cork bark elm (*Ulmus alata*), *Ulmus davidiana*, and the tiny leaved Hokkaido elm. (3 mm long leaves)

## EFFECT OF NITROGEN AND CLIMATIC FACTORS ON SEASONALITY OF BANANA PRODUCTION IN HAWAII<sup>1</sup>

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**Abstract.** Planting material ("seed") of 'Williams hybrid' ('Giant Cavendish') was grown rapidly from frequent irrigation and nitrogen applications, using vigorous sword suckers, trimmed and heat-treated to control burrowing

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