

# CHIP-BUDDING POTTED STOCKS UNDER GLASS

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**Abstract.** Small maiden trees of Comice/Quince C, Cox/Malling 9, Victoria/St. Julien A, Crimson King/*Acer platanoides*, *Tilia* × *euchlora*/*T. platyphyllos* and *Ulmus* × *vegeta* Commelin/*U. glabra* were raised in one season under glass by chip budding newly-potted stocks in spring. The main limitation to this method of quickly producing trees suitable for sale, for example, to garden centres, appears to be poor establishment of the rootstocks, particularly noticeable in imported seedling material, which may have been partially desiccated during an extended period of dispatch.

## REVIEW OF LITERATURE

Chip budding is actually a grafting method, primarily designed for use when the rind fails to part from the wood of the rootstock; it is advocated for use in the spring with cold-stored budwood (1). Recently it has been shown that a better cambial match is achieved in chip than in conventional T budding and that in England trees grow more vigorously from chip buds during their maiden season (2). This raises the possibility that by combining the potential for improved growth from chip budding with that of growing plants under glass in containers it might be possible in one season to raise maiden trees suitable for outlets such as garden centres.

## MATERIALS AND METHODS

One hundred each of the following fruit rootstocks and 50 each of the ornamental species were potted into 1:7:4 loam/peat/sand compost in 7½ in. plastic pots during late February, 1974. They were grown in glasshouses initially maintained at a minimum temperature of approximately 60°F to encourage establishment. Ornamental species were transferred to a polythene structure during mid-summer after the main effects in the trial had been noted. Rootstocks used were:

Quince C pear, M.9 apple, St. Julien A (virus-free, from the East Malling nursery) and *Acer plantanoids*, *Tilia platyphyllos* and *Ulmus glabra* (imported via a commercial UK nursery).

On 24th April those rootstocks making vigorous growth were chip-budded, tying with 1.25 cm width polythene tape and avoiding the eye. Budwood, cold-stored at 0°C, of the following cultivars was used:

Doyenne du Comice pear, Cox's Orange Pippin apple, Victoria plum, and *Acer platanoides* 'Crimson King', *Tilia* × *euchlora* and *Ulmus* × *hollandica* var. *vegeta* 'Commelin'. As late

developing stocks subsequently began to grow they were also budded.

## RESULTS AND DISCUSSION

In general the fruit rootstocks came into growth uniformly and vigorously, while *Acer* and *Tilia* stocks in particular were very variable (Table 1).

**Table 1.** Description of rootstocks at budding on 24th April

Quince C	All stocks with shoots up to approximately 10 cm length
M. 9	All stocks with shoots up to approximately 12 cm length; three subsequently died
St. Julien A	All stocks with shoots up to 10 cm length
<i>Acer platanoides</i>	Stocks variably leafing-out; three were dead or dormant
<i>Tilia platyphyllos</i>	Extreme variation in leafing-out; nine were dead or dormant
<i>Ulmus glabra</i>	Most stocks growing variably; two were dead or dormant

Bud survival in the fruit plants, expressed as a percentage of rootstocks which finally grew was 100% for Comice, 84% for Cox and 64% for Victoria. Losses in the plum were associated with the presence of blossom buds in the budwood; also shields with growing shoots sometimes became loose after releasing ties. Variable bud take in field-budded plums is not uncommon.

For ornamental species bud survival was 79% for 'Crimson King', 80% for *Tilia* × *euchlora* and 75% for *Ulmus* × *hollandica* var. *vegeta* 'Commelin'.

Mean maiden growth, measured from the union (at 30 cm above pot level for Cox and 15 cm for all others) was short compared to that expected in field-grown plants produced in the normal two-year cycle, but compared very favourably with maiden whips produced in one season in the field from bench grafting. A few maidens were sufficiently vigorous to produce feathers (Table 2).

**Table 2.** Tree production and growth (cm).

	Maidens as % of stocks potted	Mean maiden growth	% maidens with feathers
Comice	100	70	0
Cox	81	75	0
Victoria	64	147	11
Crimson King	74	41	3
<i>Tilia</i> × <i>euchlora</i>	66	45	3
<i>Ulmus</i> × <i>hollandica</i> var. <i>vegeta</i> 'Commelin'	72	139	56

Success, in terms of trees obtained from rootstocks potted, (Table 2) must be qualified by the considerable variability; for example, most of the 'Crimson King' trees fell equally into the four smallest size categories, whereas 'Victoria' trees fell into the majority of size categories (Table 3).

**Table 3.** Number of trees with maiden growth falling into particular size categories.

	Size categories (cm)										
	1- 20	21- 40	41- 60	61- 80	81- 100	101- 120	121- 140	141- 160	161- 180	181- 200	201- 220
Comice	—	6	36	27	18	13	—	—	—	—	—
Cox	6	9	10	16	21	15	4	—	—	—	—
Victoria	—	2	4	4	7	6	4	5	5	14	13
Crimson King	9	8	9	8	3	—	—	—	—	—	—
<i>Tilia</i> × <i>euchlora</i>	5	9	13	6	—	—	—	—	—	—	—
<i>Ulmus</i> × <i>hollandica</i> var. <i>vegeta</i> 'Commelin'	—	—	—	1	6	4	5	12	2	5	1

The success of 'Comice' in particular, and also of 'Cox' and 'Commelin' elm suggests that trees which would be saleable to garden centres and which would produce branched trees in the second season can be produced in this way. In other trials, branched 'Cox' trees have been produced in one year by successfully treating the most vigorous maidens with Off-Shoot-0 tipping agent. For other species, however, factors which operate against successful establishment of the potted rootstock, or successful budding, will result in unacceptable variability due to death or poor growth in the limited time available. Contributing causes may be variability in seedling stocks enhanced by the partial desiccation sometimes experienced in imported material, and poor storage or quality of budwood. The possibility that *Acer platanoides* and *Tilia* spp. are less suitable subjects than fruit cultivars for growing under glasshouse conditions may be an additional factor, which is supported by the views of some nurserymen. *Fraxinus* spp. have produced good quality trees when raised in this manner at Hadlow College (Macdonald, personal communication).

#### LITERATURE CITED

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