

Jim Wells and Ron Dool indicated that hamamelis could be successfully propagated from cuttings if treated in the same way as deciduous azaleas; i.e. achieve growth before the winter and store at 33° - 35° F. (Pete Vermuelen)

NARCISSUS PROPAGATION

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Abstract. The "twin scale" method of narcissus propagation is described and the results of a number of experiments dealing with different sizes of segments, cultivars, and storage temperatures are reported, with details of the number and weight of bulbs obtained by natural increase and by twin scaling after two growing seasons.

REVIEW OF LITERATURE

Bulb propagation by various methods of cutting or sectioning the bulb has been studied for many years at a number of centres. The early work dealt largely with hyacinths but more recently various methods of sectioning have been used successfully with narcissus and other bulbs. During the past two years, following earlier work by Alkema at Jaarverslag Laboratorium voor Bloembollenonderzoek, Holland, and by Brunt at GCRI, England, we have tried out the "twin scale" method of narcissus propagation on a number of cultivars, using various segment sizes and storage temperatures to find the most satisfactory method for large scale propagation of new seedlings.

MATERIALS AND METHOD

Bulbs for dissection must be free from pests and disease and not bruised or damaged by lifting. "Round" or "double-nosed" are the easiest to dissect but any type can be used. Dissection should be carried out in July or August; later dissections will survive but make poorer growth.

Selected bulbs are first washed in a solution of 0.5% formaldehyde (40%) to remove soil and give surface sterilizing. The nose of the bulb is then cut off about $\frac{1}{4}$ to $\frac{1}{3}$ from the tip and the body of the bulbs dissected downwards into 8 to 16 segments shaped like the segments of an orange and each held together by a portion of the basal plate. The basal plate of each segment is

then sliced through between each pair of scales to give twin scale pieces each still attached to a small piece of basal plate. The twin scales are then placed in a polythene bag to prevent drying out until sufficient have been accumulated for dipping. Soak the twin scales in a solution of benomyl (1 oz. Benlate in 1½ gallon water) for 15 minutes, drain, and mix with equal parts of damp (not wet) horticultural vermiculite in a polythene bag, seal the bag, and store at 20°C for 3 months, then either plant out into a bed in the open ground, as we do at Rosewarne, or store at about 4.4°C until the danger of severe frost is over and the ground is fit for planting.

RESULTS

Varietal Response. We have tried a limited range of cultivars. *Narcissus tazetta* 'Grand Soleil d'Or' and *N.* 'Carlton' propagate freely, the former even when dissected in September. *Narcissus*, 'Golden Harvest', 'Magnificence' and 'King Alfred', all yellow trumpet varieties, produced fewer bulbs, while *N.*, 'Fortune' was intermediate.

Size of Segments. With the smallest size of twin-scaled segments only half or less of the small bulbs formed produced foliage the first year and many were very small when lifted at two years old. For example, with *N.* 'Fortune' cut into 16 segments and twin-scaled, 12 twin scales produced foliage the first year and 51 the second. The very small bulbs produced at the end of two years will probably require another two years to reach flowering size, while larger bulbs produced by cutting the original bulb into a smaller number of larger segments will probably reach flowering size with one more year's growth. This year we have cut the bulbs into 8 segments and then twin-scaled each segment to try and produce a high number of bulbs, most of which will be sufficiently large to produce leaves the first year and small flowering size bulbs in three years.

Rate of Multiplication. Table 1 shows the rate of multiplication obtained from one round bulb for a number of cultivars in two growing seasons when grown naturally and when twin-scaled. While twin scaling has always given a reduced total weight it has given a greatly increased number of small bulbs and these are expected to increase in weight more rapidly than the few large bulbs over the next two years. In another two years it is hoped that reasonably full-sized bulbs will develop from all the bulbs produced by twin scaling, while the large bulbs will continue to produce 150% to 200% increase in weight and number of bulbs.

Table 1. Narcissus propagation, 1973 Mean product of 1 round bulb in two growing seasons

	Propagation method	No of shoots in first season	No. of bulbs produced	Harvested weight as % of planted weight
'Grand Soleil d'Or'	Whole bulb	1.0	2.8	220
	Twin scaled*	30.0	61.6	215
'Carlton'	Whole bulb	1.0	2.4	366
	Twin scaled*	24.6	59.0	289
'Fortune'	Whole bulb	1.0	2.0	236
	Twin scaled*	12.0	47.8	173
'King Alfred'	Whole bulb	1.0	3.1	273
	Twin scaled*	5.9	23.9	69
'Golden Harvest'	Whole bulb	1.0	2.1	306
	Twin scaled*	9.8	21.0	95

* 16 segments per bulb twin-scaled and stored 8 weeks 23°C + 4 weeks 17°C.

Application of "Twin scaling". In Holland this technique is being developed for the propagation of virus-free stocks, selected clones, and new cultivars. In this country the Glasshouse Crops Research Institute is using bulb dissection for the multiplication of virus-free clones produced at the Institute for distribution through the Nuclear Stock Association, and at Rosewarne we have just commenced using twin scaling for the propagation of selected seedlings from our breeding programme after two years of preliminary work with commercial cultivars.

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