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Scion Selection for Green Wood Grafting in Apple

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The results obtained from grafting presumably non-dormant *Pyrus* budwood were recently described by Thompson (2). "Green Wood Grafting" is suggested as a term for this technique since it more accurately describes the dormancy condition of the scion wood.

In this test, vigorously growing terminal shoots of 'Starking Delicious', 30-32 cm in length, were collected on 2 July, 1975. The leaf blades and all but 5-6 mm of the petioles were immediately removed. Approximately 5 cm of the softest green tissue at the distal ends of the scions was also excised. Scions thus prepared were held in poly wrapping at c.a. 5°C until the following day.

A total of 12 seedling apple plants in their second leaf were available. These had previously been selected for uniformity in size and were growing vigorously in the nursery, having been started in the greenhouse in late April and transplanted approximately 30 days later. The tops of these seedlings were excised on 3 July, 12-13 cm above the soil line. The remaining stubs, on which the bark was slipping well, were each grafted to a single scion piece using the bark grafting technique (1, p. 390). This technique was considered most practical due to the relatively small diameter and soft condition of the scion material. The grafts were tied with rubber tapes and all cut surfaces were coated with a water-asphalt grafting compound.

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When cutting scion pieces from the nearly full length terminal shoots previously collected, approximately 5-6 cm of the base, or proximal portion of the scion was excised and discarded, since this wood appeared most mature and least likely to resume growth. A scion piece of approximately 10 cm carrying 3 or 4 buds was then cut from the base of the shortened scion and grafted. A piece of equal length carrying the 3 or 4 most immature buds was cut from the remaining, or distal, portion of the scion, and grafted. For purposes of this discussion, scion pieces cut as described will be referred to as proximal and distal. The buds in approximately median position on the original scions thus became terminal on the proximal scion pieces, and basal on the distal pieces.

New growth from the uppermost bud on each of the distal scion pieces was visible on 11 July, 8 days after grafting, but none of the proximal graft pieces had started growth on this date. On 16 July, however, the uppermost bud of each of these grafts had started growth. During the remainder of the growing season, until approximately 10 October, it was apparent that the grafts of distal scion pieces grew more vigorously than did those of the proximal pieces. This observation was borne out by measurements of total growth of all grafts on 16 October, when terminal buds at the shoot apices were visible (Table 1).

Even the distal scion piece which made the least growth exceeded the maximum as well as the mean growth from all proximal scion pieces. The several days' delay in growth initiation by the proximal scion pieces does not appear sufficient to account for the striking differences observed. While no good explanation is readily apparent, it would seem that some condition of the proximal scion pieces, perhaps a partial dormancy, had some growth depressing effect which may have persisted for some time, if not throughout the season.

Table 1. Growth from green wood apple scion pieces cut from distal and proximal portions of 'Starking Delicious' vegetative shoots.

Position of scion piece on original green wood scion	Range (min. and max.) of growth from grafted scions cm	Mean of growth by 6 grafts. cm
Proximal	34 - 40	37.3
Distal	45 - 62	54.3

The lower buds on the grafts of proximal scion pieces either remained inactive or developed 1 or 2 short shoots per graft. In contrast, corresponding buds of the distal scion pieces developed rosettes of 2-4 leaves and formed new buds which resembled dormant flower buds in size and shape.

This technique may be useful to obtain a rapid, though limited increase of scarce germ plasm in 1 growing season. The good grafting and subsequent growth characteristics of immature tissue in the median to distal portions of vigorously growing apple shoots should allow the use of even 1-bud scion pieces from young plants propagated earlier in the greenhouse, yet leave enough of the original shoot to regenerate a new top during the remainder of the growing season. With this method, the complete removal of all stock tissue above the graft eliminates any apical dominance effect, thus growth starts more quickly than in the traditional "June Budding" technique.

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