

A New Approach to Rooting of Difficult-to-Root Avocado Cuttings*

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The use of growth-promoting substances has greatly improved the rooting ability of softwood cuttings under intermittent mist. Nevertheless, some clones of economic value have failed to root even under the best known conditions.

Garner (2) described an experiment carried out at East Mailing in which M.XVI was inarched with non-rooted shoots of the Ribston Pippin. The inarched component leafed, without forming roots. On the other hand, hardwood cuttings inarched onto a well-established plant "remain for one or two seasons until they develop roots and shoots on their own before they are separated and transplanted." Floor (1) succeeded in inducing rooting by grafting a cutting which roots easily onto another which was difficult to root ("X cuttings").

This report comprises one aspect of our work with difficult-to-root cuttings over a two-year period. The West Indian avocado types are shy-rooted, unless their cuttings are taken from tips or laterals of young seedlings. Five-month-old Mexican seedlings (Duke and Mexicola) grown in containers of one-gallon capacity were inarch-grafted on April 1st, 1967, with Fuchs 20, Hall 30, Nahalath 10, Ma'oz and Guatemalan Benik 31/6 scions, taken from well-established trees of local selections. The Benik selection is a moderately difficult-rooting type, Fuchs 20 a shy-rooting, Hall 30 very shy; Nahalath and Ma'oz did not root at all from ordinary cuttings, even when treated with a high auxin concentration.

The grafts were tied with plastic strips, covered with polyethylene bags (0.01 mm thick) and their basal ends placed in the sandy-loam soil of the container. Two weeks later the Mexican grafted seedlings were tipped, and late in April some of the buds of the inarched cuttings began to sprout. Cutting-back of the seedling stem above the grafting point was carried out accordingly. In August there were one or two leafy shoots 15-20 cm long on the inarched component and none was left on the seedlings.

Examination of the cuttings' basal-ends at this time revealed no marked differences from those grown under mist. Cuttings of Hall 30, Nahalath 10 and Ma'oz were heavily callused, Fuchs 20 was moderately so, and Benik 31/6 only lightly callused. At the end of October a more detailed examination was made. The attached soil particles were carefully washed off the basal-ends. This procedure gave us a better picture (see Fig. 1) of the condition of the cuttings. A small and thin rootlet had emerged from above the callus or through its openings in the West Indian types and in the Benik 31/6 clone there were 2-6 roots of 3-6 cm in length. In many grafts, the

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cuttings' basal-ends were rotted and others were only callused. Transplanting the grafts damaged many of them; 50% recovered after several months and produced well-rooted grafts in September 1968.

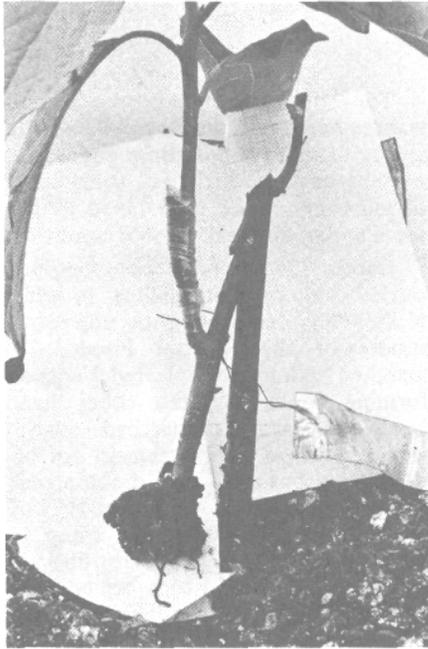


Fig. 1. A difficult-to-root "Hall 30" cutting; three months after grafting. Heavy callus (see text).



Fig. 2. "Fuchs 20" inarch-grafted onto "Duke", after seven months. Left, the well-rooted and leafy "Fuchs 20" cutting. Right, above the graft union, may be seen the remainder of the "Duke" seedling.

The experience of the previous year was taken into account in the following season. Seeds of the Duke variety were sown late in August, and in November the young seedlings were transferred to a greenhouse. This enabled us to do the grafting early in January, 1968. The cuttings basal-ends were placed in small clay, or plastic pots filled with a well-aerated medium (vermiculite + peat, 3:1), to avoid or minimize the rotting effect. In addition, the pots were covered with plastic cups or sheets, to prevent the entrance of moisture from the outside. The main aim during this period was to ensure the take of the graft and firmness of its basal ends until the appearance of callus.

Just after bud bursting and leafing, the seedling stem was cut back, and in April the entire vegetative portion of the seedling above the graft union was removed. Thus the grafts were composed only of roots from the seedling and leaves from the inarched component. Some of the inarched cuttings were grafted early in May with Hass scions. During April, all the plants were transferred to a shed with optimal growing conditions, including good aeration and appropriate air humidity.

The first root-initials appeared on some of the inarched grafts early in August, and none of the cutting basal ends rotted. The callusing of cuttings this season did not

differ from that of the previous year.

The examination was undertaken in such a manner as not to interfere with the rooting process and the growth of new shoots. In September the seedling root was cleaned with a stream of tap water, the two components were separated and the seedling was carefully pulled out. In this way the rooted cuttings remained undisturbed in their original containers.

The theoretical basis of rooting inarch-grafted cuttings is not clear. It is hoped, however, that in the continuation of this work, more detailed information on the rooting process of difficult-to-root cuttings will be obtained.

Literature Cited

1. Floor, J. 1955. Moisture as a factor in the rooting of cuttings. *Rep. 14th Int. Hort. Congr.* pp. 1140-1148.
2. Garner, R. J. 1958. *The Grafter's Handbook*. Faber & Faber, London pp. 178-179.



Fig. 3. "Fuchs 20", separated from the "Duke" seedling.