

Propagating the Avocado by Means of Stem Cuttings

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Although the Avocado is successfully propagated by budding and by grafting onto seedling rootstocks, its propagation by means of stem cuttings is generally considered either impossible or too difficult to accomplish. However, there are practically no data on record to show that this method has been subjected to systematic tests. In order to secure such data an investigation was initiated during the late Fall of 1935. While the results obtained thus far are not of practical value, they are believed to be of sufficient interest to warrant a progress report.

The Annual Report of the California Avocado Association for 1919 and 1920 p. 16 contains a brief note by S. W. Jamieson on the rooting of Avocado cuttings. However, the information was obtained second hand and no data are given as to the varieties tested and as to the degree of success attained. The procedure mentioned involved the treating of the cuttings with ether as an aid in hastening root development. No subsequent reports appear to have been issued.

In 1924 Swingle and Robinson* reported briefly on the rooting of a few Avocado cuttings taken from a seedling of the Collinson variety C. P. B. No. 12037, a hybrid between the Guatemalan and West Indian races. In one test made in Florida, the stems were first induced to form a callus, while still attached to the parent tree, by girdling and were then cut off and removed to the propagating frame. A few of these cuttings produced roots just above the callus. However, they considered the percentage of rooted cuttings obtained by this procedure too low to be very promising. Material from the same seedling variety was also tested in the department greenhouse at Washington, D. C. In this case however the cuttings were made in the usual way. The best results were secured with rather tender tip cuttings cut with a "heel", that is a small piece of the branch giving rise to the tip shoot. No percentage of cuttings rooted is given and no further reports have been issued.

MEXICAN CUTTINGS ROOTED

In our investigation we have encountered no special difficulties in rooting stem cuttings taken from two-year old Mexican nursery seedlings, but so far we have not succeeded in rooting the Fuerte or Nabal although the material used was similar to that cut from the seedlings. No reason for this difference in response can be given but it may be mentioned in this connection, that a similar situation has been observed to exist in Citrus and other plants.

Figure 1 shows the types of cuttings taken from the nursery seedlings Dec. 28, 1935. These include tender tips, single nodes with leaf and cut with a "heel", mature stems

about 1/4 inch or less in diameter and about 6 inches long, also cut with a "heel", and mature stems 3/8 – 1/2 inch in diameter. In the latter case an upward split, about 1 inch in length, was made at the basal end and kept open by the insertion of a pebble. Unsplit stems were used as checks.

The cuttings were planted about 2 inches deep in sand in a sash—covered propagating frame built inside a greenhouse. It was necessary to shade the sash with burlap to prevent scorching. The humidity was kept as high as possible by sprinkling the cuttings two or three times daily. The temperature of the sand was maintained around 75 degrees F. by electric cables with a thermostat.



Fig. 1. Types of Mexican cuttings tested.

The tender tips shown at the extreme left in Figure 1 soon deteriorated while the other types of cuttings remained alive, whether rooted or not, for several months. In most cases shoots, several inches long, were produced long before roots appeared.

Figure 2 shows rooted specimens of the other three types of cuttings tried. The largest ones (shown at the extreme right in figures 1 and 2) however, gave the best results, hence the rest of this discussion will deal only with this type.

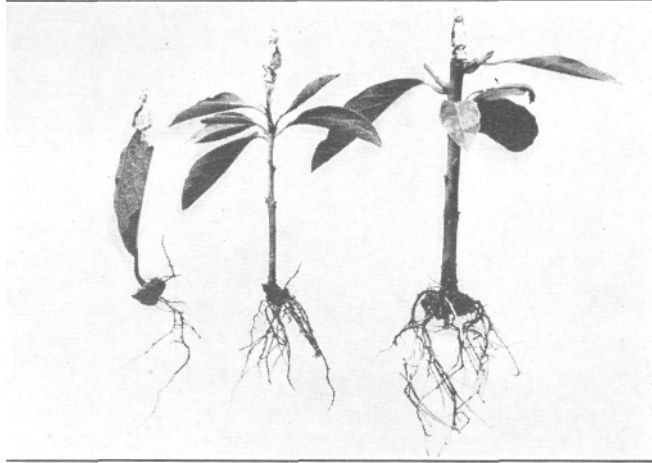
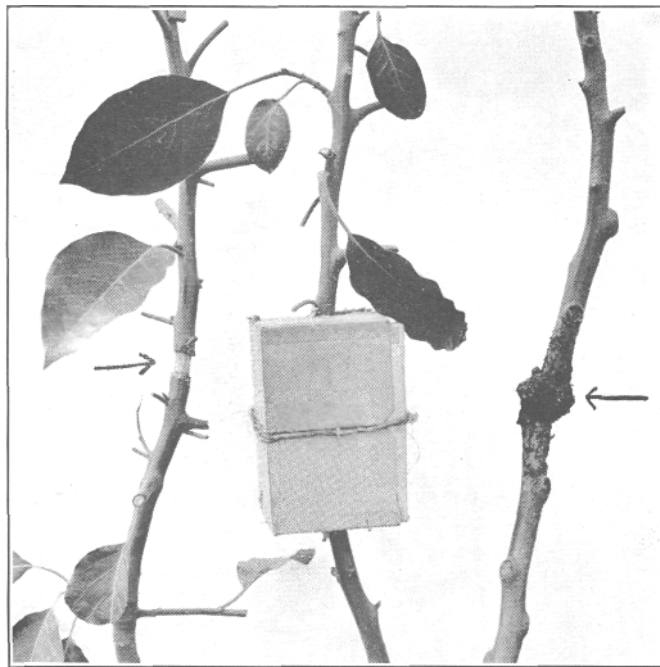


Fig. 2. Types of Mexican cuttings which rooted.



Fuerte avocado. A method of propagation known as "Air Layering" or "Marcottage". The branch on the extreme right eight months after girdling. The box containing moss was removed to show callus.

CONTRIBUTING FACTORS

One outstanding characteristic of the avocado seems to be its tendency toward profuse callusing. But as Swingle and Robinson have pointed out the roots emerge just above the callus. The evidence so far is not conclusive that the presence of leaves, or the splitting of the basal end of the cutting, are contributing factors to root development.

The percentage of rooted cutting secured in three tests made on December 28, 1935, April 1 and May 8, 1936, was 85, 39 and 23 respectively. These percentages are a

mere indication however, since there were only 10 to 13 cuttings in each set. The time required for rooting varied from three to six months. Paring the callus or surrounding it with a mixture of peat and sand or well-rooted manure had no effect on root development. Fuerte and Nabal cuttings planted simultaneously with the seedling cuttings on April 1 and May 8, died within a few weeks. A third set planted July 28 is still under observation as this report is being written. (September, 1936).

An attempt was also made to produce own-rooted Fuerte and Nabal plants by a method known as "Air Layering" or "Marcottage." As will be seen in figure 3, the method consists of the removal of a ring of bark on a suitable branch to stimulate the formation of roots. The wound is surrounded by damp moss which is held in place by a box. If roots develop, the branch is then removed and planted. The branch on the extreme right in figure 3 was so treated on December 27, 1935, and photographed August 18, 1936. It will be noted that during this period of nearly eight months the girdle, although 3/4 of an inch wide, became completely covered with callus but no roots were formed. Other branches treated February 20 and May 19, 1936, have so far, behaved similarly. Even if successful, the method would have very limited application because of the time required and the small number of plants that can be secured.

A few attempts to induce rooting of the Fuerte and Nabal by burying a part of low hanging branches in the soil, have also given negative results.

SUMMARY

The response of avocado stem cuttings to rooting was found to be erratic. While a fair percentage of cuttings taken from two year old Mexican seedlings rooted, similar ones taken from mature Fuerte and Nabal trees showed no response whatever. This indicates that the importance of such factors as variety, age and type of tree (whether a seedling or budded) must be ascertained before the value of the cutting method of propagation can be safely assigned. September 27, 1936.

*Swingle, W. T., and Robinson, T. R. The Solar Propagating Frame for Rooting Citrus and other Subtropical Plants. U. S. D. A. Dept. Circular 310, pp. 1-13. 1924.