

# Zutano Avocado Cuttings Rooted

leafy-twigg cuttings of vigorous Mexican variety readily rooted without special procedures or hormone treatments

A. R. C. Haas and Joseph N. Brusca

**Leafy-twigg cuttings** from the Zutano avocado—a vigorously growing Mexican variety—readily rooted, without special procedures or hormone treatment, in propagation trials at the Riverside Citrus Experiment Station.

Previous trials by research workers at Riverside—and elsewhere—to propagate avocado trees by stem cuttings of Fuerte, Nabal and certain Mexican and Guatemalan varieties met with little if any success without special treatment or procedures.

The Zutano avocado cuttings were collected on July 30, 1952, without regard to the season of the year, although the most desirable time for obtaining citrus cuttings is considered to be in autumn during a somewhat dormant period—or just prior to the production of a new cycle of growth.

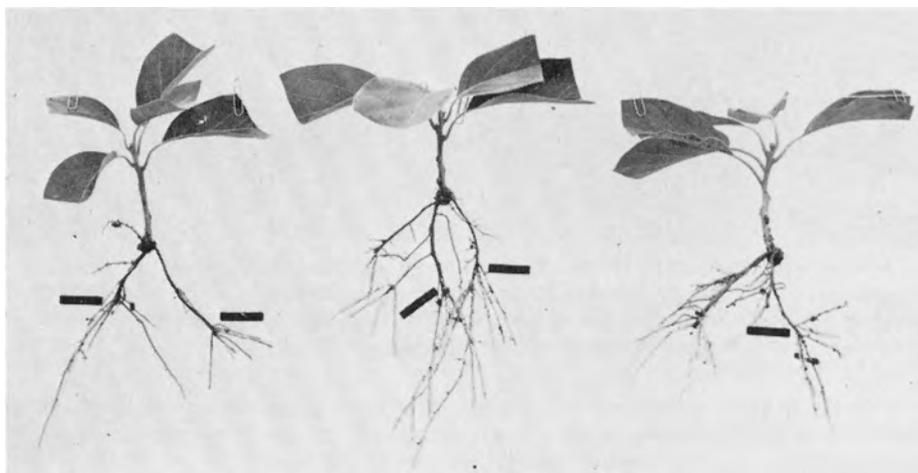
The Zutano cuttings were quickly transferred from wet burlap sacks to the propagation chamber with five to seven dark green mature leaves attached which had been cut back transversely to, roughly, slightly more than half their original length.

The propagation medium consisted of a mixture of half plaster sand and half peat. The chamber, situated in the glass-house, was thoroughly plugged in order to maintain a high humidity and to cut

down the frequency of sprinkling with distilled water—any good quality water would probably have served the same purpose. The glass panes in the lid of the chamber were allowed to remain in need of washing and the glass was covered for some time with a cheese-cloth frame. The glass sash covering the chamber sloped so the high end was westerly

and the low end easterly, in order not to expose the chamber to the effects of the hot afternoon sun. By means of bottom heat, the temperature of the soil-peat mixture was held to a minimum of 75° F. During the late summer and early autumn the soil temperature undoubtedly was considerably higher, be-

Concluded on next page



**Improvement in the root system of Zutano leafy-twigg cuttings brought about by the early replanting in the propagation chamber and later hardening of the cuttings once the short roots have been produced, or by pruning lengthy roots and replanting as above mentioned. Note the numerous rootlets produced where the original roots were cut as indicated in part by black lines.**

for mites was applied during the season within the experimental area. Plantings adjacent to the experimental area were treated for the European red mite and the walnut aphid on July 15. At that time the mite population had caused considerable silvering on the upper leaf surfaces by their feeding.

Some materials such as wettable powder formulations of EPN and malathion that have not given satisfactory results in the past when used to control moderate or heavy infestations of mites, performed fairly well in this type of control program. While they were not as effective as those listed in the upper table on page 10, the mite build-up was not excessive on those plots, consequently damage to the foliage was not enough to cause any appreciable leaf drop.

Relatively heavy dosages of organic phosphate materials such as malathion

and EPN were more effective in controlling the European red mite than the walnut aphid in this instance.

The lower table on page 10 contains a portion of the results of an experiment conducted in an area where the European red mite and the walnut aphid have been serious problems in past years.

In this instance, Systox, Genite and Ovotran were very effective in controlling the European red mite for a complete season. Pestox 3 used at the dosage indicated was not effective on either mites or aphids. At higher dosages it has given satisfactory control but it is questionable whether it would be economically feasible to utilize such amounts. The use of the lower dosages of Systox resulted in adequate aphid control for about eight weeks, which is substantially better than can be expected with any of the presently available materials.

None of the materials tested in 1952 produced any injurious effects on the foliage or fruit. Samples were collected at harvest time and processed in the normal manner. Crack tests showed that the materials evaluated for the control of the European red mite and the walnut aphid had no apparent effect on the quality of the nut meats. In addition, the systemic insecticides and standard treatments were given flavor evaluation tests. No significant effect on the flavor of the walnuts could be determined by these trials. At present the systemic insecticides are not registered for use on walnuts as adequate methods for determining the presence or absence of deleterious residues have not been developed.

*J. C. Ortega is Associate Specialist in Entomology, University of California, Riverside.*

*The above progress report is based on Research Project No. 1419.*

## AVOCADO

Continued from preceding page

cause the glasshouse temperature exceeded 100° F for many days.

Root formation had taken place sufficiently when cuttings remained in firm position after a mild pull.

At various times during the rooting process a weak solution of calcium nitrate—about 200 ppm—parts per million—nitrate— $\text{NO}_3$ —was sprinkled over the cuttings as a dilute fertilization to assist the growth process to prevent the nitrogen supply from becoming inadequate.

When sufficiently rooted the cuttings were hardened by increasing the raising of the lower end of the glass sash covering, approximately an inch a day, especially at the beginning of the hardening process.

By December 24, 1952, 85% of the cuttings were rooted with the roots extending long distances in the bed. They should not have been allowed to grow undisturbed for so many weeks because the few long roots can easily be broken without being evident. In such cases the leaves fail to remain green even when the roots are placed in a nutrient solution.

Avocado roots apparently like organic acids such as those which occur in peat. Frequently in avocado orchards, a mass of healthy white rootlets are seen to spread out over the surface of the soil at the contact with the overlying thick layer of dead leaves from which organic acids exude.

When the plants were removed from the bed on December 24, 1952, the roots of some of the long-rooted cuttings were cut back to a length of about three inches. All cuttings were replanted in the same bed and—under covering sash—grown until February 3, 1953, when the experiment was concluded and the plants again were hardened.

The rootlets that were lengthy and possibly broken and were not cut back, were not improved by being replanted; in fact, some showed obvious injury. Cuttings with the pruned roots formed rootlets near the cut area.

It appeared evident that a better practice would have been to remove the cuttings when they first had short rootlets and then replant them—with or without additional root pruning—to encourage the production of a compact mass of rootlets readily removable intact from the rooting-medium, once the plants had been again hardened.

*A. R. C. Haas is Plant Physiologist, University of California, Riverside.*

*Joseph N. Brusca is Senior Laboratory Technician, University of California, Riverside.*

*The above progress report is based on Research Project No. 1088.*



**Above: Rooted Zutano avocado leafy-twig cuttings when fully hardened on December 24, 1952, after being in the propagation chamber since July 30, 1952. Note spacing of the cuttings and dark color of the leaves against the white sand which was placed over the medium for photographic contrast.**

**Below: Excellent root systems of Zutano leafy-twig cuttings on December 24, 1952. Note the obviously broken root—second from the left—that occurred in removing long roots from the plaster sand-peat mixture.**

