

PROGRESS REPORT: AVOCADO INARCH GRAFTING

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Many possible approaches to control of the avocado root rot disease have been investigated, and a number of aspects of control are still under study. In preliminary work on resistance to the avocado root rot fungus (**phytophthora cinnamomi**), the concept was advanced that a resistant rootstock could be useful with established trees, as well as in the case of new plantings, if it were used for inarching trees on susceptible roots (1).

With this aspect in mind, a project was initiated in 1958 to perfect methods of inarching mature avocado trees to provide supplementary root systems in soils infested with root rot fungus.

Inarching is a method whereby two plants are made to unite while growing on their own roots. With fruit and nut trees, young seedlings are usually planted beside an older tree and grafted into the trunk (figure 1).

For many years citrus and walnuts have been inarched successfully. In the spring of 1918 the Parent Navel orange tree was inarched (figure 2) because *Phytophthora gummosis* had killed a band of bark six to eight inches wide around the trunk above the bud union (2). Subsequent inarching has been done through the years, and this tree—now over 88 years old—is still alive and is apparently in fairly good condition. In 1952 Rizzi (3) described the "approach graft method" of grafting young walnut seedlings into mature walnut trees that were affected with crown rot or mechanically injured at or near the crown. Serr in 1955 (4) reported recovery of walnut trees damaged by the root-lesion nematode when inarched with resistant seedlings (figure 3).



Fig. 1. Farm Advisor Hunter Johnson is shown inarching a Fuerte avocado tree with a Duke variety avocado seedling using the approach graft method. The mature tree is growing in soil infested with avocado root rot.



Fig. 2 Original Washington Navel orange tree in Eliza Tibbets Memorial Park, Riverside, California, forty-three years after original inarching operation.

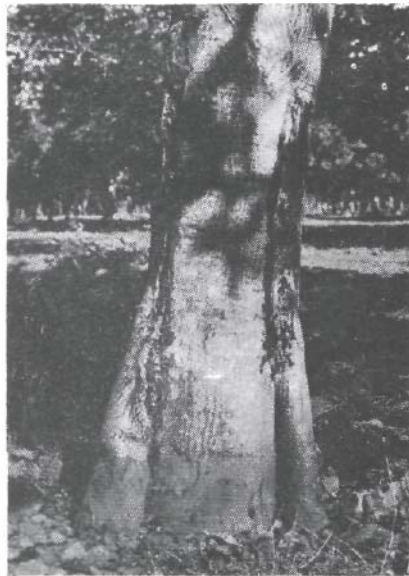


Fig. 3. Concord walnut tree in Lompoc was inarched in 1956 after being damaged by Root-Lesion Nematodes. (Photographed May, 1961, by W. Gillings).



Fig. 4. Inverted T (\perp) inarch method on avocados. Avocado seedling is cut diagonally, and is inserted under the bark.

Since somewhat more resistance to root rot has been found in the Duke avocado than other commercial rootstocks, such as the Mexicola and Topa Topa, seedlings and cuttings of the Duke have been used almost exclusively for inarches in this project.

The two most popular inarch methods are: 1) The inverted T(\perp) used mostly on citrus,

and 2) the approach graft, found most practical on walnuts.

In the first method, two cuts are made in the bark of the trunk in the shape of an inverted T (\perp) and a seedling, which has been cut diagonally, is inserted (figure 4), tacked and covered with a sealing compound. In the approach graft method, (figure 1 and figure 4), a strip of bark as wide as the seedling and at least 6" to 8" long is cut from the trunk of the tree. The bark and somewhat less than one-half of the thickness of the wood on the tree side of the seedling, is removed for a distance equal to the length of the slot (figure 5). The seedling is placed in the slot with the cambium layers of the bark meeting. It is then nailed in place with nails large enough to hold the seedling securely, and then all exposed cut surfaces are completely covered with sealing compound. The top of the seedling may be tied to the trunk of the tree to prevent breaking off or cut back to three or four buds above the graft.

The best results so far with avocado inarching have been with the approach type graft. When the mature tree shows no top symptoms of root rot damage at time of inarching, a union has been accomplished in 82% of the trials. Where the inverted T method has been tried, under similar circumstances, only 20% have joined. Often when the inarch has died back from the inverted T, a subsequent inarch, using a shoot from the same plant, has been successfully joined using the approach graft method.

Where mature trees have shown top symptoms of root rot damage at or shortly after time of inarching, an almost complete lack of union has resulted.

There are three other experimental inarch methods under test which are modifications of the approach type graft. These are: 1) the Chisel method, in which the slot or channel is cut with a half-round chisel; 2) the Overlap, where the bark is only slit above the channel and the seedling is nailed under the bark; and 3) a method demonstrated by Mr. Stanley Shepard of Carpinteria in which the bark is shaved flat, down to the cambium, and the similarly cut inarch is nailed to this area.

A number of growers have had good results inarching root shoots into the trunk or main branches of the parent tree. Using root shoots, a number of methods have been successful—including the inverted T. Here, of course, the root shoot receives vigor from the entire root system of the parent tree.

In the inarching project there are presently 27 mature avocado trees growing in or adjoining root rot areas which have been inarched. There have been 122 individual inarch grafts made using 90 seedlings and cuttings. Trees under test are growing in almost all of the avocado districts, including San Diego, Los Angeles, Santa Barbara and Riverside Counties.



Fig. 5. Approach graft method of inarching avocados. The slot cut in the bark is approximately 8" long and as wide as the seedling used for the inarch.

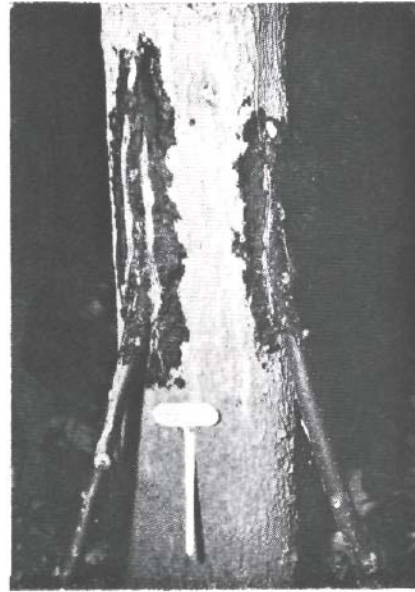


Fig. 6. Rincon variety avocado tree in Santa Barbara showing two of three Duke seedling inarches. Picture taken 14 months after inarching by approach graft method.

Many growers have shown interest in this phase of avocado culture, but it must be emphasized that inarching avocado trees is still in the experimental stage. Inarching may never be economically practical except for individual trees.

Growers are cautioned that the inarching of avocado trees for root rot control is not presently recommended.

LITERATURE CITED

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