

A SEARCH FOR NEW ROOTSTOCKS FOR AVOCADOS

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Before describing possible new sources of rootstocks for avocados, it will be necessary to review the past experience with root-stocks in California. At hand were the commercial varieties and miscellaneous seedlings stemming from these varieties. It was only natural that seeds from these trees should supply the nurseryman with rootstocks.

Commercially produced avocados fall into three recognized groups or races: West Indian, Guatemalan and Mexican. In addition there are hybrids between these races having intermediate characteristics. In California we grow only the Guatemalan, Mexican and hybrids of these two. The West Indian race is too tropical in its requirements and it not adapted to the subtropical climate of Southern California.

It is now standard practice to use the pure Mexican race seedlings for rootstocks. These have proved to be the best of the locally available seedstock. They are vigorous growers and the most hardy of the races to cold. The Guatemalan race seedlings have been used to a limited extent but have demonstrated no advantages over the Mexicans. Their greater susceptibility to frost has stopped their use. Hybrid seedlings such as from the Fuerte variety have sometimes been used but they show great variation in vigor and the nurserymen do not like them as they make an uneven stand in the nursery row.

The California avocado industry would have been satisfied with its present Mexican stocks if it were not for the increasing menace of a root rot called avocado decline. This condition results from oxygen starvation in the root zone and the resulting destructive activity of a fungus *Phytophthora cinnamomi*. The majority of our avocado orchards in California are on clay soils through which water percolates slowly. Heavy winter rains or bad irrigation practice cause periods of water logging and the resulting oxygen starvation promotes root decay. Once the *P. cinnamomi* fungus, which appears to be widely distributed, is active in the roots the tree slowly dies over a period of several years. Replanted avocado trees "will not grow where a declined tree has been removed.

Interest has been stimulated in finding a possible decline-resistant rootstock. Among the local sources none has proved promising, the Mexican seedling being still the best available.

In October 1946 this writer and Carl Crawford of Santa Ana, Calif., visited Wilson Popenoe, director of the Pan-American School of Agriculture in Honduras. We had a long standing mutual interest in the avocado. Wilson Popenoe took us to see wild primitive forms of the avocado growing in the cloud forest on nearby Mt. Uyuca. Here in

a wet jungle at 7000 feet were huge old avocado trees growing on heavy soil saturated with water from the over one hundred inches of seasonal rainfall. These trees were vigorous and healthy with no signs of decline. We were greatly impressed with the possibilities of trying these or similar types as rootstocks in California.

When we returned to California we discussed these possibilities with Dean Robert Hodgson of the University of California and others and it was determined to secure as many forms of these primitives as feasible for test as rootstocks. To carry out this project a special committee of the California Avocado Society was formed. Several expeditions have been made to acquire avocado plant material in Mexico and Central America.

One form of primitive avocado is widely distributed in the subtropical mountain forests of Mexico and Central America. We have found this form between 7000 and 9000 feet elevation at Mt. Uyuca, Honduras; near Tecpan, Guatemala and in the Mt. Orizaba region of Mexico. This wild form is classed as *Persea americana* which classification also included the two commercial avocado races: Guatemalan and West Indian. It is our belief that this primitive form is the progenitor of both the West Indian and Guatemalan races of avocados. The early Spaniards found both races on the mainland, the Guatemalan in the highlands and the West Indian on the tropical coast line. The Spaniards are known to have introduced the so called West Indian race to the West Indies where they were not previously found.

The wild *Persea americana* is a large upright tree with non-anise scented leaves. They bear small, green fruits about 1 1/2 inches in diameter mostly all seed with very little flesh. The skin is medium thick. They bloom in the spring and mature their fruit about twelve months later.

An extensive search was made for the wild form of the Mexican race avocado which is classified as *Persea drymifolia*. Tracing through the Mexican markets it was found that the most primitive type fruits were in the Mt. Orizaba area. Back in the mountain valleys at about 5000 feet we found growing almost exclusively primitive forms of these Mexicans. These trees were large spreading specimens obviously accustomed to open spaces. Both the leaves and the fruits were very strongly anise scented. Some fruits were too bitter to eat while others had a delightful flavor and had local market value in spite of their diminutive size. The fruits were less than an inch in diameter, black in color and with large seeds and little flesh. The skin is very thin and fruits are eaten skin and all.

They were always found in association with the local inhabitants and definitely are not found in the mountain forest ringing the valleys where the wild *Persa americana* is to be found. We believe these primitive forms to have been indigenous in these mountain valleys and to have been engulfed by the Indian culture. They are no longer to be found in the truly wild state except as escapes.

We also found other wild *Perseas* in the mountain forests of these regions. These are not true avocados but closely related forms and might be possible rootstocks.

This plant material is being gathered in California as fast as government restrictions will permit. It will take many years to complete tests. Progress will be announced through

the pages of the California Society "Yearbook". If any of these primitives prove to be valuable as rootstocks they will eventually be available to the avocado industry.



Fig. 1. The aguacatillo, a primitive type of avocado, found in mountainous regions of Honduras, Guatemala, and southern Mexico at elevations of 7000 to 8000 feet. Note the small size of the fruit in comparison with the pocket knife shown.