

## The Expedition to Mexico of May 1947

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The Committee on Foreign Exploration was created recently to study wild forms of the avocado. The objective of the investigation is to gain knowledge of these wild forms which may be helpful in the solution of industry problems and to clarify the botanical and horticultural relationships which exist between the cultivated types and wild forms. The committee recently completed its **first official trip** into Mexico, (May 1947) where avocados were observed growing in their natural habitat. Four members of the committee, H. B. Griswold, C. A. Crawford, Harold C. Wahlberg, and C. A. Schroeder, spent two weeks during the month of April searching for avocado specimens in the area between Mexico City and Veracruz near Mount Orizaba, Mexico.

Considerably large areas of Mexico remain practically unexplored for botanical and horticultural materials. This is especially true in regard to wild forms of the avocado and its relatives. Shortly after it was realized that avocado culture was a potential commercial industry about four decades ago, considerable effort was expended to introduce into this country many varieties of the fruit from Central America and Mexico. One of the objectives of these early importations was to obtain fruits of large size. Many of the introductions produced fruits too large for commercial use. The many small fruited forms of avocado which are found throughout Mexico and Central America were practically ignored by the early avocado explorers. A few of these forms had been recorded and studied primarily by botanists and then forgotten. Now we have come to a point in the development of the industry where knowledge about the small and wild avocado forms may be helpful to the solution of such industry problems as rootstocks, the creation of new varieties by breeding, and disease resistance of various types. The potentialities of resistance to disease and the possible breeding characters of wild forms of the avocado are entirely unknown, but, as in other plants, they appear to offer an interesting field for investigations.

The avocado, by definition, is restricted botanically to two species of the genus **Persea**, namely **Persea americana**, which includes the two races, Guatemalan and West Indian, and the second species, **Persea drymifolia**, which contains the Mexican race. The Guatemalan race is characterized by rather tender plants with large, thick-skinned fruits that require a considerable amount of time to mature from flower to fruit. The leaves are without anise odor. The West Indian race is somewhat more tender, has large, thinner-skinned fruit, but requires about half the time to mature its fruit. The anise odor is also lacking in the leaves of West Indian trees.

The Mexican race includes those plants which generally have small, thin-skinned fruit requiring about eight months to mature in California. The plants are the hardiest of the three races and the leaves are characterized by the presence of anise odor, which is detected upon crushing.

The classification of avocados into two species and three races was announced by

Wilson Popenoe more than thirty years ago, and it has proved to be very useful. Since Popenoe first established the three races he has encountered, in the course of his many explorations, several new and interesting avocado forms, some of which are mentioned in a report in the Avocado Association Yearbook in 1935. This report describes avocados with characteristics of both the Guatemalan and Mexican races in the same individual plant. These unusual forms such as the wild avocado of Irazu have fruits with thick skins and with a strong anise odor in the leaf; thus they do not fit into any race which we now recognize. There are other unusual avocado-like fruits found by Popenoe and still others found by members of the Foreign Exploration Committee which at present cannot be definitely classified according to Popenoe's scheme. A few of the types recently observed by members of the Committee are noted in this report.



Mr. Carl Crawford (second from left) and  
Group of Natives of Aquila, Mexico

The fact that the primitive form of the avocado was reported by Popenoe in the area close to Mount Orizaba, Mexico, prompted the committee to explore this region first. Mr. Griswold and Mr. Crawford also had personal reports of wild avocados in the area as the result of previous trips to Mexico. It was with the objective to find and study these reported wild forms and to bring back propagation material for further study that the first trip was made to this particular region of Mexico.

An unsuccessful attempt was made to approach Mount Orizaba from the west and north because transportation and roads are poor in this region. The main objective was the small town of Huatusco on the eastern slope where the wild avocado was noted by Popenoe. Huatusco was not reached because of transportation difficulties. Considerable time was spent, however, in the mountains around the town of Orizaba,

which lies about fifty miles south of Mount Orizaba. Many small valleys and mountain slopes are easily accessible by car and by foot from this town.

The little village of Aquila lies about twenty miles northwest of Orizaba. We climbed the steep mountain side above this village to an altitude of about seventy-five hundred feet, where a small stand of trees was found in the heavy, tall brush. The trees appeared to be avocados in all respects. They had small, thin-skinned fruits about one and a half inches in diameter. The leaves were without anise odor, but the new growth and young leaves were covered with a very heavy pubescence. This form does not appear to be a true avocado but perhaps may be a related species in the same genus **Persea**. About a mile from this first stand was found a large Mexican type avocado tree about forty feet high growing on a steep canyon bank. The second tree we learned, upon questioning some local men who accompanied us, bloomed in April and matured its thin-skinned, small fruit in September and November. It did not, however, contain the anise odor in the leaf. This lack of anise odor in the leaf of an otherwise Mexican type avocado is the point of particular interest in this specimen.



Wild Avocado of Aquila  
Photo by Schroeder

We then looked further in the mountains south of Orizaba above a small lake formed by the Tuxpango dam. Upon the assurance of a local native boy that in the hills above the dam specimens of the wild avocado were growing, a climb was made into the thicket. The local lad led us through the veritable jungle-like growth of the mountain side to several isolated specimens of avocado trees. These trees were rather small. One appeared to be a sprout from an old large tree the top of which had been destroyed, perhaps by fire. Many of these mountain forests are burned over by the native Indians from time to time in order to obtain charcoal from the burned timber. The sprouts of the fallen trunk, however, had borne fruits which were green, small in size, and with thin skin. Some of the plants had no anise in their leaves. Other specimens in the same

group contained an abundance of anise in the leaf and in the fruit. In fact, the fruits of the latter kinds were consumed without peeling and the strongly anise scented leaves were used for flavoring of cooked dishes by the local people. Another very striking character was noted from information given by the local guide, who was well acquainted with the plants. We were told that some of these plants produced flowers in February and March and matured the fruits in May or June, after a period of only four or five months. This appears to be a very short period required for maturity of an avocado fruit. Such a characteristic may be useful in avocado breeding stock in order to control the fruiting season.

Other specimens which were said to require only four or five months to mature their fruit were found at Jalapa. Thus a short season type of avocado seems to exist which differs considerably from those which we now have in California.



Primitive Avocado Type of Coscomatepec, Mexico  
Photo by Griswold

The mountain slopes near Acutzingo, located between the towns of Orizaba and Puebla, proved to be a very interesting area where a number of fine specimens were found growing in their native state. This locality was previously described by Mr. Griswold, who with Mr. Crawford visited it during October 1946. Here at an altitude of about seven thousand feet is a semi-tropical forest which is often enveloped by clouds. The vegetation is dense and lush. There are pine trees and ferns among the numerous other plants. It is reported that the area is subjected to frequent frosts during the winter and to occasional snow falls.

One of the first avocado trees encountered at Acutzingo was a large spreading tree about thirty-five feet high with a trunk about four feet in diameter at the base. More than half of the trunk had been destroyed, probably by fire, but the tree still was of great size. The small green fruits had been seen in October 1946 by Griswold and Crawford, who discovered the tree at that time. This specimen was growing in a heavily wooded portion of the mountain slope where dense shade prevailed beneath the trees. Probably

because of the lack of sunlight no avocado seedlings were observed in the vicinity of the tree. The anise odor was not detected in the leaf.

A few hundred yards from this first tree at Acutzingo several other specimens were found in close proximity to each other. These latter were apparently of a different type from the first, for the trees were very tall. One specimen was estimated to be seventy-five feet high. The fruit, which was just starting to mature at the time—in April—was green, about two and one-half inches long, short pyriform, with slightly rough and medium-thick skin. The extreme vigor of the trees plus the fact that they were growing in a region of frequent frosts was of sufficient interest to justify further study, so some budwood was collected.

In the markets of Atlixco, the home of the parent Fuerte avocado tree, there are found in the spring many avocado fruits which are small, black and thin skinned and which are obviously of the Mexican type. They differ from the typical Mexican type fruit in that the crop matures primarily in the spring, whereas most Mexican type trees bloom in the spring and mature their fruit in the fall months. One source of these spring fruits is a small village, Tochimilco, on the side of the old extinct volcano Popocatepetl, which lies about fifty miles south of Mexico City and thirty miles west of Atlixco. We searched through the village of Tochimilco, where a number of the spring fruiting trees were found growing in dooryards in most cases. We inquired of the owners as to the behavior of the trees and were told that these trees bloomed mostly in the fall and matured the major portion of their crop in the spring. It was also mentioned that a second and smaller crop of fruit matured in the fall as the result of a small bloom produced in the spring. Thus there appears to be a group of Mexican type trees which fruit in the spring, whereas the ordinary Mexican type tree matures its crop during the fall. Budwood of these off-season trees was obtained for further study to see if such bearing behavior will continue under California conditions.

It may be stated in general that a considerable amount of botanical and horticultural investigation remains to be done before a well defined system of classification for the many avocado forms can be developed. The relatively few and isolated observations made by the committee during the very limited time has only stimulated the group to make more intensive investigations. The materials which were brought back as budwood should be of considerable interest in future investigations on such problems as rootstocks, breeding, disease resistance, and botanical and horticultural classification.