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CONTINUED SEARCH FOR AVOCADO ROOTSTOCK AND BREEDING MATERIALS-1953

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The imperative need for new avocado rootstocks and breeding materials has provided the stimulus for many trips to Mexico by several California avocado growers and research men to locate these much needed plants and attempt to introduce them into California. An opportunity for a trip with this objective was presented in July, 1953. Accompanied by Ben Needham, of Vista, I traveled by plane from Tijuana to Durango, and then drove by private car to Monterrey in Nuevo Leon State. We then took a bus southward to Ciudad Victoria in Tamaulipas State to join a group of men from the Texas Avocado Society who were also exploring the area for avocado materials. The Texas group included Everett Ballard, Dr. E. O. Olson, Raphael Cintron and his daughter Josephine, and Jose Barrera. Our center of operations was Hotel Gordo at Ciudad Victoria, operated by Enrique Benites, who has been the host of and participant in the several avocado explorations which have been conducted in the Ciudad Victoria area.

Previous visits to the Ciudad Victoria area of Tamaulipas State, Mexico, by many members of the Committee on Foreign Exploration have resulted in the location and study of several forms of the avocado, both wild and cultivated, which are of particular interest as potential rootstock and breeding materials for use in California and Texas. The rather detailed observations and accounts by Griswold[3] and others[1,2,4,5] of the cultivated avocados in the Arsola and Castro groves near Ciudad Victoria have suggested that there may have originated in this area a group of clones which presumably are natural hybrids between parent trees of the West Indian and Mexican horticultural races. These tentative conclusions are based on the facts that the fruit characters are intermediate between the two groups and that the season of maturity is earlier than the typical Mexican fruit of the area. Furthermore, the rather outstanding hardiness to cold of these trees, which otherwise have characteristics of the usually tender West Indian race, lead one to conclude that these are not a simple group of individuals representing any of the three horticultural races of avocado generally described in the literature.

Among the characteristics of the fruits noted in this group of hybrids is large size. Fruits

from a typical West Indian tree are normally of large size. They are referred to by the native people as "pahuas." The hybrid fruits are somewhat smaller than typical "pahuas," but they have the smooth skin of the West Indian and Mexican fruits and in addition have a thin skin more like the Mexican types.

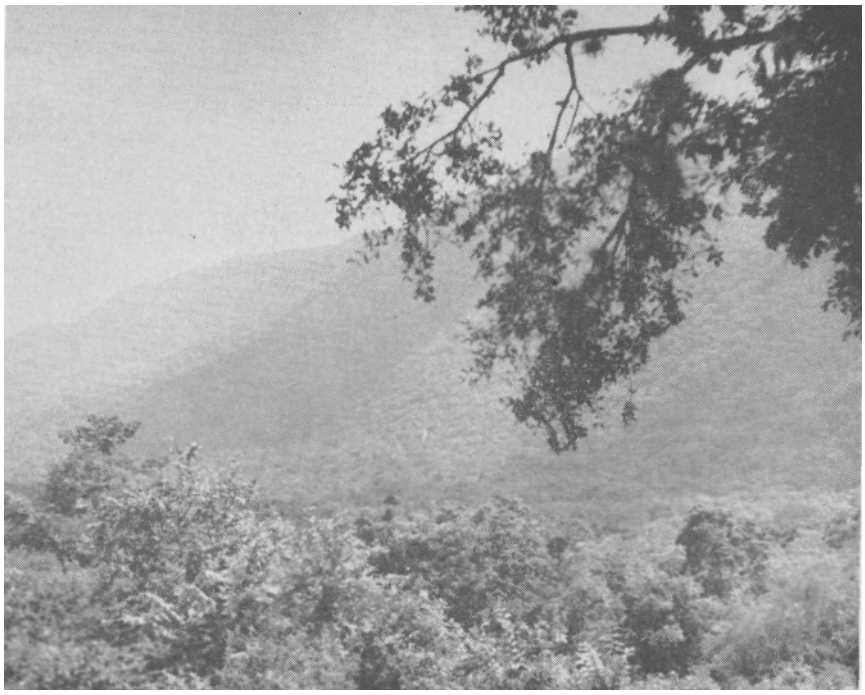

Fig. 1. *The valley near Gomez Farias in Tamaulipas state, Mexico.*

The season of fruit maturity at Llera is July and August. It is suspected that under California conditions the period of maturity will be a month or two later.

The tree characters which suggest hybridity in many of the trees in the area around Llera and Ciudad Victoria are the large leaves of pale green color characteristic of West Indian varieties, and the presence of anise, a character associated with trees of the Mexican race.

While the late summer season of maturity is a desirable fruit character which we could utilize to advantage in California, it is likewise possible that such material may have other characteristics which would make it suitable for rootstock or breeding use, such as disease and cold resistance or tolerance to other unfavorable soil conditions. An attempt is being made, therefore, to introduce into California both clonal and seedling materials of hybrid type from this area for further investigation and experimental use. Several clones selected from the extensively studied Arsola grove have been successfully established in California and are being observed with interest. Preliminary

observations have suggested that, comparable to the parent trees, the introduced clones in California exhibit a fairly high degree of frost resistance compared to the Fuerte variety.

In order to obtain a wide range of plant and fruit characteristics it is desirable to grow a progeny of seedling trees. With this objective in mind, several dozens of seed from various trees of suspected hybrid origin in the Arsola grove were collected and brought to California. These are now being germinated and grown for further observation at Los Angeles. Some of these materials will be tested eventually for disease resistance by the Department of Plant Pathology at Riverside.

Fig. 2. *Undergrowth of Ocoteo species rootsprouts and seedlings near Gomez Farias, Tamps.*

One of the chief objectives of the avocado introduction program of the University has been to locate and introduce into California representatives of as many of the forms and types of the avocado and its close botanical relatives as possible. This search has been stimulated by the excellent cooperation of the California Avocado Society and by the personal participation of many of its members and friends who have provided information leading to the discovery and introduction of many new materials. Through the cooperation of Sr. Oscar Guerra, a former student of the University of California, Los Angeles, now with the department of water resources in Ciudad Victoria, we were able to explore a new locality suggested by him. It was the mountain valley village of Gomez Farias, located high in the mountains about fifty miles south of Ciudad Victoria and about seven miles west of the main highway. Via jeep and pickup our exploration group

traveled with Senor Guerra and Oscar Berlanga Ruiz, another former student from California, to this rather isolated mountain valley. The characteristic tree dominating the

landscape was the mango. These mango trees reached huge proportions, towering perhaps fifty or sixty feet into the air. Papayas and bananas provided the major portion of the undergrowth. A considerable number of West Indian avocado trees were intermingled among the mango. The chief objective of this particular trip to Gomez Farias was to locate and collect a botanical relative of the avocado called by the local people the "aguacatillo," or little avocado. The botanical name of this plant is *Ocoteo spp.* It is a shrub or small tree with leaves very much like an avocado but having a more slender stem and smaller buds. The fruit, about the size of a small olive, is not eaten. It consists primarily of seed with very little flesh. Some of these plants were found growing under various conditions of light and shade. In one area an excellent stand of aguacatillo was found growing in the bottom of a swale in which the soil was saturated with moisture probably a good portion of the year. We were especially desirous to find rootstock materials which will withstand and tolerate such adverse soil conditions. A collection was made of young seedlings and rooted root suckers from the area. These materials have been successfully brought into California and are being established for continued observation and experiment to determine their possible and potential value as rootstocks under various conditions of soil moisture and disease infection.

Among the larger avocado trees observed in the Gomez Farias area were trees which appeared to be the typical Mexican type but without anise in the leaf. These trees were without fruit at the time in July, but a few seed, the remains of the crop located among the fallen leaves, indicated by their small size they represented a group of small fruited specimens, perhaps a primitive form of the Mexican horticultural race. This probably is the identical form noted about 150 miles south at Xilitla in 1952[5]. The simultaneous occurrence of the aguacatillo at Xilitla suggested that these two types of avocado-like fruits probably extend for some distance north and south in that mountain range.

Upon return to Ciudad Victoria we visited the Castro grove in the southwest section of the city. This grove consists of perhaps five or more acres. It is actually a dooryard orchard of very large size in which are planted many kinds of fruits such as mango, loquat, passion fruit vines, peaches and others. Dominating the orchard are many large specimens of avocado of typical West Indian type and of the hybrid type, as described in the Arsola grove at Llera. Seed were collected from the hybrid trees at the Castro grove.

We called upon several officials of the department of agriculture in Ciudad Victoria and visited with Dr. E. A. Pequeno, of the University of Nuevo Leon at Monterrey, just before leaving the area, at which time it was made known to us that several mountain valleys west of Ciudad Victoria contained avocado materials, both cultivated and wild. These areas have not been visited by competent horticulturists or research men to evaluate the materials which are growing there. This area should be explored at some future date.

LITERATURE CITED

1. Chambers, J. B. The Joint California-Texas Expedition to Victoria, Tamps., Mexico. Texas Avocado Soc. Yrbk. 1952: 10-15.
2. Cintron, R. H., Cooper, W. C., and Olson, E. O. Avocado seedling selections in the

Arsola grove at Llera, Tamps., Mexico. I. Freeze injury to trees of Mexican and West Indian races and their hybrids. Texas Avocado Soc. Yrbk. 1952:19-22.
3. Griswold, H. B. Mexican Exploration of July 1952. Texas Avocado Soc. Yrbk. 1952:16-18.
4. Miller, W. W. Expedition to Mexico. Calif. Avocado Soc. Yrbk. 1952: 31-34.
5. Schroeder, C. A. Avocado Exploration in Mexico, May 1952. Calif. Avocado Soc. Yrbk. 1952:27-30.