

AVOCADO GROWERS' STUDY MISSION #2 TO MEXICO—1970

C. D. Gustafson

Farm Advisor, San Diego County

Forty-one avocado growers from San Diego, Orange, Riverside, Los Angeles, and Santa Barbara Counties participated in the second Avocado Growers' Study Mission to Mexico. The purpose of the tour was to observe the expanding avocado industry in Mexico, meet the avocado growers and research workers, have meetings with the various grower groups to exchange cultural and marketing information, and to view the beautiful country of Mexico. The group experienced the usual warm hospitality of the Mexican people. Meetings, dinners, luncheons, refreshments in the orchards, topped off with a full-fledged Mexican fiesta, were some of the activities in honor of the California visitors.

The tour began in Mexico City, where the group flew directly from San Diego. After a couple of days of sightseeing and becoming acclimatized to the high altitude, the first session was held at the United States Embassy in Mexico City. The Assistant Agricultural Attaché, Dr. Thomas B. O'Connell, gave a briefing on agriculture in Mexico with special emphasis on avocados and their increasing importance to the agricultural economy of that country. The avocado is one of Mexico's best known trees, having been cultivated there for centuries. One report from a grower mentioned that some trees in the Uruapan area are estimated to be 300 to 500 years old. In driving through the countryside, the group could observe avocados growing wild on the hillsides along with pine trees and other native trees.

Since the first study mission in Mexico in 1967, there has been considerable activity in the planting of new commercial orchards throughout the country of Mexico. Varieties being planted mostly are Fuerte, Hass, Bacon, Zutano, and Rincón. In the more tropical areas on both the east and west coasts, the Florida-type varieties such as Booth 7, Booth 8, Lulu, and Waldin are planted. The group visited groves at elevations from sea level to over 8,000 feet. Research stations were visited both in the field and at the National Agricultural College in Chapingo.

The commercial planting of avocados has been increasing every year for the last four or five years. The greatest increase occurred in the last two years in the states of Sinaloa, Colima, Michoacan, Guanajuato, state of Mexico, Puebla, and Veracruz. The state showing the largest acreage increase is Michoacan, with most of it going in at Tacambaro and Uruapan. This state increased from a planting of 2,425 acres to 9,500 acres within two years. This makes Michoacan the leading state for the number of acres of avocados, followed by the states of Puebla and Veracruz. Because of the older age of trees from Puebla, the tonnage produced per acre is greater in Puebla than in Michoacan, but still Michoacan is second. According to the U.S.A. Embassy figures, in 1968-69 there was a total of 29,370 acres, and increasing to over 44,000 acres during

the 1969-70 period. Production rose from 352 million pounds in 1968-69 to 438 million pounds in 1969-70.

Since the diet of the Mexican includes avocado as a staple item, there is no problem in marketing this fruit within the country itself. However, the more progressive and younger farmers are looking for foreign markets as acreage increases and production goes up. They would like to have access to the United States market, but because of the presence of the seed weevil in Mexico, their fruit is barred from entering the United States. The European market is the next area that they are eyeing for marketing their increased crops.

Avocado varieties belonging to the Mexican and Guatemalan families, as well as hybrids of these two families, do best in Mexico's moderate climate zones. Although they develop well in warm or tropical climates, they do not bear fruit in the normal manner. A large percentage of high quality avocados is attained principally through Mexican native avocado varieties raised in areas where experiments have been carried out in order to develop varieties yielding suitable marketing characteristics. Adequate growing conditions are found in the states of Puebla, Michoacan, Mexico, lower California, Jalisco, Oaxaca, Queretaro, Guanajuato, Hidalgo, Morelos, and Veracruz. Varieties grown in Mexico are: Zutano (Mexican); Rincón, Fuerte, and Bacon (hybrids); Choquette (Guatemalan and West Indian); Hass and Lulu (Guatemalan); and Waldin (West Indian). Varieties preferred in order of quality are Fuerte, Hass, Zutano, Bacon, and Rincón. However, the Fuerte variety is extremely sensitive to climate and soil conditions. Care is exercised when this variety is being planted.

Avocados are not yet being commercially processed in Mexico because of high processing costs and lack of specialized technical staff. Within the three groups, each variety is differently resistant to handling and transportation. Under normal conditions, avocados are packed in wooden crates and recently in corrugated cardboard cartons.

The first orchard the group visited was near the city of Tacambaro. It was a 250-acre orchard, only one of many owned by a group of doctors from Morelia. Meeting the bus load of avocado growers with jeeps, pickup trucks, and station wagons was Dr. Mario Alvizouri, the group leader. A five-mile drive over a steep, winding dirt road through beautiful mountains brought us to the orchard. Dr. Alvizouri briefed the group on the setup of the orchard and explained what they were attempting to do in developing avocados in Tacambaro. Seventeen hundred acres have been planted in various areas within the district. We visited two orchards, this first one of 250 acres, and second one of 50 acres. Fuerte and Hass varieties dominate the plantings, with approximately 30 percent of each variety, and the balance of 40 percent divided among some promising Mexican varieties. On each orchard there are tests being conducted with varieties introduced from California. They are Bacon, Jalna, and Zutano in addition to other untried Mexican varieties.

Irrigation is considered one of the less important cultural operations in Mexico. In this area the water is free, but must be taken on a schedule so other people in the neighborhood will have a chance to use water. Fertilization is done with a combination of fertilizer materials, such as ammonium sulfate, ammonium nitrate, manures, and organic materials. These are applied throughout the year, depending on whether it is

inorganic or organic. Rainfall is from August to October, and measures between 30 and 50 inches per year.

The trees in this orchard are three to five years old. On some one-year-old trees, an experiment is being conducted with the use of drip irrigation. The main flexible hose is one-half inch, scaling down to a *very* small diameter hose which leads into each tree basin. At the end of each hose is a regulator similar to what is used on intravenous feeding apparatus. In the early stages of their experiment, the doctors used the throw-away tubing and valves from this intravenous feeding apparatus. Now they have begun to manufacture their own tubing and mainline flexible plastic hose. The hose will conduct water to ten rows of trees with ten trees per row.

After the visits to the orchards of Tacambaro, the group was driven to beautiful Lake Patzcuaro, where they boarded a launch to ride across the lake to famous Janitzio Island, the home of the butterfly net fishermen. The drive from Patzcuaro to Uruapan took about an hour. The road took us through beautiful mountain areas, where wild avocados could be seen growing on the hillsides along with the pine trees and other native tree species. Avocados are grown at an altitude of between 5500 and 8000 feet in this part of Mexico. Uruapan is in the state of Michoacan, which shows the largest acreage increase in planting avocados for the whole of Mexico. This state increased from a planting of 2400 acres to over 9000 acres within two years. Even though many of the acres are relatively young and have not reached full maturity, it is still one of the highest producing states of the country. Puebla and Veracruz are the highest.

In Uruapan we were greeted by a large group of Mexican avocado growers. Since the last visit of three years ago, the growers have joined forces and now have one growers' association which is working to establish and expand the commercial avocado industry. The motel where the group stayed was less than two years old, and was on the property of an avocado grower, Dr. and Mrs. Ceballos M. It was beautifully situated among the pine trees overlooking the highway, an avocado orchard, and part of the town.

The first evening a dinner was held in honor of the California growers, with most of the Mexican growers of the association and their wives attending. After dinner, native entertainment with native dances and music was presented by a local dance group. Small gifts were presented to each American visitor by their Mexican friends. A wonderful evening was experienced by everyone.

The next day the group was taken by trucks and station wagons to visit two orchards in the area. Both groves were in excellent condition and had old trees as well as newly planted trees. In one orchard the grower presented information in considerable detail as to the type of cultural practices followed, the costs of establishing the grove and maintaining the grove. In the first orchard some old seedling varieties were growing wild. The owner claimed that these trees were about 300 years old. Some of the more important problems facing the growers in Mexico are the diseases and pests. Sprays are applied in some areas as often as once every two weeks. The three most important cultural problems facing the Mexican growers are insects, diseases, and fertilization. Irrigation is relatively a simple thing for these growers since water is supplied free from the various rivers that run through the area. Their only concern is how to divert the water into channels on their property and to get the water to the trees. Some

experimental work is going on with the more progressive grower on irrigation methods. Production from older trees in these orchards ranges from 8000 to 12,000 pounds per acre. Some orchards in the area produced upward of 15,000 pounds or more per acre. The estimate for the cost to raise avocados was about \$300 per acre.

Harvesting and marketing avocados in Mexico is done almost entirely by the individual grower. Fruit is picked into wooden boxes and trucked into the nearest town where it is sold to a retailer on the market. The growers are interested in developing the avocado industry on a commercial scale and to ship their fruit to the main markets in cities such as Guadalajara, Monterey, Mexico City, etc. The growers from Tacambaro have as their goal the prospect, that some day in Mexico, a consistent supply and quality of fruit will be available on every market every day of the year.

The last evening in Uruapan was spent in a meeting with a large group of Mexican and California growers. A good exchange of ideas made it an interesting and profitable session. Questions were many as the Mexican growers are just beginning to learn how to grow avocados on a commercial scale. The avocado association to which these growers belong, now numbers 83 members. The purpose of the organization is to pool information for the benefit of its members. Nothing has been done as yet on marketing growers' fruit because the growers are more interested in how to grow the fruit than how to market it. Some of the large orchard operations have their own packing shed, but the smaller growers pack directly into field boxes and then either sell to truckers coming by or have an arrangement with the local merchants in the nearby town. The group was told that as far as the Mexicans could tell there was no root rot in Uruapan. We did see the root rot disease in Tacambaro, Puebla, and other areas visited. The Uruapan growers feel that the avocado may have originated in their area due to the estimated age of some of the trees that have grown wild. One scientist traveling through the area investigated an avocado tree in the national park of Uruapan and he claims the tree to be approximately 500 years old.

After leaving Uruapan the group traveled to the city of Puebla. The activities in this area included a visit to a large avocado orchard between Puebla and Atlixco that was visited by the first group in 1967. The owner of the property, Sr. Fanciatta, was very happy to see the California group pay a second visit to his orchard. He conducted us through the grove and told us about his cultural practices. They irrigate only four or five times a year because of the heavy rainfall and the clay soils found in the area, Not too far from his orchard in the lowlands around Atlixco, the water table is about one foot below the surface of the ground. Fertilization is with ammonium sulfate, ammonium phosphate, and green-cut alfalfa. Alfalfa grows between the trees and is used for both animal feed and for mulching and fertilizing the avocado trees. Root rot was present in some areas of the grove. They do not have an answer to this problem nor do they attempt any treatment.

The group's arrival in the Puebla-Atlixco area was greeted by members of the local avocado growers association. Mr. Raoul Costes and his brother planned the visit for the group. In Atlixco, we made a visit to the city plaza to view the avocado tree that was given to the people of Atlixco in 1948 by the California Avocado Society, in appreciation for what that city had done to assist the California avocado industry. From the plaza we went directly to the "home of the Fuerte." This is a courtyard in the center of town where

a Sr. Alejandro LeBlanc lived at the time the original Fuerte tree was growing in healthy condition. It was from this tree that Carl B. Schmidt took budwood and sent it to California to the West Indian Gardens. It was this budwood that survived the 1913 freeze and was destined to become the backbone of the California avocado industry.

The Avocado Growers Association of Atlixco had taken on as a project the upkeep of the monument in the courtyard commemorating the origin of the Fuerte variety. This monument was placed in the present spot in 1938 by a group from the California Avocado Society. The plaque is mounted in a cement monument which is painted white and rests in the corner of the well-kept yard.

A number of other stops were made to see the operations of the growers in the Atlixco area.

The final stop in Atlixco was at Hacienda del Santa Cristo Grande, Engineer Huberto Rivorall, the owner, was present to welcome the group. It was an outstanding reception in honor of the American visitors as they had planned a full-fledged fiesta. As the bus arrived at the Hacienda young boys were instructed to set off sky-rockets. A homemade American flag, made by the workers on the ranch coming from Mexico and Cuba, hung over the dance floor and was given to us as a souvenir of our visit. A buffet lunch under the trees was provided by the association of which Engineer Rivorall is the president. Following lunch a dance was provided by a local Indian dance club. Cockfights were presented after the dancing. The day's activities will never be forgotten by the group of Americans that made this trip. The friendly people and their warm hospitality will be long remembered. As the visitors boarded the bus to leave, the band played La Golondrina in honor of the visitors.

On the last day in Puebla, Oliver Atkins and I met with Mr. Enrique Costes and Raoul Costes in their home. Oliver Atkins, president of the California Avocado Society, met with Enrique Costes, one of the directors at large for the Avocado Society, to discuss a meeting between California growers who are directors of the Society and the Mexican growers. Also, we discussed the possibility of holding a World Avocado Congress. Since the Puebla area is the home of the Fuerte avocado and because this variety is being grown around the world, it was felt that the first meeting of the Congress should be held in this historical city. Plans are being formulated and various countries around the world are being contacted in order to obtain a reaction to holding such a meeting.

The following day the group traveled to Tlapacoyan to visit the Coffee Institute, a research experimental station. The drive was through beautiful tropical areas where coffee, avocados, mangos, papayas, citrus of all varieties, and many other fruit and ornamental tropical plants grew.

On arrival at the Institute, the workers and growers from the surrounding community provided refreshments for the California growers as they ate their box lunches. Shortly after lunch the Institute research workers briefed the growers on the work being conducted at the station and in the surrounding territory.

The director of research told of the 14 years of research that have been going on with coffee, avocados, mangos, and citrus. Extensive nurseries have been established for the propagation of varieties and root-stocks of avocados, citrus, coffee, and mangos. In

addition to these four main crops, the Institute is working in cooperation with the National Research Institute on macadamias, papayas, and rubber. The various production problems studied by the research staff are distributed among a number of staff personnel and their assistants.

Pests and disease are the main problems facing the growers and researchers of this region. The most important and most serious pest of the avocado is the seed weevil which causes 100 percent loss of the fruit. This year they were encouraged in that they could hold down the infestation of the seed weevil with eight sprays compared to last year's 12. The cost per tree per application is about 8 cents. The work on seed weevil will be given increased attention as this is the one pest that prevents the fruit from coming into the United States legally. Other work is being done on such pests as amorbia moth, leaf roller, avocado scab, ringneck, and anthracnose.

Since this is a tropical area, most of the fruit that is grown are the Florida-type varieties such as Choquette, Lulu, Hall, etc. Avocado scab, a fungus disease, attacks the Lulu and Hall the worst. Ninety percent of the Lulu fruit and 74 percent of the Hall fruit will be attacked.

During the talks we were told that in November a country-wide program would be held for growers. They showed beautifully made charts which were part of the educational material to be presented to the growers. These researchers were actually doing two jobs; first, the research work, and then an Extension job of going out and telling the growers what research has found out. Uruapan was to be one of the more important areas for the discussion of problems affecting avocado growing. The reason being that this district was the fastest central growing one in avocado plantings. One of the final talks at the station was by a researcher on fertilization. He presented material on the amount of fruit produced when nitrogen, phosphorous, and potassium were used. He pointed out that the greatest yield occurred when nitrogen, phosphorous, and potassium were used, and the increase was 92 percent over the trees receiving no nitrogen, phosphorous, and potassium. An interesting thing, however, was that even when no fertilizer was applied the yield of that variety, Booth 7, was 12,840 pounds per acre!

After the talks, a tour was provided for the group to visit the station grounds and observe some of the projects under way. The program for the day was planned by Mr. Takashi Turn, the other director-at-large for the California Avocado Society.

The last few days of the Mexican tour were spent traveling through the East Coast around Veracruz, and then back to Mexico City. We learned more about avocado production in Mexico; we saw more of the beautiful scenery that Mexico has to offer, and we learned more about the wonderful warm hospitality of the Mexican people. It was a trip long to be remembered.

Following is a list of growers who made the trip:

Oliver and Alice Atkins, Fallbrook
LeRoy and Elizabeth Cole, Los Angeles
Larry Freeman, Bonita
Ralph and Thelma Goodspeed, Santa Barbara
Don and Mary Gustafson, San Diego

John Hankey, Pauma Valley
James Hastings, Escondido
Lester and Margaret Heald, South Laguna
Walter and Tena Henning, Fallbrook
Henry and Frances Hoeger, Corona
Alfred Von Norman, Fallbrook
James and Kay Johnston, Escondido
Murray and Frances Johnston, Fallbrook
Ray Lemon, Fallbrook
Frank and Virginia Lindsay, Fallbrook
Yoneo Kariya, Pauma Valley
Alvin and Mary McBurney, Fallbrook
Carlos and Doris McIntosh, San Diego
Betty McWilliams, Vista
Seward and Betty Miller, Valley Center
Ray and Eleanor Moye, Sherman Oaks
Malcolm and Esther Parker
Dr. and Mrs. Pitchford, Riverside