

AVOCADO COLLECTING IN GUATEMALA

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In April 1972, another avocado search was undertaken in Central America. Guatemala located directly south of Mexico and about the size of Tennessee, presented us avocados and obstacles. This geographic location produces a fantastic variety of terrain and climate. This variation also extends to the inhabitants. Half the population of this lush agricultural country is Mayan Indian (descendents of the ancient Mayan civilization) while the balance is a mixed composition with strong Spanish influence. The national language is Spanish, but numerous different Mayan dialects prevail in the scattered Indian communities. A mile high mountainous plateau creates a rugged backbone through central Guatemala, and in these forested highlands much coffee (the major export) is grown. Here wild avocados and scattered domestic varieties grow among acres of corn, beans, and potatoes, staples in the Guatemala diet. In the coastal lowlands, the tropical environment favors such crops as sugar cane, coconuts, and pineapples. Also there is a small desert-like area in the south and a large, sparsely populated grassland in northern Guatemala. Climatically, there are two seasons. A rainy season extends from June through November and a dry season exists during the other months. During the wet season, 1-2 inches of rain fall daily. In this land of contrasts, our avocado explorations were conducted.

Since Guatemala is apparently one of the areas of origin of edible avocado types, and since numerous other species of *Persea* are found there, we felt this was a logical place to look for root rot resistant prospects. One method we employed consisted of using Dr. Kopp's compiled key¹ which has botanical descriptions, locations, and common names (names used by local natives for particular regional avocados) of *Persea* species described by earlier investigators. With this information, we canvassed the more promising areas. These trips produced budwood and sometimes fruit (seed source). The decision to work during the dry season was prompted by the fact that even our jeep found the numerous dirt roads impassable during the rainy season. Another collecting method consisted of visiting local markets and discretely selecting unusual fruit. In this article, a few trails and trials experienced during our collecting are described.

Antigua, the capital of Central America until an earthquake destroyed its major structures in the late 1700's, was selected as our headquarters. This small, old town is centrally located and possesses a post office where collected material can be mailed conveniently. Antigua, with its cobblestoned streets and unrestored ruins, lies in a highland valley surrounded by volcanoes. Situated in the corner of the square of this ancient town is a unique plaque (Fig. 1) presented by the California Avocado Society in 1946. Also a world renowned, former Californian, Dr. Wilson Popenoe, resides here in his museum-like home. Additionally, Dr. G. A. Zentmyer has established a working relationship with Dr. Eugene Schieber, a Guatemalan plant pathologist residing near

Antigua, to make avocado collections during the past year. Dr. Schieber accompanied me on trips described in this article. These subtle ties with California and the proximity to the Schieber home, reinforced our choice of Antigua as a base camp.

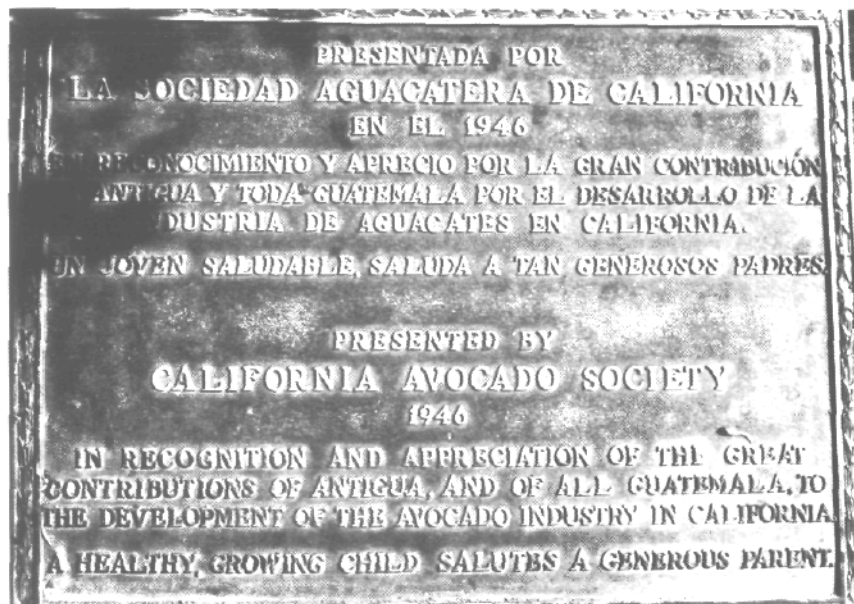


Figure 1. Plaque located in central square of Antigua.

One of our more eventful expeditions was to the department of Jalapa. This forested, mountainous state lies east of Antigua. Our old rented jeep, oscillated, rattled, and bounced our weary bodies along one-lane dirt roads winding through the mountains. Our primary interest on this trip was collecting material from *Persea steyermarkii*, a wild species similar to avocado, with small globose fruit 2 inches in diameter, known in this region as "aguacate de montaña." Using this key phrase, periodic stops and contacts with local natives yielded budwood collections from 4 possible candidate trees. On our last night, we slept in the town of Miramundo which is built on a 7000 ft. mountain top. After a refreshing night's sleep on our jeep tailgate, local residents directed us to a short, fantastically fruit laden *Persea americana* var. *nubigena* tree. We saw some of these rough barked trees with small narrow leaves growing up to 120 ft. in height with most of the 3-4 inch green globose fruit located in the tops. Since this tree is phylogenetically closely related to the domestic avocado and offered us an excellent opportunity to collect numerous seeds, we gathered materials extensively. Later this day, we arrived in the city of Jalapa. (Fig. 2) From here we planned to return to Antigua via a long roundabout paved road. Only 5 miles out of Jalapa, our vehicle stopped. Two hours and one new distributor later, we cautiously journeyed back to Antigua.

Our longest exploration consisted of a trip to Coban, an isolated coffee and silver town, in north central Guatemala. Until recently this area was practically separated from the rest of Guatemala because of its proximity to Atlantic ports and its poor roads connecting it with central Guatemala. To reach Coban involved a long day of difficult

driving. First, one crossed the desert area where temperatures often soared to 110 degrees F, forcing giant iguanas to zip rapidly across the highways. Then one climbed over two mountain ranges before descending into Coban. Here, numerous different collections of *Persea schiedeana*, (Figure 5) trees with large (golden haired) glabrous leaves and large, green, thin skinned pyriform fruit, and *Persea donnell-smithii*, trees similar in appearance to the former but in contrast bearing tiny fruit 1-2 mm in diameter, were made along with some unidentified species. Our most spectacular find was a small 15 ft. *Persea americana* var. *drymifolia* tree, (Fig. 3) bearing small egg shaped sized, thin skinned black fruit. The typical avocado leaves, bark, and even the fruit skin of this tree possessed a strong anise odor when crushed, suggesting a Mexican origin. This trip again was not without problems. Two flat tires and the agony and embarrassment of extracting a four wheeled vehicle out of rain forest mud, reduced our search to a standstill at times.



Figure 2. Looking west from Jalapa region. Volcano at far left is Pacaya. The three large volcanoes in right of photograph, from left to right, are Agua, Fuego, and Acatenango.

A one day trip to the Pacific coastal lowlands turned up a most interesting tree. This tree was locally called "aguacatillo cimarron" (Figure 4) and was located on a steep slope of the active volcano, Pacaya. The very small (2 inches long), black oval fruit were attached to the tree by large peduncles, atypical of avocado, but the leaves were typical avocado. The tree itself was robust, with the shape of an American elm tree, and with moss covered dark grey bark. Unfortunately, there were only a few scattered fruit clinging to branches 30 to 40 feet above the ground. A half hour struggle with a long bamboo pole balanced and maneuvered precariously on these steep slopes netted 4 fruit. Later we drove to a quinine farm along the coast and collected quinine seedlings infected with *Phytophthora cinnamomi* (root rot fungus). The heat and humidity here were actually oppressive, and we welcomed the tropical downpour that accompanied us back to Antigua.



Figure 3. Leaves and fruit of *PERSEA AMERICANA* var. *drymifolia* found in Coban.

Our one aqueous excursion involved crossing Lake Atitlan and exploring inaccessible areas there. This beautiful lake, about 10 miles wide and 16 miles long, surrounded by extinct volcanoes, is located in the highlands. The one access by vehicle to Lake Atitlan is at the town of Panajachel. The mode of transportation to the dozen scattered Indian villages along the shores is by boat. At 4 a.m. on Panajachel market days, a large boat motors from Panajachel to different villages, collects Indians and their wares, and brings them to market. This boat, which resembles a small tugboat, is claimed to be able to crowd 100 occupants on the floor and benches inside and balance their belongings on the cabin roof. These boats, when fully loaded, creep along about 10 mph. In late afternoon, this boat returns the Indians to their villages. Utilizing this arrangement, we took the boat across the lake in the morning, hiked, climbed, and collected avocados during the day, and caught the returning boat in late afternoon. Every afternoon a strong wind called the "Chocomil" blows across Lake Atitlan and develops treacherous waves sometimes 4 to 5 feet in height. Traveling slowly back through these circumstances, I removed my boots to prepare for anticipated swimming when the boat capsized. Fortunately, boots, explorer, and collected materials, departed together when the boat docked safely in Panajachel.

The above described trip yielded two interesting samples known as "Kanoj colorado" and "Kanoj blanco" growing high on the slopes of volcano San Pedro and budwood from an isolated tree near the Indian village Panyabar, 5 miles back in the hills. The "Kanoj colorado" was a rather small (15 ft., tall), smooth grey barked tree with yellowish green, medium sized elliptical shaped leaves (5 inches long and 3 inches wide) and with reddish, thin skinned fruit $\frac{1}{2}$ inch in diameter. The "Kanoj blanco" was found nearby and was similar in nature. This brown barked tree possessed dark green, paper-thin leaves, but had no fruit. Finally, a large 70 ft. tree was discovered in the hills near the Indian Village of Panyabar. This tree lacked fruit and flowers, but a seedling beneath this tree indicated the seed to be oval shaped about 2 inches long. The leaves of this tree were thick, smooth, and leathery textured. These three collections produced the two weariest,

sorest bodies in all of Guatemala.

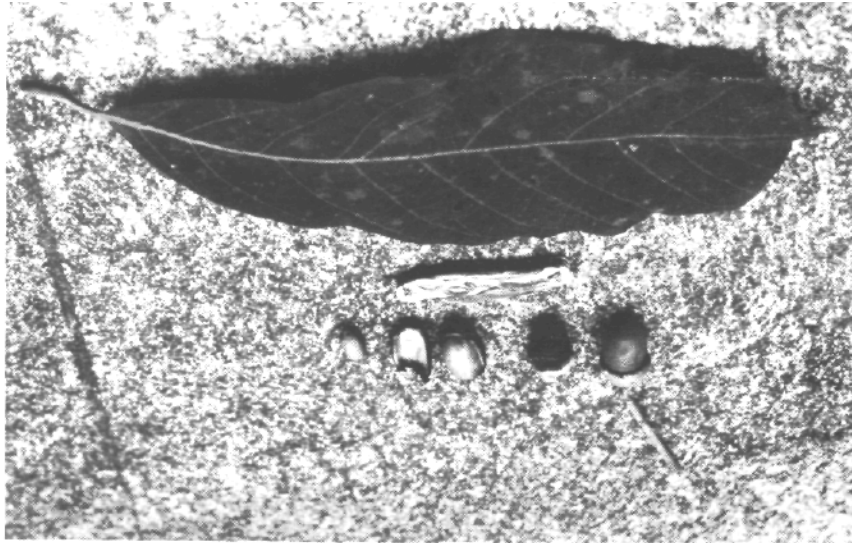


Figure 4. Fruit, seeds, and leaf of "aguacatillo cimarron" located on slopes of the volcano Pacaya.

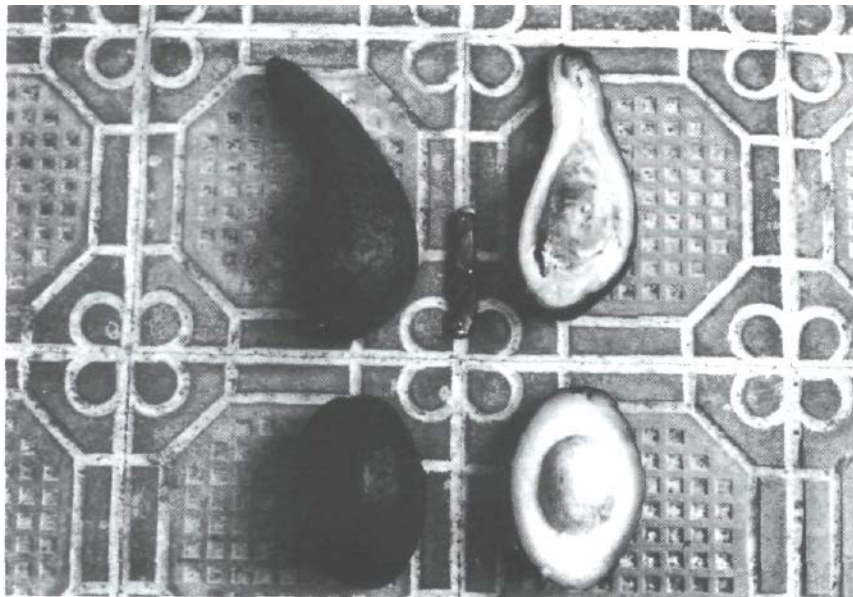


Figure 5. Upper row *PERSEA SCHIEDEANA* fruit. Lower row unidentified variety of *PERSEA AMERICANA*.

In Guatemala, each village has a special day of the week that is Market Day. It is a gay occasion. Stalls are opened in the Market Place and merchants, farmers, and craftsmen display their specialties. Brightly woven fabric of ponchos and shawls in bright stripes and traditional Mayan patterns line the sides of many stalls. One stall is bright with tinware, another offers native pottery, and another exudes the pungent odor of home-

made candles and soaps. Everything is sold at the market, wonderful tropical fruits including avocados, and vegetables, coffee, flour, and rice. Meat can be purchased on the hoof (or claw) and you are provided a string to lead away your chicken, pig, or cow. Visits to local markets produced humorous episodes. After selecting avocados and agreeing on a price, I would amaze the merchant by purchasing 15-20 fruit. Then I would convince him that I was a "loco gringo" by extracting the seeds and leaving the fruit.

The 40 separate collections made during this month are now undergoing root rot resistant screening tests at the University of California at Riverside. Credit for the success in these collecting efforts is attributed to the fine organization provided by Dr, George Zentmyer and the excellent assistance provided by Dr. Eugene Schieber. Dr. Schieber's knowledge of the languages, people, and country was invaluable,

1. Koops, L. E. 1966. A Taxonomic Revision of the Genus *Persea* in the Western Hemisphere. *Memoirs of the New York Botanical Garden* 14(1):1-120.