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REPORT FROM HONDURAS

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Dear Reader in Fallbrook, Fillmore or Fullerton—in Garden Grove, Gaviota or Glendale—do not cast a glance at the above title and say to yourself "What do I care about Honduras? I shall pass this by and read Jack Shepherd's report on marketing problems." We believe we can convince you that the Escuela Agricola Panamericana in Honduras is rapidly becoming the tropical outpost of the California Avocado Society. We are conducting, in your interest more than ours, a number of projects. No final results are available (are final results ever available?), but at Harlan Griswold's request we are jotting down the following notes, some of which may interest you.

BOTANY

There are still plenty of taxonomic problems connected with wild as well as cultivated forms of the genus Persea. Many years ago, Sidney F. Blake at Washington examined critically the herbarium material I had collected in California, Florida, and tropical America, and made a new species, *Persea leiogyna,* of the well-known Trapp avocado of Florida. Later he came to feel (or so he told me; I do not know that it is in print) that there were not sufficient grounds for this distinction. *P. leiogyna* seems to be pretty well forgotten.

Not so with the taxonor&ic difference between the Mexican race and the others. Until Carl Crawford succeeds in finding the Mexican growing in a truly wild state—and he will succeed if it takes him the next fifty years—it may well be impossible for botanists to agree on its status—though at present there is a strong tendency to make a botanical variety out of it—*P. americana* var. *drymifolla.*

For many years I have been talking about wild avocados—the prototypes of our cultivated forms. More recently, several members of the California Avocado Society—notably Harlan Griswold, Carl Crawford and Dr. Schroeder—have picked up the trail in Mexico and have brought new material to light. And the more new material we have, the more difficult becomes the problem. It has now gotten into the hands of the specialists—What is the old saw about a specialist, "a man who knows more and more about less and less?" Whenever I found, in my travels, anything which looked like an avocado I called it a wild form of *Persea americana* and was quite pleased with myself for having discovered another avocado ancestor.

So when I found a wild avocado near Tecpan, Guatemala, I considered it might easily be the prototype of the Guatemalan race—and this is still a strong probability. But Dr. Louis O. Williams, who is developing here at Escuela Agricola Panamericana the most complete herbarium and one of the best research libraries in tropical America, has this

year described (in our scientific journal "Ceiba", Vol. 1, No. 1) the wild avocado of Chichoy (or Tecpan, as I called it years ago in one of the Yearbooks of the Society) as a new species, *Persea nubigena.* And—to my mind at least—he places this whole subject of avocado botany in a new light when he says:

"Persea nubigena belongs in a complex of wild species all, except *Persea floccosa* of Mexico, of which are as yet undescribed,—the complex extends from Mexico to Honduras and probably on to Costa Rica. The nearest relative is the cultivated and ubiquitous *Persea americana,* which is cultivated throughout the tropics and even into the edge of the temperate zone."

Eventually we are going to get somewhere in this study of wild *Perseas.* For the first time in many years new material is being brought together rapidly—thanks to the presence of such botanists as Paul Standley and Louis Williams at Escuela Agricola Panamericana; to the visiting firemen who now come more frequently to this part of the world; and to the work which Californians have done in Mexico. The "avocado complex" of Dr. Williams may well come to include a number of closely-related species—several more than are now recognized taxonomically. And eventually we may get a reasonably clear understanding of the origin of our cultivated forms.

On the latter point there is one new development worthy of mention. Paul Allen, a well-known botanist who is working in southern Costa Rica, has found a wild avocado in the mountains of that region which may be the prototype of the West Indian race. He will bring together further information in the near future. Some 15 years ago I remember seeing trees of a wild avocado in a closely adjacent region, near Boquete, Panama, which gave me the feeling that they might represent the prototype of the West Indian race; but I could not get either flowers or mature fruits at the time, so I had little on which to base an opinion.

After reading this somewhat lengthy discussion of a recondite subject I can hear one of the gentlemen from Fallbrook or Gaviota saying to himself: "Guess I was right. I will go back to Jack Shepherd's report on marketing problems."

So we shall leave the botanical complex and turn to a subject which not only should be, but actually is, of interest to every avocado grower in the United States, viz., the new avocado varieties from Mexico which have been introduced to horticulture during the past few years by the Committee on Foreign Exploration of the California Avocado Society. Harlan Griswold reported briefly on the work of this committee in the 1949 Yearbook.

The only reason we in Honduras have anything to report this year is that avocados grow faster here than they do in California, and consequently, quite a few of these new introductions have come into fruit. So far as we have heard, none has done so in California up to this time.

Obviously, the behavior of an avocado variety in Honduras is not much of a guide to its value in California. We can not obtain here any data regarding resistance to frost, nor regarding the season of ripening of the variety under California conditions. But just the same, those who are interested in new varieties may care to read the following notes regarding the collection (which we call for convenience the 13000 series) introduced

from the famous Rodiles grove in Atlixco in the autumn of 1947. We cannot as yet offer any notes regarding the 14000 series, introduced in the late summer of 1948. Few varieties of this series have produced fruit here as yet, due in part to the circumstance that the original buddings were on seedlings in an unfavorable location and we could not leave them *in situ* until they produced fruit—we had to propagate them as rapidly as possible and then get them on better soil.

The introductions of 1947, all from the Rodiles grove, were selected in the latter part of October by Harlan B. Griswold, Carl S. Crawford, Louis O. Williams and Wilson Popenoe. The introductions of 1948 were selected in the Rodiles grove and in one or two other parts of Mexico by an impressive battery of avocado fanciers, including the Dean of the Corps, Dr. J. Eliot Coit of California, Carl Crawford, Knowles Ryerson, Dr. C. A. Schroeder; and from Texas Dr. William C. Cooper, Dr. Rafael Cintron and J. R. Padgett; with a couple of Hondurans tagging along behind—Louis O. Williams and Wilson Popenoe.

The history of these explorations has been sufficiently set forth in previous issues of the Yearbook. I have become a bit self-conscious about history, because when I began to publish pomological descriptions of early avocado varieties in California— back in 1910 or 1911—I did not record the origin of certain varieties and now these origins may never be known.

Lest I begin to reminisce we shall proceed at once to comment on the behavior at Escuela Agricola Panamericana, elevation 2600 feet, of the 1947 introductions from Atlixco. And incidentally, I would add that the 1947 introductions on the whole show a strong tendency to approach Fuerte in character, while many of the 1948 selections look more like Mexicans. This is due to the fact that in 1947 Harlan Griswold (who led our little group as we worked through the Rodiles orchard) had Fuerte in mind as the standard, the idea being to get some new varieties which were like Fuerte in character but might be earlier in season or more productive in certain areas; while in 1948 we felt we had done this part of the job in general—though still keeping varieties of Fuerte character as our major interest. We looked also for varieties leaning toward the Mexican side—bigger and better Mexicans as it were.

Notes on the Behavior of the 1947 Introductions from the Rodiles Grove, at Tegucigalpa, Honduras. November, 1950

No. 13515. This was known in Atlixco as "Rodiles No. 1" because the original owner of the grove—the Rodiles who planted the trees—thought it was the finest avocado of all. We saw fruits on the parent tree—they were nearly mature. Beautiful fruits, like Fuerte but larger, and with a smaller proportion of seed to fruit. But the parent tree did not seem to be a heavy producer.

Here in Honduras we succeeded in saving only one bud. It is now 10 feet high and coming into blossom. It has not yet produced fruit.

No. 13516. Known in the Rodiles Grove as "No. 2." We have two trees from the original buddings, now 15 feet high. The foliage is quite distinct from that of Fuerte (incidentally, "Rodiles No. 1" is much like Fuerte in foliage but more upright in growth). Our trees

flowered profusely in 1950 and produced a few fruits, oblate, green in color, in size and shape about like the old standard Florida variety Trapp. The seed is large. We did not get an opportunity to test the quality here but we doubt that this variety is worth much attention.

No. 13517. We have one tree only from the original buddings. Now 10 feet high. It did not fruit until this year. Fruit dark purple, 7 or 8 ozs. in weight, oval. Seed a trifle large. Even if you want a purple fruit this does not seem too promising.

No. 13518. We have lost the trees from the original buddings and no fruit as yet on the propagations. When we say we have lost the trees from the original buddings we mean that they have died from "root rot".

No. 13519. Two of the original buds left—one 10 feet high, in fruit this year, the other about to pass out. Fairly good crop carried this year by the healthy tree—no production in 1949. Fruit slender pyriform, 8 ounces, greenish but changing to purple toward the apical end. Seed rather large. Season probably later than Fuerte.

No. 13520. AZTEC. This, the first variety of the 1947 series to be considered worthy of naming, was described pomologically in "Ceiba," vol. 1, No. 2, April 1950. Like practically all of the other varieties in the 13000 series from the Rodiles grove, it seems to be a hybrid—but probably not an F_1— between the Guatemalan and Mexican races. Aztec has been noteworthy here for producing a good crop of fruit the second year after the insertion of the buds. Its growth is unusually strong, and the crop heavy—but not too much importance can be placed on that point in our clay soils, where, as our people say "the tree knows that it is going to die soon and makes a supreme effort to reproduce itself."

The first buddings again bore their second good crop in 1950 and three trees propagated from them also bore well. In other words, this variety has shown a strong tendency toward early and heavy bearing. The fruit is handsome, attractively pear-shaped, bright green in color, with a small seed and clean flesh of good quality. It may be a little large for the North American market, and the skin is nearly as thin as that of the Mexican race. It will probably be subject to anthracnose in moist regions. On the whole it seems to tend toward that dream of years—a large fruited variety of the Mexican race, even though it appears to have some Guatemalan blood. It may not be very hardy—you probably already have some data on this point in California.

No. 13521. Three of the original budded trees are growing—15 to 20 feet high. Noteworthy for the tall and slender shape of tree. A few fruits were produced in 1949, another small crop this year. A small, oval, light green fruit, seed slightly large. Until this variety produces better crops—if it ever does— we can not recommend it.

No. 13522. This is an interesting case. When we saw the parent tree in the Rodiles grove we were impressed by the tremendous crop it was producing, but the seed was large and we did not feel the tree was worthy of propagation. Because of its heavy crop, however, and the attractive unusually bright green fruits, we brought some budwood to Honduras. The original buddings did not produce any fruit in 1949. This year they produced splendid crops, as did also the first propagations from the original buddings here. The fruits are small, 6 to 8 ozs., oval in form, bright green in color, with the thin

skin typical of the Mexican race and the large seed typical of the same. They have the rich nutty flavor of the Mexican race, and all in all, if the tree is as hardy as most of the Mexicans, this variety may prove to be a real acquisition. We cannot say it is a pure Mexican—it is more probably one of those ancient hybrids which leans toward the Mexican side.

No. 13523. This selection was never established here but we understand it is growing in California.

No. 13524. We have four of the original buds growing, now 10 to 15 feet high. Upright growth, with broad crowns, and peculiar wavy leaves. Our trees bore very little fruit in 1949, the same this year. Fruit seems to mature early, 6 to 8 ozs., pyriform, smooth surface, light green in color. There is nothing in the behavior of this variety, as yet, to arouse our interest.

No. 13525. When we were working over the trees in the Rodiles grove I remember shouting to Harlan Griswold: "Come here; I've got one which looks just like Fuerte." No. 13525 does this in growth, and the fruit would almost pass for a Fuerte. We cannot say anything about resistance to frost on the basis of experience here, and certainly the tree has not produced much fruit. I would reserve an opinion regarding the variety, giving it further trial because it is so much like Fuerte, but being fearful regarding its productiveness.

No. 13526. Only one original bud here, now 10 feet high. Several propagations from this are of about the same size, and are carrying good crops this year. A purple fruit. Oval, small size, small seed and probably good quality —but still it is a purple fruit. The surface is rather rough, the skin rather thick, indicating a preponderance of Guatemalan blood.

No. *13527.* This, the last of the 13000 or 1947 series, looks mighty good to us folks who do not object to purple fruits. So good we may soon describe and name it. We have four of the original buddings, 12 to 15 ft. high, plus several propagations all bearing this year. The tree is shapely, well-branched, and this year's crop is excellent on all of the trees. Fruit oval to obovate, 8 to 10 ozs., skin rather thick (tending toward Guatemalan) slightly rough on the surface, dark dull purple in color, flesh yellow, of good quality and flavor, seed small to medium in size.

A FINAL COMMENT ON THE ABOVE NOTES

Remember that we cannot judge the value of a variety, for California, on the basis of its behavior here. It may bear heavily because the tree has root disease "and knows it's going to die" as mentioned above. We cannot determine frost resistance. But on the other side of the ledger we feel that a variety which does *not* bear heavily here; which is of poor quality, or otherwise undesirable, already has two strikes against it, so far as California is concerned. One thing we can do here, and have been doing, is to produce excellent bud-wood in quantity, and ship it abroad for experimental purposes. The new technique of shipping bud wood described in the 1949 Yearbook (we made no claim to originality, we just cited our experience) has made it possible to ship such material by airmail successfully to practically any part of the world. Recently we have sent budwood

to South Africa by this method with success. Let us admit that it costs $5 to land 10 good buds of a new variety in a region so distant as that. It is cheap.

ROOT ROT (DECLINE)

We cannot offer many definite data on this problem. We have inaugurated —as previously reported—tests of various wild and cultivated species of *Persea* with a view to determining their value as rootstocks for the cultivated races of the avocado. Last year Don Fiester, who was then with us but is now for a year at the Interamerican Institute of Agricultural Sciences in Turrialba, Costa Rica, reported in the Yearbook the results of his experiments with *Persea Schiedeana* as a resistant rootstock.

All we can add at this time is the following: Trees of Rodiles No. 1 (13515) budded on *Persea Schiedeana* are still growing well. These trees are now about 8 feet high.

In our plot for trials of seedlings, *P. Schiedeana* is still standing up much better than any other plant. Next in order of resistance to root rot—whatever this may be—are seedlings of the West Indian race from several sources. Next come seedlings of probable Guatemalan x Mexican origin, from the Rodiles grove in Atlixco. And finally—most susceptible to this trouble—are seedlings of the Mexican race from several sources—the region of Chimaltenango in Guatemala, and Coscomatepec in the state of Veracruz, Mexico.

As regards the so-called "wild avocados" in the seedling plot, none has shown any indication of being resistant. Included in these trials have been numerous seedlings of *Persea nubigena* from Tecpan, and numerous seedlings of a similar thing which grows on the summit of Uyuca near Escuela Agricola Panamericana. The only plants we have had of *Persea floccosa* from Aquila, State of Veracruz, Mexico, were budded on West Indian roots and have died out, so of course we have no readings on the resistance of this species.

Certainly we would not want to say too much at this early stage of the game, but results to date suggest that the West Indian race is more resistant than the Mexican; and here at least, *Persea Schiedeana* is more resistant than either of the above. We have seen a report from El Salvador to the effect that *P. Schiedeana* has not resisted the disease in that country, which brings up again the old question, what is this disease?

During the year we sent specimens of rootlets from dying trees to Dr. George Zentmyer at Riverside. From some of these he has been able to isolate the fungus *Phytophthora Cinnamomi.* This was the first time this fungus, associated with "root rot" of the avocado in California, has been reported from Honduras. It had previously been reported from Peru.

We have only these observations to report: The trees of our 1947 introductions from Atlixco which were budded on nursery-grown seedlings of the West Indian race of avocados, and which have remained *in situ,* are dying out rapidly. This planting is on heavy clay soil, lacking good drainage—no matter how hard we try we cannot keep the soil free of excess moisture during the heavy rains of September and October. Results agree with those obtained from the first avocado orchard we planted here in 1943—the trees were on the same soil—heavy clay at 18 to 24 inches at the most—and we have

had to abandon the entire orchard, cutting out the last few trees this year.

In contrast, the last orchard we planted is still doing well after five or six years. This orchard is on sandy soil, going down to gravel and clay and coarse stone at two or three feet. It is only fair to assume that the fungus *Phytophthora Cinnamomi* is present in all this area and we do not see why it should have attacked more promptly the avocados on the heavy soils unless the factor of soil texture (i.e. soil aeration) is important.

IN CONCLUSION

Here in your tropical outpost we shall continue to study the botanical relationships of the cultivated avocados and their wild relatives and ancestors; we shall continue to test wild and cultivated rootstocks in the presence of those factors which produce "root rot"; and we shall continue to test new avocado varieties and distribute budwood to those areas where the varieties we have in our collection of more than 80 may seem to have promise.

Our comments for this year are as follows: As regards rootstocks, we have as yet nothing of particular hope for California. The West Indian race seems slightly more resistant to whatever conditions produce "root rot" than the Mexican and *Persea Schiedeana* seems still more resistant, but we do not know that the latter is sufficiently frost-resistant to be useful in California, and in any case, our results are not conclusive.

As regards varieties—that perennial source of problems for California— we urge that continued attention be given those from Atlixco, where we believe crossing between the Guatemalan and Mexican races has taken place for many generations—perhaps two centuries or more. Because of this crossing, traits of great value to California have appeared as shown by the fact that Fuerte remains the most important commercial variety after forty years of cultivation.