

Proc. Fla. State Hort. Soc. 43:39-48. 1930.

Avocado Varieties of the West Coast

N. A. Reasoner

Oneco

Sometimes an organization, just as individuals (and of course, an organization is made up of individual people), has a tendency to over-stress one particular line of thought and endeavor. This is an age of specialization, and to amount to much it seems that one must specialize in some things. If we spread our interest over the whole field of horticulture and agriculture, we are apt to know just a little bit about this and that, and not very much about anything. "You spread yourself too thin," to use the colloquism. It happens that when an organization tries to do that, it often comes to grief.

It has been my feeling, and I will say quite frankly that it is shared probably by a good many of you, that if there could be any fault found with our Horticultural Society (and I don't think many faults can be found), it is there are many of us so greatly interested in citrus that we sometimes lose sight of other worthwhile things in the horticultural world to which we ought to give some attention. So I am coming here this afternoon without any set speech, merely to suggest to you that possibly, as I see it, there is a new star upon the horizon of the Florida horticultural world—a star which I do not think it an exaggeration to say, may at some date equal in importance that of the citrus industry.

Now you have heard much about great new discoveries in horticulture, and how this plant or that plant might revolutionize the horticulture of the state. I do not want anything that I might say to be interpreted in scare-head headlines; I do not mean it that way. I have been a good while arriving at the thought that I hold just now. I think I have looked at it rather carefully and sanely, and perhaps with a bit of prejudice in the other direction. I give you, therefore, this afternoon, as my well-considered opinion, which I can, to my mind at least, back with a sufficient array of already demonstrated facts, that Florida possesses a greater commercial opportunity in the Avocado industry of today than she did in the citrus industry, following the big freeze. I think we are in approximately the same stage of the development of the Avocado industry as the citrus industry was in Florida in about 1900.

It is not my purpose this afternoon to suggest whether we have or have not reached the point of saturation in citrus production. I will leave that to the citrus experts to discuss. I can only point out to you that with the prospect of thirty or more millions of boxes of fruit staring us in the face, a good many people are wondering where they are going to get their money out of it. We are not facing that in Avocado production. We have almost an unlimited market and a very small production at present.

There are some points I want to give you, which are largely responsible for my present state of mind. Even as little as two years ago, if you had asked me my opinion of the Avocado industry, I would have said it was a very interesting possibility, or even probability, for certain sections of the state, but without any general application to South

Florida as a whole or even Central Florida. I do not feel that way about it now. There are three things which contribute to that change of thought.

The first one is the work that had been done toward a better understanding of pollination and setting of fruit in the Avocado. We have discovered that we have two classes of trees which we call morning or afternoon bloomers; and that you must have *both* in any planting to set a commercial crop of fruit, as a regular thing.

For the information of those who may not be familiar and to simplify a rather complicated explanation, I wish to say that the Avocado flower very seldom has the pistil and the anthers in the right condition at the same time for pollination. The anthers will open and spread the pollen while the pistil is not in proper condition for fertilization, or vice versa. Some of them open in the afternoon, and the pistil may not be ready until the next morning, or the other way around. We get around that difficulty, of course, by using supplemental varieties which has flowers that open at the opposite time of day, and can pollinate the variety which has its pistil in the proper condition at that time. This was not fully understood until just recently, and it is not known, I am afraid, by everyone, as yet. We have some rather interesting examples of what seems to be a variation from that rule, but if you will study these examples, you will nearly always find that it holds true in a majority of cases.

It seems the weather has a very strong influence on the opening of the anthers and the distribution of pollen, and also in keeping the pistil in proper condition for fertilization a longer length of time. Some varieties, for example the Fuerte variety, sets fruit over a considerable period of time by itself if the weather is cool, because of the holding over of the pistil until the next morning.

The first point, therefore, I want to make, is that for the expansion of the Avocado industry we must have two different varieties interplanted to get crosspollination and a good crop of fruit. This cropping does not happen only occasionally, but will happen year after year if the varieties are properly selected, so that they can cross-pollinate.

Now the second point is this. There is something in the growing of Avocados that we have not known until recently. I did not realize it until two years ago, and I think possibly Mr. Brooks was the first to call it to my attention. It is, that the reason we have not gotten fruit on many trees, or the reason many of them dropped their fruit after it was set, is that we have not realized the amount of vitality that is taken out of the Avocado tree in putting on a crop of fruit, and, therefore, have not fertilized enough.

Citrus fruit is made up largely of water, sugars and other carbohydrates; but the Avocado has protein matter and fats as well as carbohydrates and it takes a tremendous amount of plant food from the soil to produce that crop. Unless the Avocado can have an ample supply of readily available sources of plant food, it simply cannot support the crop of fruit it sets. It takes high nitrogen content to make the protein matter, and it takes other elements in your fertilizer to mature that crop of fruit. Whereas we can get by with 25, 30 or 35 pounds of fertilizer a year on a medium aged citrus grove, putting it on in three applications, an Avocado grove of similar age will have to have, we will say, from 60 or 75 pounds up to as much as 100 pounds of fertilizer per year, preferably put on in five or six applications, so as to prevent excessive leaching.

Put then in your thought of Avocados, as the second point favoring their increasing dependability, our realization of their food requirements. I think perhaps that this is one of the most common causes of the lack of productivity in Avocado trees today. They will set a good big crop of fruit, but the fruit will drop off, because there is not enough fertility in the soil to support them. Avocado trees do not show starvation like citrus trees. They may have a perfectly green and healthy appearance, and yet need food. In other words, you may give that tree enough fertilizer to maintain vegetative growth, and a few fruit, and you think you are giving it enough, but you are not giving it enough if it continues to drop the fruit.

Third, and most important it seems to me, of these things that we must consider in order to make Avocado culture dependable, is the realization that we can and must spend some money to control the physical conditions. You probably thought about that when I started to talk this afternoon. You probably said, "The boy is crazy; you can't grow Avocados because they will freeze." Some of them will; in fact most of the commercial sorts. The West Indian type particularly will freeze very rapidly. I note that you citrus growers have found that it is worth while to provide expensive irrigation plants to prevent the dropping of citrus fruit in the spring of the year, and you may not use that irrigation plant but three or four times in the spring, and yet that is worth while, because it will save half the fruit on your trees, give you bigger crops, and it pays for itself. Why not, in the same exercise of good judgment, spend a much smaller amount for the necessary equipment to provide artificial frost protection? You can absolutely protect them from frost as cheaply or perhaps cheaper than you can provide artificial irrigation for your citrus grove. Bear in mind, of course, the use of windbreaks on the north and west sides, or on the east side, depending on the lay of your land, but do not make the mistake of putting a windbreak entirely around your place, because when you do that, you have shut yourself up in a pocket. Leave the best side open for natural air drainage. It seems to me that it is perfectly logical that if we are bright enough to use methods of control in citrus culture, we are foolish not to take advantage of the same principles in Avocado culture.

Do not misunderstand me to say I am suggesting only the frost protection. You have got to use irrigation equipment in the Avocado grove the same as you put in a well ordered, well equipped citrus grove nowadays, because you should have absolute control of moisture conditions, in and out. You should be able to keep a constant percentage of moisture in your soil. You should be able to put it on when your weather is dry, and be able to take that water off either by sub-tiling or by a natural sloped, well drained sandy situation, in extremely damp weather.

Avocados exist profitably in a more narrow range of moisture conditions than do citrus trees. A citrus tree will live and get along, in a very wet situation. It may not live profitably, or produce a profitable crop, but even at that we know a certain percentage of the fruit will hold on, even though very wet or very dry. That is not true, however, of the Avocado. It is impatient of either extreme moisture or extreme drought. So the third situation necessary in this new development is that just as we are now willing to go out and spend a considerable sum of money in equipment to produce and maintain a profitable citrus grove, just so must we be willing to go out and spend that same amount of money, or perhaps a trifle more, in properly equipping ourselves to grow Avocados.

When I tell you that it has been estimated that a well-producing Avocado grove will pay first class dividends on an investment as high as \$7,000 per acre, you can realize that you can afford to go out and spend some money on special equipment. You could not afford to unless you were going to get a good return.

Knowing we can plant varieties that will produce fruit; that we can control the temperature in anything except great catastrophes, such as an unusual freeze; that we can control moisture and drainage, and that we can make and protect our crops by proper fertilizing, there is reason to expect a large increase of acreage in Avocado culture in this state. I can tell you that in our sister commonwealth of California (which unfortunately seems to lead us a good many times in progressive development), they are going to plant Avocados as fast as they can get the trees and ground. This does not alter our real opportunity; however, as we are fortunate in that, if we plant the proper varieties, we are not going to conflict particularly with their crop. We have a season which is largely our own, and we can develop a great industry that will compete with theirs in only a minor way.

I want to give a few notes as to varieties, and then I want to call attention to one interesting experiment in my section, which I want to put into the record of our Proceedings as some of you people may want to check up on this new development which they are trying in the vicinity of Tampa, to see how it turns out.

We know, of course, that the profitable, high-class Avocados are produced from Thanksgiving on. We cannot market as late as this season of the year (April) or even earlier than this, without coming into competition with the California crop. The varieties then that we are most interested in are what we call the winter or spring ripening varieties, which are largely of Guatemalan or Hybrid-Guatemalan origin. I mention just a few of those that have been found particularly suitable and worth while.

The Winslowson, a seedling originating at Miami, at one time called the *Rolfs* variety is one that is quite profitable and promising in our section.

The Collinson, a seedling of the old Collins variety, is another which is also excellent.

These two varieties are reciprocative. If you want to plant only two varieties, the Collinson and Winslowson make an excellent combination. One is an A. M. and one a P. M. bloomer.

I will give you another pair. This second pair is remarkable because of their rather greater hardiness than any of the others of the worth while Guatemalan or Hybrid varieties. These are:

The Lula and the Linda. These two again are reciprocating varieties. The Lula is probably Guatemalan-Mexican Hybrid, originating I think in the Miami section. The Linda is reported as a true Guatemalan variety, coming, however, I think, through Mexico. We may find eventually that it has Guatemalan or Mexican blood in its makeup. The Linda is noticeably hardier than some of the other varieties. If you feel that you are in rather an exposed situation, try the Linda and the Lula. Both of these are winter fruiting varieties.

I have one other combination which I would like to give you in a group, these two being very late in the season. These I have given you, the Winslowson and Collinson, are

both varieties for the Thanksgiving to Christmas season. The Lula and Linda come around Christmas and later. The Linda will hold as late as February and March if desired.

The Taylor and the Eaglerock. These are among the latest of our varieties. It is rather a remarkable fact that so far as I know very few, if any, of the varieties directly imported from foreign countries have proven immediately available and suitable to our conditions. The only one I recall at this moment is this Eaglerock variety. It is one of Wilson Popenoe's introductions from Guatemala. It has a wonderful fine, large fruit, weighing easily up to two pounds—sometimes reaching nearly three pounds in weight. It is a late fruiter, exceeded probably only by the Taylor, Wagner (which last is, in our section being largely discarded, in favor of the Taylor, which is quite similar), and the McDonald, which is very late in reaching maturity, and it interferes with the California market. Those two I am mentioning—the Taylor and Eaglerock—give you a fine combination.

So you have in these six varieties a range of season covering from Thanksgiving until as late as May or June, if you want to hold them that long. You have reciprocating varieties which you know positively will cross-pollinate those of other varieties, and which will produce fruit consistently year after year. I think that is what we have needed for many years in the Avocado industry—• namely, to know that we could get fruit.

Now then, about this one experiment I wanted to call to your attention. Perhaps some of you know W. H. Kendrick of Tampa. He is a contractor there, has been in the game a long while; I think he built the court house there. He is an elderly gentleman, and has been there a great many years. He has a piece of property out toward Six Mile Creek, which is of very heavy hammock growth, with magnolias, hickories and oaks and similar growth. It is rolling, has very good drainage into Six Mile Creek, and yet unlike our hammocks it has very heavy, loamy top soil. He also is fortunate enough to have a spring on the property which will flow water to the highest point, and from which he can irrigate the whole property.

Now remembering the way that he had seen citrus groves .cultivated in hammocks, right underneath big native trees, and desiring to conserve the natural heat of the earth, and keep off as much frost as possible, because Tampa is a cold situation; and also realizing that one of the great damages to the Avocado industry in the last few years has been hurricanes; he conceived the idea of going in there and cleaning out merely an occasional tree, here and there, because his hammock is rather open, and making his Avocado grove right in connection with the natural growth that existed there. In this way, he is protected from the wind and from frost and he has natural drainage, natural irrigation, and practically all the necessary -requirements I mentioned in these three points. I think you will remember, I suggested you had to have these. The only possible thing I can see, which may prevent his success, is whether or not the Avocado trees will receive sufficient sunlight to set profitable crops under this semi-wild condition. If they do¹ have enough, then he is going to have a perfectly wonderful grove in a short period of time.

You have seen that same experiment carried on in the Vero section, and other sections in the northern part of the state, in growing citrus under those conditions, but so far as I know this is the only Avocado grove that has been planted under these conditions.

Q. Do you know of any other, Mr. Brooks?

Mr. Brooks: I do not.

Q. Does anyone else know of any other Avocado grove planted under those conditions?

Member: There was one started in Sebastian. The owner's name is Mr. A. B. Michael, of Sebastian.

I think that would be interesting to write into the record, so we can check up on it in future years. I have always felt about the horticultural meetings that there is not so much derived from the paper or the idea presented as there is in the discussion of it. Whether or not you wish to call for a discussion after this paper, I hope we will have a full discussion of the subject this afternoon, because I feel just as surely as I am standing here before you, that here is the possibility of the greatest future expansion in commercial grove industry and development of anything we are facing in Florida at the present time. Perhaps I over-emphasize it, because I am interested, but I lay that suggestion before you for what it is worth.

Pres. Taylor: These subjects on the program are all closely related. Do you want to go into a discussion now of this paper, or wait until the other papers are read? They are not altogether the same, but somewhat closely related.

Mr. I. C. Brooks: Let us discuss it separately.

Mr. Putney: I would like to know what you consider the proper water table from the surface.

Mr. Reasoner: I do not think the actual distance of the water table is so important, although I think it ought to be more than it is in citrus. But it is a fact that the water table should be at a constant level. I think where we see Avocados that have been drowned out it has been due to the fact that the water table has fluctuated in depth. One season we may have had a water table three or four feet below the surface of the soil, and perhaps that summer it might not have been but three or four inches below the surface of the soil. I have known some Avocados to succeed admirably in rather damp soil, where the water table must have been within two feet of the surface, but that ground was so drained that it was impossible to flood it. On the whole, though, I should not want to try any commercial planting where we did not have at least three and one-half or four feet above the water table, but I think the point is that the moisture must be maintained at a certain degree that is just moist, not soggy wet, neither must it get dry. If the top soil gets dry the roots are going deep, and when the rainy season comes on, the roots will rot off, and the tree will die, because Avocado trees do not make roots as rapidly as citrus trees. We have a gentleman here who knows a great deal about Avocados. I would like to have Mr. Brooks' idea on that same point.

Mr. C. I. Brooks: I think you have stated it accurately. It would depend on the soil conditions. For illustration, in lower Dade County, with our soil, we do not care if the water table comes as near as a foot or a foot and a half from the surface, but up here, where the soils are more sandy, it would be preferable not to have your water table nearer than two or two and a half feet from the surface.

Mr. Waite: Just for information, did not someone say that in California they were

experimenting in grafting two kinds together in the same stock, and thus getting the bloom mixed? Would it not be advisable here instead of planting two sorts to mix the pollen, to have both sorts on the same tree?

Mr. Reasoner: I do not recall that information. My own impression would be that inasmuch as with the Avocado, just as in citrus trees, you have a different rate of growth, for different varieties, you would have the same result in the long run as though you grafted a tangerine and grapefruit on the same stock. Your grapefruit would crowd out your tangerine, and the Lula would crowd out the Linda on the same stock, because the Lula would get all over the top and cut off all the light.

I suggest one point that perhaps we have not read into the record. A lot of people have the impression that you have got to have exactly half and half, or approximately so, of these reciprocating varieties. That is not true, according to the best information we have, which is that you can put three, or even four or sometimes five times as many of either variety that you would prefer with just fifteen or twenty-five per cent of the other variety to cross-pollinate. You do not even have to have approximately fifty-fifty. If you have one row of the cross-pollinating variety, so it will reach, say two rows on either side of it, you will have enough to cross-pollinate it.

Mr. C. I. Brooks: What do you know about the Schmidt variety—how well does it grow with you? Mr. Poole, have you fruited the Schmidt in Winter Haven, or do you know of anyone else who has?

Mr. Poole: I don't know of anyone who has.

Mr. Futch: We have about three trees in Lake Placid. One fruited very well.

Mr. Reasoner: How old are they?

Mr. Futch: About six years. I don't know much about the fruit. It has a good appearance, good size and good quality, but otherwise we can't give you any information.

Mr. C. I. Brooks: The Schmidt and Collinson cross-pollinate better than any other varieties. The Collinson matures in December and January, and the Schmidt in April and May. The Schmidt is not a heavy bearer, but the fruit will average about two pounds apiece, and coming at the season they do, we still are very happy about them. It makes a perfectly good combination. I might say that we find in our case that the Trapp doesn't have to be cross-pollinated, neither does the Waldin. The Waldin is much more hardy than is the Trapp. They come about the same season. The Waldin is also a much faster grower, and makes a larger tree. It will hold its fruit more evenly than the Trapp, so in places where it can be grown, I should strongly advise you to try the Waldin. It will hold until early December under normal conditions. With us it holds until Thanksgiving.

Mr. Reasoner: I didn't go into the West Indian group. I thought our greatest opportunity was with the Guatemalan and Hybrid varieties.

Mr. Brooks: The Thanksgiving market is the highest priced market.

Mr. Stambaugh: The great bulk of the Avocados on the market are grafted on the West Indian roots. They have been shipping the seed from Key West by the barrel to everybody. What effect would Guatemalan or Mexican roots have on the trees here in this section?

Mr. Reasoner: That is a thing we know nothing about at the present time. Our State Experiment Stations, particularly in Bellglade Experiment Station, are planning in this year's budget to make some experiments of that kind. They have placed an order with us for trees of one variety on the West Indian, Guatemalan and Mexican roots. It ought to be tried all over the State. After we have tried it out we can tell more about it. It seems quite reasonable to suppose that it will have a decided influence upon the maturity and possibly on the growth, quality and bearing period.

Mr. Stambaugh: And frost resistance.

Mr. Dorn: We have a neighbor, Mr. Herman, who has budded the Collinson, Winslowson and the Lula on the Mexican, West Indian and their own stock, and he was saying that in his opinion, the West Indian stock was the best. It seems to get a brighter growth, and somewhat more fruit.

Mr. Reasoner: We tried approximately that same experiment with a number of varieties some years ago, but I never felt those experiments were properly carried through, because we were making our experiments on soil that was very poor, very damp, but as you say the West Indian outgrew the Guatemalan and the Mexican, which was very dwarf in growth. However, I think the West Indian will probably do best in your territory. The point that interests me is whether we might extend the zone further north by Guatemalan and Mexican stocks.

Mr. Hammerstein: Along this root stock proposition, is there any attempt king made to bud onto a root stock that would be more resistant to the wet?

Mr. Reasoner: I do not know of any. I do not think they have gone outside the limits of the Avocado race. One of my men one time thought the Avocado looked somewhat like persimmons. He didn't get very far with it. It wouldn't take. Has anyone else any experiments in that line, trying to find some other stock that Avocado might grow on? We know, for example, a good many things—your sweet olive (*Olea fragrans*), will make a good union with the California Privet. It is not outside the bounds of possibility or probability that we might find some other plant that was not necessarily related closely that might make a good root stock, but as far as I know there has been very little experimentation done with it.

Mr. Dorn: I was interested in what was said in regard to planting winter varieties, with regard to competition with California varieties. The California production is increasing very rapidly. It seems that would be a very good reason for planting heavily of varieties that come outside their season. Mr. Dolan, President of the Avocado Exchange, had a letter from the President of the California Exchange, and they are faced this year with a possible production of fifteen million pounds of Avocados. Their heavy season is from December or January to June, and these winter varieties of ours will run into far more competition, at least after Christmas, than they have before. It may mean that eventually we will have to change our ideas.

Mr. Reasoner: I am not an Avocado grower. I had always thought that the California market reached its peak in March and April, and as long as we kept to December, January and possibly early February varieties we were all right. California is shipping in January and February it is true, but it does not reach full production until later. It is

certain we won't have Cuban competition, at least, at that time of year.

Mr. Brooks: There is one thing I think that perhaps should be said. Very likely you have not had sufficient experience here to know that the Winslowson, while a very fine eating pear, with a thick meat, good size, nevertheless when you ship under refrigeration, whether mechanical or iced, when you hold it in cold storage before it is ripe, it turns black and appears unfit for use. We are discarding it entirely for the purpose of shipping.

Mr. Ward. I don't think it would be well to condemn the Winslowson too quickly because of its getting black. You may find it is due to holding at the wrong temperatures. In view of some work to be carried on by Dr. Camp at the Homestead Experiment Station, I think we may find that the Winslowson, if held under different temperature, may be fine. We know it is a heavy producer and I still have confidence enough in it that I am going to plant more this summer. I believe he will find that we can handle this in such a way that we won't have that trouble. With the few that we have been shipping from this county that were iced we have not had that trouble, shipped in coarse grained excelsior.

Mr. Brooks: I think Mr. Ward is possibly right. My answer would be, "What is the use of experimenting when you have something else better?" We are not cutting the Winslowson out altogether, but we are cutting them down to a small percentage.