

QUESTIONS AND ANSWERS

Dr. J. Eliot Coit,
Presiding

Kepner: We are now reaching a very dangerous period for the question box comes next, so I will exchange chairs with Dr. Coit for safety sake.

Dr. Coit: This is a pretty dangerous place, but I dare say we can find some person in the room who can answer the questions that will be asked this afternoon. We asked for more time to be devoted to questions. We asked that they come in writing. Here is one that looks formidable to start with. It comes from Major Wallis, whose trees are growing in Hollywood in Laurel Canyon.

Question: August 1, 1930, I leased a small grove, fourteen years old, rows eighteen feet apart, and trees spaced eighteen feet in row. Until last month, it was irrigated by basins ten feet in diameter, and basins mulched with only the leaves that have fallen from trees. It has had little or no fertilizing, and not enough water to grow weeds. The roots are practically confined to basins. The trees are in all conditions, from thriving with a good crop of fruit on the tree, down the scale through all the stages of tip-burn, sunburn, defoliation, die-back, and dead. The soil is decomposed granite, and very deep.

I applied two inches of water to trees that were heavy with fruit and shedding it. The shedding stopped, and two weeks later I applied ammonium sulphate, nine hundred pounds per acre, followed with two inches of water. One heavily laden Fuerte shed a few fruits, while another upright-growing tree shed very heavily—about twenty per cent of its fruit. Was the shedding due to water or inorganic fertilizer?

Dr. Coit: I do not know why there should be such a variation in the same grove without seeing the trees and knowing something of the history of their origin. I do not believe I can answer this.

Question: The soil outside of the basins and exposed to sunlight tested very hard-packed, and I encountered one very small root, six-inch hole, three feet, six inches deep, moisture content five per cent. Approximately, what is the wilting point moisture content for this type of soil?

Dr. Coit: That is pretty hard to answer, or even give you a guess—those things vary so tremendously I could give you several guesses, but they would not be worth very much. James France, what is the wilting point for the moisture content for a disintegrated deep granite soil?

France: That would have to be determined by experiment.

Question: Where trees or their branches die back for any cause, is it best to delay pruning until dying back has ceased?

Dr. Coit: It would depend on what the trouble was. First find out what the trouble is. If they are dying back from tipburn, I'd say perhaps you had better wait until you find out what is going to happen. But if they are dying back from too much water or lack of drainage, which frequently causes die-back, prune quickly and give them a chance to come back with as little loss as possible.

Question: Where a branch has died part way back, should it be cut at the end of the dead wood, or near the nearest healthy branch and in green wood?

Dr. Coit: I would cut it back into good, live, healthy wood, and just beyond a good strong bud, so it will have an opportunity to have more growth.

Question: Where small branches of 1/2" or less have died back to larger branch, they break off at the latter very easily, leaving no dead wood, but they leave a hole in the larger branch. Is this breaking off of the dead branches best, or should they be cut off flush with the large branch?

Answer: What you refer to is known as "abscission." It is well to allow this to take place naturally.

Question: Should grafting wax or "tree seal" be used on all fresh wood cuts, or is it unnecessary where branches are below a minimum of 1/2" in diameter?

Answer: Ordinarily the policy is to cover all cuts and wounds that are more than one inch in diameter, unless they are very difficult to reach. If I have some wounds right close, where I can daub some on conveniently, I would probably cover them to half-inch diameter. If you have to get up on a ladder, I think one inch would be as near as necessary. However, that applies to older trees. In handling the tree in the nursery, just having been planted out, or cut back, the situation is quite different, and with baby trees, I believe I would recommend covering all cuts with tree-seal.

Question: Where trunks and branches are already badly sunburned, is whitewashing worth while?

Dr. Coit: What do you think, Mr. France?

France: Why, I should say "no." I believe it is too late. Like locking the door after the horse got out, as far as the sunburned area is concerned. Whitewash the rest.

Question: Where a tree has been top worked eight or ten years ago, and thereafter neglected, two main branches have heart-rot, and are hollow, with open tops and closed bottoms, while the third branch has two large suckers and a grafted branch growing out on one side, while the other side of the branch is dead and not grown over (the dead-wood of the latter is sound). I propose to close the hollows at the top with a metal plate covered with tree seal, and drain the lower ends by boring a one-inch hole into the lower part from the lower side of the branch. Before sealing the top, I will plug bottom and fill cavity with bichloride and let it stand over night. For the third branch, I propose to cover sound dead wood with tree seal. Please criticize this proposed treatment.

Dr. Coit: This is a good plan, except for the bichloride of mercury. On that I would say no. We don't put it on trees any more. We use cyanide of mercury in alcohol nowadays. For a disinfectant it is a much better material to use. Usually you can get tablets of this mercuric cyanide from the county agricultural commissioner's office. That, dissolved in

about a twenty per cent solution of wood alcohol and water, has very penetrating powers. I would not let it stand overnight. Just swab it out, and the alcohol makes it penetrate. Then put on your good steel plate. Before covering with tree seal, I would wash it with mercuric cyanide. By the way, this material is so deadly poisonous that when you get it mixed in a drug store, it should be mixed with some green paint or pigment to give it a poison look. The little wood-alcohol in it makes it smell like bootleg, and you can't tell when some Mexican will take a swig of it.

Question: What percentage of an avocado grove should be planted to Fuertes for the best commercial return, taking into consideration diversity of product and seasonal marketing?

Dr. Coit: It depends on whether the owner desires seasonal marketing, or whether he wants to be through and go fishing when the crop is all in. Some growers prefer to work the year around, and be always picking and delivering fruit. I think that in the best Fuerte district—along the intermediate coast country of San Diego, which I think is as good a Fuerte district as I know, as a whole, that it would not be out of the way to plant seventy-five to eighty-five per cent Fuertes. The Fuerte is not a perfect variety from the standpoint of regularity of bearing. It is, however, such a wonderful marketing variety, and is such a market and price builder, particularly in the East, that all the group of people like Mr. Strasser, who are interested in selling your fruit and getting more money for it, both here and back East, would be chagrined and disappointed if we decided to cut out Fuertes. They would be knocked in a heap, as it were. Therefore, we feel we should learn how to make the Fuerte bear regularly, and I should say in a good Fuerte district that we should plant seventy-five to eighty-five per cent.

Question: How large should a tree be before you bud it? I budded 130 trees and they all died.

Dr. Coit: How big were your trees, may I ask?

Questioner: The trees were from one-half to three-quarters of an inch in diameter, though some of them were smaller.

Dr. Coit: In what part of the country are you located?

Questioner: We have ten and one-half acres planted in El Cajon. These trees were planted about fifteen inches apart.

Dr. Coit: The size of your trees was correct. The reason was not because they were not the proper size. It might have been the wrong time. It might have been because the care you gave them in regard to water and fertilizer did not keep the sap active. Or maybe you tied them too tight or not tight enough. Or possibly the buds were cut from too near the end of the budstick or too near the stick, or possibly your knife might have become soiled or contaminated. Or the buds may have been moldy. Or maybe they were not cut I back soon enough, or maybe, too soon. I don't think I can tell you.

Questioner: (Laughing). Well, perhaps, Doctor, I gave them too much water or not enough.

Question: How can ants be kept off trees?

Dr. Coit: Are these avocado trees that the ants are on?

Questioner: Yes.

Dr. Coit: That is rather peculiar, for ants, as a rule, don't worry avocado trees much.

Questioner: They are very small ants, going right up a steady line. They I are just everywhere.

Dr. Coit: I suspect there might be a little mealy-bug in that tree.

Questioner: I have a lot of scale—black and brown.

Dr. Coit: The way to get rid of the ants is to find out what they are feeding on, and eliminate the source, and then they will disappear. Forget the ants if there is scale. Get I some medium light oil spray, and spray the tree. Or if it is mealy-bug, you will, no doubt, have to get some cryptolemus to eat the mealy-bugs up.

Mr. Norris, of Long Beach: May I tell my experience on that? I have a tree in Long Beach that has always been troubled with ants. Here, recently, I discovered that in three different places the limbs were badly scarred. I didn't know what the trouble was, so I cut off one of the limbs and sent it down to Mr. France. He told me it was probably caused by mealy-bugs. I saw some mealy-bugs. So I think that is what it came from. This tree has always been covered with ants. I have been fighting them for three or four years.

Dr. Coit: Of course, you can kill the ants off by placing containers with a good kind of ant poison or syrup. Get a good kind of ant syrup and kill the ants off, and the mealy-bugs will likely disappear. If they don't, you can put cryptolemus in.

Question: Are ants essential to the propagation of scale?

Dr. Coit: Not at all, but the ants do, however, increase the propagation of scale. Scale will breed, though, if no ants are present.

Question: Is cultivation essential where good mulching is followed?

Dr. Coit: My own opinion is that it is not essential on most soils, although there might possibly be a very heavy sticky soil in some places, where it might be desirable to do some cultivating. But in most soil conditions, after the trees are well established, I do not believe it is necessary. I have in mind right now some big trees in some of the groves I have supervised, where they haven't been cultivated in a long time, where the conditions are fine. I don't believe it is necessary to stir the soil if it is kept well mulched. To obtain a good mulch, I should say, it should be not less than two or three inches deep, and, if material is plentiful, four or five inches.

Question: If you want to fertilize with bulky material, do you rake your mulch away, or just mix it in with it?

Dr. Coit: It isn't necessary to buy bulky materials to fertilize, in addition to that mulch. The mulch furnishes the humus, which gradually disintegrates through the action on it of the worms and bugs. You need nitrogen in addition, and if your trees are bearing, you should give them plenty. Nitrogen is cheaper, purchased in the form of sulphate of ammonia. In sulphate of ammonia, the nitrogen is now \$2.30 a unit, and in barnyard manure it is \$4.00 a unit. In buying manure, it is only the humus you are after. This will be furnished through leaves, trash, straw or anything of that sort, and it is not necessary

to buy manure. Just add your nitrogen.

Question: What should be added to a compost of forty yards barnyard manure, one ton of superphosphate and three tons of gypsum to make a complete fertilizer?

Dr. Coit and Mr. France both stated that this could not be answered without an analysis of the soil conditions on which the fertilizer is to be applied.

Question: Is manure an essential for fertilization?

Dr. Coit: All we need in a fertilizer are the chemical elements that are needed by the plant and are lacking in the soil, and the humus to make it comfortable and make it grow. The manure is like the bread and potatoes of a meal, and the sulphate of ammonia is like the pie and cake. It takes them all to make a complete meal. In growing avocados, I dislike to use so much manure in the basins in the first year or two, because so much of it is likely to contain Bermuda grass. If Bermuda gets established, it becomes more or less of a nuisance, and if it is to be removed, it costs a lot of money. Therefore, we prefer to use bean-straw as a mulch, provided it is free from morning-glory seed, or something of that sort—nearly any material that is cheap, and then you can add sulphate of ammonia or nitrate of lime.

Question: How can you tell when a Fuerte is in a ripe condition to pick?

Strasser: We know there are certain maturity marks by which you can tell. It is hard to explain. I can show it to you on the trees, but I can't tell you.

Question: What is the cause of Ringneck? Also Sun-Blotch? Is there a known remedy?

Dr. Coit: Ringneck is a disease that affects the skin of the stem just above the fruit. The name is significant. We don't know just what causes the disease. Hence the name. It causes a ring near the neck, and so we use the word, "Ringneck," as a handle so that we can talk about it. It is my feeling that it is either a fungous or bacterial infection, although I believe the experiment people at Riverside are working on it, and are not quite ready to publish their results. We don't know what causes it. We do know it does some harm, and do not know if it can be controlled by spray.

As to Sun-Blotch. Is there a known remedy? It is a very interesting and obscure disease, which has caused rather heavy losses. Fortunately, I am glad to be able to state that the amount of sun-blotch present in San Diego County is comparatively light. There are large areas in many orchards where I have seen none of it. However, in other parts of the state, in the foothills from Pasadena to Ontario, it is common, and also in parts of San Fernando Valley it is quite severe. It is transmitted by budding wood or grafting wood, and may or may not be transmitted by seed. The experiment station is now conducting an experiment, which was instituted by the Association, to find out if Ring-neck is transmitted by seed. I would suggest that affected seeds be not used, and that the greatest care be exercised in cutting bud-wood. Do not cut wood from any part of a tree if it shows that characteristic color of the bark known as Sun-Blotch, or from a tree which produces the malformed, twisted fruit which is the result of Sun-Blotch.

Question: What would be the best variety to use in top-working a seedling wind-break—something that would stand the wind?

Dr. Coit: It is a matter of selection depending upon the district more than anything else.

Fuerte is just as good as anything else. It is a little tender to wind, but I do not know of any variety of avocado that isn't a little tender to wind.

Question: What is known of the treatment of soils with light magnesium concentration with H_2SO_4 ?

Dr. Coit: I have an idea that what the question is driving at is the common yellow or chlorotic conditions found in certain spots. I find it in La Habra and Vista, all about. All about, you may have a great area of green trees, and here and there will be one, bright yellow in color, making poor growth. If you dig down, you usually find that two or three feet down you run into a composition of light calcareous material, which may be lime carbonate or gypsum, magnesium carbonate. At the experiment station we have been engaged in the treatment of such trees. In Montecito, I treated four trees that had a typical case of that kind with iron sulphate, or ordinary copperas, at about ten cents a pound. I pounded it up with a hammer and applied it to the soil around those trees. We punched holes, dropped in a half-spoon of this powdered copperas, making one or two teaspoons to the hole. We made six of these holes in a ring about two feet in diameter. Then distributed the moisture in the soil by turning in some water when the job was complete. Those trees look a great deal better. Another place we tried sulphuric acid, but it didn't work very well. That was tried in Vista. I am not sure if there has been time to really test it out in a satisfactory way. Another place, sulphur was used, which did not give very satisfactory results.

Question: How much copperas do you put to the tree?

Dr. Coit: About ten or twelve teaspoonfuls to the entire tree. We made two applications, one early in the spring and another in mid-summer. Those trees are now green. Last week I stood and looked over the four-acre planting, and said to the foreman, "I don't believe I could pick out those yellow trees from the edge of the planting, and I don't think you can."

Question: How much did your copperas weigh?

Dr. Coit: I didn't weigh it, but I measured it with a teaspoon, and so I am telling you in terms of teaspoons.

France: We had a little experience with similar soil conditions where they used copper sulphate, about one pound per hundred square feet, with good results.

Question: Do broken shells have much effect in loosening hard soil, and is humus a necessary adjunct to it?

Dr. Coit: First, I would say it does not have much effect on some types of soil. Red clay, on which a few avocados are raised, is sometimes benefited by lime. Gray adobe has too much lime already. Any adobe would be benefited by adding more humus.

Question: What can best be done to reconstruct or improve the texture of a red-clay subsoil lying six inches to twelve inches below surface?

Dr. Coit: I don't know anything that can be done to it. There are lots of things you can buy that people will tell you are guaranteed to make a beautiful soil out of such a foundation, but I don't think any of them will work. Alfalfa or sweet clover will grow, and as far as it is worked in, will improve the surface, but the roots will not penetrate far into

that red clay, though it may penetrate some. Given a long series of years and perseverance, in time they might make an appreciable effect.

Comment: I found sweet clover four feet down in such a soil in Yorba Linda.

Dr. Coit: Yet I do not want to admit that a hard red-clay subsoil six to twelve inches below is an easy job to handle. I don't believe it is.

Question: Would it help to loosen it up with dynamite?

Dr. Coit: There has been a lot of experience in blasting and dynamiting refractory soils. If the soil is of such a structure and nature that it will shatter, crumble, break and crack, then I think it is a good thing to blast with powder, particularly if underlying your undesirable layer is a good soil into which the roots can penetrate. But if you have real clay, which has a certain amount of moisture in it and is plastic like putty, and you put dynamite into it, it compacts the sides just like a baked jug, and then you might just as well throw your tree away, for when you pour water in, it will drown your tree. The avocado tree must have drainage down, straight through. Unless you have a subsoil through which the water can pass readily, you are going to be called upon to do a remarkably good job of irrigation, and also to control the rainfall, and I am afraid that, at least, you cannot do the latter.

Question: I planted a few Mexican seedling trees in one of those hard clay soils, trying to find out if they would grow. Some grew very well, and some did not. What way could I wring the water out of that clay—it passes through so slowly the trees do not get drainage?

Dr. Coit: On one of my places, I have just such poor soil. It helps some to dig down and dig a little trench from the bottom of the hole out on the lower side and fill full of coarse gravel. Then the water has some chance to get away, instead of forming in a bowl or pocket.

Mr. F. D. Halm: Mr. Chairman, Ladies, and Gentlemen: For the first time in the history of a meeting of the California Avocado Association, I have discovered the sign "Standing Room Only," and I think Carlsbad should be complimented at the number in attendance and the interest shown. No one can possibly believe this is a sewing society or a bridge party. From my position I have been watching the faces of those listening to the speakers, and I have seen an intense interest taken in the subjects brought before you today.