

Questions and Answers

Annual Meeting, May 9, 1936

Mr. Christie: Now then, the rest of the afternoon's program takes the form of a Question and Answer Box, or general discussion period. Quite often in past meetings of this kind, the criticism was made that the whole day was taken up with formal talks and the growers didn't have sufficient opportunity for asking questions. This year we thought we would allow adequate time to take care of that situation. We have a group of competent authorities present who have been working on problems of avocado culture for a good many years, who should be able to help answer most of the questions. As I read the questions, I will ask those who feel they can answer them to not be at all hesitant or bashful about giving opinions; and if there are others who wish to supplement the answers, or disagree with them, to speak up; the more the merrier.

GRAFTING STOCK FROM SLENDER TREES

Q. Would slender, growing trees, like Anaheim, and Mayapan make good stock on which to graft the more vigorous varieties like the Fuerte or Nabal?

A. (Carter Barrett) It seems that the question needs a bit of interpretation. Perhaps the idea in this question is that there has been some talk among growers that we might possibly succeed in reducing the tremendous spread and height of some trees by what you might call "swapping stocks." That would be the only point I could see to the question. I don't think there is any experience at all to back that up; at least if there is, I don't know of it. Frankly, I would much prefer to take my chances with good vigorous stock than with the stock suggested by this question. Neither one of them is a particularly good type of growth. Both are very straggly in their growth and very fragile in wind, and to my mind it would be a great mistake to put other varieties on such types of stock. The only way it could be done is in case you had such trees as budded trees in an orchard and, after all, the foundation then would be some other roots. Nearly all trees in orchards have been budded on Mexican root. Therefore, it would be highly problematical what effect this "sandwich" would have on the new top. Personally, I would not favor it.

Q. In the Variety Report, is the "Thompson" which they do not recommend the Thompson Seedling?

A. (Barrett) The only "Thompson" we recognize is the tree that is growing on the Jessie Thompson place at Montebello and is registered under that name. I don't know what is referred to as "Thompson Seedling." It was a seedling originally, as all varieties are.

Q. Please have Carter Barrett state what the Committee thinks of the "Hazzard."

A. The Hazzard is a very good fruit but we spent some little time and debated the question of whether the seedling showed sufficient promise to merit special mention at this time. The consensus of opinion of those who were considering the matter at the time amounted to this: that, while the Hazzard was a very good fruit, it was not outstanding enough to warrant its being placed on the recommended list. I don't think anybody in the locality in which the Hazzard originated would be making any mistake in having some Hazzard trees. We didn't feel, however, that we were ready, as a Committee, to commit ourselves to recommend it for wide trial.

PRUNING DYING TREE

Q. Mr. Barrett spoke of trees blooming heavily and leaves dropping off. In case of twigs shriveling, is it advisable to cut back branches and how much will recover from above condition or will trees die?

A. (Carter Barrett) Well, of course it goes back a great deal to the class you put the tree in. You put a doctor on the spot every time you call on him. Except in certain things, practically nobody can diagnose the condition until he can see the tree in question. Off-hand, you would probably be wise in going rather slow in cutting back such wood, unless it is plainly evident that it is a case of root rot and not enough root left to support the top as a whole. Very often when a tree begins to die back, it is a situation very similar to that which occurs in a frosted tree. You don't know how far it is going, and it is apt to run back and back, whereas if you leave it alone for a reasonable length of time the tree will probably stop at a certain point itself, and those places will begin to cure off and then you can cut to some advantage. However, it goes without saying, that if you don't correct the condition underneath the ground responsible for the dying back, the tree will probably die back entirely. I don't think anybody can answer that sort of question without studying the individual tree, and the soil condition. Sounds like a case of over-watering and rotting the roots off. Many of these things often go back to the care you have given the tree for two or three years past. You can't correct a condition of that sort in a few weeks' time when you have been abusing the tree two or three seasons. It is simply showing the accumulated results of improper cultural care.

SUGGESTED FERTILIZER EXPERIMENT

Prof. Home: I want to confirm what Carter Barrett has said. His answer is as good as can be given. A devitalized tree is a tree which is not in a high state of vigor. Now that falls a little outside of what is understood to be the province of a pathologist; yet, if we are going to grow avocado trees and have them produce the maximum crop, we have to get at that problem of the tree which puts it in a low state of vigor. It is undoubtedly a tree in low state of vigor and I am guessing (as I don't know the tree in question)—at any rate, many times trees in low state of vigor show that conditions are not quite right with it, which blossoms very heavily and then sheds all its fruit. The young tree recovers its vigor and then you get a crop again. That whole problem is one that remains to be worked out, I think. I heard a very excellent suggestion which might be tried as an experiment, to advantage, by someone who has the opportunity to try it. You perhaps

have read the recent article in the Cultivator about trees in two physical conditions—one which holds its leaves and doesn't blossom too heavily; the other in which you have too much blossoming and then the fruit sheds. Just about the time this came to my attention, a man gave me a very interesting and promising medication for avocado trees. It seems to be an interesting thing to try and perhaps somebody would like to try it. He had this reported to him by somebody else. This party had gotten four nail kegs and had the ends taken out and he buried the four around the tree he wanted to experiment on. He set them in the ground and filled them full of manure and from time to time would go around and fill these kegs with water and run the water through them. He said he had the most wonderful results with his avocado trees. I should like to have someone try that on a number of trees of different types to see whether it will make any difference in the trees. I think it might be a very interesting experiment.

Q. Has the Federal Land Bank made any loans on avocado property?

A. (E. C. Button) As far as I know, I think we have but I have no records here with me and I don't know how many.

Mr. Christie: Orange County Association has made one or two avocado loans. Avocado loans are referred to as a loan on real estate. Otherwise they are "production" loans. The Federal Land Bank makes only real estate loans.

Q. From whom can I secure a complete list of avocado by-products attempted or developed?

A. (G. B. Hodgkin) I would refer that to the University By-Products Division.

Mr. Christie: There are two answers to that. The Calavo Growers of California would have such information but I presume that would come under the classification of business or trade secrets. A complete list of by-products could be secured from what is known as the Fruit Products Laboratory of the College of Agriculture at Berkeley, which laboratory has in the past years done considerable research work along this line and published several articles on this subject and is doubtless aware of practically everything along the line done elsewhere as well as in their own laboratory.

Q. In cases of die-back of trunk from wind breakage or topworking, is it advisable to bud a thrifty root sucker and will that eventually utilize all of the original root system?

BUDDING ROOT SUCKERS

A. (Dr. Parker) Of course that involves a problem with which Mr. Barrett is familiar. Replacement of this old original trunk, which must be cut back and which leaves a very bad stump there, is likely to sucker profusely for many years. I think that would be a situation dependent entirely on circumstances, size of the original trunk and the kind of a cut which would have to be made to remove the old trunk. No doubt the new sucker, when budded, might make a good top but probably would have a good deal of root rot, due to inability to heal over this old trunk.

Mr. Smith: I will tell you of a number of cases where I have done that and the trees now are 15 or 20 feet tall and in some cases the stump has healed completely over. It is true there are some suckers from roots. Trees are healthy, and I did bud the suckers and let

them grow eight or ten feet high in some cases and then remove the parent tree. While on my feet, I would like to refer back to a number of cases of Fuertes grafted into trees which were of the Lyon variety and of going back clear down below the bud union—originally a Mexican seedling—and they are growing fine and doing as good as other trees around there.

Dr. Parker: In some cases, where large dimensions make it impossible to cut the stump off satisfactorily a lot more space for suckers to originate is left. It might be possible to put a series of grafts over the stump and in the sucker. I have seen that done.

Carter Barrett: I am glad that Mr. Smith elaborated on the first question. He apparently has not done just what the question asked and I think I will bear out his last statement too. What he has done is to take the Lyon top or Mayapan top out of the picture entirely, going back to the root system that lay underneath that, which is an entirely different matter in reality. That can be successfully done. I have known a number of cases where Lyon trees or slim growing types of trees have been broken off or cut off, and the seedling shoots from the root came out and grew with utmost vigor. You would never have known that such vigor existed under the old Mayapan top. That will happen a great many times. In relation to the other question, the whole thing is a matter of how close you are willing to pay attention to detail. Almost any size stump can be handled with reasonable safety and success on the avocado, because of the rapid rate of healing and growth. This is true if you will be careful enough in making your cuts so that they can heal over and keep them properly sealed, providing active fungus infection has not already started. You can heal very large stumps in avocados successfully if you are willing to pay attention to detail but I am convinced that nine out of ten are not sufficiently able to spend the time nor have the detailed interest to put on that problem to carry it through successfully. Consequently, we generally find a sickness in those trees because there is a rot or decay.

Mr. Smith: I have also found that after cutting off the stump, it proceeded to grow suckers and these would be from the original root. In a good many cases, you can put a graft or two in the new cut and start that also. In that way you would have two or three in the trunk. One will grow like wild-fire and help to heal that stump.

PRAISES ORANGE COUNTY OFFICERS

C. V. Newman: I have a couple of words to say before this group gets away. I was called over by the Special Farm Detail—which is the Fruit Patrol of Orange County. I believe the Fruit Patrol has been very active in our ranch, and more should have been said than was said in their favor. Mr. Hansen tells us a wonderful story of San Diego County and they have done splendid work, but just because they got on their horses recently and made a wonderful showing shouldn't eclipse what the boys here in Orange County have been doing. They are not amateurs by any means. In the last five years, fourteen thieves were apprehended on our own ranch and got six months sentence apiece—that is a pretty good record. I can vouch for all that Mr. Kellog said and what Sheriff Jackson said and we want you to know that the Orange County group is certainly on the job and were on the job a long time before San Diego got busy down there.

Question: I have two acres of good soil at Vista. Would you plant it to avocados and if so, what varieties?

A. (James France) If the investment is not too high I would plant it to avocados and plant it to Fuertes.

Q. (Addressed to Wahlberg) Referring to your opening remark this morning, what is the oldest avocado tree in Southern California, and what are the oldest commercial orchards?

A. (Wahlberg) That takes in more territory than I can cover. My records cover only Orange County. The old Fuerte orchard (Whedon Orchard at Yorba Linda), how old is that? Planted in 1913 or 1914. How large? Five acres. Now as to the oldest tree in Southern California. One of the oldest trees down 'here was the old Taft tree and some of those trees were sent in by the Department of Agriculture approximately forty years ago.

OLDEST TREES

James France: San Diego County had an orchard of seedlings in 1913, but in 1914 the first orchard of named varieties was planted. The oldest tree was planted in 1892 at Escondido. The oldest seedling in California is in Santa Barbara. The generally accepted story of all avocado history is that the first trees were planted by Judge Ord in 1871. However, I have heard since that there are trees on the Bradbury Estate and elsewhere that outdate that, but I rather doubt it.

The first commercial orchard I know of was planted by Miss Genetta Waters —ten acres in Lemon Grove about 1912; so I was told by a relative of hers.

They were mostly seedlings at that time—Ganters and Harmons. Another planting in El Cajon in 1913 and another in 1914. The one he speaks of was planted in 1915 or 1916.

The oldest trees Sherman Stevens has can be seen there—were planted in 1891 along the highway.

Q. What about the Spinks commercial plantings, were they earlier than that?

A. About 1912. The Ganter tree in Whittier was planted before the year of 1914.

HOW FIRST FUERTE ORCHARD "HAPPENED"

Grower: Mr. Chairman, I am sure there are many seedling orchards preceding 1913. West India Gardens had quite a lot of avocados before that time. The Whedon Grove was the first commercial Fuerte orchard, due entirely to the freeze of 1913. I think it was planted in the Fall of 1913. This story will bear it out. Mr. Whedon didn't know anything about avocados and he had a "yen" for avocados. So he purchased trees at West India Gardens, and picked out at that time, the Fall of 1912, certain varieties which were supposed to be the best. The wife had five acres of land and decided to plant it the next spring. During that winter, the freeze of 1913, it got down to 12 degrees and Popenoe's plantings suffered considerably. Carter Barrett can tell you the total amount of loss (a

hundred thousand dollar loss at that particular place). Next spring when Whedon was preparing to plant, he went back to West India Gardens but was told that they couldn't give him the trees he had ordered. Mr. Whedon said they would have to give him his money back, but was told that they had suffered such a loss that they could not do it. "However, we have some trees here that did not freeze, called the 'Fuerte,' which are strong and hearty," they said. Whedon, however, stated he didn't want them. He finally came down and saw them and found he would either have to take the trees or lose his money. He was very greatly discouraged and upset because he had to take those trees. They were planted in the summer of 1913, consisting of two and one-half acres of Fuertes and some Tafts. After they got started, the demand came in for buds, and one year he took \$6,000 off in buds alone.

Carter Barrett: I might add to that—in all fairness, that many of us who were in the Association in its early days, will very clearly recall that after Mr. Whedon got over the shock of having to plant Fuertes, which he didn't want, and they became a success, we were told every meeting for so many years of his remarkable wisdom in choosing the Fuerte variety.

Mr. Kellogg: I can say I brought seedlings over from Hawaii after the Philippine war.

Q. Is there any avocado immune or resistant to sun-blotch?

A. (Parker) We don't know it, if there is. We are trying to obtain a complete list of those varieties on which sun-blotch is seen. There are so many varieties that we have not seen it on, that we cannot be sure one way or another.

Editor's Note: Although it is stated above that the Whedon Fuertes were planted in 1913, a previous article, by Mr. Whedon, in the 1916 "Yearbook states that the Fuertes were planted in March, 1914.

EFFECTS OF IRRIGATING DURING BLOOMING

Q. What effect does irrigation during blooming period have on setting and dropping of fruit?

A. (Schoonover) One rule for irrigation that applies to avocados—it pays to apply water when dry and certainly it never pays on any kind of plant that is sensitive to apply water excessively when the soil is already wet. It does no good with any plant and it may do harm. If the soil happens to be dry when the tree is in bloom, why it is a good idea to apply water. If it happens to be wet, do not apply water. That same rules applies whether the tree is in bloom or at any other time of year. The question becomes involved when you say, "Should you anticipate the time that it is going to be in bloom and try not to have to apply water at that time?" I don't think we have any particular data on that. I would say off-hand, if irrigation practices are good, it isn't essential but helpful if a grower can anticipate the time of bloom, with irrigation. The blooming period of the Fuerte is so long, you will have to irrigate during that period.

Q. Would like to hear more discussion of the Ryan Variety if others have had experience with it. (Mr. Christie: You will recall that was one of the varieties mentioned in the report this morning. Evidently the writer of this question was not fully satisfied with

the brevity of the remarks. Does anyone wish to make any comments concerning their experience with the Ryan?)

RYAN VARIETY

A. (Carter Barrett) The Ryan Variety is a point of very much interest to those who are concerned with new varieties. It is a good looking fruit. It comes in the summer and apparently runs over a pretty long season. It is certainly a good producer. Apparently it carries well but where we find a very great variance of opinion is as to its quality. As to growth and production, there is no criticism. As to the quality of the fruit, neither the various members of the committee, nor others, are in any agreement whatsoever. Personally, I don't consider the Ryan fruit of good quality. I have yet to have a specimen that would pass more than mediocre in my personal estimation. I had nine specimens that I examined individually at three different times of the maturity season—early in the season to quite late—and at no time did I get fruit that I would have given second thought to. Almost in every case it had a very large seed and in one or two cases, where the seed was what you might call "moderate," the quality of the flesh was not satisfactory to me and there was a good deal of fibre in a number of cases. I have talked the matter over with Mr. Stephens, Production Manager of the Calavo Growers, where they have tested a great many of the Ryan fruits for their members, who have rather extensively topworked to this variety, and a good many of those tests have given fairly favorable reactions as to quality and flavor, but there is always the comment as to the large seed. Now the thing goes back to the question that the Committee is immediately concerned with—volume production. We have all come to the conclusion that, unless we can get sufficient volume on any of these fruits to pay at least a living, no matter how high the quality of the fruit, it won't be permanently successful nor can an industry be founded on it. Therefore, it may well be that the public, contrary to my opinion, will favor the Ryan. It is passable to eat, to buy, and handle, and it can be relied upon to produce consistently. It may yet be a very good fruit. The Committee mentioned that the fruit should be experimented with very much more widely than is being done at the present time but I do not personally feel that it is wise to go very heavily into it or a number of other of those varieties that were suggested this morning.

Wahlberg: May I go back to sun-blotch? In Mr. France's travels in the South, did he come across sun-blotch on any of those various strains in Mexico? Did he notice any sun-blotch?

France: I wasn't looking for sun-blotch and I didn't see any anywhere. I saw a good deal of mottle-leaf, and insect injury.

Q. (Asked of Mr. France) If one were to plant a new grove, say at Vista, what varieties would you plant and in what ratios?

A. (France) I always reserve the right to change my opinion, but for the present I would say "Fuerte" in Vista, and not "varieties."

Q. If one started with seedlings to graft later, what seed stock is best?

A. (Dr. Home) I won't try to answer the question because it is out of my line. However, I would like to make a remark. There are various ways of knowing things and it used to

be the idea that you "just said it" and that was supposed to settle it. That is the ancient way of learning, as I understand it. I don't pretend to be a profound philosopher. In recent times, people have come to have other ways of deciding whether a thing is true or not true. Now it is my idea that a question of that kind is not answered properly by somebody just "saying." We have to have some experiments and then some method of proceeding and dealing with the data, and finally we can come to a conclusion. I don't think we can answer a question like that with authority.

ROOT STOCKS IMPORTANT

Carter Barrett: I want to back up Prof. Home on that, and I want to say this. I have felt for years that this question of root-stock is far more important than it is generally credited with being. The root is the foundation on which you build the whole structure, and we don't know anything about roots today. As Chairman of the Variety Committee, it has always been one of the projects somewhat in the background. We need to get more data on rootstocks. Personally I am inclined to think that in some locations and under some conditions the root will yet prove the solution of some of our difficulties, but the best evidence today, and there is mighty little of it, is that the best and most vigorous Mexican seedling that you can pick is probably the best for such purpose. There are a number of them you can find. I believe in taking a rootstock that comes from a tree, free from any contamination of sun-blotch, insofar as any can be determined. There is no evidence to support the idea that it can be carried through the seed. I believe that anybody taking that sort of proposition is doing just what Prof. Home explained—merely guessing, and their guess is as good as the next fellow's.

We look forward to a time when the Variety Committee will also be able to make a report on the suitability of different kinds of rootstocks for different kinds of tops and for different districts.

Grower: I believe I can give some information. I have made avocado culture my business for the last twenty years. I have one case in mind that I feel will verify what has been said on the importance of rootstock. Some 16 years ago I intended to go into the avocado nursery business. I planted about 500 seeds. Most of these seeds came from the West Indies, from avocados that my neighbor brought over to me. One of these seeds came up and produced a very beautiful, large leaf. I didn't bud that for a number of years. It showed every sign of perfect health. Yet in five years, was less than an inch in diameter. The great big fine leaves stood there. I admired them day by day. One day I decided it was a case with which to experiment. It was evidently a very slow growing type. I had a very beautiful Fuerte tree that had a natural spread. From it I took a nice Fuerte graft and put it on that slow growing tree. The graft took, and the following year I took that tree from where it stood, too close to a walnut tree, and put it where it could exert itself—that was about nine years ago, and today I have a perfect Fuerte tree as far as fruit is concerned.

The tree is about 22 feet high, and at no place has it a greater than possibly 30 foot spread. Just like an Italian Cypress. It is now fully as big as an almond tree at the ground. There is what you can do and will get when you get to selecting rootstock.

CAN TREES OVERCOME SUN-BLOTCH?

Q. Is there any evidence that a tree can permanently overcome sun-blotch?

A. (Dr. Parker) It won't take a long time to answer that one. We have no real evidence that such is the case. There is some evidence that symptoms of the disease disappear. Vigor of the tree has something to do with the severity of the symptoms and possibly with the rapidity of the virus in the tree. However, we cannot be sure that the virus is ever eliminated from the tree because many of these trees throw out a very fine growth but at the end of five or six years show sun-blotch symptoms which appear very gradually.

Q. What soil depths are considered adequate for avocados in San Diego County?

A. (Jean Miller) I don't think we can set a definite depth of soil and require that as a main factor. We must also consider whether that soil is well drained; which is more important than the depth of the soil, and by drainage I mean drainage straight down to the sub-soil. There are groves in San Diego County that are doing very well on 18 inches of soil, where very good sub-drainage exists. There are other groves which do not do well on three or four feet of soil, where there is poor sub-drainage. The ideal is about five feet, and well drained.

Q. How effective have methods at Carlsbad been in controlling Dothiorella?

A. (Dean Palmer) Why, I think they have been very effective in reducing it. It has not been entirely eliminated, and we couldn't expect it to do so immediately. I think our drainage system though will certainly have beneficial effect where it drains for a good many years, and the beneficial effect would be accumulative. I think it is deserving of a great deal of credit although the trouble has not yet been eliminated.

Q. Please discuss the treatment of brown mite and to what extent it can affect the coming crop. Also what weather conditions are most favorable for brown mite and what weather tends to check them.

AVOCADO BROWN MITE

A. (McKenzie) Answering the first one. I think our results today indicate that the application of sulphur dust is most effective in controlling the avocado brown mite. The second part—(What weather conditions are most favorable to growth and what weather conditions tend to check them?) It doesn't reproduce very well in winter. Early spring and summer, up to early fall, are the most favorable weather conditions under which the mite develops.

Q. Are there any extremes in weather conditions which would cause them to grow more rapidly?

A. The latter part of summer or middle of summer are the most favorable weather conditions for the avocado brown mite.

Q. When is the best time to sulphur in La Habra Heights?

A. You can sulphur any time during the day without injury. Our results indicate that. One

difficulty you are going to have is the method of application where the trees are growing on terraces and are extremely large. There the application is by means of a hand duster and is the only way you can get at your planting. I don't know how you would otherwise handle it.

Q. I have been dusting some but I have heard that real hot days would kill the red spider—a blistering day like today would it stop work, or would you dust regardless?

A. You could sulphur on a day like this. It remains active so it will kill the young after they hatch from the egg; when the egg hatches, it kills the young.

Q. I understood the weather could kill the spider off.

A. I couldn't answer that question.

Q. Will sulphur dust injure the oncoming crop? Also blossoms for the next year?

A. (McKenzie) I don't believe I can answer that question.

Q. (Asked of Carter Barrett) You referred to strains of the Fuerte in your report. Is there any definite data available on these?

STRAINS OF FUERTE VARIETY

A. (C. B.) There is today rather incomplete data in that regard. The only pronounced strain that we have is a so-called "Cole strain" which has been carried on for some 3, 4 or 5 years up in Ventura County. I looked at a number of those trees yesterday—some forty to sixty trees—and they uniformly have good vigor, good coverage of foliage, and the fruit is very evenly distributed among the foliage and is not particularly visible, and they have carried good crops consistently for three seasons. So far as I could tell yesterday, these trees were setting very nicely for the coming year. The fruit on these trees is somewhat different in shape than the average Fuerte in Los Angeles and Orange Counties, being somewhat more squatty, but I think that is generally true up in Ventura district. This strain is from the Fuerte tree in the Ojai Valley and has been carried through for several seasons by Mr. Daily who has done some of the most valuable experimental work on varieties that has been done in that county.

The Committee has in mind no definite strains as yet but certain trees that in another year or two we will have enough information on to perhaps call them "strains." There is a tree out here at Brea that has a very excellent and consistent bearing record and young buds and grafts of that tree are coming into fruit now. It had some fruit last year and should set a good crop this year. In another two years we will probably be able to tell whether that is a more or less fixed characteristic or not. There is nothing definite to go on as yet but there is considerable hope in that direction.

Q. Does the Edranol tree (budded trees of that variety) compare with the Lyon tree with respect to slenderness and growth?

A. (C. Barrett) I don't believe you could say it is as slender as the Lyon. It is, apparently, the same type of growth, but any tree showing more vigor will be somewhat more spreading. If Mr. Kepner of Vista is still here I would like to have him voice his opinion on the subject.

Roy Kepner: I only have a three year old graft. That is the extent of my Edranol planting. The trees at Dr. Colt's are not as slender as the Lyon.

Q. What kind of fertilizer and how much should be used on trees one to ten years old? Also what, in the light of present knowledge, would you recommend as an adequate fertilization program for avocados?

FERTILIZATION PROGRAM

A. (M. B. Rounds) On young trees the addition to the soil of some good quality manure each year may be all that will be required. When four to six years of age, some supplemental nitrogenous fertilizer may result in increased growth. As a suggestion, one might begin by applying as a supplemental fertilizer twenty pounds of nitrogen per acre, beginning with the fifth year, increasing the amount each year until two pounds per tree or two hundred pounds per acre are added.

For a mature orchard, we suggest that from five to ten tons of dairy or barnyard manure be applied per year, per acre, or some other good, bulky, organic fertilizer which will add to the soil an equal amount of dried organic matter. This should be applied in the summer or early fall, and it should be broadcast over the surface of the cultivated area both underneath and outside the trees. While we do not know definitely what the most efficient amount of supplemental nitrogen is which should be applied, because of a lack of experience and experimental evidence, it is suggested that approximately two hundred pounds of nitrogen be applied per year in some quickly available nitrogenous fertilizer. Possibly the supplemental nitrogenous fertilizer would be applied in one or two applications, but we are suggesting the division of the supplemental application into four equal quantities, namely, October, January, March and June. The fertilizer program should be considered along with the balance of the soil management program, which includes the irrigation practice, cover cropping, and cultivation.