

ROOTSTOCK SHORT COURSE

**3:15 & 4:45 Discussion
Tuesday, September 25**

Questions for Dr. W. P. Bitters and Dr. H. Wutscher

question: W. P. Bitters: Will a sandwich tend to give you a structually weak tree?

answer: That depends upon the sandwich, in some cases yes and in some cases no.

question: W. P. Bitters: Have you done any work with sandwiches and tristeza resistance?

answer: Yes, we have done quite a bit of work with sandwiches and tristeza testing. But the sandwich has no effect as far as tristeza is concerned. The virus moves right on through. When the vector infects the leaf the virus moves right straight through the sandwich down into the root system. The interstock does not filter it out.

question: W. P. Bitters: What sort of soil preparation do you make in California before planting a tree?

answer: We recommend soil fumigation, except when planting trifoliate orange.

question: W. P. Bitters: What sort of material do you fumigate with?

answer: There are a number of materials which are used. Vapam at 100-120 lbs. per acre is what most growers use.

question: W. P. Bitters: How long after fumigation do you put in your resets?

answer: This depends upon the soil but usually within 30 to 60 days.

question: W. P. Bitters: Did I hear you say that phytophthora was much worse on trees with sweet orange root following a fumigation?

answer: Yes, unless you use excessive doses of fumigant, so that you can get a fungicidal as well as a nematocidal effect from the material.

question: W. P. Bitters: Dr. Bitters, as I recall, you have done quite a lot of work regarding height of budding?

answer: That original work that we did was not very well replicated, however, now we have in some trials that are quite well replicated where we are studying heights of budding, from ground level up to 3 feet high and we are getting such things as yields, fruit quality, leaf analysis, and other things such as this.

question: W. P. Bitters: Does it or does it not have any effect?

answer: Yes, it does.

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- question: W. P. Bitters:** How long did the height of budding affect the dwarfing characteristics of the stock? I recall some earlier work by Swingle and Robinson in budding trees at great height where they ultimately outgrew this effect.
- answer:** In the original experiment we had at Riverside the trees are now over 20 years old and those budded at 5 feet still show a pronounced dwarfing effect.
- question: W. P. Bitters:** Have there been any attempts in California in developing a nucellar line of 'Temple' orange?
- answer:** Yes, we have a nucellar 'Temple' at Riverside.
- question: W. P. Bitters:** Is there any relationship between the height of budding and cold resistance?
- answer:** I have never had the opportunity to observe this but I think there would be. The higher you bud the greater the influence of the rootstock. Therefore, you should get a little more cold hardiness from budding high.
- question: W. P. Bitters:** Does an interstock have any influence on the cold hardiness of the tree?
- answer:** I believe this would depend upon the type of interstock that you have and the physiological problems that might be involved. In California we have a lot of lemon trees which have been topworked to oranges and we have always felt that these trees are a little more sensitive to cold.
- question: H. Wutscher:** What level of calcium do you feel that trifoliolate used as a rootstock can tolerate in the soil?
- answer:** I would have to guess and I would guess that the cut-off point would be somewhere around 15% calcium in the soil by volume.
- question: W. P. Bitters:** What is exactly the importance of cold weather in the central valleys of California?
- answer:** The central valley is a little colder than Los Angeles area but under normal conditions the trees are a little hardier and can take more cold. Last year, for example, however, we lost a good portion of our crop in the northern California area whereas the crop in the southern California area escaped with very little harm.
- question: W. P. Bitters:** Is it not true that the more northerly latitudes where these are planted that you will not get warm spells like we do in Florida during the winter so once it gets cold it will stay relative cold?
- answer:** Yes, that is true.
- question: W. P. Bitters:** When do you normally get your first cold weather?
- answer:** Usually about the first of December or the last of November.
- question: W. P. Bitters:** Does it come in gradually?
- answer:** Yes, it usually comes in gradually and will stay until around February 15 after that time we rest a little easier. Our most serious periods for cold weather are from December 15 to January 15. We always figured that the risk of cold is pretty well over by February 15.

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question: W. P. Bitters: Approximately how many nights a year would you have to protect your trees from cold?

answer: On an extremely warm winter we have had to protect probably 3 to 5 times. In a cold winter, this could run up to 10 or 12 nights a year.

question: W. P. Bitters: Do you have any idea how many acres are potentially suitable for citrus in the San Joaquin valley?

answer: would guess that our acreage could easily be doubled if it had to be.