The Propagation of Citrus

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The propagation of citrus is the foundation of the citrus industry. Without dependable trees it would mean a failure. Much good work has been done along the line of the selection of bud wood from trees known to continuously produce fruit of the character desired. This being true with the bud does it not look reasonable that the root stock that the bud is inserted in would be an important factor? It is certainly a component part of the tree.

It is a known fact that a bud of any variety of citrus budded on sour root will produce a much finer fruit than if it were on rough lemon. This proves beyond any doubt that the root does have a great influence in the make up of the tree. Therefore I maintain it is just as important to have progeny trees for root stocks of known character of prolificness, regular bearing of good smooth fruit, heavy with juice and a tendency to hold it a long while. These are points well worth considering as it is following along the lines of nature that like will produce like.

One of the most important factors of successful citrus propagation is the culling of the seeds. This can be done by spreading on a table and grading by hand or working through a sieve. It has been proved at the Citrus Experiment Station that one-fourth of the seeds should be destroyed and that only full plump seeds should be sowed and these not closer than three seeds to the inch. These seeds should be sterilized in bichloride of mercury 1:1000, then rinsed in fresh water previous to sowing.

Some citrus seeds are polyembryonic, especially the rough lemon which are capable of producing several seedlings to one seed and these are all different in stages of vitality and growth. Hence this is one of the reasons of so much irregularity in our nurseries and groves. A cull seedling will always be a cull and never have the bearing surface of a vigorous tree. It may seem extravagant to discard these seedlings, but by doing so, the nursery-man would have a better grade of trees and no inferior ones to sell. Furthermore the market gardener finds it profitable to grade and transplant cabbage, cauliflower, celery, etc., to obtain strong well developed plants and can sell them from $5.00 to $6.00 a thousand. These crops only last between 120 and 150 days, while the citrus is worth between a $1,000 to $1,500 a thousand and have a life of a century.

When the seedlings have attained a height of two inches in the seed bed they should be lifted and graded. This is one of the most important points in successful citrus propagation, as it eliminates the cull plants. It has been found that one-
fourth of the plants should be destroyed. The system of transplanting is very simple. After the ground is thoroughly prepared a board one inch by four inches by six feet long should be used as a marker, making a small trench along side of it about two and one half inches deep in which to set the selected plants in a perpendicular position two inches apart in a row. Fill in and firm with the edge of the board and give plenty of water. The rows should be about five inches apart. The planter should be provided with a one by twelve by six feet plank to stand upon, as this firms the soil to a good workable condition.

After the plants have attained a height of 12 inches they will be ready for lining out in nursery form. Here offers another opportunity for further grading. Nothing but uniform plants should be set.

Other methods of citrus propagation are being carried on at the Citrus Experiment Station. One of these is the propagation of citrus trees from cuttings. These cuttings are four inches long and one eighth of an inch in caliper. The leaves should remain on the cutting as this aids the process of rooting. They are taken from a bearing tree of known production. The work offers great possibilities in that it gets away from the irregular traits of the seedlings and has the same dependability of the bud. There is nothing difficult about the rooting of the cuttings. A frame with glass sashes and coarse propagating sand is all that is needed. An intense humidity and shade are the only cultural requirements. The cuttings can be rooted about as quickly as seedlings from seeds.

Rough lemon cuttings are the first to start growth, sour orange next, limequats next, and limes last.

PROPAGATION OF CITRUS PLANTS FROM ROOT CUTTINGS

Root cuttings were taken from bearing trees, of rough lemon, sour orange and grapefruit, and cut six inches long and having one fourth to three fourths inch caliper. Rough lemon was the first to show signs of growth. For this kind of citrus propagation half shade is needed.

Mr. Robinson and I have tried various kinds of buds and grafts in the progeny grove at the Citrus Experiment Station. We have found the terminal end of the bud stick, where the fruit has been cut, makes a most desirable tree, if inserted as a sprig graft. It will be noticed there are several eyes in a cycle, making a low, well branched tree, without any artificial training. Furthermore it gets away from the thorns.

John H. Jefferies: I have with me some of the cuttings and also some of the seedlings. Right here is a seedling that is being transplanted. It was sown on January 18, 1922. Here is another seedling that has not been transplanted. As you see the root system is quite different. The one that is transplanted has more root system; it has gained 50 per cent over the untransplanted plant.

Here is a cutting that was put in the rooting bed on January 15, 1923, a month later than this little seedling I am holding in my hand. You can see here the new growth that it has made in the plant bed during that time. The ques-
tion has been asked at different times, do these cuttings make tap roots. You can see it makes a downward growth, and instead of one tap root there seems to be several of them.

Member: Do sour oranges show the same thing?

Jefferies: I should have said that in propagation bed that we have rough lemon, sour, limequats and limes. The rough lemon was the first to start, then sour, then limequats and finally limes.

Member: Was that cutting transplanted?

Jefferies: No sir.

Member: In what season of the year did you procure the cuttings?

Jefferies: In February and March. I might say that the first lot of cuttings that we put in we lost by not keeping up the intense humidity. Another month later we put in some more and it looks like we are getting 100 per cent to grow. They have only been in the rooting bed since March first, and already are calloused.

Member: What is the idea of propagating the cutting, for stock or tree itself?

Jefferies: By propagating the tree from cutting you get away from irregularities of the seedlings.

Member: What kind of humidity is kept up?

Jefferies: After cutting put in a plant bed where the ground is made thoroughly wet. Wetting by sprinkling is sufficient. Of course you have to use some judgment about that. Make it sufficient to keep up the humidity in the air.

Member: Is this in the open?

Jefferies: No sir, this work is all carried out in a closed frame.

Member: What type of soil do you use in propagating the cuttings?

Jefferies: Very coarse sand.

Member: How would a greenhouse be for it?

Jefferies: I think all right providing the humidity is kept up.

Member: What about ventilation?

Jefferies: It should have some but not very much.

Skinner. There is a magazine called "Heredity" that describes two methods of propagation that are extremely interesting and if any of you would like to have those magazines, I am sure Dr. David Fairchild would like to have you subscribe. It is most interesting. It has a wonderful lot of information. The two illustrations in there about propagation are easy worth the price of the magazine.

Member: I might say a brief discussion of propagating methods has been printed in a number of the Agricultural Research, published by the United States Department of Agriculture, describing the Limequat.