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METHODS OF PROPAGATION OF CITRUS PLANTS IN VITRO AND IN CLOSED PROTECTED PLACES

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Abstract:

A commercial citrus tree usually consists of two parts: the stem and the root. The lemon is the above-ground part of the tree and includes the main trunk, leaves and fruit. The part of the rhizome or rhizome that consists of the lower stem and root system of a tree. Rootstocks are usually grown from seed, but can also be grown from cuttings or tissue. Lemons are joined to the rhizome by a process called grafting, detailed below. By using different cultivars for rootstock and stem, more desirable traits can be incorporated into a single tree. A specific root variety can make a citrus tree resistant to various stresses, such as unfavorable soil conditions, soil pests and diseases, and frost. Root can also greatly affect citrus tree size, fruit quality, and yield. Therefore, you can see what methods of multiplication are effective.

Keywords: Grafting, shoot, tape strip, sprout, pod, seedling, apical meristem, seed, in-vitro micropropagation, nutrient medium.

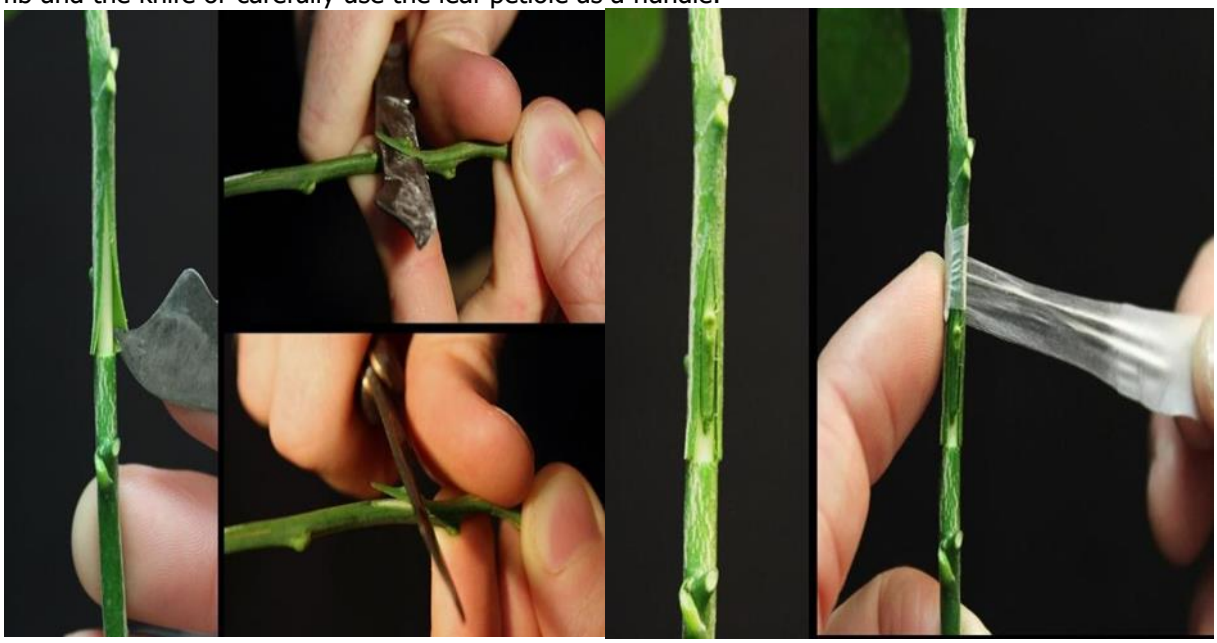
ENTER. Plant breeding is the art and science of growing plants, preserving their characteristics from generation to generation. Grafting is a specialized type of plant propagation in which one part of a plant (the shoot) is grafted to another (the rhizome or stem of the plant) in such a way that they unite and grow into a single plant. is entered. Budding is a type of grafting that consists of a single bud attached to a piece of bark and sometimes thin wood underneath. It is the method of choice for propagating young citrus trees because it works well for citrus and requires less skill than other types of grafting. There are many different types of buds, but the most commonly used for citrus in Florida, USA are inverted T buds (hanging buds) and we are also doing propagation using these methods.

A procedure known as top dressing can be used to modify an existing citrus tree variety. It involves grafting a new variety onto an existing piece. Several grafting procedures (including the T-shape) can be used to topdress citrus plants, but some require considerable skill.

Nursery. For rootstock propagation of any cultivar, budwood must be sourced from healthy and DPI (Department of Plant Industry) certified, disease-free bud source trees (Figure 1). Seedlings are usually done when they are 1/4 to 3/8 inch in diameter (about the diameter of a pencil). Plants can be done at any time when the rhizome is actively growing and the bark is sliding (easily separated from the wood under the bark), which is usually from April to November, depending on the location of the hanging area of the plant. It is important to ensure that the plants are well watered and fertilized before the buds appear. The place where the bud passes must be cleared of thorns and branches. An acceptable shoot height is 6 to 8 inches above the base of the stem.

1 FIG. Healthy plant trees.

Splitting a T-shaped post is a relatively simple procedure that requires more experience. Using Florida experiments, most citrus trees are propagated by the inverted T bud procedure, but standard (upright) T buds are also suitable. T shoots can be transplanted when the rootstock has reached a suitable size, the bark is shed and buds are present.
Before cutting the sprouts, it is necessary to disinfect the blade of the grafting knife in order not to infect the pathogen. Using a pruning knife, a vertical incision about 1.0-1.5 inches long is made completely through the bark on the smooth surface of the rootstock. A horizontal cut is made through the bark at the bottom (inverted T) or above (regular T) of the vertical section (Fig. 5). The cut is made at a slightly upward angle, again completely cutting off the bark. The point of the blade can be used to lift the shell along a vertical cut. By holding the apical end (end) of the bud stick away from you, the bud is removed from the bud. A flat, smooth piece of shield-shaped bark and wood about 3/4 to 1 inch long, cut 1/2 inch above the bud with the blade nearly parallel to the axis of the bud was the cut surface is removed. Only a thin piece of wood should remain under the bark. The bud should not be removed, because a lot of wood is removed with the bud. To avoid touching the cut surface of the bud shield, hold it between the thumb and the knife or carefully use the leaf petiole as a handle.



2 FIG. T cutting (left), bud cutting (right).
3 FIG. Bud insertion (left) and bud wrapping (right).

The bud should be immediately included in the stock; the cut surface of the bud should not be allowed to dry. Place the cut surface of the bud shield (a bud associated with bark and wood) under the bark of the rootstock flat against the wood of the rootstock. The bud shield should be completely wrapped around the T-section (Fig. 3).

Buds should be wrapped immediately after being inserted into the rhizome. Wrap buds with budding tape (polyethylene strips about 1/2 inch wide and 6-10 inches long). Start wrapping from under the bud with 3-4 turns and finish with several turns above the bud, covering all exposed surfaces of the bud with tape. Alternatively, wrapping can continue from top to bottom. The end of the tape is fastened under the last round turn. The wrap should be tight without being too tight. Wraps should be removed after 14-21 days and not left on for more than 30 days. If a successful union is formed between the bud and the rhizome, the bud will be green and will show no signs of shriveling or drying. Callus formation should also be evident at the edge of the bud.

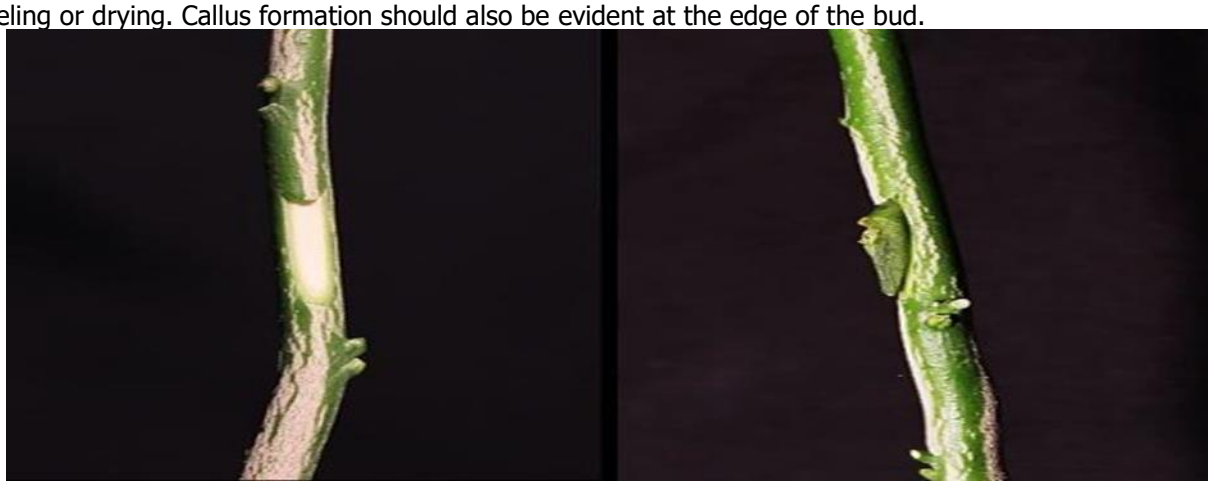


FIGURE 4. Placement of cuttings and its ripening

After care. After the wrapping has been removed and union between the bud and the stock has taken place, the bud must be "forced" to grow. Plant hormones naturally produced in the upper part of the root seedling can inhibit the growth of tumor buds if the bud is not forced. Buds are forced by cutting 2/3 of the bud, on the same side as the bud

and about 1 to 1 1/2 inches from it. Then, the top of the seedling is pushed to lie on the ground; this procedure is called rod bending. Alternatively, the top of the seedling bends to form a ring in a process called bending (Figure 5). In both cases, the upper part of the rhizome continues to supply the root and developing plant with food and other growth substances during the early stages of development (Figure 6). After the plant buds have grown several inches, the rhizome can be removed by cutting about 1/2 inch above. If twisting or bending is impractical, the upper part of the rhizome can be removed by cutting it completely off the rhizome about 1 inch above the sloping buds. Root growths that form along the main stem (especially near shoot buds) should be removed as soon as they grow, as they will slow the growth of the developing branch. as the bud grows, it will be necessary to tie and tie it regularly so that the branch does not break. When the seedling tree reaches a height of about 18 to 20 inches, it is ready to be planted in the field (Figure 7). To stimulate the development of side shoots, the upper part should be pruned.

5 FIG. Buds starting to grow (left) and finished trees (right).

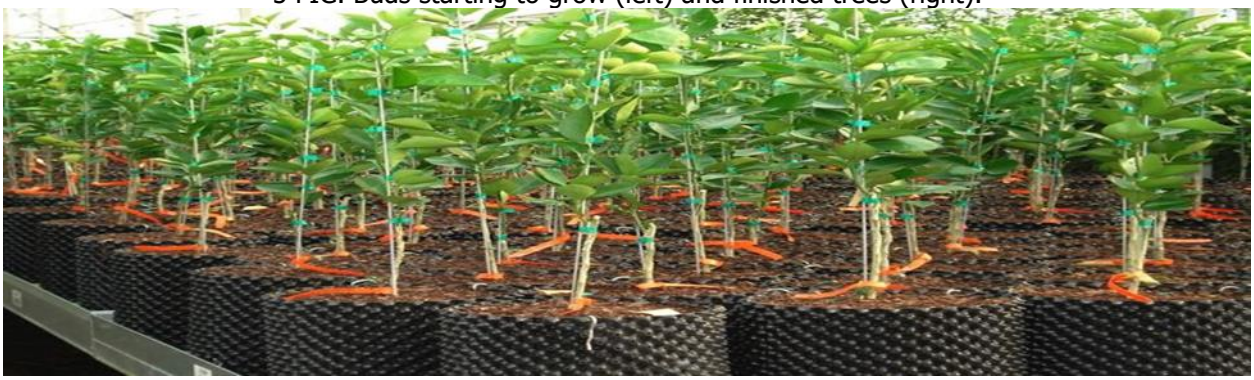


FIGURE 8. Field ready trees.

Welding. Off-bud grafting procedures involve the use of a shoot with two or more buds. There are many types of welding, including whip, slot, bridge, belt, round, side, inlay bark, butt, and more. Grafting is often used to repair existing trees or to process existing trees to change cultivars.

Top dressing is the process of changing the top of an established tree from one variety to another or to several varieties by budding or grafting. Several procedures can be used in top dressing citrus trees. These include skin grafts, crack grafts, and T-buds. To treat a citrus tree with T buds, cut the tree back to leave a few branches that are 2 to 5 inches in diameter or smaller. Put 1-3 buds on the top side of the rest of the stems using the T bud method. Remove unnecessary shoots and buds to ensure the growth of only the necessary shoots.

Propagation from cuttings. Nurseries sometimes lack seeds for some popular root varieties, and vegetative propagation techniques are required to produce large numbers of genetically identical plants. One method popular with citrus rootstock breeders, who do not usually have seed trees for new breeding, is rootstock propagation by cuttings. For this method, single-node cuttings, approximately 1 inch long, are taken from the woody parts of 2- to 5-month-old branches of certified disease-free citrus plants. The leaf remains attached to the node to transport photosynthetic to the developing roots, but may be shortened to 20-30% of its original length. The basal end of each cutting is then dipped in a root powder containing a root-stimulating hormone such as indole-3-acetic acid (IAA) or naphthalene acetic acid (NAA) and placed in a pre-moistened container (Figure 9).).

In order for plants to survive in the absence of a root system, cuttings must be kept in high humidity conditions. This can be achieved by placing the plants in a closed high humidity environment or using an automated misting system. Under such conditions, a young plant usually develops within a few weeks after planting. After the cuttings have rooted and the plants have begun to grow, care can be continued with the standard procedures used for seedlings.

9 FIG. In the process of root formation when propagating from cuttings

IN-VITRO PROPAGATION METHODS (MICROPAGATION) Advances in vegetative propagation of citrus rhizomes by tissue (micro propagation) have made it possible to economically obtain a large number of genetically identical plants from pineapple selection. The starting material for establishing micro propagated plants varies according to nursery preference and may consist of nuclear embryos or shoots, both of which should be obtained from disease-free foundation trees. Explants are placed in a nutrient medium containing agar-gelatin and more than 20 macro-micro elements and vitamins, which may contain small amounts of growth regulators to accelerate plant regeneration.

After the plants are regenerated, they are subculture in a nutrient medium containing fresh agar-gelatin and more than 20 macro and micro elements and vitamins to form several shoot clusters every few weeks (Fig. 10). After the reproduction stage, the clusters are divided into separate buds. Depending on the preference of the nursery, individual plants are rooted in MS medium containing agar gelatin and more than 20 macro-micro elements and vitamins before transplanting. After a period of acclimatization in high humidity conditions, young plants 'can be managed using the same procedures used for chats. The use of in-vitro propagation techniques allows the rapid propagation of large numbers of identical and disease-free plants and has become common practice in many fruit cropping systems.

FIGURE 10. Lemon plant under micropropagation in vitro conditions.

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