

Top-working: A Way to Change to New Cultivars

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Basic Grafting Terms

- ▶ **Grafting:** The art of joining parts of plants together in such a manner that they will unite and continue to grow as one plant.
- ▶ **Scion:** The twig or bud that will become the top part of the new plant. It is what is grafted onto the stock.
- ▶ **Stock:** The root, trunk, or branch upon which the scion is inserted. It may be a young seedling or clonal plant or a large tree
- ▶ **Graft union:** The place where the scion and stock grow together.

Basic Grafting Terms

- ▶ **Cambium:** A thin layer of living cells between the bark and the wood from which bark and wood tissues are formed.
- ▶ It is the source of all girth growth in woody plants.
- ▶ As the cambium cells divide bark is produced to the outside and wood towards the inside.

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Basic Grafting Terms

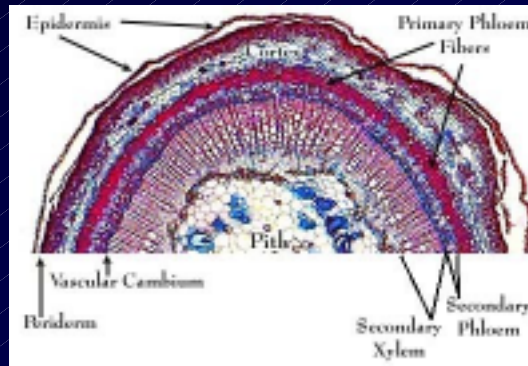
- ▶ During the healing of wounds, such as those caused by grafting, the cambium produces callus cells which will join the scion and the stock.
- ▶ Eventually, these callus cells will differentiate, forming the vascular connections between the stock and scion.

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Basic Grafting Terms



cambium



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Requirements for a successful grafting operation

- ▶ The stock and the scion must be compatible. Usually, the more closely related the plants the better the chance of the graft taking. For example, apple to apple is much more successful than apple to pear
- ▶ The cambial region of the scion must be placed in close proximity with the cambium of the stock.

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Requirements for a successful grafting operation

- ▶ The cut surfaces must be held together tightly by wrapping, nailing, wedging, etc.
- ▶ Rapid healing of the graft union is necessary so that the scion may be supplied with water and nutrients from the stock by the time the buds start to open.

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Requirements for a successful grafting operation

- ▶ The grafting operation must be done when the stock and scion are in the proper physiological stages.
- ▶ The scion buds need to be dormant. The stock needs to be capable of producing callus tissue for the healing process to occur.
- ▶ For apples, dormant scion wood is collected during the winter and kept inactive by storing at low temperatures. The stock may be dormant or active depending on the grafting method used.
- ▶ **Store with no other ethylene producing produce**

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Requirements for a successful grafting operation

- ▶ Immediately after the grafting operation is completed, all cut surfaces must be protected from desiccation.
- ▶ The graft union may be covered with tape, grafting wax, or with moist materials covered with some type of grafting frame .
- ▶ Proper care must be given to the grafts for a period of time after grafting.

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Requirements for a successful grafting operation

- ▶ Care must be taken that shoots coming from the stock below the graft do not choke out the desired growth from the scion.
- ▶ It is recommended that the scion be supported to prevent breakage due to the wind or the weight of the fruit.
- ▶ The knife needs to be very sharp. A grafting knife needs to be razor-sharp to insure success. A utility knife can be used instead of a grafting knife. Advantages of a utility knife over a grafting knife include cost and no sharpening.

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Top- working

- ▶ Top-working is the process of changing a tree from one variety to another by means of grafting.
- ▶ It is usually done in the spring, shortly before new growth starts.
- ▶ The exact time depends upon the method to be used.
 - ▶ The cleft graft is performed before the bark is slipping.
 - ▶ The bark graft is done when the bark is slipping, but before the buds of the stock begin to grow

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Top- working

Advantages of top-working:

- ▶ Shorter time for trees to come into bearing
- ▶ Avoidance of replant problems and an already established root system.
- ▶ The trees that are selected to be top-worked need to be 'healthy' and in a site that has no problems such as poor drainage.

Please remember that any cultivar or variety that is patented, such as Honeycrisp, require propagation agreements.

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Preparation of Scion

- ▶ Use healthy, vigorous, one-year-old dormant wood.
- ▶ Watersprouts are ideal since they tend to stay dormant longer than other shoots, but avoid watersprouts that developed in shaded areas.
- ▶ Scion wood should be collected while dormant, and stored in a moist medium, wrapped in polyethylene plastic sheeting. The refrigerator is a good place to store the scion wood (about 40F). If you are planning to store the wood for a period of 1 to 3 months then keep the wood at 32F. Do not store in your freezer. This temperature is too low and may cause damage.

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Preparation of Scion

- ▶ The scion piece needs to be between 1/2 to 1/4 inches in diameter. Use only the central portion of the scion stick for the graft.
- ▶ Cut a wedge at the butt end of the scion piece. Start at about 2 inches from the end, and make a smooth, straight cut that has a surface of about 1/2 inches long. Repeat the same procedure on the other side of the stick.
- ▶ After cutting the wedge, shorten the scion to about 3 buds. The top cut should be made just above a bud.

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Preparation of the stock

- ▶ Select a 'nurse' limb and cut 3 to 5 inches above this limb. Avoid areas where callus has formed (usually where a thinning cut was made).
- ▶ Make the cut at a slight right angle from the main axis. To expose the position of the cambium, smooth the stub with a sharp knife. Avoid ripping the bark.

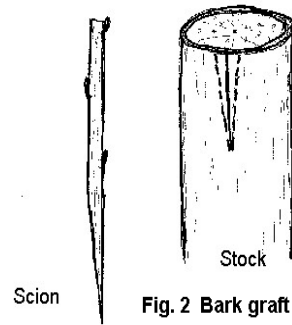
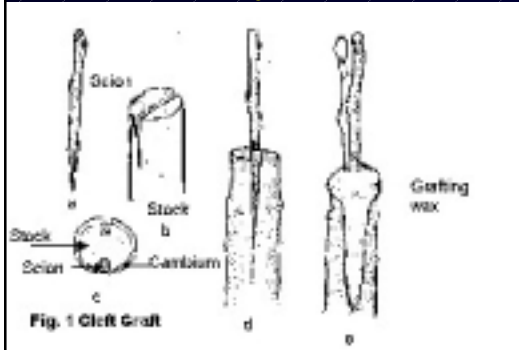
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Stock preparation



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Types of bark grafts



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Cleft graft



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Cleft graft



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Bark graft



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Bark graft



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The image contains two photographs illustrating the bark grafting technique. The left photograph shows a person using a utility knife to carefully peel away a section of the bark from a tree branch, revealing the underlying cambium. The right photograph shows the same person inserting a prepared grafting piece into the cut in the bark. The background is a dark blue gradient with a diagonal line pattern.

Bark graft



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Covering the graft



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