METHODS OF GRAFTING FRUIT TREES

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Abstract: the article provides valuable information on grafting methods of fruit trees with an in-depth analysis.

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There are two ways of propagating a tree variety to its exact counterpart, one is propagation by cuttings. In the first method - cuttings are cut from tree branches and inserted into the ground. The second method is grafting. In this method, a cutting is taken from the branch of the tree that needs to be propagated, but unlike the first method, it is not pushed to the ground. In the language of grafting, this pen is called a graft (upper part). The graft is attached to another seedling base (graft) of the same type or close to the type. In this case, both parts start to stick together and develop together. Any bruising on the graft itself is stopped and it just acts as a rooted base. The graft develops and forms tree trunks and branches. The two methods described above are called asexual vegetative reproduction. In rooted cuttings and grafted trees, the bruised part of the graft is the clone of the parent tree.

Almost all fruit trees and many ornamental tree species are propagated by vegetative methods. Because seedlings grown in this way retain all the characteristics of their parent tree. Cultivars developed are generally distinguished by high yield, quality, shape, flower and leaf, and resistance to pests and diseases. The disadvantage of seedlings grown from seeds is their late harvest.

Nowadays, almost all fruit tree species and some ornamental tree species are propagated by grafting. But some varieties of vines, figs, olives, roses and plums are best propagated by cuttings.

This guide covers two different types of grafting: bud grafting and pen grafting. As the name implies, bud grafting is the attachment of a bud itself to a graft with a little base (with the bark underneath), while grafting involves grafting a graft with one or more buds.

- The following conditions must be met for successful grafting:
- the graft should be in its effective state;
- for grafting, take cuttings from a quality one-year branch and, depending on the situation, use the most appropriate method of bud grafting or grafting;
- correct timing of grafting;
- proper post graft care.

Selection of grafting cuttings, their storage, correct timing, methods of grafting buds and cuttings, as well as the grafting process itself are explained with step-by-step examples.

The following tools are needed for grafting seedlings:

- Vine shears for initial cutting;
- A sharp knife for preparing parts to be grafted;

- Insulation tape or a suitable means for fastening;
- Special paint to protect seedlings.

Skilled grafters prefer to use special knives. However, any sharp knife can be used for grafting. The main thing is that it fits into the hands of the gardener.

A bud that is hidden by its woodiness is grafted. In Uzbekistan, the hidden bud is grafted from the end of July to the middle of September. For this, shoots are taken from branches that appear this year and grow in the spring of next year. The sprouted shoots are grafted in the spring when the bark of the tree leaves the trunk. In this case, the buds are taken from last year's cuttings prepared in autumn. Such shoots begin to grow two to three weeks after grafting. These grafts will be slower in growth than the grafts made last year. Since seed fruit species grow more slowly than pome fruit species, they cannot be grafted in the spring and transplanted into the garden the same year.

At the time of grafting, the bark of the grafts should be well separated from the wood. The stems of grafts near the root neck should not be thinner than a regular pencil, and there should be no side branches in the upper part of 20-25 cm from the root neck.

The most favorable period for grafting buds in Uzbekistan is the period from the beginning of August to the beginning of September. During this period, the buds on the cuttings are well matured, and the bark of the grafts is well transplanted, that is, it is a period of high cambial activity. A bud graft made at the end of this period often does not give good results, because the graft and graft do not hold well.

Grafting pen. When propagating graft cuttings, it is necessary to take from the strongest and healthiest branches of the main variety. It is not necessary to choose weak branches developed in the shade, choosing hard (not soft) and solid branches for the pen, which are always saturated with sunlight.

It is actually best to graft cuttings from the tree on the same day. But that doesn't mean they can't be saved. In cool and temperate climates, tree branches can be stored in a regular refrigerator in a tightly sealed plastic container or bag. In order to maintain the level of humidity inside the pot or bag, the branches should be wrapped in moistened newspaper. Soldering pins stored in this way can be stored for several weeks.

For successful grafting, subsequent seedling care is also important. Below are the things that need to be done regarding the care of the grafted seedling:

- Any development in the graft should be stopped as soon as it occurs. Otherwise, it can take away nutrients from the root and prevent the growth of the graft, as well as leave the graft in its shadow and block it from the sun's rays;
- The air temperature should be between 15 and 30 degrees for the grafted seedling to grow well and heal graft wounds. Temperatures above 30 degrees Celsius or below 10 degrees Celsius will slow down or stop wound healing. As a result, this can cause the graft development to take unnecessarily long or to dry out;
- Seedlings should be provided with water and nutrients to promote healthy vegetative growth. It is required not to exceed the norm;
- It is necessary to remove the tool (isolenta) used for connecting the graft parts before it interferes with the growth of the seedling body.

Bud grafting methods. Bud grafting is a type of grafting in which a single bud in the process of vegetative growth located on the graft is cut into slices with a little base and attached to the graft. For bud grafting, the buds located above the branch of the leaf band are

the best. Such a location is useful for correctly placing the cut bud in its new place on the graft without mistaking the upper and lower sides. Bud grafting has two advantages over pen grafting. The first is that a piece of bud is attached, and less wood is spent on grafting. In practice, T-shaped, cross-section and patch graft types are widely used.

T-shaped (shield-shaped) butt graft. The T-shaped bud graft gets its name from the shape in which the graft is cut in the bark of the graft to insert the bud. T-shaped bud grafting is the fastest of the grafting methods. Fruit trees such as quince, cherry, pear, almond, peach, plum, apple and hawthorn can be easily propagated using this method. T-shaped grafting can be done only on grafts in the process of active growth. Because the bark should be easily separated from the wood.

Figure 1. Bud graft T-shaped (shield-shaped)

The best cuttings for grafting come from the middle third of the tree's last mature annuals. In this part, the rod has hardened and filled, and in shape it has the appearance of a flat circle. During the preparation of cuttings, all the leaves on the branch are cut off. A stick 5 mm long is left from their band.

The first sign that the bud has settled well in its new place is the change of the leaf under it from green to yellow. Soon after this, the leaf axil separates from the bud and the bud begins to enlarge and burst open. If the sprout is wrapped, it is necessary to remove the insulation after 2-3 weeks, so that it does not prevent its easy growth. When grafting the bud, the upper third of the graft is cut off.

When the bud development reaches 3 months, the insulation is completely removed.

Sometimes the T-shaped bud grafting method cannot be supported due to the fact that the bark of the graft does not separate from the wooden part. Debarking may be caused by unfavorable growing conditions or winter dormancy. In such cases, the cutting bud grafting method is used.

Cut bud grafting is more commonly used in cool climate regions as it is more successful than T-shaped bud grafting.

The cut bud grafting method is also fast, only two cuts are made on each graft and graft.

The cutting bud grafting method is carried out in the following stages:

- Select a straight body part without buds on the graft body.
- At first, the flat bark is cut transversely by dipping the knife at an angle of 30 degrees to a quarter of the body.
- The second cut should be lowered 2 cm above the first cut in such a way that the ends of both cuts should meet at one point. The resulting incision is separated from the body.

➢ As described above, cutting operations are also carried out in grafting, only in this case, a bud should be placed in the middle of the cut.

➢ The budded cutting should be quickly placed in place of the cutting from the graft in such a way that the cambium layer of both parts should overlap at least on one side. Overlapping from both sides means excellent light upon light. From this it can be concluded that the size of the cuts taken in grafting and grafting is almost the same, which is a guarantee of the successful implementation of the work.

➢ Just like a T-bud butt graft end, the butt section is tightly wrapped with insulating tape to the butt graft.

Grafting between bark. Interbark grafting is used to propagate tree species with thick bark, such as walnuts and walnuts, as well as tree species where the bark layer splits across the trunk.

Grafting a bud in a leaf axil. Leaf axil grafting is a relatively new method and is mainly used in working with young citrus seedlings that have germinated from seeds. It is recommended to use this method in greenhouses with a misting device.

Grafting to the leaf axil is performed by making 2 V-shaped cuts in the following steps:

1. Starting from the middle of the leaf and the bud located on it, the graft is cut to a quarter of its body, directed to the lower part. In this case, the leaf should not break.

2. The second cut starts from the upper part of the bud, passes behind it and connects with the first cut. After such a cut, the bud on the graft is separated.

3. As described above, 2 cuts are also made on the graft, and the graft is separated from the bud branch.

4. The graft bud is attached to a new place on the graft and tightly wrapped with a thinner insulating tape.

Pen grafting methods. A pen graft is sometimes used to replace a bud graft. Examples of such cases include:

• If it is clear that bud grafting will fail for certain tree varieties;
• If the season is unfavorable for bud grafting;
• When the bark of the graft intended for the T-shaped bud graft is too thick or delicate.

Compared to bud grafting, pen grafting has several disadvantages. Cutting the grafts, compacting the cambium layers, and wrapping the graft to protect it will take more time than a bud graft. Pen grafting uses more rod per grafting pen. Also, when working with an older soldering iron, it may be more difficult to cut its wooden part. But, at the same time, it is possible to store such paivaidust pencils for a long time.

A simple pencil graft. In this grafting method, the fabric is placed on the fabric and tied. It can be done by one person. But in large gardens, it is more efficient to divide the work as a team so that the work can be done faster. In this case, one person cuts the soldering iron and the grafting tag, while the other person is engaged in connecting them together. If the diameters of the graft and the graft and the thickness of the skin layer are compatible with each other, the implementation of the simple pen grafting method becomes a simple and easy process. The location of the graft and the ability to work with it easily are also factors that facilitate the work.

A simple pencil graft is performed in the following steps:

1. A straight and flat part of the grafting body is selected. In this case, it is important that the thickness of the selected part corresponds to the diameter of the grafting pen

intended for connection. The graft rod is cut diagonally. The length of the cut is 3-4 times longer than the diameter of the rod.

2. The grafting pencil is also cut as described above. The surface of the resulting two sections should have the same appearance and shape. As in all types of grafting, the smoothness of the cut surfaces is of great importance for good adhesion of the cambium layers.

3. Grafting and grafting are joined together. The cambium layers between the bark and the wood should overlap. If it is not possible to completely overlap the cambium layers due to the different diameters or shapes of the grafting pin and the grafting rod, they should at least match on one side. Inserting a smaller diameter grafting pin into the center of the graft will result in a failed graft.

4. The graft is wrapped with insulating tape from a little below the place of attachment and upwards. During bonding, it is necessary to try to keep the grafted parts without moving. If it slips, it should be adjusted again.

Figure 2. The process of carrying out the grafting

Butt graft. Butt grafts get their name from the types of cuts that are made. In this case, a crack is created in the middle of the graft and the graft is cut in the form of a pone. After that, the graft, which is cut in the form of a blade, is inserted into the created crack. At first glance, this method seems easy, and those who are new to grafting usually prefer to use this method at first. In fact, this method is suitable for tree species that can quickly form a bubble bark layer, which plays an important role in wound healing.

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