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PROPAGATION OF GRAPES

by
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Introduction

Perhaps no other fruit is more easily grown than the grape. It can be readily propagated, requires little space, can be used as an ornamental as well as a fruit-bearing vine, comes into bearing early, and has few pests, which are easy to control.

There is perhaps no other fruit which means so much to the contentment, happiness, health, and prosperity of people, all over the world. It has been used for dessert, juice, jelly, and wine-making since ancient times. The culture of the grape has persisted and can be found recorded in the literature, sculpture, drama, and song of various peoples, and is part of man's religious ceremony and social entertainment. Today the grape ranks as one of the world's most popular fruits.

Seeds

Varieties of grapes, as well as other fruits, have originated from seed of unknown origin or from known parents. A seed from a Concord grape, for example, if planted, will probably not produce a true Concord. It may be similar in foliage, but the fruit is likely to be small and worthless. If a large number of seeds are planted, there will be a large number of inferior seedlings, but of course there is always the possibility of discovering a new and perhaps superior sort. There is no certainty in this, and in any case the seedlings are very slow in coming into bearing. As a general rule, therefore, seeds are not used in perpetuating varieties.

Some of the most recent introductions, however, have been produced from seeds resulting from hybridization. Experimenters have been working at improving varieties by combining the characteristics of certain sorts in order to produce improved varieties. Out of a great many seedlings grown, only a few are worthy of selection. After further test such selections, if found desirable, are finally named, and these are perpetuated true to type by some method other than seeds.

Cuttings

Grapes are most generally propagated from pieces of a vine of the desired variety. These are called cuttings if separated from the parent before being rooted (or layers if rooted while they are still attached to the parent

vine). Cuttings are made from one-year-old mature canes or sometimes from current season's shoots. The selection of the cuttings should be given careful attention. Experienced viticulturists go over their vineyards marking the desirable vines while the crop is on, and cuttings are taken only from the most desirable vines, care being exercised, of course, in labeling true to the variety.

The time for making the cuttings is in the late autumn soon after the leaves are off. At this time the cuttings have a high starch content, which has been found beneficial in rooting and producing vigorous rootings. The iodine test has been used to indicate the stored reserve food in grape cuttings as a basis for selecting those for planting. The test is made by applying a drop or two of 0.2% solution of iodine in potassium iodide to the freshly cut cross-section of a cutting or by immersing the end for one minute in this solution. A well-nourished cutting containing an abundance of starch will turn black all over the cut end, while one weak in starch will turn black only in the medullary rays, which will stand out like spokes in a wheel. The cutting which stains black will make a vigorous young vine, while the other kind will make a weak vine. One which shows only a few black spots with the iodine treatment will fail to grow at all. A few tests of cuttings from selected vines will give one a general idea of the degree of maturity, and he can proceed to collect the cuttings without performing the test in every case.

The part of the cane that is used to make the cuttings should be given careful consideration. Small, stiff canes are apt to be immature and lacking in starch content and probably will produce weak vines. Medium sized canes, about 3/8 or 5/8 inches in diameter, will give the best results. A satisfactory cutting should have at least three buds or nodes and this will make the cutting about eight or ten inches long. Some prefer more buds, and under such conditions the cutting may be eighteen or twenty inches long.

The lower cut should be slanting just below the lower bud or node and the upper cut about an inch above the upper bud. Cuttings may be planted at once but it is generally better to callus them during the winter and plant out in the spring. The cuttings with lower ends together, are generally tied in bundles of twenty-five for convenient handling. These are then stored in damp sand or sawdust, kept in a cool place. Sometimes they are heeled in under three to six inches of sand or loam out of doors, with the butt ends up, in order to hasten the callusing of the roots by keeping the butt ends of the cuttings warmer than the tops, and at the same time keep the tops cool and dormant. In the spring (March or April) the bundles are taken out, and it is a good idea to wash and soak them in water one or two days to give better rooting. The cuttings which have callused are sorted out and planted in the nursery row, six to eight inches apart. They should be planted deep with only the upper buds above ground, and light soil or sand packed around them.

A new method which has been found highly satisfactory in clay loam is to plant the callused cuttings in the permanent vineyard location, using a crowbar to make the holes, and sifting sand around the cutting as it is held in place in the center of the hole. The sand induces better rooting because it supplies drainage and oxygen better than heavy soil packed tightly around the cutting.

Layers

Some varieties of grapes are more easily rooted by layers than by cuttings. That is, the cane is rooted while it is still attached to the parent plant. Late in the fall or early winter a cane of last season's growth is selected and laid

on the ground, then covered lightly with mellow soil at one or more nodes. To encourage rooting it is sometimes advisable to make an incision under a node before it is covered. When growth starts, roots and shoots will be formed in the mounds, and as the shoots elongate more soil should be mounded around them. In the following fall, the new plants may be severed from the parent, dug up and transplanted.

Grafting

It may be advisable to graft grapes for one of several reasons; namely, to change a worthless or undesirable stock to a better kind, to propagate a new variety more quickly and in greater numbers than from cuttings, to produce resistant vines by using selected stock, or to increase the bearing, or advance the season of certain varieties. While complete evidence is lacking as to the advisability of grafting different kinds of grapes, some of the possible advantages mentioned above, justify a description of the procedure. For the changing of young or old vines in the vineyard, grafting will have its greatest uses, perhaps, and for growing resistant stock or stock especially suited for certain varieties, there may be but a limited demand.

The essential features of grafting consist in different mechanical means of cutting and splicing of stock and scion in such a manner as to bring the cambium layers together and thereafter to maintain favorable conditions of temperature, moisture, and aeration to promote the formation of the union.

The scions which are used for grafting should be carefully selected of mature wood of medium size, preferably short-jointed canes. They should be kept moist (not wet) in a cool place where they will be completely dormant. They may be selected any time during the late fall or early winter, but as in the case of cuttings, the earlier the better. The actual time of grafting depends on whether it is to be done indoors or in the vineyard. If done indoors during the winter, it is called "bench grafting"; if done out of doors in the spring, it is nursery or vineyard grafting.

Bench grafting consists in grafting indoors using stock and scion of about the same size by means of the whip and tongue method or some similar way of splicing. The splice is made in a smooth place between two buds. The stock may be a rooted cutting that has been dug from the nursery or an unrooted one. The stock is disbudded and the scion is cut with one or two buds. After the cambiums have been brought together, the union is tied with string. The completed grafts are callused in the manner described for cuttings except that they are handled very carefully in order not to break the union. After callusing, the grafts are planted in the nursery row the same as for cuttings.

Cleft grafting may be done in the nursery, vineyard or with isolated vines. This is best done in the early spring before the vine becomes active. The scions should be taken several weeks in advance, however, and kept dormant in cool, moist sand or sawdust. Medium sized, short-jointed scions are better than long, thin ones. The top of the stock should be sawed off at the level of the ground or slightly higher. The cleft should be made with a sharp chisel or grafting knife then one or two scions, each bearing two buds, prepared so they can be inserted into the stock so the cambiums meet. The stock should be tied to hold the emplaced scions firmly. No wax is necessary, but the completed graft should be covered with paper and then mounded over with soil to keep moist and induce

healing. Shoots will start in the early summer; only those of the scions should be encouraged, and all others pinched off. When the shoots of the scions are six or eight inches long, they should be tied to stakes to protect and support them.

Budding of grapes in the summer is receiving increased attention, especially for propagating varieties on resistant stock. The stock is grown in the nursery from cuttings planted the previous winter or spring. The bud sticks are taken in the late summer from current season's shoots which have turned brown, showing their maturity. The leaves are removed and the sticks kept in moist burlap until ready to use.

A type of bud called chip or "Yema graft" is used because the grape bark does not slip at this time of year. The method consists in cutting away a bud with a chip of wood from the bud stick of the scion and a similar bud taken out of the stock so that the scion bud will exactly fit. Cotton string or budding rubber is used to bind the bud firmly in place. Then fine soil is mounded over the completed union and about half of the original shoots of the stock are cut away while the remainder are left to aid growth of the stock and healing of the union. The inserted bud will remain dormant until the following spring, when it will start into activity and should then be uncovered and given additional opportunity to grow by removal of the remaining shoots of the original stock, leaving a stub five or six inches above the new bud, and eventually this will be cut away close to the bud. The successful bud will produce a shoot, and when this is ten inches long it should be tied to a stake and all other buds and shoots cut away.

Transplanting

The time for transplanting grapes is in the early spring under most conditions. An early start cannot be emphasized strongly enough. It has been found that the very vigorous grape vines are the most desirable and economical. Weak or medium-sized plants should be discarded and two-year-old ones should be guarded against, unless well grown.

Rooted cuttings are more desirable than unrooted ones, and if grafted plants are used, they should be handled extremely carefully in order not to disturb or break the union. With either rooted or grafted plants, the roots should be trimmed back slightly and the top cut back so that only one cane is left, and this should be cut back to two or three good buds.

The ground, of course, should have been well prepared in advance and the holes should have been dug just prior to planting the vines. These should be large enough to accommodate the root system and so the plants can be set about the same height as they stood in the nursery, with just sufficient distance for the two or three buds to be above ground. Fine moist soil should be packed around the roots and slightly mounded around the plant.

During the first summer, no pruning or training should be attempted except to tie all of the new shoots to a stake, causing them to grow upright as much as possible. The following winter the vines should be pruned back again to two or three buds, the same as at planting time. During the second summer two or three shoots should be allowed to grow at first, but as soon as one of the shoots becomes stronger than the others, this should be selected to be the permanent trunk and tied to the stake, and the others pinched back. As the

selected shoot becomes longer, it should be tied at frequent intervals to keep it firm and erect on the stake. Thereafter, a system of training and trellising that one decides upon can be carried out.

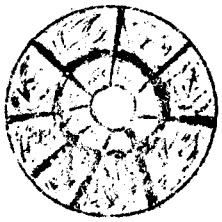
Mature vines can often be transplanted when they are dormant provided that the top is pruned back severely and that as large a portion of the root system as possible can be moved. The older the plant, the more severely the top should be pruned and the more root system should be taken up. In any case, the period of recovery of both top and root will be comparatively slow. It is not advisable to try to transplant a vine that is more than five years old.

BIBLIOGRAPHY

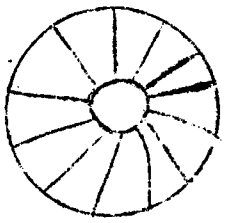
Husman, Geo. C. - Grape Propagation, Pruning and Training. U. S. Department of Agriculture Farmers' Bulletin No. 471, 1932.

Shoemaker, J.A. - Small Fruit Culture. P. Blakiston's Son & Co. 1934.

Winkler, A. J. - Some Factors Influencing the Rooting of Vine Cuttings. Hilgardia (Calif. Agr. Exp. Sta.) Vol. 2, No. 8, 1927.

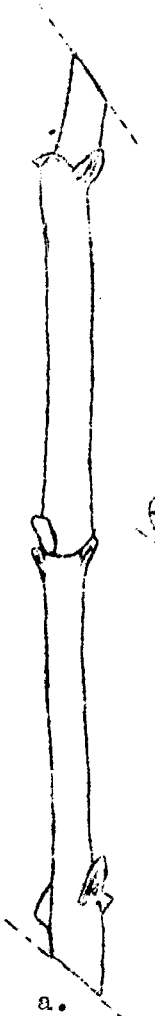


a.
good



b.
poor

Starch Test



a.
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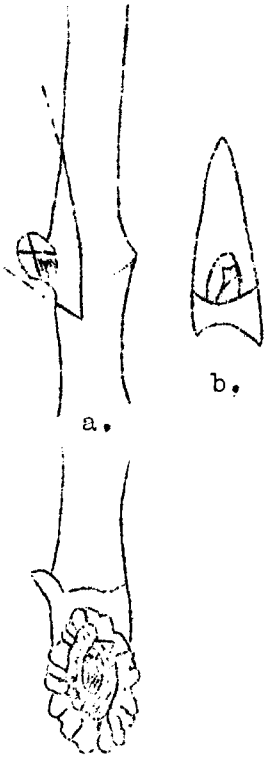
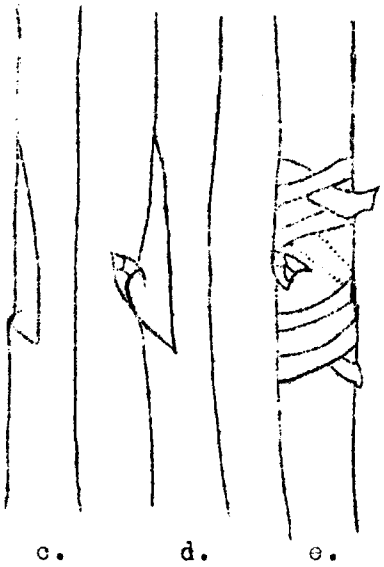


a.

b.

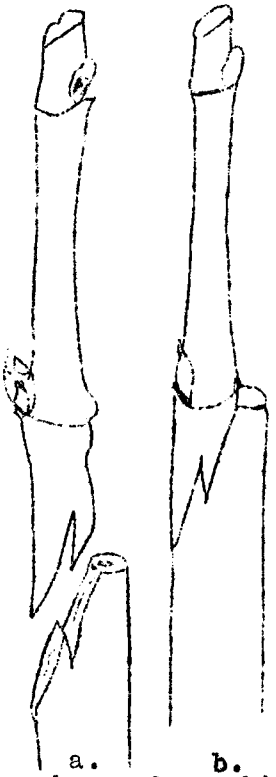
b.
callused



c. d. e.

Chip Budding

a-c old bud removed
d new bud in place
e new bud tied



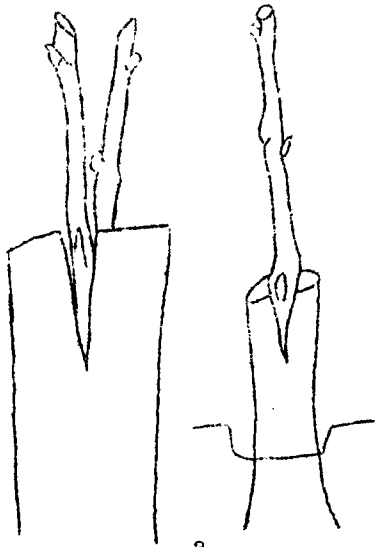
a.
scion and
stock

b.
cambiums
joined

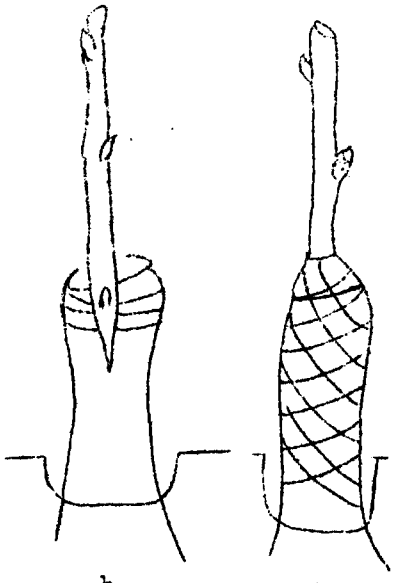
c.
tied to
hold in
place

Cutting

Tongue Grafting

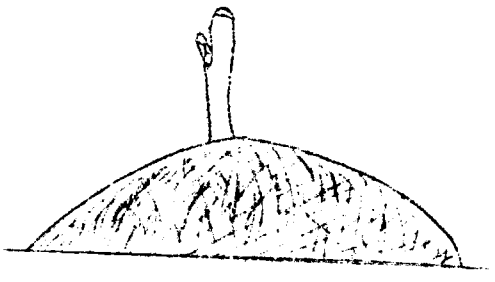


a.
cion inserted



b.
cion tied

c.
union covered with paper



d.
mounded over with soil