

(4) This project is aimed at net profit for the grower. The total labor bill for the entire experimental set up including building 200 feet of mist line was 181 man hours. With no handling and no transplanting, this method of growing landscape sized plants in one season has good possibilities.

MODERATOR MCDANIEL: Thank you very much, Mr. McGuire. Our next speaker is Mr. Paul Bosley, Sr., Bosley Nurseries, Inc., Mentor, Ohio.

WHY BUDDING IS SUPERIOR TO GRAFTING AND POINTS ON WHICH SO MANY FAIL

PAUL R. BOSLEY, SR.
Bosley Nurseries, Inc.
Mentor, Ohio

Budding is usually done in the open field and requires no expensive physical lay-out, such as greenhouses, heating plants and grafting cases.

Budding requires a minimum amount of handling and labor.

Budding takes advantage of the natural cycle of rest and growth that takes place in a plant during a year.

Budding produces the maximum size plant in the minimum amount of time. And a true union of tissues takes place during the first growing season.

I have found much to my amazement that different practices are employed in different parts of the country, as for example along the Eastern Seaboard and up around Long Island most nurserymen practice grafting and they don't have the technique or the help to establish a budding practice. In Lake County everybody practices the budding methods and budding help is generally available.

There was a time when young boys 10 and 12 years old were winders behind budders and before they had finished high school they were doing the budding and some of these same people today do budding on the side, or do contract budding. When contract budders are employed you usually can get a guarantee of a 90% "take" on the buds or the budder will come back and re-do his job. Under a set-up like this budding certainly has every advantage.

Most growers who have been grafting are not prepared to think in terms of budding and do not anticipate the entire program and in a change-over very often are discouraged with their results the first few years.

In most cases one should select a vigorous species rootstock or understock as closely related to the item that is to be budded as is possible.

Many plants have a so-called crown which is the dividing line between root tissue and top growth and as a rule, there are

very few adventitious eyes below this natural crown. Such plants when used as an understock should be planted two to three inches above the normal ground level and then the soil should be banked up around the plant, so that it has the feeling that it is properly planted.

Budding usually takes place in the summer when the understock is growing vigorously and at that time the soil is brought down to ground level, but the person that is unhill the plants should not be more than 5 or 10 minutes ahead of the man that is going to do the budding, otherwise the bark is likely to what we term "tighten down" and be much more difficult to handle. Budding is also usually timed according to the condition of the budwood. It should be quite firm and mature and yet not too mature but that the woody part underneath each eye can be removed cleanly, with a glossy cambium and certainly not with a hard stringy effect. There are some budders who can cut an exceptionally thin bud where the ratio of healing tissue is very great and that there is little of woody tissue left. However, 9 budders out of 10, and certainly the beginner should practice cutting a more generous size bud and removing the woody part beneath the eye. Some plants have a characteristic of holding a little woody sliver underneath the eye and this must be removed without scratching the cambium tissue. This is very important.

A budder usually holds his knife very firmly and with an extended forefinger as a guide along the understock does the various cutting and opening operations. The cross cut is usually made first, both in a slanting and in a downward direction and then the uppercut is made with a definite firm stroke until the cross-cut is reached and then at this point there is a critical motion to be observed. With the forefinger as a guide against the understock the hand is usually rotated ever so slightly to the side and the knife is used to open the bark. While this is taking place the other hand slides the bud down into position. Just ahead of cutting the bud, the budder usually cuts the leaf petiole rather close to the bud and with the back of his knife presses downward and against this leaf petiole to help shove the bud into a snug position underneath the bark of the understock.

Just at this point many budders lose their bud stands. It is absolutely necessary that, as the bark of the understock is opened that the knife *does not* touch or scrape the wood of the understock; if it touches even in the slightest degree then the bud that is inserted and left over that portion is sure to die, and if a budder realizes through feel or sensing, that he has scraped the bark, then usually he opens a channel further down and shoves the eye way beyond this point and can save the bud that he has inserted. I repeat again, that an understock that is scraped results very definitely in a dead eye or bud.

The operation by the budder must be done with hands that are immaculately clean and the budder should usually be preceded by what is known as a "cleaner." The cleaner should not only have leveled down the hill of dirt but should have thor-

oughly wiped the understock because a particle of dirt minute enough to hurt one's eye will result in a dead bud if it rattles down behind it. The bark of the understock should almost be polished before the bud starts.

Budding is usually done on the side of the understock that faces the prevailing spring winds. When the growing buds are soft and tender, a lashing spring wind can result in the almost complete destruction of a budded field on certain varieties, particularly if they are budded on the wrong side of the stock. Budding from the direction from which the wind comes allows the remaining understock to be a shoulder against which they can have some leverage against the wind.

Practically all budding is now done with some sort of a rubber budding or tying strip and here again is a place where you can gain some percentages. A number of years ago we experimented with winding the cuts solidly with a rubber budding strip and then we got to thinking how hot rubber boots were to wear in the middle of the summer and we experimented with making a wind of the band so that only about 50% of the whole of the area was covered and we found that by keeping definite records on budding that was done on the same variety and the same day that we increased our stands at least 10% by this open winding method.

Once a bud is properly set and has been tied in properly with a rubber budding strip it will have developed a suction so tight in 10 or 15 minutes that it is very difficult to remove should one wish to make some sort of a change.

Results are usually definitely established in the first 8 days, however, the budding strips are always left on for 21 days as a standard time to insure proper healing. Care should be used in cutting the rubber budding strips because in the event that you have to re-do any of your budding it can be accomplished on the opposite side of the understock and rebudding can be done immediately. In the case of some plants you could make three or four attempts to re-bud in a season and still get results.

At this point I would like to discuss a very great pitfall where even the professional budders sometimes fail and that is, the wet season where the rains are copious and the plants don't seem to stop growing. Under those conditions the sap is what we call watery and the tendency is to what we refer to as "drown out the buds." Sometimes the understock will seem to literally "pop" open and just be full of a copious amount of sap, and this is truly a dangerous condition.

The procedure at this point is to do budding in the normal way, but then immediately after the buds have been set, to reduce the top of the understock approximately 50% and this will take care of this situation very definitely.

Some nurserymen practice the winter hilling of budded plants or bringing soil up over the new buds but this isn't always considered desirable or necessary.

And now we come to the crucial point for maximum success and that is the time when the understock has to be headed back or cut off in the spring. In the latitude of Lake County which is generally in the Cleveland area, this time is very definitely the 15th of March. For those living farther South, say in the St. Louis area, the time would be around the first of March. At this time the deep frost is always out of the ground and there is a slow stirring in nature. This is the time when the understock needs to be cut back to within approximately a quarter of an inch of the upper-cut where the bud has been placed and after this is done a slow healing takes place on the understock. Then when the tremendous surge of sap comes and the pressure to grow develops, the one bud will take over the whole life of the plant in place of the upper part of the understock that was there previously. When I was a very young and green nurseryman I had some roses that I cut back, some on the proper date, some a week later and some as much as four weeks later. And the results were dramatically like stair steps so that on the cutting that had been done a month too late, the results were so poor that the plants were never harvested.

During the flush of the spring season the growth can be fantastically vigorous, and in the case of some varieties of plants it might be advisable to stake and tie them to take care of possible wind damage. I have noted measured growth of between two and three inches in one 24 hour period.

Lilacs when budded on privet, and this point I will gladly discuss with you, will make heavy and bushy and budded two to three and three to four foot plants in two growing seasons. Dogwoods will make three to four and four to five foot heavily headed plants in two growing seasons. I cite these two plants as examples of what the results are from budding because these are two plants that are very often grafted or grown "own root" in the East or other parts of the country. Some varieties of plants are sometimes budded in order to take advantage of that surge of spring growth and develop a nice straight stem and sometimes the stem is again re-budded in order to develop a head, as for example in the tree rose or tree euonymus.

It is a well known fact that when grafting is done, there is never a true layer of connecting tissue built between the understock and the scion until the second and third year. As a result grafted plants get off to a very slow start on this basis alone. Sometimes however, due to the physical structure of certain plants it is impractical to bud them, as for example the blue spruce would be very difficult to bud, but wherever it is possible, budding has a distinct advantage over grafting.

MODERATOR MCDANIEL: Thank you very much, Mr. Bosley. Our next speaker will be Roy Nordine from the Morton Arboretum, Lisle, Illinois.