THE VEGETATIVE STAGE OF STOCK AND SCION ARE IMPORTANT FACTORS WHEN FIELD GRAFTING YELLOW-POPLAR

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Introduction

Vegetative propagation of selected forest trees has become widespread. With many species it can be done easily; with others the best results are not satisfactory.

Grafting of yellow-poplar, Liriodendron tulipifera L., has been done on a modest scale for several reasons at the Pinson Nursery, Tennessee Division of Forestry, near Jackson, Tenn.

Although cambial action begins in the early spring, the rootstock and the scion are not completely joined until the stock has started to vegetate or grow. A late freeze, occurring before dormancy is broken on the understock, can disrupt the union. The grafts can dry out or be weak at the start.

Severe pruning at the time of grafting yellow-poplar has ill effects, since the scion vegetation often grows so fast that the union is not strong enough to support it. Also birds sometimes pick off the buds. An abnormal or poorly formed specimen usually results.

Procedures and Results

1963.--Grafts of scion wood gathered in early March 1963 while the parent trees were still dormant gave the best results. These scions were held in moist cold storage at 35° and 38° F. until the buds broke on the rootstock, usually about April 1. Then a side graft was used to graft the scions.

On April 8-9, 1963, about 100 grafts were made on 3-year-old stock, using scion material gathered on March 21. Two to four grafts were made on each stock plant to insure survival of at least one good union. A polyethylene bag was slipped over the graft, and a Kraft bag was slipped over the polyethylene. One corner of the Kraft bag was tied to the stock. As soon as the scion showed bud break and growth, usually 5 to 10 days after grafting, both bags were removed.

The understock was completely pruned and then kept clean by finger budding throughout the 1963 growing season. Finger budding is the removal of buds that open on the understock by dislodging them with the thumb. This directs more growth energy into the scion and permits it to be easily identified. However, finger budding must be done carefully, for three unions were accidentally knocked off in 1963. The grafts grew to as much as 50 inches during the season. Mild winds and favorable weather promoted shoot growth, and the grafts established themselves well. More than 90 percent of the original 1963 grafts are still growing well (fig. 1). The grafts grew to as much as 50 inches during the season. Mild winds and favorable weather promoted shoot growth, and the grafts established themselves well.

1964.--In early March 1964, the scion wood was again gathered. Grafting was started on March 24, while rootstocks were still dormant. About 30 scions from 8 clones were grafted. Additional grafting was done when the buds broke on the rootstock (7 days--April 3-22). The bags were removed on April 27; the leaves had blackened and stuck together, as if they had been scalded owing to high humidity.

Only about 5 percent of the early grafts (March 24) made successful unions, as compared with 85 percent of the later grafts (fig. 2). There was apparently little difference in survival between any of the April grafting dates.

During the spring of 1964, grafting was done in the same orchard as in 1963, and complete pruning was performed again on all stocks having successful grafts. Because the large rootstock had to be carried over from the 1963 season, many grafts were 1 inch in diameter at the union and about 56 inches long by mid-August. The leaves were abnormally

Figure 1.--Four grafts on a double stem.

Figure 2.--Ruler points to 1¼-inch graft at union.

Figure 3--Stub shows break by the wind. A second graft remains secure.

large, some as much as 11 inches across at the widest part. Most of them were clipped off to relieve strain on the union and reduce danger of wind breakage.

After the early pruning, this stock resembled bird perches and was so used by blackbirds, crows, and similar birds, and breakage resulted. In the future support stakes will be extended above the grafts for protection. A number of grafts on small, limber stock have grown equally well. These swayed with the wind more freely and withstood the high winds well.

Some grafts that had not developed a strong union were blown off by high winds in early July. During the last week of July, near tornadic winds broke off many other vigorous grafts well above the union, and on some grafts the bark was peeled off the stem by the storm (fig. 3). Two grafts that were lost in the storm bore seed pods which had been cross-pollinated.

Summary

Grafting must not be performed too high on the understock, and pruning must be done successively and with reservation. If the pruning had been done gradually, scion growth may have been slower, elongation may have been retarded, and the number of grafts successful against birds and storms may have been higher.