

GRAFTING OF *PYRUS CALLERYANA* CULTIVARS¹

BEN DAVIS II

Hill Country Nurseries, Inc.

Box 750

Tahlequah, Oklahoma 74465

During my tenure as grower for Ozark Nurseries, the firm became interested in adding *Pyrus calleryana* 'Bradford' to the product line. For about 3 years we tried various methods of budding, none of which were successful. We tried "T" budding in spring, summer, and fall, as well as chip budding. None of these methods yielded greater than 15% takes.

Therefore, we decided to try whip and tongue grafting just as we were doing on *Malus* cultivars. The first year we tried this we obtained a 73% yield of salable trees and the next year a 75% yield. In addition, the grafted trees were straighter than budded ones.

During the last 2 years at Hill Country Nurseries we have grafted *Pyrus calleryana* cultivars but have not been as successful. In 1981, out of a total of 27,436 grafts, we obtained a summer live count of 62% on 'Bradford' and 43% on 'Aristocrat', P.P. #3192. In 1982, out of a total of 47,657 grafts, we obtained a summer live count of 49% on 'Bradford', 36% on 'Aristocrat', and 14% on 'Redspire', P.P. #3815. The extremely poor take in 1982 was due, in large part, to an unusually bad outbreak of fireblight in the late spring, just as the grafts were sprouting. This will be enlarged upon later.

In addition to the *Pyrus calleryana* cultivars previously mentioned, we are now establishing scion trees of the following: 'Autumn Blaze', P.P. #4591, 'Capital', *P. fauriei*, 'Select', and 'Whitehouse'. We believe that the popularity of 'Bradford' is declining and that some of the other *P. calleryana* cultivars will be in great demand to replace 'Bradford'.

MATERIALS AND METHODS

The understock used is no. 1 grade *Pyrus calleryana* seedlings. Scionwood is 1-year dormant wood, some cut from our own scion trees and some purchased. Scions are precut on a bandsaw to 7 in. in length. Grafts are made during January and February at the bench, using the common whip and tongue method. Care is taken to graft each seedling at the crown so that ½ of the graft union is in the root tissue. We believe this improves the take, although we plan to experiment with piece-root grafting. The graft union is wrapped with cloth grafting tape and the tip of the scion is dipped in rose wax to prevent

¹ Paper given by Stanley Foster

drying. The tape on the graft union is then coated with pure talc to prevent the grafts from sticking to each other when bundled. This is accomplished by sprinkling talc on a piece of paper and rolling the grafts through it. This saves much time when planting, as the grafts separate from each other freely when the bundles are broken. If this is not done, the grafting tape becomes gummy on the surface and the grafts stick tightly to each other. The grafts are grouped 50 per bundle using two heavy rubber bands, one on each end of the bundle. The bundles are then packed in used, wax-coated chicken boxes which are first lined with brown kraft paper. Cedar shingletoe is used for packing material to retain moisture. Two labels are placed inside each box and two tied on the outside. The labels show the quantity and cultivar in the box, as well as the date grafted. The boxes are then placed in cold storage at 36 to 40°F until planting time.

PLANTING

The best time to plant grafts is at peach blossom time. When there has been enough warm weather in the spring to make peach trees bloom, the ground is usually warm enough to plant grafts safely. *Pyrus* cultivars will sometimes start to grow in the graft boxes, so we try to plant them first, when peach blossoms are in the pink stage. At Tahlequah, Oklahoma, this is usually around March 25th to April 1st. The grafts are planted 10 in. apart in 54 in. rows in soil that has previously been prepared with deep tillage.

Care is taken to assure that the grafts are planted deep enough to cover the graft union with soil. This prevents injury that might otherwise be caused by late spring freezes. Behind the transplanter, a tractor with press wheels firms the soil on each row. Behind the press wheel tractor, a cultivator tractor throws soil up to the row. Rolling cultivator gangs on either side of the row are used for this because they crush any clods and leave a smooth, even ridge on the row.

FERTILIZATION

Fertilizer and lime are plowed in as the tillage is performed. The goal is to maintain a pH of between 5.5 and 6.5, with 6.0 considered ideal. Fertilizer is applied according to soil tests, with the goal being 160 lb N; 210 lb P; and 400 lb K per acre. It should be made clear that after the fertilizer is spread, the soil is disked 8 to 10 in. deep, followed by subsoiling 28 in. deep, followed by chisel plowing with 18 in. buzzard wings 12 to 14 in. deep. These high rates of fertilizer would probably not be safe if only shallow plowing were done. To bring the

soil up to the N, P, and K levels mentioned, this past spring we applied 1,000 lb of 15-15-20 per acre.

During the summer, if there is sufficient rainfall, three applications of nitrogen are broadcast at the rate of 50 lb N per acre, each application. We try to schedule these applications May 15, June 15, and July 15. This year, due to dry weather, only one application was made, about June 15.

After one summer's growth, we are able to harvest trees that range in size from 6 to 12 in. up to 5 to 6 ft., mostly in whips. In 1981, our one-year grafts ran 26%, 2 to 3 ft.; 20%, 3 to 4 ft.; and 10% 4 to 5 ft. This allowed us to turn these trees into cash less than 15 months after the grafts were made. We were even able to sell the smaller trees as well. This is an important factor to a new firm that needs to generate cash.

HERBICIDES

Immediately after planting operations, Treflan 5G is applied at the rate of 40 lbs. per acre. This material is broadcast with a fertilizer spreader and is NOT incorporated. Some hand hoeing is done to control weeds not controlled by the herbicide.

FIREBLIGHT

For the last 2 years, fireblight has been a major problem on the young grafts from the time they begin to leaf out. The problem was especially bad in 1982, and is the major reason for our poor grafting success that year. As soon as the grafts began to leaf out, we began spraying twice per week, alternating between Agristrep at 8 oz. per 100 gal. and Citcop 4E at 3 qts. per 100 gal. This did not give very satisfactory results, so we increased the spray schedule to 3 times per week. Also, at the suggestion of our extension pathologist, we added 2 other spray materials to our program. For one of our applications we used Agristrep at 8 oz per 100 gal, combined with Kocide 101 at 2 lbs per 100 gal. On alternating applications we used Citcop 4E at 3 qts. per 100 gal combined with Dithane M-45 at 2 lb per 100 gal. This seemed to be more effective than our previous program.

Fireblight does not appear to attack the older trees in our scion blocks, only the new grafts. The first 2 years that I grafted 'Bradford' pear at Ozark Nurseries, fireblight did not seem to be a problem. On those grafts, the entire scion instead of just the tip, was dipped in rose wax down to, but not including, the graft tape. Could the wax have "smothered" the fireblight organisms that might have been present on the scionwood? We are going to try this again to see if it helps.

CROWN GALL

When we dug our crop in 1981, we found that 15% of the trees had crown gall on them. This was another problem that we had not encountered in our previous experience with 'Bradford' pear. In 1982 we dipped our grafts in "Agrobacterium radtobacter 84", a biological crown gall control. At this writing, we have not yet dug our trees, so we do not know if it will prove effective. If it does not, we will have to fumigate our soil with Vapam the summer before we plant.

DON SHADOW: How wet is the shingletoe?

STANLEY FOSTER: We put it in a barrel and fill it with water until it covers the shingletoe. When we are ready to pack we pull it out and squeeze every bit of water out we can.

PROPAGATION OF TREE PEONIES

DAVID REATH

100 Central Blvd.
Vulcan, Michigan 49892

Propagation of tree peonies by grafting is highly successful on a commercial basis. Tree peonies, which are not trees but shrubs, can be divided into 2 main types. The first to be developed were the moutans or Japanese tree peonies. These belong to the species *Paeonia suffruticosa* which is native to Northwestern China and Tibet. For several centuries the Chinese selected and improved upon the wild plants. In about the eighth century A.D., the cultivated tree peonies were taken to Japan, probably by Buddhist monks. The Japanese, through years of cultivation, improved upon them and produced a race with single and airy semidouble flowers in a spectacular color range unsurpassed by any other flower.

The second type of tree peony and perhaps the one with the greatest future is the hybrids produced by crossing the Japanese cultivars onto the small yellow species, *P. lutea*, also native to China. This hybridizing was done in this country by Prof. Saunders of New York during the later part of the 1920's and for 3 decades thereafter. His work was continued by Nastos Daphnis of the Gratwick Estate, also in New York, and more recently by other hybridizers. These cultivars are just now becoming available to the gardening public.

The Japanese have become experts at the propagation of their cultivars by grafting. They export to this country, each fall, many thousands of one- and two-year-old plants.