

# Field Grafting of Conifers for Christmas Tree Seed Orchards

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## INTRODUCTION

The practice of establishing seed orchards for Christmas tree seed production has been used for some time in the northeastern United States. Several tree growers have established seed orchards of their own tree selections that produce top quality Christmas trees under their growing conditions. They are selecting trees for: good color, form, late frost resistance (late flushing trees), less shearing required (naturally dense), and resistance to insects and diseases (a more recent attribute). The trees are established in a seed orchard usually in an area isolated from other trees so they can be monitored, evaluated, and pollinated either naturally or controlled for the production of superior Christmas tree seedlings and transplant stock.

## PROCEDURES

The following procedures have been used in my part of the country—in some cases from the mid 1960s. All have been done basically the same with slight variations. The dominate species used is balsam fir (*Abies balsamea*) and lately Fraser fir (*A. fraseri*). However, other hardy species with desirable traits have been grafted for use in breeding programs. All grafters have done the grafting outdoors with inexpensive methods and equipment with good to excellent results. Briefly I will describe the methods of field grafting used by four growers.

**Method #1.** The grafter's understocks are seedlings established in the Christmas tree plantation for several years. Scions are collected while still dormant in March and placed in a plastic bag and stored in a refrigerator or freezer. Grafts are made using a cleft type before bud break; for sanitation and sharpness reasons a single edge razor blade is used for only 10 grafts. The scion (3 to 4 inches long and formed into a wedge) and understock (after being tipped to remove the terminal bud cluster and cleft about 1 inch) are joined following removal of the needles from the graft area of both parts. The cleft graft is wrapped with a cut rubber band (cut lengthwise) and the rubber band is covered with plastic electrical tape to retain moisture. Next the taped area is wrapped with a handful of fresh sphagnum moss and then covered with a piece of aluminum foil (approximately 5 inches × 10 inches) with the terminal buds of the scion exposed. The bottom aluminum is tightly rapped with the top slightly open to catch rain or allow the addition of water if the weather is abnormally dry. The foil and tape are removed the following year.

**Method #2.** This grower demonstrated the method his father and others used in the mid 1960s on trees that are mature and producing regular seed crops. Again the scions are collected early and stored, sometimes in the snow. The grafting is done in early May in northern New Hampshire. The scions are 4 to 6 inches long and grafted on established seedlings 12 to 30 inches tall. Using a sharp knife

(cleaned frequently with alcohol), the grafter uses either a cleft or side graft, preferring a cleft graft only because it's easier. Grafting rubbers strips ( 3/8 inch x 8 inches) are overlapped, being careful not to wrap too tight. No other wrap is used.

**Method #3.** A major grower in Canada has several young cone producing orchards. This grower grafts on 3-2 transplants, 1 year in the field, in early spring until bud break when the sap is flowing. Scions 2 to 3 inches long are collected at time of grafting and a cleft graft with about 1-inch cuts is used. The diameter of the understock terminal is matched to the diameter of the scion. The union is wrapped with a wide grafting band and then covered with a wax-like product called Lac-Balsam. The band disintegrates and doesn't have to be removed. This grower gets up to 18-inches terminal growth the year of grafting with his cultural practices and has had up to 90% take some years. Pollination in seed orchards is controlled by the use of homemade Remay bags placed over the female flower. Pollen is collected with a small vacuum cleaner.

**Method #4.** This grower from the maritime Provinces of Canada has field grafted since the mid 1970s on many *Abies* species for the production of hybrids in his seed orchard trees. He collects 6-inch scions from the top section of the tree during April before the buds swell and stores them in a snow bank or refrigerator. A whip and tongue graft is used except for small thin scions which are grafted using a cleft type. Unions are covered with a 6-inch strip of Uniroyal electrical tape (cut in half length ways) and carefully overlapped. The tape is a self-adhesive type and the sun breaks it down so it does not have to be removed. This grower has also experimented with grafting in August with mediocre results and bud grafting in spring with no results.

## CONCLUSION

If there were 10 grafters in a room, there would be 10 grafting methods. However, these are four methods that work for these growers. Some observations related to grafting successes by these growers are the following:

- In years with dry springs or late spring frost, the take is not as good.
- Blue balsam selections seem to be late-frost-damage prone.
- Care should be taken not to wrap the union too tightly.
- Scions should be selected from the top portion of a tree for good straight growth and for the more rapid formation of female cones.
- These methods could possibly be used for low-cost production of some ornamental conifers. I have observed plants of *Picea pungens* and *Pinus strobus* propagated this way.