

Conifer Grafting at Iseli Nursery: Fundamentals to Creating Great Product[®]

Peter Gregg

Iseli Nursery, 30590 Kelso Rd, Boring, Oregon 97009, USA

Email: pgregg@iselinursery.com

INTRODUCTION

The foundation of Iseli Nursery is an unwavering focus on delivering high-quality plant material to many of the best independent garden centers in North America. Grafted conifers are a significant part of our business. I will share the steps and methods we take for grafting during the calendar year as a seasonal outline.

Before we start grafting we work on the production plan. It is rather complex and time consuming to create, but the end result is the blueprint we use to determine how many of which items to graft. Using historical metrics, current demand, and forecasting we hone the list of cultivars to propagate. Our list of production items for 2013 was 266 cultivars from 17 genera. Additionally, we grafted 260 evaluator cultivars last season that are in various stages of development. A select few will become new introductions after years of evaluation.

SEASONAL OUTLINE OF STEPS AND METHODS FOR GRAFTING

Spring: Potting and Planting

To make great product the plan needs to be executed by the team. We start with the rootstock. An assortment of different rootstock started as seedlings or cuttings are used. The largest quantities of rootstock that we use are spruce and pine and these are purchased and also grown at Iseli as a 1-0 plug or 2-0 bare-root. Potting of seedling stock is done in February-March. The pot sizes we use are #1's and 3-5/8 in. × 6-in. band pots which are larger container sizes than many commercial grafters use. Since we are grafting for our own needs, our goal is to focus on the end product. We make every effort to do whatever is needed to enhance the process as the grafted conifers are stepped up to the planned selling sizes.

Summer: Rootstock Growth and Development

The potted rootstock grows for at least one growing season in the pot in which it will be grafted. This enables a strong root system to support the grafted conifer as it is developing. Ideally, the rootstock will have a smooth straight stemmed "grafting face" of at least 2 in. as low to the root crown as possible void of branching with a caliper approximately 3/8 to 1/2 in. Growing a strong, healthy, uniform rootstock helps the carpentry steps that follow run smoothly and efficiently.

Fall: Rootstock Preparation

Prior to grafting we prune all side branches. This allows maximum light penetration to the new grafts and increases air circulation. Furthermore, it is an easier product to handle. The pruning process is done in an assembly line fashion with the end product graded and sorted by caliper. We assemble these graft-ready rootstocks in a greenhouse maintained above freezing.

Winter: Carpentry

The conifer-grafting period starts in late November and is completed in early March. A side-veneer graft is used. The high-skill carpentry step of grafting is the step most people consider to be "grafting" but it is really only one step in the process. The workload for winter grafting is divided and delegated to various tasks that include scion collection, scion preparation, plant transportation, and grafting.

We have one person in charge of picking; he is also our shipping quality control person.

He has a crew of detail-oriented people available as needed who are plant savvy and have experience grafting and also pulling plants for orders. The connection from start to finish helps the continuity of knowledge. It is kept with the people in the position to make the most positive impact on crop consistency and quality.

We do not maintain a stock block of plants to pick scion wood from. Keeping our production stock in prime condition facilitates the harvesting of a few pieces of quality scion wood per plant. The balance between taking scion wood and preserving or improving the selling status of plants is something that is always considered. Scion selection largely dictates the way in which the plant initially grows for the first few years, and can dramatically alter the size and time frame for a plant to reach marketable size. Good scion wood needs to be from healthy vigorous plants that fully exhibit the known qualities and characteristics of the cultivar being collected. For example, plants that are upright growers need scion wood taken from upright oriented shoots. For prostrate growing cultivars scions need to be horizontally oriented.

After being picked the scion wood needs to be prepared for grafting. Support people do the preparing and transporting of rootstock to and from the greenhouses. The scion wood is cut to a 4-in. length. The needles and buds of the scion need to be removed to simplify handling and to make sure a good secure wrap is performed. Pine needles are plucked and on spruce and other similar conifers we use a knife and scrape the direction the needles lay to remove them. We make sure that the scion stays cool and moist through this process. After scion wood is prepared it is wrapped in a moist paper towel and put it in a small plastic bag, refrigerated and ready for the next step, the carpentry step. We try to pick, prepare, and graft within a few days to minimize variables in the success of our effort.

Prior to grafting the rootstocks are thoroughly watered, because they will not be watered for a month or so after grafting. Our grafting room is set up with efficiency in mind. Potted rootstocks in flats come in on trailers through the middle of the room. The rootstock is fed to each grafter on roller conveyors so that each grafter has a continual supply. There is another set of conveyors that move the finished grafts from the ten grafting workstations back to the trailers.

In the actual grafting process, the carpentry, we look at the rootstock, assess its flaws, find the best “grafting face,” and make a smooth 2-in. cut into the cambium layer. Next, we do the same with the scion, match one side of the cambial material to the rootstock with that of the scion, and, if possible, both sides. We secure the union with a rubber-grafting strip 8 or 12 in. long. We are constantly cognizant of sanitation and use isopropyl alcohol to keep our grafting knives clean. After the trailer is loaded with completed grafted plants they are moved to a grafting greenhouse.

Again, the carpentry is typically thought to be the most important part of the process, but the next steps are equally important. Continual monitoring after the grafts are completed is imperative; looking for things like drafts, fungal problems and varmints. In the greenhouse we drape or tent sections of grafted plants with 12 ft. × 200 ft. × 2 mil poly vapor barrier. We keep the grafts covered with the vapor barrier for approximately 1 month. Pines are the only plants we do not tent. Our goal is to maintain a cool greenhouse. The thermostat is set at 45°F with tenting the relative humidity is kept high while the graft union is knitting. We do not water for at least a month after grafting, we do not seal grafts with wax and watering too soon can flood the new union and inhibit the knitting process.

Spring/Summer: Aftercare

In late May to early June, when the rootstock flushes and begins to overshadow the scion with new foliage, we complete our first cut on the rootstock, approximately half the rootstock is removed. This increases airflow, light penetration and focuses more energy to the scion. Late June into July we make final cuts (remove the remaining rootstock), remove bands, stake, prune, and weed. If the new graft is a miniature or sensitive cultivar a stub of rootstock is left on for a year or more to help sustain the new graft. The grafted

conifers are now ready to be moved from the grafting greenhouses into their summer growing location and are now part of our regular production process.

Conifer grafting in large numbers has been repeated now more than 30 times and with each repeat cycle small changes and details continue to be added to modify and improve the end result. We produce our product through planning, execution, and teamwork. This includes keeping and preserving highly skilled labor that can be relied upon to generate and deliver our conifer needs. The focus on the details of everyone in the chain from sales people to managers to scion collectors to grafters to preparers all contribute to our end product. Each one playing their part to achieve our goal of sending our customers the best product we can create.

QUESTIONS AND ANSWERS

Mike Bone: Do you tent any of the five-needle pines?

Peter Gregg: No.

Mike Bone: Do you find there's more disease when they're covered or do they need more light?

Peter Gregg: We've not tented in my experience and it may be due to concerns over light. Our goal is to keep the relative humidity high as they go through the grafting process.

Mike Bone: Do you do any hot callus for any of your species?

Peter Gregg: No.

Verl Holden: Just a comment: Hot callus does not work on conifers.

Craig Ford: Can you comment on your use of seedlings and cuttings as *Cryptomeria* rootstock?

Peter Gregg: We don't have a great source of *Cryptomeria* seed.

Joe Braeu: What kind of success rate do you find when the scion is very small?

Peter Gregg: The success rate is approximately 90-95%.

Jim Ellefson: How to handle heat build-up in the winter time on bright sunny days? Do you use shade then?

Peter Gregg: Most of our grafting houses are pretty old, so they already have about 10% shade. We use vapor barriers and if they get too hot we'll open the sides up slightly for ventilation.

Jim Ellefson: How to handle the watering when they're covered?

Peter Gregg: When they're first started they are completely watered in. Since the process is done in the winter when water needs are relatively low they're aren't watered again.

