machine consists of a power unit (engine) with a hydrostatic drive, the platform for the potting machine itself with a roof overtop, and a bin carrier for the containers (Fig. 1).

We drive the potting machine along side of the beds where ever we want to pot. A 20-ft aluminum belt brings the potted plants ¾ the distance into the beds. There are only four people running this machine, one putting pots onto the machine, two people potting, and one person taking the plants off the belt. These four people can do about 1200 to 1500 2-gal containers per day.

Controls consists of steering wheel, throttle, and the groundspeed control (hydrostatic drive). Power is supplied by a 90 hp International diesel engine that runs on idle. It drives the hydrostatic drives and a 15 KV generator. The noise level is very minimal as long as you choose the right generator. The potting mix is supplied with a portable custom-built soil mixer. It brings about 3 yards of soil at a time.

Simultaneous Top Grafting of *Salix* Standards and Hardwood Rooting of the Understock

John Langendoen
Willowbrook Nurseries Inc., 1000 Balfour St., Fenwick, Ontario L0S 1C0 Canada

INTRODUCTION

The nursery production of top-grafted standards is one of the most expensive production processes that a nursery incurs. Producing a quality understock may take up to 3 years and it could be another 2 years before a top-grafted standard is saleable after chip budding or grafting.

In a constant effort to reduce production time we have been able to produce top-grafted *Salix* taxa in only 1 to 2 years with excellent results.

MATERIAL AND METHODS

Plant Material Preparation. *Salix* ×*smithiana* understock is collected from field, trying to pick straight 5- to 6-ft stems, and placed in a cooler at 2F until needed, during above freezing weather in early February.

Propagation Medium. One-gal pots with soil mix containing peat moss, pine bark, and perlite (1 : 1 : 1, by volume) and Osmocote 19N-6P-12K fertilizer (slow start) at 7 lb yd^{-3} are prepared. Pots are place in a greenhouse with bottom heat, watered, and covered with clear 2-mil plastic. The soil temperature must be between 60 and 65F and the air temperature held around 45 to 50F.

Grafting.

- Bees' wax is melted and maintained at the desired temperature.
- Scionwood is collected from mature stockplants making sure that it is in good condition and placed in a cooler at 2F until needed; keep the scionwood moist at all times. Store scionwood is kept in wet burlap or in thin plastic bags with holes to provide drainage. This prevents scionwood from becoming waterlogged.

- *Salix* understock are graded and cut into 4-ft lengths, keep in mind that you need to leave the understock 8 to 9 inches longer than the graded 4-ft length so you can place it into the 1-gal container without affecting your desired height.
- Understocks are grafted using a whip and tongue, machine graft, or veneer graft (method used depends on the size of the understock and/or scionwood) and then tied with an elastic grafting band.
- Grafted ends are dipped into bees' wax and then the opposite ends are placed into a pail of water.
- The grafts are then moved into the propagation greenhouse, dipped in powdered rooting hormone (Stimroot #3), and stuck directly into the pots — piercing the plastic cover in the process.
- The greenhouse is misted two to three times a day depending on the condition in the greenhouse to maintain the humidity level as high as possible. After approximately 3 weeks the plastic is removed from the pots by slitting with a knife down each row of pots along the understock. This usually occurs by the middle of March (depending on the root development).
- By the 1st or 2nd week of April, suckers are removed from the understock starting with the bottom half first; then over the course of 2 to 3 weeks, slowly remove suckers up the understock until there are only 3 to 4 at the top — these are pinched back to 3 to 4 inches in length.
- Approximately 1 month later the scionwood should have started to grow. When the new growth reaches anywhere from 3 to 5 inches it should be tipped back. By the 1st or 2nd week of May all scionwood should be tipped back.
- Once they flush out again and are growing nicely, hardening off is started. Maintain inside air temperature 10F higher than outside air temperature.
- After this hardening off procedure has been implemented for a week or so, start using roll up sides to further harden off the plants so they will be fully conditioned to the outside temperature by the end of May or beginning of June.

Growing On.

- By the end of June or early July, the process of potting the grafts from a 1-gal containers into a 5-gal container starts. Grafts are potted up using a Bouldin & Lawson XL500 potting machine.
- Pots are placed pot to pot in a polyhouse covered with shade cloth (30%) for 3 to 5 days for further conditioning. As the grafts are being potted into 5-gal containers, pruning and removal of suckers is carried out. After the grafts are potted and risk of breaking off the scion is passed, the rubber grafting bands are cut off.
- During August when there is more time available the grafts are staked and tied with custom made stakes. The stakes are stained with a redwood stain to ensure that they will last two seasons. The standards will probably have to have suckers removed two or more times before the end of the season.

- The next time the top will be pruned would be the following year in March and once more during the growing season—depending on the cultivar. Plants are saleable by mid summer of the 2nd year.
- The taxa that we are currently producing with the most success are *S. caprea* 'Kilmarnock' (syn. *S. caprea* 'Pendula') (weeping pussy willow), *S. purpurea* 'Pendula' (weeping purpleleaf willow), and *S.* integra 'Hakuro-nishiki' (variegated pussy willow).

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Gisela® Series: Dwarfing Cherry Rootstocks

Leno Mori
Mori Nurseries, Ltd., Niagara-on-the-Lake, Ontario, L0S 1J0 Canada

The Gisela® series of rootstocks are important dwarfing cherry rootstocks for sweet cherry and have limited use for sour cherry and Japanese flowering cherries. The initial crosses that lead to the development of these rootstocks started in the early 1960s at Justus Liebig University in Giessen, Germany. The Gisela® series of rootstocks have gone through extensive testing in Germany where they first originated and in Michigan at Hilltop Orchards and Nurseries Inc. for almost 20 years. In addition, for the past 10 years tests as part of the North Central 140 trials (NC-140 rootstock trial plantings) have occurred at 16 locations throughout the U.S.A. and Canada.

The Gisela® rootstocks produce sweet cherry trees which are 45% to 70% or 80% the size of those on mazzard understock. Scions grafted on Gisela® understocks are very precocious and crop in their 3rd year with full crops in the 4th. Typically, in a side-by-side comparison, sweet cherry on Gisela® 12 rootstock will have a heavier bloom and will be in its 4th cropping season whereas grafts on mazzard will just be starting to flower. This earlier and heavier bloom on Gisela® rootstocks has created interest among ornamental nurseries on the potential of grafting Japanese flowering cultivars on these dwarfing cherry rootstocks.

We currently have a 3-acre high-density planting of sweet cherry on Gisela® at Niagara-on-the-Lake with a 6 ft × 14 ft spacing and are planning a 2-acre planting at a 4 ft × 12 ft spacing this coming spring. Rain and hail can be a problem for us with sweet cherries. Because of the dwarfing habit on the Gisela® rootstocks we are working on a simple easy-to-build covering to manage these problems.

Hardiness of the Gisela® rootstocks is good. I have observed damage in a nursery in Washington State where sweet cherry grafted on mazzard cherry showed damage from severe winter cold of -18F with no snow cover. In the same field no damage was observed on Gisela® 6 rootstock.

Gisela® rootstocks will definitely change the production of sweet cherries in Canada, U.S.A., and around the world. The greatest problem is the propagation of these rootstocks in satisfactory quantities. They have been quite difficult to produce in large quantities on a consistent basis. Tissue culture has worked reasonably well