

## PRODUCTION OF QUALITY ONE AND TWO YEAR UNDERCUT STOCKS

ROBIN F. SYM

*Tilhill Forestry Limited,  
Greenhills, Tilford  
Farnham, Surrey, GU10 2DY*

Tilhill is a private forestry management company with its activities split into the following divisions: Forestry management, nurseries, and landscaping.

The Company began operations in 1948 with its principal work being advising landowners on the best methods for replanting the areas of woodland felled during the Second World War. It was soon realised that plant supply was an important aspect of reforestation so the Nursery was developed and the choice of a heathland site was very fortunate.

The Nursery is situated at Tilford near Farnham, Surrey, on 100 hectares of sandy heathland soil with a natural pH of 3.5 which is raised to between 4.5 and 6.0 by the application of ground magnesium limestone.

### **Advantages of the site:**

100 ha on one site of relatively flat ground approximately 60 metre above sea level.

A very light sandy soil, free draining and workable all year round and which warms up rapidly promoting growth.

Geographically situated in southern England having a very long growing season.

Ample water available for irrigation and two 5-million gallon reservoirs.

### **Disadvantages of the site:**

High risk of early and late frosts.

Local populations of rabbit and roe deer must be fenced out.

A short dormant period means a high pressure of work during the lifting period.

**Land preparation.** One of the keys to successful production is the management of the soil. A typical cycle in the nursery following a crop is:

- 1) A stone picking machine removes stones and residues from previous crops—to a depth of 15 cm.
- 2) The land is ploughed to 22 cm to keep a good depth of cultivation.
- 3) Following soil testing, ground magnesium limestone is applied to correct pH deficiencies. A high potash basal fertiliser with phosphate and magnesium is added. Organic matter in the form of hop waste and well-rotted chicken manure is applied at 40 to 60 tonnes per hectare. The fertiliser and organic matter are lightly harrowed in.

- 4) The land is subsoiled to 0.5 metre depth at 1 metre centres, sometimes in both directions and is then ready for seedbed preparation or sterilising.

**Soil Sterilisation.** For the production of one-year stocks the sterilisation of the soil using Basamid enhances growth and quality of the product. The sterilising operation, carried out in September, involves the accurate application to the soil of Basamid granules using a Sisis Lospread.

This is then rotovated in to a depth of 15 to 20 cms and the 1 metre wide seedbeds are then formed using a tractor-mounted bed-maker which incorporates a light roller. Because of the very light nature of the soil, polythene sheeting is then laid over the beds to seal the surface using an MJF polylayer. Some nurseries with heavier soil can seal the surface by watering and rolling but on the very light soils at Tilhill polythene is necessary to seal the surface to enable the gas to work. Using five tractors 1.8 hectares can be sterilised and covered in polythene in a normal working day. A total of 12 hectares will be sterilised at Tilhill this year for seedling production. The polythene is removed in January and weed which has grown in the alleyways is sprayed with Paraquat. The beds are then lightly raked to remove any remaining gas. The soil is tested by sowing cress seed on to samples of soil contained in sealed jars. The land is now ready for seed sowing.

**Seed.** Seed will have been obtained during the previous year and pre-treated if required.

Germination data is obtained and tests are carried out to enable the correct sowing densities to be worked out. For most hardwoods, end-of-season bed densities of between 60 and 120 plants per m<sup>2</sup> is ideal, while for conifers 150 to 200 plants per m<sup>2</sup> gives a high proportion of usable plants.

**Sowing.** Seed sowing begins in February and is normally completed during April. The seed being sown for the production of the two-year undercuts is sown on unsterilised seed beds. The two-year growing period gives adequate height growth without the need or cost of sterilising. Undercuts aged one or two years can be produced from either broadcast or drill sowing.

Four methods of seed sowing are used by Tilhill:

- Sisis Lospread for broadcasting seeds of most conifer species and of beech.
- Sisis Lospread with a drill sowing attachment is used for the larger seeded broadleaves, e.g. oak, sweet chestnut, and hazel.
- Matco-Fahse vacuum precision drill for conifers.
- By hand for small lots of conifer and hardwood seeds and for difficult-shaped seeds, e.g., birch, sycamore, ash, Lawson cypress and western red cedar.

For seeds to be sown on the bed surface, using either the Sisis Lospread or by hand, a fine tilth is created using a tractor-mounted machine which levels, rolls, and brushes in one operation.

The seeds are then sown at the predetermined density, rolled into the surface and covered by a thin layer of lime-free grit, applied with a tractor-mounted grit spreader. The bed surface preparation is also required for conifer seeds that are sown with the Matco-Fahse precision drill, as these seeds are also placed on the bed surface, rolled in, and covered by grit.

Deeper drilling of seeds of broadleaved species is done using the Sisis Lospread with the drill sowing attachment. Seeds of round-seeded species, such as oak, sweet chestnut, and hazel, can be drilled, covered and the surface rolled in a one-pass operation. Seeds of the winged species, *Acer* and *Fraxinus* are sown by hand into the open drills, drawn out using the Sisis attachment, and then covered with soil and rolled by a second pass of the machine.

**Protection.** Once the seeds are sown most species require protection from attack by birds and are covered with plastic netting held off the bed surface by wire hoops. Some 100 km of netting is put down annually over the seedbeds.

**Undercutting, wrenching, and lateral pruning.** Once the seeds have germinated and the protective netting removed, the undercutting of the roots can commence. The roots are cut at depths of 10 to 15 cm depending on species and size of plant. Using the Summit Reciprocating Undercutting machine developed in New Zealand, it is now possible to undercut plants at a smaller size than previously possible.

Undercutting of hardwood species commences in June with strong-rooted species, such as cherry, sycamore, oak, and ash and is completed in August with lighter rooting species, such as birch and alder. Conifers are normally undercut in August.

A wider blade is used on the Summit Reciprocating Undercutter for wrenching the plants in the beds during late August, September, and October to stimulate the production of more fibrous roots and to encourage the growing shoot to harden off. Other machines with fixed blades can be successfully used for this operation.

In the production of two-year undercuts, particularly conifers, a Summit Lateral Pruner, which consists of a set of steel discs on a frame, cuts the laterally growing roots between the rows. All these root modifying operations lead to the production of well balanced plants with compact fibrous root systems ideal for planting and growing in the forest.

**Irrigation and frost protection.** Irrigation is normally required from sowing, depending on the season's weather, to keep the moisture content of the seed correct for germination, for the root

cutting operations, and to incorporate granular fertiliser application.

Many of the species being grown, both conifers and hardwoods, are susceptible to shoot damage from early and late spring frosts. To avoid this the Portagrid irrigation system is set out to apply 1/8 in. of water per hour once the air temperature falls to 0 °C. Ice forms on the tops of plants but the latent heat produced when the ice is forming keeps it above the temperature which can cause damage to plant cells.

Some 25 hectares of the most susceptible species can be protected in this way at Tilhill and up to one million gallons of water may be used during an 8 hr. frost night.

**Fertiliser applications.** Following seed germination, top dressing of Gold'N', a slow-release nitrogen fertiliser, is applied at 150 Kg. per ha. This type of fertiliser can be applied when the plants are very small because no foliage scorching occurs. Two top dressings of K Nitro (25:0:16) are applied during June and July at rates of 185 to 250 Kg per ha. The rate varies depending on the density of plants on the bed and the amount of rainfall or irrigation applied. K Nitro is used because the nursery soils are generally low in potassium.

Then, during late August or September, a high potassium (14:0:28) fertiliser is applied at 185 Kg. per ha., to encourage hardening-off and to keep the plants in a healthy condition during the dormant period.

**Lifting and grading.** The plants are loosened in the bed using a tractor-mounted Magnifique bed lifter. By careful adjustment the plants can be loosened but still left with a covering of soil on the roots. This prevents the roots from drying out and from any damage which could occur from an overnight frost. Grading and counting can then take place as the plants are being lifted, or the plants can be taken directly into cold storage for the grading operation to be carried out later.