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A Guide to Planting

Timing, microsites, techniques and monitoring

Planting is a highly reliable method to ensure the establishment of target species at desired densities on reclaimed sites. It allows direct control over the species, spacing and timing of regeneration. Nursery stock are also generally more robust to competition and challenging environmental conditions than naturally regenerated or seeded plants. In general, planting programs can achieve significantly higher survival of target tree species compared with seeding or natural regeneration. In some cases, survival may be as high as 80% by 10 years after planting.

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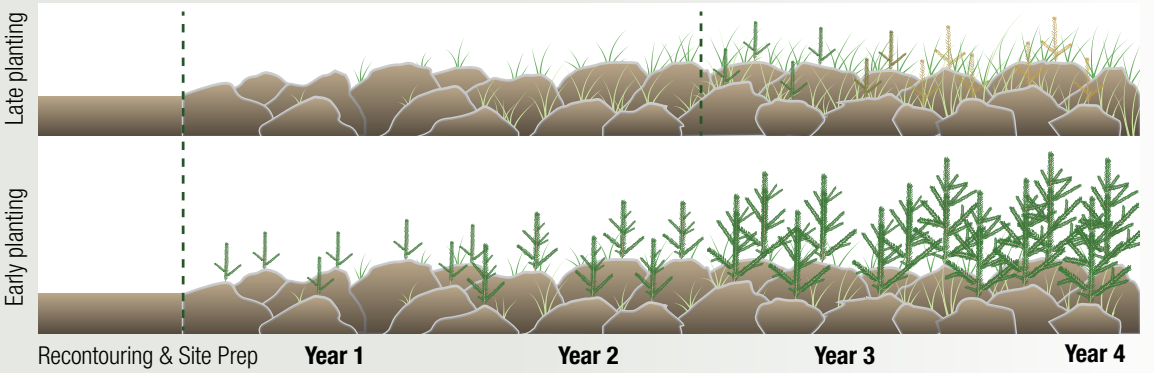
The importance of planning and timing

Planting requires planning to ensure positive outcomes. The regeneration plan — species, stock type and planting density — affects decisions on site preparation and the timing of events. Some stock types require more than a year to grow, and planting densities will determine the number of trees that need to be ordered. Planting densities should be set higher than reclamation targets to account for seedling mortality.

Sites that are recontoured but not planted for one to two years can be quickly overtaken by competing vegetation, which occupies microsites and compromises the survival and performance of planted seedlings (Fig. 1). These sites will require more intensive and costly interventions when planting eventually occurs, increasing reclamation costs and time frames and reducing the probability of success.

Figure 1. Quick planting gives seedlings a head start over competition.



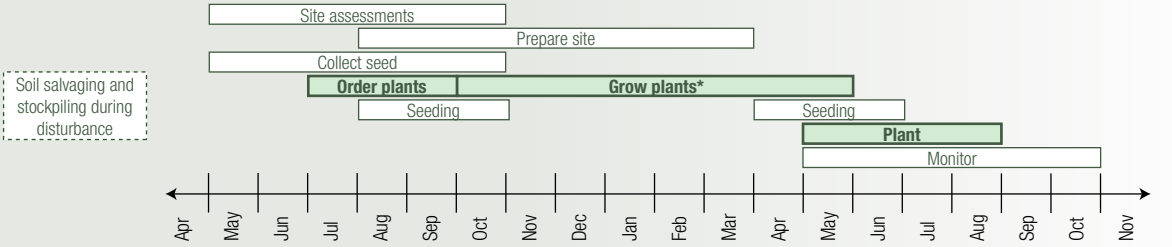
Planting windows

Planting windows are mainly limited to spring and summer (Table 1, Fig. 2), although winter planting is being evaluated in some field trials. Spring planting should begin when the ground has thawed, there is a low risk of late frost, and the soil is warmer than 5°C. Deciduous plants risk drying out in the summer and should be planted in the spring.

Table 1. Planting windows for deciduous and coniferous nursery stock

Season	Planting window	Stock type	Nursery sowing date
Spring	May–mid June	Deciduous and coniferous	Previous year; frozen over the winter
Summer	Mid June–late July	Coniferous	Previous winter
Fall	Generally not recommended, although trials for aspen have shown promising results.		

Figure 2. Timeline for planting activities.



*Note: Plants should be ordered at least a year prior to planting, but some stock types and non-commercial tree species take longer to grow (up to three years).

What about winter planting of black spruce?

Winter planting of black spruce has been tested in some field trials and has shown positive short-term results. However, long-term survival is not yet known and more research is required.

Key known considerations: Winter access of wet sites provides a logistical advantage. Trees must be planted quickly after treatment application, and seedlings must be individually wrapped and planted frozen.

Key uncertainties: Scientific evidence is limited, and no experiments to date have been replicated under controlled conditions. Uncertainty remains around sensitivities to weather conditions at the time of planting and to temperature variations during and after planting.

Seedling transportation and chain of custody

Before planting can begin, seedlings must be transported from the nursery to the site. A well-defined chain of custody and documentation ensure best practices are followed at each step.

Seedlings must be kept cool during transportation and storage (Fig. 3). Boxes of overwinter stock (for spring planting) should be kept closed; boxes of summer planting stock should be kept open to allow heat to escape.

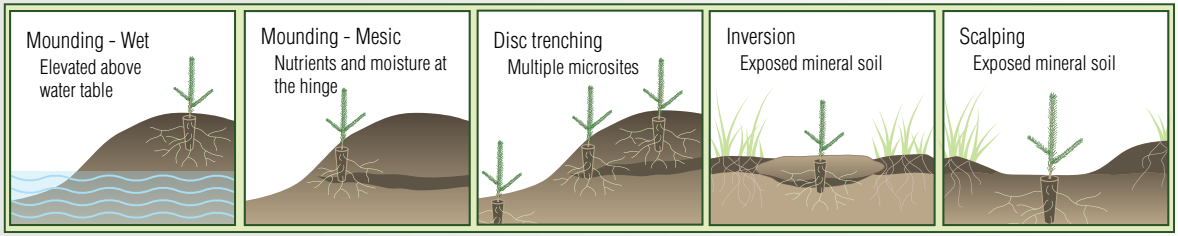
Figure 3. Seedlings must be kept cool at all stages prior to planting.

Seedlings require optimal microsites for growth

Microsites are the spots where trees are planted or seeded, and their condition helps determine seedling success or failure.

Site preparation is an important tool for creating optimal microsites by exposing mineral soil, improving soil moisture and reducing compaction and competition (see Factsheet *A Guide to Site Preparation*). Planters should be trained to recognize ideal microsites across different sites and site preparation treatments (Fig. 4).

Figure 4. Optimal planting microsites for a range of site preparation treatments.



Planting techniques and best practices

Seedlings planted improperly have poor survival. The planting hole must be deep enough to accommodate the full length of the roots, and the root collar should be just below the soil surface. Care should be taken to ensure good root-to-soil contact, avoid large air pockets and prevent roots from bending in too-small planting holes ("J-roots").

Maintenance

Steps can be taken during and after planting to improve the odds of successful tree establishment. Competition control is the most important step and is essential on newly planted sites: it may include physical barriers, cutting or targeted herbicide application. Additional steps may include fertilization on nutrient-poor sites and browse discouragement on sites with high herbivore pressures.

Monitoring for success

It is essential to follow up on planted sites to determine whether planted seedlings are surviving and growing. If there is high mortality or stunted growth, monitoring is critical in determining next steps, which may include in-fill planting/seeding, fertilization or competition control. Survival assessments should generally be conducted within the first one to two growing seasons, and longer-term monitoring at five or 10 years after planting is recommended to track success and monitor survival.

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Also available under the title : Guide de la plantation – Période propice, microsites, techniques et surveillance

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