Introduction

Planting quality is a set of standards that define how to plant a tree. In fact, there are at least 26 specific criteria that are assessed to ensure your tree quality is satisfactory. These criteria are all based on sound biological principles that will contribute to successful tree growth.

The purpose of this module is to

- Introduce these quality requirements
- Explain how these requirements are assessed
- Explain the impact this assessment has on you

It is critical for you to understand the quality requirements you are expected to meet—for your success as a treeplanter, and for the success of the tree.

Task Inventory

- Planting Quality Checks
- Planting Density
- Microsite Preparation
- Culling Damaged Seedlings
- Avoid Overhead Obstructions
- Root Positioning
- Planting Depth
- Proper Hole Closure
- Prevent Leaning Trees
- Cumulative Stress

PPE Requirements Summary

Image	Description	Standard
	CSA Approved Steel Toe Boots	Required
	High Visibility Vest	Required
	Leather Gloves	Required
	Safety Glasses	Required
	Hard Hat	Recommended

Planting Quality Checks

Every treeplanting project has quality-of-work expectations. These quality standards are designed to ensure that the seedlings survive and thrive. As a result, each treeplanter is required to meet or exceed these standards with the work they perform.

Self Monitoring

Your foreman will routinely monitor your planting quality. He or she will give you feedback on how well your work stacks up against the quality expectations of the project. However, it is strongly recommended that you take the time to monitor the quality of your own work. Many top treeplanters do their own quality plots several times each day and make adjustments to their style or speed as necessary.

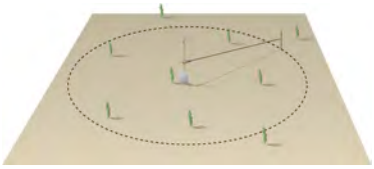
Pay Plots

A company “Checker”, or client representative, will formally inspect all planted land. This involves conducting a series of sample plots where each tree is inspected. After a grid of plots has been thrown over a cutblock, the statistics dictate whether the block passes or fails. Blocks that fail may result in replanting time or quality fines for the company.

Throwing a Plot

To throw a plot:

- Buy or make a plot cord—plot cords measure exactly 3.99 metres.
- Put your shovel in the ground and wrap the loop of your plot cord around the shovel handle.
- Stretch out the plot cord and walk around the shovel.
- Count the number of trees in the plot to determine your density (density is discussed next).
- Inspect each tree for faults.



Basic Statistics

For every 20 trees you inspect, 19 have to be perfect. Any less and you have a quality problem that needs to be repaired promptly.

Check Your Plot Cord

Regularly check the length of your plot cord with a tape measure. Even a slightly longer or shorter plot cord can cause very different plot results.

Planting Density

Planting too many or too few trees per hectare is a deviation from the foresters plan for the area.

Controls

Spacing

Seedlings that are planted too close to other seedlings (or in some cases, natural trees) may not have enough space above or below the ground to survive. For this reason, most projects will have minimum inter-tree spacing limits.
It is also important to ensure that enough trees are planted per hectare to take full advantage of the site. Each project will have a target tree density. The following chart is provided to give you an idea of how density translates into inter-tree distance.

Density (Trees / Hectare*)	Optimum Spacing Between Trees	Trees / Plot (3.99 m cord)
2000	2.15 m	10
1800	2.35 m	9
1600	2.5 m	8
1400	2.7 m	7
1200	2.9 m	6
1000	3.15 m	5

Hectare: A piece of land 100 metres by 100 metres square

Monitoring Your Density

The single best way to get immediate feedback on your spacing quality is to perform plots on your own trees:

- Count the number of trees in each of your plots.
- Adjust inter-tree spacing accordingly. For example, if you have too many trees in your plots, slightly increase your spacing between trees.
- Do 2-5 plots on your recently planted trees each day. This will save you from having to replant (which is not fun) and will give you confidence in your quality which enables you to plant faster.

Microsite Preparation

Improper microsite preparation can reduce seedling survival and vigor.

Screefing

On some projects, the upper layer of the forest floor and/or soil will have to be removed before planting the tree. This is done to overcome the site's growth-limiting factors. These factors include:

Dry Soil – screefing exposes the underlying mineral soil, which can hold more water.

Competition – screefing removes existing vegetation, and removes competition-friendly soil so it is harder for competing vegetation to get started.

Cold Soil – screefing exposes soil to sunlight so it can heat up.

The dimensions of the necessary screef will be discussed at the start of each project.

Mound Microsites

Mounding equipment can create soil conditions that need to be monitored while planting.

Loose Soil

Excavator mounders working in some swampy areas can create very loosely piled organic mounds. The soil around the planting spot should be tapped down with your foot before planting the tree. This will reduce the air content of the soil and improve its ability to retain water.

Soil Discontinuities

Mounders occasionally put mounds on top of logs or other heavy debris such as branches. This creates a microsite that is not connected to the underlying soil. This elevated mound will likely be too dry and not contain enough nutrients to support the tree for very long. Sometimes these mounds can be settled with a kick or two. If not, plant close to the mound in the next best microsite.

Culling Damaged Seedlings

Damaged seedlings should not be planted.

Controls

Cull the damaged trees. Watch for the following signs that damage has been done:

Broken Tops

Rough handling and overloaded planting bags can break the tops of seedlings. A broken top is a soon-to-be-dead tree. This is a serious planting fault.

Root Collar Damage

Rough handling, tearing apart bundles, and kicking the tree while planting can all damage the root collar. This break in the stem of the tree is like having a broken back—it's not good.

Avoid Overhead Obstructions

Planting beneath an overhead obstruction can inhibit seedling growth.

Controls

Overhead obstacles can get in the way of seedling growth and create shade on the ground that lowers soil temperature. Avoid planting near any overhanging growth.

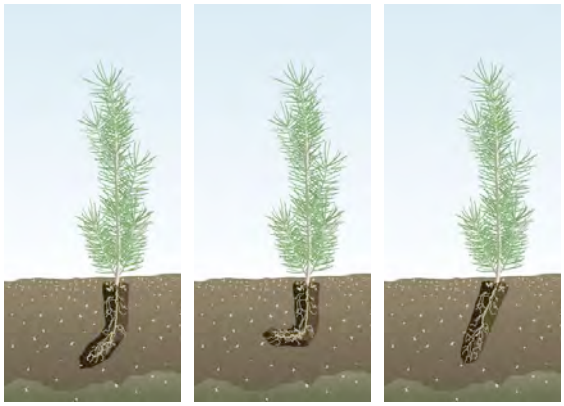
Root Positioning

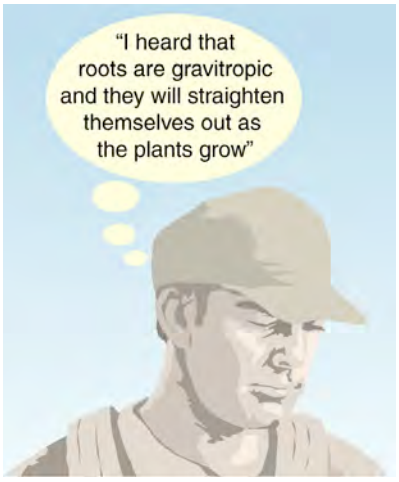
Roots must be straight up and down for optimal growth.

Controls

Roots must be planted straight up and down. They can't be leaning to the side, twisted or bent. Although these conditions may not cause immediate seedling death, they do create a problem that the tree will have to correct over time. This takes valuable resources that the seedling could be using to grow.

J-Root | **L Root** | **Slanted Root**





Planting Depth

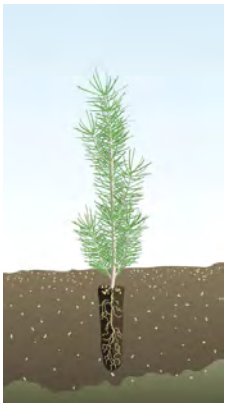
Seedlings that are planted too deep or too shallow for the local conditions will have reduced survival and vigour.

Controls

Planting a seedling too deep or too shallow can cause that seedling some significant grief. If the tree is planted too shallow, and the roots are exposed, the roots will dry out. If the tree is planted too deep, some of the branches can be buried. This leaves less of the photosynthesizing foliage (lateral branches) exposed to the sun. Either way, it is bad for the tree. Typically, the roots need to be completely covered with soil and the stem can be buried 1 – 2 centimeters.

Soil Depth

Too Shallow – Plug is exposed and will dry out.



Too Deep – Laterals are Buried

Planting Depth

Controls

Soil Depth (continued)

Shallow soils leave little room for root growth. Look for a better nearby microsite.

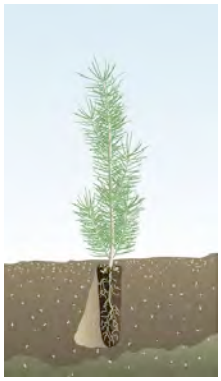
Proper Hole Closure

Holes with air pockets can cause root drying. Holes closed too tightly can shock the tree and inhibit root growth.

Controls

After the tree has been planted in the hole, soil must be pushed all around the roots. Several problems can occur if this is not done properly:

- If you stomp on the dirt around the tree, you could compact the soil too much, or leave a big divit with your heel where water could collect.
- If the soil is hard, you may only close the top of the hole but leave an air pocket around the roots. This can dry out the root mass.
- If the soil is loose, the tree might not be tight enough and the soil may contain too much air and too little moisture.



Where soil conditions are hard, it is often easiest to close the hole properly by loosening up the soil near the seedling with your planting shovel. Once the technique has been mastered, it only takes about an extra second or two.

Prevent Leaning Trees

Leaning seedlings have to divert valuable energy to straightening.

Controls

Once planted, the tree should be straight up and down. A small tolerance (about 10-15 degrees) is often acceptable.

Also true. But the energy wasted straightening out is the problem.

Reduce Cumulative Stress

Seedling stress is generally thought of as being cumulative – once weakened, a seedling's resistance to further stress, and its ability to recover, is compromised. Once stressed or damaged, the seedling triggers s survival response, shifting its resources from growth to repair and adjustment. This uses up valuable seedling energy that should be used to get established and beat the surrounding competition.

Controls

Minimize stresses to seedlings from the time they arrive on a transport truck until they are planted.