

Mounding

After the decision has been made to plant an area, it is necessary that the site is prepared the autumn prior to planting in order to ensure the best growing conditions for the seedlings. There are numerous different ways of preparing a site, the least invasive of which is Mounding, which only disturbs approximately 10-30% of ground surface, depending on intensity¹.

Mounding was traditionally developed for logging reforestation projects, as it was noticed that natural reforestation happened best on the side of small knolls in the ground, which created a small beneficial area, different from the surrounding landscape. These small areas of different conditions are referred to as “microsites” and mounding seeks to mimic this natural variation in a predictable way.

Mounds have the ability to increase the survival of seedlings by altering the local moisture regime, providing both drier and wetter planting sites, increasing soil aeration, sheltering seedlings from animals, and lowering competition - for a number of years. When done properly, mounding can double the growth of some trees by providing a more ideal growing site for a longer period than an unprepared site would¹.

Anatomy of a mound

Mounding can be done in a variety of ways, but they all involve taking a small area of soil and sod and overturning it directly adjacent to the newly created hole. This creates a small dip in the ground and a small raised area directly next to it. This structure offers a variety of different locations to plant a seedling. Each one can be used strategically to maximise survival of seedlings in different environments.

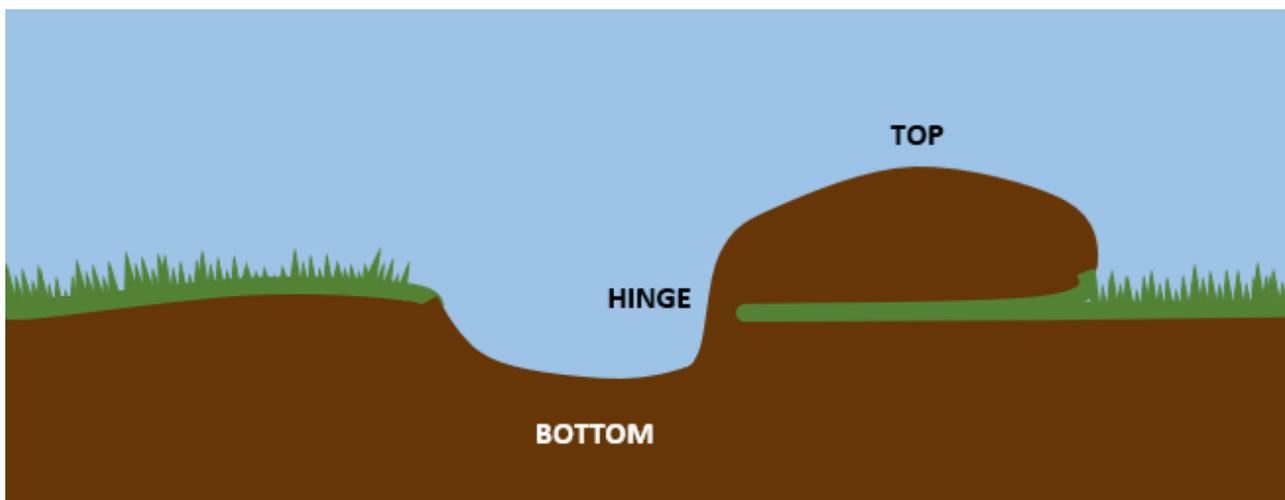


Figure 1. The anatomy of a mound

There are three general areas to plant on a mound: The top of the mound, the bottom of the pit, or in between, on the “hinge”, where the mound was flipped, upside-down, onto the ground surface. The characteristics of each location, and on what sites each would be best suited for, is described in Table 1.

Table 1: The different characteristics of each planting location in a mound

LOCATION	CHARACTERISTICS	RECOMMENDED SITE
TOP	<ul style="list-style-type: none"> • Warmer • Dryer • less competition • poor root penetration 	Extremely wet locations, where over-saturation is a concern (e.g. Riparian areas)
BOTTOM	<ul style="list-style-type: none"> • Cooler • Wetter • Better sheltered from animals 	In areas where temperature, moisture, or animals are a concern
HINGE	<ul style="list-style-type: none"> • Average temperature • Average moisture • Good root penetration • Faster competition 	The recommended location if the site is not impacted by any major issues

When to Mound

Mounding is best done when the goals are to preserve as much of the site as possible, while still ensuring improved seedling success over straight planting, or when accessibility of the site to equipment is questionable.

While mounding will reduce some of the compaction on a site, for areas with extreme compaction or a very thick sod mat, other methods (such as tilling) may be prudent to avoid issues with root penetration of the seedlings.

Mounding, like most site preparation, is best done in the fall the year prior to planting. Timing the preparation like this allows for air pockets created during the site preparation to settle, and for decay of remaining roots to begin before planting.

Mounding can be done in the spring before planting, but it is strongly recommended to prepare the site at minimum 60 to 90 days before planting to allow for rain to settle air pockets².

How to mound

Mounding is typically done using either an excavator or a specially designed piece of mounding equipment pulled behind a tractor, called a Bracke moulder. Each of these methods are best suited to certain site conditions, financial limits, and timelines. The benefits and downsides of each are outlined below, in Table 2.

Table 2. Pros and Cons of each mounding method

MOUNDING TECHNIQUE	PROS	CONS
EXCAVATOR MOUNDING	<ul style="list-style-type: none"> • Able to mound on most terrain including slopes and in wet areas. • Creates more “natural” patterns 	<ul style="list-style-type: none"> • Slow and expensive
BRACKE MOUNDER	<ul style="list-style-type: none"> • Cost effective • Fast 	<ul style="list-style-type: none"> • Limited to open areas free of large debris • May not be easily acquired



Excavator mounding as the name implies, is done with an excavator with a bucket attachment and mounds are created by simply digging a small hole before folding over the excavated material upside down directly adjacent.



The *Bracke moulder* (left) is a more cost-effective alternative that is an attachment for a tractor. It creates rows of mounds by pulling strips of soil up and pulling them forward.

There are a few tips to ensure your mounds will result in the highest seedling success:

- When mounding on a hillside, it is recommended to space the mound irregularly to reduce erosion.
- Ensure that no debris is trapped under the mound, as this will impede root penetration as the seedling grows

After planting

A form of loose mulch (such as wood chips or straw) can be applied immediately after planting to help further improve soil condition, and to help decrease competition. However, application is important to ensure the seeding is not hindered by its presence (See the AWES factsheet “Controlling Weeds by Mulching” for more).

The mound will help isolate seedlings from competition for a time, but after the tree has grown, other grasses and forbs will colonize the mound and pit. This will make the mound less noticeable and, over time, the mound will disappear completely.

It is important to remember that even though planting within mounds will help the seedlings to survive, it should be coupled with regular monitoring and intervention to resolve issues and ensure the highest survival.



Figure 2. Two years after site preparation, it is almost impossible to tell the land was altered.

Conclusion

Mounding is a lower impact form of site preparation that can be done virtually anywhere to improve seedling success. With proper technique it can create the most ideal growing locations for seedlings and ensure that they have the greatest chance of survival.



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References

- 1) S. Mattson, U. Bergsten & Tommy Mörling (2007) *Pinus contorta* growth in boreal Sweden as affected by combined lupin treatment and soil scarification. *Silva Fennica* 41(4): 649–659.
- 2) C. Michler & Rathforn, R. (n.d.) Site Preparation for Tree Planting in Agricultural Fields and Hardwood Forests. Northern Research Station USDA Forest Service. Dept of Forestry & Natural Resources, Purdue University extension

Further Reading

M. A. von der Gönna (1992) Fundamentals of Mechanical Site Preparation: FRDA Report 178. Silviculture Branch, British Columbia Ministry of Forests.

REMINDER NOTES

Mounding is good for:

- Creating a competition free microsite
- Aerating soil
- Creating an area of high nutrient and moisture content at the hinge
- Warming soil
- Elevating seedlings above the water table

Not suitable for dry or drought prone sites. South facing slopes should be avoided.
Can be mitigated by planting strategically

Mounds should be:

- Concave on top
- 20-30 cm tall after settling
- 10-15 cm mineral soil on top
- Free from slash/debris under the mound
- Placed irregularly (for erosion reduction)

Done with:

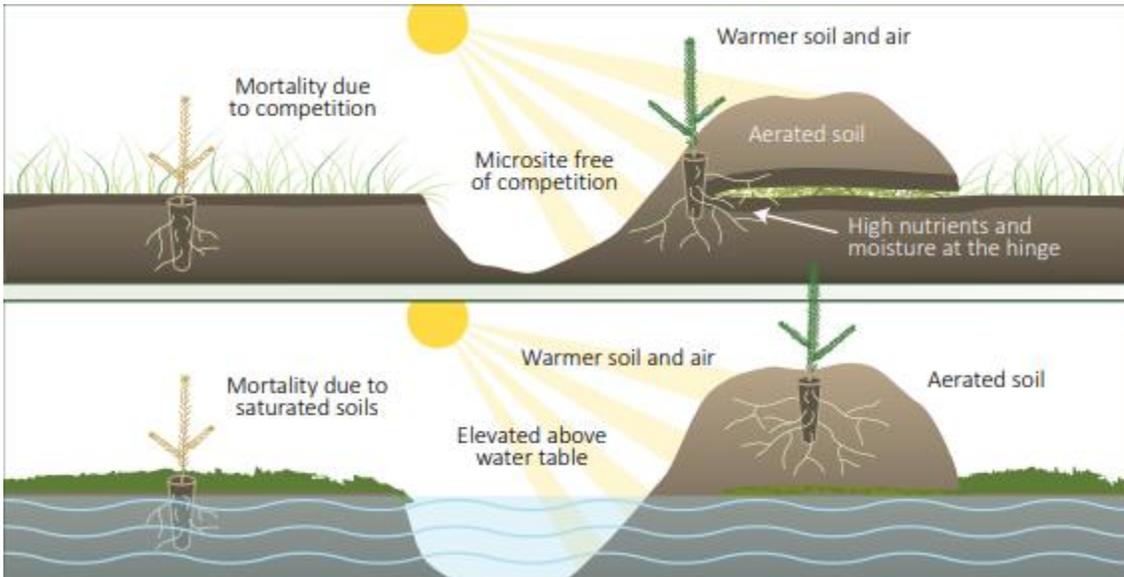
- Excavator (expensive)
- Bracke Moulder

Alternative site prep methods:

References:

- <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/38967.pdf>
- 1. <https://www.for.gov.bc.ca/hfp/publications/00084/FRDA178.pdf>

(earlier title: reforestation of pasture and hayland)



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