

Root Pruning

A method to stimulate suckering for forest regeneration

Root suckering is a mode of natural regeneration for many tree and shrub species, most notably trembling aspen (*Populus tremuloides*) (Figure 1). **Root pruning** – the practice of periodically scraping or severing the lateral (i.e. horizontal) roots of suckering species – is a relatively low-input way of stimulating root suckering, and can be used to enhance or regenerate forest cover¹.

This article explains the methods, timing, and equipment required for successful root pruning.

Methods

Natural root suckering is governed by levels of certain hormones within the plant as well as soil conditions (e.g. temperature, aeration). Root pruning stimulates root suckering both by opening up the soil around the root (which increases its temperature and aeration) and by wounding the root (which changes hormonal patterns in favour of suckering).



Figure 2. Root pruning with a modified furrower along a trembling aspen stand. Photo credit: Brenda Bohmer.



Figure 1. Trembling aspen suckers from lateral roots near the surface. Photo credit: University of Minnesota Extension.

Root pruning is most effective when it is done in areas that have abundant, large lateral roots of a suckering species – in other words, close to the main stem (Figure 2). However, the practice can be done anywhere along the length of lateral roots, which may extend quite far out – in the case of trembling aspen, up to 30m (100') away from the stem! Lateral roots should be severed or scraped 5-20cm (2-8") below the soil surface.

The majority of suckering will occur at or close to the wound location. However, completely severed roots may produce suckers at points along their entire length. Care should be taken to avoid severing the same root at multiple points (e.g. by double disking), as this will leave the suckers with smaller root systems from which to draw moisture and nutrients. Although light scraping can be

¹ Note that the term "root pruning" is also used in horticulture to refer to the cutting back of roots around a tree/shrub to make it easier to transplant. The difference between horticultural root pruning and root pruning that stimulates root suckering is the frequency and intensity: horticultural root pruning is usually done every year and involves completely severing the roots, whereas rest periods should be left if root suckering is desired (described in the Methods section).

conducted up to two times per year at different locations along the roots, a three-year recovery period is recommended if roots are completely severed.

Note that **root pruning should only be done on healthy trees and shrubs**. Root pruning on species that are already stressed may reduce their vigour and even lead to die-off.

Time of Year

Root pruning with large equipment should be avoided when soils are wet, as equipment can lead to compaction and rutting that damages the parent root systems. Root pruning may also be less successful if it is done in the active growing season, as a higher proportion of tree/shrub's energy is in their leaves rather than their roots. For this reason, the best time to root prune is when the soil is dry and vegetation is dormant (i.e. without leaves) – usually in the fall. However, root pruning has been successfully done throughout the spring and summer as well, as long as conditions are dry enough and the existing stand is healthy.

Potential Species

Root pruning has the potential to work on a number of common species that propagate by root suckering, including:

- Trembling aspen (*Populus tremuloides*)
- Balsam poplar (*Populus balsamifera*) (Figure 3)
- Plains cottonwood (*Populus deltoides*)
- Saskatoon (*Amelanchier alnifolia*)
- Choke cherry (*Prunus virginiana*)
- Pin cherry (*Prunus pensylvanica*)
- Wolf willow (*Elaeagnus commutata*)
- Red-osier dogwood (*Cornus sericea*)
- Snowberry/buckbrush (*Symphoricarpos ssp.*)
- Rose species (*Rosa spp.*)
- Raspberry species (*Rubus spp.*)
- Beaked hazelnut (*Corylus cornuta*)
- Round-leaved hawthorn (*Crataegus chrysocarpa*)
- Silver buffaloberry (*Shepherdia argentea*)
- Seabuckthorn (*Hippophae rhamnoides*)
- Sandbar willow (*Salix exigua*)



Figure 3. Balsam poplar suckering occurring after mounding near a mature tree. Photo credit: AWES.

Equipment

Small roots (e.g. of young trees and shrubs) can be wounded with a sharp spade, axe, rototiller or disk. Larger roots of more mature trees and shrubs may require more powerful equipment that can go deeper, such as a trenching machine, root or chisel plow, or furrower (Figure 4). Root pruning can also be done effectively with a “moulder”, which is a piece of forestry equipment that flips over patches of soil to create depressions in the ground (Figure 3). When choosing your implement, pay attention to the horse power required to pull it!



Figure 4. Modified furrower with knife opener. Photo credit: Brenda Bohmer.

Useful References

Farmer RE. 1962. Aspen root sucker formation and apical dominance. Forest Science 8(4): 403-410.

Fraser EC, Lieffers VJ, Landhäusser SM. 2014. Wounding of aspen roots promotes suckering. Can. J. Bot. 82: 310-315.

Frey BR, Lieffers VJ, Landhäusser SM, Comeau PG, Greenway KJ. 2003. An analysis of sucker regeneration of trembling aspen. Can. J. For. Res. 33: 1169–1179.

Indiana Natural Resources Conservation Service FOTG. 2015. Conservation practice standard: tree/shrub pruning. 2015. 660:1-5.

Steneker GA, Walters MA. 1971. The effect of root length upon the suckering of trembling aspen. 197. Edmonton (AB): Canadian Forestry Service, Department of Fisheries and Forestry; [accessed 2016 Nov. 25]. 6 p. <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/23180.pdf>

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