Oil Sands Vegetation Cooperative

In This Issue:

Targets (2018)

NAOS

Betula papyrifera 20 L
Populus balsamifera 10 L
Populus tremuloides 80 L
Larix laricina 100 L
Alnus viridis 50 L
Amelanchier alnifolia 50 L
Arctostaphylos uva-ursi 5 L
Caltha palustris 2 L
Chamerion angustifolium 5 L
Cornus canadensis 10 L
Cornus sericea 80 L
Corylus cornuta 20 L
Dasiphora fruticosa 10 L
Empetrum nigrum 3 L
Linaea borealis 1 L
Prunus pensylvanica 20 L
Prunus virginiana 10 L
Rhododendron groenlandicum 20 L
Ribes species 39 L
Salix species 20 L
Shepherdia canadensis 80 L
Vaccinium myrtilloides 5 L
Viburnum edule 40 L
Total 680 L

SAOS & COLK

No harvests are planned in 2018.

Species of Interest

Beaked hazelnut (*Corylus cornuta*) is a characteristic shrub of d ecosites. Its seeds are sought after by First Nations for its nutritional value, a result of the high oil content. The high oil content also makes it a desirable winter food source for wildlife such as squirrels. This plant grows in the mixedwoods to a height of 3 m and spreads to form large patches. Male catkins are yellow to brown and the female flowers are very small with a red hue. Fruit are enclosed in a bristly bract which extends beyond the nut to form a beak.

Vegetative Propagation

Vegetative propagation allows for production of new plants without seeds (Bryant 2003). Instead, it utilizes fragments of existing plant material containing meristems - plant cells that are found at the main growing points of a plant including the root or stem tips (apical meristems) and along the stems (vascular cambium). Common methods of vegetative propagation include stem and root cuttings, division and grafting.

Vegetative propagation is utilized when seed is scarce, difficult to collect or when germination is poor or sporadic. Offspring produced by vegetative means are more mature than those produced by seed and often flower and produce fruit earlier (Druse 2000).

Cuttings are a preferred method of propagation for balsam poplar (*Populus balsamifera*) and willows (*Salix* spp.) (McTavish & Shopik 1983; Fenchel & Hoag 2007). Harvest of balsam poplar and willow seeds is difficult because seed matures and disperses over a very brief period and is generally short lived (McTavish & Shopik 1983). However, direct sticking of hardwood or softwood cuttings can result in 80-90% success (McTavish & Shopik 1983, Fenchel & Hoag 2007). Willow stems are commonly used in bioengineering solutions for revegetation and stabilization of river and stream banks (Schiechtl 1980).

(continued on page 3)

2018 Harvest Partners

NAOS: Canadian Natural Resources Ltd., Imperial Oil Ltd., Suncor Energy, Syncrude Canada Ltd.
No harvesting is being undertaken for SAOS and COLK in 2018.

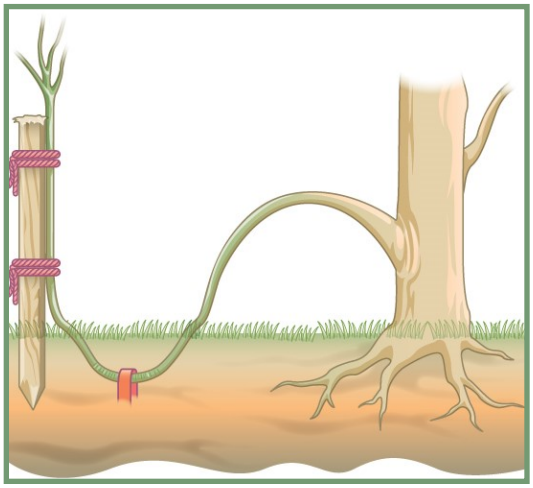
Stick, Stuck or Struck

As with many other crafts and technologies, horticulture comes with a variety of terms specific to growing and propagating plants under controlled conditions.

The terms stuck and struck are used to refer to the action of placing a cutting, often treated with rooting hormone, into a soil or soilless medium. Although "stick cuttings in sand" sounds imprecise, it is specific to this method.

Cuttings come in a variety of types. The most common cuttings are stem cuttings and can be taken either from the tip of the stem or can be internodal – between the nodes and can be classified as one of three types. Softwood cuttings are taken from new, actively growing stems shortly after they have expanded in the spring often before the leaves are fully expanded. Hardwood cuttings, by contrast, are taken from dormant wood, most often during winter. Semi-hardwood (or sometimes semi-softwood) are taken from new growth immediately after the new growth is fully expanded and is reasonably firm but not yet woody and when leaves have fully expanded.

Mallet cuttings and heel cuttings are types of stem cuttings. Both consist of new growth with a portion of older, harder wood at the base. Mallet cuttings include the base of the branch, forming a mallet head of old wood. Heel cuttings do not include the entire base, but rather a small tag. In both these instances, the mallet or heel will be treated with hormone and stuck.



Layering refers to burying a branch or other part of the parent plant. Once these produce roots, they are viable on their own and can be separated and transplanted.

Division refers to splitting root mass into two or more clumps that can be planted individually. Although difficult in natural or reclaimed locations, in greenhouse and garden soils, it is relatively easy to dig up individuals in friable, loose soil used in horticulture.

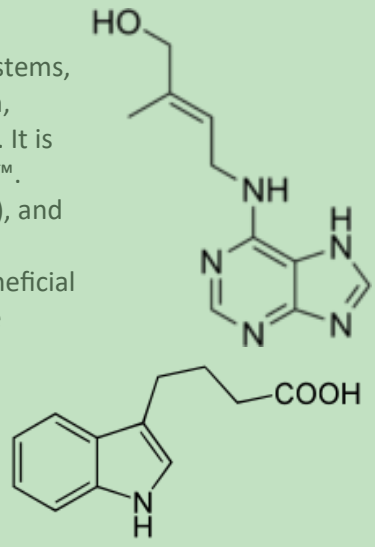
Hormones—Auxin and Cytokinin

Although some species, such as willows, spontaneously root from cut stems, most require a hormone to promote root initiation. The most common, indolebutyric acid (IBA) can be extracted from willows as willow water. It is sold under several brand names, including StimRoot ™ and Hormodin™.

Similar auxins include: indolacetic acid (IAA), indole proponic acid (IPA), and naphthalene acetic acid (NAA).

Counter to auxins, cytokinin encourage shoot development. This is beneficial when sprouting root or rhizome cuttings, but most often used in tissue culture, to stimulate cells to differentiate into stems and leaves. The most well known is zeatin, so named for *Zea* or corn, the genus in which it was discovered.

Although all plants naturally produce auxins and cytokinins, the concentration is not always sufficient to achieve effective shoot or root initiation.



IBA (top) and Zeatin (below)

Vegetative Propagation (continued from page 1)

However, because offspring propagated vegetatively are genetic clones of the originating plant, diversity in an ecosystem is reduced. While genetic uniformity is desirable in agriculture, it compromises resiliency of revegetated sites. Natural plant populations depend on diversity to survive annual variations in their environment, including those caused by disease, weather, and competition (Basey *et al.* 2015). To achieve the genetic diversity found in natural populations, cuttings used for reclamation should be sourced from a variety of parents from multiple sites. In the boreal region of Alberta, production and use of vegetative material , as with seeds, is guided by the Forest Genetic Resource Management Standards (FGRMS) (Alberta Government 2016).

Beaked hazelnut (*Corylus cornuta*) is a popular food source for squirrels and jays, and wild seed harvests rarely result in large quantities. Because of this, beaked hazelnut may be a candidate for vegetative propagation for reclamation. In 2018, the OSVC (in collaboration with NAIT) is testing published protocols for producing plants from stem cuttings (Cartabiano & Lubell 2013) on material from Alberta. If successful, the development of stooling beds will be considered.

Alberta Government 2016. Alberta Forest Genetic Resource Management and Conservation Standards—Volume 1: Stream 1 and Stream 2. 158 pp.

Basey, A.C., J.B. Fant & A.T. Kramer. 2015. Producing native plant materials for restoration: 10 rules to collect and maintain genetic diversity. Native Plants Journal 16(1): 37-52.

Cartabiano, J.A & J.D. Lubell. 2013. Propagation of Four Underused Native Species from Softwood Cutting. HortScience 48(8): 1018–1020. Available at: link

Druse, K. 2000. Making more plants: the science, art and joy of propagation. Clarkson Potter Publishers, New York, NY. 256 pages.

Fenchel, G. & C. Hoag. 2007. Coyote willow: *Salix exigua* Nutt. Available at: link

Macdonald, B. 1986. Practical woody plant propagation for nursery growers. Timber Press, Inc., Portland, Oregon. 669 pages.

McTavish, B. & T. Shopik. 1983. Propagation and use of native woody plants in northern latitudes. Proceedings of the 7th Annual British Columbia Mine Reclamation Symposium. Victoria, BC. Pages 159-181

Schiechtl, H.M. 1980. Bioengineering for Land Reclamation and Conservation. University of Alberta Press. Edmonton. 404 pages.

Stem cuttings vs. roots and rhizomes

Obtaining plant tissue for vegetative propagation causes stress to parent plants and the degree of stress is determined by the type of cutting. Conservative harvesting of stems and leaves has a limited effect on the parent plant. Exposing roots, however, disturbs the entire belowground system. and can result in the loss of the parent plant. Rhizomes, creeping stems below ground, can be extracted with less damage. Division is probably the most disruptive propagation method and the least productive. The entire root ball is exposed and divided into two or more sections, ensuring that there are sufficient roots remaining on each portion . The photo above is of a bearberry plant established from a rooted stem cutting.

To learn more about the OSVC, go to http://www.cosia.ca/oil-sands-vegetation-cooperative

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