

GROWING HYBRID POPLARS AS A CROP



Agriculture and
Agri-Food Canada

Prairie Farm Rehabilitation

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Canada

Introduction

Hybrid poplars have been planted in prairie shelterbelts for many years. They have primarily been planted into farmstead shelterbelts but have been used in wildlife and field shelterbelts as well. Their popularity has traditionally been the result of fast growth and easy care, but the future for poplar may be even brighter.

Growing poplars as a short rotation woody crop involves intensive management more similar to agriculture than forestry. Growing hybrid poplars is a long term commitment with significant investment and limited economic return for a number of years. However, hybrid poplars can be an attractive crop for landowners, especially in the northern agricultural zone where there is growing demand for poplar wood.



15 year-old Walker Poplar.

Poplars also have important environmental benefits, specifically greenhouse gas mitigation (carbon storage), riparian zone protection and wastewater management.

Benefits of Growing Hybrid Poplar

- Crop diversification.
- Production of high wood yields for fibre and wood products (pulp, OSB, solid wood)
- Hybrid poplar is easy to plant and conventional agricultural equipment can be used for most of the crop management.
- Environmental protection
 - reduces wind and water erosion
 - increases crop and forage yields because of shelter effect
 - intercepts nutrient runoff near riparian areas
 - stores carbon thereby reducing greenhouse gases in the air
 - uses up agricultural, municipal and industrial wastewater

Hybrid Poplar Clones

Hybrid poplars are produced when different poplar species are cross pollinated. Selected seedlings from these crosses can then be propagated vegetatively by taking cuttings and rooting them. Cuttings have identical characteristics to the hybrid parent plant. Many hybrid poplar clones have been tested in the Canadian prairies. These tests have shown that certain clones are adapted to the unique growing conditions found in the Canadian prairies. Most clones used in other regions of North America are unsuitable because they lack hardiness for the extreme climate and short growing season of the prairies. It is important that only proven hardy clones are used. New clones are being developed for agroforestry planting in the prairies. These clones will be available after testing is completed.



Evaluation of new poplar clones.

Hybrid Poplar Choices for the Prairies	
Walker	<ul style="list-style-type: none"> - A female clone used extensively in shelterbelts. - Extremely hardy and fast growing, narrow crown. - Moderately resistant to canker and leaf rust. - Height at 15 years; 14 to 18 meters depending on site.
Assiniboine	<ul style="list-style-type: none"> - A male clone used extensively in shelterbelts. - Extremely hardy and fast growing, narrow crown. - Susceptible to leaf rust. - Height at 15 years; 13 to 17 meters depending on site.
Manitou	<ul style="list-style-type: none"> - A male clone used extensively in shelterbelts. - Extremely hardy and fast growing, wide crown. - Susceptible to leaf spot and leaf rust. - Height at 15 years; 13 to 17 meters depending on site.
Hill	<ul style="list-style-type: none"> - A female clone. - Extremely hardy and fast growing, narrow crown. - Moderately resistant to canker and rust. - Height at 15 years; 14 to 18 meters depending on site.

Site Selection and Suitability

Research conducted in recent years has shown that hybrid poplars grow best in fertile, productive agricultural soils. Poplars need adequate moisture to grow. The best sites have annual precipitation over 400mm or access to groundwater or irrigation. Poplar does not do well in saline soils and prefers a pH of 5.5 to 8. Medium textured soils are preferred. While it is not always possible to use the best site, the poorest sites should be avoided. Operational factors such as location in relation to markets, access, and field shape need to be considered as well.



Agricultural site for a hybrid poplar plantation.

Site Preparation

Proper site preparation is essential. Site preparation practices are similar to that used for other common agricultural crops. The degree of preparation varies depending on soil type, present crop or vegetation cover and climate of the region. Intensive site preparation is needed for land in pasture or forage crops to make sure that all perennial plants are controlled. Less intensive preparation is required when the site has been in cereal grains or oilseeds. Standard agricultural equipment can be used for these operations.

Site Preparation for Agricultural Sites

1. Assess existing vegetation
 - Annuals (ie. cereal, pulse or oilseed crops, annual weeds).
 - Perennials (ie. forage crops, perennial weeds).
2. Control perennial vegetation if present
 - Post emergent herbicide (glyphosate) in late summer.
3. Disc
 - Disc in the fall at least 10 days after applying glyphosate
 - Disc site to at least 20 cm depth
 - Several discing operations may be required with fine textured soils
 - Allow at least one week between discing operations
4. Cultivate
 - Cultivate in spring before herbicide application

Tree Spacing

Spacing affects tree growth and health, maintenance and end use of the wood. Poplar is intolerant of shade and the more closely planted the less sun the tree will receive. Competition from neighboring trees will also affect tree growth. Dense plantings are more prone to disease because of reduced air circulation and high humidity. Widely spaced trees attain crown closure at a later age which means that an additional year or so of weed control may be necessary. Wider spacings result in faster growth, larger crowns and heavier branches.



One-year-old Walker poplar at 3.0 x 3.0 m spacing.

Choosing a spacing is generally a compromise depending on the hybrid poplar's optimum growth requirements. The range of recommended spacings is:

Recommended Spacing

3.0 x 3.0 m (10 x 10 ft) = 1111 trees/ha
3.6 x 2.4 m (12 x 8 ft) = 1157 trees/ha
3.6 x 3.6 m (12 x 12 ft) = 772 trees/ha

The 3.0 x 3.0 m spacing is best for narrow crowned clones and requires use of small equipment. This spacing permits two-way cultivation. The 3.6 x 2.4 m spacing works well with narrow to medium crowned clones, but limits cultivation to one direction only. The wider between row spacing permits the use of larger equipment. Yields for the two plant spacings are similar. The 3.6 x 3.6 m spacing is suited for medium to wide-crowned clones. Yield per hectare at this spacing is less but allows two-way cultivation with larger equipment.

Planting

In the prairies, growing conditions limit the suitability of planting unrooted cuttings. As a result, the currently recommended plant material is dormant rooted cuttings.

1. Rooted cuttings should be planted in the spring within 3 to 4 weeks of ground thaw and before the shoots break bud and start new growth.
2. Rooted cuttings can be hand or machine planted. Before planting, the field should be marked to ensure uniform spacing.
3. Plant trees slightly deeper (2.5 cm) than the depth they grew in the nursery.

Weed Control

Good weed control is absolutely essential. Most weeds have a more vigorous root system than trees and grow faster so they use soil moisture and nutrients and shade small trees. Weed control is important until poplars are large enough to shade out the weeds. This takes four to five years. Once the poplar canopy is developed, its shade is very effective in reducing weed competition. There are several methods to control weeds. Deciding which one to use depends on weeds present, soil type and equipment available.

Cultivation - Tillage is an effective means of controlling weeds. Usually, three operations are required during the growing season to adequately control weeds. Tillage must be shallow (5 -7 cm) to avoid damaging the root system. Also, care must be taken to ensure the trees are not physically damaged. In most cases, common agricultural equipment can be used, although equipment must be small enough to fit between tree rows. Depending on the spacing, tillage in both directions may be possible.

Herbicides - The choice of herbicide depends on site conditions, weed species, soil type and climate. Pre-emergent herbicides are applied to the soil surface, and rainfall is necessary to move the herbicide into the soil for activation. Soil incorporated herbicides are worked into the soil manually after being applied to the soil surface. Post-emergent herbicides are applied as a directed spray to the foliage of weeds when they are small seedlings and growing actively. Only those herbicides registered for use on poplars should be applied. Always follow label instructions closely to ensure safe application and good results.

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