

# Maintenance (Year 1 to Harvest)

## Hybrid Poplar Best Management Practices

### Planting Maintenance

#### Weed control

Competition of any kind will decrease poplar growth and survival. Weed control in the early years of poplar planting is essential. Weed control will be easier if good site preparation was done. There are a number of ways to control weeds depending upon the landowner's resources and philosophy. They include hand weeding, cultivation, mowing, cover crops, herbicides and mulching.

**Hand weeding** by pulling or string trimmer can be done on a small scale, but becomes a futile effort if the size of the planting exceeds one acre.

**Cultivation** has been the traditional way of controlling weeds before the advent of chemical control. Cultivation should be shallow to minimize root damage. Several cultivation passes will be needed each year. Cultivation, although effective, has serious drawbacks as it is time consuming, expensive labor/equipment and energy intensive. Cultivation must be done carefully to minimize mechanical damage to trees during the repeated passes.

**Mowing** can be used to control weeds and grasses as they compete for available moisture and provide habitat for damaging rodents. It also improves aesthetics. Mowing has the same limitations as cultivation.

**Cover crops** can be used to minimize weed growth. They also prevent wind and water erosion and can be harvested at the end of the season to decrease cover for rodents. Alfalfa and clover are legumes and can contribute to overall site nutrition. Some studies suggest that cover crops decrease production of poplars due to competition for water and nutrients other than nitrogen.

**Herbicides** are the most common means of weed control in Minnesota today. The number of labeled herbicides for poplar culture has increased over the years and there are never-ending changes in the formulations and company names. The landowner should always consult the herbicide label before applying. Herbicides can be used exclusively or in coordination with cultivation. The current recommended herbicides for poplar culture in Minnesota are given in Table 5 in the complete "Growing Hybrid Poplar in MN" publication found at [www.extension.umn.edu/agroforestry](http://www.extension.umn.edu/agroforestry). It is noteworthy that certain chemicals should be used **only on upland** sites and certain chemicals may have to be avoided in wellhead protection areas (see: [www.pca.state.mn.us](http://www.pca.state.mn.us)). Again, always read and follow the label!

Experience suggests that the most effective herbicide weed control in Minnesota is a tank mix of imazaquin (Sceptor) and pendimethalin (Pendulum) sprayed over the top of newly planted cuttings. This application is followed later in the season by one or two applications of fluazifop (Fusilade) for control of grasses. Troublesome invasive weeds like Canadian thistle are controlled with spot sprays of clopyralid (Transline) or aminopyralid (Milestone).

**Mulching** is an effective weed control method if done properly. Many materials can be used for mulch such as sawdust, wood chips and bark. Straw is not good mulch as it harbors rodents that damage trees. Organic mulch must be at least 3 to 4 inches thick to keep weeds from growing through it. Mulch tends to use up available nitrogen when it decomposes. Either fertilizer or compost must be applied

when mulches are used. Mulching can be done with landscape fabrics. Organic mulches can be used upon fabrics to hold them down. Cost is a major drawback of the landscape fabrics.

### **Planting Protection: (Insects, disease, animals)**



Cottonwood Leaf Beetle

#### Insects

There are hundreds of insects that attack poplar leaves and stems, but there are only a few major threatening insects of concern in Minnesota. They include, Cottonwood Leaf Beetle, Forest Tent Caterpillar and Poplar Borer.

If an insecticide is needed to control larva stage insects consider a commercial *Bacillus thuringiensis* (Bt) formulation. Although safe and specific, follow label directions and be aware of pollinators. Non-Bt insecticides are also available for target insects. Some clones show resistance to specific insects. The key to minimizing insect pests in poplar culture is to maintain plant and animal genetic diversity and provide an environment for healthy vigorous growth as insects are more common when trees are stressed.

#### Diseases:

There are 5 major poplar diseases in Minnesota. They include Septoria and Marssonina leaf spot, Melampsora leaf rust, Venturia shoot blight and Hypoxylon Canker. The recommendation for disease control is to plant disease resistant clones and maintain healthy stands.



Septoria Leaf Spot

#### Animal browsing

Animal browsing is a serious problem in poplar culture in Minnesota especially when preferred foods are in short supply. The greatest culprits are beaver and white tailed deer that have high populations in Minnesota. Beavers do extensive damage in riparian zones and white tailed deer (and sometimes moose) browse heavily on newly planted stock. Whitetail bucks also rub their antlers on small diameter poplars in the autumn. Mice and voles girdle trees during the establishment year and rabbits girdle or clip off young poplar stems during winter.

Control of animals is difficult. Direct control by hunting and trapping is probably most effective, but if these measures are not an option there are some indirect approaches. Good weed control discourages browsing by rodents that inhabit weeds and grasses. Raptor poles also encourage raptors to hunt for rodents in poplar plantings. Commercially available deer repellants that can be either painted or sprayed on trees are available. Some repellents are effective, but their duration is usually limited and they can be expensive if multiple applications are needed.

There are more expensive options available to control browsing. Some fencing approaches work well on small areas. Mesh fence, high-tensile fence, and 3-D polytape fences have all been used successfully.

#### Fertilization

Nitrogen is the most limiting nutrient for poplar culture in Minnesota, given soils of pH from 6.0 to 7.5. There are some soils in Minnesota where micronutrients are limiting.

If the soils are acid, liming will be necessary to bring the soil pH up to 5.0 or higher (preferable pH 6.0). If the soils are alkaline (>pH 8), elemental sulfur can be added or acidic nitrogen fertilizers can be used to decrease soil pH over time. The formulation of the fertilizer, the quantity of fertilizer, the timing of fertilization, and the number of applications are all important considerations for BMPs. Fertilizers can be applied at any time during the rotation. Soil tests can be done annually.

The “BMP” for fertilization of poplars in Minnesota is annual applications of 50 pounds of nitrogen per acre applied as urea (45-0-0), or as a fertilizer blend (18-18-18) with 2.5% sulfur with diammonium phosphate, urea, potash, and ammonium sulfate.

When animal manure is being used as fertilizer, “BMPs” are:

- Test manure for nutrient content
- Calibrate manure application equipment
- Apply manure uniformly
- Inject manure where possible
- Avoid applying manure on sloping, frozen soils
- Apply at recommended nutrient rates

These practices will help decrease nitrogen loss to the environment (Randall et al, 2003).

### Irrigation

Irrigation of poplars is not common in Minnesota, and may not be economical for traditional wood products. Poplars will respond to irrigation on drier sites with fertile soils, or where fertilizer is applied with irrigation water. Irrigation is beneficial where groundwater is below 10 feet. Where practical, irrigation can increase poplar biomass production by up to 50%.

### Thinning

Thinning is not a regular practice in poplars stands in Minnesota, because it is often uneconomical with today’s operational costs.

### Pruning

Pruning is the removal of lower dead or dying branches to enhance stem wood quality. It is not economical if high value clear wood products are not the end product goal. Pruning is usually done in late spring or early summer so wounds can heal quickly and epicormic branching is minimized. Pruning can be done by hand with pruners or by using hydraulic pruners.

The following pruning regimen is recommended for poplar stands with a 20 year rotation age for solid wood products:

- Prune to establish main leader (first year)
- Minimal pruning in the first 5 years; unwanted sprouts can be removed
- Prune only the lower 1/3 of the crown plus additional trimming (5 to 10 years)
- Prune lower 2/3 of crown leaving upper 1/3 at harvest (15 to 20 years).

Not all trees need to be pruned. Pruning should be done on only the highest valued crop trees.

### Coppicing

Poplars sprout readily from the stump or root collar when cut; this resprouting is known as coppicing. Coppicing should be done in the dormant season. Coppicing offers the landowner an inexpensive way to re-establish a stand without replanting. Most landowners choose to replant new genetically improved clones rather than coppice. But, coppicing can be attractive because coppice shoots grow vigorously and are very productive. Coppice stands are usually more productive than the original stand in the first 5 years after harvest. Coppicing is used effectively for environmental plantings where water uptake and contaminant remediation is the goal rather than merchantable wood products. Coppice can also be useful for bioenergy and animal fodder.

### Organic poplar farming practices

Organic poplar farmers rely on rotation of crops with trees, shelterbelts for livestock shelter, intercropping of poplars and agronomic and horticultural crops, green manure for building soil organic matter, livestock manure and composting for fertilizer, and cultivation for weed control.

For more information visit:

[www.extension.umn.edu/agroforestry](http://www.extension.umn.edu/agroforestry) "Growing Hybrid Poplar in MN"

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