

Vegetative Propagation of Poplar and Willow¹

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Abstract--Discusses the processes involved in the propagation of poplar and willow from hardwood cuttings including stooling block establishment, harvest, cutting planting, growth, use of equipment and chemical inputs.

INTRODUCTION

Poplar and willow species and cultivars are used in the Northern Plains for farmstead plantings, field windbreaks, and for use in moisture retentive areas where other species would not survive due to saturation of the soil for much of the year. Propagation is by hardwood cuttings which are rooted in the field, grown for one season, and harvested that fall or the following spring.

CLONAL SELECTION AND ESTABLISHMENT

Clonal selection has been based upon:

- 1) growth rate,
- 2) insect and disease resistance,
- 3) form,
- 4) adaptability to climate, and
- 5) long term use within the region.

An additional factor which needs to be considered in selection of cultivars is the ability to root in acceptable production percentages in the field. Clones of a specie or hybrid may vary greatly in this factor.

The Agricultural Research Service Station, Mandan, ND, is currently evaluating in excess of 200 clones of poplar. The Soil Conservation Service Plant Materials Centers are evaluating and releasing vegetatively propagated willow cultivars for streambank stabilization, reclamation, and natural screening (USDA 1991).

After clonal selections have been made and initial propagation completed, the rooted cuttings are planted into Treflan treated soil at a 1 to 1.5 foot spacing within rows to establish stooling blocks. A differing specie of another genus, such as willow within poplar, may be used to separate clones which would otherwise be very similar in appearance.

STOOLING BLOCK MAINTENANCE

Once stooling blocks are established the estimated life of the block is 10 to 15 years. After several years of harvesting, the plants grow together to make an almost continuous growth within the rows. Yearly inputs include:

- 1) Fertilization - 11-52-0 at 300#/Acre. Straight N causes excessive vegetative growth.
- 2) Irrigation - as needed.
- 2) Benlate/Dursban at 14 day intervals until size limits application for control of canker, leaf rust, and cottonwood borers.

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4) Herbicide applications:

- a. 1st year - plant into Treflan
- b. 2nd year and there after - Casoron fall applied at 150#/Acre or
- c. Goal fall or spring applied when dormant at 1.0#/a.i./Acre
- d. Paraquat and Goal used post-emergent when needed.

Growth should average 8 to 12 feet on vigorous blocks. After 10 to 15 years, growth rate decreases and blocks need to be rotated out and replaced.

WHIP HARVEST

Harvest of the poplar and willow whips from the stooling blocks begins after natural defoliation and hardening of tissues in the fall. The whips are severed approximately 6 to 12 inches from ground level, this may be accomplished by hand pruners, brush saw, or mechanical harvesters.

Lincoln-Oakes Nurseries has developed a mechanical harvester to side-mount on a tractor. Utilizing the PTO and hydraulics of the tractor, the whips are severed by a 22 inch rotating blade, held by belts, and transported to an employee acting as a catcher behind the belts. The whips are then placed into large wooden tree boxes, color coded, and moved to indoor storage until processing.

CUTTING PROCESSING

Whips are held in unheated storage and processed into cuttings by cultivar. All side branches and oversized portions of the whips are removed to provide a uniform size. Using a band saw, whips are processed into 7 inch cuttings and stored in wooden boxes holding approximately 2200 cuttings. Cutting diameter ranges from 1/4 to 3/4 inches. After the boxes are filled, they are immersed in a Benlate/Thiram mix to control fungal problems in storage. Holes in the bottom of the boxes allow drainage of the fungicide.

Cuttings should be stored at 24 degrees F. to 28 degrees F. to prevent fungal growth and prevent bud break in storage (Cram 1982).

PLANTING

Planting of processed cuttings begins approximately the third week of May. Soil is prepared by roto-tilling to a depth of 10 to 12 inches, this allows easy insertion of cuttings. Cuttings may be planted by a number of methods which include:

- 1) planting by hand into a prepared furrow,
- 2) planting by seedling transplanter, or
- 3) planting by mechanical cuttings planter.

Many nurseries leave 1 to 2 inches of the cutting above ground level at planting, this may lead to moisture loss through the exposed cut end and multiple bud breaks.

Lincoln-Oakes Nurseries uses a 4-row mechanical cuttings planter patterned after the unit developed by the P.F.R.A. Indian Head, Saskatchewan Nursery (Cram 1983). This unit plants 4 rows at a time moving approximately 750 feet per hour.

The tractor drawn planter has furrow openers in front of each planting unit, hydraulically driven rollers which grasp the cuttings as they are fed into hoppers by the individuals on the units and a packer wheel behind each unit which pushes the cuttings down to ground level.

After planting, the field is dragged with a harrow with teeth nearly horizontal to level ridges and lightly cover the tops of the cuttings to a depth of 1/2 to 1 inch. The herbicide Goal is applied at .5 pound active ingredient over the poplars, .25 pound active ingredient over the willows (Abrahamson 1985). This provides annual weed control through September in our area. Overhead irrigation is used to incorporate the herbicide.

GROWTH

Shoot emergence through the soil begins 1 to 2 weeks after planting. During this time, irrigation is as needed to keep the cuttings in damp, but not wet, soil. Leaf spot and canker diseases are controlled by Benlate applications at 14 day intervals until the cuttings height prevents use of the sprayer, usually at about 3 feet.

Fertilization consists of approximately 90 to 120 pounds actual nitrogen in 3 to 4 split applications through the growing season. Cottonwood leaf beetle control is as needed by the use of Sevin insecticide.

At the end of one growing season the rooted cuttings are 3 to 6 feet in height. Our cuttings are topped at 20 inches to provide a uniform size rooted cutting with a good shoot to root ratio. The tops may then be processed into additional cuttings for field planting. Rooted cuttings may be fall dug after dormant and stored at 28 degrees F. in indoor storage or spring dug before bud break. Rooted cuttings are color coded to cultivar before shipment.

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