

Hybrid Poplar Performance

Brian A. Charlton¹ and Jim Dahm²

Introduction

Reduced availability of timber supplies from Pacific Northwest public lands and declining harvest from private lands has encouraged several companies in the wood products industry to search for alternative timber supply sources. Hybrid poplar has generated much interest and is currently grown on tens of thousands of acres in the northwest. Initially, hybrid poplar was considered primarily as a source of pulp. Changing economics for pulp has heightened interest in evaluating the potential for production of other wood products. Most northwest commercial hybrid poplar production is concentrated in the long growing season environment of the Columbia Basin.

Poplar is a generic term used to refer to trees in the genus *Populus*. Aspen, Lombardy poplar, black cottonwood, and eastern cottonwood are all members of this genus. Several hybrid (products of cross-fertilizing plants of different species) clones have been developed and constitute most of the commercial acreage. In the Pacific Northwest, hybrid poplar trees have grown to 70 ft in height and 15 inches in diameter in just 7 years in the long-season environment of the Columbia Basin.

The availability of timber supplies for pulp and wood products in the Klamath Basin has been severely curtailed by loss of access to timber on

public lands. Several mills in the area have closed in the past decade and supply to remaining mills from private land is rapidly being depleted. Wood product companies in the area are interested in determining if hybrid poplar is an economic alternative for the short-season environment of the Klamath Basin.

A study was established at the Klamath Experiment Station (KES) in 1999 to evaluate the performance of clone OP-367 in a short-season environment.

Procedures

1999

Hybrid poplar clone OP-367, selected from earlier experiments (Leavengood *et al.* 1997), was planted in two observational blocks at KES on June 15. The northern block is a Poe fine sandy loam soil with pH about 7.0. The southern block is a Fordney fine sandy loam soil with pH ranging from 7.5 to 8.5 in a west-to-east direction. Both fields were ripped to 18-inch depth with shanks spaced 18 inches apart. Fields were moldboard plowed and a broadcast application of 500 lb/acre of 16-16-16 fertilizer was incorporated to a depth of 6 inches. Poplar cuttings ("sticks") were planted at 7-ft spacing in 14-ft rows on June 15. Irrigation was provided with solid-set sprinklers arranged on a 40- by 40-ft spacing equipped to apply 0.123 inch/hour. The total water applied for the 1999 season was approximately 24

¹ Faculty Research Assistant, Klamath Experiment Station, Klamath Falls, OR.

² President, Whiskey Creek Timber Company, Klamath Falls, OR.

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inches, including rainfall. Irrigation was stopped in early September to allow tree buds to harden off. Weed control was achieved by cultivating between rows with a tractor-drawn harrow and within rows with an ATV-drawn harrow.

2000

The total irrigation plus rainfall for the season was approximately 24 inches, as in 1999. To prevent root pruning, mechanical cultivation was not used for weed control in 2000. As an alternative, winter wheat was planted on May 2 as a cover crop to suppress weed competition. The cover crop and weeds were periodically flail-mowed during the summer. Foliar analysis performed in August of 1999 indicated elevated nutrient concentrations in both observational blocks. Therefore, no additional fertilizer was applied in 2000. Foliar analysis performed in August of 2000 indicated all major elements were at or well above recommended levels. Calcium and a few minor elements tested low, but deficiency symptoms were not identified.

2001

Vandals cut down all trees in the southern block on March 21, 2001. No further work was done with this block.

A serious drought in the region and Federal regulatory actions left about 170,000 acres within the Klamath Reclamation Project with no surface water during 2001. Therefore, aside from approximately 4 inches of rainfall during the growing season, no additional moisture was provided for trees in the northern block.

2002

The total irrigation plus rainfall for the season was approximately 20

inches. Natural groundcover (grass and weeds) was periodically flail-mowed during the summer. Groundcover that could not be mowed because of close proximity to tree bases was sprayed with a tank mix of Roundup™ (glyphosate, Monsanto Company), Goal® (oxyfluorfen, Dow AgroSciences LLC), and Surflan™ (oryzalin, Dow AgroSciences LLC) at labeled rates on April 24 prior to bud break. Fifty units of nitrogen were injected with the irrigation water during the month of June.

Results and Discussion

A group of 12 trees (4 by 3) in the northern block was chosen for data collection. This is the largest contiguous block of trees without a border effect or missing trees. All data reported are derived from this block.

1999

All trees in the northern block appeared healthy throughout the growing season. Growth data were collected on September 8. Trees averaged about 4.5 ft of growth during the year of establishment (Fig. 1). Diameter at breast height (DBH) measurements were not taken; therefore, volume per acre values are not available. Weed control with the cover crop and mowing was adequate.

2000

Mortality of trees in the northern block was 7.1 percent. The winter wheat cover crop required minimal mowing and effectively reduced weed competition. Ceasing irrigation in the first week of September allowed adequate time for buds to “harden off” and appears to have prevented further winter mortality.

Growth data were collected in October. Trees averaged about 8.9 ft of new growth. Average height was about

13.4 ft. As in 1999, DBH measurements were not taken.

2001

Despite the moisture stress experienced during the growing season, all trees survived. Growth data were collected in January. Trees averaged about 4.3 ft of new growth. Average height and DBH measured 17.7 ft and 2.5 inches. Volume per acre was approximately 44.0 ft³ (Fig. 2).

2002

Growth data were collected in February 2003. Trees averaged about 5.9 ft of new growth during 2002. Average height and DBH measured 23.6 ft and 3.8 inches. Volume per acre was approximately 154.0 ft³.

Future Direction

All trees have been pruned to remove multiple leaders and limbs to approximately 20 percent of total height. The plot was thinned by removing alternate trees, which left a stand of 14-by 14-ft or approximately 220 trees/acre. Future pruning will occur annually to promote knot-free trunk wood. Height and diameter data will be collected annually.

References

Leavengood, S., J. Dahm, and K.A. Rykbost. 1997. Hybrid poplar research. Pages 84-88 in Crop Research in the Klamath Basin, 1996 Annual Report. Special Report 981, Agricultural Experiment Station, Oregon State University, Corvallis, OR.

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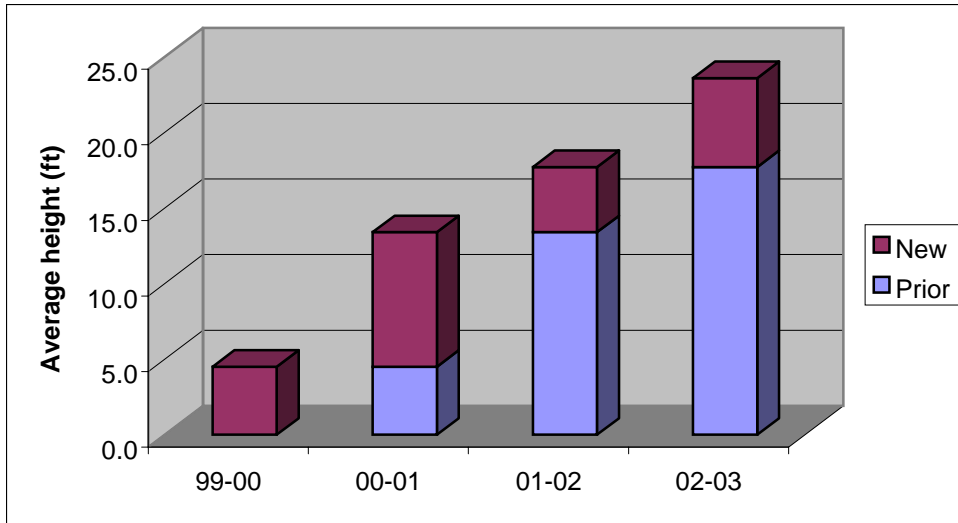


Figure 1. Tree height and growth of hybrid poplars at Klamath Experiment Station, OR, 1999-2003.

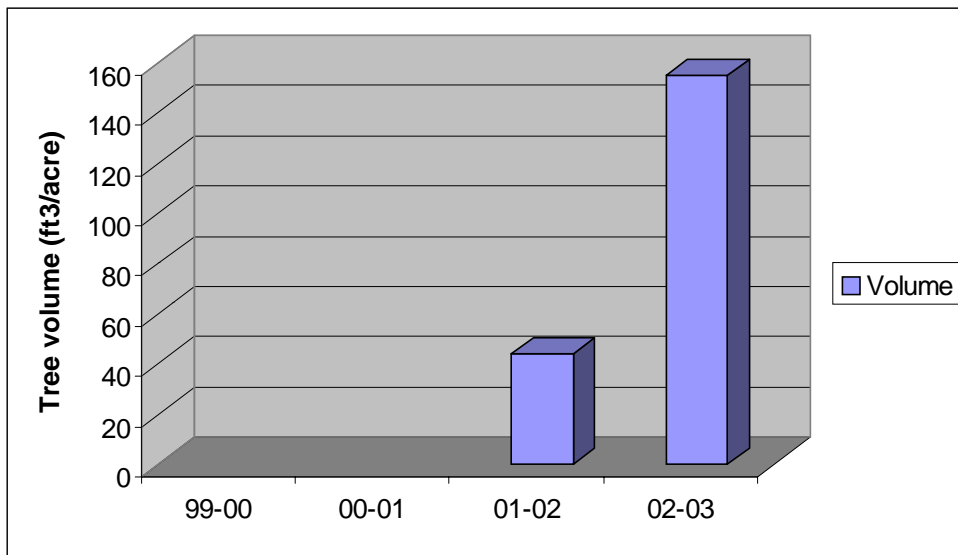


Figure 2. Tree volume of hybrid poplars at Klamath Experiment Station, OR, as measured January 2002 and February 2003.