From Forest Nursery Notes, Summer 2007

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Growing Your Mulch On-Site: Using Site Produced Sorghum/Sudan as a Mulch for Hybrid Poplar

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ABSTRACT

Killed cover crops are being used increasingly for weed control in horticultural systems. We propose the use of killed cover crops as a method of erosion and weed control in afforestation and conservation plantings. We grew sorghum-Sudan in two plots during 2001. We cut the crop and planted hybrid poplar cuttings in spring 2002. We did no other weed control during the season. As controls, we planted two adjacent plots with hybrid poplar cuttings and used conventional tillage and hand weeding to maintain a weed-free bed. The survival was greater in the plots with sorghum-Sudan mulch than in the conventionally managed plots; however, the growth was not significantly different. Based on this initial test, killed cover crops appear to have potential for erosion and weed control in afforestation and conservation plantings.

Keywords: poplar, cottonwood, cover crop, mulch, vegetation control

Mulches are a long-used method of controlling weed growth; (Watson 1988, Greenly and Rakow 1995, Iles and Dosman 1999, Smith et al. 2000); however, typically, they are viewed as far too costly and labor-intensive for large-scale forestry plantings. Although this may be true for mulches transported to the planting site, using mulches grown on site may be more feasible. Recent work with "killed cover crops" has looked promising for agricultural crops (Hofstetter 1993, Abdule-Baki and Teasdale 1997, Abdule-Baki et al. 1997, Kuepper 2001). We believe that they also may hold promise for trees being planted into former agricultural fields.

Hybrid poplar (*Populus* hybrids) is being planted as a short-rotation woody crop across much of central Minnesota (Streed 1999). Production of hybrid poplar requires either repeated careful mechanical maintenance or use of several herbicides (both pre- and postemergents) or a combination of both herbicide and mechanical vegetation control. The cost of both herbicide and tillage for the fall before planting and the 1st year of growth can amount to $92 for a field coming out of sod (Demchik et al. 2002). During the 2nd year, Demchik et al. (2002) estimated the cost of tillage and herbicide to be $50. Currently, this system is economically marginal in part due to the extensive early maintenance (38% of total cost of growing the crop). Developing a technique for growing hybrid poplar, which requires lower overall maintenance, will increase social, environmental, and economic benefits of hybrid poplar production.

We propose growing sorghum-Sudan hybrid as a "smother crop" (a crop that outcompetes with weeds and reduces their future presence in fields) the year before planting hybrid poplar sites. At the end of the growing season, the resulting biomass produced will be used as an in-field mulch and erosion control. The cost of planting an acre of Sudan grass would be $32.97, based on Lazarus's (1999) cost of moldboard plowing ($11.95), grain drill ($7.40), mowing ($9.30), and seed ($4.32; Trostle 2001). If this method was to control weeds successfully, it would be much less expensive than the cost of conventional management.

The benefits of this mulch are expected to be weed suppression, moisture retention, and erosion control.

Methods

In late June 2001, sorghum-Sudan hybrid was broadcast seeded and tilled into the top 2 in. of the planting site. No additional treatment was given to the crop until the following spring. On May 5, 2002, a sicklebar mower was used to cut the standing crop of sorghum-Sudan. This crop was windrowed into two adjacent 4-ft-wide rows. These rows resulted in a compacted depth of 4 in. of mulch. This windrowing left approximately a 4-ft width of sorghum-Sudan stubble and a 4-ft width of mulched ground for each row of hybrid poplar. Hybrid poplar cuttings of the clone NM-6 were planted into these two rows of mulch and into an adjacent two rows of unmulched ground. The unmulched ground was managed through conventional tillage and hand tillage for the growing season (to maintain weed free). The mulched ground received no tillage or supplemental weeding. On Aug. 28, 2002 the trees were measured for survival and height growth. Survival was compared using the chi-square test. Height growth was compared using Student's *t*-test. Weed infestation was minimal in the mulched site (ocular estimate of one mature weed per 8-ft of row). Weed infestation was even less in the conventionally managed hybrid poplars because tillage was regularly applied and all remaining weeds were removed through use of hand tools.

Results

Successful rooting and survival at sample date was higher in the plots with mulch (85%) than in plots using conventional tillage (51%). The low rate of success for the conventional plots may have been caused by low moisture conditions in the early growing season.

Received May 14, 2005; accepted August 5, 2005.

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