



## Effective Willow Plantings for Streambank Erosion Control

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Streambank erosion is a severe problem in many watersheds, and costs for stabilization often exceed available funds from public and private sources. Planting of dormant willow (*Salix* sp.) posts (cuttings several feet long and several inches in diameter, Figure 1) has been used to address these problems. Posts are planted in dense arrays (say on 3 to 4 foot centers), and provide mechanical erosion control during the critical period between planting and plant establishment. However, several post planting projects in incised channels in Mississippi have failed due to low willow post survival rates (Figure 2).



Figure 1. Recently harvested dormant willow posts awaiting planting.



Figure 2. Posts planted along Harland Creek, MS.

Factors contributing to post failure have been investigated by the USDA-ARS National Sedimentation Laboratory and cooperating scientists from the University of Memphis. Investigators suspected that the harsh underground environment found on eroding streambanks might be hindering rooting. They designed and conducted field studies of the relationships between soil conditions and survival and growth of willow posts planted along two rapidly eroding streams in Mississippi. Plant vigor and growth were significantly lower for posts growing in soils that were too wet or too dry (Table 1). Optimal conditions for growing posts were found at moderate elevations—about 1.5 ft above the stream level at low flow. At this elevation soils tended to have adequate moisture but frequent drainage.

The scientists also found a close relationship between soil texture and survival of willow posts. Posts growing in silty-clay soils had a low survival rate, and decreased height (Table 2), as well as smaller leaf size and lower leaf tissue chlorophyll content than those growing in sandy soils.

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# Plant Spotlight

Indian Bayou Source Powdery Thalia (*Thalia dealbata* Fraser ex Roscoe)

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The USDA-NRCS Jamie L. Whitten Plant Materials Center (PMC) released Indian Bayou as a Mississippi source-identified wetland plant in 1997. Seeds came to the PMC via Dr. Dale Arner of Mississippi State University but were collected by Travis Salley from a yard in Cleveland, Mississippi; the homeowner said the plants originally came from Washington County. Powdery thalia is native to the Southeast and southern Plains states, but it is rarely found in Mississippi wetlands, likely a consequence of habitat disruption and limited seed dispersal.

Indian Bayou is a robust, herbaceous perennial that spreads by means of its large rhizomes. Leaves arising from the rhizome are 3 to 4 feet tall, with ovate to lanceolate blades and a stout petiole. Flowering scapes are 5 to 7 feet tall, terminating in clusters of purple to blue flowers. The large, brownish seeds are oval to rounded in shape. The common name, powdery thalia, refers to the white, glaucous coating present on all above-ground portions of the plant. Additional information is contained in release brochures available from the PMC.

Because of its highly ornamental appearance, this plant can be used in backyard ponds and, although it has not been widely tested for this purpose, it can also be used to improve the appearance of some waste treatment wetlands. However, recent PMC plantings show that Indian Bayou is not “just a pretty face”; it’s also quite tough. Plantings were made on a WRP site in Lambert, Mississippi in the spring and fall of 1998 and the spring of 1999. Rainfall was below average levels following all three planting dates, which was especially critical for the spring plantings that had to



Indian Bayou Source Powdery Thalia

survive the summer months. Indian Bayou had the best survival of any species planted, although it was only able to thrive on lower elevations of one planting site where boards remained in the water control structure year round. In these areas, plants were inundated up to a depth of 1.5 feet during the winter and soils remained inundated or saturated during the summer. The landowner and several other individuals commented on the impressive growth and appearance of these plants. On sites where, according to standard practice, boards were removed from the water control structure in the spring, long-term survival was minimal.

Planting Indian Bayou on WRP and other similar sites could function as a method to reintroduce this plant into Mississippi wetlands. These plantings could also benefit wildlife, because some waterfowl eat the seeds and the large leaf area can harbor insects that also serve as a food source. The dense growth habit provides nesting sites and cover for several wildlife species. Contact the PMC for information on obtaining plant materials.

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Since locations with well-drained, sandy soils and adequate moisture had high post growth and survival rates, targeting these zones for willow plantings will best ensure successful streambank restoration efforts using willow posts. Research continues on development of a predictive test for evaluating specific sites for planting willow posts.

Table 1. Results of Greenhouse Experiment, University of Memphis. Average dry biomass production in grams by willow posts subjected to various moisture regimes

Treatment	Total Biomass, g	Aboveground biomass, g	Root biomass, g
Control (well-watered and well-drained)	110	76	34
Intermittently flooded	111	82	35
Continuously flooded	33	28	5
Drought	16	13	7

In a related effort, the same team examined the effect of soaking willow posts in water for up to ten days before planting. Anecdotal evidence suggested willow cuttings might grow more vigorously if soaked in water before planting. This idea is based on the fact that many willow species growing naturally utilize flood events for dispersal of vegetative propagules, thus subjecting them to periods of soaking. It was hypothesized that this life history trait results in optimal conditions for growth and survival. Accordingly, a greenhouse experiment was conducted using black willow (*Salix nigra*) posts 4 feet long with a basal diameter of two inches. Cuttings were subjected to three soaking treatments (0, 3, and 10 days), and then grown under four soil moisture regimes (control, drought, permanently flooded, and intermittently flooded). Growth, biomass, and survival were recorded. Results clearly demonstrated that soaking had significant effects on willow post success when evaluated across all soils moisture regimes. Posts subjected to the 10-day soaking treatment had a survival rate nearly twice as high and three times as many roots as the posts that were not soaked (Table 3). Benefits of soaking were less significant for posts subjected to drought. Soaking willow cuttings prior to planting is a simple, inexpensive technique that may be used to bolster streambank restoration success.

Table 2. Results of Field Experiment, Twentymile Creek, Mississippi. Average Height Growth and Survival for Posts Planted in Soils with Various Composition

Soil Texture	Silt+Clay, %	Height Growth, ft	Survival, %
Coarse	9	8.0	83
Medium	30	6.3	58
Fine	74	6.7	50

Table 3. Average Dry Biomass Production and Percent Survival for Willow Posts Subjected to Various Durations of Soaking in Water before Planting

Duration of Soaking, days	Total Dry Biomass Production, g	Survival, %
0	14	39
3	16	36
10	35	68

## PMC Highlights

USDA-NATURAL RESOURCES  
CONSERVATION SERVICE

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### PMC Staff

Joel Douglas – Manager

Janet Grabowski – Biologist

Scott Edwards – Agronomist

Patricia Taylor – Secretary

James Pomerlee – Gardener

**April 17** – Janet Grabowski presented a poster presentation at the MS Water Resources Conference in Raymond, MS.

**May 22** – Janet Grabowski presented a poster presentation at the Sustainability of Wetlands and Water Resources Conference.

**June 8** – 12 scientist from South Africa toured the PMC

**June 21** – 185 people attended a wildflower tour at the PMC. Participants were from the Soil and Water Conservation Districts, MS Dept of Transportation, and local garden clubs.

**July 8** – Scott Edwards presented poster presentations at the SWCS Annual Conference in St. Louis, MO.

**August 8-11** – James Pomerlee and Scott Edwards attended Farm Management and Agronomy Principles training at the Aberdeen Idaho PMC.

plant-materials.nrcs.usda.gov

## Ask the Expert

### **Q. Where can I buy wetland plants like Powdery Thalia?**

**A.** Just open up your copy of the *Directory of Wetland Plant Vendors in the United States*. This directory provides a national listing of vendors indexed by scientific name of wetland plant species. This is an updated version of the 1992 *Directory of Wetland Plant Vendors* published by the U.S. Army Corp of Engineers, Waterways Experiment Station. This directory provides a listing of wetland plant vendors and their contact information. Included are obligate and facultative wetland plant species for which vendor sources were found. There is 363 vendors and 1100 species listed.

To get a copy, go to our web site at: [www.plant-materials.nrcs.usda.gov](http://www.plant-materials.nrcs.usda.gov)



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