



SHRUB WILLOW

Fact Sheet
Series



Renewable Energy • Rural Development • Environmental Benefits

Calendar of Tasks for Willow Bioenergy Crops

Timeline	Task	Notes	
Year 1	1.1 Site assessment	Assess existing vegetation, soil conditions and operational limitations of site.	
	1.2 Establishment plan	Create a plan for site improvements, site preparation, weed control, planting and maintenance.	
	April-July	1.3 Site improvements	Address challenges to access, operations, drainage, field layout, tillable acreage, etc.
		1.4 Clear existing vegetation	Mow or brush hog perennials and annuals, remove large quantities of biomass.
		1.5 Contact herbicide	Apply contact herbicides to kill existing vegetation. Consult an expert for guidance.
	Aug-Sept	1.6 Soil pH amendments	Add lime or other amendments to adjust soil pH as necessary based on soil test results.
		1.7 Plow	Rip any hardpans, then plow to depth of 10 inches or more using moldboard plow.
		1.8 Disc	Cross disc to create a well-prepared planting bed.
		1.9 Rock pick	Use a rock-picking attachment to clear rocks and avoid planting and harvesting equipment.
		1.10 Assesses weed control	Assess overall weed control and repeat mechanical and/or chemicals controls as necessary.
		1.11 Sow cover crop	Plant winter rye or other cover crop for improved weed and erosion control.
Year 2	April-May	2.1 Terminate cover crop	Kill cover cop using a roller crimper, mower, or contact herbicide.
		2.2 Plant willow crop	Double-row pattern at 2.5-foot row spacing, 2-foot plant spacing and 6-foot alley spacing.
		2.3 Pre-emergent herbicide	Apply pre-emergent herbicide immediately after planting. Consult an expert for guidance.
		2.4 Interplanting and replanting	Interplant by hand and mechanically replant large areas to ensure >4500 plants per acre.
	June-Sept	2.5 Crop monitoring	Monitor crops for growth, weed pressure, pests and diseases, etc.
		2.6 Weed control	Implement mechanical and/or chemical weed control until a closed canopy is achieved.
		2.7 Pest control	Implement integrated pest management as needed.
		2.8 Maintain headlands	Mow in late summer to maintain access and suppress woody vegetation.
	Nov-March	2.9 Coppice	Cut dormant willow plants two inches above ground using sickle bar mower.

Year 3	May-Sept	3.1 Fertilize	Apply fertilizer if necessary based on soil test results. Standard rate for nitrogen is 100 lbs/acre.
		3.2 Crop monitoring	Monitor crops for growth, weed pressure, pests and diseases, animal browse, etc.
		3.3 Weed control	Implement mechanical or chemical weed control for optimal willow growth rates.
		3.4 Pest control	Implement chemical or integrated pest control as needed.
		3.5 Maintain headlands	Mow one to two times per year to maintain access and suppress woody vegetation.

Y 4	May-Sept	4.1 Crop Monitoring	Monitor crops for growth, pests and diseases, manage as needed.
		4.2 Maintain headlands	Mow one to two times per year to maintain access and suppress woody vegetation.

Year 5-23	May-Sept	5.1 Crop Monitoring	Monitor crops for growth, pests and diseases, etc. Repeat annually.
		5.2 Mow headlands	Mow one to two times per year to maintain access. Repeat Annually.
	Nov-March	5.3 Harvest	After leaf-fall, every three to four years.
	April	5.4 Fertilize	Apply fertilizer in the spring following harvest based on soil nutrient management plan.

Year 24	April	24.1 Mulch stools	Grind stools with forestry mulcher after harvest.
	May	24.2 Contact herbicide	Once vigorous regrowth has resumed, spray herbicide to terminate willow.
		24.3 Disc	After confirming effective of herbicide, disc to incorporate stools and smooth the soil.
	May-June	24.4 Replant	Replant with new willow cultivars or other crop, or plant cover crop until next growing season.

Summary

This protocol outlines the tasks generally required for converting idle fields or pasture to willow in the Northeast. Sites recently used for row crops will require less-intensive site prep. Refer to the other fact sheets in this series for more information on each task. Timeframes are approximate. Follow standard safety protocols for all tasks and refer to the Penn State University Safety and Health Management Planning for Biomass Producers guidebook or consult an expert for more information. These and other resources, including access to specialized planting and harvesting equipment, are available from The Willow Project at SUNY-ESF and NEWBio.

The Willow Project at SUNY-ESF
www.esf.edu/willow | (315) 470-6775 | willow@esf.edu

Northeast Woody/Warm-Season Biomass Consortium
www.newbio.psu.edu

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