



# Planting Willow Using Farmers' Traditional Method – A Case Study<sup>1</sup>

## BACKGROUND

Much research has been conducted regarding clonal production of willows using the double-row planting methods of the breeding program of Sweden, the United Kingdom, and North America; however biomass production using the traditional planting methods of farmers has not been explored across geographical regions. The double-row planting design of Sweden and SUNY is compatible with commercial operations, however, it limits the application of such design by farmers because it is not compatible with their existing operations (e.g., spacing of cultivation equipment). This could pose challenges to adoption of the willow as a SRWC energy production system. Efforts must be made to develop willow production systems compatible with existing farmers operations.

## PROJECT OBJECTIVE

In an attempt to demonstrate the biomass production potential of willow using farmers' traditional planting arrangements, an experiment was conducted in Northern Minnesota to assess willow biomass production using different methods.

## METHODOLOGY/PROCESS

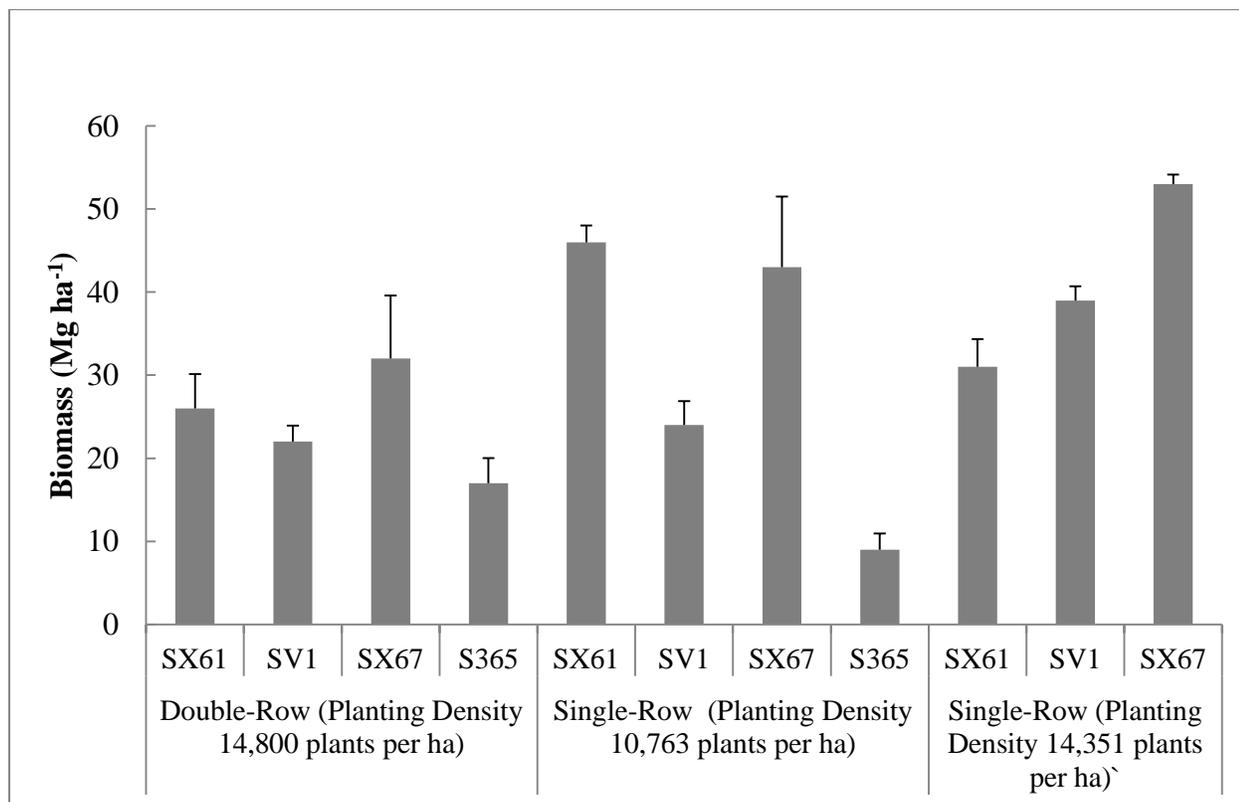
The first method used the SUNY and Sweden double-row planting method. The second and third methods employed a single-row planting system with an inter-row spacing of 1.5 m (5 ft.) Two intra-row spacings were introduced in the single-row planting method: 0.61 m (2 ft.) and 0.46 m (1.5 ft.), representing 10,763 and 14,351 plants ha<sup>-1</sup>, respectively. The 1.5 m spacing between the single rows was used to allow for the passage of weed maintenance equipment.

## RESULTS

The double-row planting systems of Sweden and SUNY generated total biomass of 20 Mg (oven dry) ha<sup>-1</sup> at the end of first rotation (3 years of growth). On the other hand, 31 Mg (oven dry) ha<sup>-1</sup> and 39 ha<sup>-1</sup> of biomass were produced using the single planting method with 0.46 m and 0.61 m intra-row spacing, respectively, representing an increase of 27% and 45% more over the double row planting system (**Fig 1**). The biomass production of willow using the traditional planting

<sup>1</sup> Information presented in this factsheet series was taken from a peer reviewed book chapter by: Zamora D, Apostol K, Berguson W, Volk T, Wright J, Ogdahl E. (In Press). Short Rotation Woody Crops Production. In S. Jose (ed). Feedstock for Advance Biorefineries. CRC Publishing.

method is within the range of a similar planting arrangement in Canada (Mirck and Schroeder, 2013).



**Fig 1.** Biomass production (Mg oven dry) of willow growing in a clay-loam soil in Northern Minnesota. Experiment 1 employed the SUNY and Sweden double row system (with spacing 1.5 m between double-rows, 0.76 m between rows and 0.61 m between plants within the rows); experiment 2 used a single row planting arrangement with 0.61 m plant spacing within the row; and experiment 3 used a single row planting with 0.46 m spacing within the row. The distance between single rows was 1.5 m.

## IMPLICATION

Farmers continue to explore options to achieve production cost effectively while end users of biomass continue to demand high quality feedstock suitable for their production systems. The economics and benefits of the sustainability of utilizing farmers' methods of planting willow is an important consideration and the compatibility of the SRWC system in the local social landscape is a necessary factor in the long-term success of SRWCs.

## QUESTIONS OR COMMENTS?

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