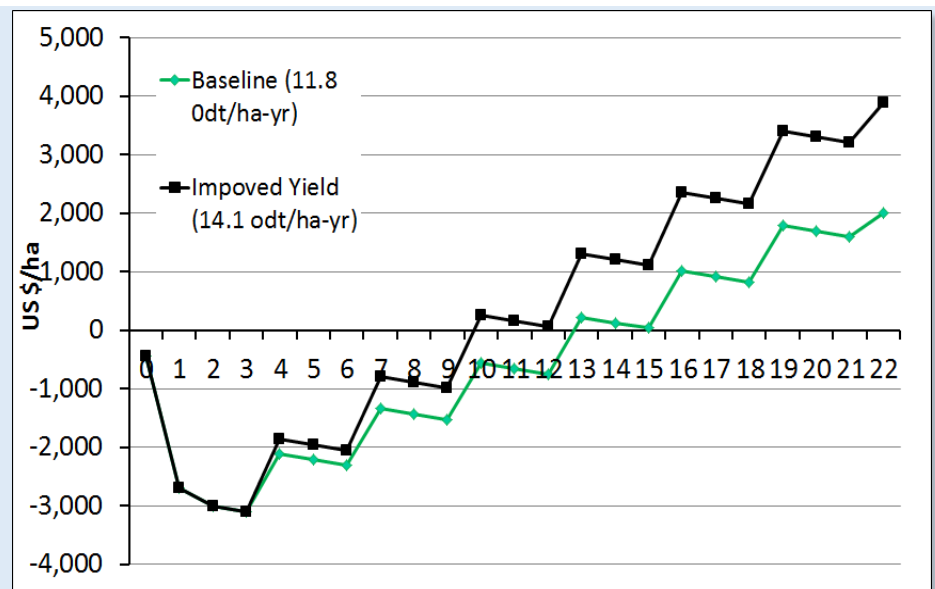
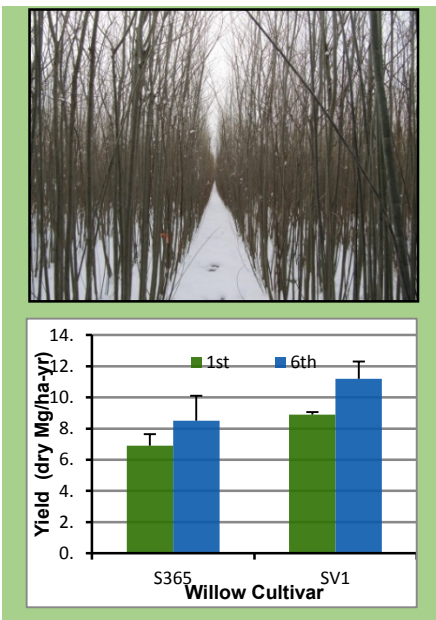


Regional Feedstock Partnership Highlights—Willow

Long-Term Productivity Studies: A network of 20 willow biomass crop trials in seven states is supported in the regional feedstock network. Trials include between 6 and 30 cultivars at each site with three to four replications and they are separated into two groups depending on age of the plant material. The first set incorporates trials established with plant material developed in the late 1980s and early 1990s. These trials provide long term data on biomass yield (*green box, top*). Under the current model, willow biomass crops are harvested every 3-4 years for seven rotations. However, at the start of this project the oldest trials in North America were only in their fourth rotation. With the support from this project, data is now available through six rotations and it shows that the best cultivars remain productive over time. The two cultivars in this trial that are still commercially available produced $18.7 \pm 7.3\%$ more biomass in the sixth rotation compared to the first rotation (*green box, bottom*). This and other data from long term trials provides the foundation for projecting yields over multiple rotations, which is essential for yield and economic modeling.

Genetic Improvement: The remaining network of trials includes new shrub willow cultivars that have been developed through a breeding and selection program at SUNY ESF and Cornell University. These trials formed the backbone of the data set used to develop regional yield models for willow biomass crops for different regions of the country. A key part of this process was to predict the increase in yield from new cultivars and from the increase in yield from first to second rotation that have been observed in trials. Data from these trials show that new cultivars of willow have 15 to 25% higher yields across a range of sites. Changes in yield from the first to second rotation for the top three cultivars across the five sites was $13.7 \pm 5.8\%$. Yields increased slightly again in the third rotation and remained stable in subsequent rotations. Incorporating this new information in economic assessments showed that the internal rate of return increased from 5 to 8.5%, effectively reducing payback by one rotation (*blue box, below*).



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For more information visit <http://www.sungrant.org> or email sungrant@sdstate.edu