

Premature Selection and Inadequate Testing of Willow Biomass Varieties Results in Significant Losses for Growers.

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Willow (*Salix* spp.) can be a financially sound energy crop when site- appropriate varieties are grown. Because varietal performance changes with time and from place to place, appropriate selections can only be based on long-term and local tests. If choices are made without allowing sufficient time for testing or without adequate local experience, yield and financial returns suffer. Here we examined the yield of numerous willow varieties over a seven-year period at three diverse sites in Upper Michigan. In order to determine the impact of early varietal selection, we compared the total biomass production of a cohort of five top-performing varieties selected based on their growth after four years with a different cohort selected based on their growth after seven years. At one site, the fourth-year cohort yielded 7% less biomass than the seventh-year cohort. This equated to an annual loss to the grower of about \$15 per acre. In order to determine the consequence of using varieties selected in distant tests we identified the best five-variety cohort at each test site and then compared the performance distant cohorts with that of the local cohort. At one site the distant cohort produced 15% less biomass than the local cohort. This equated to an annual loss to the grower of about \$33 per acre. If a region contained 5,000 acres of willow energy plantations and selections were made prematurely, the financial loss to growers would be \$75,000 per year. Selecting varieties based on non-local field testing could represent a financial loss to growers of about \$165,000 per year in this same hypothetical region. These investigations place a concrete value on the need to test varieties over long periods and at multiple sites.

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Raymond Miller is the Director of Michigan State University's (MSU) Forest Biomass Innovation Center and Adjunct Associate Professor in MSU's Department of Forestry. He received his Ph.D. in 1984, and has conducted short rotation forest plantation research now for 37 years. Most recently he has participated in and led trans-disciplinary teams of scientists working on applied research and outreach projects with the goal of advancing sustainable woody biomass energy and advanced bio-product supply chains at state, region, national, and international scales.