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Leaf Area Development, Light Interception, and Yield among Switchgrass Populations in a Short-Season Area

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Abstract

Cool spring and early summer temperatures have limited the adoption of warm season grasses in northern environments like eastern Canada. This study characterized the performance of nine switchgrass (*Panicum virgatum* L.) populations ('Blackwell', 'Cave-in-Rock', 'Dakota', 'Forestburg', 'New Jersey 50', 'Pathfinder', 'Sunburst', 'Shelter', and 'ND3743') in southwestern Quebec. These populations were evaluated for 3 yr on a St. Bernard sandy clay loam (Typic Hapludalf) near Montreal. Leaf area development patterns during the season fitted second degree polynomial models, increasing with time after planting and decreasing in the fall. Maximum leaf area index (LAI) ranged from 6.1 to 8 m2 m22, with Cave-in-Rock and New Jersey 50 having the highest LAIs. The populations had different vertical leaf area distributions. For Blackwell, Cave-in-Rock, and Shelter, more than 50% of the leaf area was in the top third of the canopy. New Jersey 50 and Pathfinder had uniform vertical leaf area distributions through the canopy. Light extinction coefficients (*k*) ranged from 0.57 to 0.72. Average end-of-season biomass yields were 8477, 9943 and 10 869 kg ha_{21} in 1993, 1994, and 1995, respectively. The relationship between end of season yield and leaf area duration was linear. Cave-in-Rock, New Jersey 50, and Blackwell produced the greatest yields. All entries had high neutral detergent fiber (NDF) [810–870 g kg_{21} dry matter (DM)] and acid detergent fiber (ADF) (510–570 g kg_{21} DM). Nitrogen and ash concentrations ranged from 3.2 to 8.2 and 47 to 66 g kg_{21} DM, respectively. This study showed that switchgrass can be successfully grown in southwestern Quebec.

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