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Phenology and Tiller Characteristics of Big Bluestem and Switchgrass Cultivars in a Short Growing Season Area

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Abstract
Warm-season grasses are increasingly being cultivated in North America for summer forage and biomass production. The cooler temperatures and shorter growing seasons typical of Canadian production areas, are major limiting factors to warm-season grass production in these areas. This research assessed the morphological development and relationship of growing degree-days (GDD) to plant morphology and tiller characteristics in nine cultivars of switchgrass (*Panicum virgatum* L.; Blackwell, Cave-in-Rock, Dakota, Forestburg, Path- finder, Shelter, Sunburst, ND3743, and New Jersey 50) and in 'Niagara' big bluestem (*Andropogon gerardii* Vitman). The study was conducted for three years on a St. Bernard sandy clay loam (Typic Hapludalf) in southwestern Quebec. Stand cover, plant morphology, tiller number, height, and diameter, and leaf number per tiller were all assessed during the season. All entries persisted through the three years of the study and showed increases in tiller number (from an average of 565 to 683 m_{22}) from one year to the next. Dakota, Cave-in-Rock, and Shelter switchgrass had the highest ground cover ratings after three years (85, 85, and 84%, respectively). Dakota, ND3743, and Forestburg were early maturing; New Jersey 50 was the latest in maturity. Niagara big bluestem had the tallest tillers (183 cm) and largest rates of increase in height (2.8 cm d_{21}), followed by Cave-in- Rock (2.0 cm d_{21}) and Blackwell (1.9 cm d_{21}). The shortest tillers were recorded for Dakota (111 cm) and ND3743 (118 cm). Changes in leaf number per tiller with GDD were best described by quadratic regression models (*r* 250.80–0.97). These models were stable over two years. Cultivars varied in the number of GDD required for maximum number of leaves per tiller, with later-maturing cultivars generally requiring greater GDD accumulation. These data indicate that warm season grasses can be grown successfully in eastern Canada.

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