

Casler, M. D. and A. R. Boe. 2003. Cultivar × Environment Interactions in Switchgrass. *Crop Sci.* 43:2226–2233

Abstract:

Switchgrass (*Panicum virgatum* L.) is a widely adapted warm season perennial that has potential as a bioenergy feedstock. The objectives of this study were to estimate the effect of harvest date on switchgrass cultivars at two locations in the north central USA and determine the relative importance of cultivar × environment interactions for agronomic and biofuel traits of switchgrass. Six switchgrass cultivars were grown in southern Wisconsin and eastern South Dakota for 4 yr and harvested each year at three harvest dates (August, September, and October). Cultivars differed widely in biomass yield, but interacted with all environmental factors. Biomass yield did not respond consistently to harvest date, varying with cultivar, location, and year. Despite these interactions, cultivar rankings for biomass yield were consistent across harvest dates and years, but not locations. There was some preferential adaptation to either Wisconsin or South Dakota, related to longitude of the original germplasm collection site, also reflected by ground cover data. Reduced stands and biomass yields for the August harvest date in later years suggested that harvests delayed to late summer or early autumn may be beneficial in the long term. Mean dry matter, forage fiber, and lignin concentrations also varied among cultivars, consistently across locations and years. These three traits all increased with later harvest consistently across locations and years, but inconsistently among cultivars. It should be possible, through selection and breeding, to develop switchgrass germplasm with increased fiber and decreased lignin and ash, increasing the availability of fermentable sugars and decreasing the unfermentable and/or incombustible residues.