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Abstract

The objective of this research is to evaluate the forage quality of forage species for their seasonal productivity differences and their ability to withstand droughty environmental conditions in Iowa.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

Forage Crop Research: Evaluating Forage Species in Iowa for Productivity during Drought Conditions—Quality

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Introduction

The objective of this research is to evaluate the forage quality of forage species for their seasonal productivity differences and their ability to withstand droughty environmental conditions in Iowa.

Materials and Methods

Small plots of pure stands of various forage species were seeded at a rate of 20 lb/acre, with a 30-in. row spacing in a completely randomized block design with six replications at Nashua on May 17, 2001, May 15, 2002, and May 22, 2003. The plots were fertilized according to the previous crop and the current soil test. Plant materials used were forage sorghum, GX-BMR (Wolf River); sudangrass, True Hybrid (Cenex) and Trudan 10 (NK); and sorghum-sudangrass hybrid, Nutri+Plus BMR (Wolf River), Sweet Sioux (Cargill), and STE6 (Dekalb). The forage plots were harvested at a vegetative (July 10, 2001, July 9, 2002, and July 9, 2003), boot (July 24, 2001, July 19, 2002, and July 21, 2003), dough (August 21, 2001, August 21, 2002, and August 12, 2003), and grain or silage growth stage (September 11, 2001, September 18, 2002, and September 3, 2003). Regrowth was harvested from the plots that had been harvested at the vegetative and boot stages (September 8, 2002, and September 3, 2003). Nutritional quality was determined by analyzing a dried subsample for crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin content. Relative feed

value (RFV) was calculated using the following equation:

$$\text{RFV} = [(120/\text{NDF}) \times \{88.9 - (0.779 \times \text{ADF})\}] / 1.29.$$

Results and Discussion

It will be important to compare the forage quality of the plant material harvested. Both percent protein and fiber content are critical forage quality indicators that are used in preparing feed rations for livestock. Fiber content is often reported as the relative feed value, using a calculation that includes both fiber values. The sorghum variety, GX-BMR (brown mid-rid), generally had the highest crude protein values regardless of the year and the stage of growth at harvest (Table 1). Both the GX-BMR and Nutri+Plus BMR varieties had the highest relative feed value (Table 1). This is not surprising because BMR varieties have been adopted for of their lower fiber content. Although the crude protein and relative feed values for sorghum, sudangrass, and the sorghum-sudangrass hybrids were not as high as the relative feed values for corn silage, the forage quality would be adequate for livestock feed.

Sorghum, sudangrass, and the sorghum-sudangrass hybrids can meet the needs of livestock producers in locations or years when the environmental conditions are less than adequate.

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