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

M. H. Wiedenhoeft
Iowa State University

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Abstract
Drought often results in greater agricultural damage in southern, western, and northeastern Iowa than in the rest of the state. Slight to severe slopes are prone to erosion, and soils high in clay content are slow to drain excess moisture during wet periods and have low amounts of available moisture during periods of drought. The land is predominantly used for livestock production because of the factors that limit the level of productivity in row crop production. Pastures/hayfields typically used in these areas contain cool-season grasses with little tolerance to drought and warm climatic conditions. Even in years of normal temperatures and rainfall, forage productivity in Iowa is often limited by low productivity of cool-season grasses during the summer. Sorghum, sudangrass, and sorghum-sudangrass hybrids are adapted to environments with limited rainfall and high temperatures. Unfortunately, new varieties have not been tested for Iowa conditions.

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M. H. Wiedenhoeft, associate professor
R. L. Hintz, assistant scientist
P. Patrick, research associate
Department of Agronomy

Introduction

Drought often results in greater agricultural damage in southern, western, and northeastern Iowa than in the rest of the state. Slight to severe slopes are prone to erosion, and soils high in clay content are slow to drain excess moisture during wet periods and have low amounts of available moisture during periods of drought. The land is predominantly used for livestock production because of the factors that limit the level of productivity in row crop production. Pastures/hayfields typically used in these areas contain cool-season grasses with little tolerance to drought and warm climatic conditions. Even in years of normal temperatures and rainfall, forage productivity in Iowa is often limited by low productivity of cool-season grasses during the summer. Sorghum, sudangrass, and sorghum-sudangrass hybrids are adapted to environments with limited rainfall and high temperatures. Unfortunately, new varieties have not been tested for Iowa conditions.

The objective of this research is to evaluate 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 30-in. row spacing in a randomized complete block design during the 2001 and 2002 growing seasons at three ISU research farms (Nashua, McNay, and Ames). 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 established forage plots were harvested at appropriate growth stages for grazing and silage forage systems. Forage yields were determined, and nutritional quality is being analyzed.

Results and Discussion

Sudangrasses have smaller, finer stems than sorghum-sudangrass hybrids, which have finer stems than forage sorghums. Consequently, sudangrasses and sorghum-sudangrass hybrids are more easily cured for hay than forage sorghums.

Tables 1 and 2 summarize the dry matter yields (lb/acre) of the 2001 and 2002 results. In general, the sorghum-sudangrass hybrids produced more dry matter per acre compared with the sorghum and sudangrass varieties. Forage yields were greater in 2002 than in 2001. Forage yields of the later growth stages (dough or silage) were greater than multiple harvests of vegetative material (harvest plus regrowth). It will be important to compare the forage quality of the plant material harvested.

Acknowledgments

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Table 1. Dry matter yields for six different sorghum and sorghum-sudangrass hybrids in 2001 at Nashua.

	Stage of growth at harvest			
Plant material	Vegetative July 10	Boot July 24	Dough Aug 21	Silage Sept 11
	ton dry matter/acre			
GX-BMR	0.77	1.46	4.58	4.94
True Hybrid	0.77	1.65	4.90	3.23
Trudan 10	0.81	1.68	4.28	4.31
Nutri+Plus BMR	0.85	1.69	4.37	4.98
Sweet Sioux	0.88	1.66	4.54	5.55
STE6	0.90	2.04	4.46	5.25
LSD (p=0.05)	0.19	0.33	0.94	0.63

Table 2. Dry matter yields for six different sorghum and sorghum-sudangrass hybrids in 2002 at Nashua.

	Stage of growth at harvest					
Plant material	Vegetative July 9	Regrowth Sept 18	Boot July 19	Regrowth Sept 18	Dough Aug 21	Silage Sept 18
	ton dry matter/acre					
GX-BMR	2.65	4.09	2.46	2.24	5.48	8.00
True Hybrid	1.75	3.63	1.95	2.50	5.98	6.32
Trudan 10	1.94	4.71	2.46	3.23	5.25	6.82
Nutri+Plus BMR	2.68	4.71	2.27	2.72	5.92	8.40
Sweet Sioux	2.44	4.73	2.67	2.93	6.40	7.65
STE6	2.61	4.08	2.99	4.42	6.13	6.88
LSD (p=0.05)	0.68	1.01	0.89	1.95	1.75	1.73