EFFECTS OF CUTTING SCHEDULE ON HAY YIELDS OF FOUR PERENNIAL GRASSES IN THE IRRIGATED SONORAN DESERT

Juan N. Guerrero and Herman S. Meister[1]

ABSTRACT

A trial that compared four warm season grasses; swathed at three (3WK), four (4Wk), and five weeks (5Wk); was planted at the University California Desert Research and Extension Center (UCDREC) in May of 2001. The four grasses that were compared were: Tifton-85 bermudagrass (T85), Newmex Sahara bermudagrass (NM), Kleingrass (Selection 75, KG), and giant bermudagrass (GB). Across the four grasses, the 4Wk treatment produced greater ($P < 0.10$) hay yields than 3Wk. Hay from the 5Wk treatments yielded no more ($P > 0.10$) hay than 4Wk. The ranking of the mean hay yields per cutting of the four grasses were: NM < GB < T85 < KG. In 2003, both T85 and KG yielded similar ($P > 0.10$) amounts of hay per cutting and both yielded greater ($P < 0.10$) amounts of hay than the two varieties of common bermudagrass (NM and GB). In 2003, from the 4Wk cuttings, T85 and KG produced 12.2 and 16.1 t/ac of hay at UCDREC.

Key words: bermudagrass, Kleingrass, Tifton-85, cutting schedule, irrigated desert

INTRODUCTION

Bermudagrass (C*ynodon dactylon*) has been grown in the US for more than 250 years and is currently considered one of the primary weed pests in US agriculture. However, bermudagrass is also considered a valuable hay and perennial pasture crop in the humid South. Numerous cultivars of bermudagrass are grown in the US, *Coastal* probably being the most prevalent. Bermudagrass is propagated either by seed or by vegetative sprigs. Bermudagrass is widely grown in the irrigated Sonoran Desert of western Arizona and southeastern California. In these desert areas *common* bermudagrass is most often grown for seed. However, if hay prices are attractive, growers often make hay instead of seed (Table 1). Bermudagrass hay is very popular as horse feed. In 1992 a new bermudagrass cultivar, Tifton-85 was released. Several recent publications have indicated that Tifton-85 yields more hay and is higher in nutritive value than Coastal bermudagrass.

Kleingrass (*Panicum coloratum*), originally from Africa, has been grown in the south Texas as a pasture grass since 1957. Kleingrass grows well in warm climates. Kleingrass is an erect bunchgrass that grows about 4 feet tall and responds well to irrigation and fertilization in the irrigated Sonoran Desert. Kleingrass, in California, was first grown at the University California Desert Research and Extension Center in the early 1990's and first reported in the mid 1990's. Kleingrass did not appear in official Imperial County crop statistics until 2001 (Table 1). In 2001, the mean hay yield per acre of Kleingrass in Imperial County was 9.13 tons.

---

[1] Juan N. Guerrero, Area livestock advisor; Herman S. Meister, Farm advisor. UC Coop. Ext., 1050 E. Holton Rd., Holtville, 92250. e-mail: jguerrero@ucdavis.edu, hmeister@ucdavis.edu. **In** Proceedings, National Alfalfa Symposium, 13-15 December, 2004, San Diego, CA. UC Coop. Ext. Univ. Calif. Davis, 95616. (See http://alfalfa.ucdavis.edu for this and other proceedings).

Even though both bermudagrass and Kleingrass are both important hay crops in irrigated Sonoran Desert agriculture, little scientific information exists regarding cultural practices for these two important hay crops. The purpose of this study was to evaluate several cultivars of bermudagrass and Kleingrass and to evaluate three cutting schedules, with regards to hay yield, for these popular desert hay crops.

PROCEDURES

A perennial grass cutting schedule trial was planted at the University California Desert Research and Extension Center on 06/28/01. Four perennial grasses commonly used for seed and/or hay production in the irrigated Sonoran Desert were used: Tifton-85 bermudagrass (T85), Newmex Sahara bermudagrass (NM), Kleingrass (Selection 75, KG), and giant bermudagrass (GB). Seeding rates for the two selections of common bermudagrass, NM and GB, were 15 lb/ac. Kleingrass was planted at 6 lb/ac. On the same day as planting, live sprigs of Tifton-85 were dug and planted within 4 hours, 15 cm apart in lines 20 cm apart. Plot size was 14 X 60 ft. The four grass selections were planted in four blocks. In each block, each grass selection was randomly assigned to one of three cutting schedule treatments: 3 weeks (3Wk), 4 weeks (4Wk), and 5 weeks (5Wk). Plots were irrigated the same day as planted. At each irrigation, 50 lb/ac of water run ammonia were applied to all plots, for a total of 550 lb N per acre. At hay harvest dates, a 14 X 20 ft sub-sample within each plot was swathed at approximately a 2 inch height. Wet hay from the sub-sample was weighed within several hours of harvest. Subsequent to the weighing of the wet hay from the plot sub-sample, on the same day, the entire plot was harvested. A grab sample of approximately 500 g of wet hay was placed into paper bags and dried in a forced air oven at 50° C for 72 h and weighed to determine the moisture percentage of the wet hay. From the moisture determinations and plot sub-sample wet weights, hay dry matter yields per plot were converted to t/ac and recorded. No hay yield data were recorded during 2002. Hay yield data were recorded during the summers of 2003 and 2004. Data from each year were analyzed as a split plot design. If the main effects in the statistical model were significant ($P < 0.10$), means were separated using pair-wise T-tests. Grab samples of dried hay, approximately 10 g, were collected for subsequent chemical analyses; to be reported later.

RESULTS and DISCUSSION

In 2003 (Table 2), across the four grasses hay yields increased ($P < 0.10$) when cut at four weeks in comparison to three weeks. There were no differences ($P > 0.10$) in hay yields if the hay was cut at five weeks in comparison to four weeks. Because of researcher scheduling conflicts, hay yield data in 2004 were evaluated with fewer harvests. Hay yield trends were similar in 2004 as in 2003, although because of greater treatment variances, statistical differences could not be detected ($P < 0.10$). Across the four grasses (Table 3), the 4Wk treatment produced greater ($P < 0.10$) hay yields than 3Wk. Hay from the 5Wk treatments yielded no more ($P > 0.10$) hay than 4Wk. Past research at UCDREC has indicated that a four week cutting schedule for alfalfa, from April through October, produces the greatest hay yields; the same cutting schedule also appears to be most appropriate for the warm season grasses evaluated in this study.

In 2003 and 2004 (Table 3), the ranking of the mean hay yields per cutting of the four grasses evaluated were: NM < GB < T85 < KG. In 2003, both T85 and KG yielded similar ($P > 0.10$)

amounts of hay per cutting and both yielded greater ($P < 0.10$) amounts of hay than the two varieties of common bermudagrass (NM and GB). In 2004, a similar trend in hay yields for the four grasses was evident. In 2003, from the 4Wk cuttings, T85 and KG produced 12.2 and 16.1 t/ac of hay at UCDREC (Table 2). In recent years the export market for Kleingrass and common bermudagrass hays has been increasing. T85 produced well in this study. Several research studies from the southern US have demonstrated that Tifton-85 bermudagrass produces greater amounts of hay in comparison to Coastal bermudagrass and that Tifton-85 also produces more beef per acre than Coastal. The digestibility of Tifton-85 was compared to Coastal in horses; both were comparable. For growers in the irrigated Sonoran Desert, the greatest disadvantage of Tifton-85 is that it must be planted from sprigs; most growers in the desert do not possess sprig diggers and planters.

Table 1. Bermudagrass and Kleingrass hay acreages and yields in Imperial County, 1999-2003.

	Bermudagrass		Kleingrass	
	Acres	t/ac	acres	t/ac
2003	64,675	5.32	13,327	8.78
2002	62,373	5.72	10,383	9.13
2001	53,773	5.43	10,262	8.71
2000	42,059	5.59	*	
1999	31,131	4.84	*	

Source: Imperial County Agricultural Commissioner's Annual Report.
* Prior to 2001, Kleingrass data was included in "miscellaneous crops".

Table 2. Yields of four perennial grasses cut at three stages of maturity at the University of California Desert Research and Extension Center, 2003-2004.

	Time since previous cutting		
Grass	3 weeks	4 weeks	5 weeks
2003*		Ton/acre	
Tifton-85	10.9[a,c]	12.2[b]	12.7[b,c]
New-Mex Sahara bermudagrass	6.3[a,c]	7.3[b]	6.8[b,c]
Kleingrass	12.0[a,c]	16.1[b]	20.0[b,c]
Giant bermudagrass	5.5[a,c]	9.4[b]	7.7[b,c]
2004**			
Tifton-85	6.0[a]	8.6	9.2[b]
New-Mex Sahara bermudagrass	3.9[a]	4.8	5.7[b]
Kleingrass	7.3[a]	10.9	12.2[b]
Giant bermudagrass	3.2[a]	6.2[b,c]	6.9[c]

* 6 cuttings for 3 week cycle, 4 cuttings for 4 week cycle, and 4 cuttings for 5 week cycle.
** 4 cuttings for 3 week cycle, 3 cuttings for 4 week cycle, and 3 cuttings for 5 week cycle.
[a] within each row, means with different superscripts are different, LSD ($P = 0.10$).

Table 3. Effects of cutting four perennial grasses at three stages of maturity at the University of California Desert Research and Extension Center, 2003-2004.

	Time since previous cutting		
	3 weeks	4 weeks	5 weeks
		ton/acre	
2003	1.4[a]	2.8[b,c]	3.0[c]
2004	1.3[a]	2.5[b,c]	2.8[c]

grass	T85[*]	NM	KG	GB
2003	2.6[b,c]	1.5[a,d]	3.4[c]	1.6[d]
2004	2.4[b,c]	1.4[a]	3.0[c,d]	1.6[b]

[a] within each row, means with different superscripts are different, LSD (P = 0.10).

[*] yield per cutting (ton/acre), T85=Tifton-85 bermudagrass, NM=New-Mex Sahara bermuda-grass, KG=Kleingrass, and GB=Giant bermudagrass.