

EVALUATION OF BERSEEM CLOVER AS AN ANNUAL FORAGE IN CENTRAL OREGON

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Abstract

Berseem clover may represent an alternative annual forage crop for central Oregon. In a spring planted trial, three varieties of berseem clover were tested against three red clovers, an alsike clover, and a crimson clover along with 'Vernal' alfalfa. All the same lines, except for the berseem clovers (which are not winter-hardy), were included in a fall planted trial (planted the preceding fall) on an adjacent plot. 'Trialex' and 'Bigbee' berseem clovers showed the greatest yields among the spring planted clovers. 'Solid' red clover also performed well. Among the fall planted clovers, 'Solid' and 'Medium' red clovers produced the most hay over the course of the season.

Introduction

In a survey of central Oregon farmers conducted last year, development of alternative crops consistently came up as a priority for research (Sexton and Roetcisoender, 1999). A spring planted crop that could come off the field in time to allow for fall seeding of other crops would be particularly useful. A second interest of local farmers was use of green manures and cover crops to promote the productivity of their soil. The positive effect of some species of annual legumes on the following crop of oat hay was demonstrated in some trials in 1993 and 1994 (Bohle, 1999). With these interests in mind, it was decided to evaluate berseem clover as a potential alternative crop. Berseem clover would be used as an annual forage here as it is not winter-hardy. It has been tested as an emergency forage in the Midwest when stands of alfalfa are lost to winterkill (Shrestha et al., 1998). In their study, the forage quality of berseem clover was similar to that of a nondormant alfalfa (Nitro') included in the trial, while tonnage was consistently equal to or greater than that of the alfalfa. It was decided to include some other clovers in the trial as well, including a fall-established stand, in order to have a more complete view of possible options for including clovers in the cropping pattern as annual forages. This work complements trials done earlier with several clovers at Powell Butte (Bohle et al., 1999).

Materials and Methods

Fall and spring seeded clover plots consisted of 6 rows planted at an 8-inch spacing with a 20-foot plot length. The fall seeded clover trial was planted on August 20, 1998, and the spring seeded trial was planted on May 13, 1999 using an Oyjord small-plot drill. Seed rates were as follows: alsike clover, 6.2 lb/ac; crimson clover, 22.3 lb/a; red clover, 9.8 lb/a; alfalfa, 22.3 lb/a; berseem clover, 13.4 lb/a. Fertilizer was applied at a rate of 29-74-0-48 lb/acre of NPKS before planting. Plots were irrigated as needed using a solid set sprinkler system. Harvest dates for fall seeded trials were June 2, July 13, August 6, and October 13. Harvest dates for spring seeded trials were August 13 and October 13. Plots were end-trimmed with a flail mower removing two to three

feet from the edge of each plot to avoid border effects on the yield data. A small plot forage harvester with a 40-inch-wide head was used to harvest the plots. For each plot, the total forage mass first was weighed, then a subsample of 200 to 400 g was weighed in the field for a moisture and quality sample. The subsamples were dried at 145 °F. The percent moisture was used to estimate yields on a dry matter basis. After weighing, the dry subsample was ground in a Thomas-Wiley mill (Arthur H. Thomas Co., Philadelphia, PA) and bulked across replications for each cutting. The ground samples then were analyzed for quality at a public laboratory (Klamath Experiment Station, Klamath Falls, OR) using near-infrared spectrometry. Data on dry matter yield was subject to standard analysis of variance using SAS statistical software (SAS Institute, Cary, NC). The forage quality analysis was not replicated, so no statistical analysis was done other than calculating averages for forage quality.

Results and Discussion

All the fall seeded clovers over-wintered well and produced good stands in the spring. Harvest yields for four cuttings of the fall seeded clover are summarized in Table 1. Average total yield for the fall seeded varieties was 9.43 tons/a, with red clover varieties tending to give the greatest yields over the course of the season. Dixie Crimson clover had the highest first cut yield with 3.34 tons/acre, but did not produce any regrowth. Berseem clovers were not included in the fall planting because they are not winter-hardy.

Harvest yields for two cuttings of the spring seeded clover varieties are summarized in Table 2. Average total yield over the season was 4.9 tons/a for berseem clovers compared to the vernal alfalfa check at 2.82 tons/a. Dixie Crimson clover again had the greatest first cut yield at 2.49 tons/acre. The three varieties of berseem clover performed well in both cuttings with, Trialex berseem yielding the best at 5.28 tons/a over the entire season.

Berseem clovers appear to have good potential, both as an annual forage or as a green manure. They produced the greatest tonnage of the forages tested, and they accumulated the most N per acre also. As a forage or green manure they would have the advantage over a grain crop of providing flexibility for early harvest in order to prepare a field for fall seeding. The seed cost versus the value of the product will determine whether or not berseem clover will be profitable versus planting alfalfa for hay. Berseem clover seed costs about \$75 per 50-pound bag. At a seed rate of 15 pounds per acre, the seed cost would be about \$22 an acre. The seed cost for alfalfa would be closer to \$60 an acre (assuming a cost of \$150 per 50-pound bag and seed rate of 20 lb/acre).

Table 1 Continued:

		Flowering	Quality						
Variety		Dry Matter	Crude	Acid	Neutral	Total	Relative	Plant	
		Yield	Protein	Detergent	Detergent	Digestible	Feed Value	Nitrogen	
		(tons/acre)	(%)	Fiber	Fiber	Nutrients		Accumulation	
		(% bloom)		(%)	(%)	(%)		(lb/a)	
4 th Cut	Solid Red		2.45	22.3	22.8	• 35.0	70.1	189	88
	F5 Red		2.34	22.0	22.7	34.5	70.2	192	83
	Medium Red		2.24	21.8	23.9	36.0	68.9	181	79
	Vernal Alfalfa		1.68	22.7	24.7	33.9	67.9	191	61
	Alsike		0.69	24.1	15.5	30.2	78.5	237	27
	Dixie Crimson								
	LSD		0.53						
	CV %		22.40						
Total	Solid Red		13.23						
Season									
	Medium Red		12.30						
	F5 Red		11.13						
	Vernal Alfalfa		9.45						
	Alsike		7.17						
	Dixie Crimson		3.34						
	LSD		1.30						
	CV %		7.50						

Table 2. Performance of spring seeded clover and alfalfa at COARC, Madras, OR, 1999. Planting date was May 13 with harvest dates August 6 and October 13. All quality data reported on a dry matter basis. Relative differences in quality are accurate, but true quality may not be completely precise in terms of exact values. The first cut was made August 13, and the second cut was made October 13.

	Variety	Dry Matter Yield (tons/acre)	Quality				Relative Feed Value	Plant Nitrogen Accumulation (lb/a)
			Crude Protein (%)	Acid Detergent Fiber (%)	Neutral Detergent Fiber (%)	Total Digestible Nutrients (%)		
1st Cut	Dixie Crimson	2.49	18.7	33.3	40.4	58.1	145	75
	Trialex Berseem	2.45	17.9	32.2	41.8	59.4	142	71
	Bigbee Berseem	2.42	19.4	32.2	41.2	59.3	144	76
	Multicut Berseem	2.00	17.5	29.8	38.3	62.1	160	56
	Solid Red	1.89	20.3	32.1	39.6	59.4	150	62
	Medium Red	1.85	19.0	32.4	40.7	59.1	145	57
	F5 Red	1.79	21.4	30.8	39.7	60.9	152	62
	Alsike	1.69	23.5	26.5	35.6	65.8	178	64
	Vernal Alfalfa	1.53	19.8	33.4	42.3	57.9	138	49
	LSD	0.44						
CV%	12.60							
2nd Cut	Trialex Berseem	2.68	17.8	30.0	39.7	61.9	154	77
	Bigbee Berseem	2.44	18.0	27.8	37.0	64.4	169	71
	Solid Red	2.30	21.0	22.9	34.7	70.1	191	78
	Multicut Berseem	2.27	17.0	27.1	36.1	65.2	175	62
	Medium Red	1.84	20.5	23.6	35.0	69.2	188	61
	F5 Red	1.76	20.9	22.3	33.2	70.8	200	59
	Vernal Alfalfa	1.34	21.0	24.1	33.5	68.7	195	46
	Alsike	0.99	22.8	17.4	30.0	76.3	234	37
	Dixie Crimson					-		
	LSD	0.49						
CV%	19.10							
Total Season	Trialex Berseem	5.28						
	Bigbee Berseem	4.67						
	Multicut Berseem	4.27						
	Solid Red	4.19						
	Medium Red	3.69						
	F5 Red	3.62						
	Vernal Alfalfa	2.82						
	Alsike	2.62						
	Dixie Crimson	2.49						
	LSD	0.79						
CV%	12.40							