Cereal Forage Trial, 2005

Richard J. Roseberg and Jim E. Smith[1]

Introduction

In the Klamath Basin, annual cereal forages produce one cutting and typically result in a high biomass yield of hay suitable for feeding many types of livestock. Cereal hay prices are generally lower than those of higher quality hay such as alfalfa, perennial grass, and grass/alfalfa mixtures. Cereal forages are useful because they can fill a crop rotation need (e.g., coming out of alfalfa, grow one cereal crop for forage or grain, then rotate back into alfalfa). In addition, cereal crops are commonly planted following potatoes and are harvested for either grain or forage, thus utilizing some of the nutrients that may remain in the soil following potatoes.

To test the yield and quality potential of several cereal hay species and varieties, a trial was planted in 2005 on the Henzel farm, about 10 miles south of the Klamath Experiment Station (KES), near the intersection of Lower Lake Road and Cross Road. This trial was done in cooperation with Winema Elevators, Tulelake, California, and was planted there to evaluate variety response to the high organic matter lake bottom soil. The 2005 trial included two beardless barley varieties, one beardless wheat variety, two triticale varieties (one bearded and one beardless), and four oat varieties. The entries were similar to those included in our 2003 and 2004 trials, but those two trials were conducted on the mineral soil at KES.

Procedures

The trial was planted on the Henzel farm on an Algoma silt loam soil following wheat grown the previous season. Seedbed preparation included plowing, disking, spring-tooth cultivating, and rolling. The trial was arranged in nonreplicated strips, with separate varieties or species in each strip. Most entries were planted at 2 or more rates, ranging from 30 seed/ft^2 up to 105 seed/ft^2 in one case (Table 1). Due to differences in seed size between species, these rates ranged from 78 to 413 lb/acre. This arrangement resulted in four replications of each variety/seeding rate combination, but the treatments were not randomized. All entries were drilled using a modified Kincaid (Kincaid Equipment Manufacturing) planter on May 25. Individual plots were 4.5 by 20 ft, with 3 by 15.5 ft harvested. All plots received 16-20-0-13 fertilizer at 310 lb/acre banded at planting (supplying nitrogen [N] at 50 lb/acre N, phosphorus at 63 lb/acre P_2O_5, and sulfur [S] at 41 lb/acre S. During the season, the farmer followed his normal fertilizer and weed control practices for the entire field including our plot area. Irrigation was applied with an overhead linear irrigation system as part of the farmer's normal small grain production operations.

The crop was harvested on August 16-18, when heads were in the milk or soft dough stages. This is quite a bit later than the harvest date in 2004

[1]Associate Professor and Faculty Research Assistant, Klamath Experiment Station, Klamath Falls, OR.

(July 20), when a similar trial was conducted on the mineral soil at KES. The delay in 2005 was probably due to the greater water-holding capacity of the high organic matter soil delaying maturity in 2005.

Plots were harvested with a Carter (Carter Manufacturing Co. Inc.) tractor-mounted flail harvester with a 3-ft-wide header. A sample of about 1.0 lb of chopped forage was taken from each plot and oven dried to determine dry matter yield. Dried samples were ground to 2-mm-sieve size in a Wiley Mill (Arthur H. Thomas Co.) and to 1-mm-sieve size in a Udy Mill (Udy Corp.) before being analyzed in a near infrared spectrophotometer (NIRS) (NIRSystems) to determine forage quality. Because the entries were laid out in nonreplicated strips, we could not calculate analysis of variance statistics as we commonly do for variety trials. We did harvest multiple plots within each variety strip, and thus were able to calculate a variance for each entry's mean value, providing a measure of how variable the results were.

Results and Discussion

Yields across varieties in this spring-planted cereal forage trial ranged from 3.1 to 6.1 tons/acre (Table 1). In general, yields were somewhat less in 2005 than in 2004, but as was noted in the 2004 annual report, growing conditions at KES in 2004 were ideal for grain crops, resulting in unusually high yields for both the small grain forage and grain experiments. In general, the triticale entries produced the highest yield, although Charisma oat also produced 5 ton/acre. In contrast, Cayuse oat had the lowest yield.

For a given entry, increasing the seeding rate from 30 to 45 seed/ft^2 tended to increase forage yield, but increasing the seeding rate beyond 45 seed/ft^2 did not have an obvious effect on forage yield.

The quality analysis data were not deemed reliable. It appeared that the samples were too contaminated by the high organic matter soil, and thus the soil material was mixed with the forage during grinding. These high organic matter soils are easily dislodged and subject to wind erosion, as can happen during harvest with a flail chopper, or during any dry, windy weather period. Future studies on these soils will have to take this effect into consideration to allow accurate sampling for quality parameters.

Table 1. 2005 yield results for the grain hay variety trial planted in high organic matter soil 10 miles south of Klamath Experiment Station, Klamath Falls, OR. Harvested on August 16-18, 2005.

Species	Variety	Head type	Seeding rate (seed/ft^2)	Seeding rate (lb/acre)	Yield ton/acre	Variance (s^2)
Barley	Sara	Beardless	30	118	4.0	0.70
	Sara	Beardless	45	177	4.6	0.51
	Sara	Beardless	60	236	4.1	0.28
	Sara	Beardless	75	295	4.2	0.28
	Sara	Beardless	90	354	3.9	0.29
	Sara	Beardless	105	413	4.4	1.06
	Belford	Beardless	30	112	4.1	1.41
	Belford	Beardless	45	168	4.5	0.34
Oat	Cayuse	Hulled	30	92	3.1	0.15
	Charisma	Hulled	30	104	5.0	0.74
	Everleaf	Forage Oat	30	81	4.2	0.46
	Everleaf	Forage Oat	45	121	4.3	1.72
	Ajay	Hulled	30	78	4.5	0.65
	Ajay	Hulled	45	117	3.6	0.01
Triticale	Trical OLT6042	Beardless	30	127	5.1	0.11
	Trical OLT6042	Beardless	45	190	5.2	0.14
	Trical 2700	Bearded	30	138	6.1	0.05
	Trical 2700	Bearded	45	207	5.4	0.19
Wheat	Twin	Beardless	30	112	4.3	0.06
	Twin	Beardless	45	169	4.3	0.05
	Twin	Beardless	60	225	4.6	0.07
	Twin	Beardless	90	337	4.4	0.13