

2011 Central Oregon Alfalfa Variety Trial

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Abstract

An alfalfa variety trial was established in August, 2011 at the Central Oregon Agricultural Research Center, Madras, Oregon. It is a four year project that will generate yield, protein and relative feed value (ADF, NDF) data under 4-cut management. Ten conventional (including 2 industry standards) and seven Roundup Ready[®] alfalfa cultivars are being evaluated in side by side replicated plots. This information will be utilized by the sponsoring seed companies, local agricultural dealers, crop consultants and producers to improve hay production and enhance economic value to the grower.

Introduction

Alfalfa is an important crop for central Oregon. The 2007 USDA-NASS Census of Agriculture reported in 2007 that there were 421 farms with 41,315 acres of alfalfa grown in central Oregon: 17,975 in Crook, 8,165 in Deschutes, and 15,175 acres in Jefferson County. The alfalfa hay produced in the three counties is fed on-ranch and marketed to livestock producers, dairies and feed stores in Oregon, Washington, Idaho, California, and Canada, as well as exported to Pacific Rim countries. Alfalfa is a major crop in the area, important in rotation to break disease and insect cycles, has the ability to fix its own nitrogen and provide nitrogen for subsequent crops.

This 4 year project is expected to include 4-cuttings per year. Yield, protein and relative feed value (ADF, NDF) data will provide a thorough variety performance evaluation under central Oregon conditions. This information will be utilized by the sponsoring seed companies, local agricultural dealers, crop consultants and producers to improve hay production and enhance economic value to the grower.

Materials & Methods

The evaluation was established at Central Oregon Agricultural Research Center (COARC), Madras, Oregon. Crop history for the plot area at indicates fallow in 2010, oats for hay in 2009, and alfalfa from fall 2003 to the summer of 2008. Soil samples were taken and analyzed by Agri-Check Laboratory at Umatilla, Oregon. For soil testing purposes the plot area was treated as one field (Table 1). Lime was applied at 1 ton/acre on August 23 and tilled immediately after application. Fertilizer was applied at 150 lbs/acre of Mesz “hydropyl” (12-40-0-10, 1% zinc) on August 25.

Ten conventional and seven Roundup Ready[®] alfalfa cultivars were planted on August 31, 2011. Entries were divided into two side-by side trials, conventional and Roundup Ready[®] cultivars separated by a 60 ft border. The entries were planted in 5 ft by 20 ft plots in a randomized block

design, replicated 4 times. Planting rate was 25 lbs/acre of pure live seed, with an Oyjord plot drill with 8 inch row spacing. All seed was inoculated with Nitragin AB[®] prior to planting. No fungicides treatments were added to seed; some varieties were coated by the provider (Table 2).

The trials were irrigated using solid-set sprinklers (9/64 inch Rainbird heads) on a 30 ft by 40 ft spacing. The first irrigation was August 31 immediately after planting and rolling the field. Plant emergence was evaluated on September 5, and percent stand was estimated visually as percent green in the rows on September 15. Stand uniformity was evaluated September 21 by determining percent of plants within a one-foot square area that had one, two, and three trifoliate leaves.

Weed pressure following planting was light, so no herbicides were applied to the conventional trial. The Roundup Ready[®] trial was sprayed with Roundup PowerMAX[®] at 44 oz/acre plus Quest at 4 pts/100 gal on October 12 per label recommendation.

Results and Discussion

All varieties showed excellent germination and stand cover during establishment in the fall of 2011 (Table 2). The conventional varieties showed significant variation in stand (percent of row) 15 days after planting. Roundup Ready[®] varieties showed no significant difference in stand 15 days after planting. Uniformity of plant development varied between both conventional and Roundup Ready[®] varieties (Table 3). This information is helpful for fall application of herbicides during establishment. Most herbicide applications are based on number of trifoliate leaves. Application of these herbicides and their proper timing is critical to overall stand vigor by eliminating weed competition. The cost of a traditional herbicide program on seedling alfalfa is a significant portion (up to 25%) of the overall stand establishment budget. Information for the conventional alfalfa varieties related to fall dormancy, winter survival index, pest resistance, and other agronomic ratings are provided in Tables 4, 5, and 6.

Table 1. Soil test results from pre-plant samples taken on July 29, 2011 at Central Oregon Agricultural Research Center, Madras, Oregon.

Soil depth (inch)	pH	NO ₃ ¹ (lb/acre)	NH ₄ (lb/acre)	P (ppm)	K (ppm)	S (ppm)
0-14	6.3	122	12	29	227	8.6

¹NO₃ = nitrate, NH₄ = ammonia, P = phosphorus, K = potassium, S = sulfur.

Table 2. Row stand presented as percent green in rows 15 days after planting.

Conventional		Roundup Ready®	
Variety	Stand (% Cover)	Variety	Stand (% Cover)
6422Q	89 cd ¹	R470K215	89
WL 363HQ	93 cd	433TRR	93
WL 354HQ	95 ab	FGI R58HG236	95
445NT	92 bcd	FGI R48W224	92
FGI 48W202	86 d	DKA 43-22RR *	86
Mountaineer 2.0	89 cd	Pioneer 54R01*	89
Pioneer 54V09 *	100 a	4R200 *	100
Pioneer 54Q25 *	100 a		
Vernal	90 bcd		
Plumas *	100 a		n.s.

*Coated seed

¹Mean separation with Least Significant Difference (LSD) at P≤0.05

Table 3. Percentage of plants with 1, 2 and 3 trifoliolate leaves observed 21 days after emergence, for conventional and Roundup Ready alfalfa varieties planted on August 31, 2011 at the Central Oregon Agricultural Research Center, Madras, Oregon.

Percentage of Conventional alfalfa plants with 1, 2, and 3 trifoliolate leaves				Percentage of Roundup Ready® alfalfa plants with 1, 2, and 3 trifoliolate leaves			
Variety	1 st	2 nd	3 rd	Variety	1 st	2 nd	3 rd
	Trifoliolate (%)	Trifoliolate (%)	Trifoliolate (%)		Trifoliolate (%)	Trifoliolate (%)	Trifoliolate (%)
6422Q	1	41	58	R470K215	0	39	61
WL 363HQ	3	61	36	433TRR	0	36	64
WL 354HQ	0	60	40	FGI R58HG236	4	61	35
445NT	7	79	14	FGI R48W224	3	41	56
FGI 48W202	10	49	41	DKA 43-22RR *	1	50	49
Mountaineer 2.0	1	58	41	Pioneer 54R01*	2	65	33
Pioneer 54V09 *	0	27	73	4R200 *	2	45	53
Pioneer 54Q25 *	1	35	64				
Vernal	5	54	41				
Plumas *	0	35	65				

*Coated seed

Table 4. National Alfalfa and Forage Alliance (NAFA) Resistance Ratings.

Resistant Plants (%)	Resistance Class	Class Abbreviation
0-5	Susceptible	S
6-14	Low Resistance	LR
15 -30	Moderate Resistance	MR
31-50	Resistance	R
>50	High Resistance	HR

Table 5. Fall dormancy, winter survival index, pest resistance, and other agronomic ratings for the conventional alfalfa varieties planted in August 31, 2011 at Central Oregon Agricultural Research Center, Madras, Oregon.

Variety	FD	WSI	BW	VW	FW	Anth1	PRR	SAA	PA	BAA	SN	APH1	APH2	NRKN	MFE	CGT	SE	ST	Tech
6422Q	4	1	HR	HR	HR	HR	HR		R		R	HR			H				C
WL 363HQ	5	1	HR	HR	HR	HR	HR		HR		HR	HR		HR	H				C
WL 354HQ	4	1	HR	HR	HR	HR	HR	HR	HR		R	HR	HR		H				C
Ameristand 445NT	4		HR	R	HR	HR	HR	HR	R		HR	R		HR	M				C
FGI 48W202																			
Mountaineer 2.0	5	2	HR	R	HR	HR	HR	R	HR		HR	R		R	H				C
54V09*	4		HR	HR	R	HR	HR	R	HR		HR	R	MR	HR					C
54Q25*	4		HR	HR	HR	HR	HR	R	R		HR	R		HR					C
Vernal	2		R		MR									MR					C
Plumas	4	2	HR	R	HR	HR	HR	R	R		HR	HR		R	H				C

Blank space indicates that the variety is susceptible or has not been adequately tested.

*Coated Seed

Table 6. Fall dormancy, winter survival index, pest resistance, and other agronomic ratings for the Roundup Ready alfalfa Varieties planted in August 31, 2011 at Central Oregon Agricultural Research Center, Madras, Oregon

Variety	FD	WSI	BW	VW	FW	Anth1	PRR	SAA	PA	BAA	SN	APH1	APH2	NRKN	MFE	CGT	SE	ST	Tech
R470K215																			R
433 TRR	3	2.5	HR	R	R	HR	HR		R			HR							R
FGI R58HG236																			R
FGI R48W224																			R
DKA 43-22RR*	4	2	HR	HR	HR	HR	HR				HR	HR		R	H				R
54R01*	4	2	HR	HR	HR	HR	HR	R	R		R	HR		R	H				R
4R200*	4	2	HR	HR	HR	HR	HR	MR	R	MR	HR	HR		R	H				R

Blank space indicates that the variety is susceptible or has not been adequately tested.

*coated seed

FD = Fall Dormancy, WSI = Winter Survival Index, BW = Bacterial Wilt, VW = Verticillium Wilt, FW = Fusarium Wilt, Anth1 – Anthracnose Race 1,

PRR = Phytophthora Root Rot, SAA = Spotted Alfalfa Aphid, PA = Pea Aphid, BAA = Blue Alfalfa Aphid, SN = Stem Nematode, APH1 = Aphanomyces Race 1, APH2 = Aphanomyces Race 2, NRKN = Northern Root Knot Nematode, MFE = Multi-Foliolate Expression

CGT = Continuous Grazing Tolerance, SE = Standability Expression, ST = Salt Tolerance (G – germination, F – forage), Tech = Technology (C – conventional, H – Hybrid, R – Roundup Ready)

Fall Dormancy Rating: 1 = most dormant to 11 = least dormant

Winter Survival Index: 1 = Superior, 2 = Very Good, 3 = Good, 4 = Moderate, 5 = Low, and 6 = Non-Winter Hardy