

Alfalfa Variety Selection – Decisions, Decisions, Decisions

Dan Putnam, Chris DeBen, and Shannon Mueller, UC Davis and UCCE
Kearney Alfalfa & Forage Field Day, September 20, 2017

See: <http://alfalfa.ucdavis.edu> for current variety information

What needs to be considered when selecting an Alfalfa Variety?

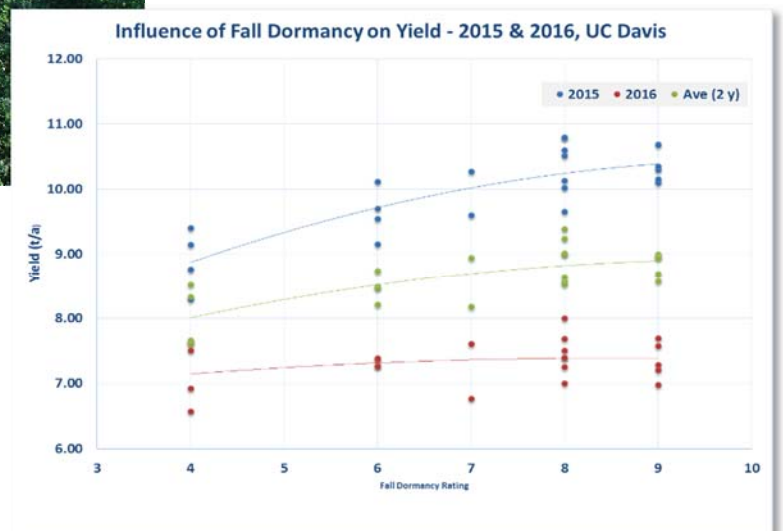
1. Fall Dormancy
2. Yield Potential
3. Pest Resistance Characteristics
4. Stand Persistence Potential
5. Forage Quality
6. Biotech Traits
7. Economics

1. Fall Dormancy



Fall dormancy affects yield, quality, and persistence. Yield tends to increase with fall dormancy score while forage quality declines. Choose a variety adapted to your production area. In this part of the Central San Joaquin Valley, varieties with fall dormancy scores ranging from 7-9 or 10 are recommended.

Differences in fall dormancy begin to appear in late summer and fall. More dormant alfalfas begin to yield less than their non-dormant counterparts. Choosing a variety in the wrong dormancy class for a particular region may result in excessive stand loss in the first winter or lower production potential through the growing season.



2. Yield Potential

Yield is the primary driver for profitability and integrates many components including fall dormancy, pest and disease resistance, and persistence. We have observed yield differences of 20-30% in the San Joaquin Valley which can be economically important. Data from the most recent Kearney Trial is shown below. Use data from the trial location most similar to the location of the field to be planted.

2014-2016 YIELDS. UC KEARNEY ALFALFA CULTIVAR TRIAL. TRIAL PLANTED 9/18/2013										
		2014	2015	2016	Average					
		Yield	Yield	Yield						
	FD	Dry t/a								
Released Varieties										
DG 9212	9	14.40 (1)	12.32 (5)	13.00 (9)	13.24 (3)	A B C				
6906N	9	14.18 (2)	12.05 (10)	13.39 (6)	13.21 (4)	A B C D				
6015R	10	14.06 (5)	11.91 (15)	13.23 (7)	13.06 (6)	A B C D E				
Sun Quest	9	13.24 (27)	12.71 (3)	12.98 (10)	12.98 (7)	A B C D E F				
Catalina (OGP)	9	13.93 (8)	11.96 (13)	12.66 (17)	12.85 (8)	A B C D E F G				
Saltana	9	13.36 (22)	11.68 (22)	13.44 (4)	12.83 (10)	A B C D E F G				
RRALF 9R100	9	12.94 (39)	12.40 (4)	13.00 (8)	12.78 (12)	A B C D E F G H				
RRALF 9R100	9	13.37 (21)	12.01 (12)	12.83 (15)	12.73 (13)	A B C D E F G H				
WL 662HQ.RR	9	14.04 (6)	11.28 (30)	12.65 (18)	12.65 (14)	A B C D E F G H				
WL552HQ.RR	10	13.78 (9)	10.97 (35)	12.89 (13)	12.55 (15)	A B C D E F G H I				
Ameristand 901TS	9	13.71 (11)	11.67 (23)	12.16 (26)	12.51 (17)	A B C D E F G H I J				
WL 662HQ.RR	9	13.16 (30)	12.27 (6)	12.01 (28)	12.48 (18)	A B C D E F G H I J K				
SW9628	9	13.19 (29)	11.42 (27)	12.72 (16)	12.44 (19)	A B C D E F G H I J K				
6015R	10	13.35 (24)	11.68 (21)	12.29 (23)	12.44 (20)	A B C D E F G H I J K				
Catalina (EM)	9	13.36 (23)	10.89 (37)	12.93 (12)	12.39 (22)	A B C D E F G H I J K L				
Ameristand 915TS RR	9	13.13 (32)	11.73 (18)	12.28 (24)	12.38 (23)	A B C D E F G H I J K L				
Integra 8800	8	13.42 (19)	11.16 (31)	12.55 (19)	12.38 (24)	A B C D E F G H I J K L				
AR-370	10	13.63 (15)	11.71 (19)	11.63 (37)	12.32 (25)	A B C D E F G H I J K L				
WL 550 RR	8	12.76 (46)	12.18 (8)	11.56 (41)	12.17 (28)	B C D E F G H I J K L M				
Catalina (QR)	9	13.27 (25)	11.44 (26)	11.78 (32)	12.16 (29)	B C D E F G H I J K L M				
WL 550 RR	8	13.73 (10)	11.28 (29)	11.38 (47)	12.13 (32)	D E F G H I J K L M				
Ameristand 915TS RR	9	13.61 (16)	10.78 (40)	11.99 (30)	12.13 (33)	D E F G H I J K L M				
SW8421-S	8	12.94 (38)	11.02 (33)	12.21 (25)	12.06 (37)	E F G H I J K L M				
Supersonic	9	12.61 (49)	11.94 (14)	11.43 (43)	11.99 (38)	E F G H I J K L M				
Catalina (OGP+QR)	9	13.97 (7)	9.77 (49)	12.15 (27)	11.96 (39)	F G H I J K L M				
WL656HQ	9	12.79 (45)	11.00 (34)	12.01 (29)	11.93 (40)	F G H I J K L M				
WL552HQ.RR	10	13.05 (36)	9.97 (48)	11.53 (42)	11.52 (45)	I J K L M N				
Catalina	9	12.24 (53)	10.48 (44)	11.63 (38)	11.45 (47)	J K L M N O				
PGI 908s	9	13.11 (34)	9.02 (51)	11.20 (49)	11.11 (51)	M N O P				
Cuf 101	9	13.12 (33)	8.60 (53)	10.25 (52)	10.66 (52)	N O P				
NeMex Melton	7	12.60 (50)	8.44 (54)	10.11 (53)	10.38 (53)	O P				
Ameristand 445NT	4	11.71 (54)	8.85 (52)	10.11 (54)	10.22 (54)	P				
MEAN		13.25	11.20	12.12	12.19					
CV		8.28	15.19	9.17	7.53					
LSD (0.1)		NS	2.01	1.32	1.09					

Don't base a decision on what to plant using just one year of data.

Trial seeded at 25 lb/acre viable seed on Hanford fine sandy loam soil at the Univ. of Calif. Kearney Agricultural Center, Parlier, CA.
 Entries followed by the same letter are not significantly different at the 10% probability level according to Fisher's (protected) LSD.
 FD = Fall Dormancy reported by seed companies. Also, included in this trial were plots inoculated with 4 seed treatment combinations using alfalfa variety 'Catalina'. These treatments include: Optimize Gold Plus (OGP), Rhizobia with an LCO promoter; An isoflavinoid (EM-09009); and Quick Roots (QR), a microbial seed inoculant.

3. Pest Resistance

An alfalfa variety is a ‘population’ consisting of a range of plant types in a single variety. Thus, alfalfa varieties typically have more variation within a variety than most other crop plants – both an advantage and a disadvantage. Resistance is not absolute. When a variety has a high level of resistance to a pest, it’s not 100%, but >50% of the plants that are resistant. Even a highly resistant variety can be overwhelmed if the pest pressure is high.

Note – Host plant resistance is often the only economically viable means of managing a disease, insect pest, or nematodes. Think about pest resistance as you do auto insurance – it may not be important every year, but it can be very important in those years with severe pest pressure.

Resistance Abbreviations	Percent Resistance¹
HR Highly Resistant	>51%
R Resistant	31-50%
MR Moderately Resistant	15-30%
LR Low Resistance	6-14%
S Susceptible	<5%

Recommendations Sacramento/San Joaquin Valley:

	4-8 Rating
Fall Dormancy	R
Spotted Alfalfa Aphid (SAA)	HR
Pea Aphid (PA)	HR
Blue Alfalfa Aphid (BAA)	HR
Pythophthora Root Rot (PRR)	HR
Bacterial Wilt (BW)	MR
Fusarium Wilt (FW)	HR
Stem Nematode	HR
Root Not Nematode	HR
Verticillium Wilt (VW)	R

Source of Pest Resistance Characteristics for commercial varieties - NAFA publication *Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties* located at <https://www.alfalfa.org/pdf/2017%20NAFA%20Variety%20Leaflet.pdf>

4. Stand Persistence Potential

Most stands in this area are kept for 3 years. Persistence is influenced by harvest traffic, irrigation practices, root diseases, and nematodes. Variety tests demonstrate which varieties still produce well at the end of the multiple year trial.

5. Forage Quality

Varieties differ somewhat in forage quality, but management factors can often have a greater impact on quality. Forage quality is of great importance in a low-price year, but tends to be less important to growers in a high price year. If the price differential between *Supreme*, *Good*, and *Fair* alfalfa hay is large, it might pay to sacrifice yield for quality, but those times are relatively few. In most years, a grower makes more money choosing the highest yielding varieties over varieties that would yield less but perhaps produce higher quality hay.

Remember:

- Yields are more important economically than quality (mostly),
- Fall Dormancy can greatly affect quality (see above)
- Cutting Schedule is a more powerful method to influence quality compared to variety selection.
- More dormant lines enable growers to adjust harvest schedules with greater success.
- Stand Persistence tends to be somewhat superior in more dormant lines than in non-dormant lines, especially varieties such as CUF-101 which tends to go out quickly in the Central Valley.

6. Biotech Traits

The most widely-used biotech trait is currently glyphosate resistance. A second biotech trait is HarvXtra: Are either of these right for you? In both cases, you need to ask yourself these questions: Do your markets accept GE crops? (Organic, no. Export, currently mostly no.) How might your decision affect Coexistence with your neighbors – don't impact neighbors who may be sensitive to GE traits.

Roundup Ready Trait – additional considerations for determining selection:

- Your current weed pressure and control strategy success.
- Can you justify the cost (compare Roundup vs. conventional weed control costs)?
- Do you have Roundup-resistant weeds? Weed shifts? It is important to incorporate a combined strategy of occasional alternative conventional herbicides with Roundup for hard-to-control weeds and to prevent weed shifts/resistance.

HarvXtra Trait– additional considerations for determining selection:

- HarvXtra was de-regulated in 2014. Mostly dormant varieties available currently (FD 4), but some FD 6-8 becoming available in 2016-18.

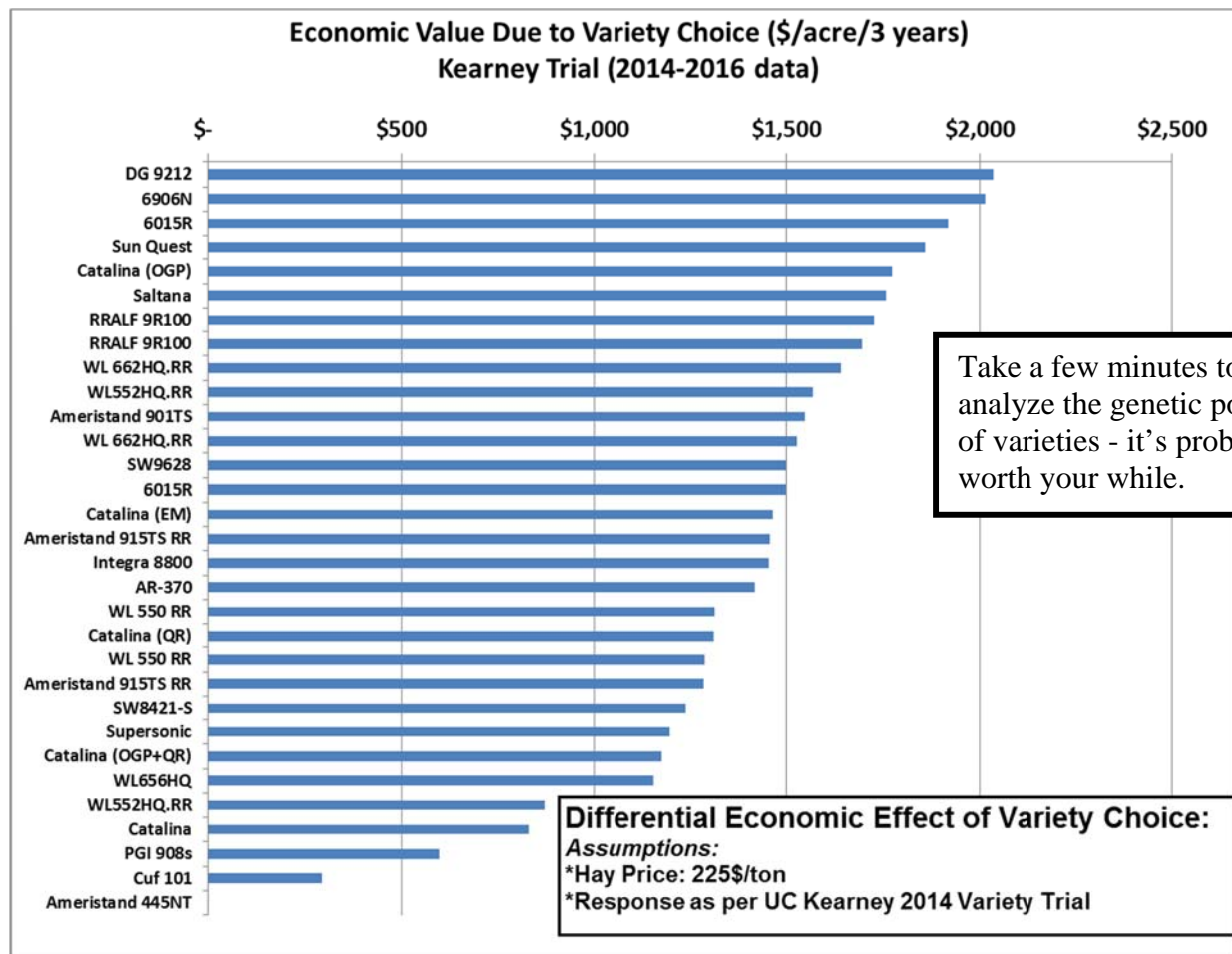
- HarvXtra (FG International) is genetically engineered and distinct from the Hi-Gest lines (Alforex, Dow AgroSciences), which are non-GM.
- Review comparative data - e.g. from the 2016 California Alfalfa Symposium where both companies presented information about their products. See video and PowerPoints at: <http://alfalfa.ucdavis.edu/+symposium/2016/index.aspx> - not all 'low lignin' products are the same.
- Will your markets reward quality?
- Cost/benefit – impacts on yield as well as quality.

7. Economics

The maximum differences in **seed costs** might be about \$75/acre (not counting biotech traits). However, the differences due to **yield potential of varieties** are much higher. In the calculation below from the last Kearney trial, the economic benefit is well over \$1,000/acre over 3 years. The benefit can be over \$300/acre in a single year.



Look at PERFORMANCE potential before you look at the COST of the seed. The production potential includes yield, pest resistance, persistence, quality, & biotech traits.



Kearney Layout

Roundup												Conventional												Conventional												Roundup	
												←-----Spray 36'----->																									
												6'																									
B	47	B	B	48	24	23	39	7	40	5	8	B		B	9	24	6	14	3	42	28	47	B	B	45	B											
	12			13	36	37	60	61	84	85	108				109	132	133	156	157	180	181	204			205												
B	46	B	B	46	12	17	36	19	25	26	18	B		B	11	2	21	16	33	30	36	44	B	B	48	B											
	11			14	35	38	59	62	83	86	107				110	131	134	155	158	179	182	203			206												
B	45	B	B	45	11	34	4	9	28	30	32	B		B	25	12	26	39	4	15	5	46	B	B	44	B											
	10			15	34	39	58	63	82	87	106				111	130	135	154	159	178	183	202			207												
B	43	B	B	44	41	37	27	14	38	42	31	B		B	34	8	10	40	31	7	17	45	B	B	47	B											
	9			16	33	40	57	64	81	88	105				112	129	136	153	160	177	184	201			208												
B	48	B	B	43	13	20	10	35	2	6	15	B		B	38	37	32	13	41	27	29	48	B	B	46	B											
	8			17	32	41	56	65	80	89	104				113	128	137	152	161	176	185	200			209												
B	44	B	B	47	22	33	29	16	3	21	1	B		B	1	18	22	35	20	23	19	43	B	B	43	B											
	7			18	31	42	55	66	79	90	103				114	127	138	151	162	175	186	199			210												
B	47	B	B	46	11	38	31	4	3	35	39	B		B	25	23	12	9	2	36	34	45	B	B	46	B											
	6			19	30	43	54	67	78	91	102				115	126	139	150	163	174	187	198			211												
B	45	B	B	45	25	10	20	19	32	36	6	B		B	15	24	38	17	18	5	11	46	B	B	45	B											
	5			20	29	44	53	68	77	92	101				116	125	140	149	164	173	188	197			212												
B	43	B	B	47	34	21	2	13	24	37	18	B		B	41	4	20	29	42	27	3	44	B	B	44	B											
	4			21	28	45	52	69	76	93	100				117	124	141	148	165	172	189	196			213												
B	46	B	B	43	8	22	9	12	23	28	14	B		B	14	22	10	31	35	32	30	43	B	B	47	B											
	3			22	27	46	51	70	75	94	99				118	123	142	147	166	171	190	195			214												
B	48	B	B	44	17	27	26	41	15	40	5	B		B	28	8	37	33	6	40	39	48	B	B	48	B											
	2			23	26	47	50	71	74	95	98				119	122	143	146	167	170	191	194			215												
B	44	B	B	48	42	33	29	30	7	16	1	B		B	13	19	7	21	16	1	26	47	B	B	43	B											
	1			24	25	48	49	72	73	96	97				120	121	144	145	168	169	192	193			216												

Levy (6' unplanted space)

III

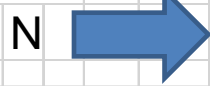
IV

264'

←-----36'-----> | ←-----84'-----> | ←-----6'----->

←-Spray to Flag

Plots: 3' X 22' planted, trim to 18' length



B = all RR line (FD 8 WL550RR) Planted: September 18, 2013

No.	Variety Name				
1	Cuf 101	11	RD132	21	DG 9212
2	SW9628	12	Saltana	22	FG 106T701
3	SW8421-S	13	Vulcan	23	FG 98T812
4	SW9106	14	Supersonic	24	Sun Quest
5	SW9107	15	Catalina	25	Ameristand 901TS
6	SW9108	16	Catalina (OGP)	26	WL656HQ
7	SW7339	17	Catalina (EM)	27	98T811
8	SW8341	18	Catalina (QR)	28	108T813
9	SW1037	19	Catalina (OGP+QR)	29	CW058071
10	RD121	20	6906N	30	CW060046
				31	PGI 908s
				32	AR-12
				33	AR-380
				34	AR-370
				35	NeMex Melton
				36	UC 416
				37	UC 417
				38	UC 418
				39	UC 419
				40	UC 101
				41	Ameristand 445NT
				42	Integra 8800
				43	WL552HQ.RR
				44	RRALF 9R100
				45	Ameristand 915TS RR
				46	6015R
				47	WL 662HQ.RR
				48	WL 550 RR