Variety X Irrigation Trials – UC Kearney Research

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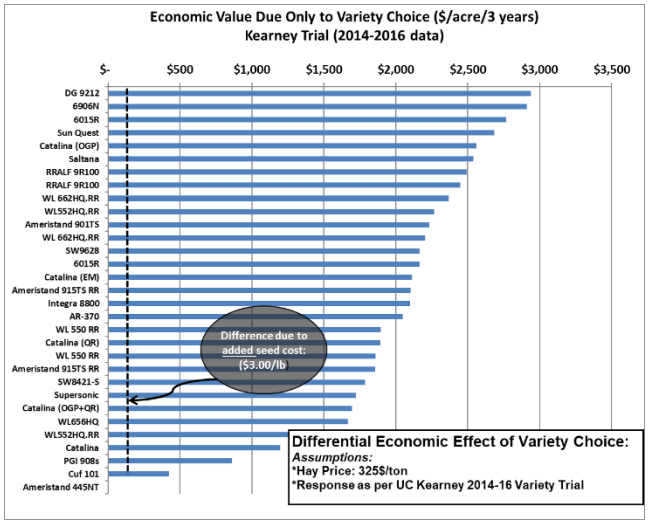
How to choose an alfalfa variety? While alfalfa varieties may superficially look similar, each variety is really a population of plants – look carefully. Improved varieties have an average yield or other characteristic that may be superior or inferior to other lines. Criteria for selection:

- Yield
- Traits (RR, HarvXtra)
- Pest Resistance
- Persistence
- Quality
- Company Hats/price

Start with Yield. The economic Value of yield differences between varieties can be significant economically. Yield economic differences due JUST yield differences can be worth hundreds or thousands of dollars/acre over three years (see graph from 2014-16 trial). Yield also predicts plant vigor and stand life that help with weed competition and recovery from pest damage.



Varieties: Important for Pest Management. Alfalfa variety choice can make a large difference in pest management. Key aspects are as follows:

1. Roundup-Ready Alfalfa – can assist with difficult weed problems.
2. Stand Persistence – prevents weed intrusion.
3. Insect, nematode, and disease genetic resistance—often the only cost-effective tool.
4. A pest may take some of the plants, but not all in a resistant variety.

Recommendations San Joaquin Valley:

	4-9 Rating
Fall Dormancy:	
Spotted Alfalfa Aphid (SAA):	R
Pea Aphid (PA)	HR
Blue Alfalfa Aphid (BAA):	HR
Pythopthora Root Rot (PRR).	HR
Bacterial Wilt (BW):	MR

Fusarium Wilt (FW):	HR
Stem Nematode:	HR
Root Not Nematode:	HR
Verticillium Wilt (VW)	R

- **Current Variety Leaflet:** https://www.alfalfa.org/publications.php
- **Variety Trial Data:** https://alfalfa.ucdavis.edu/+producing/variety/

What about Water Issues and Varieties?

There is little doubt that water will be a limiting factor for alfalfa production in the San Joaquin Valley – actually in many parts of the Western US. Contrary to some public opinion, alfalfa's water story is actually quite positive. Alfalfa has proved to be highly flexible and resilient in surviving droughts while sustaining productivity, even when as little as ½ the water requirement is applied. Data from Davis and other locations indications that between 60-95% of full yields can be realized when irrigation is cut back 25-50% during the season (see graph). In most of the studies on deficit irrigation, alfalfa has mostly recovered from late-summer droughts and come back to yield normally the following year. Contrary to superficial thinking on crop choice concerning water supply, alfalfa, with its high flexibility, is an important component to adjust to a water uncertain future. Our objective is to understand the optimum varieties for droughts.

UC Studies on Alfalfa Varieties & Water:

- High salinity response of alfalfa varieties (West Side, completed)
- Alfalfa variety x deficits & winter recharge (Kearney, current)
- Alfalfa variety x deficits (UC Davis, 2023)
- Alfalfa Variety x deficits (El Centro, 2023

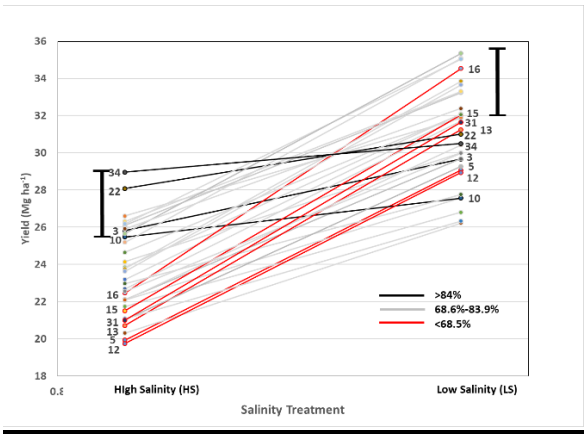


Figure 3. Three-year dataset from West Side showing differences between Varieties in response to salinity. While some lines did quite well under both saline and low saline conditions, others were affected more than 35%. Alfalfa is generally a pretty salt tolerant species.

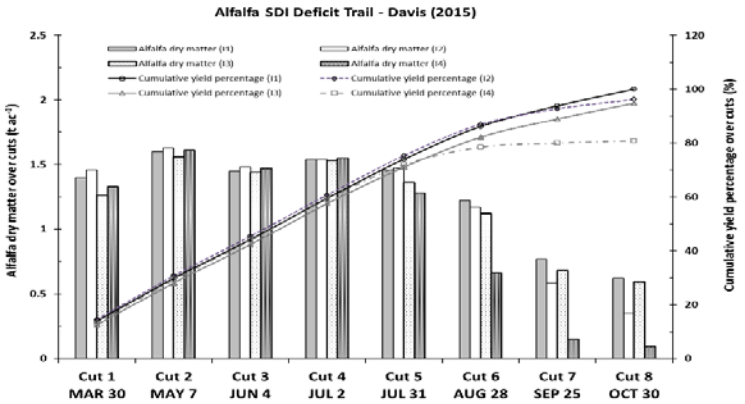


Figure 2. These data from UC Davis illustrate the ability of alfalfa to sustain late-season drought while conserving water. Approximately 50% reduction in water resulted in about 80% of full yields, while a 25% reduction in applied ET resulted in about a 95% of full yields. Average of 15 varieties, drip irrigated.

FIRST-YEAR YIELDS – KEARNY TRIAL (NORMAL IRRIGATION). Note- ONE YEAR DATA SHOULD NOT BE USED TO JUDGE VARIETY PERFORMANCE.

2022 YIELDS, UC KEARNEY ALFALFA CULTIVAR TRIAL. TRIAL PLANTED 10/19/21

Note: Single year data should not be used to evaluate alfalfa varieties or choose alfalfa cultivars

		Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Cut 6	Cut 7	YEAR		% of
		9-May	7-Jun	12-Jul	17-Aug	13-Sep	11-Oct	15-Nov	TOTAL		CUF101
	FD	Dry t/a									
WL 668HQ.RR	9	2.23 (1)	1.97 (1)	2.61 (1)	2.07 (11)	1.49 (3)	1.22 (1)	0.94 (1)	12.54 (1)	A	121.6
NM1705PAR	7	1.99 (3)	1.82 (4)	2.47 (6)	2.36 (1)	1.58 (1)	1.16 (2)	0.86 (10)	12.25 (2)	A B	118.8
AmeriStand 835NT RR	8	1.96 (5)	1.92 (2)	2.44 (7)	2.12 (4)	1.34 (13)	1.12 (4)	0.90 (2)	11.81 (3)	A B C	114.5
SW 9813s	9	2.07 (2)	1.92 (3)	2.37 (8)	1.99 (16)	1.33 (15)	1.13 (3)	0.85 (13)	11.67 (4)	A B C D	113.2
Alphatec 921	9	1.85 (7)	1.81 (5)	2.49 (3)	2.18 (2)	1.39 (7)	1.08 (8)	0.84 (15)	11.63 (5)	A B C D	112.8
6829R	8	1.94 (6)	1.79 (9)	2.49 (3)	1.98 (17)	1.50 (2)	1.01 (16)	0.79 (18)	11.49 (6)	A B C D	111.5
NM1703PAR	7	1.77 (9)	1.75 (12)	2.51 (2)	2.11 (8)	1.45 (4)	1.01 (16)	0.88 (7)	11.49 (7)	A B C D	111.4
AmeriStand 803T	8	1.42 (22)	1.80 (7)	2.49 (3)	2.11 (6)	1.35 (11)	1.09 (7)	0.90 (2)	11.16 (8)	A B C D E	108.2
NM170506PAR	7	1.57 (15)	1.64 (18)	2.26 (12)	2.10 (9)	1.42 (6)	1.11 (5)	0.85 (11)	10.95 (9)	A B C D E F	106.2
Magna 995	9	1.33 (24)	1.76 (10)	2.37 (9)	2.15 (3)	1.43 (5)	1.01 (16)	0.85 (11)	10.91 (10)	A B C D E F	105.8
Ameristand 901TS	9	1.58 (13)	1.63 (19)	2.23 (15)	2.04 (13)	1.34 (12)	1.03 (14)	0.89 (6)	10.75 (11)	B C D E F G	104.3
SW 9812	9	1.55 (17)	1.72 (13)	2.25 (13)	2.03 (15)	1.33 (15)	1.02 (15)	0.84 (14)	10.73 (12)	B C D E F G	104.1
Highline	9	1.55 (17)	1.59 (20)	2.21 (16)	2.04 (13)	1.36 (9)	1.06 (11)	0.90 (2)	10.71 (13)	B C D E F G	103.8
RRALF 9R100	9	1.36 (23)	1.66 (16)	2.18 (17)	2.11 (6)	1.36 (9)	1.08 (8)	0.87 (9)	10.63 (14)	B C D E F G	103.1
NM1701PAR	7	1.50 (19)	1.79 (8)	2.18 (17)	1.92 (20)	1.38 (8)	1.05 (12)	0.79 (17)	10.61 (15)	B C D E F G	102.9
NM1702PAR	7	1.47 (21)	1.76 (11)	2.12 (21)	2.05 (12)	1.33 (15)	1.07 (10)	0.80 (16)	10.60 (16)	B C D E F G	102.8
Alphatec 821	8	1.65 (11)	1.54 (21)	2.28 (11)	2.12 (4)	1.29 (19)	1.00 (20)	0.73 (21)	10.60 (17)	B C D E F G	102.8
NM1704PAR	7	1.47 (20)	1.65 (17)	2.37 (9)	1.96 (19)	1.31 (18)	1.05 (12)	0.77 (19)	10.59 (18)	B C D E F G	102.7
WL 656HQ	9	1.25 (25)	1.69 (14)	2.14 (20)	2.08 (10)	1.34 (13)	1.10 (6)	0.90 (5)	10.51 (19)	C D E F G H	101.9
CUF101	9	1.56 (16)	1.80 (6)	2.16 (19)	1.85 (21)	1.24 (21)	0.82 (25)	0.88 (7)	10.31 (20)	C D E F G H	100.0
RRL913T455	8	1.80 (8)	1.44 (24)	1.98 (23)	1.97 (18)	1.27 (20)	1.01 (19)	0.68 (22)	10.15 (21)	C D E F G H	98.5
6601N	6	1.98 (4)	1.40 (25)	2.25 (14)	1.69 (26)	1.21 (22)	0.85 (24)	0.58 (24)	9.95 (22)	D E F G H	96.5
Ameristand 715NT RR	7	1.74 (10)	1.68 (15)	1.63 (26)	1.84 (23)	1.16 (24)	0.94 (22)	0.59 (23)	9.59 (23)	E F G H	93.0
Magna 801FQ	8	1.17 (26)	1.52 (22)	1.93 (25)	1.85 (22)	1.18 (23)	0.98 (21)	0.76 (20)	9.38 (24)	F G H	91.0
Ameristand 518 NT	5	1.61 (12)	1.45 (23)	2.01 (22)	1.74 (25)	1.10 (25)	0.74 (26)	0.42 (25)	9.06 (25)	G H	87.9
HybriForce-4420/Wet	4	1.58 (13)	1.13 (26)	1.94 (24)	1.84 (23)	1.06 (26)	0.88 (23)	0.37 (26)	8.81 (26)	H	85.4
MEAN		1.65	1.68	2.24	2.01	1.33	1.02	0.79	10.73		
CV		37.74	19.41	16.43	12.40	10.34	14.90	12.46	13.40		
LSD (0.1)		NS	NS	NS	NS	0.17	0.18	0.12	1.74		

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.