

UC Tulelake Field Day, 28 July, 2022
**Strategies for Drought in Alfalfa &
 Variety Testing Results**

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

WATER

FIRST THE BAD NEWS. There is plenty. This is a tough time for farmers in all the western US, including the Klamath Basin of CA-OR. The Western US has been under EXCEPTIONAL drought for more than 2 years in many regions, with the possible exception of some areas of the PNW. As of Spring, 2022, more than 50% of US alfalfa has been considered under severe drought (Figure 1). Many farms are suffering mightily, as are local communities.

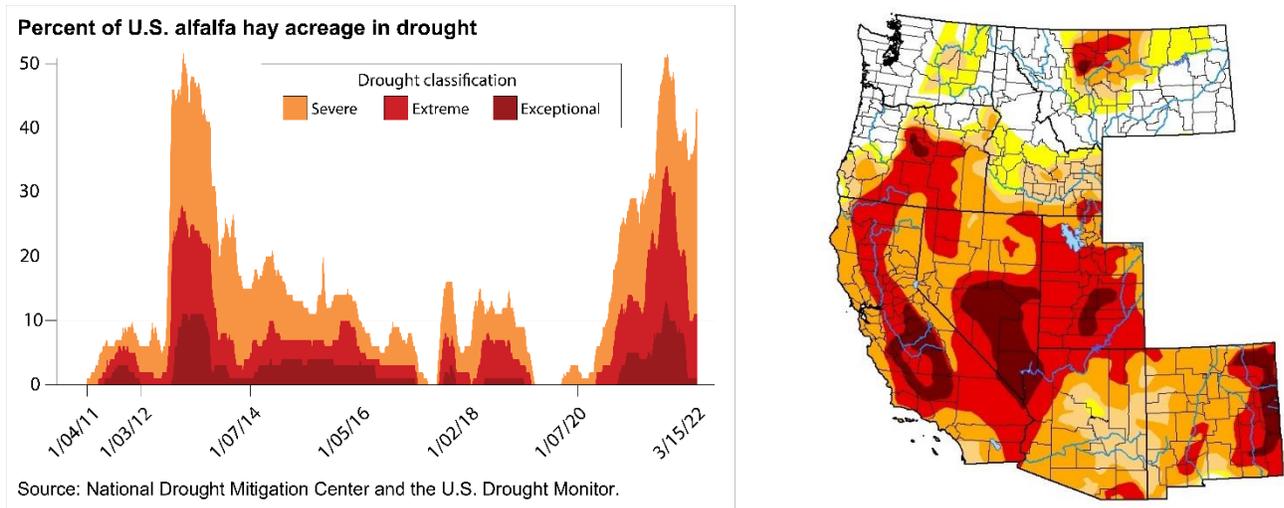


Figure 1. Percentage of US alfalfa under drought (left) and extent of western drought (right)

GOOD NEWS. OK, Not much in the way of good news with regards to water. However, if growers are able to find the water resources, the prices have never been higher.

Table 1. Prices for Alfalfa Hay (July 22, 2022, The Hoyt Report). \$/ton			
Category	Tulare/Hanford (delivered)	Idaho (stack)	WA/OR (stack)
Supreme	\$465-480	\$325-335	\$385
Premium	\$445-458	\$310-330	\$370-380
Good	\$440-450	\$290-315	\$350-375
Fair	\$405-430	\$275-290	\$285-310

RECOMMNDATIONS FOR A LOW WATER YEAR

1. **Triage** – Choose crops and fields with the highest returns, which may mean switching crops, alfalfa is still a promising option, given the price. Choose fields with the best stands, with best promise of persistence. Stop watering older marginal stands.
2. **Starvation Diet.** Though tempting to Spread the meager water supplies across the season, this is not recommended. Highest yields and highest quality are obtained early.
3. **Partial Season Irrigations.**
Water Early as much as possible to build up moisture for mid-season growth. Over 65% of annual production is accomplished by mid July (Figure 2). Then if necessary dry the crop down, or reduce substantially.
4. **Harvest Schedules.** Extend harvest schedules, and water deeply early to obtain highest yields. This is true especially in a high priced year.
5. **Alfalfa-one of the best crops to have in a drought** – due to its deep roots, high yield potential, and ability to be partially irrigated to obtain at least some yield.

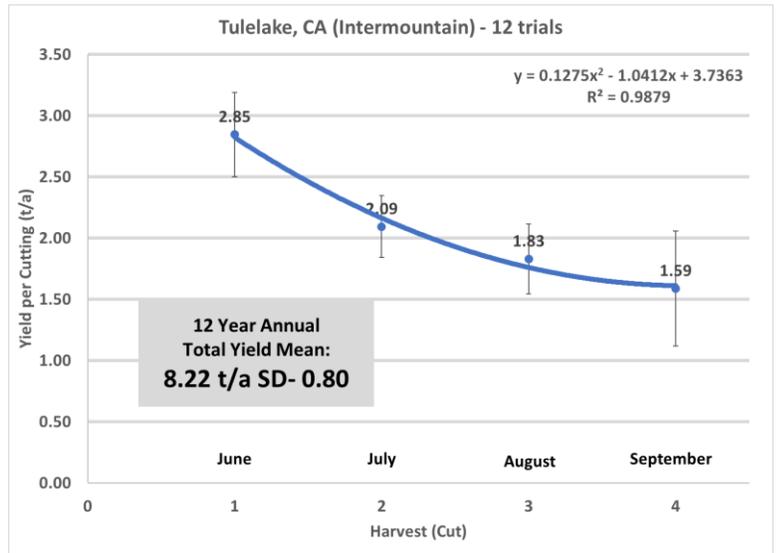


Figure 2. Yield patterns in Tulelake Variety Trials over 12 years. Over 65% of yields are typically obtained by July.

TULELAKE ALFALFA VARIETY TRIALS

The University of California tests alfalfa varieties at multiple locations throughout the state, from Tulelake through the Central Valley to El Centro, CA. Below, the results from the first two cuttings in drought-stricken 2021 growing season at Tulelake illustrate the resilience of alfalfa varieties under drought stress (Figure 3). These results are somewhat unusual given the very high water-holding capacity at Tulelake, but illustrate the early season productivity of alfalfa even with very limited water.

Most Recent Variety Results. Over the 2017-2021 growing seasons, even with the lower seeding-year yields and lower 2021 yields (due to drought), the lowest yielding line produced 6.7 tons/acre averaged across years, and the highest yielding 7.8 tons/acre average over years. The full yield potential of the best varieties was 9.2 to 9.6 t/acre in the fully-watered years (Table 2).

What about Economics? It's actually a difficult to determine whether choice of variety makes an economic difference just by looking at a large field. Figure 4 shows the economic differences due only to variety choice over 5 years at Tulelake. Differences in seed cost is typically easily paid for with higher performance (Figure 4). Other traits like pest resistance or quality, or biotech traits such as Roundup Ready of HarvXtra should be considered.

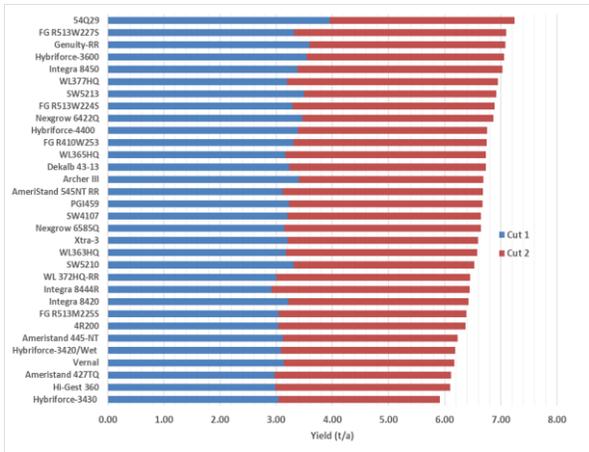


Figure 4. First two cuttings of the Tulelake trial, 2021 obtained with only 6" of winter rainfall contribution.

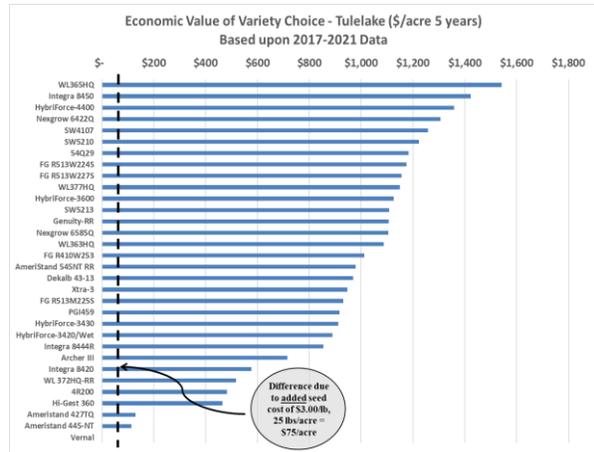


Figure 3. Economic Return from Variety Choice - 5 years, Tulelake Trial (assume \$300 hay).

Table 2. 2017-2022 Tulelake Yield Results.

2017-2022 YIELDS, TULELAKE ALFALFA CULTIVAR TRIAL, TRIAL PLANTED 5/22/17											
		2017	2018	2019	2020	2021*	2022*	Average		% of	
	FD	Yield	Yield	Yield	Yield	Yield	Yield			Vernal	
		Dry t/a									
Released Varieties											
WL365HQ	5	3.80 (9)	9.64 (9)	9.42 (2)	9.23 (1)	6.74 (13)	3.11 (15)	6.99 (1)	A	113.2	
Integra 8450	4	3.76 (11)	9.72 (7)	9.03 (5)	8.88 (6)	7.03 (5)	3.33 (3)	6.96 (2)	A B	112.8	
HybriForce-4400	4	4.14 (4)	9.74 (6)	8.95 (10)	8.63 (21)	6.76 (10)	3.28 (7)	6.92 (3)	A B C	112.0	
Nexgrow 6422Q	4	3.03 (35)	9.89 (1)	9.27 (3)	8.98 (3)	6.87 (9)	3.36 (1)	6.90 (4)	A B C	111.8	
SW4107	4	3.04 (29)	9.84 (2)	9.50 (1)	8.84 (8)	6.65 (18)	3.33 (4)	6.87 (6)	A B C D	111.2	
SW5210	6	3.74 (12)	9.51 (12)	9.05 (4)	8.92 (4)	6.53 (25)	3.26 (9)	6.84 (7)	A B C D E	110.7	
54Q29	4	3.04 (30)	9.76 (5)	8.95 (9)	8.63 (20)	7.24 (1)	3.32 (5)	6.82 (8)	A B C D E F	110.6	
FG R513W227S	5	3.27 (24)	9.20 (26)	8.96 (8)	9.01 (2)	7.09 (2)	3.14 (14)	6.78 (9)	B C D E F G	109.8	
FG R513W224S	5	3.64 (18)	9.50 (13)	8.92 (12)	8.64 (18)	6.89 (8)	3.05 (22)	6.77 (10)	B C D E F G H	109.8	
HybriForce-3600	6	4.28 (2)	9.25 (23)	8.32 (36)	8.53 (24)	7.06 (4)	3.18 (11)	6.77 (11)	B C D E F G H	109.7	
WL377HQ	5	3.04 (27)	9.66 (8)	8.98 (6)	8.88 (7)	6.95 (6)	3.07 (20)	6.76 (12)	B C D E F G H I	109.6	
SW5213	5	3.51 (22)	9.51 (11)	8.82 (16)	8.61 (22)	6.92 (7)	3.09 (17)	6.74 (13)	C D E F G H I	109.3	
Nexgrow 6585Q	5	3.74 (13)	9.25 (22)	8.83 (15)	8.89 (5)	6.65 (19)	2.96 (27)	6.72 (14)	C D E F G H I J	108.9	
Genuity-RR	4	3.74 (14)	9.20 (25)	8.81 (17)	8.53 (23)	7.09 (3)	2.95 (28)	6.72 (15)	C D E F G H I J	108.9	
WL363HQ	5	3.78 (10)	9.26 (21)	8.94 (11)	8.75 (13)	6.58 (22)	3.02 (23)	6.72 (16)	C D E F G H I J	108.9	
Dekalb 43-13	4	3.81 (8)	9.27 (19)	8.71 (19)	8.38 (28)	6.74 (14)	3.09 (19)	6.67 (17)	D E F G H I J K	108.0	
PG459	4	4.16 (3)	9.01 (31)	8.64 (23)	8.25 (35)	6.67 (17)	3.26 (8)	6.67 (18)	D E F G H I J K	108.0	
FG R410W253	4	3.61 (20)	9.20 (24)	8.67 (21)	8.82 (9)	6.75 (11)	2.90 (35)	6.66 (19)	E F G H I J K	107.9	
AmeriStand 545NT	5	3.41 (23)	9.35 (17)	8.83 (14)	8.66 (16)	6.68 (16)	2.91 (34)	6.64 (20)	E F G H I J K L	107.6	
HybriForce-3420M	4	4.09 (5)	9.57 (10)	8.55 (30)	8.25 (36)	6.19 (36)	3.16 (12)	6.63 (21)	E F G H I J K L	107.5	
Xtra-3	4	3.54 (21)	9.41 (15)	8.89 (13)	8.39 (27)	6.59 (21)	2.93 (31)	6.63 (22)	F G H I J K L	107.4	
HybriForce-3430	3	3.98 (6)	9.79 (4)	8.66 (22)	8.37 (29)	5.91 (44)	2.99 (26)	6.62 (23)	G H I J K L	107.2	
FG R513M225S	5	3.71 (16)	9.19 (27)	8.69 (20)	8.80 (11)	6.38 (31)	2.89 (36)	6.61 (24)	G H I J K L	107.1	
Integra 8444R	4	3.72 (15)	9.27 (20)	8.42 (34)	8.67 (15)	6.44 (29)	2.92 (33)	6.57 (25)	H I J K L M	106.5	
Archer III	5	3.03 (38)	9.41 (16)	8.62 (27)	8.32 (32)	6.69 (15)	3.32 (6)	6.56 (26)	I J K L M N	106.3	
Integra 8420	4	3.03 (34)	9.42 (14)	8.44 (33)	8.28 (33)	6.42 (30)	3.09 (18)	6.45 (29)	L M N O P Q	104.5	
WL 372HQ-RR	5	3.02 (42)	9.19 (28)	8.56 (29)	8.18 (38)	6.45 (28)	2.92 (32)	6.39 (31)	M N O P Q R S	103.5	
Hi-Gest 360	3	3.03 (39)	9.30 (18)	8.63 (26)	8.17 (39)	6.10 (41)	3.01 (24)	6.37 (33)	M N O P Q R S T	103.3	
4R200	4	3.67 (17)	8.72 (37)	8.29 (37)	8.24 (37)	6.38 (32)	2.94 (30)	6.37 (34)	N O P Q R S T	103.2	
AmeriStand 427TQ	4	3.04 (25)	8.95 (32)	8.24 (38)	7.77 (43)	6.12 (40)	3.10 (16)	6.20 (40)	S T U	100.5	
AmeriStand 445-N	4	3.04 (26)	8.86 (35)	8.12 (40)	7.82 (42)	6.23 (35)	3.14 (13)	6.20 (41)	S T U	100.4	
Vernal	2	3.03 (32)	8.68 (39)	8.10 (41)	7.69 (44)	6.18 (38)	3.36 (2)	6.17 (42)	T U V	100.0	
MEAN		3.44	9.20	8.66	8.51	6.55	3.04	6.57			
CV		8.16	3.66	3.47	3.97	6.87	5.11	2.61			
LSD (0.1)		0.33	0.40	0.36	0.40	0.53	0.18	0.20			

Trial seeded at 25 lb/acre viable seed at Intermountain Research and Extension Center, Tulelake, 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.

*No supplemental irrigation used for 2021-22 harvests (only natural rainfall and residual soil moisture)

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