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2022 Summer Newsletter

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Research Updates

Scott Valley's Dryland Small Grain Trial

Field trials conducted by Steve Orloff in Siskiyou County in the early 2000s showed growing a winter cereal, especially triticale, can prolong spring and summer grazing or produce hay in early summer. As winter is the wet season in the Intermountain Region of California, this system uses fall and winter precipitation as part of the crop water requirement. Although Orloff's trials successfully demonstrated winter cereal crops are suitable to be grown for grazing or hay, his field experiments were planted in late summer or early fall and required irrigation water for crop establishment and development.

To build on the work Steve conducted several years ago, with the current water crisis in mind, a field trial was planted on October 21, 2021 in Scott Valley to evaluate the performance of newer winter small grain varieties for forage production under dryland conditions.

During this first year of the multi-year project, 14 varieties of triticale, wheat, and barley were assessed regarding forage yield. The only harvest was conducted on May 12th, 2022 and the following data is expressed as fresh weight (ton/A) to mimic grazing and also converted to dry matter basis (18% at boot stage of development).

Fresh yields ranged from 2.7 to 1.5 ton/A on dry matter basis as shown on the following table, with triticale (a hybrid of wheat and rye) varieties performing better than wheat and barley. Generally, triticale produces taller plants and has faster canopy closure compared to wheat, leading to a more competitive advantage against weeds. Additionally, triticale roots are more abundant, which is important under dryland conditions because the crop can explore more soil volume in the search for water.

	ton/A						
Variety	Fresh Weight	Dry matter					
14401	15.2	2.7	A				
Thor	13.2	2.4	A	B			
Legend	12.2	2.2	A	B	C		
TriMark099	11.9	2.2		B	C		
Surge	11.8	2.1		B	C		
Merlin Max	11.6	2.1		B	C	D	
Forerunner	11.0	2.0		B	C	D	E
UC3185	10.5	1.9		B	C	D	E
Yamhill	10.1	1.8		B	C	D	E
Alvena	9.1	1.6			C	D	E
Mandala	9.1	1.6			C	D	E
Patron + Eureka	8.5	1.5				D	E
Patron	8.3	1.5				D	E
Brundage	8.2	1.5					E
Mean	10.8	1.9					
CV%	21.0						

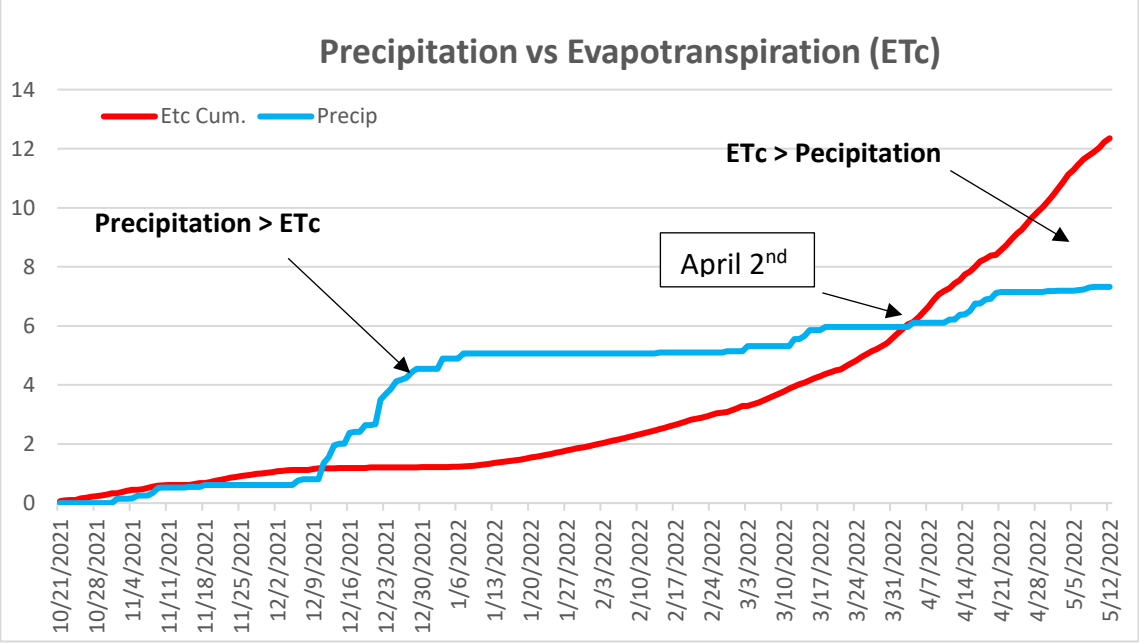
Canopy coverage was assessed on May 3, 2022. The varieties ranged from 72.5 to 87.5%, showing a relatively good persistence under very dry conditions.

Variety	Canopy Cover on May 3rd, 2022
Merlin Max	87.5
Patron +Eureka	85.0
Forerunner	85.0
Surge	82.5
UC3185	82.5
Patron	80.0
Legend	80.0
14401	80.0
Yamhill	77.5
Thor	75.0
Alvena	75.0
Mandala	75.0
Brundage	72.5
TriMark099	72.5
Mean	79.3
CV %	6.1
Significance	NS

Precipitation and Crop Evapotranspiration (ETc)

The crop was planted on October 21, 2021 in Diyou loam soil on the east side of Scott Valley. According to the CIMIS station number 225 in Fort Jones, Scott Valley's average precipitation between 2016 and 2021 was 15.2 inches per year, which shows potential for dryland small grain production. The location received 0.07 inch of rain one day prior to the trial's planting, and the next measurable rain was on November 1st, 2021 (0.15 inch). The soil's moisture content and the rain following planting provided enough water for good seed germination. During seed germination and early crop development, there were 5.07 inches of precipitation (rain and snow) from October 21st, 2021 to January 7, 2022. Winter precipitation looked great up until early January, and then there was no measurable precipitation the rest of January, 0.07 inch in February, 0.83 inch in March, 1.21 inches in April, and only 0.14 inch in May (until harvest on May 12, 2022). When normal or above-normal precipitation happens, rain and snow are often sufficient to sustain small grain growth until March or April when fall-planted. However, that was not the case in the 2021/22 season in Scott Valley.

Small grain water consumption varies depending on variety, location, and stage of development. If sown in October and harvested for hay in the first half of May, peak water consumption is in March and April. The amount of precipitation the crop received was enough until early April in our trial as can be seen below.



Precipitation versus evaporation: plants became water stressed (cumulative ETc greater than cumulative precipitation) around April 2nd

On April 2, crop cumulative evapotranspiration became higher than the total precipitation. From then on, the lack of water started to impact plant growth, and later that month, signs of water stress were showing up. In order to calculate crop ETc, I needed to estimate the crop coefficient (Kc). In this trial, a Kc=0.7 was used for the first 160 days after plating and Kc=1.15 was used for the next 43 days (until harvest). The cumulative ETc, or the amount of water consumed by the crop and loss through soil evaporation, from planting to the May 12 harvest was 12.35 inches of water. On the other hand, precipitation was 7.32 inches during the same period of time.

As the plots were showing significant water stress and plant growth stagnated, plants were not harvested for hay. Fall sown triticale, wheat, and barley can be successfully grown for grazing and hay with limited water. While the Scott Valley field trial did not receive adequate precipitation for hay harvest, a couple of spring irrigations could provide enough water to allow crop growth for a summer hay harvest. Additionally, small grains can be used to fill dry corners on center pivots with no end gun.

2022 Alfalfa Variety Trial Yields

The following table depicts the cumulative yield after 3 cuttings on June 21st, July 29th, and September 13th. The average dry matter percentage of the subsamples collected was 25%.

2022 Yields, UCCE Scott Valley Alfalfa Variety Trial

Varieties	FD	Dry ton/a						
LG EXTERRA (5FD)	5	9.3	A					
SW 4412Y	4	9.3	A					
Ameristand 518 NT	5.2	9.2	A	B				
6422Q	4	8.9	A	B	C			
AFX Magnum 8	4	8.9	A	B	C			
LG Camas	4	8.9	A	B	C			
AFX Hybriforce 4400	4	8.8	A	B	C			
SW5210	5	8.7	A	B	C	D		
6585 Q	5	8.6	A	B	C	D	E	
Hybriforce 3400	4	8.6	A	B	C	D	E	
Ameristand 427TQ	4	8.6	A	B	C	D	E	
AFX 460	4	8.6	A	B	C	D	E	
SW4107	4	8.5	A	B	C	D	E	F
WL 377 HQ	5	8.3	A	B	C	D	E	F
Ameristand 415 NT RR	4.3	8.3	A	B	C	D	E	F
AFX 579	5	8.3		B	C	D	E	F
SW3407	3	8.2		B	C	D	E	F
AFX 360 Highgest	3	8.1			C	D	E	F
DG 5315	5	8.1			C	D	E	F
Nexgrow 6516	5	8.1			C	D	E	F
DG 4210 Dynagrow	4	8.0			C	D	E	F
LG 4R300	4.1	7.8				D	E	F
LG 5R300 (5FD)	5	7.6					E	F
Ameristand 545 NT RR	5.4	7.5						F
MEAN		8.5						
CV		10.0						
LSD		1.9						

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