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2021/22 Siskiyou County Dryland Small Grain Trial

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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 12, 2022, and the following data is expressed as fresh weight (ton/A) to mimic grazing and also converted to dry matter.

Yields ranged from 3.0 to 1.6 ton/A on dry matter basis (90% DM), with triticale (a hybrid of wheat and rye) varieties performing better than wheat and barley.

		ton/A						
Variety		Fresh Weight	Dry matter (90% DM)					
14401	Triticale	15.2	3.0	A				
Thor	Triticale	13.2	2.6	A	B			
Legend	Triticale	12.2	2.4	A	B	C		
TriMark099	Triticale	11.9	2.4		B	C		
Surge	Triticale	11.8	2.4		B	C		
Merlin Max	Triticale	11.6	2.3		B	C	D	
Forerunner	Triticale	11.0	2.2		B	C	D	E
UC3185	Triticale	10.5	2.1		B	C	D	E
Yamhill	Wheat	10.1	2.0		B	C	D	E
Alvena	Wheat	9.1	1.8			C	D	E
Mandala	Wheat	9.1	1.8			C	D	E
Patron + Eureka	Wheat + Barley	8.5	1.7				D	E
Patron	Wheat	8.3	1.7				D	E
Brundage	Wheat	8.2	1.6					E
Mean		10.8	2.2					
CV%		21.0						

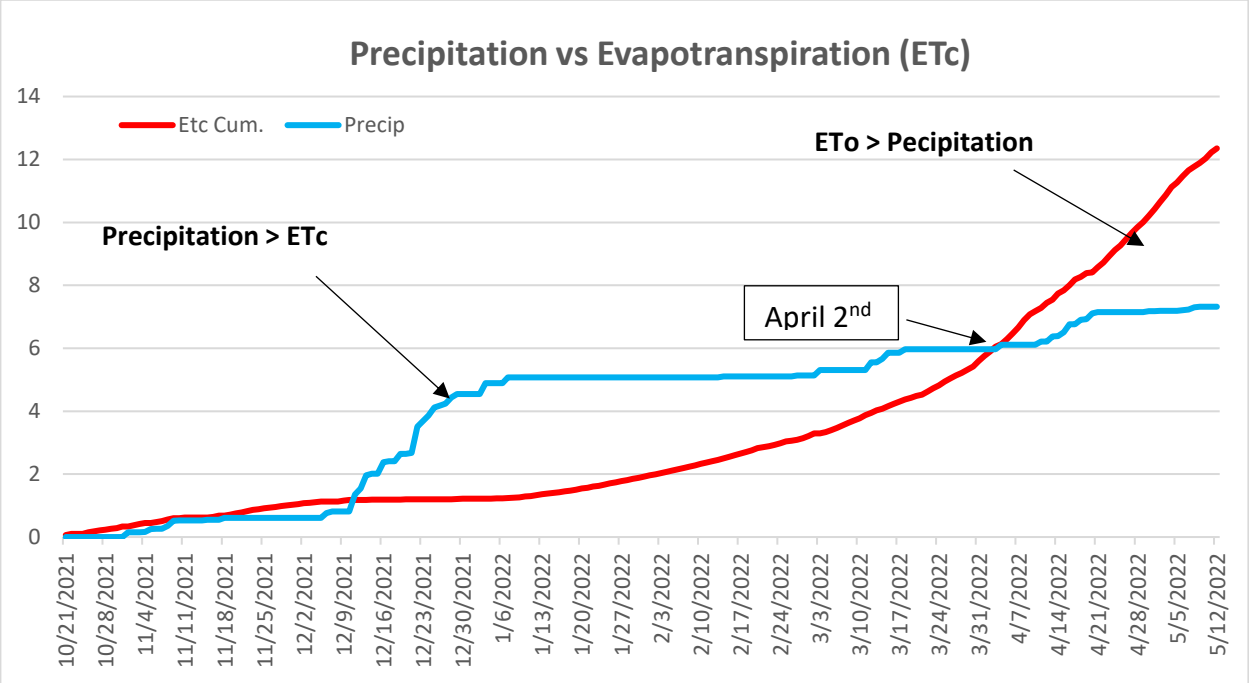
Canopy coverage was assessed on May 3, 2022. The varieties ranged from 87.5 to 72.5% showing a relatively good persistence under very dry conditions.

Variety	Crop Type	Canopy Cover on 5/3/2022
Merlin Max	Triticale	87.5
Patron +Eureka	Wheat + Barley	85.0
Forerunner	Triticale	85.0
Surge	Triticale	82.5
UC3185	Triticale	82.5
Patron	Wheat	80.0
Legend	Triticale	80.0
14401	Triticale	80.0
Yamhill	Wheat	77.5
Thor	Triticale	75.0
Alvena	Wheat	75.0
Mandala	Wheat	75.0
Brundage	Wheat	72.5
TriMark099	Triticale	72.5
Mean		79.3
CV %		6.1

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 (i.e. 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 in the figure 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.