

Forage Production of Four Crops Grown Under Two Different Irrigation Cultures

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INTRODUCTION

Forage yields trials of oats, barley, durum, and wheat were conducted at the Maricopa Agricultural Center during the '88-'89 growing season. There have been no previous forage yield trials for small grains grown under a one-irrigation culture. The purpose of this forage trial was to obtain yields from 6 cultivars in each of the four crops - oats, barley, durum, wheat - grown under a one-irrigation culture. As a comparison, the same trial was duplicated using a full-irrigation culture.

The varieties tested included two barleys (Seco, 2-22-9), two durums (B83-33, B83-40) and three wheats (M83-39-184, B85-277A, B83-450). These cultivars were developed for grain yield under a one-irrigation culture and were included in this trial to obtain forage yields.

MATERIALS AND METHODS

For both cultures, a 6x6 Latin square design was used to compare differences in forage yields between cultivars of each crop. The plot size was 5.5 feet wide by 15 feet long, consisting of six rows planted 11 inches apart. The seedbed was prepared by incorporating 120 lbs N/A and 75 lbs P₂O₅/A into the soil. All four crops were planted at the rate of 20 seed per foot which is approximately 70, 80, 100, 80 lbs./A for oats, barley, durum, and wheat respectively. The field was planted in a dry seedbed on November 1 and irrigated November 4. Seedlings emerged by the 11th of November.

No subsequent irrigation was given to the one-irrigation culture. Rainfall throughout the growing period was 2.77". Four irrigations were scheduled during the growing season for the full irrigation culture on January 19, February 24, March 14, and March 30. An additional 50 lbs N/A were applied in each of the first two irrigations.

Forage was harvested when each cultivar headed. Three middle rows were cut with a Jari mower equipped with a 3-foot cutter bar set at a cutting height of 2 inches. Fresh samples were taken from each plot to determine moisture content of harvested forage. All yields presented in Tables 1 and 2 have been adjusted to a 12% moisture content.

RESULTS

The highest yielding cultivars for each crop grown under a full-irrigation culture were Cayuse oats (12,778 lbs/A), Harlan II barley (8781 lbs/A), 881 durum (8616 lbs/A), and 911 wheat (8525 lbs/A) (Table 1). It is interesting to note that, with the exception of the durums, the highest yielding varieties in each crop was also the latest maturing variety and had at least one extra irrigation. Highest yielding cultivars for each crop grown under a one-irrigation culture were Cayuse oats (6563 lbs/A), BFC79-18 barley (6453 lbs/A), Mexicali durum (5335 lbs/A), and M83-39-184 wheat (5885 lbs/A) (Table 2).

Of the seven cultivars developed for one-irrigation culture, only one - M83-39-184 - was the highest yielding cultivar within the wheat crop grown under the one-irrigation culture. None of these seven cultivars were the top yielders in their respective crops grown under the full-irrigation culture.

Table 1. Four crop forage yields under a full-irrigation culture.

Variety	Source	Heading Date	Number of Irrigations	Plant height in.	% Lodging	Forage yield lbs/A
<u>Latin square 5 C.V.=7.4</u>			<u>Oats</u>			
Cayuse	WSU	4-8	5	47.2	80	12778 a
Mesa	UA	3-15	4	35.4	90	9790 b
Stampede	WPB	4-3	5	38.6	20	8635 c
Nora	UofArk	3-18	4	33.5	75	8323 cd
Markton		3-17	4	37.4	90	7718 d
Montezuma	UC	2-28	3	29.5	00	7645 d
<u>Latin square 6 C.V.=5.7</u>			<u>Barley</u>			
Harlan II	UA	3-11	3	39.4	75	8781 a
Arivat		2-26	3	37.4	00	8360 a
BFC79-18	WPB	3-2	3	37.4	00	7791 b
Gustoe	WPB	3-8	3	28.3	00	6416 c
2-22-9	USDA	2-14	2	31.5	00	5921 d
Seco	USDA	2-14	2	29.5	00	5665 d
<u>Latin square 7 C.V.=7.5</u>			<u>Durum</u>			
881	WPB	2-28	3	25.6	00	8616 a
Aldura	NK	3-6	3	23.6	00	8580 a
Turbo	WPB	3-9	3	26.4	00	8268 a
B83-40	UA	2-27	3	23.6	00	7498 b
B83-33	UA	2-25	3	29.5	00	7369 b
Mexicali	CIMMYT	2-26	3	27.6	00	6985 b
<u>Latin square 8 C.V.=8.2</u>			<u>Wheat</u>			
911	WPB	3-15	4	19.7	00	8525 a
B85-277A	UA	2-25	3	27.6	00	7333 b
M83-39-184	UA	2-27	3	27.6	00	7150 b
SuperX	CIMMYT	3-3	3	26.4	00	6930 bc
Y.Rojo	UC	2-27	3	22.4	00	6306 c
B83-450	UA	2-16	2	25.6	00	4235 d

Table 2. Four crop forage yields under a one-irrigation culture.

Variety	Source	Heading Date	Plant height in.	% Lodging	Forage yield lbs/A
<u>Latin square 1 C.V.=8.7</u>			<u>Oats</u>		
Cayuse	WSU	4-6	31.5	00	6563 a
Markton		3-15	29.5	00	5646 b
Mesa	UA	3-10	22.4	00	5628 b
Stampede	WPB	4-3	17.7	00	5500 b
Montezuma	UC	2-19	21.6	00	5408 b
Nora	UofArk	3-15	27.5	00	4546 c
<u>Latin square 2 C.V.=6.9</u>			<u>Barley</u>		
BFC79-18	WPB	3-8	23.6	00	6453 a
Harlan II	UA	3-7	26.4	00	6288 a
2-22-9	USDA	2-13	26.4	00	5353 b
Gustoe	WPB	3-8	14.6	00	5298 b
Arivat		2-27	27.6	00	5188 bc
Seco	USDA	2-14	25.6	00	4785 c

Variety yields within each latin square followed by the same letter are not significantly different at .05% probability level using Duncan's Multiple Range Test.

Table 2. Four crop forage yields under a one-irrigation culture.

Variety	Source	Heading Date	Plant height in.	% Lodging	Forage yield lbs/A
<u>Latin square 3 C.V.=10.0</u>			<u>Durum</u>		
Mexicali	CIMMYT	2-21	22.5	00	5335 a
Turbo	WPB	3-4	23.6	00	5316 a
881	WPB	2-21	23.6	00	5206 a
B83-33	UA	2-20	24.6	00	5133 a
B83-40	UA	2-20	21.6	00	4950 ab
Aldura	NK	2-28	18.5	00	4418 b
<u>Latin square 4 C.V.=8.2</u>			<u>Wheat</u>		
M83-39-184	UA	2-24	23.6	00	5885 a
SuperX	CIMMYT	2-28	21.6	00	5536 ab
911	WPB	3-12	11.8	00	5463 ab
Y.Rojo	UC	2-24	18.7	00	5445 ab
B85-277A	UA	2-19	23.6	00	5188 b
B83-450	UA	2-13	22.6	00	3758 c

Variety yields within each latin square followed by the same letter are not significantly different at .05% probability level using Duncan's Multiple Range Test.