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Irrigated Perennial Cool Season Grass Hay Trial

In May 2003 Luna and Mandan pubescent wheatgrass, NewHy hybrid wheatgrass, Rosana western wheatgrass, Critana thick-spike wheatgrass, Hycrest crested wheatgrass, Bozoisky Russian wildrye, Manchar smooth brome grass, and Regar meadow brome grass were seeded into replicated plots at two locations – Ray Daly’s along lower Piney Creek in southern Sheridan County and Larry Vignaroli’s along Clear Creek near Ucross in Northern Johnson County.

The purpose of the trial is to determine hay yields of these grasses over a 10-year period and compare them to that of alfalfa. Although alfalfa produces high yields in its first years of production, stand longevity may be as short as five to seven years. The field then has to be farmed and planted to an annual forage crop for a couple of years prior to being planted back to alfalfa. If hay yields of cool season perennial grasses are similar to that of new alfalfa stands for at

least a ten year period than total hay production costs could be lowered as a result of less farming operations. In addition, grass hay fields could be grazed without fear of bloat providing livestock operators more management options. Grasses may also require less irrigation water compared to alfalfa but they would require yearly applications of a nitrogen fertilizer.

Management Practices

Nitrogen (N) fertilizer was applied at 100 lb N/ac at Daly’s on 19 April 2005, 19 May 2006, 9 May 2007, and 5 May 2008. At Vignaroli’s 30 lb N/ac was applied on 12 May 2006 and 100 lb/ac on 1 May 2007 and 7 May 2008.

Irrigation water was applied in late May 2004 and early June 2006 at Daly’s and in late May 2006 at Vignaroli’s. Because the surrounding field at Vignaroli’s was planted to millet in 2004 irrigation water was not applied until early July. Spring 2005, 2007 and 2008 precipitation was sufficient to forego spring irrigation at both locations.

Hay Yields: Differences between Sites

Grass hay yields at Daly's averaged 0.4, 1.5, and 0.4 T/ac more in 2004, 2005, and 2006, respectively, compared to at Vignaroli's (see data on page 3). These differences were probably the result of no irrigation at Vignaroli's prior to clipping in 2004; nitrogen fertilizer at Daly's but not at Vignaroli's in 2005; and 70 lb/ac more N at Daly's than at Vignaroli's in 2006. In 2007 and 2008 grass hay yields, excluding Critana thickspike wheatgrass, averaged 0.7 and 2.3 T/ac more, respectively, at Vignaroli's compared to at Daly's.

Hay Yields: Differences between Years

Grass hay yields at Daly's and Vignaroli's respectively averaged 1.5 and 0.4 T/ac more in 2005 compared to 2004 as a result of the grass stands being a year older (more tillers) and the 10" of spring precipitation the area received in 2005 (April – June norm 6"). However, the larger yield increase at Daly's was, as noted above, probably the result of N fertilization in 2005.

At Daly's grass hay yields averaged 1.2 T/ac less in 2006 compared to 2005, whereas at Vignaroli's they averaged 0.1 T/ac less. The greater yield difference at Daly's was possibly due to irrigation not occurring until early June in 2006, whereas at Vignaroli's irrigation occurred the third week of May. However, irrigation at both sites probably should have occurred in early May 2006 due to the dry April that year (50% of normal).

Grass hay yields at Daly's and Vignaroli's (excluding Critana thickspike wheatgrass) averaged 0.6 and 1.8 T/ac more in 2007 compared to 2006. April – June precipitation for the area in was approximately 7.5 inches in 2007 which would account for the greater yields. In addition, the greater amount of N fertilizer applied at Vignaroli's in 2007

compared to 2006 most likely accounted for some of the increased yield at this site.

Why the grasses at Daly's produced less than half the amount of hay in 2008 as they did in 2007 is not known, especially since spring precipitation was similar both years. Grass hay yields at Vignaroli's in 2008 were similar to those in 2007.

Hay Yields: Differences between Grasses

Over the five years of the study Manchar smooth brome produced the most hay at an average of 15.5 T/ac between the two sites. Regar meadow brome and Mandan pubescent wheatgrass both produced an average total of 14.8 T/ac, respectively, followed by Luna pubescent wheatgrass at 14.7 T/ac. Hycrest crested wheatgrass, NewHy hybrid wheatgrass, Bozoisky Russian wildrye, and Rosana western wheatgrass produced an average total hay yield of 13.4, 13.0, 10.7, and 9.0 T/ac, respectively.

Both Critana thickspike wheatgrass and Rosana western wheatgrass are being overtaken by other grasses. This is why there is no hay yield estimate for Critana at the Vignaroli site for 2007 and 2008. These two native range grasses would not be recommended for use in irrigated hay fields. In addition, Hycrest crested wheatgrass at Daly's appears to be dying out (Oct 2008 observation) and would explain its 80% lower yield in June 2008 compared to 2007.

Irrigated alfalfa hay yields averaged 2.6 T/ac between 2004 and 2007 for Johnson and Sheridan counties. The two bromes and the two pubescent wheatgrasses had comparable hay yields. However, the grasses would require nitrogen fertilizer at a minimum of 100 lb N/ac applied by early May to have comparable yields.

Grass hay yields (Tons/acre) at Ray Daly's along lower Piney Creek 2004 through 2008.

Grass (Variety & species)	23-Jun 2004	20-Jun 2005	21-Jun 2006	26-Jun 2007	26-Jun 2008	<i>Total</i>
Luna pubescent wheatgrass	2.5	3.7	2.8	2.9	1.3	13.3
Mandan pubescent wheatgrass	2.5	3.7	2.6	3.3	1.2	13.4
NewHy hybrid wheatgrass	2.2	3.3	2.6	2.7	1.3	12.1
Rosana western wheatgrass	1.5	2.0	1.4	2.3	0.8	8.0
Critana thickspike wheatgrass	1.1	2.4	1.6	2.2	0.8	8.1
Hycrest crested wheatgrass	3.0	4.2	2.2	3.4	0.7	13.6
Bozoisky Russian wildrye	1.6	3.0	2.0	3.4	1.6	11.6
Manchar smooth bromegrass	2.1	5.0	3.3	2.8	2.1	15.2
Regar meadow bromegrass	2.0	5.2	2.6	4.1	1.9	15.8
<i>Average</i>	2.1	3.6	2.4	3.0	1.3	

Grass hay yields (Tons/acre) at Larry Vignaroli's along lower Clear Creek 2004 through 2008.

Grass (Variety & species)	30-Jun 2004	30-Jun 2005	26-Jun 2006	21-Jun 2007	26-Jun 2008	<i>Total</i>
Luna pubescent wheatgrass	2.4	2.8	2.5	4.5	3.9	16.1
Mandan pubescent wheatgrass	2.1	2.4	2.6	4.6	4.5	16.2
NewHy hybrid wheatgrass	2.2	2.5	1.8	3.7	3.8	13.9
Rosana western wheatgrass	1.3	1.6	1.9	2.8	2.3	9.9
Critana thickspike wheatgrass	1.1	1.6	1.3			3.9
Hycrest crested wheatgrass	1.9	2.2	2.3	3.7	3.2	13.3
Bozoisky Russian wildrye	1.0	1.1	1.6	3.1	2.9	9.7
Manchar smooth bromegrass	2.2	2.5	2.2	4.1	4.7	15.7
Regar meadow bromegrass	1.2	2.5	1.7	4.1	4.3	13.8
<i>Average</i>	1.7	2.1	2.0	3.8	3.7	

Irrigated alfalfa hay yields (Tons/acre) in 2004, 2005, 2006, and 2007 for Johnson and Sheridan counties (Wyoming Agricultural Statistics 2005, 2006, 2007, and 2008):

County	2004	2005	2006	2007	<i>Average</i>
Johnson	2.0	2.4	1.9	3.1	2.4
Sheridan	2.6	3.3	2.5	3.2	2.9
<i>Average</i>	2.3	2.9	2.2	3.1	

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