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Comparative Productivity of Five Cool-Season Pasture Grasses Under Intermittent Flood Irrigation Grazed by Beef Cow-Calf Pairs Using Management Intensive Grazing Practices

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Introduction

Utah State University is engaged in studies to determine management practices that can be employed under intensive irrigated pasture to increase productivity and viability of beef and dairy producers in Utah. One of these initiatives was a study comparing five cool-season grasses grazed by beef cow-calf pairs over a 4-year period.

Description of Project

A 12.5 acre field used for silage corn production the previous three years was prepared for a late fall, dormant seeding of cool-season grass species commonly used for irrigated pasture. Four equally spaced burms were raised separating the field into five strips 125 ft x 870 ft. An electric fence was placed on each burm. The burm aided control of flood irrigation. Each of the five strips was then subdivided into two equal plots, 125 ft x 435 ft. Each of the resulting ten 1.25 acre plots was then randomly assigned one of five grass species with two plots per species:

1. Regar Meadow Brome
2. Ambassador Orchard Grass
3. BG3 Perennial Ryegrass
4. Fawn Tall Fescue

5. Fuego Tall Fescue

Seeding rate for all of the species was 20 lbs per acre. Seeding was accomplished using a roller packing type drill.

Results

Plots were not grazed the first year allowing proper establishment and weed control procedures including use of herbicides and hay crop removal. Hay yields in year one were as follows:

Species	tons/acre
Regar Meadow Brome	.84
Ambassador Orchard Grass	1.76
BG3 Perennial Ryegrass	2.14
Fawn Tall Fescue	3.18
Fuego Tall Fescue	3.36

Intervals between flood irrigation were longer than would be considered ideal for irrigated pasture due to drought conditions during the study. Dates of flood irrigation are shown for each of the four years of the study beginning with the establishment year and each of the 3 years of grazing:

Year	Dates of flood irrigation			
Establishment	May 29	July 8	Sept 4	
Grazing: 1	June 4	July 12	Aug 29	
2	May 21	July 17	Sept 3	
3	June 5	July 12	Aug 7	Aug 25

Flows of irrigation water were often inadequate for thorough coverage and saturation. Before each irrigation, nitrogen in the form of ammonium nitrate was applied to each plot of a rate of 30 lbs nitrogen/acre.

Plots were grazed by 32 beef cow-calf pairs. Average body weights of the cows was 1420 lbs and that of the calves was 400 lbs through the grazing period (May through October). It was originally planned that all plots would be grazed simultaneously by small groups of cattle requiring 14 to 21 days to graze each plot. However due to lack of irrigation water, the cattle were stratified into two groups of 16 pairs each. Thus two plots were grazed at a time. This allowed the fairly rapid removal of forage on the plots (4-7 days). The grazed plots were then fertilized and irrigated while the two groups of cattle grazed two other plots. At the beginning of each grazing season the different species of grass reached grazing readiness at different times in the following order:

1. Meadow Brome
2. Orchard Grass
3. Fuego Tall Fescue

4. Fawn Tall Fescue
5. Perennial Ryegrass

The two plots of each of these grass species were grazed in the order above. After the first grazing period, plots were grazed as they reached readiness, yielding at least .75 tons DM/acre.

Management intensive grazing was used with cattle receiving a new allotment of pasture every 24 hours. Daily pasture allotments were controlled using polywire electric fencing in front and behind the cattle. Forage harvested was estimated by the difference in clip plot analysis of dry matter before and after grazing each daily allotment.

The following is a summary of the grazed forage yields from the pasture grass species for three consecutive years (water availability was limited):

Species	Grazed Forage Harvested (tons/acre)			
	1	2	3	Average
Regar Meadow Brome	4.08	4.95	3.93	4.32
Ambassador Orchard Grass	5.26	5.94	6.27	5.82
Fawn Tall Fescue	5.92	6.86	7.14	6.64
Fuego Tall Fescue	6.05	6.62	7.06	6.58
BG3 Perennial Ryegrass	4.18	4.49	3.82	4.16

Conclusions

1. Under the conditions described, the tall fescue species produced 13.4% more grazed forage than orchard grass.
2. The tall fescue species produced 57.1% more grazed forage than either the meadow brome or perennial ryegrass, which were similar.
3. Meadow brome and perennial ryegrass appeared to be declining in productivity

while orchard grass and tall fescue species were increasing.

4. There was little difference in productivity for the two tall fescue species.

It was estimated that the average dry matter requirement of the cow-calf pairs used in this study was approximately 46 lbs DM/pair/day. Using this DM amount, the following would be an estimate of the carrying capacity of the grass species under the conditions described:

Species	Lbs Dm/acre/yr	Lbs Dm/pair/d	Grazing Days	Carrying Capacity, pairs/acre
Regar Meadow Brome	8640	46	180	1.04
Ambassador Orchard Grass	11640	46	180	1.41
Fawn Tall Fescue	13280	46	180	1.60
Fuego Tall Fescue	13160	46	180	1.59
BG3 Perennial Ryegrass	4320	46	180	1.00

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