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Cow-Calf Production and Profitability on Irrigation Pastures Composed of Forage Mixtures or Monocultures During the First Year After Establishment

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Forages and their use in the Intermountain West are of great interest for livestock owners. Research at Utah State University in this area continues to provide information that could be useful for producers.

One particular study was conducted to determine if forage mixtures in irrigated pastures would result in superior cow-calf productivity compared to monocultures.

A 10.75 acre field was partitioned into 15 plots of .72 acre (48' x 655') using electric fencing. Each plot was then randomly assigned and sown to one of five forage treatments, three plots per treatment:

1. alfalfa (Alfagraze)
2. tall fescue (Fuego)
3. birdsfoot trefoil (Empire)
4. meadow brome (Regar)
5. mixture (equal proportion of the above four forages)

The mixed-forage plots were not sown as an interspersed mixture of forages. Rather, forages were sown separately as four adjacent, parallel strips (12' x 655'). Cattle were allowed access to all four strips each day on these plots.

Thirty spring-calving cow-calf pairs were stratified into 15 groups of two pairs each, which were then randomly assigned to the 15 pasture plots. Management intensive grazing procedures were used with cattle receiving a fresh paddock each 24 hours. Daily paddock allotments were confined using electric polywire fencing in front of and behind the cattle. Pasture forage harvested was estimated using raised-plate meter readings before and after grazing. Pasture allotments were adjusted daily to allow maximum intake.



Pastures were sprinkler irrigated as close as possible after grazing. Irrigation was limited due to drought conditions and mechanical problems:

Month	Applications	Inches/Water Application
June	2	2.50
July	2	2.10
August	2	2.25
September	1	2.25

Legume pastures received one application of super phosphate fertilizer in May (130 lbs. of 0-45-0). Grass pastures received 30 lbs. of nitrogen from ammonium nitrate each 30 days (June through September).

The following table summarizes preliminary results after the collection of one year's data:

	Choice ^a	Fescue ^b	Alfalfa ^c	Brome ^d	Birdsfoot trefoil ^e
Total DM harvested, lbs/acre	12509	15682	13987	10229	7764
Carrying capacity, pairs/acre ^f	1.78	2.23	1.99	1.45	1.10
Calf daily gain, lbs	2.76	2.60	2.13	2.68	2.42
Total calf gain ^g , lbs/calf	442	416	341	429	387
Calf gain/acre ^h , lbs	787	928	679	622	426
Calf gain/DM	.0629	.0592	.0485	.0608	.0549
Actual calf weaning weight, lbs	662	659	608	631	647
Cow body weight change, lbs	6.0	-4.2	-69.2	14.2	-41.7
Cow body condition score change ⁱ	+17	+17	-42	-17	-17

^aMixture of equal surface areas of tall fescue, alfalfa, meadow brome and birdsfoot trefoil.

^bTall Fescue (Fuego)

^cAlfalfa (Alfagraze)

^dMeadow brome (Regar)

^eBirdsfoot trefoil (Empire)

^f44 lbs dry matter consumed/pair/day for a 160-day grazing period.

^gAverage daily gain x 160-day grazing period

^hGain/calf x pairs/acre.

ⁱBody condition scores 1 through 9, with 1 = emaciated and 9 = extremely obese.

Preliminary Conclusions

- Fuego tall fescue produced more grazeable forage and had a higher carrying capacity than any of the other forage species compared or the combination of species. Each acre of tall fescue carried 2.23 cow-calf pairs during the 160-day grazing period, or each cow-calf pair required about .45 acres.
- Alfalfa exhibited high carrying capacity, 1.99 cow-calf pairs/acre for the 160-day grazing period, but resulted in the poorest performance of both cows and calves of any forage or combination.
- Birdsfoot trefoil produced the lowest amount of grazeable forage of the species compared, producing only about half the dry matter/acre compared to tall fescue. There were, however, indications that this species was improperly inoculated when sown. While cows and calf performance associated with birdsfoot trefoil was improved compared to alfalfa, animal performance was lower than that observed with the grass species or the combination of forages.

- Allowing the cattle a choice of the four forage species resulted in the highest calf daily gain. The most efficient calf gain, and the choice of forage species enhanced nutrient utilization compared to grazing monocultures.
- Cows on all forage species and the mixture with the exception of those on alfalfa maintained body weight and body condition.

Economic Analysis

The table on the following page reflects the preliminary economic analysis of the first year's data. Cost of pasture includes annualized establishment costs, labor, land ownership costs, irrigation, fertilization, harrowing, etc.

Item	Mix ^a	IF ^b	ALF ^c	MB ^d	BTF ^e
Pasture cost, \$/pair/yr	148.97	129.54	123.06	198.35	222.64
Other feed cost, \$/pair/yr	127.42	127.42	145.37 ^f	127.42	127.42
Non-feed cost, \$/cow/yr	271.88	271.88	271.88	271.88	271.88
Annual Cow Cost, \$/co	548.27	528.83	540.31	597.65	621.94
Profit/Loss ^g	20.33	38.08	37.73	(-59.63)	(-69.80)

^a Equal surface areas of tall fescue (Fuego), alfalfa (Alfagraze), meadow brome (Regar), birdsfoot trefoil (Empire).

^b Tall fescue (Fuego), monoculture.

^c Alfalfa (Alfagraze), monoculture.

^d Meadow brome (Regar), monoculture.

^e Birdsfoot trefoil (Empire), monoculture.

^f Reflects extra feed required to rectify lowered body condition of cow grazing alfalfa.

^g Calculated based market value of weaned calves minus ranch value of calves (breakeven price x weaning weight)

Preliminary Conclusions

- As would be expected, differences in pasture costs were a reflection of differences in dry matter yield. Cattle grazing the alfalfa and tall fescue had the lowest pasture cost due to higher yields.
- Other feed costs were higher for cows grazing alfalfa since they lost nearly .5 body condition score and require extra winter feed to compensate.
- This study provides an excellent illustration of the importance of forage yield and cow-calf performance when using irrigated pastures:
 - Substantial financial loss was incurred when cow-calf pairs grazed meadow brome and birdsfoot trefoil even though performance was acceptable.
 - Although the dry matter yield of the forage mixture was intermediate, it was profitable due to superior performance of the cattle.
- On the forage species where grazing was profitable, profit per acre may be questionable. Cow-calf pairs grazing tall fescue required about .45 acre/pair for the grazing season. At \$38.08 profit/pair, there was \$84.62 profit/acre. This level of profit may not be acceptable on productive irrigated land where other crops may be more profitable. A value-added system of cow-calf production is likely necessary.

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