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Comparison of Range-Based and Irrigated Cow-Calf Systems – Grazing Season Performance

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Introduction

- Western U.S. beef operations generally rely on range for a portion of their grazing supply (Asem-Hiablie et al., 2017).
- However, available nutrients from rangelands may be limiting especially for spring-calving cows during mid-lactation and in the first two trimesters of gestation (Ganskopp and Bohnert, 2001).
- Irrigated pastures may offer an alternative to range-based systems, but input costs may be greater for these operations.
- Prenatal nutritional environment may affect lifetime productivity; however, it may be dependent on the severity of nutrient restriction (Funston and Summers, 2013).
- Information on extent of nutrient restriction in range vs irrigated environments is limited.

Objectives

The objectives were to compare and contrast:
1) cow performance, 2) cow fertility, and 3) calf performance in a range-based (RAN) or an irrigated (IRR) system over 4 years

Materials and Methods

- Crossbred beef cows were assigned according to age, BW, BCS (1 - emaciated to 9 - obese) and productivity to IRR or RAN.
- Cows in IRR (n = 170/yr) grazed irrigated cool season perennial pastures (May-October) then grazed crop residues (October-December).
- Cows in RAN (n = 160/yr) grazed sagebrush steppe range (May-December).
- All cows were provided hay and supplement (January-mid-March) to achieve BCS 5 by calving.
- Cows were artificially inseminated (AI). AI sires were distributed across IRR and RAN. Natural service bulls were introduced 8 to 14 d after AI.
- Cow BW and BCS were recorded at branding (April), pregnancy diagnosis, and end of grazing (December). Pregnancy was diagnosed at 60, 100, and 120 d after AI.
- Calves were weighed at birth, July, August and weaning (September).
- Data were analyzed using mixed models with main effect of system. Year (n = 4) was the experimental unit.

Results

- Cow weights at branding and calf birth weights were not different ($P > 0.11$) between systems (Figure 1 and Table 1).
- During the grazing season, cow and calf weights were attenuated ($P < 0.01$) in the RAN system compared to the IRR system.
- Calves in the IRR system had greater ($P < 0.001$) average daily gains than calves in the RAN system
- Heifers were lighter ($P < 0.03$) than steers at all time points. There were no sex of calf by system interactions ($P > 0.25$).

Table 1. Effect of cow/calf system on calf performance.

Item	Range		Irrigated		SE	*P*-Value System	*P*-Value Sex
	Steer	Heifer	Steer	Heifer			
Number of animals	306	307	335	346			
Birth date (Julian day)	53.8	49.8	56.3	51	1.04	0.098	< 0.001
Birth Weight (kg)	39.7	36.4	40.5	36.7	0.5	0.31	< 0.001
Weaning Weight (kg)	254.1	242.2	276.7	261.2	5.7	0.003	0.033
ADJ Weaning Weight (kg)	266.0	250.1	294.1	274.2	4.7	< 0.001	0.002
Weaning Age (d)	202.6	207.3	198.2	203.2	1.39	0.01	0.004
Ave Daily Gain (kg/d)	1.07	1.00	1.21	1.11	0.027	< 0.001	0.008

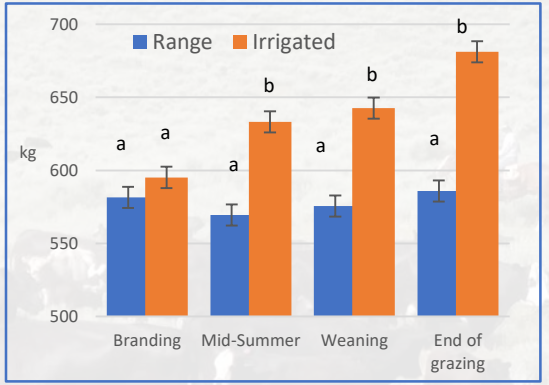

Figure 1. Effect of cow/calf system on cow weights. a,b Within weighing period effect of system (P < 0.005)

- Body condition scores mirror body weights
- Pregnancy rates were similar (P = 0.64) for cows in the IRR and RAN systems (94.7% and 93.6%, respectively).
- Gross returns per cow were $60.50 greater for cows in the IRR

Conclusion/Implications

- Performance of cows and calves in the RAN system compared to the IRR system indicates that nutrients are limiting for cattle using sagebrush steppe range.
- Nutrients were limiting in RAN system during gestation and early postnatal life. Whether this level of restriction will have lifelong effects on calves remains to be determined.
- Producers using range as part of their management system may need to operate at reduced costs to offset decreased returns.

References

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