Rumensin supplements for replacement heifers on irrigated pasture

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Heifers fed 3.75 pounds per head per day of a barley-Rumensin supplement increased their average daily gain by 16 percent.

Replacement heifers to be bred early (as yearlings to calve as 2-year-olds) must reach 650 pounds by 14 to 15 months of age. In the system of fall calving (October to November) used in California's annual grassland range, this usually means transfer at weaning to a high-energy diet in drylot or to high-quality, energy-supplemented irrigated pasture. Use of such pasture is still marginal, because only 1 pound average daily gain (ADG) is common, but heifers need 1.25 ADG to reach the desired weight by breeding. In this study, we added Rumensin (monensin sodium, a biologically active feed additive produced by Eli Lilly and Company) to a pasture supplement as a possible method of increasing ADG.

Trials were conducted with 7- to 8-month-old Hereford replacement heifers at the University of California Sierra Foothill Range Field Station, Browns Valley, during 2 years. The irrigated pasture at the start of the first grazing season was approximately 15 percent perennial clovers, 60 percent perennial grasses and 30 percent other species. A system of two-field rotational grazing with weekly rotation was used. The pastures were flood irrigated throughout the grazing season.

Heifers in three supplementation treatments were fed ground barley at rates averaging 3.75 pounds per head per day during each season. Treatments were: (1) self-fed barley-salt mix without Rumensin, (2) self-fed barley-salt mix with 50 mg Rumensin per pound of barley, and (3) hand-fed (daily) barley with 50 mg Rumensin per pound of barley. Each treatment was replicated once within each year.

The stocking rate was 10 heifers per acre and was based on results of previous experiments on these same pastures. Heifers were individually weighed every 28 days after being held overnight in drylot without feed and water. Because some of the heifers the first year had received Ralgro implants (growth stimulants) 84 days before weaning, implanted and nonimplanted heifers were allotted equally to each grazing treatment. Heifers of uniform weight were selected before random allotment to the experimental treatments.

Supplements, prepared at U.C., Davis, of ground barley with and without 50 mg Rumensin per pound of barley and with or without 9.1 percent salt, were fed in feed bunks placed in each pasture. Bunk space permitted all heifers to eat at the same time. All heifers

TABLE 1. Influence of Rumensin and Method of Supplementation of Beef Heifers

	Self-fed		Self-fed		Hand-fed	
	Year		Year		Year	
	1	2	1	2	1	2
Rumensin supplement, mg/lb	0	0	50	50	50	50
Length of trial, days	105	112	105	112	105	112
No. of animals	18	18	17	18	16	18
Animals/acre	4.0	4.2	4.0	4.2	4.0	4.2
Initial weight, lb	457	455	458	447	456	447
Final weight, lb	580	568	600	587	611	565
Barley, lb/head/day	3.9	3.4	3.7	3.6	3.8	4.0
Total barley fed, lb	411	379	393	404	404	443
ADG, lb	1.17	1.01	1.34	1.25	1.47	1.06
Mean ADG*	1.08 a		1.30 a		1.25 b	

*Treatment means followed by different letters differ significantly (P<.01).

TABLE 2. Comparison of Expected Results from Three Hypothetical Management Regimes for Rearing Replacement Beef Heifers for Breeding as Yearlings*

Management	Below average†	Average†	Above average†
Birth weight (Oct.)	75	75	75
ADG (225 days)	1.55	1.61	1.70 I
Wean weight (June)	424	437	457
ADG (120 days)	0.90 O	1.10 S	1.25 S + R
End pasture-season (Oct.)	532	569	607
ADG (75 days)	0.75	1.00	1.00
Breeding season (Dec.) (14 mo)	588 O	644 S	682 I,S + R

NOTE: Expected gains based on management regimes from previous trials at Sierra Foothill Range Field Station.
*Yearlings 14 to 15 months of age, weight 650 to 700 pounds.
†I = implant; O = nonsupplemented; S = supplemented; S + R = supplement plus Rumensin.

were fed to consume an average of 3.75 pounds barley per head per day regardless of treatment. The hand-fed groups were fed daily, and self-fed groups were fed fresh supplements weekly in an amount equal to 3.75 pounds per head per day.

Salt level for the self-fed group was adjusted at the trial site to aid in controlling intake. Weekly variation in salt percentage ranged from a high of 15.4 to a low of 9.1 percent with averages of 9.9 in the first season and 10.7 in the second. Slightly more salt (1 to 2 percent) seemed to be needed to keep supplemental intake of the barley-Rumensin group at the same level as those receiving barley only. If, however, these self-fed groups consumed more than 3.75 pounds barley per head per day during any week, they could have been without supplement for one or more days per week. This was occurring during most weeks for the self-fed barley-Rumensin groups, even when more salt was used to limit their intake to the 3.75 pounds.

From day 30 to day 105 of the first year, forage growth rates were judged inadequate to support the stocking rates established, and alfalfa cubes were fed at 5 pounds per head per day from day 30 to day 84 and at 7 pounds from day 85 to day 105. No alfalfa cubes were fed in the second year.

Although the heifers were preconditioned to being fed supplements, difficulty was encountered at the start of the trial each year in getting them to consume 3.75 pounds per head per day, especially during the second year. This difficulty may have been due to the succulent forage available to the grazing heifers. It has been demonstrated that a uniform daily intake of 200 mg Rumensin per head increases ADG of pasture cattle the most consistently. Therefore, predetermination of the level of supplements consumed daily is important to ensure ingestion of the desired level of Rumensin.

Regardless of treatment, feeding 3.75 pounds per head per day of barley-Rumensin supplement gave the desired 1.25 to 1.30 pounds ADG. The increase in ADG for heifers fed Rumensin varied from 4 to 26 percent with an average of 16 percent and was significant at $p<0.01$. ADG was not influenced by feeding method. The magnitude of the response varied significantly ($p<0.05$) between years with feeding method, but each year a significant increase in ADG was obtained when Rumensin was fed.

Because the heifers used in this study were from University herds, performance data before and after the grazing season were available. Implanting heifers 84 days preweaning increased weaning weight by 8 to 10 pounds over those not receiving implants. During the grazing season, heifers that had received implants showed no carryover effects, since no significant differences were observed in ADG or onset of estrus. Also, 80 percent of the heifers with above-average ADG at weaning time that were Rumensin-supplemented during the pasture season reached a minimum of 650 pounds by breeding season, 60 days after the pasture trial ended. Only 60 percent of the heifers of average or below-average ADG up to weaning reached this weight.

The heifers were also observed for onset of estrus after the pasture season and before the breeding season began 2 months later. Of those that had previously received Rumensin, 57 percent were in standing heat before the start of breeding season, compared with only 37.5 percent of those not receiving Rumensin. This difference was not statistically significant (Chi square). We concluded that feeding Rumensin did not adversely affect the onset of estrus in yearling heifers but significantly increased body weight.

Conclusions

It seems evident that, although supplementation of growing heifers may be economically marginal when evaluated solely on the basis of weight gains, other considerations, such as preweaning ADG, increased pasture stocking rate, and specific breeding weight and time goals, would determine the most appropriate management practice to be used during the growing phase. The data indicate that energy supplementation of irrigated pasture increases ADG. In these studies, the addition of Rumensin further increased ADG by 16 percent.

In conclusion, all phases of management, genetics, and nutrition must be considered to rear replacement heifers successfully for early breeding. A good preweaning diet is necessary to ensure optimal weaning weights. Only the heifers with above-average ADG at weaning should be selected as replacements and fed a diet for continued rapid growth to reach 650 pounds by 14 to 15 months of age.

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