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## ENERGY AND PROTEIN SUPPLEMENTS FOR CALVES GRAZING RYE-RYEGRASS PASTURES

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**Background.** Rye-ryegrass pastures which are used extensively in East Texas and the southeastern U.S. typically have protein values in excess of 20% and digestible dry matter values in excess of 75%. The protein of this high quality winter annual forage, however, is extensively degraded (80%) in the rumen. Thus, ruminants are dependent upon microbial protein to meet tissue level requirements.

**Research Findings.** A total of 166 stocker cattle (initial weight = 650 lbs) grazed rye-ryegrass pastures in 5 different years to evaluate the influence of supplemental energy (86% corn ration) and protein (50% fishmeal ration) on animal performance and supplement:gain ratios. In addition, these research supplements were self-limiting using ration ingredients of 3 to 6% salt, 8 to 10% minerals, and an ionophore. However, some ionophores are not approved for commercial use in self-limiting rations. Table 1 partitions these various trials by average daily supplement intake. All animal performance shown is an average of steers and heifers (1/2 Simmental x 1/4 Brahman x 1/4 Hereford) with the exception of the 0.74 lb/day corn-based supplement in which purebred Brahman steers were used. The average daily gain (ADG) of all calves assigned to pasture only during these five trials was 2.2 lbs/day. Animal performance presented from this research is generally from late January to late May (120 days). Thus, calf ADG that would include the fall and early winter periods may be less than data reported here. In all trials in which less than 2 lbs/head/day of corn or protein ration were fed, the supplement to extra gain ratio was about 2:1. The Simmental-bred calves receiving less than 2 lbs/day of the corn ration gained an extra .77 lb/day for an ADG of about 3 lbs/day. Steers and heifers that received the fishmeal ration did not readily consume the supplement, but gained an extra .27 lbs/day. When the corn rations were fed at more than 2 lbs, but less than 3 lbs/day, calves gained an extra .45 lbs/day; however, supplement:extra gain ratios increased to 5.4:1. In the single trial in which 4 lbs/day of the corn ration was fed, supplement:extra gain ratios accelerated to 9:1 and extra gain remained at only .45 lb/day. Animals, therefore, were substituting the corn ration for forage and the conversion of supplement:extra gain exceeded the desired efficiencies.

**Application.** Stocker cattle gains should be about 2 lbs/hd/day from rye-ryegrass pastures. Both energy and protein supplements can improve weight gains of steers and heifers grazing high quality rye-ryegrass pastures. The best supplement:gain ratios were obtained when the

supplements were fed at the rate of about 0.25% of body weight. Traditional recommended levels for supplementation at 1% of body weight may exceed the desired level of biological and economic efficiencies. Thus, small quantities of energy or protein will supplement or add to the forage-animal response. The delivery system, however, may provide the most logistical problem to commercial stocker operators since the supplement should be self-limiting or else supplement would have to be fed on some daily or alternate-day schedule.

Table 1. A summary of five trials in which a supplemental energy or protein ration was fed to calves grazing rye-ryegrass pasture.

Pasture Only	Average Daily Gain	Supplement	Daily Supp. Consump.	Additional Gain	Supp: Add. Gain
	-----lbs-----				
<u>CORN RATION</u>					
1.91	<1 lb/day	2.29	.74	.38	1.9:1
2.21	<2 & >1 lb/day	3.47	1.68	1.26	1.3:1
2.21		3.26	1.60	1.05	1.6:1
2.40		2.77	1.13	0.37	3.1:1
2.19		2.64	1.32	0.45	2.9:1
2.27	←AVG→	3.04	1.43	0.77	1.9:1
2.29	>2 & <3 lb/day	2.59	2.32	0.30	7.7:1
2.19		2.79	2.56	0.60	4.3:1
2.10	←AVG→	2.69	2.44	0.45	5.4:1
2.29	>4 lb/day	2.74	4.06	0.45	9:1
<u>FISHMEAL RATION</u>					
2.21	<1 lb/day	2.62	0.76	0.41	1.9:1
2.40		2.53	0.32	0.13	2.5:1
2.31	←AVG→	2.58	0.54	0.27	2:1