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Edward Barrow Rayburn
West Virginia University, ed.rayburn@mail.wvu.edu

Marcella A. Whetsell
West Virginia University

Phill Osborne
West Virginia University

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Calf Performance Related to Pasture Quality and Supplements

Ed Rayburn, *WVU Extension Forage Agronomist*

M.A. Whetsell, *WVU Davis College Postdoctoral Fellow*

P.I. Osborne, *WVU Extension Livestock Specialist*

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Preconditioning programs can add value to feeder calves. Weaning systems that incorporate high-quality pastures can help reduce the stress and health-related expenses that accompany high-concentrate diets. Accurate performance predictions are a valuable management tool for producers evaluating alternative marketing options. Our project evaluated performance of calves that were weaned on pastures differing in quality and that received different levels of supplementation.

Calf performance was measured on 22 farms in 2002 and 8 farms in 2003. These calves were part of the West Virginia Beef Quality Assurance Sales program. They were weaned about September 1 and back-grounded on pasture until mid-October, when animals were shipped. The calves were fed pasture with hay and concentrate supplements (corn or a commercial supplement).

Herbage mass and forage quality were evaluated each week. Supplemental hay and concentrates were sampled once. A commercial forage testing lab evaluated pasture, hay, and concentrate samples for chemical nutritive composition.

Initial animal weights ranged from 415 to 619 pounds per head. While the animals were on test, the per-head average daily gain ranged from 0.40 to 3.22 pounds.

Pasture heights ranged from 2.1 to 8.0 inches, representing a forage mass of 593 to 2,405 pounds dry matter per acre. Across farms, pasture quality ranged from 12 to 26 percent crude protein, 54 to 65 percent total digestible nutrients, and 46 to 61 percent neutral detergent fiber.

Animals were fed energy supplements of corn (0.92 to 1.55 pounds per head per day) and/or a commercial starter (1.98 to 7.66 pounds per head per day). In this study, energy supplements accounted for about 33 percent of dry matter intake and pasture accounted for 66 percent, on average.

Calf average daily gain was affected by commercial starter intake, corn intake, and pasture total digestible nutrient or neutral detergent fiber concentration.

It took 4.26 pounds of commercial starter to give 1 pound of additional calf gain. Similarly, it took 3.31 pounds of ground shelled corn for 1 pound of additional calf gain. Calves gained more from corn than from the commercial supplement because corn is higher in energy. Because of that high energy, less corn should be fed. Otherwise, the calf's rumen may become upset, reducing performance, or the calf may become too fat, which is not desired by the buyer.

The cost of gain can be calculated as follows. If the commercial supplement costs \$160 per ton, then a pound of supplement would cost \$0.08 ($\$0.08 = \$160 / 2000$). The cost of supplement per pound of additional gain would then be \$0.3408 ($\$0.3408 = 0.08 \text{ cost per pound supplement} \times 4.26 \text{ pounds supplement per pound gain}$). If the marginal value of calf gain (increase value per head between a 500-pound calf and a 600-pound calf) were \$0.68 per pound, then feeding this supplement would return about two dollars for every dollar invested in feeding the supplement over the six-week backgrounding phase.

We found that increasing pasture total digestible nutrients from 55 percent to 65 percent increased average daily gain by 0.86 pounds. Improved pasture management can decrease the pasture's neutral detergent fiber content by increasing the legume content or by grazing younger forage. By providing a pasture with 10 units less of forage neutral detergent fiber content (increasing legume content by 20 percent), the manager should increase calf average daily gain by about 0.5 pound.

Well-managed pasture can provide a clean environment and low-cost feed for weaning calves. Good calf growth and profitable pasture weaning depend on preweaning health management, high-quality pasture, and proper supplemental feeding. High-quality pasture can increase calf daily gain by 0.86 pound for each 10 percentage points of increase in pasture total digestible nutrients or by about 0.5 pound for each 10 percentage points of decrease in pasture neutral detergent fiber (achieved by increasing

pasture legume content by 20 percent). Energy supplements, such as ground shelled corn or commercial supplements, fed at 0.5 to 1 percent of body weight, increased calf gain by 1 pound for each 3 to 4 pounds of grain fed. Proper pasture management and energy supplementation can increase the net return from weaning calves on pasture.

Note: This study was part of the USDA/ARS-funded project "Pasture-Based Beef Systems for Appalachia," a multi-institutional project conducted by the ARS Appalachian Farming System Research Station at Beaver, West Virginia University, Virginia Tech, and the University of Georgia.

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