# Beef Cattle Production on Reclaimed Surface Mined Land

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## Introduction

Reclaimed surface mined land offers a variety of alternative uses including forestry, wildlife management, recreation, and beef cattle production. Beef cattle production offers the opportunity to realize annual income from the reclaimed resource rather than delaying income as in the harvest of forest products. In addition, if mining operations are resumed in the reclaimed area, then cattle operations suffer less disruption and loss of income than forestry operations, especially when trees have not reached a marketable size. However, overall returns per acre are lower in beef cattle operations compared to forest products.

The PRP Beef Demonstration Project has showcased the opportunities for beef production on reclaimed mine land. Continued viability of beef operations in coal producing regions of the eastern US will depend on cost efficient production and ability to market a value-added product. In addition, enhancement of the grazing resource and control of undesirable plant species in pastures are critical to decreasing cost of production and increasing productivity of beef operations in coal producing regions.

Three major challenges currently exist to beef production in reclaimed areas. First, traditional pasture management is difficult as practices such as clipping, fertilizing, and weed control are nearly impossible in the rough terrain of reclaimed land. Second, access to quality genetics and use of crossbreeding for herd improvement is limited by geographic location and small herd size. Third, adding value to feeder cattle requires adoption of herd health and marketing practices not usually associated with beef production in coal producing regions.

The focus of the PRP Beef Demonstration Project is to provide research information, demonstration and education on bio-based pasture management, artificial insemination, use of crossbred bulls, and health and marketing programs.

## Objectives for 2005-2006 Project

The objectives of PRP Beef demonstration project were to:

1) Demonstrate cost effective forage management practices that provide near year-round grazing
2) Investigate the potential of goats for pasture management and an alternative enterprise.
3) Demonstrate the combination of animal genetics, health management, and records needed to produce value-added feeder cattle.

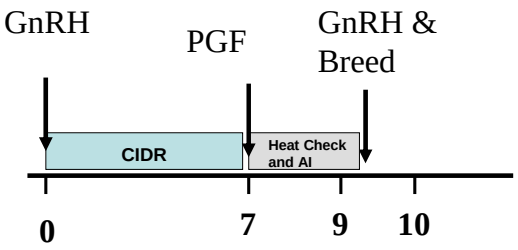
4) Benefit the coal industry and region by showing that reclaimed land can make an important contribution to the economic life of the community.

**Methods**

Forage was stockpiled for winter grazing by applying 50 units of N per acre to approximately 1/3 of the acreage in August 2005. Methods to improve the watering system to allow better grazing management were considered using information from Penn Virginia and Virginia Tech personnel. Three grazing pastures were established for research on control of woody plant species with goats.

In 2004, cows were artificially inseminated (AI) to Angus or Balancer (Angus X Gelbveih) sires. All cows were exposed to a Simmental bull that bred any cows not conceiving to AI. Cows calved in March and April 2005. In June 2005, all cows were estrous synchronized using the CO-Synch CIDR system (Figure 1.) All cows were inseminated over a 72 hour period. Cows were vaccinated against IBR, PI3, BVD and BRSV pre-breeding. Calves were vaccinated against IBR, PI3, BVD, BRSV, and heamophilus somnus as well as clostridial diseases. All calves and young cows (< 3 years-old) were dewormed in June. All male calves were castrated and implanted twice with Ralgro®. Calves were weighed in June, September, and November. Calves were marketed in November along with calves from the Coalfields Cattlemen's Association.

Figure 1. CO-SYNCH CIDR System




Ten goats were leased from a local producer and placed on three grazing treatments in fall of 2005: Control (no-animals), cattle only, and cattle-goat co-grazing. Goats remained on their grazing pastures until December.

**Results:**

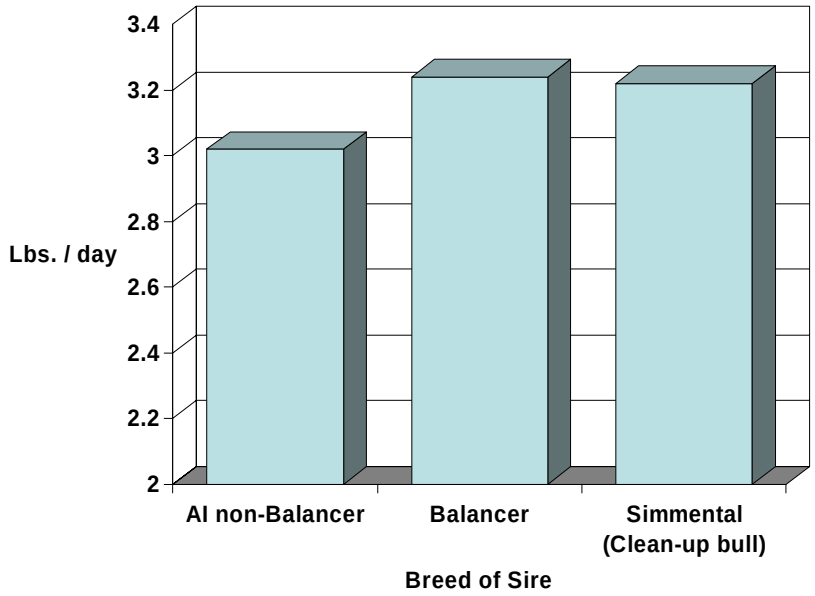
*Forage Production*

Stockpiling of fescue for winter grazing and rotational grazing management provided sufficient grazing for 10 months of the year. The forage/grazing program resulted in cows in an average body condition of 5.4 (1=emaciated to 5 = optimum to 9 = obese) at the beginning of the breeding season. Thus, the grazing season can be effectively extended in pasture developed on reclaimed land resulting in decreased production costs.

*Cow and Calf Performance*

Forty-two cows calved in March and April of 2005 and 39 calves survived to weaning. Sixty-one percent of the calves were sired by AI sires. Male and female calves were equally distributed across bull type (AI Balancer, AI non-Balancer, Natural service Simmental). Growth as determined by weight per day of age is illustrated in Figure 2. Balancer sired calves grew as fast as Simmental sired calves. In addition, Balancer and Simmental calves out gained calves from non-Balancer AI sires. Growth rates in excess of 3.0 per day of age are considered highly profitable. This limited data indicates producers may be able to use crossbred bulls in place of terminal type continental bull breeds without sacrificing calf performance. These observations will need to be replicated over several years to confirm this result.

## Figure 2. Effect of Sire on Growth Rate of Calves (Weight per day of age)




Responses to estrous synchronization and artificial insemination were excellent. A majority of the cows (66.7%) and most of the heifers (80.0%) became pregnant to AI. Pregnancy rate above 50% to AI are considered good and pregnancy rates exceeding 60% are excellent. Results from 2003, 2004, and 2005 breeding seasons indicate that producers with small herds can achieve AI pregnancy rates in excess of 50 to 55% with as few as three days of estrus detection and insemination. Research during the 2006 and 2007 breeding seasons will focus on estrous synchronization systems that eliminate the need for detection of estrus.

*Water system development and fencing*

Personnel from Penn Virginia and VA Cooperative Extension developed a plan for a system of two wells to replace surface water and enhance grazing management. Penn Virginia agreed to drill a new well near the existing cattle working facilities. It was determined that rather than abandon the old well a portable power supply would be used to power the well pumps. A generator was purchased to power well pumps at two locations. Under the new system, the generator will be used to run the well pump which will provide water to a storage tank. The storage tank associated with each well will hold sufficient water to meet the needs of the cow herd for 3 days. Water from the storage tanks will flow by gravity to a series of troughs. This will allow for establishment of smaller permanent pastures. Smaller permanent pastures will allow for enhanced grazing management while reducing labor currently associated with moving temporary fence.

*Control of invading woody species with goats*

Replicate pastures of 10 to 12 acres were fenced to contain goats were established in fall 2005. Goats and cattle were introduced to their respective pastures after the end of the growing season. However, sufficient stockpiled forage and browse was available to support animal nutritional needs.

Assessments of the impact of goats on woody invading species were obtained before goat introduction and after goats were removed. Initial observational data indicated that cattle alone did not affect Autumn Olive, multiflora rose, other woody invaders (Figure 3) and control pastures still had plants with some leaves as well as an abundance of other plants (Figure 4).

Figure 3. Autumn Olive tree and litter in cattle only treatment. Note intact bark and lack of disturbance of leaf litter at base of tree.

Figure 4. Intact leaves and stems on Autumn Olive tree in control (no grazing) area.

In contrast, pastures with goats had Autumn Olive and other woody species that sustained considerable damage to stems, bark, and twigs (Figure 5). In some cases stems of trees were completely stripped of bark (Figure 6).

Figure 5. Damage inflicted to Autumn Olive tree by browsing activities of goats.

Figure 6. December 2005. Stems of Autumn Olive tree completely stripped by goats

In spring 2006, Dr. Abaye and her graduate students initiated the full scale project on use of goats as a bio-control measure for woody invading species. Data collection is continuing and the initial results will be presented in the 2006-2007 report.

*Educational activities*

The annual PRP beef field day was conducted on August 8, 2005. Presentations included information on use of crossbred bulls, herd health, and value added marketing. Approximately

50 producers attended the meeting. The program on use of crossbred bulls included results from the first year of Balancer-sired calf data.

In April, the PRP hosted a meeting of the Agricultural Extension Agents in the Southwest District. Agents viewed the impacts of the bio-control of woody species project. In addition, Dr. Hall discussed the opportunities for agents to become involved in research at PRP and use the cattle herd and facilities for beef producer education.