Expanded Beef Program for the Ohio Dept. of Rehabilitation and Correction

Introduction

Dr. Fernando Silveira is now an Assistant Prof. at The Ohio State University. As part of his responsibilities, he is the veterinarian in charge of all beef cattle within the State of Ohio Dept. of Rehabilitation and Correction (DRC). His new appointment focuses on the beef brood cow herd expansion, and controlled breeding, to produce a year-round supply of cattle for the food supply of the DRC.

This project is part of a new, comprehensive program established within Ohio, to rehabilitate inmates prior to release, teaching them livestock management, meat processing, and food service. At the same time, this program is projected to save the DRC an estimated 25% in prison current operating costs, by producing up to 50% of the beef and other meat needed per year by the prison facilities.

Cattle Resting in a Prison Facility Pasture

Background

Presently in Ohio's prison system there are 35 prisons. A contracted service provider privately manages two institutions. Thirty-three are entirely state-operated. In all, there are about 55,000 inmates currently within the Ohio system, housed in various levels of confinement, from minimum to maximum security.

There are 10 farms involved with beef production, plus five with swine, and five with dairy, with associated grain cropping related to producing cattle feed. The farms are scattered throughout Ohio, and all are located adjacent to the minimum-security prison units. Dairy steers are part of the farm produce. All the milk and cheese from the dairy is used within the prison system. All meat animals from the farms currently are slaughtered and processed commercially by outside contractors. All this meat is totally deboned, and then returned to the prisons in the form of ground beef, chopped beef, stew-meat, pork sausage, patties, etc. All farm produce is consumed entirely within the prison system.

Two Examples of Meals in which Ground Beef is Served: Ravioli and Meat Loaf

With this farming operation, only 30% of the DRC's beef requirements were being met. The remaining supplies have been bought by one of two processes. A) Steers bought at commercial auction, then finished in the DRC feedlot, which can finish 3,000 head at one time; and B) Prepackaged meat in the form of boned, chopped or ground beef, purchased from commercial meat packers.

Of the cattle bought for the feedlot, essentially nothing has been known about their genetic origin, calfhood nutritional regimen, vaccination program, etc. Typically when a load of steers arrived at the feedlot, about 22% of them would not eat at all their first day at the facility, due to stress, illness, unfamiliarity with the surroundings, etc. This led to higher operating costs and cattle losses due to sickness, etc.

The DRC needed to expand its beef program and to reduce overall DRC operating costs per prisoner. However, DRC also needed to increase prisoner opportunities to learn employable skills. In order to meet these challenges, a team of Animal Science, Food Science, and Veterinary professionals from The Ohio State University worked with DRC, and developed the strategy for the new program. They took into consideration these elements: a) beef breeds that will fit into the program; b) management requirements, especially with the available work force; c) time frame needed for DRC to become self-sufficient and profit-neutral; and d) investment needed and return on investment.

The proposed program was presented to the state's highest-ranking officials of The Ohio State University and the DRC for approval and funding requests. The program was ratified and is now under way.

Program

The goals of the Expanded Beef Program are to provide up to 50% of the DRC's need for beef and other meat for the prison population, in addition to rehabilitation and employment experience for the prison inmates. The plan calls for increasing the beef cowherd size from its present 1,000 cows, up to 2,500 cows. Inmates will work with the expanded cattle herd, and at intermediate "backgrounding units" where young weaned cattle are fed a grass-based diet. Inmates will also work at the feedlot units where the cattle are finished for slaughter by receiving a grain-based ration. By working at these facilities, inmates will learn about animal husbandry and farm operation, enabling many of them to gain employment experience within agriculture.

Examples of Backgrounding and Feedlot Operations

In addition, all meat animals will be processed at a brand new meat packing facility constructed, and wholly owned and operated, by the State of Ohio. This new meat packing facility, now under construction, will also process steers from the dairy operation, and all swine, and will provide employment for 150 inmates. The operating plan calls for slaughtering beef animals two days per week, 80 head of cattle per day, plus the required number of swine, about 140/day, for three days each week. This will require a steady supply of 7,680 head of slaughter-ready cattle for the beef part of the facility per year.

Three Views of a Modern Meat Packing Facility

As mentioned above, a projection of animals needed was made as part of the project planning. Ideally, in order to supply these 7,680 beef meat animals per year, the DRC cow herd would need to consist of 10,666 cows, taking into account calf death losses, retained replacement heifers, etc. encountered in the operation.

Presently, however, the State of Ohio owns about 10,000 acres of land suited for traditional agriculture, sufficient for a maximum of 5,000 cows, based on the terrain, climate, and available forage. Some of this land, however, is also needed to grow the grain for the feedlot cattle. In order to expand to total in-house beef production, Ohio would need to purchase additional acreage in the future. Constrained by availability of land for farming, the program target, for the present, has been set at 2,500 cows. Hence, the DRC will become at least 50% self-sufficient in its overall meat animal production, if it is successful in this program. The remaining beef cattle needed to fill the meat packing facility will be purchased from commercial sources. As part of its existing facilities, DRC will continue to operate its feedlot.

However, the nutritional requirements for cattle vary during their life cycle. Cattle need nutrition for maintenance, development, growth, lactation, reproduction, and fattening. Fattening is the last stage, and the most expensive. Cattle, toward the end of their finishing phase, gain less weight per pound of feed consumed, compared to gain at their other stages of life. If the time spent on attaining slaughter weight could be reduced, overall costs could be reduced. The strategy of the program developers has been to look at the cost of each stage, and to try to minimize those stages that do not add much value to the final product.

Taking into account the economic factors, the DRC has developed an operating plan, based on an accelerated time frame needed to obtain a meat animal for the packing plant, from conception to slaughter. The plan adds up as follows: three months for cow breeding; nine months for calf gestation; five months of growth from birth to weaning, and five months from weaning to slaughter. The goal is to produce an animal weighing 1,000-1,200 pounds at 13-14 months of age. The cattle will be slaughtered at a relatively young age, thus shortening the finishing stage where growth and daily gain decrease with time, and saving feed costs. Also cattle will be weaned at five months, instead of the traditional seven months, enabling the mother cows to gain back body condition during their next pregnancies. The cowherd will be divided into four breeding groups, to produce a year-round supply of calves, and to allocate resources most efficiently.

This shortened cycle of conception-to-slaughter beef production is not typically practiced within the commercial beef producing industry in the USA, where cattle are typically slaughtered at about 29 months of age. The DRC is attempting to compress the time period, but still produce a reasonable meat animal, and a wholesome and nutritious meat product. The DRC animals will have minimal fat/finish, but the meat will be tender and flavorful.

Prior to the start of this expanded beef program, the practice of the DRC was to buy the cheapest available cows at local auction barns. These cows were of unknown genetic origin. They were unproven breeders with no guarantee of conception. In the long run, those cheap cows were actually costing the DRC more money, due to increased calving dystocia, lameness, etc., and a high cull rate.

In order to have a higher probability of success with the expanded beef program, careful consideration has been given to the breeds of cattle that would work in the shorter cycle. For the maternal line, the brood cows need to be efficient very suited to converting grass to protein, and to milk for their calves. They must be the sturdy "Range Rovers" of the beef breeds, requiring low maintenance, calving unassisted, with sound feet and legs for foraging. They must have gentle temperament, since an inexperienced work force will be learning about cattle by taking care of the herds. Also research has shown that medium-framed cows are more efficient then either small- or large-framed cows. A cowherd with animals of frame score ~ 4.0 to 5.5 is highly desirable for this purpose.

Two High Efficiency Utility Vehicles:
A Murray Grey Cow and a Land Rover

For the paternal line, sires of calves destined for the meat packing facility need to add muscle mass and weight gain per day of age to the calves. For these traits, Continental European breeds are more suited. Purebred Continental breeds require more feed and especially more grain feed than British breeds. They do not thrive on marginal terrain. They are like "luxury cars" which require higher-octane fuel. Purebred continental females also require more feed for their maintenance, and tend to be less fertile and to milk less than British-breed females. The Continental females would not fit the time line goals of the DRC program, for attainment of puberty, mating, cow maintenance and rebreeding. Thus, only the paternal lines for the meat animals will be Continental European; specifically, Charolais, Simmental, and Limousin were the paternal breeds chosen. DRC will also reduce costs by not housing or maintaining the Continental Bulls. Instead, DRC will use artificial insemination in this part of the breeding program.

Examples of Paternal Breeds: Charolais,
Limousin, and Simmental

Based on a wealth of scientific and practical experience, the four British breeds of cattle selected for the maternal lines, to meet the maternal criteria, were Murray Grey, Hereford, Shorthorn, and Angus. All maternal brood cows will eventually be purebred and one of these four breeds.

Examples of Maternal Breeds: Shorthorn,
Angus, Murray Grey, Hereford

Murray Grey cattle, in particular, were expressly developed in Australia for their ability to convert grass efficiently, and for their gentle disposition. Their milking ability was derived from their origin, a cross between a milking Shorthorn cow, bred to a succession of Angus bulls. Murray Greys are renowned for their ability to produce high quality beef, essentially on grass alone, without heavy grain feeding. They are easy calving, due to the slender fetal conformation of the calf, and the basic structural soundness of the breed. The females attain puberty precociously. Their ease of management will be helpful to the overall sustainability of the program.

To begin this process to maternal cows of known genetics, the existing cowherd was evaluated in January, 2002. Each pregnant female of reasonable structural soundness was placed in one of four groups, based on her phenotypic appearance. The "best" 250 cows in each of the four groups were retained selectively, and now make up the DRC herd.

The predominantly Hereford-appearing group will be bred using purebred Hereford bulls and some artificial insemination with Hereford bloodlines. Similarly, the Murray Grey-appearing females will be bred via purebred Murray Grey genetics, etc. Likewise, Shorthorn genetics will be used on the Shorthorn-type cows, and Angus genetics on the Angus cows. All bull calves resulting from these matings will be used in the meat animal supply. All female calves will be retained for breeding.

By controlled purebred breeding of the maternal groups, with Murray Grey, Hereford, Shorthorn, or Angus bulls, eventually DRC will obtain four strictly purebred maternal breeding groups. To hasten the timeline to achieve four PB maternal herds, DRC has also purchased registered purebred yearling heifers, of known pedigree, to begin to build the purebred base of the breeding groups. To date, the Murray Grey comprises the largest pool of purebred females. The five-year plan for expansion, via controlled breeding and purchases of purebred females, is to increase from 1000 females in 2002, up to 2,500 females in 2005, etc.

Since the DRC program will require finished animals year round, calving will be divided into four seasons. The 250 existing MG-appearing females, plus the purebred MG females purchased this spring by DRC, will be bred in December, to calve in the autumn of 2003 with their first calves.

Eventually the purebred females of each breeding group will be serviced by the selected three Continental breeds: Charolais, Limousin, and Simmental. All of the calves from these matings, bulls as well as females, will become meat animals for slaughter at the packing plant. Hence, none of these crossbred female calves resulting from the Continental X British breeding will be retained as herd replacements.

This system of crossbreeding is an F1 two-breed rotational cross system of management. It is the easiest system to track and the simplest to maintain within the program.

The State of Ohio can be divided into four quadrants, with Columbus, the capital city, located in the very center of the state. Cow/calf operations are located in the southern-most areas of the southern quadrants. The dairy operations are found in the northern-most areas of the north quadrants. Interim units are located midway between the farms where calves are born and Columbus. The feedlot is located approximately 30 miles south of Columbus, and the packing plant will be located just south of Columbus, at Pickaway. Thus the meat animals, through their life cycle, start out at the farthest distance away from the packing plant, and progressively are brought closer to the plant as they grow and reach slaughter weight. This arrangement minimizes the trucking and hauling time and expense needed to move the cattle from their point of origin to the packing plant. It also minimizes stress placed on each animal when it is transported from one facility to another during its life cycle. (See inserted map for graphic representation.)

Map of Ohio with Inserted Farming
and Meat Processing Unit Operations

All cattle will be identified as part of the project, via electronic ear tag, and by tattoo. These electronic ear tags can be easily read with a scanner, and data on birth weight, weaning weight, etc. can be tracked using this approach. Each animal will be monitored from its birth through its eventual termination from the herd.

> *Methods of Identification to be Used on DRC Cattle:*
> *Conventional Ear Tag, Electronic Tag, and Tattoo*

The records will be maintained in a central office using the "Cow Sense®" computer program. Use of a central office will help to transform the beef production system from the historical "10 individual farms" to "one single beef production program." This unification of activities will lead to the economy of scale, to further enhance the profitability of the program.

PB Murray Grey Heifers Getting Acquainted with a Correctional Officer in the Program

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