

EVALUATION OF USING CULLED SWEETPOTATOES IN THE DIETS OF BEEF HEIFERS

Richard R. Evans¹, Paul G. Thompson², Lora R. Ballweber³,
Mark W. Shankle², Brian J. Rude⁴, John E. Huston¹, and Timothy F. Best¹

¹Prairie Research Unit, Prairie, MS 39756

²Pontotoc Ridge-Flatwoods Branch Experiment, Pontotoc, MS 38863

³College of Veterinary Medicine, Mississippi State, MS 39762

⁴Animal and Dairy Sciences, Mississippi State, MS 39762

ABSTRACT: Cull sweetpotatoes present a problem for potato producers, since their cash value is lower than their cost of harvesting and storing. As a consequence, many producers simply leave these culls in the field. This is the second year of a study conducted to determine if enough value can be added to these culled potatoes, by using them as a feed for beef cows and (or) replacement heifers or feeder cattle, to make their harvest a viable economic alternative. The primary areas of concern were the nutritional value of the sweetpotato, feeding methods and the potential for choke, due to its physical size. In this study, yearling heifers were selected, since they are in need of high quality nutrition and because animals of this size (approximately 740 lb) would be more likely to choke on potatoes, if this were a problem, than would mature cows. In this study, the crossbred heifers used were managed as a group prior to treatment assignment and fed a ration equivalent to the control diet. In mid-January the heifers were equally divided, by weight and breed makeup, and assigned to either a sweetpotato (SP) or a control (C) diet. The SP diet consisted of 1.5 lb of corn/day, 2.0 lb of cottonseed meal/day, and free choice sweetpotatoes. To reduce the input cost incurred in the purchase or building of troughs, the potatoes were taken to the pasture in storage crates and dumped on the ground. More potatoes were provided when the heifers had cleaned up the pile. This proved to be an effective and efficient feeding system. The C diet consisted of 4.0 lb of corn plus 1.75 lb of cottonseed meal/head/day. All heifers had access to a high quality complete mineral mixture plus free choice hay. Heifers were weighed and fecal samples taken at trial initiation and for every 28 days thereafter, until trial termination in early April. Average daily gains (ADG) were less than desired for both groups (0.63 lb/d for SP and 0.76 lb/d for the C) in 2000-2001 as compared to 2.0 lb/day in 1999-2000 for both groups. From this study, it appears that culled sweet potatoes can be used as a supplement for beef cattle. Caution should be taken to prevent freezing and the associated problems. The potential for choke exists when feeding anything as large as a sweetpotato to cattle but in the two years of this study, no heifers choked. The ration formulation used to determine the nutritional needs for these heifers did not account for the abnormal winter pattern encountered in the winter of 2000 and 2001. The ration formulation worked well for the milder winter of 1999-2000 but did not provide enough energy in the extremely cold weather encountered in the second year of the study. Therefore, the heifer's maintenance requirements were much higher than usual and less energy was available for growth. Although there was no difference in numbers of internal parasites between treatments or years, internal parasite infection did not follow a normal pattern in 2000-2001. Eggs per gram (EPG), the measure for internal parasites, were highest in January, which follows a normal pattern, but continued to decrease until April at trial termination, which is the opposite of a normal pattern. The EPG counts normally increase when environmental conditions improve for egg and larvae survival. Since the heifers were not given an anthelmintic to control internal parasites, it is assumed that the environmental conditions encountered in the drought of 2000 were so hostile that parasite eggs and larvae had not survived on pasture to cause infection. Since the adult brown stomach worm normally lives for approximately 60 days in the host, then the adults present in the heifers at trial initiation, died during the winter from senescence by spring. Due to the extremely cold conditions, the eggs that were laid by these adults did not develop into infective larvae. Therefore, re-infection of the heifers would have been slight and EPG should have decreased.

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KEY WORDS: Culled sweetpotatoes, beef heifers.

MATERIALS AND METHODS: Forty-two (42)-crossbred heifers were allotted to one of six (6) groups. The six heaviest were randomly allotted to a group, then the next six heaviest, etc. until all heifers are assigned. There were two treatments, a sweetpotato diet and a control diet. Each treatment was replicated three times. Both rations were formulated to meet NRC requirements. The sweetpotato diet consisted of 10 lb of sweetpotatoes plus 1.5 lb of corn and 2.0 lb of cottonseed meal per day. The control diet was 4.0 lb and 1.75 lb of cottonseed meal per day. Both grain supplements were hand fed daily and the sweetpotatoes were dumped from storage crates onto the pastures on an as needed basis. All groups had access to high quality mineral and free choice hay.

Heifers were weighed and allotted to treatment on January 23, 2001 and adapted to the sweetpotatoes for two weeks. Actual data collection began on February 6, 2001 when heifers were weighed and fecal samples collected. Heifers were weighed and fecal samples collected on a 28-day basis for the next 56 days until April 4, 2001. Heifers were checked daily for choke, respiratory or other health problems when they were fed their grain supplements. The sweetpotatoes used in this study were kept dry and were not allowed to freeze.

RESULTS AND DISCUSSION: The desired average daily gain (ADG) for heifers after breeding is approximately 1.0 lb/head/d. The heifers in 2001 had an ADG of 0.63 for SP and 0.76 for the C diet. This was less than desired but the heifers increased in frame size. The heifers had been exposed to bulls for 60 days from early December through February, and removed the day of trial initiation. The pregnancy rates were 86% for SP and 67% for C. The diets had no effect on these breeding percentages but it should be noted that the inclusion of sweetpotatoes into the diet had no negative effect on pregnancy retention. There have been some reports of respiratory problems and possibly other health problems linked with the feeding of sweetpotatoes but the potatoes associated with these problems were stored outside and allowed to freeze and thaw and become wet. A fungus that causes these health problems grows in the nutrient rich environment, provided by the decaying potatoes. Potatoes that are black and showing signs of mold or fungus should not be fed. Practically, the potatoes should be fed early in the season before freezing occurs and other supplements used later in the season to eliminate the potential for this problem.

The ration formulation used to determine the nutritional needs for these heifers did not account for the abnormal winter pattern encountered in the winter of 2000 and 2001. The ration formulation worked well for the milder winter of 1999-2000 but did not provide enough energy in the extremely cold weather encountered in the second year of the study. Therefore, the heifer's maintenance requirements were much higher than usual and less energy was available for growth.

Although there was no difference in numbers of internal parasites between treatments or years, internal parasite infection did not follow a normal pattern in 2000-2001. Eggs per gram (EPG), the measure for internal parasites, were highest in January, which follows a normal pattern, but continued to decrease until April at trial termination, which is the opposite of a normal pattern. The EPG counts normally increase when environmental conditions improve for egg and larvae survival. Since the heifers were not given an anthelmintic to control internal parasites, it is assumed that the environmental conditions encountered in the drought of 2000 were so hostile that parasite eggs and larvae had not survived on pasture to cause infection. Since the adult brown stomach worm normal lives for approximately 60 days in the host, then the adults present in the heifers at trial initiation, died during the winter from senescence by spring. Due to the extremely cold conditions, the eggs that were laid by these adults did not develop into infective larvae. Therefore, re-infection of the heifers would have been slight and EPG should have decreased.

From this study, it appears that culled sweetpotatoes can be used as a supplement for beef cattle. Caution should be taken to prevent freezing and the associated problems. The potential for choke exists when feeding anything as large a sweetpotato to cattle but in the two years of this study, no heifers choked. The heifers would take the potato into their mouth and crush it with their back teeth before swallowing. The energy value of sweetpotatoes is high but the protein level is low. A protein supplement is recommended when sweetpotatoes are fed and an additional energy supplement must be provided when environmental conditions dictate, as evidenced by the Winter of 2000-2001. Although feeding potatoes on the ground would appear to be a wasteful method of supplying them to the heifers, there was almost no waste. If producers allow the animals to clean up before giving the animals a new crate of potatoes, then they will root around until all the potatoes have been eaten. Feeding potatoes is much like feeding hay. If animals are not made to clean up before a new bale is added, then they will leave the old bale and feed on the fresh bale. Animals do not understand the concept of limited feed supply or efficiency.

