# Effect of supplemental summer mineral containing Aureomycin® for Anaplasmosis control or Rumensin® for feed efficiency on beef cowherd performance

Authors: Denny Hausmann, DVM and Marshall N. Streeter, Ph.D.

**Summary**

Mineral supplements to the cowherd during summer grazing are an important management practice to improve cow and calf health and performance. Mineral supplements provided to the cowherd can contain Aureomycin for the control of active anaplasmosis infections or Rumensin to improve feed efficiency and coccidiosis control. This study compared the effects of supplying a mineral supplement containing Aureomycin or Rumensin with a non-medicated control mineral. Cow measurements including cow weight, weight gain, and pregnancy rate were not influenced by medicated supplementation. Lush pasture conditions and an extensive post partum period may have contributed to the lack of response typically noted with medicated supplements. Calf weaning weight and weight gain were increased by 19 lbs for Aureomycin and Rumensin-containing supplements compared with non-medicated control supplements. Explanations for increased calf weight gain could not be determined from study measurements. Aureomycin supplementation reduced the incidence of foot rot in cows and calves compared with those receiving mineral containing Rumensin. Including Aureomycin in mineral supplements supplied to the cowherd during summer grazing results in improved calf performance and cow and calf health.

**Introductions**

Mineral supplementation programs to meet cow-calf mineral requirements are an important part of summer grazing programs. Mineral supplementation also provides an opportunity to provide medications to control anaplasmosis, improve herd health, and enhance herd performance. Three medications are currently approved for use in beef cowherds: 1) Aureomycin (chlortetracycline) for the control of active anaplasmosis infections and the control of Bovine Respiratory Disease (BRD), 2) Deccox® (decoquinate) for the prevention of coccidiosis, and 3) Rumensin (monensin sodium) for improved feed efficiency and coccidiosis control. Comparisons of medications in a beef cow herd have not been reported. The objective of this study was to determine the effect of medicated mineral supplementation on cow and calf weights, cow body condition scores, and cow herd health compared with a non-medicated mineral program (Breiner et al., 2005).

**Experimental Procedures**

Two hundred forty-six commercial Angus-based cow-calf pairs were randomly allotted to three treatment groups that were balanced for anaplasmosis carrier status, dam, and calf age. Initial cow weight and body condition score was collected on April 26, 2004 to provide baseline measurements. Cows and calves were weighed and cows were body condition scored on May 6, 2004 before being sorted into treatment pastures, and just prior to initiation of the breeding season. Pastures were randomly assigned to treatment groups.

Cattle grazed native pastures in the Flinthills of central Kansas from May 6 until October 5, 2004 with ad libitum access to water. Cattle were rotated among pastures every 2 to 4 weeks depending on pasture growth conditions. A standard mineral supplement (Elanco® Free Choice Formulation for Rumensin) was provided to all pastures throughout the duration of the study with a predicted average intake of 4 oz/hd/pair. Treatments consisted of:

1) non-medicated control mineral supplement, 2) control supplement containing 5600 g of chlortetracycline (Aureomycin 90) / ton to provide 0.5 mg of Aureomycin/lb of body weight, and 3) control supplement containing 1600 g of monensin sodium (Rumensin 80) / ton to provide 200 mg of Rumensin /pair/d. All cattle had access to mineral feeders throughout the study. Mineral supplements were provided to maintain the designated amount of supplement intake with orts measured and recorded weekly.

Cows and calves were gathered in the late afternoon one day prior to weight determination, and were fed 10 lbs of prairie hay per cow-calf pair in dry lot with no access to water. Cows and calves were separated just prior to weight and body condition score measurements beginning early the next morning. At the termination of the study on October 5, 2004 cows were weighed; body condition scored and pregnancy rate were measured. Cow body condition score (scale 1 to 9, where 1=emaciated and 9=obese) estimate was the average of 4 independent observers using a combination of visual and palpation techniques.

Blood samples were collected on May 16 and May 26, 2004 to determine the percentage of cows cycling before initiation of the breeding season on June 7. Estrous synchronization consisted of 2 shots of $PGF_{2\alpha}$ on May 26 and June 6, to initiate the breeding season. Cows were artificially inseminated using three purebred Angus bulls from June 7 until June 11. Polled Hereford bulls were turned out on June 15 for natural service. The natural breeding season lasted 65 days. Confirmation of pregnancy occurred from October 14 to October 22 using rectal palpation. In addition, cows and calves were observed throughout the study period for bovine respiratory disease, foot rot, pinkeye, clinical anaplasmosis, and general health concerns common to beef cow herds.

**Results and Discussion**

Daily mineral consumption (Table 1) slightly exceeded targeted levels of 4 oz/pair for all treatment groups resulting in mineral intakes that ranged from 4.4 to 5.2 oz/pair. Observed mineral intakes resulted in an Aureomycin intake of 910 mg/pair and a Rumensin intake of 216 mg/pair. The average weight of a cow-calf pair during the study was 1483 lb resulting in an Aureomycin intake of 0.61 mg/lb of body weight. The approved intake of Aureomycin for the control of active infections of anaplasmosis for hand fed supplements is 0.5 mg/lb of body weight, whereas, the approval for supplements provided on a free-choice basis is a range from 0.5 mg to 2.0 mg/lb of body weight.

**Table 1. Average intake of mineral mixes used in the experiment.**

| | Treatment | | |
|---|---|---|---|
| Item | Control | Aureomycin | Rumensin |
| No of cow-calf pairs | 62 | 91 | 93 |
| No. Pasture groups | 2 | 3 | 3 |
| Mineral intake, oz/pair/d | 4.9 | 5.2 | 4.4 |
| Medication intake, mg/pair/d | 0 | 910 | 216 |

Pasture conditions were lush during the first three and a half months of the study. During the first 32 days of the study prior to the breeding season, cows gained a remarkable 3.7 lb/d. Cow weight, cow weight gain, cow body condition score and changes in cow body condition score were not influenced ($P > 0.10$) by medicated treatments (Table 2). Pregnancy rate was not altered ($P > 0.49$) by medicated treatment; however, the greatest pregnancy rate was noted with the Aureomycin treatment and least for the Rumensin group. Lush pasture conditions may have contributed to the lack of effect noted for Aureomycin and Rumensin on cow measurements. In addition, the post partum interval was extended during the year of the study as the calving season was moved later into the spring the following year. Calf weaning weight and weight gain at the time of weaning was 19 lbs greater ($P < 0.0002$) for the calves receiving Aureomycin or Rumensin in their supplemental mineral compared with the non-medicated control group (Table 2). The cause of increased weaning weight and weight gain prior to weaning could not be determined. Several potential mechanisms may be responsible for this observation.

Milk production and composition was not measured in this study. Aureomycin and Rumensin may have resulted in increased milk production during the summer grazing period. Increased milk production would be expected to cause greater calf weight gain and weaning weight. However, this would seem unlikely because of the lush pasture conditions and apparent excess energy available to the cowherd. Evidence exists in the scientific literature with steers fed high energy finishing diets that continuous feeding of Aureomycin alters the growth hormone axis

consistent with greater fat deposition. Studies on lactating beef cows have not been conducted to determine if Aureomycin increases milk fat content. Greater milk fat content would result in increased calf weight gain if energy were the first limiting nutrient. This potential mechanism would not seem to apply to Rumensin as studies with lactating dairy cows would suggest either no change in milk components or a slight decrease in milk fat. Calves may have consumed more mineral, consequently, more medication than anticipated, resulting in a direct health or growth effect on the calves. Some evidence for this theory is present for the Aureomycin treatment in Table 3.

**Table 2. Effects of medicated treatments on cowherd performance**

| | Treatment | | | Contrast P-value | |
|---|---|---|---|---|---|
| Item | Control | Aureomycin | Rumensin | Control vs Medicated | Aureomycin vs Rumensin |
| *Observations at study initiation* | | | | | |
| Cow wt, lb | 1013 | 977 | 981 | | |
| Cow BCSa | 5.0 | 4.9 | 4.9 | | |
| Calf wt, lb | 218 | 219 | 218 | | |
| *Observations at weaning* | | | | | |
| Cow wt, lb | 1194 | 1181 | 1180 | 0.14 | 0.95 |
| Cow wt gain, lb | 206 | 198 | 192 | 0.28 | 0.60 |
| Cow BCS | 5.1 | 5.1 | 5.0 | 0.40 | 0.18 |
| Cow BCS change | 0.2 | 0.2 | 0.2 | 0.52 | 0.98 |
| Pregnancy rate, % | 90.2 | 92.0 | 88.9 | 0.95 | 0.49 |
| Calf weaning wt, lb | 561 | 579 | 581 | 0.0002 | 0.74 |
| Calf wt gain, lb | 343 | 362 | 362 | 0.0001 | 0.97 |

[a]Body Condition Score, estimated on a scale of 1 = emaciated to 9 = obese

Because of excessive moisture during the early part of the study and rock out-croppings in all pastures, the incidence of foot rot was much greater than expected for cow-calf pairs. Aureomycin* reduced (P = 0.008) the incidence of foot rot in cows when compared with mineral containing Rumensin (Table 3). The recurrence of foot rot also appeared to be reduced with one animal requiring additional treatment in the Aureomycin group and 10 animals requiring subsequent treatment in the Rumensin group. These observations might be expected based on other data noting reductions in foot rot of cattle receiving various levels of Aureomycin. Foot rot incidence was also reduced (P = 0.04) in calves in the Aureomycin treatment group compared with the Rumensin treatment group. Passive transfer of Aureomycin through the milk to the calf occurs when cows consume Aureomycin. However, the level of Aureomycin reaching the calf through passive transfer is low and not expected to have a biological effect on the calf. Reduced foot rot in calves in the Aureomycin group is most likely the result of direct consumption of mineral containing Aureomycin. Foot rot undoubtedly has a negative effect on calf growth rate and perhaps pregnancy rate of cows. A reduction in foot rot could explain improved weaning weight and weight gain of cow-calf pairs consuming mineral with Aureomycin. Obviously, this explanation would not pertain to cow-calf pairs consuming Rumensin, as no effect on foot rot or other disease concerns such a coccidiosis were noted.

*Aureomycin is not approved for the prevention, control or treatment of foot rot.

**Table 3. Effect of medicated treatments incidence of foot rot**

| | Treatment | | | P-value |
|---|---|---|---|---|
| Item | Control | Aureomycin | Rumensin | Aureomycin vs Rumensin |
| No of cows | 62 | 91 | 92 | |
| First pull, % | 25.8 | 9.9 | 28 | 0.008 |
| Repull, % of first pull | 37.5 | 11.1 | 38.5 | |
| No of calves | | | | |
| First pull, % | 16.1 | 3.3 | 10.9 | 0.04 |
| Repull, % of first pull | | | | |

As a group, cows with foot rot, regardless of medicated treatment, did not experience a reduction (P = 0.25) in pregnancy rated when compared with their healthy counterparts. The effects of foot rot in cows on pregnancy rate is likely very sensitive to timing of disease in conjunction with estrous. If a cow experiences foot rot during estrous she may be less likely to stand for natural service and/or less likely to graze with the herd and be exposed to the bull. Conversely, if a cow experiences foot rot either during the anestrous period or after she has already conceived, no impact of foot rot would be expected. Cows experiencing foot rot during the study period, regardless of medicated mineral supplementation, did not wean calves that were lighter (P = 0.30) than their healthy counterparts (Table 4). On the other hand, if a calf experienced foot rot during the summer grazing period weaning weight was reduced (P = 0.02) by 18 lb.

**Table 4. Change in calf weaning weight caused by foot rot incidence**

| Item | Change in weaning weight, lb | P-value |
|---|---|---|
| Cow experience foot rot | 5.6 | 0.30 |
| Calf experience foot rot | 18.3 | 0.02 |

Within the Aureomycin treatment group, fewer calves had foot rot than in the Control or Rumensin groups. However, the effects of foot rot in the Aureomycin treatment group only accounted for 3 of the 19 lb increase in weaning weight. Apparently, factors other than foot rot alone were responsible for increased weaning weight noted with cow/calf pairs consuming Aureomycin medicated mineral.

**Implications**

Aureomycin and Rumensin can be effectively supplemented to cow/calf pairs grazing summer pastures. Within the first year of this study neither medication appeared to influence cow weight gain, body conditions or pregnancy rate. However, Aureomycin dramatically reduced the incidence of foot rot compared with Rumensin or control. Aureomycin and Rumensin supplementation resulted in increased weaning weight and weight gain of calves compared with the control group. Mechanisms responsible for increased weight gain remain unknown but appear to be unrelated to a reduction in calf foot rot in the Aureomycin treatment group.

**Literature Cited**

Breiner, R.M., Llewellyn, D.A., and Marston, T.T. 2005. *Effect of adding Aureomycin for anaplasmosis control or Rumensin to mineral supplements on summer beef cowherd performance.* Kansas State University Beef Cattle Research, pp 50 - 53.

ALPHARMA
Animal Health Division

Alpharma Inc.
One Executive Drive
Fort Lee, NJ 07024 USA
1-800-645-4216



Additional technical information is available at www.alpharma.com