Inclusion of Biuret With or Without Bovatec in a Commercial Mineral Supplement Did Not Improve Growth Performance of Yearling Calves Grazing Native Grass: Year 1 of 2

M. G. Pflughoeft
Kansas State University, madi24@k-state.edu

Z. M. Duncan
Kansas State University, zmduncan@k-state.edu

Z. L. DeBord
Kansas State University, zdebord97@k-state.edu

Follow this and additional works at: https://newprairiepress.org/kaesrr
Part of the Beef Science Commons

Recommended Citation
Pflughoeft, M. G.; Duncan, Z. M.; DeBord, Z. L.; Suhr, K. J.; Hollenbeck, W. R.; Brazle, F. K.; Tarpoff, A. J.; Olson, K C.; and Blasi, D. A. (2022) "Inclusion of Biuret With or Without Bovatec in a Commercial Mineral Supplement Did Not Improve Growth Performance of Yearling Calves Grazing Native Grass: Year 1 of 2," Kansas Agricultural Experiment Station Research Reports: Vol. 8: Iss. 1. https://doi.org/10.4148/2378-5977.8222

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 2022 Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.
Abstract

Objective: The objective of this experiment was to measure the effects of non-protein nitrogen (NPN; biuret) or NPN + ruminal modifier (biuret + Bovatec, Zoetis, Parsippany, NJ) inclusion in a commercial mineral mix on growth performance of yearling beef calves grazing in the Kansas Flint Hills.

Study Description: Three hundred ninety-five crossbred steers (initial body weight: 612 ± 77.8 lb) of Texas origin previously backgrounded at the Kansas State University Beef Stocker Unit were used. Three mineral treatments consisting of a basal supplement (control), a basal supplement plus NPN (biuret), and a basal supplement plus NPN and lasalocid (Bovatec) were provided with a 4 oz/head/day mineral consumption target. The three mineral treatments were randomly assigned to one of 18 pastures with a total of six pastures per treatment. Feeders were checked daily to determine days-to-empty and were weighed weekly to determine mineral consumption. Individual weights were collected at the start and end of the 90 days to determine initial and final body weights (BW).

Results: There was no difference ($P \geq 0.31$) in final BW, total BW gains, average daily gains, and mineral consumption between mineral treatments. For days-to-empty, there was an interaction between treatment and week of the experiment ($P = 0.02$).

The bottom line: The data were interpreted to suggest that the addition of biuret or biuret and lasalocid to a commercial mineral supplement did not affect growth performance of yearling beef cattle grazing in the Kansas Flint Hills.

Keywords
stocker, grazing, non-protein nitrogen

Creative Commons License

This work is licensed under a Creative Commons Attribution 4.0 License.

Authors
M. G. Pflughoeft, Z. M. Duncan, Z. L. DeBord, K. J. Suhr, W. R. Hollenbeck, F. K. Brazle, A. J. Tarpoff, K C. Olson, and D. A. Blasi

This beef cattle management is available in Kansas Agricultural Experiment Station Research Reports:
https://newprairiepress.org/kaesrr/vol8/iss1/3
Inclusion of Biuret With or Without Bovatec in a Commercial Mineral Supplement Did Not Improve Growth Performance of Yearling Calves Grazing Native Grass: Year 1 of 2

M.G. Pflughoeft, Z.M. Duncan, Z.L. DeBord, K.J. Suhr, W.R. Hollenbeck, F.K. Brazle, A.J. Tarpoff, K.C. Olson, and D.A. Blasi

Abstract
The addition of feed additives [rumen modifiers or non-protein nitrogen (NPN)] to mineral supplements may improve health and performance of grazing beef cattle. The objective of this experiment was to evaluate the inclusion of NPN (biuret) with and without Bovatec (Zoetis, Parsippany, NJ) in a commercial mineral mix on growth performance of yearling beef calves grazing in the Kansas Flint Hills. Three hundred ninety-five crossbred steers [initial body weight (BW) 612 ± 77.8 lb] were assigned to one of three mineral treatments (control, biuret, or biuret + Bovatec). Mineral treatments were randomly assigned to one of 18 pastures for a total of six pastures per treatment. Steers were grazed for 90 days from May to August. Individual BW were collected at the start and end of the grazing period. Mineral feeders were placed in each pasture and filled once weekly, and the respective mineral treatment amount was added to target a daily consumption of 4 oz per head. Feeders were weighed weekly and checked daily to estimate the number of days until an individual feeder was empty and in need of refilling (days-to-empty). Total BW gains, average daily gains, final BW, and mineral consumption did not differ (P ≥ 0.31) between treatments. Conversely, there was an interaction (P = 0.02) between days-to-empty and week of the experiment; mineral consumption appeared to be influenced by temporal environmental conditions.

Introduction
Providing a mineral supplement to cattle grazing during summer months in the Kansas Flint Hills can improve growth rate, overall profitability, and provide an opportunity to add nutrients or growth-promoting feed additives to the diets of grazing cattle. The addition of non-protein nitrogen (NPN) or ruminal modifiers to a mineral supplement may be an effective way to improve overall productivity during the grazing season. The objective of this experiment was to measure the effects of NPN (biuret) or NPN + ruminal modifier (biuret + lasalocid) inclusion in a commercial mineral mix on growth performance of yearling beef calves grazing in the Kansas Flint Hills.
**Experimental Procedures**

Three hundred ninety-five crossbred steers (initial BW 612 ± 77.8 lb) of Texas origin previously backgrounded at the Kansas State University Beef Stocker Unit were used in this experiment. Steers were stratified by BW and then randomly allocated to 18 pastures. Steers were grazed for 90 days from May to August at a targeted stocking density of 250 lb of live-weight per acre. Mineral treatments were randomly assigned to one of 18 pastures for a total of six pastures per treatment. Three mineral treatments consisted of basal supplement (control), basal supplement with biuret (biuret; 0.6 oz/ head daily), and basal supplement with biuret and Bovatec (Zoetis, Parsippany, NJ; 180 mg/head/day). Biuret was included in the supplement at 300 lb/ton dry matter (DM) basis to provide 0.6 oz of biuret when mineral was consumed in an intended 4 oz per head daily. Bovatec was included in the supplement at 15.5 lb/ton DM basis to allow a daily consumption of 180 mg/head/day lasalocid when mineral was consumed at 4 oz per head daily. Identical supplement feeders (Bullmaster; Mann Enterprises, Inc., Waterville, KS) were placed in each pasture.

Prior to turnout, steers were individually weighed, assigned a pasture tag, treated for internal (Valbazen, Zoetis, Parsippany, NJ) and external (Standguard, Elanco, Greenfield, IN) parasites, and implanted (Revalor-G, Merck, Kenilworth, NJ). Following initial processing, cattle were sorted and allocated to pastures over a three-day period. Initially, mineral feeder flaps were folded up for approximately two weeks to help cattle locate mineral. In the event of inclement weather, flaps were unfolded to prevent rain from getting into the mineral. Once mineral consumption increased, flaps were left down for the remainder of the grazing period. Each week mineral tubs were weighed to determine weekly mineral consumption. After the mineral tub was weighed, mineral was added to allow for a daily consumption of 4 oz/head for the following 7 days. Mineral tubs were checked daily for cleanliness, to monitor rate of consumption, and visually estimate the number of days until each mineral feeder was empty (days-to-empty). Mineral tubs were refilled the same day each week. At the completion of the 90-day grazing period, calves were gathered and individually weighed to determine final BW, total BW, and average daily gains (ADG).

**Results and Discussion**

At the conclusion of the grazing period, final BW, total BW, ADG, and mineral consumption did not differ \( (P \geq 0.31; \text{Table 1}) \) between mineral treatments; however, there was an interaction between days-to-empty and week of the experiment \( (P = 0.02; \text{Figure 1}) \). At the initiation of the experiment, mineral consumption was low. However, it increased rapidly such that days-to-empty for all treatments reached 2 to 4 days by week 3 of the experiment. In late June, mineral consumption decreased, coinciding with elevated ambient temperatures. After the elevated ambient temperatures, normal mineral consumption resumed and all treatments were consistently between 2 to 4 days-to-empty at each observation.

**Implications**

The data from this first year suggest that the addition of biuret or biuret and Bovatec to a commercial mineral supplement did not affect growth performance of yearling beef cattle grazing in the Kansas Flint Hills. A second year of this study will be conducted to fully evaluate the impact of these mineral supplementation strategies.
Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Table 1. Mineral ingredients and nutrient composition

| Item                     | Control | Biuret | Biuret + Bovatec |
|--------------------------|---------|--------|------------------|
| Salt                     | 485     | 485    | 485              |
| Monocalcium phosphate 21%| 385     | 385    | 385              |
| Calcium carbonate        | 350     | 300    | 300.25           |
| Dried distillers        | 310     | 310    | 310              |
| Microlite                | 200     | 15.75  | ---              |
| Dried molasses           | 120     | 120    | 120              |
| Soy hulls                | 85      | -      | -                |
| Soy oil                  | 20      | 20     | 20               |
| Magnesium oxide          | 15      | 30     | 30               |
| Zinc oxide               | 15      | 15     | 15               |
| Copper sulfate           | 8       | 8      | 8                |
| Sulfur flour             | ---     | 4.25   | 4.25             |
| Vit A 60,000             | 6       | 6      | 6                |
| Ethylenediamine dihydroiodide | 1 | 1 | 1 |
| Biuret                   | ---     | 300    | 300              |
| Bovatec²                 | ---     | ---    | 15.5             |
| Total                    | 2000    | 2000   | 2000             |

continued
Table 1. Mineral ingredients and nutrient composition

| Item                      | Control     | Biuret      | Biuret + Bovatec |
|---------------------------|-------------|-------------|------------------|
| **Calculated nutrient composition** |             |             |                  |
| DM, %                     | 96.46       | 97.14       | 97.14            |
| Crude protein, %          | 5.4         | 42.9        | 42.9             |
| Crude fat, %              | 2.27        | 2.18        | 2.18             |
| Crude protein, NPN, %     | ---         | 37.95       | 37.95            |
| Total digestible nutrients, % | 21.03       | 18.05       | 18.05            |
| Calcium, %                | 10.35       | 9.28        | 9.27             |
| Phosphorus total, %       | 4.24        | 4.2         | 4.2              |
| Salt, %                   | 24.23       | 24.23       | 24.23            |
| Sodium, %                 | 9.71        | 9.66        | 9.66             |
| Chloride, %               | 14.74       | 14.74       | 14.74            |
| Potassium, %              | 0.66        | 0.43        | 0.41             |
| Magnesium, %              | 1.38        | 1.06        | 1                |
| Sulfur, %                 | 0.33        | 0.542       | 0.542            |
| Manganese, ppm            | 197.8       | 137.9       | 132.8            |
| Zinc, ppm                 | 5485.6      | 5439.6      | 5435.6           |
| Iron, ppm                 | 1061.2      | 1024.3      | 1021.2           |
| Copper, ppm               | 1019.3      | 1013.7      | 1013.3           |
| Cobalt, ppm               | 52          | 5.93        | 2                |
| Iodine, ppm               | 495.1       | 495.1       | 495.1            |
| Selenium, ppm             | 0.056       | 0.056       | 0.056            |
| Vitamin A, total KIU/lb   | 81.65       | 81.65       | 81.65            |
| Bovatec, mg/lb            | ---         | ---         | 705.3            |

1Designed for 4 oz intake per day; Dr. Frank Brazle, 2021, personal communication.
2Zoetis, Parsippany, NJ.
3Dry matter.
4Nonprotein nitrogen.

Table 2. Inclusion of biuret with or without Bovatec on stocker cattle performance grazing native grass

| Item                      | Control | Biuret | Biuret + Bovatec | SEM | P-value |
|---------------------------|---------|--------|------------------|-----|---------|
| Initial BW, lb            | 610     | 613    | 623              | 11.1| 0.48    |
| Final BW, lb              | 816     | 829    | 830              | 11.1| 0.40    |
| Total BWG, lb             | 206     | 216    | 206              | 7.8 | 0.32    |
| ADG, lb/day               | 2.29    | 2.41   | 2.29             | 0.090| 0.32   |
| Daily mineral intake, oz/| 3.96    | 3.96   | 3.85             | 0.081| 0.31   |

1Standard error of the mean.
2Body weight.
3Body weight gain.
4Average daily gain.
Figure 1. Effects of biuret and Bovatec on weekly mineral consumption rate of yearling cattle grazing native grass pasture, mixed model standard error of the mean associated with comparison of treatment × week interaction effect means (P = 0.02).

*Week 2 Biuret > Control (P = 0.007), Biuret = Bovatec (P = 0.33), Bovatec vs. Control (P = 0.08).

†Week 3 Biuret = Bovatec > Control (P ≤ 0.05).

§Week 5 Bovatec > Biuret (P = 0.05), Biuret = Control, Bovatec = Control (P ≥ 0.12).

¶Week 13 Control > Biuret (P = 0.05), Biuret = Bovatec, Bovatec = Control (P ≥ 0.12).