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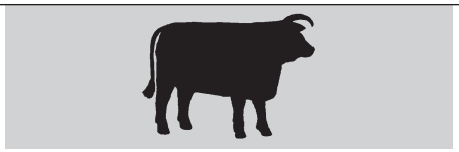

Effect of supplementation of developing replacement heifers with monensin or bambermycins on gain and pregnancy rates[1]

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ABSTRACT

Medicated feed additives have been shown to increase BW gain and decrease age at puberty; therefore, heifers were provided nonmedicated control (CNTRL), bambermycins (BAMB, Gainpro, Huvepharma Inc., Sofia, Bulgaria), or monensin (MON, Rumensin, Elanco Animal Health, Greenfield, IN) supplements to determine effects on growth performance and reproductive development. Spring-calving (block 1; n = 70 heifers; BW = 208 ± 21.7 kg; age = 231 ± 17.0 d) and fall-calving (block 2; n = 72 heifers; BW = 225 ± 31.7 kg; age = 276 ± 12.8 d) heifers were allotted to treatments [n = 4 groups in CNTRL and 5 groups in BAMB and MON (block 1), 4 groups per treatment (block 2)] by breed, BW, and source. Heifers in block 1 grazed tall fescue [Lolium arundinaceum (Schreb.) Darbysh.] for 188 d; heifers in block 2 grazed bermudagrass (Cynodon dactylon) pasture and tall fescue for 161 d. The BW at breeding and ADG of CNTRL (323 ± 4.8 kg and 0.68 ± 0.0167 kg/d, respectively) was less (P ≤ 0.04) than medicated, yet MON (346 ± 4.6 kg and 0.73 ± 0.0163 kg/d) and BAMB (344 ± 4.6 kg and 0.74 ± 0.0163 kg/d) did not differ (P ≥ 0.69). Prebreeding reproductive tract scores (3.5 ± 0.60), cycling activity (61 ± 12.3%), and AI (30 ± 12.3%) and total pregnancy rates (82 ± 11.5%) did not differ (P ≥ 0.25) among treatments. This experiment indicates that BAMB and MON effectively increased growth performance of heifers but did not affect reproductive development or pregnancy rates.

Key words: bambermycins, beef heifer, monensin, reproduction

INTRODUCTION

Medicated feed additives, such as lasalocid, monensin, and bambermycins, have been used for years to effectively increase BW gain of growing cattle on pasture or fed hay (Bretschneider et al., 2008). Replacement heifer development is an expensive endeavor with lifetime implications on productivity of the cowherd. To optimize production and lifetime profitability, heifers should be bred at 15 mo of age to calve at 24 mo of age (Clark et al., 2005; Stygar et al., 2014). Furthermore, heifers that calve early in the calving season tend to calve early in subsequent calving seasons (Short and Bellows, 1971), which may have ef-

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fects on the ability to get primiparous cows to rebreed with their second calf within a short subsequent breeding season.

Producers have increasingly become interested in forage-based programs that will cost-effectively supply required nutrients to growing beef cattle without daily feeding of mixed diets. Ionophores and ruminally active antibiotic growth promoters function by increasing the production of propionate and decreasing the acetate:propionate ratio, increasing DM and protein digestibility, and increasing gluconeogenesis and glucose turnover (Schelling, 1984). McCartor et al. (1979) found that heifers fed diets containing monensin that resulted in increased propionate production were pubertal 30 d earlier and 17 kg lighter in BW than heifers fed nonmedicated diets. There are data available that indicate that supplying monensin to developing replacement heifers improves fertility and decreases age at puberty (Lalman et al., 1993), but there is limited research investigating the utility of bambermycins in similar production systems. Therefore, this research was conducted to determine the effects of supplementation of growing replacement heifers with monensin (Rumensin, Elanco Animal Health, Greenfield, IL) or bambermycins (Gainpro, Huvepharma Inc., Sofia, Bulgaria) on BW gain, puberty, and pregnancy rates of developing replacement heifers.

MATERIALS AND METHODS

Animal procedures in the experiments were approved by the University of Arkansas Institutional Animal Care and Use Committee (Protocol #12042). Heifers from spring-calving (block 1; n = 70 heifers; mean BW 208 ± 21.7 kg; mean age 231 ± 17.0 d) and fall-calving (block 2; n = 72 heifers; mean BW 225 ± 31.7 kg; mean age 276 ± 12.8 d) cowherds were used to test the effects of bambermycins or monensin fed in 1 kg/d corn gluten feed–based supplements (22.1% CP, 11.8% ADF, 30.7% NFC, and 72% calculated TDN; DM basis) on pasture in comparison with nonmedicated supplement. The 3 treatments were (1) **CNTRL**—supplement included a mineral and vitamin premix only; (2) **BAMB**—supplement included a mineral and vitamin premix designed to supply 15 mg per heifer of bambermycins daily; (3) **MON**—supplement included a mineral and vitamin premix designed to supply 200 mg per heifer of monensin daily. Following weaning and preconditioning, heifers were allocated into 14 groups (n = 5 heifers per group) for block 1 and 12 groups (n = 6 heifers per group) in block 2 by breed, BW, and source. These groups were then assigned randomly to pastures, and pastures were assigned randomly to treatments [n = 4 groups in CNTRL and 5 groups in BAMB and MON (block 1), 4 groups per treatment (block 2)]. Heifers from the Livestock and Forestry Research Station cowherd (n = 56 in block 1 and n = 60 in block 2) were crossbreds of English (Angus) and Continental (Gelbvieh and Charolais) origin. Heifers from the Southwest Research and Extension Center cowherd (n = 14; block 1) were predominantly of Angus origin (87%) with slight *Bos indicus* influence (13%). Heifers used from the Southeast Research and Extension Center cowherd (n = 12; block 2) were predominantly of Beefmaster breeding.

Treatment supplements were offered daily at a rate of 1.0 kg per heifer (as-fed basis). Supplements contained (DM basis) 89% corn gluten feed and 11% of the respective mineral premix. The mineral premix for CNTRL (Control Mineral G0771AAA, ADM Alliance Nutrition Inc., Quincy, IL) was designed to contain (as-fed basis) 17.5% Ca, 7% P, 18.5% salt, 2.7% Mg, 0.1% K, 1,200 mg of Cu/kg, 1.25 mg of Se/kg, 4,200 mg of Zn/kg, and 440,000 IU of vitamin A/kg. The mineral premix for BAMB (GAINPRO Test Mineral G0771AOZ, ADM Alliance Nutrition Inc.) was designed to contain (as-fed basis) 17.5% Ca, 7% P, 18.5% salt, 2.7% Mg, 0.1% K, 1,200 mg of Cu/kg, 1.25 mg of Se/kg, 4,200 mg of Zn/kg, 440,000 IU of vitamin A/kg, and 132 mg of bambermycins/kg. The MON mineral supplement (MoorMan's Grower Mineral RU-1620; ADM Alliance Nutrition Inc.) was designed to contain (as-fed basis) 9.2% Ca, 6% P, 21.6% salt, 0.3% Mg, 0.8% K, 1,120 mg of Cu/kg, 26 mg of Se/kg, 3,840 mg of Zn/kg, and 441,000 IU of vitamin A/kg.

Study Site and Pasture Management

This research was conducted at the University of Arkansas Livestock and Forestry Branch Station located near Batesville, Arkansas. Heifer calves in block 1 were housed in fourteen 2-ha pastures consisting primarily of nontoxic endophyte–infected [*Epichloë coenophiala* (Morgan-Jones and W. Cams) C.W. Bacon & Schardl, comb. Nov.] tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh. Duramax Gold, DLF International Seeds, Halsey, OR]. Pastures were fertilized with 168 kg of ammonium nitrate/ha (56 kg of N/ha) in September and February. Pastures were allowed to accumulate forage mass from fertilization in September until October 29, 2013, at which time 5 heifers were placed on each pasture. Each pasture was divided into 4 paddocks and rotationally grazed by the heifers assigned to that particular pasture. Residence time on each paddock was 7 d, allowing for 21 d of rest for each paddock before grazing of regrowth. Heifers remained on the study from October 29, 2013, to May 5, 2014 (188 d). From February 3, 2014, to March 17, 2014 (35 d), slow regrowth of tall fescue and ice and snow cover made it necessary that nontoxic endophyte tall fescue hay be fed (14.4% CP and 56.6% TDN, DM basis). During the hay feeding period heifers were placed on a single paddock in each pasture and resided there until grazing was reinitiated for the spring-grazing season.

Heifer calves in block 2 grazed twelve 2-ha common bermudagrass (*Cynodon dactylon*) pastures from June 24, 2014, to October 2, 2014, at which time heifers were moved to twelve 2-ha tall fescue pastures (Dura-

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