

Research Now

Feeding the Beef Cow Availa[®]4 Improves Productivity and Economic Returns of the Calf

Introduction:

While much is known about the influence that energy and protein intake have on beef cows during late-gestation (third trimester), there is limited data available regarding trace mineral status of cows in this physiological phase. This study evaluated the response of offspring to different trace mineral supplementation regimes of late-gestation beef cows.

Experimental Design:

At the end of the second trimester of gestation (d 0), 84 crossbred (Angus X Hereford) cows were ranked by BW and BCS, before being allocated to 21 drylot pens. Pens were assigned to 1 of 3 treatments:

1. CON: no trace mineral supplementation
2. INORG: Zn, Mn, Cu and Co from sulfates
3. Availa[®]4 (7 g/hd/d): Zn, Mn, Cu and Co from Zinpro Performance Minerals[®]

The INORG and Availa-4 supplements were formulated to provide Iso levels of Zn, Mn, Cu, and Co, which were added to a forage-based diet and fed to cows from d 0 through calving.

Liver biopsy samples were obtained from cows, and BCS recorded on d -10 and 75 of the study (prior to calving season). Within 3 h post-calving, calves were weighed, liver samples taken, and placenta recovered for collection of cotyledon samples. Liver and cotyledon samples were analyzed for Zn, Mn, Cu and Co content. Cow-calf pairs were then managed according to standard protocols of the herd, which included inorganic mineral supplementation (post-calving). At 6 months of age, calves were weaned and underwent 45 d of preconditioning.

Results:

Cows

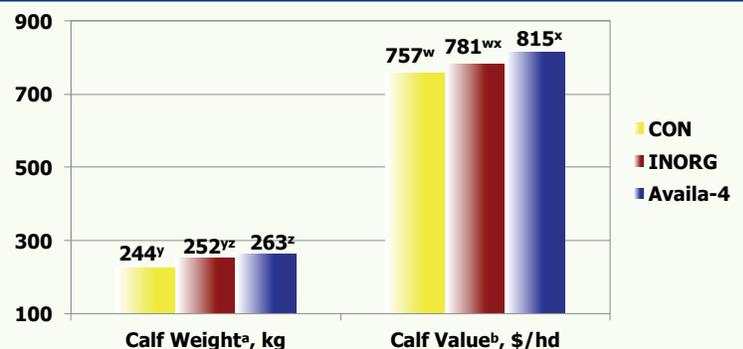
- Cows consuming the CON treatment had smaller increase in BCS in the third trimester of gestation, $P \leq 0.05$
 - All cows had similar ($P = 0.61$) and appropriate pre-calving BCS
- Cows receiving supplemental minerals had greater liver Zn, Cu and Co concentrations, $P \leq 0.05$
 - Decreased ($P = 0.04$) Co and increased ($P = 0.03$) Cu was observed in liver tissue of cows receiving INORG compared to Availa-4
- Cotyledon analysis revealed Co concentration to be greater for cows consuming supplemental minerals, $P \leq 0.05$
 - Cotyledon Co concentration were greater in cows fed Availa-4 vs the CON treatment, $P = 0.05$

Calves

- Calves whose dam consumed a trace mineral supplement had greater liver Co concentrations, $P < 0.01$
- Offspring in the Availa-4 group had greater liver Zn and Cu concentrations, compared to those in the CON treatment, $P \leq 0.05$
- BW and value of calves at weaning and after preconditioning were greatest for those whose dam consumed Availa-4 vs. CON, $P \leq 0.04$
 - Calves from the INORG treatment fell intermediate to the other treatments for these parameters, $P \geq 0.18$

Supplementing late-gestation beef cows with Availa-4 offers an opportunity to enhance the productivity and economic value of offspring in a cow-calf system.

205 d Adjusted Calf Weaning Weight and Value



^a Beef Improvement Federation, 2010

^b USD 3.1/kg BW, 2013 and 2014; USDA Agricultural Marketing Service, 2015

^{wx} Means lacking a common superscript letter differ, $P < 0.09$

^{yz} Means lacking a common superscript letter differ, $P < 0.05$

Abstract

Effects of Organic or Inorganic Co, Cu, Mn and Zn Supplementation to Late-Gestating Beef Cows on Productive and Physiological Responses of the Offspring. R. Marques*¹, R. F. Cooke¹, M. C. Rodrigues^{2,3}, T. Guarnieri Filho^{1,3}, B. I. Cappellozza¹, P. Moriel⁴, and D. W. Bohnert¹, ¹Oregon State University - EOARC Burns, Burns, OR ²Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR ³Faculdade de Medicina Veterinária e Zootecnia, UNESP – Univ. Estadual Paulista, Botucatu, Brazil ⁴North Carolina State University - Mountain Research Station, Waynesville, NC

Eighty-four pregnant Angus X Hereford cows were ranked by BW and BCS, and allocated to 21 drylot pens at the end of their 2nd trimester of gestation (d 0). Pens were assigned to receive: 1) diet supplemented with sulfate sources of Cu, Co, Mn, and Zn (INR), 2) diet supplemented with an organic source of Cu, Mn, Co, and Zn (ORG), and 3) no Cu, Co, Mn, and Zn supplementation (CON). From d 0 until calving, cows were offered a forage-based diet formulated to meet requirements for energy, protein, macrominerals, Se, I, and vitamins. The INR and ORG diets were formulated to provide the same daily amount of Cu, Co, Mn, and Zn. Cow BCS was recorded, and liver samples were collected on d -10 and 2 wk (d 75) before the calving season. Within 3 h after calving, calf BW was recorded, liver samples were collected, and the placenta was retrieved for cotyledon collection. All liver and cotyledon samples were analyzed for Cu, Co, Mn, and Zn. After calving, cow-calf pairs were assigned to the general management of the herd that included inorganic mineral supplementation. Calves were weaned at 6 mo of age and preconditioned for 45 d. Cows receiving CON had less ($P \leq 0.05$) BCS gain during the last trimester of gestation compared with INR and ORG cows, although cows from all treatments had similar ($P = 0.61$) and adequate pre-calving BCS. On d 75, liver concentrations of Co, Cu, and Zn were greater ($P \leq 0.05$) for INR and ORG compared with CON, whereas INR cows had reduced ($P = 0.04$) liver Co but greater ($P = 0.03$) liver Cu compared with ORG cows. In the cotyledons, Co concentrations were greater ($P \leq 0.05$) in ORG and INR compared with CON cows, whereas Cu concentrations were increased ($P = 0.05$) in ORG compared with CON cows. Calves from INR and ORG cows had greater ($P < 0.01$) liver Co concentrations compared with calves from CON cows. Liver Cu and Zn concentrations were also greater ($P \leq 0.05$) for calves from ORG cows compared with cohorts from CON cows. Calf BW and value at weaning and upon preconditioning were greater ($P \leq 0.04$) for calves from ORG cows compared with calves from CON cows, and similar ($P \geq 0.18$) between calves from INR cows compared with the other treatments. Therefore, supplementing late-gestating beef cows with organic Co, Cu, Zn, and Mn is an alternative to enhance offspring productivity and economic returns in cow-calf systems.

Key Words: beef cows, minerals, offspring, pregnancy

2015 ASAS Western Section, June 23-26, 2015, Ruidoso, NM, USA