INTRODUCTION
Western sheep production systems rely largely on rangeland plant communities as the primary feed source. This reliance on the rangeland plant community could lead to mineral deficiencies, which may limit the productivity of livestock operations. Mineral concentrations in forages are highly variable across rangelands with influential factors such as soil geochemistry and forage stage of maturity. Numerous studies have suggested that the chemical form of a mineral source plays an important role in bioavailability; generally with organic sources being more bioavailable than inorganic sources (Spear, 2003). A survey conducted to quantify serum Zn concentrations in Montana ram lamb populations indicated that approximately 14% of rams sampled were categorized as being deficient and 52% marginally deficient in Zn (Page et al., 2016). Subclinical deficiencies in Zn could be more frequent than other trace minerals because the body does not sequester large amounts of available Zn in any one organ (NRC, 2007; Herdt and Hoff, 2011). Optimal concentrations of dietary Zn are not well understood, and with such high tolerance to dietary Zn in most mammals, there is potential for higher supplementation levels than the recommended concentrations for sheep (NRC, 2007).

OBJECTIVE
Evaluate the effects of dietary zinc source and concentration on Zn status, growth performance, and wool characteristics in developing Targhee rams.

HYPOTHESIS
We hypothesized greater dietary Zn concentrations, and a more bioavailable chemical form would result in greater serum Zn concentrations, growth performance and efficiency and wool characteristics.

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LITERATURE CITED

MATERIALS AND METHODS

- Forty-four Targhee rams (14 mo of age; 68 ± 18 kg BW) were used in an 84-d completely randomized design. 
- Treatment Groups
  - 1. control diet without fortified zinc (CON; 47.5 ppm Zn; n = 15)
  - 2. diet fortified with a Zn amino acid complex (ZnAA; 95.5 ppm Zn; n = 14)
  - 3. diet fortified with ZnSO₄ (ZnSO₄; 91.5 ppm Zn; n = 15)
- Growth and wool traits measured e.g., ADG, DMI, G:F, BMI, wool staple length (SL), and average fiber diameter (AFD). 
- Jugular venous samples were collected from each ram at four time periods to quantify serum Zn concentrations by ICPMS.

RESULTS

- There were no differences in DMI, BW, LMD, BF, and AFD among treatment groups.
- ZnSO₄ had greater serum Zn concentrations compared to ZnAA and CON treatments.
- Rams consuming ZnAA had greater ADG than ZnSO₄ and CON.
- There tended to be differences among groups for G:F, with ZnAA being greater than ZnSO₄ and CON.
- Wool staple length was greater in the ZnSO₄ treatment group and tended to be longer in ZnAA treatment group compared to CON.

IMPLICATIONS
- Zn source and concentration affected ADG, serum Zn concentrations, staple length, and tended to increase feed efficiency.
- Results indicate that greater dietary Zn concentrations can enhance nutritional strategies in ram development.
- These findings might be especially applicable to producers developing white-face type rams for fall ram sales in the mountain west and northern plains regions.