

Mineral Supplementation to Range Sheep

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New Mexico range forages may be seasonally deficient in required nutrients; therefore, supplemental nutrients must be provided to meet production goals. Nutrient supplementation can be costly and, in the interest of maximizing profitability, should be approached strategically. Informed decisions about mineral supplementation to range sheep require knowledge of the dynamic nature of forage mineral concentration and animal requirements. However, the dietary mineral content of sheep on specific sites is challenging to pinpoint. It is important for producers to identify minerals that are most likely to be deficient and hamper performance.

To develop a general measure of mineral content and variation in forages on New Mexico rangelands and aid producers in nutritional management of range livestock, a forage mineral survey was conducted across the state. In the fall and late winter of 2001 and 2002, forage samples were collected and analyzed for macrominerals (calcium, phosphorous, magnesium, potassium, sodium, sulfur) and microminerals (cobalt, copper, iron, manganese, molybdenum, selenium, and zinc). The average concentration for each mineral was: calcium (0.46%), phosphorous (0.07%), magnesium (0.09%), potassium (0.37%), sodium (0.05%), sulfur (0.10%), cobalt (0.46 ppm), copper (12.6 ppm), iron (876 ppm), manganese (75.5 ppm), molybdenum (1.1 ppm), selenium (0.10 ppm), and zinc (24 ppm). However, forage mineral concentration varied greatly, both within and across major land resource areas of New Mexico and use of statewide average values may be dangerous. In most cases, average mineral concentrations were higher in the fall than in late winter. The results indicate that when developing a mineral supplementation program for sheep grazing New Mexico rangelands, primary consideration should be given to phosphorous, potassium, magnesium, copper, selenium, sodium, sulfur, and zinc. Phosphorous, potassium, magnesium, sodium, and sulfur were not sufficient to meet the requirements of a mature lactating ewe in 89 to 100 percent of samples. Zinc, selenium, and copper were deficient in 85, 47, and 31 percent of samples, respectively, whereas cobalt, iron, and manganese were rarely deficient.

Deficiencies of potassium, phosphorous and magnesium are often hard to fully mediate via a mineral supplement alone because of the sheer magnitude of the deficiency and amount of mineral supplement intake necessary to meet requirements. On the other hand, the trace minerals are rather easy to incorporate at quantities needed to meet requirements through a mineral supplement. Calcium, cobalt, and manganese were less frequently observed to be deficient, but should not be completely disregarded. In addition to a mineral supplement, producers should consider fortifying protein or energy supplements with needed macrominerals and microminerals.

Sodium and sulfur were deficient in 92 and 95 percent of samples; however, both of these minerals are commonly high in New Mexico ground water. Intake of minerals from ground water should be considered when evaluating the potential for a deficiency of sodium or sulfur. Other minerals, like copper, selenium, and zinc have reduced availability when sulfur intake from water or feed is high. Additionally, molybdenum and iron are antagonistic to copper absorption. The results of this survey revealed that 32 percent of samples had an iron:copper ratio classified as high risk for creating a copper deficiency, while molybdenum was never high enough to be considered problematic. The differential between copper requirement and copper toxicity is very small for sheep. High iron concentration therefore presents a challenge because

copper supplementation to sheep increases the risk of copper toxicity. In fact, eight percent of samples exceeded the maximum tolerable level (25 ppm) for copper. A conservative approach is to not include copper in supplements, fully relying upon mobilization of copper stored in the liver during periods when the diet is copper deficient.

The observed magnitude of variation in forage mineral concentration highlights the importance of site-specific forage analysis to develop cost-effective mineral supplementation programs. For more information about sheep mineral supplementation feel free to contact me at (505) 646-8022.