Do My Livestock Require Mineral Supplementation? Part III

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The **Type and Amount** of mineral supplementation required by livestock depends on the **mineral content and intake of their basal diet** compared to minimal requirements. The following table shows the mineral content of 3 forages that will be used as examples in this article. Mineral concentrations are reflective of those that would be typical of similar forages in southcentral Missouri. **However, mineral concentrations of the forages in your pastures or hays may be entirely different**. **Sampling and testing of forages is necessary** to be conclusive due to the complexity of factors that can affect how forage plants incorporate minerals from the soil into their tissues. And those factors can change for better or worse over time.

Nutrient	Grass Pasture, vegetative	Grass Pasture, early bloom	Grass Hay, full bloom
NEm, mcal/lb. DM	.6273	.5182	.4864
Crude Protein, % DM	14.00	10.30	7.11
NDF, % DM	55.00	64.00	70.50
Calcium, % DM	.54	.43	.34
Phosphorus, % DM	.27	.20	.17
Potassium, % DM	2.68	1.83	1.85
Magnesium, % DM	.19	.16	.11
Sulfur, % DM	.17	.15	.13
Sodium, % DM	.08	.04	.01
Cobalt, mg/lb. DM	.0818	.0636	.0864
Copper, mg/lb. DM	5.2727	4.1364	2.3955
Iron, mg/lb. DM	109.0909	68.1818	70.4500
Iodine, mg/lb. DM	.0500	.0273	.0259
Manganese,mg/lb. DM	37.0909	30.1045	20.2864
Selenium, mg/lb. DM	.0363	.0207	.0153
Zinc, mg/lb. DM	11.4545	9.65	7.1456

The following table depicts the mineral intake that can be expected when 1200 lb. lactating beef cows consume the 3 forages in the table above at the dry matter intakes indicated. The last column in the table lists the minimum mineral requirements of these cows . Percentages indicate the percent of the requirements met.

Mineral	Grass Pasture, vegetative	Grass Pasture, early bloom	Grass Hay, full bloom	Requirement
Dry matter intake, lbs./day	28.5	26.4	22.8	
Calcium, lbs./day	.1539 (208%)	.1135 (153%)	.0775 (105%)	.0740
Phosphorus, lbs./day	.0770 (156%)	.0533 (108%)	.0388 (79%)	.0493
Calcium:Phos. Ratio	2.00	2.13	2.00	1.50
Potassium, lbs./day	.7638 (413%)	.4875 (264%)	.4218 (228%)	.1848
Magnesium, lbs./day	.0542 (102%)	.0422 (80%)	.0251 (47%)	.0530
Sulfur, lbs./day	.0484 (122%)	.0400 (101%)	.0296 (75%)	.0396
Sodium, lbs./day	.0228 (86%)	.0107 (41%)	.0023 (9%)	.0264
Cobalt, mg/day	2.3313 (194%)	1.6943 (141%)	1.9700 (164%)	1.199
Copper, mg/day	150.27 (125%)	110.19 (92%)	54.62 (46%)	120.000
Iron, mg/day	3109.1 (518%)	1816.36(303%)	1606.26 (268%)	600.00
Iodine, mg/day	1.4250 (24%)	.7273 (12%)	.5909 (10%)	6.00
Manganese, mg/day	1057.09 (220%)	801.98 (167%)	462.53 (96%)	480.00
Selenium, mg/day	1.035 (86%)	.551 (46%)	.349 (29%)	1.199
Zinc, mg/day	326.45 (91%)	254.76 (71%)	162.92(45%)	360.00

It is a common practice to insure that minerals are supplied in slight excess of the minimal requirement (10+%) to account for variations in mineral bioavailability, etc. This is called a **Margin of Safety**. The following are a few observations regarding the table above:

1. As forage plants mature, the **number** and the **magnitude** of mineral deficiencies increase.
2. **Calcium** is provided in adequate amounts by all three of these forages, although the margin of safety for the full bloom hay is narrow. Calcium to Phosphorus Ratios are adequate.
3. **Phosphorus** supplementation will be required for only the cows consuming the hay diet.
4. **Potassium** supplementation is usually never required with forage-based diets.
5. **Magnesium** supplementation will be required for the early bloom pasture and the full bloom hay. Although the vegetative pasture provided adequate magnesium, the margin of safety was narrow and grass tetany could be a problem in the early spring, especially with high potassium.
6. **Sulfur** supplementation is required only for cows fed the hay diet. Sulfur is often neglected but is required by rumen fiber-digesting bacteria, important with this high-fiber hay.
7. **Sodium (salt)** supplementation is required with all three of these forages.
8. **Cobalt** supplementation is not necessary with these forages.
9. **Copper** supplementation is required for early bloom pasture and full bloom hay.
10. **Iron** supplementation is seldom required with forage diets.
11. **Iodine** supplementation will be required with all three of these forages.
12. **Manganese** supplementation is required only with the full bloom hay.
13. **Selenium** supplementation is required with all three of these forages.
14. **Zinc** supplementation is required with all three of these forages.