INFO SHEET
Veterinary Services
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Trace Mineral Contents of Harvested Forages

A USDA study found that zinc is the trace element most commonly deficient in harvested forages on cow-calf operations.

Assessment of trace minerals is one of the critical components of feed analysis, a herd management practice that can improve an operation's cost efficiency. Deficiencies in copper, manganese, selenium, and zinc can all affect reproduction efficiency. Among other affects of individual trace element deficiencies are alterations to the immune system due to low copper or zinc levels and weak calves at calving time which has been linked to selenium levels.

The National Animal Health Monitoring System (NAHMS) collected 352 forage samples from 327 beef cow/calf operations during the 1992 Beef Cow/Calf Health and Productivity Audit. The samples were collected from operations in 18 states.[1] Dr. Larry Corah of Kansas State University collaborated with NAHMS to coordinate analyses of the samples and resulting data.

The CHAPA samples were categorized as deficient, marginal, adequate, or high for copper, cobalt, manganese, selenium, and zinc (Table 1).

Copper levels were adequate in only 36 percent of the samples (Figure 1). Nearly 50 percent of the samples were marginal for copper.

The CHAPA looked at iron and molybdenum, both antagonists that can affect absorption of other trace

Table 1

Classification of Trace Elements Relative to Their Ability to Meet Dietary Requirements

Trace Minerals	Deficient	Marginal	Adequate
Copper	below 4	4-7	7 or more
Manganese	below 20	20-40	above 40
Zinc	below 20	20-40	above 40
Cobalt	below .1	—	.1-.25
Selenium	below .1	.1-.15	.15-.3

Figure 1

Percent of Forage Samples by Copper Level Classification

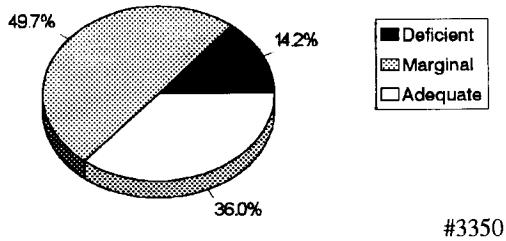

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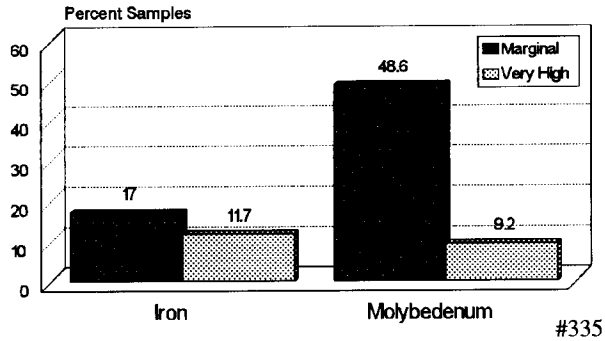
Figure 2

Percent of Forage Samples by Classification Levels for Iron and Molybdenum



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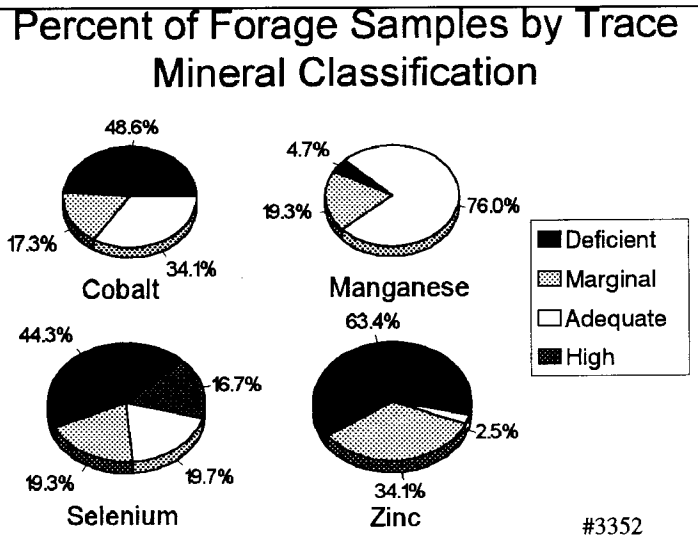
1 Alabama, Arkansas, California, Colorado, Florida, Georgia, Iowa, Kansas, Kentucky, Mississippi, Missouri, Nebraska, New Mexico, Oklahoma, Tennessee, Texas, Virginia, and Wyoming.

minerals. Iron levels above 400 ppm can cause copper tie-ups and the need for considerably higher levels of copper than normal. About 12 percent of the forage samples had iron levels high enough to cause copper deficiency (Figure 2). The molybdenum level of concern is above 3 ppm for copper absorption. Nine percent had levels of molybdenum high enough to have antagonistic affects on copper availability.

Manganese levels were adequate in 76 percent and deficient in only 4.7 percent of the samples collected (Figure 3).

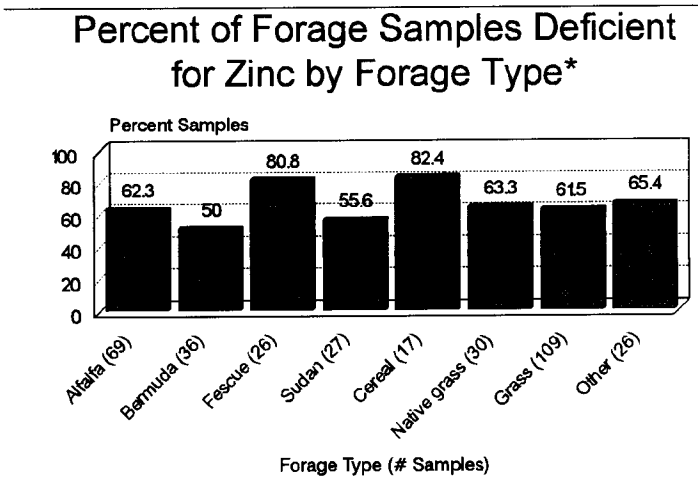
Figure 3



The trace element most commonly deficient in the forages was zinc with 63.4 percent of the samples below 20 ppm. Only 2.5 percent of the samples tested in the adequate range.

The CHAPA samples were combined into nine forage categories. At least 50 percent of the samples in each forage type were deficient for zinc (Figure 4). Over 80 percent of the samples of both cereal and fescue forages were deficient for this trace mineral.

Figure 4



While 63.6 percent of the CHAPA forage samples were considered marginal or deficient for selenium, 16.7 percent of the samples showed selenium levels considered to be high (greater than .3 ppm). Of the alfalfa and alfalfa mix forages tested, 37.0 percent had selenium levels considered to be high. An even greater percentage (40.8 percent) were either marginal or deficient for selenium, showing the wide variation in nutrient content possible, even within a forage type.

Results of this forage study suggest there may be opportunities to improve production and health on some cow/calf operations through a well-designed mineral supplementation program. However, CHAPA estimates showed that only 48.7 percent of operations calculated a winter feed schedule based on animal requirements and feedstuff quality. Only 8 percent had laboratory nutritional analyses done on purchased or harvested feeds.

For a more detailed report of the NAHMS CHAPA forage analyses, contact:

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