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Collection of Pasture Forage Samples for the Determination of Trace Mineral Content

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Grazing cattle selectively consume forage with 25 to 30 % more crude protein than hand-clippings of the same pasture. In a field study, we attempted to collect the same forage being consumed by grazing steers. Prior to grazing controlled areas, we emptied the ruminal contents from four rumen-cannulated steers. During the grazing periods, we attempted to clip that forage which the steers were consuming. Later, the rumen of each animal was again emptied and the consumed forage rinsed with water. Even though we made attempted to clip exactly the forage being consumed, the steers selected forage higher in crude protein (30.0%), calcium (52.6%), and phosphorus (36.8%), compared to hand-clipped samples. However, no differences occurred in the trace mineral content of steer selected vs. clipped forage (Table 1), suggesting that hand-clipped forage samples are a good reflection of the trace mineral concentration of animal-selected forage.

Table 1. A Comparison of the Trace Mineral Content of Hand-Clipped vs. Grazed Forage Samplesa Collection Method

	Iron	Copper	Zinc	Manganese
Steer selection	152.7	10.7	20.4	11.3
Hand-clipped	154.8	11.5	19.5	12.8

aResults are expressed as the mean mineral content of triplicate analyses; all results are expressed as mg/kg DM.

Season of the year also impacts the trace mineral concentration of pasture forage. Dr. Lee McDowell evaluated the trace mineral levels of bahiagrass on a south Florida beef cattle ranch for three years. The concentration of copper, manganese, and selenium was higher

in November vs. May bahiagrass clippings. Conversely, forage zinc concentration was higher in May vs. November samples. The differences in trace mineral content were small, however, copper, selenium, and zinc tended to be deficient in samples collected at both seasons (Table 2).

Table 2. A Comparison of South Florida Bahiagrass Trace Mineral Concentration with NRC Beef Cattle Requirements.

Source	Copper	Manganese	Selenium	Zinc
Bahiagrass Mineral Concentration*, ppm	3.7	53.9	0.07	17.0
1996 Beef Cattle NRC Requirements, ppm	10.0	20.0	0.10	30.0

*Dr. Lee McDowell, 1991; average of three years and two seasons (May & June); all values reported on a DM basis.

When collecting forage samples for trace mineral analysis it is important to collect the sample from areas where animals are grazing (selecting). Do not collect from non-selected forage areas and be careful to not contaminate your sample with weeds or dirt. Prior to collection, find a laboratory that will test forage for trace mineral levels. Many commercial laboratories offer an analysis package containing a group of trace minerals for \$15 to \$30 per sample. The laboratory will provide directions for collection, handling, and shipping. It is important to test for copper, zinc, selenium, cobalt, and manganese. It is also important to consider including antagonistic trace minerals, which may interfere with the normal absorption of other minerals. Three commonly recognized antagonists in Florida forages are molybdenum, iron, and sulfur.