

TRACE ELEMENT INVESTIGATIONS

Dickinson Experiment Station

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In 1982 serum and hair samples were collected from cow-calf pairs shortly after calving. These samples were assayed to determine if there were trace mineral differences between healthy and scouring calves. The serum was analyzed for copper content and the hair samples were assayed for copper, zinc, manganese, magnesium and iron. We also determined the copper levels in serums collected at calving in 1979 and 1980. The results of the hair and serum assays are shown in Tables 1 and 2.

Table 1. Serum Copper Levels

Serum Copper*				
Year	No.	Cow	Calf	ADG.**
1979	33	-	.48+.12	1.94+.24
1980	48	.70+10	.51+.09	1.98+.20
1982	140	.29+.13	.29+.09	1.63+.24

*Parts Per Million

**Average Daily Gain for Animals Sampled.

Table 2. Trace Minerals in Hair*

	Cow Hair			Calf Hair	
	Scours	Healthy		Scours	Healthy
Copper	6.2+1.4	6.1+1.5		9.9+1.4	8.8+1.8
Zinc	122+12	122+10		116+12	119+18
Manganese	16.6+4.8	16.3+7.9		3.5+2.4	3.2+1.7
Magnesium	356+85	375+115		313+134	286+89
Iron	114+78	110+58		81+55	67+45
Number	12	19		12	19

*Parts Per Million – Dry Matter Basis

The serum copper levels varied substantially from year to year. The 1982 average level (0.29+.13) was substantially below the recommended minimum of 0.5 ppm. Greater than 95% of the calf serum coppers were less than 0.45 ppm. Levels consistently below 0.5 ppm may be indicative of copper deficiency. The correlation between the herd averages of calf serum copper and ADG for 3 years was substantial ($r=0.999$), but its ramification is not yet known. Blood samples will be collected during the 1983 calving season to see if the pattern continues.

Trace mineral analysis did not show a significant difference between hair samples from healthy and scouring animals. The correlations between the various trace elements and also between those minerals and growth rates are being evaluated. Initial examination indicates there are several correlations, but the practical use of these interactions is not clear. Hair samples from other experiment stations and ranches have been analyzed and will be statistically evaluated.