

SOIL PRODUCTIVITY ON SITES WITH VARYING EROSION

BY

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Soil erosion and its effects on soil productivity and crop production have come under greater scrutiny in recent years. Rolling landscapes with slight to strong slopes such as those found in western and southwestern North Dakota are subject to erosion which can cause severe reductions in soil productivity.

A study was established on strongly sloping Amor-Cabba soil association on the W $\frac{1}{2}$, NE $\frac{1}{4}$, Section 21, R96W, T143N of the Dickinson Experiment Station to measure the effects of erosion on crop growth. This area is stripped-cropped in a barley-corn rotation and is conventionally tilled. In two strips, one planted to corn and the other to barley, areas of slightly, moderately or severely eroded soil have been identified and are being characterized for organic matter, total nitrogen, NO $_3^-$ -N, electrical conductivity, pH, carbonates, textural analysis, available water capacity and hydraulic conductivity. Soil moisture at seeding and harvest are also being determined.

Production data for both barley and corn are reported in Tables 1 and 2. Significant differences between erosion levels are noted for residue and grain yield, plant height and kernel weight for the barley and silage yield and plant count (stand density) for the corn. Protein values for both barley grain and corn silage and silage moisture content were not significantly affected by the erosion level.

**Table 1. Residue and Grain Yield, Protein, Plant Height and Kernal Weights
For Barley -- 1987 Dickinson Erosion Study^{1/}**

Erosion Level	Residue Yield^{2/} -lb./A-	Grain Yield^{2/} -bu/A-	Protein -%-	Plant Height -cm-	Kernal Weight -grams/ 1000 kernals-
Severe	1299 a	14.9 a	11.92 a	37.7 a	40.25 a
Moderate	1320 a	14.8 a	12.63 a	40.3 ab	40.84 a
Slight	2371 b	27.7 a	12.17 a	43.0 b	43.51 b

^{1/}Values followed by the same letter are not significantly different at the 5% level.

^{2/}Over-dry basis.

**Table 2. Yield, Protein, Plant Count and Moisture of Corn Harvested
For Silage – 1987 Dickinson Erosion Study^{1/}**

Erosion Level	Silage Yield^{2/} -T/A	Protein -%-	Plant Count -N/Plot-	Moisture -%-
Severe	6.76 a	5.29 a	15.0 a	74.1 a
Moderate	9.58 ab	4.27 a	16.7 b	71.6 a
Slight	14.50 b	4.21 a	19.0 c	69.7 a

^{1/}Values followed by the same letter are not significantly different at the 5% level.

^{2/}Corrected to 70% moisture.