

**BACKGROUND**

- ❑ Erosion of productive topsoil leads to declining crop yields in claypan regions of the United States, and contributes to nonpoint source water contamination globally.
- ❑ Crop rooting structures may help prevent topsoil erosion, and different rooting structures may vary in their effectiveness for mitigating erosion.
- ❑ In this study the impact of different crop rooting structures on soil erodability of claypan soils was evaluated for two different cover crops (sorghum and pearl millet) and one cash crop (corn).

**OBJECTIVES**

- ❑ Evaluate the role of crop rooting structures in preventing soil erosion.
- ❑ Compare the erosion resiliency of soils containing roots to that of soils not containing roots.
- ❑ Compare the erosion resiliency of soils containing different root structures.

**METHODOLOGY**

Evaluating Soil Erosion

Subsurface Sampling

Erosion  
Testing

Root  
Evaluation

Soil  
Classification



Figure 1: A) Sorghum Sample before Erosion Test;  
B) Sorghum Sample after Erosion Test;  
C) Erosion Function Apparatus

**RESULTS**

**Table 1: Classification of Soils**

Corn Between Plants (Top-soil)	Corn w/ Plant (Top-soil)	Corn Between Plants (Sub-surface)	Corn w/ Plant (Sub-surface)
Lean Clay with Sand	Lean Clay	Lean Clay	Lean Clay



Figure 2: Plant Samples (left to right), Pearl Millet, Sorghum, Corn.

**Table 2: Root Profile**

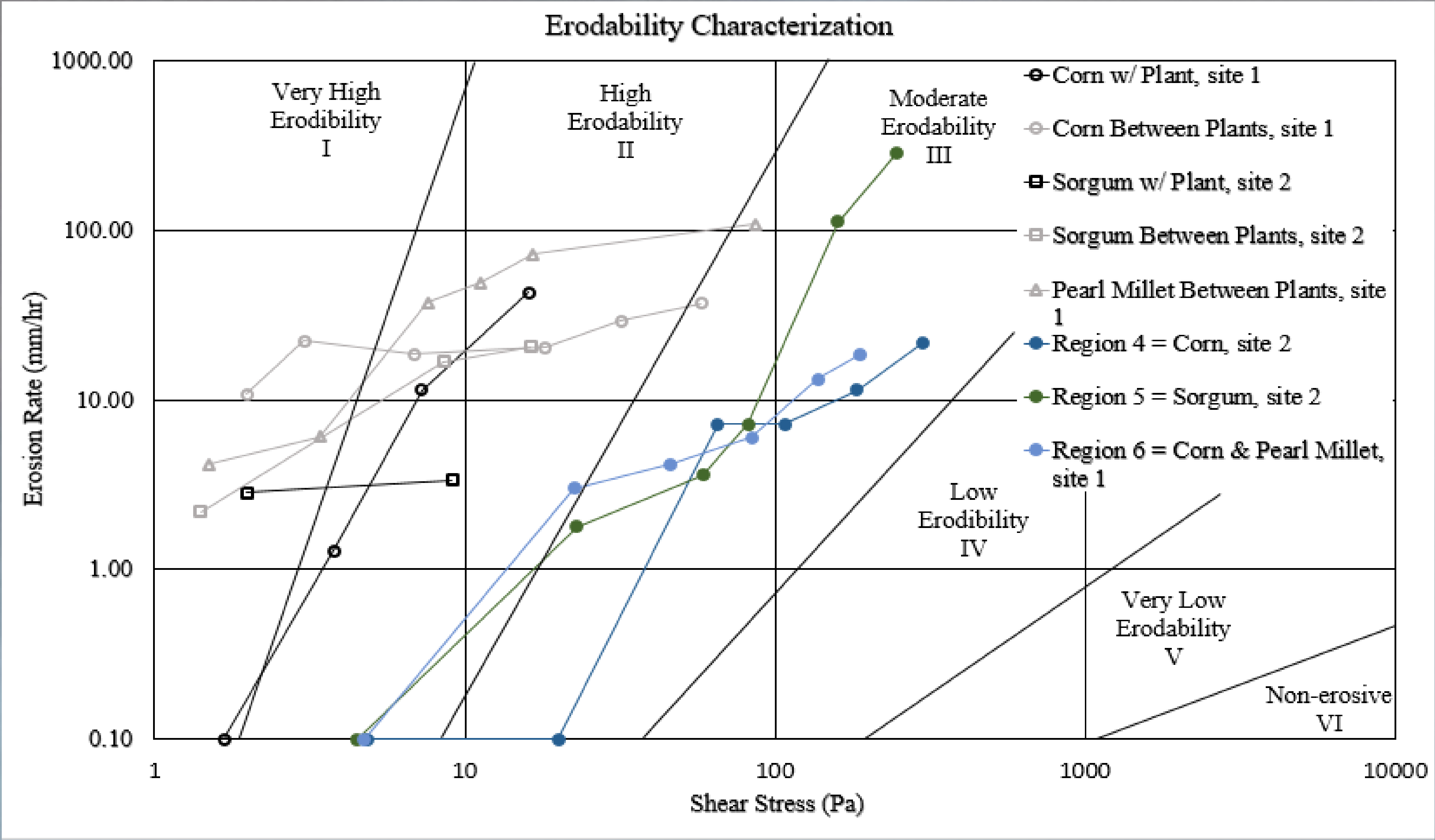


Figure 2: Plot of Erosion Rates of Claypan Soil with Plants, Between Plants, and Prior to Planting

**CONCLUSIONS**

- ❑ Hydraulic shear stress evaluation is inaccurate due to inclusion of the plant surfaces in soil roughness modeling and roughness calculation.
- ❑ Determination of root effects on soil erosion are not conclusive.
- ❑ Use of a larger flume could better simulate field conditions, and may yield conclusive erosion results.

**RECOMMENDATIONS**

- ❑ Increase the size of the flume to better represent in field conditions.
- ❑ Use plant shears to trim roots off soil surfaces: trim closer to soil surface which will increase the accuracy of photogrammetry roughness calculations and reduce soil disturbance.

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