



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002SD4B

Title: Establishing a Relationship Between Soil Test P and Runoff P for a South Dakota Soil Using Simulated Rainfall

Project Type: Research

Focus Categories: Agriculture, Nutrients, Water Quality

Keywords: Soil Test Phosphorus, P Saturation, P Runoff, Eutrophication

Start Date: 03/01/2003

End Date: 02/28/2005

Federal Funds: \$9000.00

Matching Funds: \$18257.00

Congressional District: First

Principal Investigators: Schindler, Frank V. (South Dakota State University); German, David R.; Gelderman, Ronald H.

Abstract: Current South Dakota regulations base land applications of manure on nitrogen (N) needs of the crop, with no consideration given to crop phosphorus (P) requirements. This practice can result in P additions to soil well above what is required by the plant to achieve maximum dry matter yield. There is a need to better understand phosphorous (P) loss in runoff as affected by land applications of livestock manure. The result of over application of P is increased soil test P (STP) levels and research supports a direct correlation between STP and runoff P. Increased runoff P results in nutrient loading and possible water resource eutrophication. Soil test phosphorus and runoff P correlations have not been evaluated for South Dakota soils receiving manure from the major livestock enterprises of the region (i.e., beef, dairy and swine). The objectives of the proposed research are: 1) establish correlations among STP, runoff P, and P saturation for a Vienna soil series by conducting in situ rainfall simulation in the field, 2) evaluate P sorption capacity and P saturation of the Vienna series and their relationship to runoff P by conducting controlled laboratory experiments and indoor rainfall simulation, and 3) use the research results to develop educational brochures, field day demonstration events, and offer manure management education to extension educators and area animal producers. Certain soils have a greater capacity to hold added P

and thus would be better suited for the larger feedlot operations. This research will provide answers as to which soil has a higher holding capacity for P and to what extent. This will help livestock producers and various environmental stakeholders identify suitable feedlot areas in South Dakota.

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Last Modified: Wed June 11, 2003 12:18 PM

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