
INFLUENCE OF HOG MANURE APPLICATION ON WATER QUALITY AND SOIL PRODUCTIVITY

C. P. Maule ¹, J. Elliott ², M. Ferguson ², A. Cessna ³, H. de Gooijer ⁴, G. Padbury ⁵, J. Schoenau ⁶, S. Perih ¹, D. Meier ¹, and L. Ingram ¹

Introduction

Hog manure is known to be a valuable source of nutrients but there is little documented knowledge about the environmental impacts of organic fertilizers on ecosystems of semi-arid to sub-humid ecosystems.

This study will directly address manure management on croplands and as well, the environmental and health concerns with the use of hog manure as a fertilizer.

Objectives

Within the context of hog manure as a fertilizer for dryland crops, the objectives of this project are to:

- Measure the presence and potential pollutants in soils, runoff waters and shallow groundwater,
- Provide recommendations to prevent the accumulation of environmental or health related pollutants,
- Provide recommendations as to application rates based on soil productivity on a landscape basis and
- Establish a protocol for long term monitoring.

Experimental Procedure

This study takes place over a period of six years (1998 to 2004) at two locations: near Perdue, SK at Heartland Bear Hills Pork Producers and one near Elstow, SK at the PSC Elstow Research Farm Inc.

Field measurements are taken to determine soil and water quality at the application sites.

Parameters measured include dissolved solids, total nitrogen, total phosphorous, carbon, heavy metals and coliform

bacteria.

Runoff quality is evaluated by snowmelt runoff, which is collected by way of weirs and by spot runoff simulation experiments. Standing water is also evaluated one to three times a year.



Manure injection into stubble. Hog manure is valuable fertilizer, but we need to know more about environmental impact.

Shallow soil samples are taken in the spring and fall of each year to monitor available nutrients and to help predict future application rates. Soil moisture to three metres is measured three times a year in designated field locations.

Detailed soil and groundwater analysis was performed in 1998 and will be repeated at the end of the study at each baseline sample location.

Results

At the Perdue site, baseline soil and water data was collected during the period between fall 1998 and fall 1999 and the first manure application took place in October 1999. Post-application data collection has been taking place through 2000. Preliminary results are expected to be evaluated beginning spring of 2001.

Baseline data has been collected at the Elstow site during 1999 and 2000. The first manure application at this site is expected to be fall 2001.

Acknowledgements

The authors would like to thank the following for their contributions: Sask Wheat Pool, Sask ADF, Canada-Alberta Hog Industry Development Fund, Alberta Pork Producers, NSERC and SPI.

Ongoing work at Perdue and Elstow looks at land and water before and after manure application.

¹ Department of Agriculture and Bioresource Engineering, University of Saskatchewan

² National Water Research Institute

³ Agriculture and Agri-Food Canada, National Water Research Institute

⁴ Sask Land Resource Centre, University of Saskatchewan

⁵ Land Resource Unit, Semi Arid Prairie Agriculture Research Centre, University of Saskatchewan

⁶ Department of Soil Science, University of Saskatchewan