

AFFORESTATION

Opportunities for the Swine Industry

The following describes the research program in Afforestation at Prairie Swine Centre



BACKGROUND

The general objective of the proposed research is to develop strategies and application technology for use of manure (solid and liquid) as a source of plant nutrients and soil amendment in afforestation plantations (hybrid poplar). Specific objectives include:

1. to develop/adapt and evaluate technological options for manure handling, delivery and application in the plantations in the field
2. to determine the effect of manure amendment on soil nutrient loading, losses and overall soil chemical, physical and biological quality
3. to determine the impact of the manure amendments and water on stand growth, productivity and nutrient recovery
4. to establish a demonstration site for best management practices, and to promote the benefits of this technology to pork producers

EXPERIMENTAL SITE

- Soil type at PSCE site: Elstow loam located in the Dark Brown soil-climatic zone of Southern Saskatchewan.
- Liquid manure application treatments: 1. Injected manure in alleyway (0, 15,000, 31,000 and 62,000 L/ha or about 0, 50, 100 and 200 kg of total N/ha); and 2. Broadcast application (0, 15,000, 31,000 and 62,000 L/ha). All treatments replicated on four experimental plots and all manure applications done annually in the late spring (June).

MANURE LAND APPLICATION METHODS

Separated liquid fraction for raw manure or liquid fraction from secondary cell of earthen manure storage:

- Feasibility of drip irrigation technology for point application to each tree (energy and time requirements, manure flow, costs, ease of operation).

Separated solid fraction from raw manure:

- Comparison between broadcast vs. banded; surface vs. subsurface modes of application (energy and time requirements, costs, ease of operation).

EFFECTS OF MANURE FERTIGATION ON SOIL

Measured parameters:

- Manure: total and available nutrient, solids and salt content; pH.



- Spring soil analyses (each plot): 0 - 15 cm available N, P, K, S + amounts and supply rates; pH; electrical conductivity (salinity).
- Fall soil analyses (each plot): extractable ammonium, nitrate and phosphate (0 - 15, 15 - 30 and 30 - 60 cm) to determine leaching of nutrients.

EFFECTS OF MANURE FERTIGATION ON TREES

Seedlings in the measurement plots will be measured each fall for growth parameters (height, root collar diameter in latter years) to determine the effects of the manure treatments. Tissue samples will also be collected in August of each year from plots to determine foliar nutrient levels (N, P, K, S) and to be used in conjunction with the soils data to establish relationships between soil and foliar levels of nutrients.

EFFECTS OF MANURE APPLICATION ON ODOUR PRODUCTION AND AIR QUALITY

Odour measurements will be taken downwind before and after manure application to assess the odour production and air quality.

TAKE HOME MESSAGE

Research in afforestation has the potential to directly benefit the western Canadian swine industry, if the results demonstrate that application of manure on hybrid poplar plantations constitute an effective method for recycling this important by-product. Increased interest from swine producers toward establishing poplar tree plantations in the vicinity of swine operations, would result in additional benefits such as improved aesthetics, reduction of odour and greenhouse gas emissions.

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