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Use of Sludges on Pastures

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The use and disposal of sewage sludge (also called biosolids) has become a predominant problem facing municipalities. A survey by the Environmental Protection Agency (EPA) revealed that in 1990 the U.S. generated 8.5 million tons of sewage sludge, and by the year 2000, 12 million tons/year will accumulate because of increased population and advanced sewage treatment processes. In the past much of this sludge had been disposed of in landfills or incinerated. However, with the enormous quantities of waste generated, landfill space has become scarce. Many states estimate that their landfill capacity will be exhausted within five years. For this reason many states have banned disposal of sludge in landfills.

Diminishing landfill space, skyrocketing landfill costs and concern over air pollution from incineration of wastes have generated a strong interest in alternative disposal routes for sewage sludge. This has led to increased use of sludge as a soil amendment in agriculture. Sludge can be applied to agricultural land to improve physical properties (e.g., water retention, infiltration, aggregate stability) and chemical characteristics of soils (e.g., plant nutrient status of soils).

Because sewage sludge is a source of nutrients for crops, and also a potential ground and surface water contaminant, we need to better understand its rate and transformation in soils where it is applied. An application rate of 10 tons per acre of sludge containing five percent N supplies 1000 lbs N/acre to the land, and this quantity may exceed crop assimilative capabilities, provided all the N is released and made available to plants. Consequently losses may occur to the environment. In the past there had been concern over heavy metal contamination from sludges. Over the past 30 years sludges have become substantially cleaner and thus heavy metal contamination of the environment from sludge application is of little concern. Recently EPA came out with specific heavy metal limits for sludges which must be met before it can be applied to land (Table 1). The

concentrations of nutrients and heavy metals in sludge should be provided by the suppliers.

Sewage sludge is an organic slow release fertilizer. Approximately 40 percent of the nitrogen in sludge is available to the plant the first year with the other 60 percent becoming available over time. However, studies are still being conducted at the Ona Research Center to determine the rate of nutrient availability for sludges applied to Florida soils. Using sludge as an organic slow release fertilizer for crops and grasses grown in Florida would be a beneficial source of nutrients compared to inorganic fertilizers which leach more readily than slow release fertilizers in sandy soils. Before sludge can be used by growers in Florida there is a need to demonstrate that it is a safe and viable source of nutrients for crops in Florida. Researchers at the Ona Research Center are currently evaluating the potential of using sludge as a fertilizer for pastures in Florida. Both field and laboratory studies are being conducted to determine optimum application rates for sludges and the rate of nutrient availability for pasture grasses.

Table 1. EPA limits for Metal Concentrations for the Land Application of Sewage Sludge			
Metal	Maximum Concentration (ppm)	Metal	Maximum Concentration (ppm)
Arsenic	75	Mercury	57
Cadmium	85	Molybdenum	75
Chromium	3000	Nickel	420
Copper	4300	Selenium	100
Lead	840	Zinc	7000