

# Laboratory Testing of Fluted Wheels as A Metering System for Poultry Litter

**Cody L. Mathis<sup>1</sup>**

*Wesley M. Porter, PhD<sup>1</sup>*

*Simerjeet Virk, PhD<sup>1</sup>*

*Joshua McGrath, PhD<sup>2</sup>*

<sup>1</sup>University of Georgia

Department of Crop and Soil Sciences

Tifton, Georgia

<sup>2</sup>OCP North America



## Introduction

Poultry litter is a mixture of chicken manure and bedding material. Land application, as a fertilizer, is the most common and widely accepted method of management. Poultry litter has been shown to provide major sources of nitrogen, phosphorus, iron, zinc, copper, and manganese all of which are necessary nutrients for crop production and effective in improving both physical and biological fertility.

## Background

This project is the continued effort of evaluating subsurface banding methods of poultry litter application within the soil. Previous studies have evaluated the agronomic benefits of subsurface banding methods. However, there has been no practical metering design proposed. The use of subsurface banding in perennial pastures and row crop production systems demonstrated the application of poultry litter produced similar or greater yields than conventional surface broadcast application methods. The use of a metering system to apply litter allows for variable rates to be applied throughout the fields compared to “blanket rate” applications most commonly associated with land application

## Objective

The objective of this laboratory testing is to determine adequate parameters and design concepts to further develop a fluted wheel style metering system in order to precisely apply poultry litter into the soil for the most efficient and effective nutrient uptake by the crops.

## Materials & Methods

- Examine the variability and application abilities of both High Rate & Very High Rate fluted wheels (Figure 1)
- Utilize laboratory test stand along with developed meter roller shaft (Figure 2) for operating fluted wheels at various rpms to simulate in-field operating parameters (Figure 3)
- Litter samples of various bedding materials and
- Refine litter properties to a uniform state in order to have consistent flowable material.



Figure 1. High Rate Meter Roller



Figure 2. Meter Roller Shaft

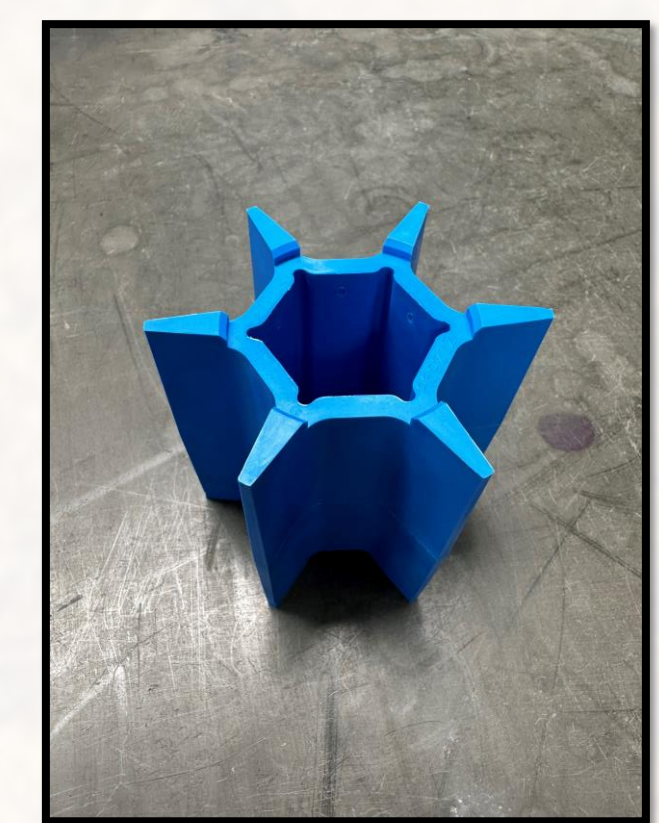


Figure 3. Very High Rate Meter Roller

## Future Work

- Continue development of fluted wheel design
- Consider use of side-by-side fluted wheels for litter metering
- Begin adaptation of metering system onto subsurfer (Figure 4)
- Evaluate metering system parameters with subsurfer
- Analyze in-field testing of metered subsurfer
- Compile data collected to further refine metering system effectiveness and efficiency in litter application



Figure 4. Poultry Litter Subsurfer



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