Report from the Vermont Wool Project: Early Findings on Wool Pellets as a Fertilizer for Vegetable Farms

Kimberly Hagen, Center for Sustainable Agriculture, January 2020

Project Background & Team

Kimberly Hagen and Suzy Hodgson of the Center for Sustainable Agriculture were seeking a way to support Vermont's sheep farmers by exploring market options for a use for raw, low-grade wool. A grant from USDA Rural Development, support from the Vermont Agency of Agriculture, Food & Markets, and the partnership and interest of an energetic team of partners made it possible to explore a range of options.

Originally focused on finding a way to process raw wool to meet demands for local and sustainable materials for the building trade, the group came to realize that a use that would not require scouring (cleaning) was what was most useful and sustainable.

After learning that wool could be "pelletized" - compressed into small dense shapes - the team began investigating the process and potential impact for both sheep and vegetable farmers.

Project Coordinators:
Kimberly Hagen, Grazing Specialist
Suzy Hodgson, Sustainable Agriculture Outreach Specialist

Team:
Deb and Ed Bratton, Vermont Fiber Mill
Alex DePillis, Vermont Agency of Agriculture, Food and Markets
Anna Freund, Open View Farm
Ben Graham, New Frameworks
Dave Martin, Settlement Farm
Andrea Murray, Vermont Integrated Architecture
David Ritchie, Green Mountain Spinnery
Alex Wilson, Building Green

Raw wool

Why Wool Pellets for Vermont?

Wool costs sheep farmers money

For decades the market price for raw wool has been very low – below the cost to shear sheep and transport the wool. A small percentage of the "clip" is fine enough for small batch value-added products, but generally, if they do not sell to the local wool pool collection, many producers simply pile it in a corner of their barn or haul it out to the woods to dump it.

Environmental & Agronomic Qualities

Wool pellets may in some ways be superior to the peanut meal that many farmers currently use. Wool's hygroscopic quality means an ability to ameliorate the current wild swings in precipitation because it can absorb, hold and release moisture as well as nutrients, over time.

NPK Profile

Analysis of wool pellets reveals an NPK profile average of 9-0-2. Generous of nitrogen, virtually no phosphorous, and small amounts of potassium. The nitrogen slowly releases due to the physical properties of the fibrous wool pellet and slow breakdown. For many vegetable farmers in Vermont this is an ideal combination. Many are over their limit for P, and need a slow release N to avoid the risk of runoff before plants can utilize the nutrient.

Carbon sequestration

Up to fifty percent of the weight of wool is carbon. When pellets are incorporated into the soil, that carbon stays in the ground.

Wool pellets, ready for use

Methodology & 2019 Field Trials

In the 2019 growing season, three Vermont vegetable farms served as initial sites to test the pellets.

- All sites used raw wool pellets purchased from Wild Valley Farm in Utah.
- All sites trialed broccoli in side-by-side 100 ft. rows.
- One row was treated by incorporating wool pellets into the soil. A control row utilized the farm's usual fertilizer protocol. At Golden Russet Farm, a third row had no treatments.
- Because of varied on-farm conditions, the researchers' working assumption is that the comparison between results on the same farm is more important than the comparison of yields between different farms.

Golden Russet Farm
- Hand broadcast application
- Tilled in to 4" depth
- Spring crop
- Heavy clay soil
- **Yields:**
  - **Wool pellets - 74.5 lbs./100 ft.***
  - **Peanut meal - 72.25 lbs./100 ft.**
  - **Control - 68.25 lbs./100 ft.**

** 80% of row with wool pellets was ready for harvest 3 days earlier.*

Shelburne Farms
- Hand broadcast application
- Tilled with crown vetch cover crop to 2"depth
- Clay loam soil
- Compared with crown vetch cover crop and 5;3;2 fertilizer
- **Yields (identical):**
  - **Wool pellets - 158.9 lbs./100 ft .**
  - **Control row - 158.9 lbs./100 ft.**

UVM Catamount Farm (picture at right)
- Hand broadcast application
- Tilled in 2" depth
- Late fall crop
- Sandy dry soil
- **Yields:**
  - **Wool pellets - 61.5 lbs, per 100 feet,**
  - **Control row - 19.5 lbs per 100 feet.**

What's Next?

A locally produced fertilizer that releases nitrogen slowly and has no phosphorous could be an extremely attractive and sustainable resource for both livestock farmers and produce growers.

Based on extremely promising early results, the project's next step is to secure funding for the next two-pronged research approaches:

1. Conduct in-depth longer trials on a single farm before planning for a larger field trial with multiple growers.

2. Test of at-scale production of pelletized wool in order to determine actual cost of production and practical viability.

Contact Kimberly Hagen at 802-522-6729 or kimberly.hagen@uvm.edu to learn more.

The row on the right was grown with wool pellets at the UVM Catabmount Farm during the 2019 field trials. The control row is on the left.

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