

Compost Boosts Yields for Farmers

by Lois Ruskell

Sometimes, simple solutions are the best. Take compost for example. It's often considered a waste product, coming straight from our homes and businesses, that is high in supply and low in demand, at least on a large scale.

However, a major premise of the sustainable agriculture movement is using local resources like this 'waste', and avoiding costly synthetic additives such as fertilizers, pesticides, etc. To find out more precisely how adding compost to soil can benefit crops, yields, and soil health, a major demonstration and scientific research trial was started four years ago with many local partners, including large-scale commercial composters and crop producers in Snohomish County.

The purpose of this project was three-fold: 1) to give farmers an opportunity to use compost on their fields, 2) to conduct the research needed to scientifically validate suspected benefits of using compost in agriculture, and 3) to create a sustainable market for recycling local landscape waste and food waste and returning it to local farms.

With funding from a Washington State Department of Agriculture Specialty Crop Block Grant, the trials were led by the WSU Snohomish County Extension Office. Other financial support came from Snohomish County and King County. The partner organizations included Snohomish Conservation District, Waste Management, Inc., King Conservation District, Bailey Compost, Cedar Grove, Lenz Enterprises, Topsoils Northwest, and of course, local farmers!

Let the Compost be Spread - Carleton Farms

The project began in earnest in 2011 and 2012 with compost provided to farmers Reid and Darren Carleton, Andy Werkhoven and Eric Klock. Later in 2013 and 2014, specialty crop producers Rick and Garret Williams, and Darrell Hagerty, along with several others, joined the program. Initial crops included corn, pumpkins and triticale. Additional on-farm side-by-side demonstration trials have expanded to include pasture grasses, winter wheat, barley, tomatoes, leafy greens, potatoes, nursery and orchard trees as well as vegetable crops.

The randomized and replicated trials included control plots that were 'business as usual' and involved using the farmers' standard crop-growing regime. This provided a control field to compare to those plots supplied with compost, often 6.5 or more dry tons per acre of added compost.

Reid and Darren Carleton own a three generation farm near Lake Stevens and have participated in these trials all four years. Applying Cedar Grove compost to their pumpkin and sweet corn fields showed an increase in 2012 and 2013 yields. Trials began with pumpkins, a staple of their u-pick operation. After the first pumpkins were harvested, Reid Carleton said, "We found out that with compost applied, we had greater emergence of pumpkin plants, they were healthier, they grew faster, and in some of the trying wet weather that we had, it was an asset. Also, the rapid canopy (leaf growth) that was established really helped with weed control....also, we got better pumpkins, and more [pumpkins]!"

In 2014, research began on pickling cucumbers, another crop the Carleton's are well-known for at their farmstand. Soil tests revealed no need for additional nutrients (in the fields supplied with compost the past two or three years), so no compost was applied. Three soil treatments were examined: business as usual, two years of previous compost application, and three years of previous compost application.

The 2014 harvest took place ten days earlier than anticipated due to the ideal growing season that year. For cucumbers, adding compost produced 2.55 tons of additional cucumbers per acre. Pickling cucumbers are a high-value crop that customers have come to rely on from the Carleton's. They also use these cucumbers in the original pickle products for sale at their farmstand. This increased yield at current prices produced a potential for \$6,630/acre of additional gross profit.

Beet Seed Supplier – Williams Farm

Beet seed is a key crop in Western Washington, which supplies 95 percent of the U.S. supply and 50 percent of the world's supply of table beets. In recent years, these crops have suffered due to causes unknown. Some speculate that dry, hot conditions or disease may have impacted beet crops.

The Williams Farm in Stanwood, a major producer of beet seed, agreed to participate in these trials in 2014. Bailey Compost was delivered by Topsoils Northwest and applied (directly after seeding) on a beet seed crop at the rate of about 55 cubic yards per acre. One month after application, soil tests revealed an increase in plant-available nitrogen in the compost-amended plots. Farmers and ranchers observed that compost treated plots produced slightly larger plants, and greater emergence, as compared to the control plots. Tests revealed an average increase of 21percent more beet seeds (175.25 pounds per acre) compared to the control plot.

Organic Beans Require Registered Organic Compost – Hagerty Farms

Registered organic compost from Lenz Enterprises made it possible to conduct research trials in 2014 on organic green beans at Darrell Hagerty's farm. Hagerty is the second largest organic farmer (by acreage) in Western Washington. He farms more than 1,200 certified-organic acres and markets organic green beans to wholesale grocery outlets, including Costco.

Hagerty uses chicken manure, cover cropping, wood ash, organic fertilizers, and reduced tillage practices to maintain his soil fertility. The 2014 trials gave him the opportunity to use food and yard waste compost to help determine the value of adding organic compost to his operation. Lenz Organic Green Blenz® compost was applied at a rate of approximately 24.8 cubic yards/acre, or 6.5 dry tons/acre. Organic green beans were planted two days later. In addition, pelleted chicken manure and Nutra-rich fertilizer were applied evenly across all plots.

Once harvested, the beans were sorted for marketability, eliminating those that didn't make the cut (mostly size variations). Applying organic compost resulted in a statistically significant (19 percent or 0.64 ton/acre) increase in yield compared to the business as usual treatment. At a

price of \$485/ton of green beans, this increase in yield translates to \$312/acre gross increase in profit for the farm. Including spreading expenses (labor, fuel, and machinery), the break-even point for Hagerty Farms would be \$12.58 per cubic yard of compost, delivered and applied.

Compost Businesses and Farmers Can Both Benefit

In addition to contributing scientific data regarding compost's effect on local crops, the WSU Compost Outreach Project has provided more than 55 local (King and Snohomish County) farmers the opportunity to use compost through on-farm demonstration trials. Guided by WSU program staff, farmers receive a donated load of compost from Lenz Enterprises, Cedar Grove, or Bailey Compost to apply in their own experimental side-by-side trial. Farmers and program staff gather observational feedback over the growing season and farmers gain valuable experience working utilizing the commercial compost. Forty-nine demonstration trials were conducted in 2014 alone.

This year, it was revealed that, although 73 percent of participating farmers hadn't used food or yard waste compost before participating in the WSU compost trials (June 2014 survey with 44 respondents), 53 percent of participants now plan to use compost as part of their regular land management practices as a result of participating in the trials (November 2014 survey with 38 respondents).

According to WSU Lead Researcher Dr. Andrew Corbin, "Compost can provide many benefits to a farmer's land management strategy. Compost improves soil quality, provides nutrients to crops, buffers soil pH, decreases erosion, maintains soil moisture and adds organic matter to the soil."

As part of an overall farm cropping plan, Dr. Corbin said, "Compost can potentially improve marginal land, and help farmers reduce their dependence on chemical fertilizers, when used as part of a land management strategy that incorporates crop rotation, tillage reduction, and cover cropping."

The information gleaned from this research project will help the compost industry fine-tune their service and price for commercial growers, and give them a better understanding of their product's usefulness in producing local food. In addition, growers have an increased awareness of compost's benefits to their soil, their crop yields, and their pocketbook. Dr. Corbin added, "One of the key findings of this project was discovering that what the growers are willing to pay for compost may not necessarily match what the compost producer's current price is for their product."

Additional 'harvest help' with the trials came from Leif Fixen, Snohomish Conservation District; Hallie Harness, WSU Extension; Julie Kintzi; Landon Harness and Kate and Bill Halstead.

For more information on these compost trails, visit the WSU Snohomish County Extension website at: <http://www.snohomish.wsu.edu/compost/>. For information on compost spreading equipment and techniques, go to: <http://ext100.wsu.edu/snohomish/spreading-equipment/>.

Material for this article was supplied by Andrew Corbin, PhD, and Hallie Harness at WSU Extension, Snohomish County. Additional 'harvest help' with the compost trials came from Leif Fixen, Snohomish Conservation District; Hallie Harness, WSU Extension; Julie Kintzi; Landon Harness, and Kate and Bill Halstead.

Not using:

Survey of Farmers

At the end of the trial, a survey

100% of project participants believed that the compost was a benefit to their farm enterprise.

93% of the farmers believed the compost improved (or greatly improved) their soil quality

70% of farmers believe the compost improved (or greatly improved) their crop production.

Farm Types Participating

Tree Nurseries

Organic Farms

CSA Farms

Agro tourism Farms
Transitional Farms
Conventional Farms

“WSU Extension can help farmers keep up with the growing demand for local food, while recovering a valuable resource from our urban waste stream.”