

Worm Wrangling

How a Local Worm Farm Helps Improve Soils, Crops & Plants

From a single worm bin at her home, Cristy Christie has grown her interest in healthy soils and composting into an efficient and successful business. The resulting product, Black Diamond VermiCompost and liquid compost “tea,” is in such demand with home gardeners and commercial growers that she is preparing a new business plan to expand production.

Before starting the Paso Robles farm in 2010, Christie spent a year on research, visiting worm farms around the country and attending worm conventions. She chose to follow the methodology of two respected farmers as mentors, one in Sonoma and the other in New York.

“Worms are efficient at reducing food waste and composting organic matter,” Christie says. “They like a 70 percent moisture environment, but they can take the heat, from 40–100 degrees. When it’s over 100, they start escaping.”

She found that out when her first worm bin overheated. After finding several worms out of the bin, she quickly cooled their environment and the majority survived.

Soil Amendment

Researchers who study the uses and properties of vermicompost—a combination of worm castings and mature, stable compost—at Ohio State University and other labs have found “compelling results,” Christie says. “Under controlled conditions, microbes in vermicompost will surround a seed, altering chemical cues and making the seed zone unattractive to pathogens.”

Christie understands the chemistry and biology involved in re-

newing soils, and sends vermicompost samples to the lab for chemical analysis, including nutrient qualities and biology assays for levels of bacteria, fungi, protozoa, etc. She consults with agriculturalists and gardeners, demonstrating how vermicompost can improve their soils, help reduce nitrates leaching into groundwater and retain water.

Her own local experiences with vermicompost and liquid tea confirm the benefits. When a corn crop at an organic farm failed, Christie helped to amend the soil. Her team tilled the crop under, drilled holes to spray-inject compost tea 18 inches deep, planted a cover crop and sprayed with tea. One month later, a “puny” cover crop appeared.

Once again, her team tilled, injected more tea, planted a cover crop and sprayed tea. Two weeks later, a healthy cover crop appeared. Four applications of the tea, 50 to 75 gallons each, provided enough beneficial microbes at a depth sufficient to rebuild the soil.

“Vineyards in the planting stage can use one cup in each hole to give a major boost to the plants’ immune systems,” Christie says.

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Oak trees on Christie’s property, like many on the Central Coast, have sparse leaves and are hung with Spanish moss (above). She has done a trial with three of her oaks, amending the soil over two years with vermicompost and having an arborist cut dead limbs and remove moss. The results (page 11 top) are vigorous, leafy oaks with no additional moss. Photo courtesy of Cristy Christie



Worms eat feedstock (round bowl) to produce mature vermicompost (rectangular bowl).



Photo courtesy of Cristy Christie



Christie (top right) checks the temperature in six bins that hold separated dairy solids (SDS). The SDS composts in the bins to kill pathogens and weed seeds. With forced aeration, temperatures can stay at 135 to 145 degrees.

Once in a bin, SDS sits for one week, is turned into an adjacent bin to ensure all the material is heated properly, and sits for another week. At the end of two weeks, the compost, full of bacteria and fungi, is spread on top of the worm beds as tasty food.



Photo courtesy of Cristy Christie



Photo courtesy of Cristy Christie

Most worm-composting operations are done in windrows—long, narrow piles of biodegradable materials placed on the ground—that take 9 to 12 months to process. Christie uses flow-through worm beds (right and middle right), where she feeds from the top and harvests from the bottom (right). This more controlled environment produces compost that tests equally well or better than windrows—and takes only 2 to 3 months to process.

Once the vermicompost is removed from the concrete pad, Christie rinses off the residual worm castings into the garden—“Our veggies love it!” The squash (above) concurs.



Photo courtesy of Cristy Christie

Worm Wrangling *continued*

Wigglers

The two 45-foot flow-through worm beds Christie uses are custom built by her brother-in-law, an engineer. They are housed in a structure hung with shade cloth to keep birds out and some light and moisture in. Since worms are sensitive to light, they're active at night.

Christie identifies distinct layers of worm activity in the beds. The top layer, closest to where a meal of separated dairy solids (SDS) is spread, she calls the "teenagers" because they eat a lot. The "mating zone" is next so the hatched "younglings" can go up to fresh food. Next are the "senior citizens." Worms are hermaphrodites (both male and female) and peel off a cocoon with an average of three babies that hatch in about 30 days.

How many wigglers are on the farm? A head count is impossible, but one square foot of compost yields about two pounds of worms. "That allows for efficient composting," Christie says.

Twice a week, she feeds the worms about 800 pounds of SDS;

once a week, she harvests about 400 pounds of vermicompost. Processing time from food on top to finished product from under the bed takes about 60 days. The reduction by half of food to harvest is the result of major decomposition.

Worm Bins for Home Gardens

Worm castings from home worm bins provide "good stuff" for gardeners, Christie says. Bins do require some work, as they need to be maintained with fresh food and moisture. They are sold at most farm and garden supply stores.

With home-produced vermicompost, gardeners can add beneficial microbes that provide essential plant nutrients and strengthen immune systems to fight off pests and plant diseases.

"The USDA says that when organic matter is increased by one percent, the water-holding capacity is changed by gallons," Christie says. "If you add lots of water to vermicompost, it stays wet for days.

"Worms are such humble critters and they do such amazing things!"



After harvest, Black Diamond Vermicompost goes through a fine screen (top) or coarser screen (middle), based on end use, and then bagged for sale.



Starting the same, the basil at right developed a better root system with vermicompost.

Black Diamond Vermicompost

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The company sells worms, vermicompost and tea to home gardeners and agriculturalists (farms, orchards, vineyards). Workshops cover building better soil, making successful compost piles, composting with worms and brewing quality compost tea.