

# Working WITH Worms



Dan Coyro/Sentinel

Mike Keller's Restoration Soil & Research company makes fertilizers out of pounds upon pounds of worm excretion.

## Company converts worm castings into fertilizer

By GWEN MICKELSON  
SENTINEL STAFF WRITER

SANTA CRUZ — Deep in the heart of La Selva Beach on the campus of the Monterey Bay Academy private school, 25,000 pounds of worms are hard at work eating, well, poop.

Feeding animal manure and other organic residues to earthworms at the campus is part of the business plan of new Santa Cruz-based company Restoration Soil & Research, which creates organic fertilizers out of the worm castings or excretions.

Restoration Soil founders hope the idea will help solve global warming, curtail waterway contamination and reduce waste.

"You realize there's so much waste around," said Mike Keller, Restoration Soil president. "Plant material, organic waste, animal manure, pre- and post-consumer food waste."

According to the Sierra Club, concentrated animal feeding operations, which confine thousands of animals in one

facility, alone produce 2.7 trillion pounds of animal waste per year.

There are nutrients in that waste, said Keller, who formerly operated a worm-distributor business in Watsonville. He said he started to realize that something needed to be done about the country's large-scale animal runoff and use of petroleum-based fertilizers.

"The way we currently handle waste is very harmful," he said. "It pollutes the water and creates air pollution — that in itself is a source of greenhouse gases."

### Worming along

Keller and his wife, Annaliese, who handles marketing at the new venture, launched their worm-distributing business, Panua Farms, two years ago.

Their new business takes the idea a step further. In June they teamed up with Scott Subler of State College, Pa., a leading expert on soil ecology and an internationally recognized authority on vermiculture, or the business of grow-

ing worms.

Subler, who splits his time between State College and Santa Cruz, is the founder of Pacific Garden Co. and Dr. Subler's Living Soil brand of vermiculture products, for use as a plant watering additive and foliar spray. Restoration Soil absorbed Pacific Garden Co. and now markets Dr. Subler's Living Soil products.

Formerly a research scientist adjunct assistant professor at Ohio State University, Subler left academia five years ago to start Pacific Garden Co. He is now the research director for Restoration Soil.

"There's 25 years of good science behind the entire industry of organics and compost," said Subler.

That research is backed up by articles in such journals as BioCycle magazine, and by research published by universities including Ohio State, Cornell, North Carolina State and Texas A&M.

However, there are also "a lot of wild

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### Restoration Soil & Research

**WHAT:** Research and composting firm that converts organic residues and animal waste into organic fertilizers.

**FOUNDERS:** President Mike Keller and Research Director Scott Subler.

**LOCATION:** 207 McPherson St., Suite E, Santa Cruz.

**PRODUCTS:** Dr. Subler's Living Soil plant watering additives, for commercial and consumer use.

**ORDERING:** [www.vermico.com/castings.htm](http://www.vermico.com/castings.htm); 423-1902.

**PRICE:** For commercial enterprises, \$300 per yard and up; for consumer use, products range from \$2 to \$18.50.

**INFORMATION:** 423-1902; [www.restorationsoil.com](http://www.restorationsoil.com); [www.livingsoil.com](http://www.livingsoil.com).

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It pollutes the water and creates air pollution.'*

MIKE KELLER, PRESIDENT, RESTORATION SOIL & RESEARCH



# Worms

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and unsubstantiated claims about what worm castings can do," according to Keller. So the company has taken pains to assemble a roster of international experts on soil ecology, composting, plant pathology, organic agriculture and soil microbiology to serve on its advisory board.

"Worms create topsoil," said Keller. "We're reliant on worms to create the medium that grows our food. So all we're doing is emulating nature."

The problem in creating a business like Restoration Soil has been the ability to create enough castings, said Keller. But in recent years, production capabilities have increased to a point where a commercial enterprise has become viable, he said.

In August, Restoration Soil joined the Chicago Climate Exchange, a marketplace for reducing and trading greenhouse gas emissions. Restoration Soil is one of the first exchange members that will produce offset credits from agricultural activities for itself and other companies.

## Waste not

With the one-two punch plan of taking waste off various producers' hands and out of the environment — not just manure but waste as varied as grape pomace, hatchery debris, corn mash, blood plasma paste — and making organic fertilizers, Keller thinks his now-tiny firm of 10 employees could go big, as well as benefit the planet.

Dealing with waste of any kind can be an expensive proposition for a business.

Brian Collins of Cal-Cruz Hatchery of Santa Cruz said he pays \$1,500 a month to dump his hatchery debris — mainly eggshells and anything that didn't hatch — at the Buena Vista dump west of Watsonville.

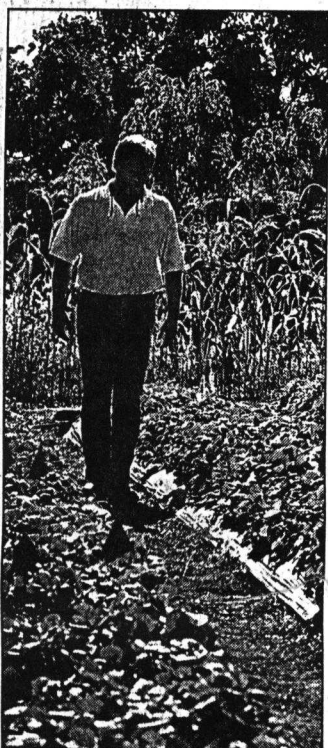
Keller is interested in making tomato fertilizer out of hatchery debris like Collins' because it contains high levels of phosphorous, nitrogen and calcium, three things tomatoes require.

Collins said he is interested in a partnership with Restoration Soil if the parties can work out the details.

"It would be beneficial for everyone," he said. "The dump would be happy, (Keller) would be happy because he would be getting a very nutrient-rich product for practically nothing, and I wouldn't have to haul it to the dump."

## Casting for success

Though Restoration Soil is still working out the details of its partnerships, plants and the various products it will sell,



Dan Coyro/Sentinel

Restoration Soil & Research President Mike Keller tests his company's worm-casting soil at UC Santa Cruz's agroecology department field.

Keller said he already can't keep up with the demand for his worm castings.

Right now, he can produce 12,000 pounds of worm castings a day out of the worm facility at Monterey Bay Academy. The castings look like soil and are odorless.

"We feel that handling the explosive growth of the company is going to be our single biggest obstacle," said Keller.

The few companies doing something similar to Restoration Soil have been remarkably successful, said Keller.

Restoration Soil received \$1 million in seed funding from the Jesuit Community of Santa Clara University, and is now seeking a first round.

Keller said startup costs for the company were \$2 million to \$4 million, and that he expects the company to hit \$100 million in sales in two years. He also intends to position the company to go public in that time period.

He said the company is developing technology to make fertilizers targeted to different plants, like tomatoes, as well as fertilizers that will help suppress disease and infestations.

"The scale of the problem of how to get rid of organic residues is so huge," said Keller. "The economics are, businesses will pay me to take waste off their hands. We'll use the product to augment synthetic fertilizers while protecting the air and water. We're paid to take it in, paid to process it and get carbon credits, paid every step of the way. And there's no waste."

Contact Gwen Mickelson at [gmickelson@santacruzsentinel.com](mailto:gmickelson@santacruzsentinel.com).