



By Dale McDonald

# Earth First

Soil amendments are gaining ground.



**T**alk farming with Nick Greco, and what you get back is passion. He's enthused about new opportunities for the next generation. He's excited that his crop yields are on a steadily rising curve.

But most of all this rice grower from Sheridan, California, is thrilled that the effort he has put into improving his soils is paying off big time.

As a devotee of the Albrecht method of soil balancing, developed by William Albrecht at the University of Missouri, Greco analyses his annual soil tests like they are final exams. Then he uses gypsum, lime, compost, manure, sulphate of potash, and trace minerals to steer his cation exchange capacity (CEC) numbers where he wants them to be. It's not a quick fix.

"I'd say it takes about five years to get soils where I want them," he says, "sometimes longer. But in 2007 I was able to drive the final nails in." Greco prefers to take an organic approach to soil cation nutrient balancing by adding a variety of organic materials and natural mineral amendments

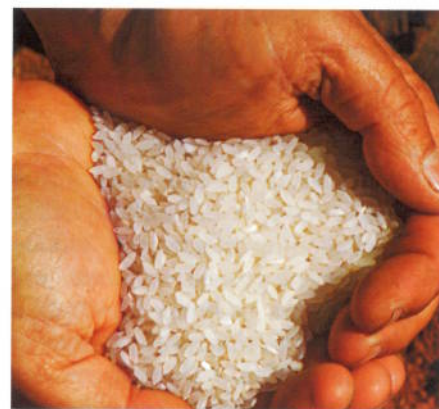
to the soil. "I had a rice field yield 87 hundredweight. That's a good crop for a conventional grower, but organically it's simply off the charts."

During winter, Greco stockpiles huge mounds of soil amendments, then with a soil test in hand, he starts incorporating them.

"The first step is correcting the calcium/magnesium base saturation ratio with lime, then gypsum," he says, "because that affects other things like pH. Then I apply anywhere from 7 to 10 tonnes of compost to boost organic matter. That's crucial in these soils."

**Dramatic example.** To illustrate how soils change, Greco produced records on a field he has been farming for 10 years. He said it was probably about as bad as soil gets, and demonstrated that by finding a spot where he could not drive a piece of rebar more than a couple inches deep. Here's how some important numbers changed:

Magnesium was very high at 32 percent base saturation ratio, now it's at 18 percent, and he's shooting for 12 percent. That was accomplished by raising calcium levels with the



► **TOP:** Nick Greco, an organic rice producer from Sheridan, California, focuses on soil amendments like lime and manure to improve his soils. ► **ABOVE:** Last year Greco had a field that produced 87 hundredweight of rice. He says that's a good yield for anyone; off the charts for organic.

addition of lime and gypsum. Calcium started out at 39 percent base saturation ratio, is now 49 percent, with an ultimate goal of 68 percent.

Nitrogen was boosted as well, accomplished by adding manure and organic matter.

Organic matter improved from 1.6 percent to 2 percent. Zinc was 3 parts per million, now it's 15.6. He used

manure, compost, trace minerals, and zinc sulphate. CEC was 4.8 the first year, now sits at 9.35 (still bad), with a goal of 15 to 25.

"Creating good soil takes a lot of time and effort," Greco says, "but it's worth it. Take that field that yielded 87 hundredweight. I was able to reduce tillage passes. The straw-to-grain ratio was low, and that's big here because we can't burn. I had no pressure from fungus, and reduced weed pressures, too. I achieved a balanced soil that is optimum for crop production."

Lime and gypsum, in particular, are the focus in many other areas of the country. Again, the goal is to modify the calcium/magnesium ratio.

**Gypsum boost.** "Gypsum has a number of beneficial effects," says Clint Truman, a United States Department of Agriculture soil scientist at Tifton, Georgia.

"A principal horticultural effect is to prevent blossom end rot in flowering vegetable crops. It has a high calcium content and is highly soluble, so it increases calcium concentration throughout the soil rooting depth. That improves



► **ABOVE:** Throughout the Southeast of the U.S., vegetable producers are learning that gypsum boosts calcium levels in the soil, which reduces blossom end rot and boosts yields.

► **LEFT:** Nick Greco demonstrates how bad soils can be. He could only drive this rebar into the soil two inches.

gypsum was applied compared to the control. Also, percent calcium in the skin increased 16 percent compared to the control plot. The additional calcium improves shelf life for the fruit, an important bonus for retailers.

Fortunately, Truman says growers throughout the Southeast of the U.S. are about to be blessed with abundant gypsum resources courtesy of the electric utilities that are reducing emissions.

"The utilities are investing in equipment to reduce sulphur dioxide and other emissions at coal-burning power plants," he says.

"The process often involves scrubbing flue gasses with calcium carbonate, which reacts with sulphur to form calcium sulphate or gypsum. It looks like gypsum production is about to increase dramatically in the next two to five years." ■

soil structure, the depth of water penetration, and counters subsoil acidity."

Truman says gypsum has proved to be beneficial in peanuts, alfalfa, cotton, tomatoes, cantaloupes, and sweet corn. In one study, peanut yields improved 21 percent, 46 percent, and 58 percent when receiving 0.5, 1, and 2 tonnes per acre of gypsum respectively.

Cantaloupe yields increased 51 percent when 0.5 tonnes per acre of