The Long Term Effects of Nitrogen Fertilizer on Soil Biology

Nitrogen fertilizer is an established part of most agriculture and plant care routines. However, new research suggests that long term use of nitrogen may have unintended consequences.

Like many growers, you may already know there are bacteria that work synergistically with plants to make more nitrogen available. Inoculating beans and peas with species specific bacteria to take advantage of this relationship has become common practice for farmers and gardeners. The legumes shelter the bacteria in their roots, providing them with carbon. The bacteria take essential nitrogen and combine it with oxygen or hydrogen, which makes it usable for the plants. It's a partnership, a relationship of mutualists, that has evolved and thrived over time, and the benefits linger into later growing seasons because the fixed nitrogen remains in the soil.

Studying Nitrogen’s Influence on Nitrogen Fixing Bacteria

A recent study suggests that long term use of nitrogen may be changing the nature of this partnership. This study looked at 6 different fields, each with 2 experimental plots. One plot in each field had been fertilized with nitrogen for more than two decades. The other plots had never been fertilized and were used as a control.

The researchers took rhizobia from the nodules of legumes in both fertilized and control plots. They used these isolated bacteria in a green house experiment to see how they influenced legume growth and health.

What happened? Well the title of the paper pretty much says it all. "Long-term nitrogen addition causes the evolution of less cooperative mutualists." The scientists found that the plants grown with the nitrogen-exposed Rhizobia produced 17-30 percent less biomass and significantly less chlorophyll than plants grown with the Rhizobia from the unfertilized plots.*

This suggests that long term nitrogen use creates the need for continued nitrogen supplementation—a nitrogen addiction of sorts. And as those fertilizers run off into surrounding lands, that need, the nitrogen addiction, may go with it.
Microp 4XL Offers a Solution

Microp 4XL offers a unique approach to this problem. This Soil Tech product contains cyanobacteria that work like a legume, adding nitrogen from nitrogen fixation. But because Microp 4XL contains cyano (plant like) bacteria, they can easily grow as a companion plant. Growers don't have to take their land out of production to get the benefit of this microbial cover crop and they don't have to buy species specific inoculants either. What's more, growers can use Microp 4XL at any point in their commercial crops' growing cycle.

Application is easy--simply mix the Microp 4XL powder with water and apply it to the soil surface using conventional spray equipment or irrigation. With the slow release of nitrogen from the cyanobacteria, growers will reduce the need for conventional nitrogen fertilizer, bringing immediate financial and long term environmental benefits.


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