Conservation Corner for March 28, 2017

Nitrogen for Your Farm or Garden

Legumes can help drastically reduce your fertilizer bill

By Jeff Fewless
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As landowners and farmers start to plan for the upcoming planting season, they may want to think about the benefits of using legume cover crops to provide nitrogen. One of the major benefits of legumes is that they can convert atmospheric nitrogen into a form of nitrogen that plants can use. Some of the most common types of legumes include clovers, alfalfa, and soybeans.

"Fixing" It

The process a legume uses to convert nitrogen into a useable form is called fixation. During fixation, specialized bacteria colonize the roots of the legume, and take in nitrogen from the air that's in the pore spaces of the soil. They then convert the nitrogen into ammonia, which is a form of nitrogen that plants can use. The bacteria that is responsible for this feat are known as rhizobium. If you were to plant a legume, and the seed was not inoculated with rhizobium, it would be kind of like purchasing a new car without a key to start it. During crop production farmers want this process to be 100% guaranteed in order to protect their investment. The farmers and many gardeners will actually inoculate their seeds with the correct bacteria so that this symbiotic relationship happens.

Benefits to Other Plants

Almost all of the fixed nitrogen goes directly into the host plant which enables it to grow and be productive with very little, if any, additional nitrogen fertilizer. However, some of it can be transferred into the soil to benefit neighboring, non-legume plants. While the legume is growing, the amount transferred to other plants can be as much as 30 pounds of nitrogen per acre. If a legume cover crop is tilled under it's a different story. When the legumes die, most of the nitrogen that was contained in the plant eventually returns to the soil as the plant decomposes. A healthy stand of alfalfa that is tilled under can contribute up to 100 pounds per acre of nitrogen to succeeding crops. Red clover can contribute up to 80 pounds. Gardeners often wonder if their bean and pea plants will do the same. Unfortunately, the answer is no. On sandy ground, beans and peas don't accrue enough nitrogen to benefit succeeding crops. On fine textured soils, the most that can be hoped for from them is 20 pounds of nitrogen per acre.

See it in Action

There's a way to witness the process of nitrogen fixation. Once the weather has warmed up and plants are actively growing, try this experiment with your family or friends. Dig up some clovers or alfalfa along with their roots. Wash the roots until there is no more soil clinging to them. You should see some balls, called nodules, on the roots. They will be small – usually about 1/8 inch in diameter. Slice them open. If you see a reddish or pink substance, it means that the plant is actively fixing nitrogen. This substance is called leghemoglobin, and is similar to the hemoglobin in our blood.

Reduce Your Carbon Footprint

If you and your family are looking for a way to potentially reduce your carbon footprint, planting legumes to fix nitrogen may be the ticket for you. Commercial nitrogen fertilizer is made from natural

gas, a non-renewable resource. This fact, along with rising price of nitrogen fertilizer, may make using cover crops an appealing option for you and your family.

Jeff Fewless is the conservation technician serving Wexford, Missaukee, and Osceola-Lake conservation districts. To speak with him about how legumes can improving your crops, call him at 231-775-7681, ext. 3, stop by the Wexford Conservation District office located at 7192 East 34 Road in Cadillac, or email him at jeff.fewless@mi.nacdnet.net.

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This farm in Osceola County shows a sweet corn field where crimson clover and annual ryegrass were planted following the final cultivation. In this instance erosion was controlled, a nitrogen credit was banked for the following year, and it provided some late fall grazing for livestock. Photo credit: Greg White, USDA-NRCS

Plants in the legume family have the ability to obtain nitrogen from the atmosphere. The round, ball-shaped growths on the roots of this plant are nodules where nitrogen fixation takes place. Photo credit: Terraprima