

Benefits of Increased Soil Microbial Activity with Chandler Soil

Product Summary

Chandler Soil is a liquid biological soil conditioner designed to improve soil fertility and soil tilth. Chandler Soil stimulates growth and metabolism of beneficial soil bacteria and other microorganisms that convert soil nutrients and decompose organic materials like crop residue. Chandler Soil also contains several micronutrients and naturally occurring organic compounds (enzymes, hydrolyzed proteins, and amino acids) that promote microbial activity in the soil.

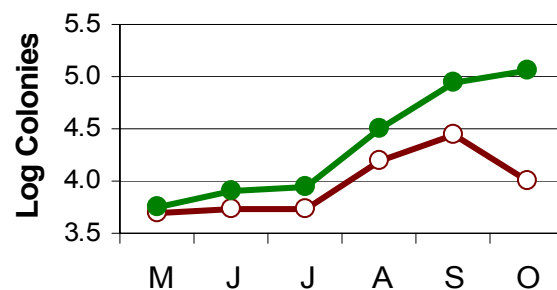
Recent Field Research

To demonstrate the potential impact of Chandler Soil on soil microbial activity, we have results from a field trial conducted at the University of Louisiana at Monroe. The trial measures microbial activity by comparing the number of soil microbe colonies formed in soybean field plots with and without Chandler Soil applied at the recommended rate (ten ounces per acre). The counts in the treated and control plots were taken each month from May to October, and Chandler Soil was applied to the treated plots in early June. The monthly colony counts (per gram of soil) for three types of beneficial soil microbes (bacteria, fungi, actinomycetes) are plotted on the right.

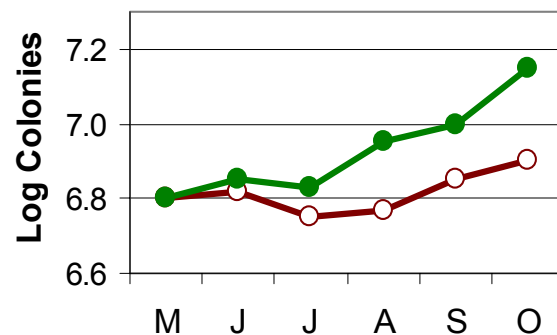
The solid dots are the microbe counts for the bean plots treated with Chandler Soil, and the circles represent the control results. The colony counts are stated in a log scale, which measures the multiplier effect of the soil treatment on the soil microbe counts. For example, an increase from 4 to 5 under the Chandler Soil treatment represents 1000 times more microbe colonies than the control.

As we should expect from a fair test, the microbe counts are about the same in May before Chandler Soil is applied. After the June treatment, the counts of all three types of microbes increase in the treated plots relative to the control plots. By October, the fungi and actinomycetes counts in the treated plots are about 300 times the control counts, and the bacteria counts in the treated plots are about 1000 times the control counts.

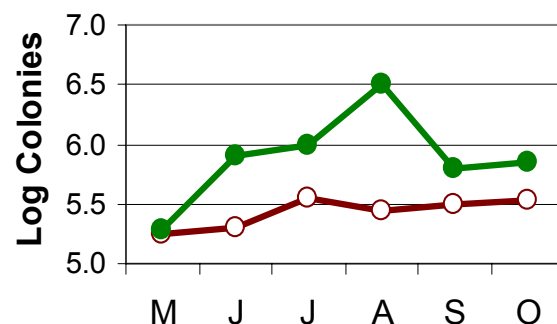
Bacteria



Actinomycetes



Fungi



What are These Soil Microbes? Aren't Bacteria and Fungi Bad?

Actinomycetes are a type of bacteria that decompose the toughest plant materials like cellulose that form the plant walls. They generate the earthy smell from freshly turned soil or a newly opened compost pile. When you dig into a compost pile, the actinomycetes may be seen as gray web-like filaments in the outer 4 to 6 inches of the pile.

Bacteria are the most numerous of the soil microbes, but there are different types of bacteria. Some bacteria convert plant nutrients to forms that the plant can use, and other types work to decompose plant material in the soil. The decomposers work on plant material after the actinomycetes and fungi are done with the heavy work, and these soil bacteria generate the heat found in the center of a compost pile. Also, soil bacteria release a sticky mucus-like substance that binds the soil particles and builds soil tilth and structure.

Some forms of soil bacteria are pathogens and are responsible for soil-borne disease. However, the beneficial soil bacteria form a protective shield around the plant roots to keep the harmful bacteria away. Also, the beneficial bacteria attract other types of soil microbes that feed on the harmful bacteria and reduce their numbers. The key to soil disease prevention is to maintain strong and active colonies of beneficial bacteria.

Mycorrhizal fungi also form a protective shield around the plant roots and help protect the plant from soil pathogens. They also send out root-like vessels known as hyphae that can extend several feet away from the roots to carry water and nutrients back to the plant. Like the beneficial bacteria, mycorrhizal fungi generate sticky substances that help to build soil structure. Other types of fungi are like the actinomycetes and decompose cellulose, and the fungi in a compost pile may be seen as fluffy gray colonies on or near the surface.

Benefits of the Increased Microbial Activity

Beneficial soil microbes may decline in number or become dormant when placed under stress, especially after excessive tillage, heavy nitrogen or phosphorus applications, and soil surfaces are left bare or unprotected. You can use Chandler Soil in conjunction with a minimum tillage program, reduced fertilizer applications, and proper residue management to protect the soil and realize the following benefits of increased soil microbial activity:

- All soil-borne and applied nutrients (fertilizer, manure, lime, etc.) have to be converted to a form usable by the plant, and soil microbes play a major role in this conversion process. Soils with a healthy balance of microbial activity can generate up to 80% of the nutrients needed for crop growth. So, increased microbial activity reduces the need for applied fertilizer and helps the plant make better use of the nutrients you do apply.
- Beneficial bacteria and fungi form a protective shield around the plant roots and help to reduce the number of soil pathogens. In the field study summarized on the first page, the Chandler Soil treatment reduced the number of harmful soil nematodes by 34 percent.
- The sticky substances secreted by bacteria and fungi help to build soil structure and tilth, and a biologically active soil will be more flocculent or porous (more air spaces among the soil aggregates). The result is a reduced risk of soil compaction, deeper plant root penetration, better rainfall absorption and retention for dry periods, fewer standing water problems, and less erosion from runoff. Thus, you can farm more of your soil.
- The sticky substances secreted by soil bacteria contribute alkaline character to the soil, and the mycorrhizal fungi secrete acids that they use to break down plant materials. By maintaining healthy microbial activity, you can help to balance your soil pH.