Valuing the Diversity of Microbe Inoculants

A healthy soil microbiome is amazingly diverse. To restore damaged soil and provide full functionality, broad spectrum inoculants are essential.

Healthy soils have 800 to 1,000+ microbe species and 1 to 10 billion population per gram.
Average production soils have 5 to 10% diversity and only 1-hundredth to 1-millionth the population.

Impacts of Low Soil Microbe Diversity

- Increased pest and disease incidence
- Decreased water and nutrient efficiency
- Reduced plant nutrient status and vigor
- Reduced plant stress tolerance to heat, cold, drought, salt

How do Broad Spectrum Inoculants Help?

- When so many microbes are missing, many soil and plant functions are missing-in-action.
- A broad spectrum inoculant is designed to repopulate the entire soil microbiome. This fills the functional niches with many species for each beneficial function. This redundancy provides alternatives to assure performance no matter the combination of soil and plant conditions, nutrient antagonisms, and pathogen pressure.
- Many plant physiological activities require multiple sequential reactions, which frequently require different microbes to perform different parts of the process. Broad Spectrum Inoculants increase the likelihood of having those microbes available
- Some species are good early colonizers. Others, like Mycorrhizae, don't colonize well until there's a fairly complete supporting biology.
- Some soil conditions allow only tolerant species to colonize first, e.g microbes tolerant to salt, high or low pH or toxicity.
- Plants can be selective for some species. Some microbial species may not proliferate until there's a crop rotation to a plant that will favor that microbe.

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What do you Mean by Broad Spectrum?

MetaGrow ST and **MetaGrow 5X+** have more than 20,000 species and populations of 100 billion to 1 trillion per mL (1×10^{11} to 10^{12})

Maximum biological diversity is our focus. We have sourced microbes from virgin habitats all over the world -- from arctic tundra, tropical rainforest, tidal flats, virgin prairies, desert oases and other habitats. We have nurtured these cultures for years and grow the inoculants in 5 distinct phases. We feed them diverse food sources to build a large and diverse community of self-reinforcing beneficial microbes.

For example, **MetaGrow ST** and **MetaGrow 5X+** have 6 species of free living nitrogen fixers (which pull nitrogen from the air) and over a dozen species of nitrogen cyclers (which change the form of nitrogen). And there are at least 6 species of phosphorous solubilizers. All of these are in populations of at least 1×10^{7} cfu/ml.

How do you Compare the Value of Microbial Inoculants?

Since broad spectrum diversity is so important to restore soil health and plant resiliency, microbial inoculants should be evaluated for their population size and functional diversity.

Many microbe products provide a relative handful of species, without overlapping functionality.

To compare the value of microbe products, you want to know the cost per microbe. Compare the total population size of competing products and calculate the cost per billion microbes. In some cases, when addressing a specific production problem, it helps to know the cost of microbes that can perform certain desired functions.

Application Strategy

To restore soil functionality, apply broad spectrum microbes and microbe food in repeated small applications.

- More smaller applications provide better colonization.
- Apply to the soil plant root zone by the most practical method, and also foliar.
- If soil is bacterial dominant, apply **MetaGrow F**, our diverse fungal dominant inoculant.
- Apply microbes to all crops in the rotation, not just the money crop.
- Feed microbes with each application (**MetaGrow MFOOD** and Pacific Gro fish hydrolysate).

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