Microbe Point of View

By Chris A. Marr

The right soil makeup for successful revegetation

A study from Yale University on types of protein to feed microbes in humic acid formation showed that when compared with grasshoppers not under stress, grasshoppers under stress can change the biochemical makeup of the local ecosystem when they die.

Grasshoppers eat vegetation that is low in protein and high in cellulose (carbohydrates) when under stress. In the study, the threat of being eaten by a spider changed the eating habits of grasshoppers, and the decay of those grasshoppers impacted the ecosystem function of the microbes living in that environment.

This study seems to indicate that in order to achieve the highest success rate for revegetating disturbed or barren area soil formations, it is important to look at soil makeup from a microbial point of view. Following are some factors that can affect soil makeup.

Compost. Compost recently has been found equally as effective as the standard erosion materials used for vegetation establishment and slope protection. The U.S. Composting Council's "Seal of Testing Assurance" program provides certification for compost products used for erosion control. Compost manufacturers are required to test for various parameters, including pH, soluble salts, nutrients (including nitrogen, phosphorus, potassium, calcium, magnesium), moisture, organic matter, maturity (bioassay), stability (respirometry), particle size, pathogens and trace metals.

Coconut Fiber. Extracted coir fibers that grow between the husk and outer shell of the coconut have high concentrations of lignin (which slows biodegradability) and are a 100% renewable product. Coconut fiber has a high carbon-to-nitrogen ratio (80:1), which promotes plant growth, absorbs pesticides, herbicides and petroleum products, and absorbs water five to eight times its weight. Coir pith used as a plant substrate has a natural pH of 5.7 to 6.5, plus an unusually high cation exchange capacity; this assures that available water and nutrient coir will be held and released over extended periods without rewatering.

Humic Acids. Humic acid can bind plant nutrients and strongly stabilizes soils. It can act as a photosensitizer, retain water, bind to clays, act as plant growth stimulants, and bind corrosive, toxic and salty soils.

Mycorrhizae. Mycorrhizae are beneficial plant fungi known to help plants uptake phosphorus and other mineral nutrients. There are endo- and ectomycorrhizal concentrates on the market designed for situations where grasses and plants such as conifers, oaks, etc., that are being installed can be targeted for fast establishment.

Biochar. Biochar has been described as a possible means of improving soil fertility as well as other ecosystem services. It is porous at the microscopic level, its nooks and crannies creating a massive surface area to catch bacteria and nutrients like nitrogen. Biochar carries a negative electrical charge and attracts positively charged nutrients like calcium, potassium and magnesium.

Organic Nitrogen. Protein is not as temporary a chemical source as nitrogen, and provides a steady and slow supply of the nitrogen needed by all plants and soil microbes. Vegetable proteins provide the highest quality protein, which means more nitrogen per gram of protein, and support the mycorrhizal plant relationship.

All of these building blocks in soil work together to form the biochemical makeup of the local ecosystem in a microbe point of view. SWS

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