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Effective Organic Fertilizer Practices for A Healthy Soil Food Web

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The textbook definition of organic fertilizer is a fertilizing product which contains Carbon. Carbon is considered the “Organic Molecule” as it is found in all living things. Presently, in the agricultural industry, “Organic fertilizer” is loosely defined as a fertilizing product that meets the standards of the USDA National Organic Program (NOP) rules. In general, these products are not produced via a chemical reaction. They must occur naturally, be non-toxic, and supply necessary nutrients. They can be made according to specific rules which allow composting, microbial actions, grinding and pelletizing.

Organic fertilizers have become the backbone of high quality, high yielding organic crop production. Through proper product choices and timely application, organic farmers use these products to improve crop quality and yield by feeding the soil which in turn feeds the crop. To accomplish this, an organic farmer must determine if a product meets the USDA rules and consider how the product affects his biological Soil Food Web.

The Soil Food Web consists of the interdependent relationships of all the “ingredients” of the soil including all organic and inorganic components. These ingredients vary from basic elements to simple organic matter to complex plants. The measurements used by organic production experts to determine the overall health of the Soil Food Web include biological diversity measurements (number of different species) and the total number of active organisms. The Soil Food Web is responsible for the recycling of nutrients on a farm as well as anywhere else on our planet.

A useful tool in understanding the implications of nutrient recycling and a healthy Soil Food Web is to superimpose a simple financial model. In reviewing Chart A, which graphically depicts the value of nitrogen available to plants from Soil Organic Matter, a large variance in available Nitrogen for crop growth can be observed in the center or “active” fraction of the Soil Organic Matter. As the biological activity of the soil increases, and the health of the Soil Food Web improves, the amount of available Nitrogen increases. Nutrients derived from the “active” fraction of soil Organic Matter are essentially free, resulting in great economic benefit to the farmer. In a native or natural non-farming setting the trees are always green, the grass grows well and there are no apparent nutrient deficiencies. This is because there is no harvesting or removal of soil nutrients as occurs in agriculture.

Agriculture requires the replacement of nutrients in order to continue farming. The replacement of these nutrients may occur in several ways. In a conventional agricultural setting, simple chemical compounds are applied. These basic chemicals contain the necessary nutrients for the crop. The nutrients are absorbed directly into the plant with either little impact or negative

impact on the soil organisms. Therefore, the Soil Food Web is not improved and may slowly degrade. Additional inputs are necessary. These materials may be manure, compost, or other organic materials which together with the chemical fertilizers provide a complete food source for the soil organisms to reproduce.

The replacement of nutrients on an organic or biological farm is more complicated since simple chemistry is not allowed, not effective and not preferable. A farmer may apply large amounts of manure or compost in an attempt to provide nutrients and organic matter to the soil. These materials are excellent amendments for providing various nutrients and may be excellent inoculants of micro-organisms. The main drawbacks to using high levels of these materials are their inherent excess of unstable raw organic matter and possible high salt content.

At first glance, one may think that high levels of unstable or free organic matter is good because it will provide a food source for the Soil Food Web provided other required nutrients are available. In reality, the free organic matter is in competition with the crop for available nutrients. The end result is that every time nutrients are applied, they are quickly consumed by the organism specific to digesting free organic matter and are converted into low availability, very stable humus. A “nutrient sink” is created and the farmer must then compensate with higher levels of readily available nutrients.

Using the prior example of how a product may affect the Soil Food Web, the conclusion may be made that a farmer needs to consider the overall impact of products prior to use. If a healthier “active” fraction of the Soil Food Web Organic Matter is desired, products which promote the development of the entire Soil Food Web should be used when possible. Any product which may have an overbearing impact on the web should be utilized in moderation or with other complementary products in order to achieve the desired result. There are hundreds of characteristics of fertilizing products to consider.

A few of these characteristics are salt content, pH, percentage of organic matter, solubility, nutrient content, biological content, origin, availability, cost and so on. All of the above will affect efficiency as a plant growth nutrient and their impact on the Soil Food Web. A product may be satisfactory as a fertilizer for the crop in the short term but may have a long term deleterious effect on the Soil Food Web.