

19. ORGANIC AND BIOLOGICAL FERTILIZERS AND AMENDMENTS

The word "organic" has a mystical quality about it many associate the word with purity and plain old fashioned goodness. In contrast, "inorganic" can seem a cold, sterile word and "chemical" far worse.

Plant scientists in the nineteen thirties taught us that inorganic chemicals could provide complete nutrition of crops. Today, commercial hydroponic operations (where all nutrients are supplied in an inorganic form to a water solution) produce a variety of high quality vegetables (ironically, some of this hydroponic produce is sold as "organic" produce). It has been only relatively recently that agriculture has used inorganic fertilizers in quantity. Today, inorganic fertilizers are used, usually exclusively, to supply the nutrient needs of crops on virtually every agricultural operation in the U.S.

Organic fertilization in this country goes back to when the Indians taught the pilgrims that planting fish with corn was beneficial to the corn. Later, manure was widely used as a nutrient source. The popularity and widespread use of inorganic fertilizers today is due to their high analysis of essential nutrients. Crops could still be successfully grown today solely with manure and other organic materials but the relatively low nutrient analysis of such materials means that it's just not economical to transport them around the country. (Manure is still an economical and valuable fertilizer material when hauling distances are short and economical. Use of sewage and industrial wastes in agriculture is increasing and is as much a disposal problem as an agricultural use consideration; the benefits of disposal tilt the normal cost:benefit calculations toward the use of such materials).

Part of the mystique of organic fertilizers lies in their appeal to the sense of longing in many of us to return to what is perceived as simpler and easier times. For the unknowledgeable, the idea that inorganic fertilizers are sterilizing the soil is a tempting concept.

Every year, salesmen for some "new" organic or biological material make their appeal to these feelings. The above is not to say that there is no benefit from applying organic materials it's just that in most cases the costs far exceed the benefits.

A major benefit of organic additions to soils is on the physical condition of the soil (rather than a nutritional benefit). Organic matter addition can result in improved tilth and permeability of many soils. Unfortunately the effect is only temporary and again, the costs may exceed the benefits.

Soils that would benefit most from organic amendments are, logically, those that are very low in organic matter to start with. A main reason that soils are low in organic matter is that they occur in hot, arid areas. Heat and moisture greatly accelerate the decomposition of organic matter and as a result it is difficult to maintain organic matter levels on irrigated lands in hot, arid areas. Any organic material added will be effective

only a short period of time during a hot growing season (effects will be longer during the cool part of the year, but the effects are usually desired during the warm part of the year). Like a newly hatched bird, low organic matter soils in hot, irrigated areas have an insatiable appetite an appetite for organic matter. An exception to the preceding is some orchards, where shading of the ground by trees reduces soil temperature to the point where organic matter can build up. Judicious use of mulches and organic materials in such cases may be helpful in improving soil tilth and permeability.

When considering a proposed organic amendment, the farmer (or fieldman) should test it on a small plot before any large scale application is considered. Better yet, wait for a thorough, unbiased test by University personnel positive results from such tests are extremely rare; when they do occur the economics are usually prohibitive. **Don't** be influenced by testimonials.

Beware of biological amendments that "bring a soil to life". They might work in a test tube, but in the relatively hostile environment of agricultural soil they are unlikely to maintain sufficient populations to be of any benefit.

Current University work on biological additives, including bacteria and algae, has shown promise in pot tests but results have not yet been translated to field tests. Mycorrhizae, a common root fungus, has shown significant benefits, including nutritional benefits, in pot and small plot tests; again, field scale results have not been obtained.

There may well be a day when some of these materials will be successful in the field. In the meantime, the farmer-fieldman should look to Universities rather than salesmen for solid information on organic or biological materials.

General References

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