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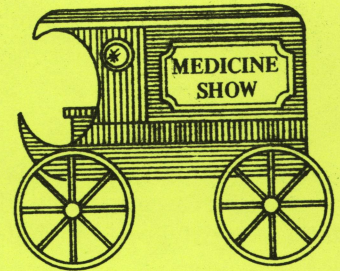
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Wonder Products In Agriculture



R. E. McDole and C. G. Painter

New agricultural products appear on the market in a steady stream. Some of these products have merit and contribute to the advancement of agriculture production. Others are of questionable value. These products are seldom worthless, but they may be worth very little in relation to their cost. They are often sold by honest, enthusiastic people — farmers in some cases — who use scientific-sounding sales talks and promise unbelievable benefits based on “knowledge” which is often the product of pure fantasy. These materials are often referred to as “wonder” products or “soil medicines.” They are not unlike the elixer and snake oils of the old time medicine man.

Methods of Promotion

The success of a “wonder” product, or the duration of its successful marketing, depends on the advertising program and the effectiveness of its salesmen or field representatives.

One method used to promote these materials is based on claims that they reduce the need for commercial fertilizer. When soil nutrient levels are high, as they frequently are in cropland, fertilizer rates can be reduced or eliminated regardless of whether a “wonder” product is applied.

A “wonder” product is often sold as a “cure all” for practically all soils and crops. Many times it is also recommended for use as a livestock feed additive and as a cure for disease, pests and nutritional problems in livestock as well as crops.

The advertising program or sales pitch is usually

built almost entirely on testimonials by “successful users” of the product. Scientific or factual data to support the claims for the product are usually lacking. Any scientific or factual data given are usually based on statements taken out of context.

An emotional crusade is sometimes used to liberate the farmer from the “evil” agricultural chemical industry and its “henchman,” the agricultural researcher.

Striking results obtained with use of the product are usually attributed to some “unknown” natural process or property inherent to the product. Frequently yields obtained from treated fields or portion of fields were not measured, but claims for results are based on “visual observations which show an obvious effect of product application.”

Comparisons are often made between different fields or between different years. These comparisons ignore the fact that tremendous differences can exist between fields and between years.

Claims are usually made for all the good things that can happen to a soil. A few symptoms will usually identify these products. Beware of products that make unsubstantiated claims for:

1. Increases in soil water-holding capacity.
2. Increases in soil aeration.
3. Changes in soil temperatures.
4. Increases in nutrient-holding capacity and nutrient availability.
5. Improved soil structure and aggregate stability.

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6. Increased micro-organism or microbial populations and behavior.
7. Improved organic matter behavior.
8. Increased disease and insect resistance.
9. Reduced effects of toxic materials in soils.
10. Increased water penetration.
11. Increased base exchange capacity.
12. Stimulated seed germination and root growth.
13. Improved root respiration.
14. Increased water-use efficiency, less evaporation and more absorption.
15. Reduced need for commercial fertilizers.

Types of Products

Most “wonder” products can be classified into one or more categories based on their claimed benefits. These categories include:

1. Soil additives
2. Soil amendments
3. Microbial or bacterial inoculants
4. Supplemental organic materials
5. Plant growth regulators

Soil Additives

Soil additives reportedly supplement or replace conventional commercial fertilizer products. Composition of many of the products show considerable amounts of trace elements occurring in their “natural form.” The analyses given for the composition of these products are usually the total amount of element present in the material. This has no relevance to actual available nutrients or water-soluble content of nutrients. Even basalt rock has a high content of total nutrients. In fact, if similar analyses were run on the soil to which the material is to be added, the soil would often be higher in total nutrients than the product being applied. Thus it is conceivable that the application of the “wonder” product to the soil may be diluting the natural content of nutrients in the soil (1).

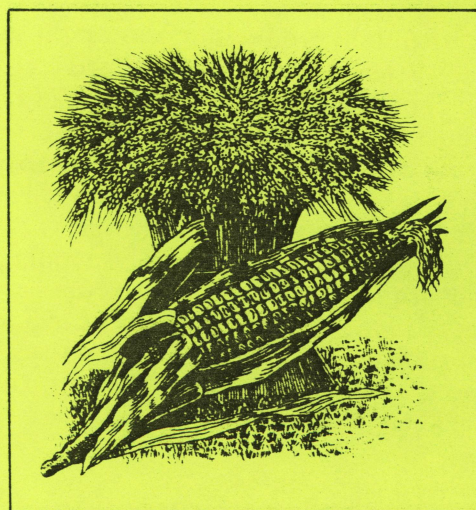
Soil Amendments

Addition of soil amendments is claimed to improve the soil’s physical or chemical properties. Claims made for altering soil physical properties should be viewed with skepticism. Altering physical properties such as soil structure, soil texture, pore space, aeration and water-holding capacity is difficult or impossible without massive amounts of amendments. Adding a few pounds or even a few hundred pounds of soil amendment product to a soil will have little, if any, influence on soil physical or chemical properties.

Microbial or Bacterial Inoculants

Soil microbial or bacterial inoculants supposedly increase numbers of organisms in the soil or stimulate activity of organisms already present. For example, adding a relatively small amount (1 pint or 1 pound per acre of the product is often recommended) of bacterial inoculant to the soil results in claims of astounding results. The contributions made by this relatively small number of bacteria in the inoculant — approximately 40 bacteria per gram of soil — is insignificant compared to the number of bacteria already present in the soil. In some cases, the inoculum has actually been pasteurized to facilitate shipping and handling so the organisms are dead.

A note of caution is necessary to prevent confusion of these soil inoculants with the nitrogen-fixing bacteria used to inoculate legumes. It is a well documented and established fact that *Rhizobia* strains of bacteria live symbiotically on roots of legume plants where they convert nitrogen in the air to plant-available nitrate. This should not be confused with “wonder” product type of bacterial inoculants.



Supplemental Organic Materials

“Soil humus,” “humic acid” and “fulvic acid” are terms commonly used by representatives of companies selling dark-colored, mineral organic matter supplement products (2). These products, called humates, reportedly increase soil levels and activity of soil organic matter. Many claims are made for benefits derived from humic acid being applied with these products. Applications of humic acid can be made into a convincing story, but the facts are less spectacular.

Soil humus consists of a wide array of compounds, ranging from well-defined biochemicals to complex high molecular weight polyelectrolytes, formed from a graveyard of bodies of microorganisms and altered plant residues. Humic acid and ful-

vic acid are names given to materials which can be extracted from soil humus. Humic acid is that part of the humus soluble in bases or alkali solutions but insoluble in acid. Fulvic acid is that part of the soil humus soluble in both acids and bases.

Compounds can be dissolved from any organic material by the acid-base technique of extraction. For example, extraction with acids and bases can result in the isolation of compounds from fresh animal manures, coal, asphalt, crude oil, shales, etc. Extracts from these different organic materials would have few, if any, common properties and would in no way resemble humic acid or fulvic acid obtained from soil organic matter or soil humus. The assumption that any compounds extracted with acids and bases, regardless of source, is comparable to humic or fulvic acid extracted from a soil is erroneous.

Compounds derived from commercial humates lack many of the properties found in soil humic acid and fulvic acid which are beneficial to crop production. They resist microbial attack and thus are not readily broken down to release nutrients. They are low in proteins and other nitrogenous biochemicals and thus are not sources of nitrogen for plant growth. They lack the gums and resins present in soil humus and thus are not beneficial in forming stable soil aggregates. Because of high carbon and low oxygen contents and condensed structures, materials derived from humate will be easily immobilized in the soil and thus have little opportunity to influence plant growth by acting as growth hormones.

A light-colored soil with an organic matter content of 3% will contain 60,000 pounds of organic matter per acre furrow slice of soil. Applying 500 pounds of commercial humate, containing 60% organic matter (a high value), will increase organic content of the soil from 3.00% to only 3.03%. For darker-colored soils having higher than 3% organic matter, the relative increase will be even less.



Plant Growth Regulators

Plant growth regulators stimulate plant growth processes. When properly applied, they can have a beneficial effect on plants. Some of the "wonder" products may actually contain some growth regulator components. It is questionable, however, if a soil application of a small amount of material can have much impact on plant growth processes. Not all growth regulators are beneficial. In fact, many are detrimental to plant growth. Without extensive testing the benefits of growth regulators cannot be established.

Conclusions

The "wonder" products have demonstrated the need for industry and research to maintain close ties with farmers and the consuming public. We cannot prevent the public from being "taken" or "ripped-off" by dealers in these products any more than we can prevent the public from being taken by unscrupulous dealers selling any product. A continuing effort is required to raise the level of understanding of good cultural practices and products available for farmers.

Numerous products can be included in this classification of "wonder" products or "soil medicines." Approximately 50 products sold in and around the state of Idaho fit this category.

What Is the University's Responsibility in Evaluating These Products?

Should research evaluate every "wonder" product that is being sold? In the past, some have been evaluated by research and extension personnel for their effect on yield and crop quality. Data rarely, if ever, shows real benefits from application of these products. However, the companies selling the products have disclaimed, ignored and ridiculed the research results. In some cases, a product shown to have no agricultural benefit has been altered slightly — as little as a name change — so the research results no longer could be applied. Many claims made for a product are too abstract or too small to be measured in a well-designed experiment. For these reasons, evaluation of these products by research or demonstration is difficult, if not impossible. Evaluation is also expensive and time-consuming. Thus, the University can not effectively evaluate the "wonder" products.

What Response Should Be Given to Questions About "Wonder" Products?

Attacking the validity of one of these products is difficult. Closely examine literature or other information on benefits claimed for the product. Are the claims based mainly on testimonials and inadequate research? How much scientific data are shown to prove or disprove the benefits?

Remember that the product representative is well trained in defending his product, so don't expect to challenge him and win any battles on his own ground.

Given time, products that have no benefits will fade from the market as they have in the past. Although it is difficult to sit back and watch as money

is squandered on these products, a passive attitude is usually the best approach. A strong attack on a product often leads to publicity and advertising that does more to enhance sales than hinder sales of the product.

Remember, there are few short cuts to good management, but there are many good, sound management practices available to increase crop yield and quality. Promote and use the information that is available on these good crop and soil management practices.

References

1. Christensen, Paul D. 1975. Soil medicines - A game of fantasy and supposition. Proceedings, Twenty-Sixth Annual Fertilizer Conference, Salt Lake City, Utah. p. 183-194.
 2. Stevenson, F. J. 1979. Humates - Facts and fantasies on their value as commercial soil amendments. Crops and Soils Magazine. p. 14-16.
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