Soil Organisms are Important

Millions of soil organisms are stimulated into activity in the presence of suitable forms of organic matter. They will use part of the organic matter for energy food (carbohydrates) and part of it for grow-food (protein). In the process of digestion much of the elements derived from the soil organic matter by these organisms are utilized within their bodies. Waste products are formed and given off much like the waste products expelled from the body of animals. These waste products represent important forms of plant food. They include essential elements for the production of crops. They become available to the plants from the organic (unavailable) form through the efforts of soil organisms. The release takes place in even and well regulated quantities.

The work of Dr. Wacksman (Rutgers University) has given indications that these waste products contain, in addition to the essential elements, many organic compounds which show great promise in providing for health factors not to be expected present in soils deplete of organic matter and with it deplete of the great variety of soil organisms and their waste products. I refer to compounds known as antibiotics which are commonly accepted and used by the medical profession with great success for the control of diseases. Research covering the effect of antibiotics (penicillin, streptomycin, etc.) on the health of plants has been launched by many research agencies in this country. Cornell University is active in this direction and Dr. Foster, the Plant Pathologist at the Ornamental Research Laboratory here at Farmingdale, has started an extensive program. Efforts in this direction are very promising and deserve and need the closest attention and support of growers.

Much has been said about the soil reaction, commonly referred to as the pH of the soil. We are familiar with the fact that the availability of essential elements is closely linked to the soil reaction. Certain plants will not do well if grown in soils which are too acid while certain types prefer acid conditions and show ill effects, if grown in soils with a higher reaction. In general, plants are extremely tolerant to this factor. The effects of the soil reaction on the plants are indirect. There is the purely chemical effect which (if not cared for) causes restriction of plantfoods like phosphorus, potassium, calcium, iron, and others. In addition, we have to consider the effect on the microbial population which, in my opinion, is even more important.

Soil microbes differ and distinguish themselves by the waste products formed and by their requirements for life. Generally, bacteria prefer a less acid soil (pH 5.8 - pH 6.8) and produce nitrate compounds. Fungi prefer a more acid soil (pH 5.5 and lower) and produce ammonium compounds.

Plants have naturally adjusted themselves to prefer one or the other form of nitrogen compounds. This resulted in the development of plants into groups which are known to us as acid-loving plants and others which are known to do better if grown in soils with a higher pH value. The fact of the matter is that the plants known as acid-loving plants prefer to take in the element nitrogen in the form of ammonium compounds (the endproduct of the life of fungi) in contrast to the other group which will greatly prefer nitrogen in the form of nitrate compounds (the endproducts of bacterial life).

All living things (this includes the soil) that we as growers deal with are by nature endowed with great tolerance towards conditions which effect their development. We can expect to find bacteria, fungi, and many other types of organisms to be present in all types of soils regardless of the soil reaction. Yet it will be worth the effort to make use of this knowledge in preparing soils for different crops to assure optimum production.