Effective Microorganisms for a More Sustainable Agriculture, Environment and Society: Potential and Prospects

Prof. Dr. Teruo Higa
College of Agriculture University of the Ryuhyus Okinawa, Japan

Good morning ladies and gentlemen. The video you have just seen illustrates a multitude of benefits that can be derived from using Effective Microorganisms (EM) in over-coming many of the problems that are associated with modern agriculture and its impact on the environment. It is difficult to believe that such small amounts of EM inoculants could be so effective in solving the problems that were discussed in the video.

The fact is that over the past three decades or so, the microbiological component of soil and crop management has been largely neglected in favor of chemical and physical relationships and their analysis in the soil-plant-water-environmental continuum. There are many beneficial microorganisms in the natural environment and when they are selected, cultured and combined with others for use as microbial inoculants it provides a very powerful tool for enhancing and improving soil fertility, crop growth and yield, plant protection, food safety and quality, and human health. This is the premise upon which I have devoted my time and effort to develop the concept and practical applications of EM technology.

Kyusei Nature Farming is a method of farming without the use of agrichemicals (i.e., synthetic chemical fertilizers and pesticides) and in this regard is similar to other versions of organic farming. However, Kyusei Nature Farming goes beyond organic farming because it must satisfy the following five requirements:

1. It must produce safe and nutritious food to enhance human health.
2. It must be economically and spiritually beneficial to both producers and consumers.
3. It must be sustainable and easily practiced by anyone.
4. It must conform to nature and protect the environment.
5. It must produce sufficient food of high quality for an expanding world population.

EM technology has become an integral part of Kyusei Nature Farming. The technology has been extended to a large number of countries throughout the world and beneficial results are being reported for a diverse range of environments, under both laboratory and field conditions. Some countries have adopted EM technology as part of their national agricultural policy, and you will be informed of these developments and the resulting benefits to agriculture and the environment during this conference.

The basis of action of EM is related to a general method classifying microorganisms into reviving, neutral or disintegrating types. The microorganisms that comprise EM are also found in nature and can be classified as reviving types. They act harmoniously to develop a more productive and sustainable system of agriculture. For example, the reviving types enhance the soil biological, chemical and physical properties while acting as synergists. The reviving types could also change the neutral ones to beneficial types. A11 of the EM cultures decompose organic materials to produce available nutrients and growth factors for crops; EM also reduces environmental pollution and suppresses malodors of organic wastes. In contrast, the disintegrating types of microorganisms cause diseases, but can be suppressed by EM.

The action of EM does not occur in isolation. The microorganisms in EM cultures are mostly heterotrophic, i.e., they require complex organic compounds of carbon and nitrogen for metabolism and biosynthesis. Thus, the effectiveness and benefits of EM are maximized when it is applied with organic amendments such as crop residues and green manures. The EM microorganisms have the ability to breakdown organic materials thereby releasing simpler compounds such as amino acids, sugars and auxins (i.e., plant hormones). These compounds can be absorbed directly by plants to enhance growth and yield. In animal husbandry, EM can accelerate the decomposition of manures, suppress malodors, and produce good quality organic amendments such as compost. In this process, EM suppresses disease-causing organisms.

EM can best be described as a technology that is capable of providing solutions to the problems of crop production, food safety and quality, resource conservation, organic recycling, environmental quality, human and animal health, and soil quality. However, the benefits of EM do not end here. More recent developments include the use of EM in health and sanitation programs in Japan and other Asian countries. We have also developed special EM products for industrial use. Results of these initiatives will be reported at other conferences that deal with such topics. However, at our concluding sessions later this week I will discuss in greater detail the theories, concepts and recent advances in EM technology that can lead to a more sustainable agriculture, environment and quality of life.

Again, I would like to express my sincere thanks and appreciation to everyone who contributed their time and effort to ensure that this Fourth International Conference on Kyusei Nature Fanning and EM Technology is a great success. My best wishes to all of you for a highly informative and productive conference.