

Soil microorganisms produce lots of substances which act as a binding agent of soil particles to form soil aggregates. Presence of stable soil aggregates help to improve the soil structure. Good soil structure is very important to retain plant nutrients and organic matter, water, and also to minimize the risk of erosion.

Soil microorganisms play a major role in nutrient cycling. Microorganisms are involved in two major processes which contribute to nutrient cycling. One is absorbing nutrients from the soil and transforming them into microbial tissues. This process known as immobilization of nutrients. The opposite process is mineralization. Mineralization happens when soil microorganisms die and release nutrients from their tissues. Further, soil microorganisms are responsible for decomposition of crop residues and release nutrients in mineral form. These processes are vital necessity in providing nutrients for plants growth.

Intensive agriculture is practiced throughout the world to cater the ever-increasing food demand through enhanced yields. This practice relies upon excessive use of fertilizers, pesticides, high yielding seeds and mechanization while over exploiting the potentials of natural resources. Excessive land preparation practices disrupt the soil structure and reduce the pore size and distribution of soil particles. Consequently, water infiltration, drainage and aeration are affected. Repeated land preparation practices cause reduction of organic matters and substantial reduction of microbial population in soil. Excessive application of agrochemicals alters the soil properties and causes accumulation of toxic

substances. These changes result in many undesirable impacts on the whole ecosystem and living macro and microorganisms.

There is an urgent need of shifting towards more eco-friendly crop and soil management practices. Otherwise soil microorganisms will be unable to create a beneficial and favorable ecosystem for plant production. Minimum or zero tillage practices, crop rotation, cultivation of legumes crop, application of crop residuals, conducting integrated pest management practices and integrated plant nutrient management by combining inorganic and organic fertilizers such as organic manure and biofertilizer are some of eco friendly practices we can adopt to improve the soil biodiversity and assure optimum functioning of microorganisms. Especially, microbial inoculants can be used as bio fertilizer, bio pesticides or bio herbicides as an alternative for agrochemicals, which contain harmful compounds for living organisms. All these benefits are available if diverse microorganisms co-exist with plants or could be isolated from soils and formulate inoculants. Therefore, soils with less environmental disturbance would sustain diverse beneficial microorganisms in soils and allow ecosystems to carry out all beneficial functions.

#### Reference

Schenk P.M., Carvalhais L.C., Kazan, K. 2012. Unraveling plant-microbe interactions: can multi-species transcriptomics help?, Trends in Biotechnology, Volume 30, Issue 3.