



Role of soil microfauna and microflora in agriculture

SUBHA GANGULY

AICRP on Post Harvest Technology (ICAR), Department of Fish Processing Technology,
Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences,
Chakgaria, Panchasayar, KOLKATA (W.B.) INDIA
(E-mail : ganguly38@gmail.com)

Abstract : Microbial biomass in the soil contains millions of soil organisms is the living part of organic matter in the soil. The microbial biomass mainly consists of bacteria and fungi, which has active and inactive parts. Some of which are very beneficial to the soil include bacteria and fungi for maintenance of fertility. Apart from these, earthworms, nematodes, protozoa and different arthropods also remain as inhabitants in the soil. The soil contains millions of micro-organisms which are dominated by bacteria and fungi. Bacteria and fungi are associated with crop health problems. Bacteria and fungi are a necessary part of the ecosystem and help with the availability of plant nutrients and plant health. By building up soil organic matter it will increase plant nutrient availability, water-holding capacity and improves soil structure. Management of soil organic matter is, therefore, a major part of the general farm practices.

Key Words : Biomass, Micro-organisms, Soil

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Bacteria and fungi have different roles in the recycling of nutrients. Fungi are generally much more efficient at consuming and storing nutrients than bacteria. One reason for this is the chemical composition of fungi cell walls. They are composed of polymers of chitin and melanin, making them very resistant to degradation, thus they are able to store a lot more, especially micronutrients like Ca, and making macro aggregates which form air passageways and hallways to allow air and water to move into the soil, and to allow good drainage (Alexander, 1977; 1994).

Chemical activity of micro-organisms present in soil for decomposition and disintegration of inorganic to organic mass:

The bacteria and fungi carry out the decomposition of plant residues, breaking them down and holding the nutrients in their bodies, glued and bound to soil particles, this prevents the nutrients leaching out into the soil (Alexander, 1994). At this point the nutrients are not available to the plants. Bacteria and fungi hold onto these nutrients until protozoa, nematodes, small micro arthropods, and earthworms consume individuals of bacteria and fungi and release

nutrients in plant available forms. The nutrients are released to the plants in the right amount and form according to the requirements by the growing plants. The plants protect the own root system from pathogen and pest attack by excrete foods for bacteria and fungi which are a food source for the beneficial species (Bardgett, 2005).

Bacterial membranes, in comparison, are phospholipids, which are energy-rich. Bacteria degrade easily and quickly. They also function as a food source for a wide range of microorganisms. The different proportions of C and nitrogen (N) (*i.e.* different C: N ratios) of bacteria and fungi might also play a role in the mineralization and immobilization processes of nutrients in the soil. Due to their structure, fungi need a greater amount of carbon to grow and reproduce and will, therefore, 'collect' the required amount of carbon available for this from the soil organic matter. Bacteria, however, have a higher nitrogen requirement and, therefore, a lower C: N ratio and take more nitrogen from the soil for their own requirements (Paul and Clark, 1996).

To feed up the numbers of fungi which remain present in the fertile soil, it is needed to add fungal foods such as

dead leaf material, woody material, fish hydrolysate (also a bacterial food), and N and other micronutrients. Wood, sawdust, bark, paper and cardboard can be used as well, but diversity is the key (Paul and Clark, 1996).

Rate of bacterial activity influences soil quality:

If activity is low, then bacterial foods need to be added to increase plant growth rates and improvement in numbers. A diversity of foods needs to be added, and thus molasses is a much better choice than white sugar. Fish hydrolysate is also a fungal food and a potential source of nitrogen and other micro-nutrients. Fruit juices can be used as well, but diversity is the key.

Conclusion:

It is important to add a good quality compost or compost tea or soil is inoculated to keep the bacterial and fungal population up to appreciable limit. All composts contain a good range of bacteria, fungi and microorganisms. So it's important to keep adding these products to the soil to build up bacteria and fungi numbers (Sylvia *et al.*, 2005; Tate, 2000).

Losses incurred at post-harvest are quite common and

enormous leading to valuable food loss. At every stage of post-harvest practice, agricultural products are deprived from quality due to physical, chemical, biological and mechanical factors. The soil quality also proves to be an important factor in this aspect (Ganguly, 2013)

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