



Microbial Soil Diversity

Guest Editor



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Message from the Guest Editor

Dear Colleagues,

Over the recent decades, the world has seen a growing global energy deficit. The growing costs of agricultural production and the need to protect the environment create the necessity of using farming systems with reduced frequency and intensity of the treatments. Such tillage system should produce low amount of carbon, thus being compatible with the assumptions of organic management systems, sustainable farming and soil biodiversity protection. In modern agriculture, tillage has to meet many conditions to protect the soil and improve its parameters. First and foremost, it is important to reduce the losses of soil organic matter, to improve the soil structure. As a result of the use of intensive cultivation methods in many regions, soil fertility is characterized by, among others, reduction of biodiversity, accumulation of harmful microorganisms and plant pathogens as well as pesticides and their derivatives in soils. It can be assumed that these phenomena will intensify as a result of dynamic climate changes, i.e. temperature increase and reduction of rainfall during the growing season. Therefore, in order to better access nutrients to plants and create the right conditions for their growth and development, it is important to maintain high activity and biodiversity of beneficial soil microorganisms in soil, and to introduce rational biology of agriculture.

The main aims of this special issue will be:

1. evaluation of biodiversity of agricultural soil as a foundation for environmental protection, improvement of plant yields and soil quality in the aspect of plant adaptation to climate change.
2. optimization of processes leading to the protection of soil biodiversity in plant cultivation with particular emphasis on innovative solutions and biological yielding agents.
3. Intensification of activities leading to the formation of natural biological processes increasing



environmental biodiversity, adaptation of microorganisms to climate change, plant and soil protection against the background of the concept of sustainable development of agriculture.

Soil microorganisms are a highly diverse group of living organisms in terms of genomic and phenotypic characteristics. Biodiversity is a crucial step towards finding new microorganisms important features. Microorganisms play an important role in the ecosystem of the soil and participate, among others, in maintaining soil structure, humification, release of organic compounds, disposal of pollutants but also in the processes of transformation of organic matter. The competent state of soil microorganisms communities which consists of appropriate amount, activity and diversity is a necessary condition for functioning of a highly complex system such as soil. In this issue the special attention will be paid to the importance of biodiversity of soil microorganisms and their contribution to the improvement of soil quality and fertility. The role of microorganisms in the creation of a proper soil structure, in the circulation of elements, humus formation, production of substances stimulating plant growth, detoxification and bioremediation of harmful compounds will be presented.

Due to such large diversity, it is important to find the appropriate methods which would provide the highest degree of microbial diversification. Genetic techniques are the tools which allow analyzing genetic variability of microorganisms. These techniques allow multiplying specific sequences, usually corresponding to the fragments of the sequence of genomic DNA. Hence, undoubtedly an important aspect of the research is the selection and development of indicators to evaluate biodiversity microorganisms of soil and plant. This issue is to increase of knowledge about the protection of natural resources, which are soils used for agricultural purposes. Intensive farming conducted for many years has brought many negative effects on the quality of cultivated soils. It should be taken some activities to improve them and to intensify the protection of soil resources. This issue will be presented selected molecular methods used for the diversify of microorganisms in soil and other environments.

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