

Pinton, R., Varanini, Z., Nannipieri, P. (ed.): **The Rhizosphere. Biochemistry and Organic Substances at the Soil-Plant Interface.** – Marcel Dekker, New York - Basel 2001. 424 pp. 175.00 USD. ISBN 0-8247-0427-4.

The aim of this book is to provide a comprehensive and updated overview of the most recent advances in the research on plant-soil interaction, and on the processes that take place in the rhizosphere—the soil environment surrounding the roots. Three editors of the reviewed book—professors of plant nutrition and agricultural chemistry at the Universities of Udine and Florence, Italy—assembled 21 scientists from Australia, France, Germany, Italy, The Netherlands, UK, and USA to prepare 12 comprehensive review articles included into this book.

In the first four chapters, the functional features of rhizosphere as a site of biochemical interactions among soil, plants, and microorganisms is described, the physiological and environmental factors influencing the release of root exudates, and the dynamics of rhizosphere microbial populations. Next four chapters suggest the importance of organic compounds in mineralization and humification processes in the rhizosphere. Stable components of soil organic matter, namely, humic and fulvic substances, can influence both plant and microorganism metabolism. The attention was paid also to biologically active substances produced by microbial populations in the activity of signals between plants and microorganisms, and also to the function of siderophores in the plant rhizosphere. It has long been recognized that both roots and microorganisms compete for iron at the rhizosphere. For the future, it is important that the ability to manipulate siderophore production in the rhizosphere could improve plant trace metal nutrition and biocontrol of root disease.

The rhizosphere is a dynamic environment in which bacteria, viruses, fungi, and microfauna develop, interact with each other, and take advantage of organic matter released by the root. The chapter 9 is devoted to the investigation of the occurrence and role of mycorrhizal fungi in the rhizosphere. This chapter deals with mycorrhizal symbiosis, a mutualistic plant-fungus

association which is an essential feature of the biology and ecology of most terrestrial plants, since it influences their growth as well as their water and nutrient absorption, and protect them from root diseases. The next chapter 10 deals with the nitrogen fixation, in the first place with the rhizobium-legume symbiosis.

The chapter 11 is devoted to mathematical modeling of the rhizosphere. Here, very successfully is documented that the rhizosphere is a highly complex environment where almost every process involves multiple interactions between the soil-root-microbe triumvirate. For example, the rate of nitrogen influx into the root system is an important determinant of plant productivity, and yet explaining why this flux differs between different experimental treatments requires a very detailed knowledge of plant physiology, soil physics, chemistry, and biology. Information about mathematical modelling of the rhizosphere can be used to solve the problem of global climate change.

In the last chapter 12, methodological approaches to the study of rhizosphere carbon flow and microbial population dynamics are treated. In my opinion, the part of this chapter dealing with methods for the study of microbial population dynamics is unnecessary short. It would be useful to include more information on well-known results about selective media for determination of microbial populations to monitor some groups of microorganisms (*e.g.*, some media for total fungi enumeration and their isolation could be more suitable than potato dextrose agar).

The book is edited and produced in good standards of Dekker publications. Every chapter is accompanied by extensive bibliography (together 1670 references), and the book is complemented by a subject index. I am convinced that the book will find numerous readers especially among soil microbiologists, botanists, plant physiologists, ecologists, and other plant scientists and post-graduate students.

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