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Pinton, R., Varanini, Z., Nannipieri, P. (ed.): **The Rhizosphere. Biochemistry and Organic Substances at the Soil-Plant Interface.** 2nd Edition. - CRC Press, Taylor and Francis Group, Boca Raton - London - New York 2007. 447 pp. ISBN 0-8493-3855-7.

The crucial effect of soil environment on plant growth is generally well recognized but our understanding of all contributing parts is still not satisfactory. Soil compartment is of very complex nature, with plethora of highly variable physico-chemical processes and biotic interactions. Exact study of root responses to separate abiotic and biotic components of the soil environment is extremely difficult and reliable data are, therefore, rather scarce. The main aim of the reviewed book is to provide a comprehensive overview of recent advances in this problematic.

The first three chapters are devoted to root exudates. Main types of organic compounds released by plant roots are listed, together with their biological activity and possible roles in mineral nutrient acquisition or protection against pathogens. Quite useful is description of different techniques used for collection of root exudates in solution culture and in soil systems. Mechanisms of root exudation are clearly explained at cellular level. Dependence of root exudation rate on physiological status of a plant and on soil conditions (e.g., nutrient deficiency, strong acidity, aluminium toxicity) is also treated.

The following block of four chapters is focused on transformations of mineral nutrients in the rhizosphere and their uptake by roots. Special attention is devoted to nitrogen and phosphorus dynamics, and to extracellular enzymatic activity. New methodical approaches to the study of soil transformation processes are discussed. Functions of special iron chelating agents (siderophores) secreted by microorganisms and grass roots in iron-limiting growth conditions are treated in detail. Very

interesting are also the two chapters newly added to this second edition, discussing the mechanisms by which soil nutrient availability may modify root morphology and architecture, and also detail description of membrane processes in roots relevant to nutrient acquisition.

Direct interactions of plant roots with nodulating bacteria, mycorrhizal and pathogenic fungi are treated in three separate chapters. Much attention is devoted to the recent considerable advances in our understanding resulting from extensive application of molecular methods. This has deeply modified our view on signalling mechanisms of interacting roots and fungi or bacteria, their genetic background and evolution. Practical applications of such research in biocontrol of crop plants could be undoubtedly possible and very helpful.

The following topics are of more synthetic character, presenting a general overview of chemical communication in the rhizosphere, approaches to the mathematical modelling of soil processes, carbon flow in soil systems, and microbial population dynamics. The last contribution is devoted to mechanisms of natural gene transfer among soil microorganisms.

All chapters of this nicely printed and bound book are arranged in a similar form of concise review articles with many figures and abundant list of references. The book will be undoubtedly of continuous interest to plant scientists, soil biologists and practising plant ecologists as an invaluable source of basic information. It might be certainly useful to students and teachers of biological disciplines as an advanced textbook.

J. GLOSER (*Brno*)