Rengel, Z.: **Handbook of Plant Growth. pH as the Master Variable.** (Books in Soils, Plants, and the Environment Series. Vol. 88.) - Marcel Decker, Inc., New York - Basel 2002. 446 pp. USD 200.00. ISBN 0-8247-0761-3.

This book is concerned in a dynamic phenomenon of H^+ fluxes across cell membranes with implications in formation of pH gradient. Subtle changes in pH have consequences in various physiological processes such as the basic one, the growth. The book deals with a role of pH on level of molecules, cells to environment, *i.e.* from symplast, apoplast, and rhizosphere, up to soil and the ecosystem.

There are 16 chapters, all of them were carefully rewieved. This speaks about high standard of individual articles. The beginning is devoted to all aspects of a plasma membrane H^+-ATPases, the essential H^+ transporters. The most important are the ways of their regulation by kinases. The second chapter describes vacuolar ATPase with regard to its physiology and molecular biology. The ability of plants to cope with variations in H^+ concentration is immense. The plants can o grow under quite a wide range of acidity from pH 2.3 to 10.2 This capability is explained in the third chapter. Despite these harsh external conditions and despite H^+ production in metabolism, the internal milieu is maintained at quite a constant value. It is enabled by specific reactions acting together as pH stat. Several methods were developed using various kinds of microscope in order to visualise proton distribution, in so-called pH maps. The most challenging is confocal topography that is described in fourth chapter. Fifth chapter is addressed to pH as a signal and regulator of membrane transport. The chapter 6 deals with a role of the apoplastic pH in cell wall extension and cell enlargement. Necessarily, the most important H^+ fluxes occur in electron transport chains. Next part is devoted to mechanisms of physiological roles of proton movements in plant thylakoid membranes. Dynamics in H^+ fluxes in mitochondrial membrane is described in chapter 8. Content of section 9 is nitrate and ammonium ion uptake by root and their assimilation, which are associated with changes in pH. The plants with crassulacean acid metabolism represent a special case of pH regulation and H^+ fluxes; this phenomenon is discussed in chapter 10. Apoplast is recently regarded as the important compartment in plant cell metabolism. Next chapter is concerned in dynamic of H^+ fluxes in apoplast. Twelfth chapter is devoted to the H^+ current around plant roots that is of great importance for nutrient input with consequences in growth and development. Here, the newly developed techniques for pH measurements in roots are explained. Chapter 13 is aimed at soil chemistry with particular stress to the pH of soil and how it influences availability of ions for roots. Microorganisms are interactive component of soil systems. The considerations of regulation of microbial processes by soil pH are involved in chapter14. Next chapter is focused on H^+ effects and specifically addresses constraints that acid soils place on symbiotic relationships between plants and soil microorganisms. The very last part covers distribution of plant species in relation to pH of soil and water. Plants use various mechanisms to adapt to a wide range of soil pH or water in aquatic ecosystems.

This book presents most recent progress and provides us with a unifying view of the role oh pH in plant growth as well as the complex of processes of plant interaction with biotic and abiotic environment. It is thus apparent that this book can be useful for experts in many areas as plant biologists, physiologists, microbiologists, ecologists, also for scientists in agronomy and forestry.

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