

Lambers, H., Poorter, H., Van Vuuren, M.M.I. (ed.): **Inherent Variation in Plant Growth. Physiological Mechanisms and Ecological Consequences.** - Backhuys Publishers, Leiden 1998. 592 pp. NLG 290.00. ISBN 90-73348-96-X.

This book has arisen from the Workshop held at Utrecht University June 1997 and concerns the amazing ability of plants to grow in completely different habitats. We can observe variations in growth capacities according to individual conditions. Plants grow rapidly in favourable but slowly in harsh conditions. However, this slow rate is sustained even if plants are grown in favourable environments. Aim of the book is to follow these different growth capacities together with elucidation of this phenomenon.

The book contains four main sections. The first part deals with cellular basis of plant growth, especially of roots and leaves. Studying the cell cycle can bring molecular approach to possibility of plant growth manipulation by regulation of involved genes. Organ important for whole plant growth is root, modulation of root cell wall properties playing role in root growth is achieved by peroxidases, xyloglucan endotransglycosylase, and expansins. Similarly, the regulation of leaf expansion is discussed on cellular basis. It leads to elucidation of differences in leaf growth rate.

Second part concerns metabolic bases determining or influencing plant growth rate. Naturally, differences in photosynthetic characteristics of fast and slow growing species are discussed. The extent of photosynthetic capacity can be explained not only on molecular level but also depends on canopy characteristics. Next bioenergetically important process is respiration, which has different features in plants growing with different rates. Exudates mediate carbon flow from root to soil and influence nutrition supply to rhizosphere micro-organism. This event leads to reduction of plant dry mass accumulation. Another process participating in growth is carbon allocation between shoot and root. In fact, this is a

complex of processes and relationship between plant rate and allocation is suggested.

Third section deals with growth analysis of individual plants. It begins with a comparison of slow growing alpine and fast growing lowland plants and with a description of factors associated with these variations. Positive correlation was found between water use and growth in some plants. However, it is not a general rule. Further, relation between growth rate and light intensity was investigated. Growth parameters were tested in order to express growth variations. Relation between disease resistance and growth rate can be expressed in two ways. Only resistance based on constitutive compounds, which are costly for a plant, can be negatively correlated with growth rate. This section also involves a contribution to statistical modelling of plant growth. It introduces a method for description of interactions between various plant attributes using structural equations.

Fourth part involves the highest level of growth variations, i.e. ecosystems. Competition between plants growing in one ecotope can be assumed as intra- and interspecific. The principal factors important for variations in growth rate are outlined. Root is a major organ which mediates the access of plants to water and nutrients. On the other hand, leaf determines plant growth rate through photosynthesis. Other aspects playing role in competition between plants is adaptation to nutrient-poor soil, efficiencies of nitrogen-use and light capture. The book is closed by an epilogue pointed to further investigation, namely cell growth at the biophysical and biochemical level. This book presents recent advances in understanding of evaluation of differences in plant growth rate with consequences for ecology as well as agronomy.

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