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PLANTS: SO CLOSE YET SO UNKNOWN – INTRODUCTION

Cave paintings made by humans as early as in the Palaeolithic age depict mainly animals, people or parts of the human body, but never plants. Possibly, plants were treated by humans as a component of landscape, absent in the paintings. Come to think about it – don't we still view plants as obvious and uninteresting "things out there"? Surely, many of us know that without plants and other photosynthetically active organisms (e.g. cyanobacteria) the life on Earth would not be possible, since only these organisms are able to fix carbon dioxide from the atmosphere and synthesize organic compounds. Thus, as primary producers, plants constitute the bottom layer of the trophic pyramid. Others know that CO₂ fixation by plants prevents an increase of its concentration in the atmosphere, which in turn limits the greenhouse effect. One should also bear in mind that the atmospheric oxygen indispensable for almost all organisms (except anaerobes, as some bacteria and archaea) has originated in the course of oxygenic photosynthesis provided by autotrophic organisms for hundreds of millions of years. However, most people still treat plants as a part of the landscape (indeed, some of them notice their beauty). They do not ask themselves how plants grow, flower and bear fruit, and fit in an often unfavourable environment. Not only lay people are unfamiliar with the biology of plants. Also the scientific community underestimate the role of plants for the science of biology. For example, only three Nobel

Prizes have been awarded for achievements related to plant science directly (Melvin Ellis Calvin, discovery of photosynthetic carbon reduction cycle, Nobel Prize 1961; Ernst Borlaug, contribution to Green Revolution, Nobel Peace Prize 1970; Barbara McClintock, discovery of transposable genetic elements, Nobel Prize 1983). One should note, however, that studies on plants resulted in many other fundamental discoveries of general importance, i.e., not limited to these organisms. Most notable examples include the Mendel's laws of inheritance, genetic recombination by crossing-over, and co-suppression leading to the discovery of gene silencing.

This volume of KOSMOS strives to make plants closer to the Reader scientifically unfamiliar with those organisms. We discuss several topics of plant biology. One is energy production. Here we concentrate on the photosynthesis and its practical aspects, but also address mitochondrial respiration, different in some details from the one known in animals. Several papers are related to plant physiology with the emphasis on the integration of processes at the tissue and organ level. The role of the apoplast, the continuum of cell walls and intercellular spaces, is discussed, since numerous important biological processes and the reception of external and internal signals take place there. We present also the significance of plasmodesmata, cytoplasmic channels between protoplasts, in the cell-to-cell communication. As an example of integration of biological processes at the tis-

sue level, the little known process of radial transport in xylem radials is presented. Another paper discusses the path and mechanisms of long-distance transport of water and organic compounds along the plant. They are definitely different from those known in animals, but amazingly efficient. Adaptation of plants to the environment is the subject of three papers. The role of light in the regulation of plant growth and development is discussed as well as morphological and ana-

tomical adaptations of plants to unfavourable conditions in some biotopes. Finally, the question of the plant-plant and plant-animal communication is presented. We hope that the presented short review of current topics of plant science will allow the Reader better understanding of our silent green companions.

A handwritten signature in cursive script, reading "Paweł Sołiński".