FOCUS ON SYMBIOSES: “WHERE TWO ARE BETTER THAN ONE”

MPMI Focus Issue Overview

If only living side by side or, perhaps, even inside one another, mutualisms and, more generally, symbioses have been a major force in allowing plants, animals, and microorganisms to spread across the biosphere through creation of new forms and functions. This has allowed the symbionts to occupy new niches and to survive and persist in seemingly harsh and often barren environments. Constantly striving for novelty in the continuum of facultative to obligate states, beneficial symbiotic interactions of different biological species account for, among many others things, the friendship of a bacterium with a squid, the intimacy and obscurity of gut microflora, the attractiveness of flowers, and the enhanced growth responses of plants due to interactions with microbes. The latter has been of significant interest since the rise of agricultural sciences, which brought about knowledge of the intimate relationships between plants and growth-promoting microorganisms more than 120 years ago. While the more recent ‘Green Revolution’ has intensified food production, it has also shown us that further progress on food sustainability is dependent upon closer

and more long-term interactions with the environment, also a symbiosis of sorts.

The last two decades bear great witness to tremendous advances in our understanding of the basic principles governing two agriculturally relevant symbioses of plants with beneficial microorganisms: i) the nitrogen-fixing nodule bacteria of legumes and angiosperms and ii) phosphate-acquiring mycorrhiza fungi. This is reflected by the content of this special issue. This special focus issue brings together five outstanding invited reviews, one technical advance, and seven research articles, covering aspects of evolution and phylogeny, diversity, signaling, differentiation, and development of new investigative tools. Together they provide a window into the exciting world of plant-microbe symbioses.

It is with privilege and honor that we introduce this issue to the readership of MPMI. It is dedicated to the memory of Adam Kondorosi, a great scientist, mentor, colleague, friend, and above all, one of the biggest fans of SYMBIOSIS.

Krzysztof Szczygłowski and Michael Sadowsky, Guest Editors