

EDITORIAL

Plant Science: Challenge or Dilemma?

Plant science, and more particularly agricultural science, is one of the most important research fields because plants greatly depend on biotic and abiotic factors. Basically and regardless of their genetic and phenotype features, plants are biophysically affected by meteorological variables, including rising temperatures, changing precipitation regimes, and increasing atmospheric carbon dioxide levels, as well as other variables such as soils, insects and microorganisms. These effects could be positive in some regions, and negative in others, and will vary over time. On the other hand, plant and food ecosystems can be affected in different ways, and determining the impacts of the factors affecting plants and by causality food security is not assured, because not only plant systems could be affected, but the whole food chain including pre- and post-harvest handling, markets, food prices and food-chain supply. By 2050, the world population is estimated to be around 9 billion people, and the two main key challenges are that (i) crop production will be required to produce at least 50% to 60% more food to feed that rising population, and (ii) satisfy the nutritional requirement of the population by supplying adequate nutritional crops quality. Even though the development of molecular biology, and more recently omics technologies, are helping scientists to better understand the mechanisms that regulate and control plants growth and development, we still have much to discover how plants differ in their acclimation capacities by modifying their tolerance, phenotype and plasticity. Therefore, plant science should “grow” to more sophisticated level and undertaking analyses at genome, transcriptome, proteome and metabolome levels will undoubtedly contribute to revealing the level of changes needed to adapt molecular and regulatory mechanisms of plants.

This knowledge will not only provide insights into potential rates of adaptive evolution and capacities for plants to acute and long-term biotic and abiotic changes, but it will also help to understand the trends of plants evolution in this changing environmental conditions.

Despite promising results obtained by the progress of research and innovation in plant science, other factors are making these two challenges more “challenging”, due from one hand to the accelerated urbanization, deforestation, soils erosion, drought, flooding, global warming, CO₂ rise, and from the other hand the depletion of fossils energies. By 2080 the end of oil era, plant science would be diverted to plant production for biofuels and carbon-based chemical industries, creating a great competition between “Food-Plant Science” and “Industry-Plant Science”. This dilemma will make the challenge more complex because plant science should work to innovate for satisfying the two sides without prejudice.

Conclusively, redirection of plant science research has to take the right way and put it in the right place. Plant biologists have the role by their research to convince of this opportunity and necessity. Plant science should also accept the responsibility to solve the plant biology problems particularly in countries with much poorer research conditions. Coordinating our research through plant science and plant biology can help achieving our aims by preserving and sustaining the plant biodiversity and satisfying the need of the population.

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