Editorial

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Arabidopsis has long been projected as a model organism by several plant biologists because of its features like small size, high fecundity, short life cycle and availability of a large number of mutants (Redei 1975). In addition, the ability to introduce DNA into *Arabidopsis* obviating the requirement of tissue culture combined with the availability of complete genome sequence of this plant made it indeed a model plant in the twenty-first century (Fink 1998). Owing to these attributes and rapid advances made in molecular genetics in general, *Arabidopsis thaliana* was adopted by a large number of scientists around the world in the last nearly three decades and consequently rapid developments in various fields of plant biology like genetics, physiology, biochemistry, developmental biology, pathology, pharmaceuticals and agriculture have taken place (Koorneef and Meinke 2010; McCourt and Benning 2010). The impact of research on *Arabidopsis* has not only remained confined to plants but has ramifications for human health (Jones et al. 2008).

Thus, the Editorial Board of the Journal of Biochemistry and Biotechnology decided to bring out a special issue devoted to *Arabidopsis* research and to highlight the latest developments in various fields involving *Arabidopsis* as the model plant. We, the Editors of this special issue have been keen students of developments in the application of *Arabidopsis* as a model system in plant biology and have also closely monitored the developments in India and have been providing annual summary to the *Arabidopsis* Community as country representatives in the Multinational *Arabidopsis* Steering Committee (Parry et al. 2020), regularly. Hence,

we also wanted to showcase some of the exceptional work being carried out in India in this issue.

We are happy to present more than 16 comprehensive reviews ranging from role of light in plant development, gene regulation, signalling mechanisms underlying biotic and abiotic stresses in this issue. We are confident that the readers will have a veritable treatise on an array of articles written by experts in their respective fields.

R. Khanna, besides providing a historical background of *Arabidopsis* as a model system, also explains the need for invoking the presence of an yet unidentified signal and receptor for skotomorphogenesis. The review articles dealing with various aspects of photobiology have been contributed by pioneers in the field: Masamitsu Wada, Sudip Chattopadhyay, J P Khurana, Sourav Dutta, Margaret Ahmad, Utpal Nath and their co-workers. Masamitsu Wada, credited with the discovery of Phototropin 2 (PHOT2), reviews its role in the movement of chloroplasts in response to blue light. Jiten Khurana's group provides an in-depth account of how Constitutive Photomorphogenesis 1 (COP1) and Long Hypocotyl 5 (HY5) work as a module and act downstream to multiple photoreceptors in regulating various aspects of plant development. The article by Sudip Chattopadhyay's group has highlighted the role of Z-box Binding Factors (ZBFs) as key components of light signaling pathways in regulating plant developmental processes. Sourav Datta's group comprehensively discusses the identification and characterisation of BBX proteins and how they interact with other components of light signaling to regulate plant development. Margaret Ahmad, who along with Anthony Cashmore made the discovery of cryptochrome 1 (CRY1), provides an insight into the emerging role of cryptochromes as sensors of electromagnetic fields in plants. Utpal Nath and co-worker have given a lucid account on the intergration of light and hormonal signals (the endogenous cues) in regulating seedling morphogenesis.

Kishore Panigrahi's review provides an update on senescence and biological clock. Girdhar Pandey provides a meticulous account on the role of Ca^{2+} signaling in regulation of several biological processes involved in stress

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responses, specifically during microbial infection and symbiotic associations in plants. Ashverya Laxmi provides a comprehensive review on the crosstalk of glucose signalling with different phytohormones in regulating different aspects of plant development. Kundan Kumar et al. give a detailed account of information on MAPK signalling and cross talk in *Arabidopsis* during abiotic stress. Anil Grover's article discusses the role of heat shock proteins in *Arabidopsis* and explores the possibility of exploiting the knowledge generated on Hsp101 in particular for engineering thermotolerance in plants. Ananda K. Sarkar's article provides an overview on the role of miRNA in root developmental process under abiotic stress conditions. Giresha Mohannath summarizes a very interesting, but relatively unexplored aspect about ribosomal RNA (rRNA) gene regulation. Sachin Teotia's group discusses the possibility of regulation of free fatty acid biosynthesis exploiting transcriptional factors, miRNA and chromatin modulators. The development and application of gene editing tools for myriads of purposes has been discussed by Sangram Lenka's group.

A few of the groups led by Asis Nandi, Alok Sinha, Jyothilakshmi Vadassery, Jagreet Kaur and Ram Yadav have contributed research articles on salicylic acid-mediated stomatal immunity, role of MAPK cascades in regulation of ABA induced inhibition of seed germination, role of jasmonoyl-L-isoleucine (JA-Ile) in cytosolic Ca^{2+} level, role of Phytooglobins during fungal infection and the requirement of C-terminal domain of APETALA1 in flower development, respectively.

We thank all our contributors to this special issue on *Arabidopsis* research for responding to our request and meeting the deadline in submitting the articles. We thank the members of the Editorial Board for all their help and cooperation. We thank Dr Pratikshya Borah for the cover design. We acknowledge the unstinting support provided by Dr Mamta Kapila, Ms Karen Grace and Ms Deepika Sureshkumar and their team members at Springer in bringing out this special issue.

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