9-1-2021

Towards Improving Agriculture Productivity

Sushma Naithani
Oregon State University

Dhirendra Kumar
East Tennessee State University, kumard@etsu.edu

Jaindra N. Tripathi
International Institute of Tropical Agriculture (IITA)

Citation Information

Naithani, Sushma; Kumar, Dhirendra; and Tripathi, Jaindra N.. 2021. Towards Improving Agriculture Productivity. *Current Plant Biology*. Vol.27 https://doi.org/10.1016/j.cpb.2021.100218

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Current Plant Biology 27 (2021) 100218

Contents lists available at ScienceDirect

Current Plant Biology

journal homepage: www.elsevier.com/locate/cpb

Towards improving agriculture productivity

The volume 27 of the Current Plant Biology contains eight articles and one tribute. The articles' foci range from the molecular breeding, omics approach to applications of tissue culture, seed priming, and microbiota for improving agriculture productivity—thus, encompass a wide range of audiences. To improve overall navigation, visibility, and accessibility, we publish an article as soon as it becomes available in regular volume, and if applicable, the article is also included in a Virtual Special Issue (VSI). We encourage our authors to submit articles for two open VSI: (i) Understanding plant's response to global climate change using Omics and (ii) Plant Biology on Anthocyanin in Fruit.

Hernández-Soto et al. [1] provide a review of rice breeding focused on the various genes and phenotypes associated with the agronomic traits, including historically important domestication traits (e.g., grain numbers/panicle, grain weight, plant structure), as well as traits of contemporary interests (e.g., herbicide tolerance, pathogen resistance, nitrogen use).

Guapeva (*Pouteria gardeneriana* Radlk) is a native tree of the Brazilian Cerrado that has tremendous economic, ecological, and biotechnological importance; however, due to seeds recalcitrance, its propagation is limited. Leite et al. [2] showed micropropagation technique could overcome the challenges posed by seeds recalcitrance. In addion, inoculation with plant growth-promoting bacterial consortium can promote acclimatization of micropropagated *P. gardeneriana* plantlets.

Al-Quraan et al. [3] discussed the effect of 1,2,3-Thiadiazole [1,3-Bis [4-(1,2,3-thiadiazol-4-yl) phenoxy] propane] on wheat growth and metabolism, including seed germination, seedlings' growth, oxidative damage, protein content, carbohydrate content, and GABA levels.

Garcia et al. [4] studied hydro-electrostatic hybrid priming in combination with other priming methods on germination of tomato seeds and demonstrated a potential synergism associated with the priming procedures, conferring fast germination of tomato seeds *via* hormone regulation and the reprogramming of gene expression.

Mehalainea and Chenchouni et al. [5] reported the production of medicinal plant materials through biotechnological approaches, especially macro-propagation, and micro-propagation of the mint family Lamiaceae (*Thymus algeriensis, Rosmarinus officinalis, Marrubium vulgare*, and *Salvia officinalis*) widely distributed in Algeria and northern African countries. This is an important step to save medicinal plants from extinction and a sustainable way to meet the high demand for natural medicinal products.

Mahmud et al. [6] has reviewed the manipulation of rhizosphere microbiome for sustainable crop production. The authors discuss various novel and emerging strategies involving indigenous microbiota and engineered microbiota for improving the rhizosphere of crop plants.

Jamla et al. [7] reviewed the current knowledge on plants' response to heavy metals such as Cd, As, Al, Hg, and Pb in the light of recent high-throughput genome, transcriptome, metabolome data.

Pythium myriotylum causes soft rot in a zinger (*Zingiber officinale*Rosc). Jimtha et al. [8] studied the role of a rhizospheric probiotic *Bacillus sp*. for its antifungal activity against *P. myriotylum*.

Finally, we have a tribute to Dr. Nick Lauter (December 13, 1972 – January 7, 2021) by Yandeau-Nelson and Wisser [9]. Dr. Lauter was a USDA-ARS Plant Geneticist, a faculty member in the Department of Plant Pathology and Microbiology at Iowa State University. His research on plant sciences impacted millions of farmers and researchers globally.

This regular volume includes two articles [7,9] from virtual *SI: Understanding plant's response to global climate change using Omics,* and one article [6] is from virtual *SI: Plant Microbiota*.

References

[1] A. Hernandez-Soto, F. Echeverría-Beirute, A. Abdelnour-Esquivel, M. Valdez-Melara, J. Boch, A. Gatica-Arias, Rice breeding in the new era: comparison of useful agronomic traits, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100211.

[2] M.S. Leite, T.E.F. Pinto, A.R. Centofante, A.R. Neto, F.G. Silva, P.J.R.G. Selari, P. F. Martins, Acclimatization of Pouteria gardeneriana Radlk micropropagated plantlets: role of in vitro rooting and plant growth–promoting bacteria, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100209.

[3] N.A. AL-Quraan, S.M. Saabi, M.L. Al-Smadi, Physiological and biochemical effect of synthetic 1,2,3-thiadiazole [1,3-bis [4-(1,2,3-thiadiazol-4-yl) phenoxy] propane] on wheat (*Triticum durum* L.) seedlings growth and metabolism, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100212.

[4] D. Garcia, Y. Zhao, S. Zhao, L.C. Ming, D. Huang, Hydroelectrostatic hybrid priming stimulates germination performance via ABA and GA regulation: new promising evidence for tomato gene expression, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100215.

[5] S. Mehalainea, H. Chenchouni, New insights for the production of medicinal plant materials: *ex vitro* and *in vitro* propagation of valuable Lamiaceae species from northern Africa, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100216.

[6] K. Mahmud, A. Missaoui, K. Lee, B. Ghimire, H.W. Presley, S. Makaju, Rhizosphere microbiome manipulation for sustainable crop production, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100210.

[7] M. Jamla, T. Khare, S. Joshi, S. Patil, S. Penna, V. Kumar, Omics approaches for understanding heavy metal responses and tolerance in plants, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100213.

[8] John C. Jimtha, G.E. Mallikarjunaswamy, Noushad Najiya, Probiotic Rhizospheric Bacillus sp. from *Zingiber officinale* Rosc. displays antifungal activity against soft rot pathogen *Pythium* sp, Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100217.

[9] M.D. Yandeau-Nelson, R.J. Wisser, Remembering Dr. Nick Lauter (December 13, 1972 – January 7, 2021) (8), Curr. Plant Biol. 27 (2021), https://doi.org/10.1016/j.cpb.2021.100214.

Sushma Naithani[a,*], Dhirendra Kumar[b], Jaindra Nath Tripathi[c]

[a] *Department of Botany and Plant Pathology, Oregon State University, Corvallis, OR, USA*

https://doi.org/10.1016/j.cpb.2021.100218

Available online 28 July 2021

[b] *Department of Biological Sciences, East Tennessee State University, Johnson City, TN 37614-1700, USA*
[c] *International Institute of Tropical Agriculture (IITA), PO Box 30709-00100, Old Naivasha Road, Nairobi, Kenya*

[*] Corresponding author at: Department of Botany and Plant Pathology, Oregon State University, Corvallis, OR, USA.
E-mail addresses: sushma.naithani@oregonstate.edu (S. Naithani), kumard@etsu.edu (D. Kumar), j.tripathi@cgiar.org (J.N. Tripathi).