



Emerging Research Areas in Plant Physiology and Pathology

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Introduction

Plant physiology deals with the biophysical and biochemical processes that form the basis for the cellular, subcellular and molecular level of interactions, respiration, photosynthesis, transport of nutrients & solutes, plant growth, differentiation, reproduction, seed dormancy, etc. Plant physiology is a rapidly evolving science with new observations being reported almost every month. The concepts in plant science are being refined with innovations and multi-disciplinary studies. Recently there is a greater emphasis on converting C3 plants into C4 for increasing their photosynthetic output. A great deal of research is taking place for introducing nitrogen-fixing genes into plants for addressing low levels of soil fertility as well as on plant nutrition, abiotic and biotic stress resistance, water regimen, fertilization, plant ecology, and irrigation. There has been growing evidence refining the principles and concepts about cell growth, water relations, membrane channels, active transport mechanisms, bioenergetics of mitochondria & chloroplasts, ion transport, chemical potential gradients, energy conversions, carbon dioxide utilization, and plant atmosphere interactions, production of secondary metabolite, medicinal compounds, etc. Consequently, there is a need for rapid communication in this field of plant science for translation of the new findings, novel insights, and interpretations into agricultural and horticultural productivity and in tune with the latest demands of agricultural practices and education.

Journal of plant physiology and pathology is one of the leading and authoritative publication platforms for rapid communication of scientific findings in plant science. The journal aims to convey the scientific knowledge to the readers in an authentic manner and make it freely accessible to aspiring plant science scholars and focuses on the in-depth analysis of a wide range of topics in plant physiology and pathology. The journal highlights the recent findings in photosynthesis, respiration, as well as nitrogen metabolism that are important and fundamental for sustainable crop productivity and food security, particularly under climate change conditions. The journal also deals with molecular aspects of stress physiology.

Plant pathology deals with the study of pathogenic microorganisms that hinder the normal metabolism of the plants. This is a wide subject in plant science that covers specific topics like disease etiology, pathogenesis, integrated pest management, morphological & physiological analyses and diagnosis, molecular studies, and genetic studies. Pathogenesis in plants can affect water uptake, mineral & solute transportation, flowering, photosynthesis, respiration, and fruiting. Some of the recent challenges in plant pathology include

climate change, pesticide resistance, pathogenic mutations, abiotic and biotic stress. Disease-affected crops lead to significantly reduced plant production and productivity and consequently, the farmers incur heavy loss. Particularly, in countries that are dependent on agriculture and horticulture, plant diseases can even lead to famines. Plant pathology is an important topic of research since plant diseases whether biotic or abiotic, have the potential to shake the economy of the countries if they are not managed well. Prevention, treatment, and management of plant diseases is still a daunting task for several stakeholders of agriculture. There has been great progress in research in plant pathology such as the use of micro RNA, epigenetics, and nanotechnology and these advancements are revolutionizing the diagnosis and treatment of plant diseases. Recent research activities in plant pathology emphasize the molecular biology of the plant-pathogen interactions, defense mechanisms of the host, selection of resistant plants in vitro conditions, and genetic engineering for incorporation of disease resistance genes sourced from different or same species.

Journal of Plant Physiology and Pathology provides comprehensive coverage of all aspect of plant diseases, including pathogens, plant-pathogen interactions, disease management, nomenclature & classification of bacterial pathogens, a listing of fungal pathogens, viral pathogens, phytoplasmas and spiroplasmas, disease assessment, remote sensing, parasitic protozoa, green algae, nematodes, parasitic higher plants; protection of biodiversity, and the environment. The journal promotes science that describes the nature of the problem, the mechanisms behind it, the kinds of organisms that cause disease, the fundamental biology of plant-microbe interactions, and the approaches used to control and manage the disease. process of disease infection, cell-to-cell recognition, as well as new plant breeding strategies for the development of resistant cultivars.

The journal covers all the major diseases of crop plants of tropics, semi-tropics, and temperate regions and furnishes the latest updates on crop loss assessment by imaging & satellite mapping, mycorrhiza, seed viability tests, fungicides, pesticides, molecular diagnostics, bactericides, viricides as well as marker-assisted breeding for developing resistant varieties. Students, university faculty, public & private sector research scientists, agriculture extension service professionals, plant pathologists, mycologists, bacteriologists, virologists, botanists, and plant breeders benefit from the research publications of the journal immensely. The most valued authors of the journal provide expert and seamless analysis and interpretation of emerging challenges in plant pathology.

The journal is also formulating special issues focusing on important and major economic disease-causing pathogenic organisms that are infecting several crops and ornamental plants, including a dedicated issue on horticultural crops. Recently, the journal has published several peer-reviewed research articles on the effects of fluoridated water on *Abelmoschus esculentus*, antioxidant and phytochemical response of watermelon to lead toxicity and determination of nitrogen fixation in soybean using positron-emitting tracer imaging. [1] studied fluoride accumulation in different parts of *Abelmoschus esculentus* and its effect on growth and crop yield. The results showed the roots accumulated more fluoride than the leaf or fruit. [2] studied

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the physiological changes in terms of photosynthetic and antioxidant activity in watermelon cultivar as induced by lead toxicity and found that certain varieties were more tolerant than others [3] has found that the nitrogen-fixing ability of the soybean nodules in the rhizosphere was depressed by low oxygen concentrations and the export of the fixed nitrogen from nodules was found to be enhanced. These articles contribute immensely to the existing knowledge base of plant pathology and physiology.

References

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3. Hung NVP (2021) Evaluate the effects of the low partial pressure of O₂ on nitrogen fixation in soybean using a positron-emitting tracer imaging system. *J Plant Physiol Pathol* 9:3.

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[Top](#)