Grass
Research

EDITORIAL

https://doi.org/10.48130/GR-2021-0001
Grass Research **2021**, 1: 1

Grass Research for a Productive, Healthy and Sustainable Society

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The grass family (Poaceae and Gramineae) is comprised of over 11,500 species classified in 12 subfamilies, 52 tribes, 90 subtribes, and more than 768 genera, making this family the third most abundant flowering plant in number of genera[1]. Grass species, besides cereal grasses as food crops, are economically, environmentally, ecologically, recreationally, and aesthetically important in a wide range of applications including, but not limited to, cultivated grasses for turfgrass, forage, pasture, ornamental landscape, biofuel feedstocks, and wild grasses in natural grassland, woodlands, and deserts. The non-food grass species touch everyone's lives directly and indirectly by serving multiple functions and benefits to humankind and society, such as beautifying landscapes, protecting the environment, enhancing human physical health, improving human recreational activities, providing feed for livestock and wildlife, serving as an alternative source of energy for bioenergy feedstock, and providing a natural habitat for wildlife[2,3,4,5,6].

Grasses exhibit a variety of breeding mechanisms, including cross-pollination, self-pollination, cloning, apomixes, and hybridisation between species, which contributes to wide genetic diversity and enables grasses to adapt to a wide range of climate conditions. Grass species are classified into cool-season (Pooideae) grasses and warm-season grasses (Aristidoideae, Arundinoideae, Micrairoideae, Danthonioideae, Chloridoideae, Panicoideae). Cool-season grasses utilize the C3 photosynthetic pathway, predominately inhabiting temperate climates, while warm-season grasses utilize the C4 photosynthetic pathway, predominately growing in warm and dry climates[3].

Grass species consist of both annuals that complete their life cycle annually and perennials that have a life cycle lasting more than two years. Grasses may produce seeds and/or propagate vegetatively by lateral shoots (tillers) and creeping stems (stolons and rhizomes). The regenerative ability of tillers from the crowns and daughter plants from stolons and rhizomes enables grass plants to withstand mowing, grazing, and fire, as well as recover from environmental stresses, weather damages, and other various adverse conditions that may be lethal to other plant species. In addition, grass species may form symbiosis with microorganisms, which also facilitate their growth and adaptation to adverse environmental conditions, such as nutrient and water deficit soils, and enhance biodiversity in cultivated or natural ecosystems.

The wide diversity of genetics, growth/development characteristics, functionality, and adaptability of grass species in various applications offers both challenges and opportunities for research discovery to continue to improve plant productivity, environment sustainability, and quality-of-life for humans. Scientific research with grass species has made great discovery in addressing the basic mechanisms for controlling growth and development, responses to abiotic and biotic stress, responses to the natural environments, responses to cultural practices or management regimes, and interaction with other organisms. In order for grass research to move significantly forward in discovering novel information on how grass plants grow and function in diverse applications in ever-changing environments, particularly dealing with future global climate changes, technological development and application of the most advanced technologies available in plant biology become critically important.

There's no better time than now to launch the new fully open-access journal, *Grass Research*, as a unique outlet for advancing and disseminating research discovery and serving the broader international scientific community of grass biologists. The *Grass Research* journal is devoted to publishing original research and reviewing perspectives focused on grass species in the Poaceae or Gramineae family in a wide range of applications including, but not limited to, turfgrass, forage, pasture, ornamental landscape, biofuel feedstocks, and natural grassland. *Grass Research* publishes research primarily focused on mechanistic aspects of grass biology with broad international and disciplinary interests. Research papers and review articles published by *Grass Research* represent significant advances in the mechanistic understanding of genetic, genomic, molecular, cellular, biochemical, and physiological processes and pathways involved in grass plant growth and development, as well as interactions with the environment, other organisms, and culture management practices. Original research and review articles will also cover the topics of development and application of new emerging methodology and technology in plant biology, such as gene editing, "Omics", non-invasive imaging, remote sensing, and artificial intelligence or machine learning technologies. *Grass Research* also publishes Editorials and Perspectives for expressing an opinion on a specific issue or novel insights about existing research on a particular topic.

The *Grass Research* team invites all scientists in the grass biology research community worldwide to join the editorial board of well-known experts with the shared goal of building this high-standard journal specifically dedicated to grass biology and to contribute research or review articles in the topic areas within the scope of this new journal.

Conflict of interest

The author declares that there is no conflict of interest.

Dates

Received 8 January 2021; Accepted 9 January 2021; Published online 26 January 2021

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