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Editorial

Plant Science in a Challenging World

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A grand challenge, it would seem, has to be grand, i.e., large and impressive in size, scope, or extent. While each plant physiologist would likely come up with a list of challenges in their own area of work, to be truly grand these should span the entire discipline of plant physiology, and ideally have significant impact on both science and technology. The question then is what is the scope of "plant physiology?" Turns out there are numerous definitions in use. The Journal of Plant Genetics and Breeding considers it to encompass the "nature of functioning of an organism" studied at various levels of complexity and embracing the full range of technologies from cell biology to systems biology. Likewise, the journal with this name considers it to include broad aspects of plant biology, including an "understanding of the plant as a whole organism and its interactions with symbionts, pathogens and pests, and the environment," and employing disciplines ranging from cell and molecular biology, biochemistry, and biophysics to genetics and physiology. These are consonant with my definition of plant physiology

So how can plant physiology research help achieve the grand challenge? Taking a fairly restrictive view of what constitutes physiology research, we might consider each of the three traditional areas of physiology research: (i) metabolism (including nutrition); (ii) growth and development (vegetative and reproductive); and (iii) response to the environment. Each of these is an area of active work where breakthroughs could result in progress toward societal needs, and a partial list (and admittedly biased) of specific challenges and opportunities is highlighted below.

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