

USDA-CSREES Stakeholders Workshop for Plant and Pest Biology
ASA/CSSA/SSSA Recommended Research Priorities
Presented by Dr. Mark Westgate, November 20, 2007

The primary missions of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA/CSSA/SSSA) are to promote effective research and teaching, foster high educational standards, disseminate agronomic, crop, and soil sciences information, encourage professional growth, and to interact with organizations sharing similar goals. With 11,353 members, ASA/CSSA/SSSA are the largest life science professional societies in the United States dedicated to the agronomic, crop and soil sciences. The programs and activities of ASA/CSSA/SSSA are tailored not only to our members' interests and scientific advancement, but also serve the public interest. ASA/CSSA/SSSA publishes six peer-reviewed journals in which over 1100 scientific articles are published yearly.

Recommended Research Priorities from ASA/CSSA/SSSA:

Interdisciplinary Research on New Bioenergy Crops: A major program devoted to new energy crop development is fundamental to the long-term success of the bio-economy. Greater federal investment is needed to develop alternative plant species capable of producing greater biomass yields with desirable biomass traits to develop cultivars of alternative species through genomics and plant breeding approaches and to develop new crop management systems for producing new crops dedicated to bioenergy. Acquiring the new knowledge needed to address these critical areas and effective deployment of this knowledge requires both interdisciplinary and systems level approaches for research and technology transfer. Funding interdisciplinary teams for a 5-year period would be far more effective than funding smaller groups for 2-3 years. Success in this area also requires significant new resource, above current investments in new crop development, plant breeding, crop management and associated disciplines. Integrative long-term research approaches provide a more effective mechanism for ensuring US citizens and policy makers are prepared for global climate change, recovery from natural disasters, and the risks of bioterrorism.

Integrative-Functional Genomics Research: Recent advances in the DNA and RNA sequencing technologies are making it possible to sequence whole genomes of higher plants. Coordinated by DOE's Joint Genome Initiative (JGI) Community Sequencing Program, the scientific community now has completed, or will soon have available, whole genome sequences for a number of major agricultural crops (e.g. maize, soybean, sorghum, millet, cotton, cassava), as well as several model species. New sequencing technologies also have made it possible to quantify the activity of regulatory genes and small RNAs expressed at very low levels. These remarkable developments, coupled with rapid strides in structural genomics, will enable research programs aimed at understanding and altering the complex biochemical and developmental processes underlying traits of economic value in our important agricultural plant species. Funding is needed on several fronts to achieve this goal: continued support is needed for development and utilization of genomics databases for the major crops; support is needed for integrated programs on functional genomics of complex traits; and it is critical to provide increased support for training the next generation of scientist capable of integrating fundamental new knowledge about plants at the genome level with applied research needs at the systems level. This is particularly important for training the next generation of plant breeders and physiologists.

Integrative Research and Training for Crop Improvement: Plant breeding provides the genetic resources and diversity, for agricultural plant production, needed to address future environmental pressures associated with climate change, increasing food demand, and a diminishing land resource base. Educational activities in plant breeding that focus on developing new varieties for biomass/bioenergy production and integrate functional genomics approaches for crop improvement are desperately needed. To meet this immediate need, the NRI commitment to the Plant Biology (E) – Plant Breeding and Education program (\$1.35Mil) should be increased to be on par with other NRI-Plant Biology programs focused on more basic research. To meet national level funding needs, training programs should capitalize on successful distance learning strategies that utilize digital technologies to complement classical training methods.



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