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American Society of Plant Biologists

Cultivating a better future through plant biology research

Official Written Testimony in Support of the Department of Energy's Office of Science Fiscal Year 2017 Budget

Submitted to the Subcommittee on Energy and Water Development

Committee on Appropriations

United States House of Representatives

Submitted by

American Society of Plant Biologists

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On behalf of the American Society of Plant Biologists (ASPB), we submit this written testimony to support the fiscal year (FY) 2017 requested level of \$5.672 billion for the Department of Energy's (DOE) Office of Science. ASPB supports the FY 2017 request for the Office of **Basic Energy Sciences at \$1.936 billion** and the Office of **Biological and Environmental Research at \$661.9 million**. The testimony highlights the importance of biology—particularly plant biology, which is a major backbone for enhanced bioenergy production—as the nation seeks to address energy security and other vital issues.

ASPB recognizes the difficult fiscal environment our nation faces but believes investments in scientific research will be a critical step toward economic recovery. We would also like to thank the Subcommittee for its consideration of this testimony and for its support for the basic research mission of the DOE Office of Science.

ASPB is an organization of professional plant biology researchers, educators, graduate students, and postdoctoral scientists with members across the nation and throughout the world. A strong voice for the global plant science community, our mission—achieved through work in the realms of research, education, and public policy—is to promote the growth and development of plant biology, to encourage and communicate research in plant biology, and to promote the interests and growth of plant scientists in general.

Fuel, Food, Environment, and Health: Plant Biology Research and America's Future

Plants are vital to our very existence. They harvest sunlight, converting it to chemical energy for food and feed; they take up carbon dioxide and produce oxygen; and they are the primary producers on which most life depends. Indeed, plant biology research is making many fundamental contributions in the areas of domestic fuel security and environmental stewardship;

the continued and sustainable development of better fuels, foods, fabrics, pharmaceuticals, and building materials; and in the understanding of basic biological principles that underpin improvements in plant growth and home-grown energy sources for all Americans.

In particular, plant biology is at the center of numerous scientific breakthroughs in the increasingly interdisciplinary world of alternative energy research. For example, discoveries will enable energy crops that are more drought and pest tolerant, thereby greatly boosting yields. Bioenergy research encompasses fundamental and applied plant biology, engineering, chemistry, and physics, representing critical frontiers in both basic biofuels research and bioenergy production. Similarly, with the increase in plant genome sequencing and functional genomics, the interface of plant biology and computer science has become essential to our understanding of complex biological systems, ranging from single cells to entire ecosystems. This research is critical for our future in bioenergy production.

Despite the fact that foundational and mission-oriented plant biology research—the kind of research DOE funds—underpins vital advances in practical applications in energy, health, and the environment, plant scientists have had to maximize and leverage modest federal funding in order to understand the basic function and mechanisms of plants. A strong investment in plant biology research is important considering the significant positive impact crop plants have on the nation’s economy and in addressing some of our most urgent challenges like energy and food security.

In order to address these future challenges, ASPB organized a two-phase Plant Science Research Summit with support and funding from DOE, the National Science Foundation, the U.S. Department of Agriculture, and the Howard Hughes Medical Institute. The Summit brought together representatives from across the full spectrum of plant science research to develop a research agenda and resulted in a report—*Unleashing a Decade of Innovation in Plant Science: A Vision for 2015-2025* (plantsummit.files.wordpress.com/2013/07/plantsciencedecadalvision10-18-13.pdf). The report, part of an ongoing and iterative process, puts forth a ten-year consensus plan to fill critical gaps in our understanding of plant biology and address the grand challenges we face. As a research community, our vision is to create plant systems that are flexible and adaptable to new and existing challenges by increasing the predictive and synthetic abilities of plant biology. In achieving these goals, the plant science research community will make significant contributions to:

- Exploring, conserving, and utilizing our natural resources;
- Protecting, maintaining, and improving energy crop productivity; and
- Creating new plant-inspired industries.

DOE Recommendations

Because the ASPB membership has extensive expertise and participation in the academic, industry and government sectors, ASPB is in an excellent position to articulate the nation’s plant science priorities as they relate to fundamental plant biology and, specifically, with regard to recommendations for bioenergy research funding through DOE’s Office of Science.

Within the Office of Science, the programs in Biological and Environmental Research (BER) and Basic Energy Sciences (BES) are crucial to understanding how basic biological processes work. Within BER, ASPB supports the many plant science programs, including the proposed funding increases for Plant Genomes for Bioenergy Research. For this reason, ASPB supports the Administration's FY 2017 request for the Office of Basic Energy Sciences and the Office of Biological and Environmental Research. Sustained funding for these programs is vital as the discoveries made in these areas will ultimately be the foundation for the next fuels and technologies we use in our daily lives.

In addition:

- We commend the DOE Office of Science, through its programs in BES and BER, for funding the Bioenergy Research Centers and the Energy Frontier Research Centers. These centers provide a model for collective science innovation that complements DOE's essential investment in individual investigator and small group science. ***ASPB strongly encourages additional funding for the DOE Office of Science that would specifically target funding at individual or small-group grants for bioenergy and plant growth research.***
- Considerable research interest is now focused on the processing of plant biomass for energy production. Fundamental discoveries of the genes that control plant growth and enable plant growth in response to stresses, including drought, are needed to secure our energy future. If biomass crops, including woody plants, are to be used to their full potential, extensive effort must be expended to improve our understanding of their basic biology and development, as well as their agronomic performance and conversion efficiency in processing to fuels and high-value co-products. ***Therefore, ASPB calls for DOE to support research targeted at efforts to increase the utility and agronomic performance of bioenergy feedstocks both in the field and for their end users in the bioeconomy.***

Thank you for your consideration of our testimony on behalf of the American Society of Plant Biologists. For more information about the American Society of Plant Biologists, please see www.aspbo.org.