

American Society for Horticultural Science

Comments Regarding Stakeholder Priorities for Plant and Pest Biology Research

Continued funding for horticultural research through the USDA-CSREES National Research Initiative is crucial for the advance of horticultural science, which in turn will have important benefits for country's horticultural industry. Fruits and vegetables are increasingly recognized as crucial components of healthy diets, while ornamental horticulture (landscape, greenhouses, and nurseries) is one of the fastest growing areas of agriculture and contributes to the well-being of the American people and beauty of our landscapes. Since many horticultural firms are small, locally-owned, and create many local jobs their success has a direct impact on their local community. Thus a strong horticultural industry contributes significantly to maintaining and improving the sustainability of rural communities and the livability of American cities.

Based on feedback from its members, ASHS has identified priorities for horticultural research. They are presented below in relation to the strategic goals of CSREES.

1. Enhance International Competitiveness of American Agriculture

- Optimizing high-input systems such as protected environments/greenhouses. Many high value horticultural crops will increasingly be produced under high controlled environmental conditions, either in 'plant factories' or greenhouses. Such production systems require high inputs, but are potentially highly profitable.
- Environmental control of valuable traits. Manipulation of environmental factors may be an effective method to improve the value of horticultural crops, for example by increasing their phytonutrient content.
- Allocation within the plant to harvestable parts. Breeding efforts have resulted in much of the yield increases during the last 30-40 years. Not all horticultural crops have benefited equally. For many crops further yield increases may be possible.

2. Enhance the Competitiveness and Sustainability of Rural and Farm Economies

- Decrease production costs through improved efficiency of input utilization (water, fertilizer, energy, etc.). Many inputs used for agricultural production are becoming increasingly expensive, which has negatively impacted farm income.
- Reducing production costs by increasing productivity of labor. Horticultural production is generally labor-intensive and it is increasingly difficult to find the required labor. At the same time, labor costs are increasing.

3. Increased Economic Opportunities and Improved Quality of Life in Rural America

- Rural area revitalization. Many horticultural producers are relatively small and locally owned. Research aimed specifically at the economic success of small producer will directly impact rural communities.
- Value-added products. The value of many horticultural products can be enhanced through post-production processing. This can open new markets for many producers and increase their profit margin.
- Market-driven research and development of new crops and products. Careful market analyses can identify opportunities for new profitable crops and value-added products.

4. Enhance Protection and Safety of the Nation's Agriculture and Food Supply

- Invasive species. Invasive species, either plants pests or pathogens pose a serious risk to agriculture. Continued research is needed to reduce the risk of invasive

species being introduced, as well to develop measures to deal with invasives that are introduced.

- Post-harvest handling. Post-harvest handling of fruits, vegetables, and nuts greatly affects their quality and can potentially lead to contamination with or spread of human pathogens. Improved post-harvest practices that maintain product quality and decrease the risks associated with human pathogens are needed.

5. *Improve the Nation's Nutrition and Health*

- Optimization of bioactive/nutraceutical components and sensory components. Horticultural crops, like fruits and vegetables are crucial in a healthy diet. There may be more opportunities to enhance the quality of many horticultural crops by increasing the content of bioactive components.
- Psychological/social benefits of people/plant interactions. The effects of plants on human well-being are well documented. Nonetheless, this field of science gets little respect, slowing down progress in this area.

6. *Protect and Enhance the Nation's Natural Resource Base and Environment*

- Environmentally sensitive approaches, including organic. Better production guidelines that optimize profits while minimizing the environmental impact and use of natural resources are direly needed.
- Improving and implementing best management practices. Integrated BMPs that provide guidelines for production, as well as pest and disease management can reduce the environmental impact and assure that natural resources are used efficiently.
- Efficiency of uptake and utilization of water, nutrients and other production inputs. Basic and applied research can improve our understanding of how crops utilize various inputs, leading to more efficient production practices.

In addition to the above research topics, ASHS recommends the following general approaches to CSREES funding:

- Application of model systems knowledge to applied agricultural problems
- Improve affordable access to biotechnology and other expensive approaches to solving applied agricultural problems
- Increased emphasis on practical applications of research, for example through more integrated programs and/or by requiring practical applications for basic research
- Increased emphasis on regional research projects, that are multidisciplinary and cropping systems-oriented, as well as strategic planning for multi-state coordination & goal-setting, leading to regional sustainability
- Computer-assisted/high tech approaches in horticulture
- Specialty crop funding should reflect its economic importance

Equally important as the research initiatives themselves are the role they play in determining the balance of disciplinary expertise in horticulture departments. Many departments have hired faculty trained in the genomics, molecular biology and related sciences to pursue competitive grants. This has resulted in a decrease in faculty members who are highly qualified to teach applied undergraduate horticulture courses. This issue is a national problem that is becoming progressively worse and must be addressed. A stronger emphasis of CSREES-funded research on real-world applications would encourage agriculture colleges to hire more applied scientists, in turn would strengthening horticultural teaching programs. The same likely is true in most other agricultural sciences.