Colloquium Papers and Authors

Presiding: S.L. Kitto

The Impact of Biotechnology on the Environment: Introduction to the Colloquium

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Biotechnology and the Environment: Challenges and Opportunities

Kathleen M. Vickers and Peggy G. Lemaux

The Identification and Development of Proteins for Control of Insects in Genetically Modified Crops

David R. Corbin, John T. Greenplate, and John P. Purcell

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Denise M. Seliskar

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Jeffrey S. Karns, Cathleen J. Hapeman, Walter W. Mulbry, Elmer H. Ahrens, and Daniel R. Shelton

The Impact of Biotechnology on the Environment: Introduction to the Colloquium

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There is no doubt that biotechnology is here to stay, regardless of social resistance (Krimsky and Wrubel, 1996). While there are some who are against everything biotechnology represents, is the picture all doom and gloom or is there a rosier, more positive view? What about those adamant supporters who view biotechnology as the ultimate, environmentally friendly tool? It is clear, whether pro or con, the public wants a voice in decisions concerning biotechnology.

Over the past few years, concerns associated with the uncertainty and the potential harm of biotechnological products and their impact on the environment have been voiced. While the detractors have presented much verbiage "proving" that there will be a negative impact, the available opposing rhetoric fails to wholly clear-up the issues making it truly difficult to assess the overall effect biotechnology will have on the environment. Based on the power inherent to the field of

biotechnology, specifically in molecular biology with its ability to create organisms having novel attributes, it seems highly likely that biotechnology will have a number of positive impacts on the environment. Surely, one of the benefits of biotechnology is the ability to produce environmentally friendlier plants; however, the long-term effects on the environment due to the release of genes are not known. Will farmers use more or less herbicide when growing herbicide-resistant transgenic crops? Will transgenes escape into the environment and will they be harmful? Will antibiotic resistance be transferred to human gut bacteria? Will insects develop resistance to pesticides due to increased exposure to transgene products? Are environmental impacts necessarily negative because they are derived via biotechnology? Are any or all of these concerns real? Issues and questions of this magnitude will not be resolved via verbal intercourse but will require testing in the real world.

In light of the conflicting views surrounding these questions as they relate to biotechnology and the environment, this colloquium was developed to provide an overview of the topic and review the research in four areas that address environmental challenges using biotechnological tools. The Plant Biotechnology Working Group was interested in bringing together a diverse field of scientists, albeit a small group, who work in fields outside the discipline of horticulture to provide an update and an opportunity for discussion on the impacts of biotechnology on the environment, with special emphasis in the areas of soil and water remediation, insect control, and ecological restoration.

Literature Cited

- Krimsky, S. and R. Wrubel. 1996. *Agricultural biotechnology and the environment: Science, policy, and social issues*. University of Illinois Press, Urbana and Chicago

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