NABC news

Fall 2004 no. 29

Providing an open forum for exploring issues in agricultural biotechnology

NABC'S PRINCIPAL OBJECTIVES ARE TO:

- *provide an open forum for persons with different interests and concerns to come together to speak, to listen, to learn, and to participate in meaningful dialogue and evaluation of the potential impacts of agricultural biotechnology*
- *define issues and public policy options related to biotechnology in the food, agricultural, biobased industrial product, and environmental areas*
- *promote increased understanding of the scientific, economic, legislative, and social issues associated with agricultural biotechnology by compiling and disseminating information to interested people*
- *facilitate active communication among researchers, administrators, policymakers, practitioners, and other concerned people to ensure that all viewpoints contribute to the safe, efficacious, and equitable development of biotechnology for the benefit of society*
- *sponsor meetings and workshops and publish and distribute reports that provide a foundation for addressing issues.*

Ralph W.F. Hardy, President
Allan Eaglesham, Executive Director
Susanne Lipari, Executive Coordinator
Boyce Thompson Institute, Room 419
Tower Road
Ithaca, New York 14853
phone: 607-254-4856 fax: 607-254-1242
nabc@cornell.edu
http://www.cals.cornell.edu/extension/nabc

Letter from the Chair . . .

It is an honor to serve as chair of NABC. I am an animal scientist by training, and as an experiment station administrator at Mississippi State University and the University of Kentucky, I have participated in NABC activities since 1996. This has been extremely valuable in my education on both scientific and public-policy issues surrounding agricultural biotechnology.

NABC has held sixteen annual meetings, and has published proceedings volumes on timely topics; as subject matter has evolved, so have the services provided by NABC, which have remained commendably relevant through these 16 years. NABC continues to objectively serve scientific needs and has become a resource for academicians, regulators, policymakers, and industrial and not-for-profit organizations.

NABC conference topics have ranged from public good associated with agricultural biotechnology, agricultural sustainability, food safety, the regulatory environment, consumer issues, health, and industry structure and international issues. Although all of the conferences have had impacts, several recent meetings have heralded changes in scientific progress or stimulated new ways of thinking about agriculture.

For example, NABC 12, *The Biobased Economy of the 21st Century: Agriculture Expanding into Health, Energy, Chemicals, and Materials*, captured the array of science and policy issues surrounding non-food aspects of agriculture. This conference topic was an outgrowth of the NABC occasional paper produced in 1998, *Vision for Agricultural Research and Development in the 21st Century*, which recognized that agriculture in this century will expand beyond food, feed, and fiber into an emerging era of biobased industrial products. In this vision, agricultural R&D was recognized as the driving force for this new economy. These collective activities resulted in NABC being asked to take a leadership role in organizing the April 2004 First World Congress on Industrial Biotechnology and Bioprocessing, in partnership with the Biotechnology Industry Organization (BIO), and the American Chemical Society.

Nancy Cox
NABC Chair, 2004-2005

NABC 14, *Foods for Health: Integrating Agriculture, Medicine and Food for Future Health*, impacted the national research agenda by emphasizing that stronger links are needed between food and health research. The conference organizers at the University of Minnesota subsequently participated in forums organized by the American Association for the Advancement of Science and the National Academy of Sciences as well as continuing discussions with federal funding agencies to address these needed multidisciplinary links.

Of value to NABC members are the council meetings at which interaction with representatives from such organizations as the Center for Science in the Public Interest, the Grocery

continued on page 7

Highlights of NABC 16

Agricultural Biotechnology: Finding Common International Goals

Alan Wildeman
University of Guelph, Canada

Agriculture is one of the central and universal human activities, and every person on the planet is a stakeholder in it. Along with the food and fiber and other products it yields, it is intimately entwined with nutrition and livelihoods, with changes to the environment, with global markets and with human emotions. NABC's sixteenth annual meeting at the University of Guelph provided a unique forum—of world leaders, students, farmers, scientists, administrators, *etc*.—for the examination of agricultural biotechnology's place within this global context.

Agriculture has had a long history of innovation and adaptation as new ideas and practices, and new technologies, emerged. One need only look at the tractor as a not-too-distant example of how technology radically altered food production throughout much of the world. More recently, agricultural biotechnology has emerged as a new engine of change in farming. Through directed genetic alterations, crops have been given new traits that enhance their resistance to insect pests, that permit more targeted and safer control of weeds, and that eventually will improve their nutritional value or their value as industrial feedstocks. But like every new technology, it is being viewed from the perspective of how it will affect the fundamental activity that, for centuries, humans have depended upon.

NABC 16 focused on how agricultural biotechnology is being used—and may be further developed—to address three goals that are common to all countries. These are the ability of agricultural biotechnology to address issues of the environment and minimize the ecological footprint of people on the planet, to address the quality of life for all people including those who grow crops, and to address the need for safe and healthy food. Over 160 people from more than twenty countries attended, and throughout the meeting there was a strong emphasis on keeping the discussion focused on broad global perspectives.

The opening keynote session provided a broad overview of perspectives from different parts of the world. Kanayo Nwanze from the Ivory Coast, Neal van Alfen from California and M.S. Swaminathan from India spoke about the extent to which biotechnology is now being used in agriculture worldwide. Each highlighted the importance of local and national communities and farmer participation in new technology development and implementation. Whether in the most technologically sophisticated systems or in the most rural and traditional settings, they spoke of the importance of local know-how in achieving adequate nutrition and improved livelihoods, social and economic stability, and minimal environmental impacts.

The three subsequent sessions dealt with goals that are common to all countries. In the session on the ecological footprint, William Rees (Canada), Klaus Amman (Switzerland) and David Lavigne (Canada) discussed the complexities of estimating the impact of human activity on the planet, and highlighted not only the fragility of a global food system based on high-energy-input agriculture and the toll that self-interest exacts on the environment, but also the opportunity that might be realized by looking for new alternatives for food production. Tom Remington (Kenya), Ruth Chadwick (UK) and Joel Cohen (USA) spoke about agricultural biotechnology and the quality of life, drawing upon many examples of how the regulatory issues associated with biotechnology can both enhance and constrain adaptation of new technology.

In the final session on food, Edilberto Redona (Philippines), Florence Wambugu (Kenya) and Suzanne Harris (USA) discussed the many ways in which nutrition is inadequate for many people in the world, and suggested ways in which these challenges could be overcome and ways in which biotechnology could be of value. They highlighted the importance of combining biotechnology with traditional plant breeding for improving crop varieties, particularly since traditional approaches not only are scientifically tried and tested, but because they also benefit from local knowledge and cultural familiarity.

In a closing address at the final luncheon, Ron Herring (USA) provided an overview that picked up on many of the themes of the meeting, particularly on the importance of understanding cultural differences between countries, the attractiveness of biotechnology to farmers who see it giving them a competitive advantage, and the downsides of assuming that the North American approach to

continued on page 7

NABC 16: Workshop Proceedings

Summarized by*
Allan Eaglesham
NABC

In **Module I** of the conference, *Opening Global Dialogue*, keynote presentations were made by Kanayo Nwanze (Africa Rice Centre, Ivory Coast), Neal Van Alfen (University of California at Davis) and M.S. Swaminathan (M.S. Swaminathan Research Foundation, India). They described regional and global adoption of agricultural biotechnology and its potential to help increase food production. Although problems associated with agbiotech—scientific, cultural and regulatory—were highlighted, these world leaders were strongly optimistic regarding genetically engineered crops for each region of interest. These presentations provided the basis for subsequent discussions in three break-out workshop sessions that convened at the conclusion of plenary-session Modules II–IV.

In **Module II**, *Diminishing the Ecological Footprint*, William Rees (University of British Columbia)—who coined the term "ecological footprint"—Klaus Ammann (University of Bern, Switzerland), and David Lavigne (International Fund for Animal Welfare, Canada) examined the environmental impact of agriculture on global ecology and the degree to which biotechnology may help or hinder amelioration. Pessimistic views offered by Rees and Lavigne were countered by Ammann.

Module III comprised presentations by Tom Remington (Catholic Relief Services, East Africa), Ruth Chadwick (Lancaster University, UK) and Joel Cohen (International Food Policy Research Institute, Washington, DC) in which they addressed agbiotech's possible contributions to local, regional and global aspects of *Improving Quality of Life*. Remington, whose mandate area covers much of East Africa, suggested that policy issues rather than lack of technology are responsible for rural poverty. Chadwick stated that the extent to which agbiotech may improve food security does not settle the question of its relevance to quality of life; it is essential to move stakeholder involvement upstream in setting research priorities and fairly share benefits through appropriate infrastructure and ownership arrangements. Cohen examined the need for safety and risk assessments while taking into account the cost implications of precautionary systems that argue against biotech approaches.

In **Module IV**, Edilberto Redona (Philippine Rice Research Institute, Philippines), Florence Wambugu (Africa Harvest Biotech Foundation International, Kenya) and Suzanne Harris (International Life Sciences Institute, Washington, DC) focused on biotechnology's possible role in *Ensuring Safe and Healthy Food*. These speakers agreed that agricultural biotechnology offers significant potential to increase food availability and to enhance nutritional quality. Coupled with adequate public-health guidance on scientifically sound dietary patterns and other strategies, agbiotech has the potential to be a key tool in eliminating malnutrition.

Discussions in the workshop sessions followed the themes of the plenary-session modules. To help initiate exchanges, participants (assigned randomly to groups) were invited to address the questions below. Facilitators* guided the discussions towards developing policy recommendations.

- Diminishing the Ecological Footprint
  - —What priority should the environmental consequences of agricultural biotechnology be given?
  - —How and by whom should policies be set?
- Improving the Quality of Life
  - —To what extent might agricultural biotechnology affect quality of life by creating changes in the relationships that people have with food and the ways in which it is produced?
  - —What are the North-South implications for policy?
- Ensuring Safe and Healthy Food
  - —What must policy-makers do to ensure that agricultural biotechnology enhances access to safe and healthy food?

* This summary draws on verbal reports delivered at the end of the conference by facilitators David Castle, Stewart Hilts, Sally Humphries, Ricky Yada (all of the University of Guelph) and Tony Shelton (Cornell University). The workshop proceedings were recorded by Mei Bi, Janice DeMoor, and Carol Hannam (all of the University of Guelph), Sarah Bates (Cornell Univesity) and Allan Eaglesham (NABC). Fuller coverage of the break-out sessions will be provided in the NABC 16 proceedings volume.

Diminishing the Ecological Footprint

The consequences of biotechnology could be positive or negative for the ecological footprint. Positive effects include decreased chemical inputs, less soil erosion (insofar as agbiotech supports no-till practices) and opportunities for bio- or phyto-remediation. Also, there are possibilities of developing traits like salt tolerance and salt-accumulating ability. Feed-use efficiency may be improved in animals and fish. On the negative side, promotion and acceptance of agricultural biotechnology may result in increasing reliance on fewer species and fewer crop types, with more monoculture farming. The effects could be widespread particularly in combination with gene flow, including hybridization with wild relatives. A community-ecology question arises on scale effects of farm consolidation, which tends to go hand-in-hand with agbiotech: to what extent does farm size affect the ecological footprint? A case can be made that agbiotech has focused predominantly on profitability, begging a counterfactual question: what if focus had been on a different array of products targeted specifically toward ecological sustainability?

Adoption of an ecological paradigm—a systems-oriented approach—was recommended as a basic tenet. But, how and by whom should policies be set? The process should be consultative, including scientists, pro- and anti-biotech groups, and members of the public and industry. In Australia, the consultative process has not included economic-benefit analyses since industry representatives felt that government was not qualified to judge and the public was afraid that a technology with high economic benefits would be pushed through. The policy-making process should be science-based, and should include, from the outset, persons from developing countries in which impacts and potential trade disadvantages are likely to be greater.

Improving the Quality of Life

Again, the concern was raised that success of biotechnology in the South may lead to monoculture farming. In particular, as crop losses are minimized because of reduced risks from disease and insect predation, farmers are likely to reject species and varieties that have been used in the past, which will affect biodiversity. Planting of *Bt* cotton quickly expanded in the Punjab and Gujarat when its benefits became evident to farmers. Any perception of environmental risk did not impede this spread, nor did concerns about intellectual property rights. There is a need to be wary of the implications of the success of biotechnology.

Gender aspects of adoption of genetically engineered crops received significant attention. Introduction of crops that reduce labor demands—such as herbicide-tolerant varieties—is likely to have negative consequences for female field laborers. Also, as crops become commercially successful, control over them often passes from women to men, and women are disempowered as a consequence. Gender aspects of biotechnology need to be fully explored along with concerns about health and nutrition, all of which affect quality of life.

Food security, standard of living and quality of life are nested concepts, which relates to a point made by Ruth Chadwick: you cannot get to quality of life without considering antecedents that indicate a priority for action. First you need food security and then you can talk about quantitative and qualitative measures of standard of living and quality of life. These are underpinned by trust in regulatory systems. Food labeling is an issue in industrialized countries where people want to maintain particular cultural associations with what they eat or they just want to know what they are eating. They may not act any differently, or they may opt to avoid all genetically modified foods. In the developing-country context, the issue for improving quality of life is that agricultural biotechnology can lessen labor input. However, with fewer involved in farming, alternative gainful employment would need to be found. It cuts both ways.

It is hard to imagine how enabling technologies will be placed in the hands of the people who need them if there are trade subsidies in the form of research inputs that lead to intellectual property in developed countries and then trade barriers in the form of insurmountable licensing practices.

How are we to understand cross-country differences in acceptance and success of genetically engineered crops? It is likely that what makes agbiotech work is often due less to the technology itself than to the social conditions that must be in place for it to work.

The impact of agbiotech will depend considerably on the country; the higher on the socioeconomic ladder, the less is the potential for effect. In developing countries, subsistence farmers could benefit since they have limited access to pesticides and fertilizers.

Agricultural biotechnology is likely to significantly impact diets in terms of new functional foods and nutraceuticals. It could have considerable secondary impacts on agricultural intensification and soil fertility. Adoption of salinity-tolerant varieties would promote yields, but may perpetuate overuse of irrigation that contributes to soil salinity. Concern was expressed that agbiotech will contribute to increased farm size with negative social results from labor-displacement. Interactions between food and migration—internal and international—are complex: might biotechnology eventually have negative impacts?

Ensuring Safe and Healthy Food

The regulation of agri-business is important as is trust in regulators resulting from a positive regulatory influence. Setting up regulatory regimes in developing countries will

involve continuous evolution of context-relevant policies. Policies for monitoring the safety and healthfulness of food are not available "off the shelf." While international harmonization of standards may be required, there is also need for contact-sensitivity that is appropriate to the place in which a technology will be applied.

Science education and communication are important. Need-assessments are necessary: what do people really need from agricultural biotechnology? What should they plant to ensure food security and environmentally sustainable agricultural practices? The other part of this is the informational aspect: what do you need to tell people in order for them to be familiarized with a technology and to ensure that it actually provides promised benefits? One way is to establish an opinion-leaders' network by tapping into local government structures in a way that helps build trust in new biotechnologies.

There is need to demonstrate and discuss all possible benefits from a new product, which may present added opportunities in certain situations. For example, less susceptibility to fungal infection may occur with *Bt* corn as a secondary effect of less insect damage. Less aflatoxin contamination could have tremendous significance in particular contexts.

The adoption and use of biotechnology and genomics should be approached within the context of conventional practices. Rather than view agricultural biotechnology as the wave of the future—it's new therefore it's good—we should regard it as part of a mélange of new and old, balanced appropriately to meet local needs. The point was emphasized that agricultural biotechnology would be more readily adopted and food security would be more attainable as would environmental sustainability if it were blended back into conventional practices in order that value-added benefits would accrue alongside maintenance of traditions.

Again, stakeholder participation is essential in setting research priorities, including farmers, and in the South, poor farmers. Public trust needs to be garnered and the public respects the opinions of farmers.

In the North American context, the best method of ensuring that agricultural biotechnology enhances access to safe and healthy food is via linkage to the healthcare system. If biotech reduces costs, it will garner attention. A central issue came up in terms of trust: do policy-makers trust, or even understand, biotechnology? Science is becoming more and more politicized, particularly in the United States, which impinges on how we should go about dealing with biotechnology.

In terms of regulation, we may not have to do much in North America where institutions already exist for the management of foods and drugs. We don't need to reinvent the wheel, but we do need to adjust it to fit particular circumstances. On the subject of food labeling, the Canadian system seems to be reasonably constructed—based on the product and not the process—and may serve as a useful model for other countries. However, regulation should be experience-based and should be appropriate to the country where the crop will be grown.

Recurring Themes

Several recurring themes ran through the discussions. Scientists need to communicate more effectively not only with the public, but also with politicians and policy makers. They need to learn how to write in plain language in half-page portions. Until then, there will be need for "translators." Also, there is need for that communication to be couched in questions that the audience being addressed is asking rather than simply trying to get a message out. Scientists must communicate with a range of different audiences. On one hand, there is the political "battle," which needs one style of communication whereas other audiences need to be listened to and questions answered in terms they will understand. Understanding risks and finding a balance between those risks is a key stumbling block in terms of public understanding. Communication may be improved if multiple disciplines are represented in graduate-student programs and on committees, to expose students in the biological sciences to social-science issues and ways of thinking. Related to improvement in communications, public education in agricultural biotechnology is needed. When 50% of the population feels that they don't want DNA in their food, you know you have a real challenge. Such challenges will be specific to each country. We should focus on a long-term educational outreach program in schools. Public outreach is also needed as is public dialogue—not a debate, but a dialogue on agricultural biotechnology—so that interested members of the public can form sound opinions. With traits that are important to the people in the country, the dialogue will be much more constructive.

When biotechnology is considered in the international context, private-sector investment must be replaced with public-sector investment. Clearly, there is need for significant public-sector funding initiatives if benefits are to reach resource-poor farmers in developing countries. It will be necessary to work with local communities to ensure acceptance and adoption from the bottom up rather than simply again trying to impose viewpoints from the top down. Thus, needs must be identified—nutritional and environmental (*e.g.* cutting down pesticide use)—so that product traits are country-relevant. The public sector will not make these products become a reality, it has to be in partnership with the private sector; increased investment in the public sector is needed.

Finally, a direct quote is worthy

continued on Page 8 "Workshop..."

Guiding Plant/Microbial Biotechnology for Pharmaceutical Production and Environmental Remediation

NABC 17 Will Convene in Nashville, TN, June 27–29, 2005

Co-Hosted by the University of Kentucky and the University of Tennessee

The theme of NABC 17 will be:

- new uses of plants and microbes for synthesis of pharmaceutical and industrial products,
- new uses of plants and microbes to remediate damaged ecosystems,
- public communication and policy, and regulatory oversight for commercialization of these products and processes.

Biotechnology promises exciting possibilities for solving problems as varied as production of protein pharmaceuticals, ameliorating salinity in soils, producing disease-resistant ornamentals, discovering new natural-product medicinals, and mitigating invasive species. The presentations will overview opportunities based on transgenic plants/systems, and will consider new technologies to expand the use of non-transgenic plants as sources of novel natural products.

In recent years, applications of biotechnology to develop beneficial input traits in food crops have been associated with intense public scrutiny, and there have been many challenges to the validity of regulatory and containment processes. More recently, the possible use of crops for pharmaceutical production has created additional concerns, as the potential for pollen drift and cross-contamination receives increased scrutiny. This experience identifies the need for early communication/dialogue on these technologies for the above mainly unexplored uses of transgenic plants and microbes. Meanwhile, progress in plant genomics is creating new prospects for discovery of natural products including medicinals, the eventual production of which may or may not involve transgenics, but will be based on biotechnology.

Much of the commercialization of the more novel uses of plants is being undertaken by small companies that are particularly dependent on private investment and public economic incentives. These new companies are increasingly being looked to by communities for creating knowledge-based economies and "green industries" that support agriculture and reduce reliance on traditional manufacturing. There is increasing effort to commercialize university technologies through such in-state enterprises.

The conference organizers are planning four main topics: *Plant-Made Pharmaceuticals*; *Bioremediation, Phytosensing and Ecorestoration*; *Gene-to-Product*; and *Regulatory Constraints and Opportunities*. The plenary sessions will include presentations by leaders in research, commercialization, trade organizations, regulations, and of public interest groups. There will be discussions among university and company scientists, state policymakers, and government regulators.

Plant-Made Pharmaceuticals will review the several technologies available for producing protein drugs in various plant species. The use of major food/feed crops for pharmaceutical production faces significant regulatory challenges, but there are also opportunities for production of pharmaceuticals in non-food crops such as tobacco. What are the advantages and disadvantages of these different systems?

Bioremediation, Phytosensing and Ecorestoration will recognize that genetically engineered plants will be increasingly useful in environmental monitoring and restoration. Plants modified for increased uptake of soil-borne contaminants, and microbes modified to deactivate water-borne contaminants, may be useful for cleaning up environmentally disturbed areas. Genetically engineered plants and microbes may be used as phytosensors to monitor real-time presence of chemical or biological agents within the environment. Endangered plant species may be restored through applications of biotechnology, and disease-resistant woody ornamentals and other non-food crops can be produced through biotechnology. How will these technological approaches to environmental issues and enhancement be implemented effectively and safely? What regulatory guidelines will be needed for using genetically engineered plants in these ways?

Gene-to-Product will explore the fact that new biomaterials and bioproducts may be discovered in plants, and produced with higher efficiency and with more desirable attributes through application of various biotechnologies. In a reverse process, the desired attributes of the finished product are determined and then genetic modifications to reach that goal are applied to the plant or microbe. Such

technologies can reduce dependence on petroleum-based products for manufacturing, revitalize drug-discovery in plants, and create new markets for producers of agricultural and forest products. How will creation and manufacture of such products be controlled? Will new regulatory processes need to be developed? This session will provide a view of long-range opportunities and issues related to the transition from petroleum-based to current-photosynthesis-based production of materials for manufacturing and medicine.

Regulatory Constraints and Opportunities will examine evolving federal regulations for transgene containment and their impact on success of early-stage companies. The variety of economic incentives and local regulations will also be examined. Forums will involve discussions among regulatory officials, industry representatives, state and local policy-makers, and economic development agencies.

Questions to be addressed include:

♦ How do the public and private sectors affect constraints and opportunities for moving technology from the academic sector into the commercial pipeline?

♦ How does the developing federal regulatory environment impact commercial production of transgenic crops?

♦ What realistic agricultural prospects are to be expected from the plant-made-pharmaceuticals paradigm?

♦ How might agriculture effectively and safely engage the plant-made pharmaceuticals opportunity?

♦ How might transgenic plants used in bioremediation, phytosensing, or ornamentals applications be effectively and safely deployed?

♦ What extent should sterility be a requirement in transgenic crops, in relation to the additional costs of propagation?

♦ What is the potential for discovering and developing new commercial products, such as natural plant medicinals, based on manipulation of newly characterized genomes?

Questions and comments may be directed to:

Ric Bessin
Program Chair, NABC 17
Department of Entomology
University of Kentucky
Lexington, KY 40546
rbessin@uky.edu ■

continued from page 2 "Highlights..."

regulation of the technology will be used worldwide.

The proceedings of the meeting are currently in preparation and promise to be a comprehensive and detailed overview of the scientific and social issues surrounding biotechnology worldwide. ■

continued from page 1 "Letter..."

Manufacturers of America, the Pew Initiative on Food and Biotechnology, and USDA-APHIS has occurred. These meetings allow membership access to the thinking of consumers, industry, and the regulatory community.

A new NABC activity was spawned in March of 2003. A council member pointed out the need to improve on-campus management of field trials with transgenic plants. The council's university members saw opportunities to streamline field-research practices, with involvement of everyone associated with the research, including farm workers as well as scientific personnel. A Best Practices Sub-Committee was formed with the goal of first producing a set of guidelines for field research on transgenic plants and then encouraging voluntary participation by all NABC member universities. Over the past 18 months, the subcommittee has reviewed university procedures and federal regulations to produce a consensus document that is currently in the final stages of review. The federal regulations themselves are in transition, and the subcommittee has had frequent consultations with appropriate agency leadership. This exercise represents a new and different role for NABC in not merely establishing consensus on scientific directions, but actually suggesting uniform practices that will grow public confidence and communication with farm neighbors and organizations that sponsor university research on transgenic plants.

Continuing the evolution, NABC seeks to provide a timely science-based voice to increase public understanding of issues related to agbiotech. To that end, an alliance is being explored with the Agricultural Biotechnology Communicators, an informal group organized several years ago by former NABC chair, Neal Van Alfen. This group was created in order to communicate science-based information to the public. One of the group's hallmarks is the desire to provide rapid, science-based responses to public controversies involving genetically modified crops and foods. Participants at the upcoming fall council meeting (September 26, Oklahoma City, OK) will discuss this extension in NABC's repertoire.

Certainly, NABC can be characterized as an organization that has remained true to its mission of promoting the dissemination of science-based information to the widest audience possible. The efforts to support voluntary compliance with field-research protocols will further NABC's commitment to transparency in the agricultural science process that must be a part of informed decisions by the public on agricultural biotechnology. The discussions with the Agricultural Biotechnology Communicators to increase dissemination of science-based

continued from page 7 "Letter..."

information is another expression of NABC's commitment to informed public decision.

NABC 17, *Agricultural Biotechnology: Beyond Food and Energy to Health and the Environment* will build on new scientific horizons on the use of plants for pharmaceutical and bioremediation purposes. This conference will also consider the regulatory and commercialization environments that assure successful translation of basic discoveries into public use.

We hope that NABC's audience will continue to appreciate NABC's commitment to relevancy, timeliness and transparency. ■

continued from Page 5 "Workshop..."

of mention: "Genetically modified crops are only a small part of the problem and only a small part of the solution." Enhancing food production using genetic engineering as a tool faces the same basic problems as with traditional breeding in terms of transferring benefits to the level of the resource-poor farmer. ■

Mark Your Calendars!

NABC 17: Guiding Plant/Microbial Biotechnology for Pharmaceutical Production and Environmental Remediation

Nashville, TN, June 27–29, 2005

Boyce Thompson Institute, Room 419
Tower Road
Ithaca, New York 14853