

NABC news

Fall 2012 No. 45

**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 dialog 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.

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Letter from the Chair....

This is my first NABC “Letter from the Chair,” having moved into this position earlier than planned with the appointment in May this year of Sonny Ramaswamy as director of NIFA. On behalf of NABC I thank him for his many contributions and wish him well in his new role.

This is the first newsletter to go out under our new name *North American Agricultural Biotechnology Council*. At this summer’s meeting of the board it was decided that this name more appropriately reflects our membership. As a Canadian member I am, of course, happy with the change, although I did point out that “national” is often used as synonymous with North American (NHL, NBA), but, of course, not always (NFL). We did agree to retain the same initials and, in my latest Google search, we ranked 15th among a diverse (and interesting) group of NABCs. I note that moving to NAABC would have put us among a much more elite group (17,000 Google hits vs. almost a million), but we agreed to retain NABC.

Once again, our annual conference (in Fayetteville, Arkansas) was a great success and I want to extend my personal thanks to Ken Korth, Rick Bennett and their team for their work and hospitality. This newsletter includes a summary of that meeting and the proceedings volume, *NABC Report 24*, will follow—likely early in 2013.

As I write this, planning for next year’s conference (NABC 25 in Texas hosted by Bill McCutchen) is well underway. Again more information can be found in this newsletter. As you are aware, our recent meetings have included a *Student Voice* component



GRAHAM J. SCOLES
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NABC CHAIR 2012-2013

which provides a great opportunity for graduate students to attend, participate and network with representatives of other member institutions. Unfortunately as occurred last year, we achieved graduate-student attendance from a minority of our member institutions. I don’t know why this is. I fear that maybe the message of what the *Student Voice* program has to offer is not getting down to the appropriate level in our institutions. With that in mind I plan on being more proactive for NABC 25 by directly contacting appropriate departments in our member institutions with a request that they forward details of both the conference and the *Student Voice* program to faculty and graduate students and let them know their institutional NABC contacts.

The 2011 ISAAA report on the acreage of genetically engineered (GE) crops continues to show a year-over-year increase of about 8%. It appears that 2013 will be the first year that the acreage in the developing world (as defined by ISAAA) will exceed the

NABC 25 — Mark Your Calendars
Biotechnology and North American Specialty Crops:
Linking Research, Regulation, and Stakeholders

June 4–6, 2013
College Station, Texas

Graham Scoles & Bill McCutchen
University of Saskatchewan & Texas A&M University

As we enter a new century of plant, animal and health improvements through the application of genome-scale technology, we are both building an unprecedented view of gene content and genome organization and developing the ability to make genetic selections and improvements based on DNA roadmaps. NABC's 25th annual conference will bring together academic researchers, government officials and industry leaders to discuss the roles of genomic sciences, regulatory policy and related topics in an attempt to catalyze progress and realize opportunities for improving agriculture, especially as it relates to specialty crops.

By maintaining diverse research programs that include projects across the spectrum of basic-to-applied, opportunities will be created for collaborations among industry, government agencies and universities for maximal societal impact. Moreover, the utilization of transgenic traits beyond traditional row crops, and more specifically for specialty crops will clearly be significant contributors in leading the way to a second Green Revolution. Currently, the vast majority

of scientists at public institutions do not even consider further development of GM crops for commercial utility; even for traits that could vastly advance agricultural systems and improve human health, although this trend is changing. Several transgenic events, especially in specialty crops, are now moving towards commercialization as a result of collaborative efforts involving universities, industry, and regulatory agencies.

Several constituencies and stakeholders will gather in College Station, Texas, at Texas A&M University, June 4–6, 2013 for NABC 25, entitled *Biotechnology and North American Specialty Crops: Linking Research, Regulation, and Stakeholders*. The plenary sessions for NABC 25 will comprise:

- An overview of specialty crops that are genetically modified and commercialized as well as benefits, limitations and concerns;
- Current case studies of transgenic specialty crops and products that are being advanced through private, government and public partnerships;

- The regulatory process, technology access and intellectual property matters from representatives of EPA, USDA, FDA and CFIA, as well as private and academic institutes;
- Perspectives from multiple stakeholders to include consumers, producers and distributors as they relates to risk-benefit, health, sustainability and viability.

The conference will be held at the George Bush Presidential Library. Texas A&M University is conveniently located for air travelers, having an airport of its own and being within driving distance of the Houston airports. Additional information regarding NABC 25 will be available at <http://nabc25.tamu.edu/>.

Please direct questions, comments, and suggestions on NABC 25 to:

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NABC 25: *Biotechnology and North American Specialty Crops:*
Linking Research, Regulation, and Stakeholders

<http://nabc25.tamu.edu/>

Overview of NABC 24

Water Sustainability in Agriculture

Ken Korth & Rick Bennett
University of Arkansas, Fayetteville

The twenty-fourth annual conference of the NABC convened in Fayetteville, Arkansas, June 11–13, 2012, hosted by the University of Arkansas and the University of Arkansas Division of Agriculture. The meeting focused on agricultural impacts on water use and quality, sustainability efforts, and on water-related challenges for food and fiber production. This is a timely subject for NABC to address, as agriculture is by far the largest user of fresh water on the planet, and availability of water is a growing worldwide concern for political security and quality of life. Welcoming meeting attendees were Graham Scoles (NABC Chair), Ken Korth and Rick Bennett (meeting co-organizers, University of Arkansas), Sharon Gaber (Provost, University of Arkansas) and Mark Cochran (Vice President for Agriculture, Division of Agriculture University of Arkansas System).

The meeting was structured, as past NABC conferences, with an emphasis on dialogue with the speakers and open discussion. The keynote address was entitled *Water for Food: Everyone's Challenge*, presented by Marc Andreini of the Robert B. Daugherty Water for Food Institute, University of Nebraska. Dr. Andreini gave an excellent overview of his experiences as a biosystems engineer in Africa, and discussing relevant problems and lessons for US agriculture. Speakers for the four plenary sessions represented a broad set of institutions, including business, academia, non-profit and government sectors:

Session 1. Agricultural Adaptations to Water Needs. This session kicked

off the meeting with four talks that examined very different approaches to tackling issues of water management. They comprised a discussion of a large-scale water-management plan on Lake Winnipeg, industry attempts at improving commercial maize lines, a transgenic approach to improving plant drought tolerance, and a discussion of the benefits of embracing perennial cropping systems.

Session 2. Developments in Water Management and Policy. Watershed welfare in the form of water-quality trading programs, watershed-protection programs, and management of agricultural practices to control runoff were discussed in this session. In addition, the meeting was fortunate to hear from a fourth-generation Arkansas rice farmer who shared his experience with changing agricultural practices and regulations from a grower's perspective.

Session 3. Changing Role of Agriculture in Environmental and Consumer Issues. Water use in agriculture and society will continue to impact future economic and environmental policies. This session included talks that covered a corporate approach to measuring and improving sustainability, an agricultural program aimed at improving efficiency and impacts of irrigation, and an industry approach to improving sustainability in the production of food products.

Session 4. Preparing for Future Challenges of Water Issues. Water

sustainability in agriculture depends both on economic viability and on a means to quantify success. This session included talks that addressed large programs to monitor water sustainability, and the economic benefits of a biotechnological approach to improving plant products.

A breakout session provided opportunity for attendees to meet in small groups to address questions regarding water issues in agriculture. The findings of each group were shared with the entire assembly on the final day. (See page 4; a fuller report will be included in the conference proceedings, *NABC Report 24*.)

As with past NABC meetings, graduate-student participants met as the *Student Voice* group. The students compiled their own report of the meeting, brought out additional issues that could be discussed surrounding water sustainability, and made suggestions for meeting improvements. (See page 6; again, a fuller report will be published in the conference proceedings.)

A new aspect of this year's meeting was inclusion of a research poster session that was held in conjunction with an evening reception and included a student competition. The posters allowed faculty and student participants to present their own research related to water sustainability, and served as an excellent means to generate discussion among all attendees. Certificates

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Summary of the Discussions at the NABC-24 Breakout Workshops ^{1,2}

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Four parallel workshops were convened at the end of the second afternoon. Each group addressed the same questions. Reports on the discussions elicited by the questions were delivered orally at the end of the conference by those listed above.

At this conference, we are discussing both technical and cultural approaches to dealing with challenges of water sustainability. Beyond the specific topics being covered in this meeting,

—What technical approaches should be pursued to improve efficiency of water use in agriculture?

—What policy changes or educational efforts that should be pursued to help improve cultural practices?

New technologies:

- Small scale on-farm approaches: drip irrigation; re-use of wastewater for irrigation; run-off capture to control loss of nutrients and soil.
- Identify knowledge gaps for using these new technologies and scientifically document how effective they are, including economic analyses.
- Novel technologies need to be approved by NRCS³ to be eligible

for crop insurance and bank-financing of farm operations.

- Identify C4 plants that are better suited for drought-stressed production areas. Consider the potential for conversion of C3 crops to C4 pathways.

Policy/educational changes:

- The new Farm Bill should include language that is supportive of innovative water-saving methods and use of water-efficient crops by growers in areas of moisture deficiency.
- Better assessments of land use and regional planning are needed. Irrigation of crops or dairy operations in water-scarce areas (like New Mexico and Arizona) may not be good use of public natural resources. There is need for broader understanding that water is not “free”; societal and environmental impacts result from inefficient use of water.
- Incentives are needed to encourage adoption of new technologies. NRCS is limited on resource availability per project; many more requests are received for support than they can fulfill.
- Education of policymakers and regulators is needed. Large

companies are setting priorities, not necessarily for the public good. Fundamental to this is conducting solid science to provide the basis for guiding policy

The US Department of State recently launched the US Water Partnership to deal with water challenges that can potentially increase regional tensions and political instability worldwide. How can agricultural researchers best direct their efforts to deal specifically with such social and political aspects of water use?

- Coordination of research projects across regions could have broad/national impact. For example, research along the Mississippi River should be consolidated, from on-farm point-source pollution and water use to hypoxia in the Gulf.
- Grass-roots interactions will build communities that care about these issues and come together to help solve problems from multi-faceted perspectives.
- The impact of other industries on water use and pollution needs to be documented to

¹ The discussions were facilitated by Chris Henry, Anna McClung, Tom Riley Jr. and John Rupe, and notes were taken by Kim Keeney, Cindy Morley, Lacey Nelson and Samantha Roberson.

² A fuller summary will be published in the proceedings volume, *NABC Report 24: Water Sustainability in Agriculture*.

³ National Resources Conservation Service.

achieve better understanding at the watershed level. Agriculture may be receiving greater blame for pollution than is warranted.

- The public needs to better understand the value of products of agriculture (food, fiber, fuel) in relation to its use of natural resources. Public perception of farmers should be as good stewards of natural resources who feed the world.

In a recent study Hoekstra and Mekonnen (2012¹) estimate that agriculture contributes 92% to the global freshwater footprint of human activity.

—Should we be concerned that there is such a high proportion for agricultural use, or are such high amounts inevitable?

—Given this high amount, should there be more focus on educating consumers about the needs of agriculture for food production?

Inevitability of high water use:

- The discussion should be reframed to clarify the difference between agricultural water use and water consumption.
- It is essential to be able to estimate accurately agriculture’s water footprint. There was consensus that 92% is an over-estimate; recycling of irrigation water was probably not considered.
- Deriving lifecycle models of water use are fraught with difficulties because, inevitably, they become so complex as to be meaningless

¹ <http://www.pnas.org/content/109/9/3232>.

Consumer education:

- There is need to communicate that farmers are not irresponsible about resource use.
- Education is needed at the K–12 level to engender better public understanding of food production, environmental stewardship, and water use for crop and animal production.
- Marketing by industry is more effective at leading the public than is our education system. There is pressing need to reverse the trend of the public being further and further removed from food production and ever more suspicious of science.
- Few consumers understand that many sources of our food are of high water content, requiring significant uptake of water.

What other topics are worthy of discussion?

- We need to more effectively communicate the overall potential impact of agriculture, not only for food and feed production but also on resource use—including water—climate change and human nutrition and health, and use this to justify increased funding because agricultural research has huge potential for addressing 21st-century problems.
- Better understanding is needed of the long-term implications of government policies, such as the Farm Bill, and efforts to improve conservation.
- Better understanding is needed of competition for water resources for agricultural and urban uses. We need to stop blaming farmers and change people’s perception of how this

can be a win-win proposition in terms of environmental and ecological economics as well as food and feed production.

- One of the biggest problems is funding; where do we look for it and how do we convince those who have the funds to increase commitments to agricultural research?■



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and cash awards were generously provided by the Arkansas Water Resources Center. The poster competition coordinator, Andrew Sharpley (University of Arkansas) presented awards to Zhenyi Du, 1st place, University of Minnesota, Jonathon Smith, 2nd place (tie), University of Arkansas, and Lauren Vitko, 2nd place (tie), Penn State University. The organizers thank all who presented posters at the meeting.

NABC 24 closed with final comments from NABC President Ralph Hardy. A full report on the conference will be included in *NABC Report 24*, which will be published early in 2013. ■

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http://nabc.cals.cornell.edu/email_form.cfm

The *Student Voice* at NABC 24¹

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We, the *Student Voice* representatives of NABC’s 24th annual conference, heartily thank those behind the *Student Voice* program for making our participation possible and welcome. The discussion at this meeting has been provocative and stimulating, and we came away from it with something more to consider, which will broaden our research in the area of water sustainability in agriculture.

Many issues in the area of water sustainability could drive discussion for weeks, but throughout the conference, a couple of major themes emerged repeatedly. Below we mention in brief a few of our thoughts on those major themes as well as a few comments on the conference in general in hopes that future meetings can be even more productive.

The major themes are education, communication and collaboration, and policy changes. As technology

continues to advance through the efforts of many like those at this meeting, there are issues that arise with a stronger focus on social and economic problems that we, as the upcoming research generation, feel deserve more discussion and action.

MAJOR THEMES

Education

- A disconnect exists between the source and the shelf for products in the United States, perpetuating the idea that consumer decisions have little impact on the environment and local and global economies. This can be remedied through consumer education, possibly through.
 - Branding (e.g. animal friendly, rainforest friendly, fair-trade)—a mark for sustainable agricultural practices.
 - A recognizable symbol (Smoky the Bear for conservation!) that people will associate with good and healthy conservation

practices to encourage smart consumer choices.

- Changing societal values and human behavior will come only through education and involvement at a community level.
 - More involvement with extension and other organizations (e.g. soil- and water-conservation districts) is important.
- As was mentioned in the conference, changes may only come generationally.
 - Can we change curricula across the country such that we emphasize the importance of conservation for a new generation?
 - Even current curricula that stress conservation are behind on current issues; updating is needed without underestimating the intelligence and resilience of children.

¹A fuller version will be published in the proceedings volume, *NABC Report 24: Water Sustainability in Agriculture*.

²Verbal reporter at the conference and author with contributions from the other students.

Continued from previous page "Student..."

Communication and Collaboration

- There seems to be a lack of knowledge/wisdom about connecting the science to the ground level.
- If a lead area farmer learns about new technologies, but doesn't take those back to the farm, it's not going to be implemented.
- There needs to be better communication among all parties involved in producing, supplying, and consuming products.

Policy Changes

- Groundwater is being depleted and other current practices are not sustainable, so the question is: How do we change?
- Our system is basically agricultural survival of the fittest without capital.
- Is it possible to incentivize change through policymaking or through changing current subsidy practices?

General Comments on NABC 24

- There was not much give and take.
- We would like to see more representation from all groups involved: farmers, suppliers, and policymakers in equal representation with the researchers.
- If we want to encourage grassroots participation, then we'd like to see more representation of grassroots-level groups at this kind of discussion. ■



Continued from page 1 "Letter..."

acreage in the developed world. One of the challenges of bringing these crops to market is clear by the fact that after 15 years, crops other than the big four make up less than 10% of that acreage. This is unfortunate when GE can offer so much to many other crops in both the developing and developed worlds. There are of course many hurdles in different areas of the world. The theme of NABC 25 is essentially to discuss one of these; the issues faced by public institutions in trying to bring GE small-acreage food crops to the North American market, given the costs (particularly regulatory costs but also access to use of proprietary seeds) involved. I hope that a more streamlined experience-based regulatory system will evolve and reduce the regulatory burden that impedes the entry of new GE crops into the market.

While NABC 25 will primarily tackle the above issue from the regulatory side, of course there are other hurdles to commercialization of GE crops, including the cost of licenses for some of the technologies required and also public opinion in certain areas. It is well worth noting that Monsanto recently announced that it will provide a royalty-free research license to the academic community and other non-profit research institutions to a newly issued US patent related to the *Agrobacterium* transformation method. In terms of technologies, a number of new gene-editing approaches have become available for genetic manipulation. Given that they don't involve the insertion of "foreign" DNA, these may not come under the same regulatory scrutiny as transgenic methods. Only when a crop developed using these methods comes before regulatory authorities will we

know how they will be handled. Even if the regulatory authorities agree with the above, the anti-GE lobby may once again try to mount a negative campaign around such techniques.

The anti-GE lobby quickly jumped on the September publication by the Seralini group that reported negative effects on rats involving the intake of Roundup and Roundup-tolerant corn. However the furor was short-lived and received limited coverage compared to earlier media reportage of similar experiments that were said to show negative effects of GE crops. As recent polls have indicated, there appears to be a maturing of the public's acceptance of GE crops, even in some European countries. I expect the limited coverage of the Seralini work exemplifies that change. Given the lack of a scientific explanation for the results, scrutiny by scientists and regulatory authorities (including the European Food Safety Authority) has now concluded that the experiments were lacking in a number of areas.

Twenty-five years ago NABC was established to deal with issues such as the foregoing, and I am sure many of us did not expect that our role would be as relevant today as it was then. I expect issues related to agbiotech will continue to demand our attention and provide topics for many annual conferences to come. ■

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