



The 2nd World Seed Conference

Responding to the challenges of a changing World: The role of new plant varieties and high quality seed in agriculture

The overarching goal of the Conference was to identify an enabling environment that encourages the development of new varieties and facilitates the production and distribution of high quality seed. In this context, several issues were examined including environmental change, market developments, as well as population growth in the light of growing concerns over food security and economic development, especially in developing countries.

The 2nd World Seed Conference was held at the FAO, Rome, on 8-10 September 2009. The Conference was organized into two parts; consisting of a two day Expert Forum followed by a one-day Policy Forum. The following organizations: FAO, OECD, UPOV, ISF and ISTA co-organised the Conference.

In economic terms, the international seed market is substantial. Recent estimates value the global seed market at

US\$37 bn, with trade in seed estimated to be worth about US\$6.4 bn. With the continued strong growth in the global market, it is critical to ensure that markets remain open and appropriately regulated so that high quality seed reaches the farmer.

Central to the availability of having adequate future food supplies is the need to have effective plant breeding and the enhancement of genetic resources which together are crucial to meeting the increasing demands of an ever rising global population. Accompanying this challenge is the need to continue to raise food production and productivity, especially in the context of the increasing concerns over climate change.

Economic gains can be extended to the range of stakeholders in the seed market through plant variety protections and the development of stronger scientific infrastructure. These factors are required in order to attract investment in the sector, to increase the development of new plant varieties, and to enhance seed quality determination and assurance. This leads to more competition in foreign markets and an increase in food development and independence in the rural economies. The harmonisation of regulations at international level also contributes

Contents

- **2nd World Seed Conference (Rome, 8-10 Sept. 2009)**
- **In-depth evaluation of the OECD Seed Schemes**
- **Update on the ESA Meeting (Brussels, 11-14 October 2009)**
- **Certification Program Established in South Asia**
- **Authorised inspection officers are ready for Western Australia's first GM canola trials**
- **Workshop on seed industry development in Tanzania**
- **7th World Potato Congress a huge success**
- **DNA of ancient lost barley could help modern crops cope with water stress**
- **Shatter Resistant Brassicas**
- **Can these "amber waves of grain" become perennials?**

to the economic gains through reducing the technical barriers to trade and improving transparency and information sharing.

The conference emphasized the need for further government action to nurture an environment for a stronger seed supply chain, involving all stakeholders, to facilitate the production and distribution of high quality seed. Professor M.S. Swaminathan, Father of the Indian Green Revolution, further emphasized the need for more consideration and investment with respect to the production of quality seed. Governments are encouraged to provide a regulatory environment that is predictable, reliable, user friendly and affordable. This regulatory framework should provide a conducive environment for public and private investment if agriculture is going to meet the long term challenges of food security and environmental sustainability.

For further information on the presentations at the Conference, please see www.worldseedconference.org

A Note on the In-Depth Evaluation of the OECD Seed Schemes for International Trade

In 2008 the OECD undertook an In-depth Evaluation of the Seed Schemes, as well as the other three programmes that deal with the harmonisation of standards and certification under the Codes & Schemes. The main focus of this exercise was on the orientation and functioning of the programmes, and, in particular, the output from the programme as

well as the use of and impacts of the results.

The time period covered in the Evaluation was 2003-2007, with most focus on the latter period. The methodology used in the Evaluation consisted of collecting and analysing primary data from a widely distributed questionnaire, supplemented by additional information gleaned from in depth interviews with delegates to the Schemes. A number of criteria namely; relevance, efficiency, and effectiveness were used to assess the performance of the Schemes.

The Evaluation Committee, which consisted of six OECD Ambassadors, assessed the overall performance of the Schemes. More specifically, the results show that the Schemes are:

- **highly relevant**, i.e. the objectives of the Schemes are addressing the needs of participating countries;
- **highly efficient**, i.e. the Schemes are optimising the relationship between the human and financial inputs and quality and quantity of output results;
- **highly effective**, i.e. participating countries are using the outputs of the Schemes, which, in turn, is having a positive impact on the international seed trade.

In addition, it was also noted that the Schemes contribute to ensuring product quality, reducing technical barriers and simplifying trade procedures, which, in turn, facilitates market openness.

Concerning the recommendations arising from the In-Depth Evaluation, the key

recommendation relates to the sharing of good practices amongst the four programmes in the Codes & Schemes, as well as to consider how to make working methods more reactive and flexible.

For further information on the In-depth Evaluation of the OECD Agricultural Codes & Schemes for International Trade see C(2008)95 and C(2008)95/CORR1.

Certification Program Established in South Asia

The American Society of Agronomy (ASA), an international scientific society based in Madison, WI, recently announced that it will develop and implement a highly qualified workforce program for private- and public-sector extension by establishing a Certified Crop Adviser (CCA) program in South Asia. The main target for this program will be the frontline agronomists employed by private companies, non-government organizations, and public-sector agencies. More than 13,000 CCAs already work in the United States and Canada. ASA established the CCA program in 1992 to ensure that crop advisers were competent in all aspects of crop production and provided services in an ethical manner.

ASA has partnered on the Cereal System Initiative for South Asia (CSISA), which brings together a range of public- and private-sector organizations to enable sustainable cereal production in India, Pakistan, Bangladesh, and Nepal. CSISA is led by the International Rice Research Institute (IRRI) and three other centres with support from the Bill & Melinda Gates Foundation, the United States Agency for

International Development (USAID) and the World Bank during the first three years of the program.

Many private companies in Asia are investing in new agribusiness and services infrastructure, including a substantial workforce of crop advisers who directly work with farmers, providing inputs, crop advice, and market information. High quality standards are vital for providing new technologies to farmers and developing sustainable production practices. This responsibility requires a proficient understanding of crop production science, food safety, economics, and the environment.

“The private sector in India and in other countries in South Asia is moving aggressively in the agricultural area, but they do not have a certified program for crop advisers to help transfer knowledge for improving crop productivity,” says ASA member J.K. Ladha, an IRRI soil scientist and leader of one of CSISA’s working groups. “Many technologies that we have on the shelf are not going efficiently and quickly to the farmer. About 25% of the overall CSISA program is funded for delivery of information to the farmer, and that is the key in making this program successful.”

To address this emerging demand by the private sector and the continuing need of public-sector extension systems, CSISA will facilitate the implementation of a voluntary, self-sustained CCA program that establishes a base level of competency through testing, education, and experience requirements and maintains or raises that competency through continuing education or

requirements for participants in the program.

This program comes at a crucial time for key nations in the region—home to 40% of the world’s poor with nearly half a billion people subsisting on less than US\$1 a day—as they struggle to boost grain supplies in the wake of growing demand and strained natural resources. The project, which builds on past cereal research achievements in the public and private sectors, aims to produce an additional five million tons of grain annually and increase the yearly incomes of six million poor rural households by at least \$350.

“This program is extremely important for the food supply of the most populous region of the world,” says Mark Alley, ASA President and W.G. Wysor Professor of Agriculture at Virginia Tech. “We are honoured to take part in this initiative with IRRI.”

CSISA’s 10-year goal is for four million farmers to achieve a yield increase of at least 0.5 tons per hectare on five million hectares and an additional two million farmers to achieve a yield increase of at least 1.0 ton per hectare on 2.5 million hectares. The CSISA initiative will focus initially on eight hubs in Bangladesh, India, Pakistan, and Nepal, which represent key intensive cereal production systems that play a major role in feeding close to a quarter of the world’s population.

For more information on the Certified Crop Adviser program, see

www.certifiedcropadviser.org

Authorised inspection officers are ready for Western Australia’s first GM canola trials

The Department of Agriculture and Food has commenced inspections of the State’s first GM canola trials with seeding of up to 1000 hectares expected to be completed on 20 sites this month.

The team of authorised officers will make regular visits to all of the farming properties and department research sites at Geraldton and Esperance hosting the commercial trials to ensure correct procedures are followed

Seeding of the GM canola had been delayed in some areas, as farmers waited for breaking rains. Department Agricultural systems manager David Bowran said all participants had signed a licence agreeing to allow the authorised officers access to their farms to inspect the site, machinery hygiene and facilities.

Dr Bowran said the officers would visit each site at least three times during the 2009 season at sowing, flowering and after harvest to inspect handling processes and provide advice. This would be followed up with management of volunteer canola plants in succeeding years.

“Equipment used at all stages will be checked, starting with storage bins for the seed, storage equipment, sprayers, harvesting equipment, field bins, silos and then the trucks to take the seed to the CBH receival bin,” Dr Bowran said.

The team, comprising Ross Ramm (Albany), Vince Lambert (Katanning), Marcus Owen (Lake Grace/Merredin) and

Shari Dougall (Wongan Hills) have pure seed production experience from research stations and are well qualified to assist individual farmers.

Authorised officer Shari Dougall with department officers Wayne Parker and Steve Cosh make sure seeding equipment is ready for the GM canola trial at Geraldton



They will work closely with a number of department development officers to provide regional information and Nufarm advisers who are coordinating the trials for Monsanto.

Dr Bowran said the department's AGWEST plant laboratories would also be involved with verifying that seed and grain were handled correctly outside of the farm. This would include inspection of CBH bins and road transport arrangements.

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Workshop on seed industry development in Tanzania

The Tanzania Seed Trade Association (TASTA) organized a one-day workshop on Seed Industry Development in Tanzania at the Golden Rose Conference Centre. It was attended by stakeholders involved in the seed industry from the private and public sector. The Regional Centre for Africa was represented

by Mr. Jan Helsen, vBSS Project Manager and Ms. Ronia Tanyongana, vBSS Seed Health Specialist.

The objective of the workshop was to sensitize stakeholders—especially the private sector in the region—on the importance of affordable good quality seeds to the overall government food security objective, and to expose stakeholders to the different seed schemes, regulation in the International Seed Testing Association (ISTA), the Organization for Economic Co-operation and Development (OECD), and the government plant health services.

Presentations were made by the Tanzania Official Seed Certification Institute (TOSCI) on the OECD Seed Schemes, ISTA, and progress the Institute has made toward becoming accredited to these two organizations. Accreditation success has been of concern to both government and the seed industry as it facilitates all trade in seed originating from Tanzania.

The Plant Services department presented an update on the regulations governing the import and export of seed with emphasis on seed bean, a big export in Tanzania.

One important constraint identified as hampering the growth of the seed industry in Tanzania was the lack of basic or foundation seed for many varieties needed by seed companies and other producers to multiply commercially.

Through the vBSS project, the Regional Center for Africa will hold an Innovation Platform meeting to chart a way forward

for sharing foundation seed with the private sector.

More news from: AVRDC (Asian Vegetable Research & Development Center)

Website: <http://www.avrdc.org>



7th World Potato Congress a huge success

Potato "food hero" say experts!

The phrase the 'humble potato' was banished in favour of 'food hero' at the World Potato Congress (WPC), held in Christchurch, New Zealand, during March.

The resounding theme was the vital role the potato can play in feeding the world's millions. It is predicted that by 2050 the world's population will have reached 9 billion, and it will be increasingly difficult to meet demand for food. Experts believe the challenge of meeting future food needs offers a significant opportunity for the potato industry

More than 550 people from 50 countries attended the premier industry event, which is held every three years. "The opportunities for delegates to establish global contacts at our triennial Congress are significant," said Allan Parker, President and Chairman of World Potato Congress Inc. "I am proud

to see the impact of World Potato Congress can be felt so strongly on the world stage," affirmed Parker.

Feedback from the Congress was extraordinarily positive with many saying they enjoyed the range of speakers, the debate and the opportunity to network. Several described it as the best yet.

For the first time in the history of the WPC, the "Proceedings" of the event have been captured in digital audio-visual format. They can be accessed at the WPC Inc website www.potatocongress.org



DNA of ancient lost barley could help modern crops cope with water stress

Researchers at the [University of Warwick](http://www.warwick.ac.uk) have recovered significant DNA information from a lost form of ancient barley that survived for over 3000 years during which changes in civilisation occurred, there were periods of water shortages and a more popular form of barley was developed that produces more

grains. The discovery of this ancient type of barley gives an insight into what ancient farming was like and could assist the development of new varieties of crops to face today's climate change challenges.

The researchers, led by Dr Robin Allaby from the University of Warwick's plant research arm Warwick HRI, examined Archaeobotanical remains of ancient barley at Qasr Ibrim in Egypt's Upper Nile. This is a site that was occupied for over 3000 years by 5 successive cultures: Napatan, Roman, Meoitic, Christian and Islamic.

The researchers found that throughout that 3000 year period every culture seemed to be growing a two rowed form of barley. While natural wild barley tends to be two rowed most farmers prefer to grow a much higher yield 6 row version which produces up to 3 times as many grains. That 6 row version has grown for over 8000 years and that was certainly grown in the lower Nile over the same period as Qasr Ibrim was occupied. It was thought that despite the fact that the rest of Egypt used 6 row barley that the farmers of Qasr Ibrim were perhaps deliberately choosing to import 2 rowed barley but the researchers could not understand why that would be so.

The plant scientists were pleased to find that the very dry conditions at Qasr Ibrim meant that they were able to extract a great deal of DNA information from barley samples from the site that dated back 2900 years. This was far better than would normally be expected from barley samples of that age. This led the researchers to a second and much bigger surprise. They found that the DNA evidence showed that the two rowed barley at the site wasn't

the normal wild two eared barley but a mutation of the more normally cultivated six rowed barley that had changed into a two ear form that had continued to be cultivated for around three millennia.

Dr Robin Allaby said: "The consistency of the two-row phenotype throughout all the strata spanning three millennia indicates that the reason for the reappearance of the two row form is more likely to be genetic, not environmental. Consequently, the two-row condition has probably resulted from a gain of a function mutation at another point in the plants DNA that has also reasserted the two-row condition from a six-row ancestor"

"There may have been a natural selection pressure that strongly favoured the two-row condition. One such possible cause we are currently investigating is water stress. Qasr Ibrim is located in the upper Nile which is very arid relative to the lower Nile where six-row remains are found, and studies have shown that two-row can survive water stress better than six-row"

He concluded that: "This finding has two important implications. Such strong selection pressure is likely to have affected many genes in terms of adaptation. Archaeogenetic study of the DNA of such previously lost ancient crops could confirm the nature of the selection pressure and be very valuable in the development of new varieties of crops to help with today's climate change challenges. Secondly this crop's rediscovery adds to our respect for the methods and thinking of ancient farmers. These ancient cultures utilized crops best suited to their environmental situation for

centuries, rather than the much more popular six rowed barley they used a successful low grain number yield crop which could cope far better with water stress."

The research paper entitled "*Archaeogenetic Evidence of Ancient Nubian Barley Evolution from Six to Two-Row Indicates Local Adaptation*" has just been published in [PLoS One](#). The papers authors are: by Dr Robin Allaby, Sarah A. Palmer and Jonathan D. Moore from the University of Warwick's plant research Warwick HRI; Alan J. Clapham from Worcestershire Historic Environment and Archaeology Service at the University of Worcester; and Pamela Rose from The McDonald Institute for Archaeological Research, University of Cambridge.

Shatter Resistant Brassicas

An international team of scientists has cracked the problem of pod shatter in brassica crops such as oilseed rape.

Just before harvest, oilseed rape pods are prone to shatter, causing a 10-25% loss of seeds and up to 70% in some cases.

"By artificially producing a hormone in a specific region of the fruit, we have stopped the fruit opening in the related model plant *Arabidopsis*, completely sealing the seeds inside," says Dr Lars Østergaard from the John Innes Centre. "We need to refine the process for use in agriculture to reduce seed loss but still allowing them to be easily harvested.

The scientists discovered that the absence of the hormone auxin in a layer of cells in the fruit is necessary for the fruit to open. Two stripes of tissue form where no auxin is present, and these separate to open the pod.

It is already known that proper plant development, such as organ growth and patterning, requires specific hormones to accumulate in specific regions. This is the first time that removal of a hormone has been found to be important for cell fate and growth.

Oilseed rape is grown for its tiny black oil-containing seeds, prized for cooking oil and margarines low in saturated fat, and increasingly for biodiesel. The meal that remains after oil extraction is also used as a high protein animal feed.

Brassica plants normally disperse their seeds by a pod-shattering mechanism. Although this mechanism is an advantage in nature, it is one of the biggest problems in farming oilseed rape. As well as losing valuable seeds, it results in runaway 'volunteer' seedlings that contaminate the next crop in the rotation cycle.

If rape seeds are harvested early to get round the problem, immature seeds may be collected which are of an inferior quality.

Oilseed rape is relatively undeveloped in breeding terms when compared to wheat and other crops. It retains characteristics of a wild plant including maximising seed dispersal. JIC scientists are also researching genetic solutions to reduce pod shatter and to improve breeding of the crop.

The John Innes Centre is an institute of the Biotechnology and

Biological Sciences Research Council (BBSRC)

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Notes to Editors

- **Reference:** 'A regulated auxin minimum is required for seed dispersal in *Arabidopsis*', Nature, doi: 10.1038/nature07875
- **Funding:** The research was funded through a core strategic grant from the BBSRC and through grants from the FWO (Research Foundation –Flanders) Odysseus Programme and the Netherlands Organisation for Scientific Research.
- The **John Innes Centre**, www.jic.ac.uk, is an independent, world-leading research centre in plant and microbial sciences with over 800 staff. JIC is based on Norwich Research Park and carries out high quality fundamental, strategic and applied research to understand how plants and microbes work at the molecular, cellular and genetic levels. The JIC also trains scientists and students, collaborates with many other research laboratories and communicates its science to end-users and the general public. The JIC is grant-aided by the Biotechnology and Biological Sciences Research Council.

Pod shattering in Brassica plants is used to disperse the seeds.

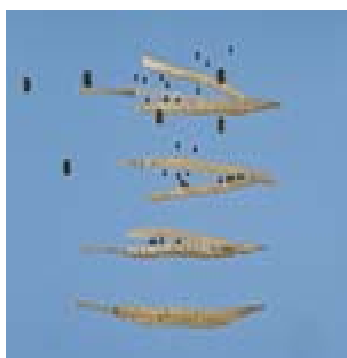


Image by Andrew Davis, JIC

Can these "amber waves of grain" become perennials?

Every time a farmer plants a cash crop, he or she makes a substantial investment of money, time and labour resources. But what if that crop wasn't something that had to be planted every year, but instead, sprouted out of the ground each spring and was ready for a summer harvest?

Michigan State University (MSU) associate professor of crop and soil sciences at the Kellogg Biological Station, Sieg Snapp, is addressing that question. Her team is studying the possibilities for developing perennial wheat as a crop for environmentally friendly agricultural production. She's conducting this work thanks to a four-year, one million dollar U.S. Department of Agriculture organic research grant.

Snapp is leading a team that includes MSU professor of agriculture, food and resource economics, Scott Swinton; MSU outreach specialist, Vicki Morrone; MSU wheat breeder, Janet Lewis; Michigan farmers; and colleagues at Washington State University. Their work

builds on research that leads to a new type of perennial grain crop. "Our goal is to go the next step and develop perennial wheat varieties and management that are practical for farmers to adopt, to use as a ground cover, a forage AND a grain crop.

"Washington and Kansas have conducted innovative plant breeding, crossing intermediate wheat grass forage to annual wheat to get the annual wheat grain characteristics and a close to marketable product," Snapp says. "I realized that nobody was focusing on agronomic management, and practical aspects of variety development, so my student, Brook Wilke, started about three years ago to evaluate varieties suitable for Michigan." Snapp and the team will study these perennial wheat varieties at the W.K. Kellogg Biological Station (KBS), an MSU Agricultural Experiment Station facility located in southwestern Michigan.

"We're going to be investigating them for their adaptation to Michigan farms at the research station and on farms," Snapp says. "We're looking at organic production practices, and different management options, like whether we could possibly graze the crop in the fall to obtain multiple products, forage and grain."

The research team will study the wheat over three to four cropping seasons so they can observe its hardiness under different weather conditions and extremes in temperature and precipitation. The perennial wheat isn't just a money-saving crop --it also protects the environment -- helping to keep the soil in place and capture rain and snow.

"It's always growing and keeps roots in the soil to prevent erosion," Snapp points out. "We've already found that the roots of the perennial wheat can reach three-times deeper than annual wheat roots and this is promising for a crop that could capture carbon."

The perennial wheat may save farmers money at planting, produce enough yield to allow them to realize a profit, provide a secondary income source and protect the environment, but it also has to fit in on the typical Michigan farm. Snapp won't be conducting her studies in a vacuum, but will include farmer co-operators who will be part of the research team, giving input into the experiments and sharing the results they find in using it on their farms.

In a year or two, the researchers will produce enough seed at KBS to provide farmer experimentation opportunities. Snapp plans to include growers who can help test the wheat under different conditions on farms of varying sizes around the state.

"We'll also look at some of the economics and how it does as a single and dual crop," she says. "That's where the agricultural economist will come in and look at profitability of the dual use crop."

Snapp says she's looking forward to seeing how farmers will fit perennial wheat into their crop systems. "My experience with participatory farm research is that you learn new ways from the farmers to make it work," she says.

The studies will continue at KBS while the on-farm research gets underway in a systematic effort

that Snapp has developed that is used by plant breeders in Africa and Asia, a research design called “mother and baby trials.” “The research station trial is the ‘mother’ and that’s the big-scale trial that includes all of the varieties and agronomic treatments,” she says. “The on-farm trials are the ‘baby’ trials. We’ll give farmers the opportunity to choose a few varieties to test on their farm, which will facilitate testing across many environments and under

different management systems including organic production. Farmers will have the opportunity to provide feedback on varieties they test.”

So what will become of this information? It will be used to inform basic science research conducted at universities around the world, but Snapp will also disseminate the study’s outcomes via MSU Extension to farmers who might want to grow perennial

wheat in fields across Michigan and beyond.

“MSU Extension is part of our advisory group and we work with several specialists,” Snapp says. “Their role will become even more important as we get more seed and do this on a larger scale - - we couldn’t do it without Extension.”

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