PLANT BREEDING NEWS

EDITION 241

January 2013
An Electronic Newsletter of Applied Plant Breeding

Clair H. Hershey, Editor
chh23@cornell.edu

Sponsored by GIPB, FAO/AGP and Cornell University's Department of Plant Breeding and Genetics

-**To subscribe**, see instructions here
-**Archived issues** available at: FAO Plant Breeding Newsletter

1. NEWS, ANNOUNCEMENTS AND RESEARCH NOTES

Reviews of broad issues in research and development

1.01 European strategy to tackle great challenges of agriculture and food security under climate change
1.02 Southeast Asia's rice surplus
1.03 Bumper crops mean China can feed itself
1.04 Recent study reveals stagnating crop yields, calls for regional action
1.05 Global partnership launched to drive Africa's agricultural research

People in the news

1.06 McFadden and Borlaug: pioneering rust-resistant wheat

Review of breeding programs

1.07 Field tests confirm the potential of genetically modified potatoes for sustainable potato cultivation
1.08 China to launch campaign for agricultural innovation
1.09 Sowing the seeds of food security in South Sudan - FAO and France join efforts to improve farmers' livelihoods
1.10 Farmers in Burkina Faso get IITA improved cowpea varieties
1.11 UF lettuce breeder takes a local approach to variety development
1.12 Multinational wheat initiative aims to raise yield potential 50%
1.13 Cultivation of hybrid rice increasing in Pakistan
1.14 New padi variety, MR 269, to boost production

Policy and IP issues

1.15 House considers alternative patent royalty scheme for genetically engineered seed
1.16 United States patent - Transgenic plants with increased stress tolerance and yield

GM issues

1.17 Rootworms are resistant to monsanto corn in two states
1.18 Threat to global GM soybean access as patent nears expiry
1.19 China - Golden rice trial triggers sackings, investigation
1.20 Genetically modified food labeling measure to qualify for Washington state ballot
1.21 Especialistas da América Latina e Caribe vão discutir o papel da biotecnologia para o desenvolvimento sustentável

Genetic resources

1.23 Bioversity International releases descriptors for tree tomatoes and its wild relatives
1.24 Global Crop Diversity Trust moves headquarter to Germany
1.25 Unlocking sorghum's gene bank - Adapting agriculture to a changing climate

Trait selection

1.26 Not only humans wilt in heat - developing heat tolerant crops
1.27 Threat of new strains of late blight on potato
1.28 Potato late blight still a threat to global food security
1.29 CXE1 Enzyme improves flavor of ripening tomatoes
1.30 Over expression of EVA1 in potato plants confers potato virus Y resistance
1.31 Wheat genetically engineered to make it nearly gluten free
1.32 Scientists reveal mechanism to enhance rapeseed's oil yield
1.33 Iron biofortification of rice through overexpression of OSFER2
1.34 PSTOL1's application to other crops may have a great impact on global agriculture
1.35 Rwanda Releases iron-rich beans to improve public health
1.36 Inheritance and stability of mutation based herbicide tolerance in cotton (*Gossypium hirsutum* L.)

Molecular/basic genetic research

1.37 Scientists discover genetic key to efficient crops
1.38 New low-cost barley genotyping assay launched
1.39 Scientists learning how multiple-genome plants reproduce
1.40 Plant scientists hope to use epigenetics to improve crops
1.41 Scientist discover new ways in which plants control flower production
1.42 International team unravels the chickpea genome

2. PUBLICATIONS

2.01 Laboratory manual on GMO detection - English and Arabic
2.02 GMOs in the pipeline: E-conference summary

3. WEB AND NETWORKING RESOURCES
- 3.01 Genomics in food and agriculture - FAO e-mail conference
- 3.02 Are you linked-In to the BGRI?
- 3.03 Crop improvement in a changing environment

5. POSITION ANNOUNCEMENTS
- 5.01 Monsanto plant breeding and related scientist positions
- 5.02 Director of the Office of the USDA Chief Scientist

6. MEETINGS, COURSES AND WORKSHOPS

7. EDITOR'S NOTES

---

1 NEWS, ANNOUNCEMENTS AND RESEARCH NOTES

1.01 **European strategy to tackle great challenges of agriculture and food security under climate change**

United Kingdom
January 22, 2013

The Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE JPI) Strategic Research Agenda has been launched following dialogue between high-level international scientists and stakeholders.

It sets out five core research themes reflecting the key challenges to be tackled:
1. Sustainable food security under climate change
2. Environmentally sustainable growth and intensification of agriculture
3. Trade-offs between food supply, biodiversity and ecosystem services
4. Adaptation to climate change
5. Mitigation of climate change

FACCE JPI sets out the strategic priorities for trans-disciplinary and innovative European research on Agriculture, Food Security and Climate Change and provides a framework for the alignment of existing programmes and joint research efforts to achieve the twin objectives of food security and combating climate change.

The Strategic Agenda defines short, medium, and long term research priorities and sets out joint actions for each of these core themes. It aims to reinforce infrastructures and platforms, training and capacity building in Europe and knowledge exchange. It also foresees evaluation and monitoring of its activities. The implementation of the joint research priorities has already begun with the FACCE MACSUR Knowledge Hub on the "Modelling of the impacts of Climate Change". A second joint action, an international call on Greenhouse Gas Mitigation in collaboration with non EU-countries, is planned for early 2013.

For more information visit: www.faccejpi.com or contact by email: secretariatjpi@paris.inra.fr.

FACCE JPI was launched by the European Council in October 2010. Coordinated by the Biotechnology and Biological Sciences Research Council (BBSRC) and the French National Institute for Agricultural Research (INRA), it brings together 21 European and Associated countries engaged to enhance European research capacity for facing the challenge of producing food - as well as feed, fibre and bio-fuels for an increasing population in the context of changing climate. BBSRC and the Department for Environment, Food and Rural Affairs (Defra) are UK members of FACCE-JPI Governing Board. By aligning national research programmes, FACCE JPI aims to reduce duplication, cover gaps, and create European level synergy and critical mass in these areas and to maximise the efficiency of research funding. The Strategic Research Agenda, designed as a research and innovation road map, will steer FACCE JPI activities for the future.

http://www.seedquest.com/news.php?type=news&id_article=33147&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.02 **Southeast Asia's rice surplus**

Washington, DC, USA
January 4, 2013

Southeast Asia dominates the world's rice trade as the leading source of rice exports and the second-largest importing region. This region's rice surplus of exports over imports has grown steadily over the past decade and the USDA projects that it will remain large over the next decade. Full report

http://www.seedquest.com/news.php?type=news&id_article=32683&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.03 **Bumper crops mean China can feed itself**

Beijing, China
December 26, 2012

China increased its grain imports this year, but thanks to consecutive years of bumper crops the country will continue to be able to largely feed itself, a senior agricultural official said on Tuesday.

China's imports of its three main food staples — rice, wheat and corn — reached 10.09 million metric tons in the first 10 months of this year, an increase of 9.29 million tons compared with the same period last year, said Bi Meijia, chief economist of the

Ministry of Agriculture. The total imports of the three main grain crops were 3.57 million tons in 2011. China did ramp up its grain imports in recent years, mainly as a result of the increasing domestic need for grains for fodder and industrial use, and the rising demand for more grain varieties," he said at a news conference organized by the State Council Information Office.

The strong surge in imports of the three staple crops has triggered widespread concern about the country's long-asserted goal of maintaining its food security by domestically supplying at least 95 percent of the grains that it consumes.

But both government authorities and analysts said there is no shortage of grain in China. "The total import volume of rice, wheat and corn now accounts only for about 2 percent of the country's production output. China will surely continue to be largely self-sufficient in grain production," Bi said.

Analysts believed so much was imported mainly because of the big price differences between domestic and relatively cheaper international markets. They said this price discrepancy was created by the government's minimum purchase price, which shored up domestic grain prices while they declined on the global market due to weak demand as a result of the sluggish economic recovery. "The government should allow the purchase price some flexibility to fluctuate with international market prices," said Ma Wenfeng, a senior analyst at Beijing Orient Agribusiness Consultant, one of the industry's largest specialist consultancies.

Ma also said cheap imports are likely to push down domestic grain prices while greatly adding to the country's stockpiles, which is likely to lead to a waste of grain in processing and storage.

Also, the import volume of soybeans from this January to October was 48.34 million tons in China, a 16.6 percent year-on-year increase during the first 10 months of this year, Customs statistics showed. The total import of soybeans is expected to reach more than 60 million tons in 2012 because of favorable prices in the international market, Bi said. But China will certainly satisfy more than 40 percent of its demand for oil crops by itself, he said.

China recorded a grain output of more than 589 million tons in 2012. It was the ninth consecutive year of increased grain harvests, according to the ministry. From 2004 to 2012, the total grain output rose by more than 158 million tons, of which nearly 60 percent came from the improved yield on corn, it said.

Also, about 88 percent of the increase in grain output over those nine years came from the country's 13 major grain-producing regions. For instance, an increase in grain output in Northeast China, where industrialized agriculture produces high yields, accounted for nearly 40 percent of the country's increase in grain output during that period, according to the ministry.

The increase in grain output relying on the expansion of arable land is quite limited in the future because of the country's rapid urbanization, Bi said. "So more advanced agricultural technology input is needed to improve grain yields per unit," he said.

http://www.seedquest.com/news.php?type=news&id_article=32487&id_region=&id_category=&id_crop=

Source: Chinadaily.com.cn via Ministry of Agriculture

(Return to Contents)

++++++++++++++++++++++

1.04 **Recent study reveals stagnating crop yields, calls for regional action**

In a study published in the Dec. 18 issue of Nature Communications, the crop yields of four major crops were globally examined using huge crop census data and were found to show stagnating or declining patterns in 24 to 39 percent of the harvested areas.

Scientists from the University of Minnesota's Institute on the Environment and McGill University in Montreal, Canada developed geographically detailed maps of annual crop harvested areas and yields of corn, rice, wheat and soybeans from 1961 to 2008.

One of the important findings shows that China and India, the two most populous countries in the world, have vast areas characterized by an alarming yield stagnation or decline in recent years. According to the authors, the overall yield pattern "underscores the challenge of meeting increasing global agricultural demands".

The paper suggests two main actions to address the stagnating or declining yield trend. First, it recommends to maintain the yield gains in high-performing areas or the 61 to 76 percent of croplands where yield is still climbing, and second, it encourages new investments in under performing regions around the world.

Read the news release at http://www1.umn.edu/news/newsreleases/2012/UR_CONTENT_424268.html and the journal article at http://www.nature.com/ncomms/journal/v3/n12/full/ncomms2296.html

Source: Crop Biotech Update December 19, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++

1.05 **Global partnership launched to drive Africa's agricultural research**

Nairobi, Kenya
January 29, 2013

by George Achia

- *Partnership launched to promote science-based agricultural transformations*
- *Research will focus on Africa's most pressing agricultural challenges*
- *Experts fear partnership could undermine other African networking frameworks*

An international agricultural research programme has unveiled plans to collaborate with the African Union to drive agricultural research and boost productivity on the continent.

In a Memorandum of Understanding signed earlier this month (15 January), the Consortium of International Agricultural Research Centers (CGIAR Consortium) set out its agreement with the African Union Commission (AUC) to work towards aligning research agendas to help create a food secure future for Africa.

The collaboration will support the efforts of African research institutes at the country, sub-regional and continental level to realise science-based agricultural transformations and advance science and technology agendas, says Piers Bocock, director of knowledge management and communications at the CGIAR Consortium.

"In addition to developing capacity and sharing knowledge, the memorandum will facilitate the sharing of existing scientific and technological breakthroughs," Bocock tells SciDev.Net.

The CGIAR Consortium is a global partnership that brings together 15 of the world's leading agriculture research centres and that also leads 16 comprehensive global agricultural research programmes addressing food security.

The consortium will work to improve its coordination with governmental agricultural strategies and the AUC's Comprehensive Africa Agriculture Development Programme (CAADP), which aims to boost African agriculture by addressing policy and capacity issues in the sector. "By understanding the priorities of African governments, we can ensure that our research is focused on the most pressing agricultural challenges in Africa," Bocock says.

Abebe Haile Gabriel, the AUC's director of rural economy and agriculture, says the memorandum "calls for joint actions to guide the implementation of programmes and support activities for the CAADP," while noting that the agreement does not include any financial exchange.

But collaborations such as this also raise a number of potentially challenging issues, says Maurice Bolo, director of the Scinnovent Centre, a Nairobi-based research and training organisation focused on science and innovation.

Bolo is keen to know, for example, how the partnership plans to tap into existing regional centres of excellence that were created under the New Partnership for Africa's Development's (NEPAD) Consolidated Plan of Action (CPA) on Africa's Science and Technology. "This cooperation may further undermine intra-African networking or cooperation, which is already suffering, and there is little attention given to programmatic synergies with other continental initiatives, such as the CPA," he says.

Bolo adds that there is very little collaboration between scientists in different African countries, and that this does not augur well for attempts aimed at increasing such collaboration.

He also expresses concern that the new memorandum does not focus sufficiently on agricultural innovation, a deficiency that he feels is common across the continent. "Research and development products have stagnated in laboratories, whether at the

CGIAR or African research institutes, and any new collaboration should give attention to moving these products into use or commercialisation," Bolo says.

This article has been produced by SciDev.Net's Sub-Saharan Africa desk.

http://www.seedquest.com/news.php?type=news&id_article=33395&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.06 **McFadden and Borlaug: pioneering rust-resistant wheat**

Brookings, South Dakota, USA
January 7, 2013

Plant diseases can have a devastating impact on human lifestyle (starvation, immigration, etc.). Late blight of potato, southern corn leaf blight, and stem rust in wheat are a few examples that will be quoted in history books for ages.

The civilized world has cultivated wheat for centuries, and the prospect of golden fields of wheat provided fuel for much of the westward expansion of the United States in the late 1800's and early 1900's. During a brief period of time in the Dakota Territory in the late 1800's, wheat acreage increased from just over 100,000 acres to well over a million acres. During one year in the height of this heyday, 1897, it has been stated that two-thirds of the world's wheat was shipped from present-day Eureka, SD, and wagons bearing the crop rolled in from as far as 75 miles away.

Wheat producers consider a number of traits when choosing wheat varieties to plant, including yield, test weight, maturity, straw strength, protein content, winter hardiness (winter wheat), height, end-use quality, and disease resistance. Of all the characteristics they consider, stem rust resistance is the one wheat producers don't worry much about. The reason is simple; virtually all public and private wheat breeding programs place a high priority on stem rust resistance, and they don't release varieties without a minimum level of resistance to the devastating disease.

Fortunately, today's wheat breeders have a large gene pool of wheat germplasm to work with in pursuit of high-yielding, adaptable wheat varieties to continue to feed the world. Inherent in this gene pool is resistance to stem rust, but that wasn't always the case.

In 1904 an epidemic of stem rust occurred, reducing production in South Dakota by 50%. For the next several decades, planted wheat acres were high, but rusts and scab plagued wheat farmers, nearly wiping out the crop in 1920. Wheat farmers across the world were experiencing similar challenges, causing poverty and hunger.

During this time, Edgar McFadden, born in 1891 near Webster, SD, was coming of age. In 1911, at 20 years of age, he watched a wheat crop with 40 Bu/acre potential produce 5 Bu/acre because of stem rust, yet the rust hadn't bothered a patch of Yaroslav emmer, an ancient grain crop. When he enrolled in the Dakota Agricultural

College, now South Dakota State University, that fall, he wondered if emmer crossed with wheat would provide rust resistance in the progeny.

At least two articles tell the story of Edgar McFadden and his contributions to the wheat industry, the Spring, 1999 issue of SDSU's Farm and Home Research, "Hope" article and the November/December 2007 issue of the South Dakota Magazine's "A Grain of Hope" article. In short, McFadden successfully crossed emmer and the spring wheat variety, Marquis, to eventually produce the variety, Hope, which was resistant to both stem and leaf rusts. As SDSU spring wheat breeder Karl Glover states in the article, "A Grain of Hope", plant breeding textbooks no longer mention McFadden, or only in passing.

However, as former SDSU winter wheat breeder, Amir Ibrahim said in the article, many wheat varieties still have "Hope" wheat as a great-grandparent. Magazines of the 1940's reported that perhaps 25 million people across the world escaped death by starvation due to bread derived from McFadden's rust resistant wheat, "Hope".

Another pioneer of rust-resistant and semi-dwarf wheat, Norman Borlaug, was born March 25, 1914 on a farm in Iowa. Borlaug received his schooling at the University of Minnesota, and he spent most of his life breeding rust-resistant and semi-dwarf wheat varieties. The semi-dwarf characteristic was recognized by Borlaug as being critical to produce wheat that didn't lodge under high yields. Norman Borlaug is credited with saving over a billion people from starvation by helping people across the world increase their wheat production. Norman Borlaug was a plant pathologist, but he also proved to be a good breeder.

The story of Norman Borlaug is well documented; including the film, "Freedom from Famine – The Norman Borlaug Story"; the book, "Our Daily Bread: The Essential Norman Borlaug," written by Noel Vietmeyer; and numerous other films and books. A search of "Norman Borlaug" using any Internet search engine or on YouTube will produce a number of results.

Wheat farmers and anyone who eats products made from wheat should remember these and other pioneers who revolutionized the wheat industry

http://www.seedquest.com/news.php?type=news&id_article=32821&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.07 **Field tests confirm the potential of genetically modified potatoes for sustainable potato cultivation**

Wetteren, Belgium
January 8, 2013

After a two-year scientific field trial with genetically modified potatoes, researchers have concluded that potatoes with multiple resistance to potato diseases can make

our potato growing much more sustainable. Both in 2011 and 2012, genetically modified potatoes showed greatly decreased susceptibility to *Phytophthora infestans*.

Potato cultivation here has been threatened for decades by a potato disease caused by the fungal blight *Phytophthora infestans*. In the wet summer of 2012, potato growers had to spray more than 20 times in order to keep this blight under control. That means not only ecological and social pressure, but also costs for Belgian farmers estimated at approximately 55 million euros (for the purchase and application of products, lost revenues and losses during the storage of the potatoes).

Cultivation of sustainable, resistant potatoes is expected to be able to reduce fungicide usage in this crop sector by 80%. Potato growers can also benefit financially, even though the resistant plant stocks will be more expensive. The farmers will also not have to be ready with their spraying equipment at a moment's notice, which will reduce stress levels. The researchers also predict a positive effect for those potato growers who do not elect to use sustainable, resistant potatoes: the greater the acreage of sustainable and resistant potatoes planted, the less chance *Phytophthora* will get to reproduce.

In the scientific field trials in Wetteren, twenty-six different genetically modified strains of potatoes were tested in 2011 and 2012, each containing one to three genes for natural resistance that come from wild relatives of our cultivated potatoes. They were compared against susceptible reference varieties such as Désirée, Bintje, Nicola, Agria and Innovator, and against the non-susceptible reference varieties Bionica, Toluca and Sarpo-Mira. The genetically modified potatoes scored better than the non-susceptible varieties Bionica and Toluca that are used in biocultivation. The results of the field trials are to be published in an international scientific journal.

The natural resistance genes (some of which still contained a xenogenetic selection marker) were inserted in the middle-late variety Désirée. Lines that contain only natural resistance genes and no genetic material from other species are referred to as 'cisgenic'. The potato plants tested in the field were test lines that will not be used commercially. In order to progress towards genuine development of more sustainable potato cultivation, good combinations of resistance genes will now have to be inserted into varieties such as Bintje that are interesting for Belgian farmers. It will still be several years before potatoes such as these are available for new field trials.

http://www.seedquest.com/news.php?type=news&id_article=33087&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.08 **China to launch campaign for agricultural innovation**

Beijing, China
January 23, 2013

The Agricultural Science and Technology Innovation Project will be launched this year. The announcement was made by the Chinese Academy of Agricultural Sciences

(CAAS) at a media briefing in Beijing on Jan. 21st, 2013. Vice Minister of Agriculture and CAAS President Li Jiayang attended the media briefing.

The Project is initiated by the Ministry of Agriculture, funded by the Ministry of Finance, and implemented by CAAS. It is an important move in agricultural science and technology, prioritizing China's S&T institutional reform, S&T innovation capacity building and international competitiveness lift.

The Project aims at building CAAS into a world-class agricultural academy through the following measures:

1. A pro-innovation academic discipline system. Under the Project, a three-tier discipline system (discipline clusters, study subjects and research fields) is to be constituted to tackle research overlap and encourage innovation.
2. Sustained research programs. In light of research trend and China's innovation needs in key technologies, priorities and tasks are to be identified for different disciplines to ensure long-term research.
3. Networking among institutes. Mechanism will be established among national institutes and colleges to share resources within and among discipline clusters.
4. Performance evaluation approach. The Project will introduce research performance evaluation into CAAS to guide resource allocation and enhance efficiency.
5. Open recruitment. CAAS will carry out global recruitment to attract highly-competent scientists across the world to work for China's agricultural development.

The Project will cover prominent agricultural issues in China, such as breeding, animal disease control, and quality standards on agricultural products.

The 13-year Project will be progressively carried out in three phases, namely phase I (2013-2015), phase II (2016-2020) and phase III (2021-2025).

http://www.seedquest.com/news.php?type=news&id_article=33143&id_region=&id_category=&id_crop=

Source:SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.09 **Sowing the seeds of food security in South Sudan - FAO and France join efforts to improve farmers' livelihoods**

Rome, Italy
January 15, 2013

A new programme in the Republic of South Sudan is helping vulnerable farmers to improve their livelihoods by boosting the quality of the seeds used to produce key crops.

With the support of the Government of France, FAO is joining efforts with the South Sudanese Ministry of Agriculture to implement the year-long programme in several states.

The project, valued at more than $612 000 (EUR 500 000), will help to train farmers in the production, storage and marketing of quality seeds and cuttings for staple crops like sorghum, maize, cassava and cowpeas. It will also increase the availability of seeds to South Sudan's most vulnerable farmers.

Decades of conflict and displacement have taken their toll on farmers' access to quality seeds and other planting materials, and eroded their knowledge of seed production techniques. Together, these factors have severely undermined crop productivity and farmers' livelihoods.
"The importance of seeds to the food security and livelihoods of South Sudan's farmers and rural communities is very high" said Sue Lautze, the head of FAO's office in Juba. "Despite widespread food insecurity, the country is committed to ensuring food security for all, as soon as possible. Seeds are a critical component to realizing this important ambition."

The programme aims to help an estimated 30 000 people from more than 5 000 vulnerable farming households, in addition to 400 seed producers. The beneficiaries, half of whom are women, live in the states of Central Equatoria, Western Equatoria, Lakes, Western Bahr el Ghazal and Northern Bahr el Ghazal.

Building self-reliance
"We know that the formal seed sector in South Sudan is underdeveloped and in desperate need of rehabilitation" said Michael Legge, Minister for Agriculture and Forestry for Central Equatoria State. "South Sudan relies heavily on neighbouring countries for certified seed, which is costly, and farmers rely on the informal seed sector."

More than 90 percent of South Sudanese farmers still depend on the informal seed system, which is based primarily on saved seeds (42 percent), social networks (26 percent), and local markets (22 percent). Typically, farmers repeatedly use saved seeds from one season to the next, which tends to lessen the genetic purity of the seed.

Farming families are ‘seed secure' only when they have access to adequate quantities of seed, of acceptable quality, and in time for planting. These three key elements of seed security (availability, access and quality) are of concern in South Sudan.

Improving the country's ability to produce quality seed would help to inject money into the local economy and provide training that would benefit farmers for years to come.

Seed smart
"Through the project, FAO aims to not only reduce the number of households affected by food insecurity through improving the availability and access of locally produced quality seed on the market, but also aims to improve the incomes and capacity of seed producers," said Joseph Okidi, Project Officer with FAO South Sudan.

Technical capacity in quality seed production, especially among youth, and even within the government services, is very limited.

The project will include seed fairs, capacity development for seed enterprises, input distribution and Farmer Field Schools. It will also increase the amount of land dedicated to quality-seed multiplication.

Proven success
FAO has been supporting the seed sector in South Sudan for several years. In 2011 nearly 5 000 vulnerable households, 513 seed producers and 23 government extension workers benefitted from a similar project funded by the Government of France. This is one of several important seed projects FAO is implementing throughout South Sudan.

"After FAO supported us with the project, our farmers' group was able to come together and save enough money to buy four bulls. We used the two pairs to plough our fields," said Lou Marial, a farmer from Adwel, Rumbek East County in Lakes State, who benefitted from the previous project.

"We have managed to expand our production area and are expecting a significantly bigger harvest this year," Marial added.

"It's a real pleasure to see how our support has been transformed into such a significant seed production," said Laetitia Tremel, Programme Officer at the French Embassy in Juba.

The 2011 project intervention led to the production of more than 350 tonnes of quality seeds and planting materials, and injected some USD 300 000 into the local economy.

Although South Sudan has enormous agricultural potential, it faces multiple challenges to realizing national and household food security. The seed sector is a primary tool for ending hunger and FAO and the Government of France joined efforts to develop this sector in a sustainable manner.

http://www.seedquest.com/news.php?type=news&id_article=32980&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.10 **Farmers in Burkina Faso get IITA improved cowpea varieties**

Ibadan, Nigeria
January 16, 2013

Burkina Faso has released two improved cowpea varieties to help advance better nutrition for women and children, and boost the incomes of farmers. The two varieties, IT99K-573-2-1 and IT98K-205-8, were developed by the International Institute of Tropical Agriculture (IITA), and have undergone participatory varietal selection with farmers in the central and northern region of Burkina Faso. Local farmers and researchers selected the varieties from a basket of options after a two-

year trial, thanks to funds from the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF).

The varieties being selected are early maturing and high yielding and are also resistant to *Striga*—a parasitic weed that limits the yield of cowpea. "These varieties mature in about 60 days as opposed to local varieties that mature in about 80-90 days," says Dr Haruki Ishikawa, IITA Project Coordinator for the Appropriate Varieties of Early maturing Cowpea for Burkina Faso (AVEC-BF) project.

Generally, cowpea is an important crop in Burkina Faso as it provides food and cash for farmers, and fodder for livestock. Most local varieties in the country record a yield of between 400 kg and 600 kg per hectare. "But the new varieties have a potential yield of 2170Kg/ha," Dr Ishikawa said.

Farmers love the varieties for their yield, color and cooking qualities and have given the varieties the following local names: Yiis yande for IT99K-573-2-1, meaning a crop that helps farmers to escape from shame arising from hunger; and Niizwe for IT98K-205-8, meaning a crop that has brought an end to hunger.

Burkina Faso's Research, Science & Innovation Minister, Gnissa Isaïe Konaté, who is also a researcher, said that the physical qualities of the varieties such as color and bigger size were appealing and would make farmers more competitive in the region. "Also these varieties will help farmers to adapt better with climate change," he added.

Dr Satoru Muranaka, a scientist with the Japan International Center for Agricultural Sciences (JIRCAS), who initiated the project while working for IITA, notes that the improved varieties offer a lot of benefits to farmers. "For instance, because these varieties are early maturing, they will help cowpea farmers to escape from drought. Also farmers now have a crop that they can harvest early, consume, and sell to generate income when other crops are still on the field. Such incomes help farmers to pay school fees for their children. Again, with protein content of about 20 percent, cowpea provides a good option to tackle malnutrition in local communities," Dr Muranaka added.

Dr. Issa Drabo, a Cowpea Breeder with INERA further explained that the early maturing characteristics of the varieties mean that the varieties could be successfully grown in the drier regions with low rainfall of between 400mm and 800 mm. The AVEC-BF project is a research for development project that aims to disseminate improved varieties.

The project is developing new dissemination system for cowpea that combines selection of appropriate varieties for the region, community seed system, and farmer field school activities with the ultimate goal of improving access of farmers to improved varieties and technologies. Japanese Ambassador to Burkina Faso, His Excellency Tsutomu Sugiura called for the scaling up of the project, having recorded significant milestones in a short period of time. "This is the kind of project that should be supported to continue. I hope it will not stop at this stage," he said.

http://www.seedquest.com/news.php?type=news&id_article=32987&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.11 **UF lettuce breeder takes a local approach to variety development**

January 8, 2013

By Vicky Boyd

After a several-year hiatus, University of Florida's lettuce breeding program is up and running again at the Everglades Research and Education Center near Belle Glade. Huangjun Lu, who joined the faculty as an assistant professor of plant breeding in June 2010, leads the effort.

He is joined by several other colleagues, such as Richard Raid, Gregg Neussley and David Sui, who provide input in their respective areas of expertise.

Lettuce is an important crop for the Everglades Agricultural Area, Lu says, with the South Florida region accounting for about 15 percent of U.S. production.

The crop—grown on about 11,000 acres—is valued at $30 million to $35 annually, with iceberg, romaine and baby lettuce being the main types.

Florida ranks third nationally, only to first-place California and second-place Arizona.

Taking inventory

Much of Lu's time initially has been spent taking inventory of existing university germplasm and conducting trials to determine what desirable traits the plant material might be able to contribute to his efforts.

The germplasm dates back to 1991, and many of the seeds were from the 1980s, he says.

Many of the envelopes and packages containing the seeds were broken, and Lu says only about 80 of the germplasms were still viable after all of these years.

In October 2010, he planted the seeds and found that some of the seeds didn't even germinate while others produced plants that were stunted or never reached maturity. He selected the best performers to use for crosses.

Developing a new variety that's commercially viable takes at least 10 generations and about five years.

After each generation, breeders weed out all but the top 5 percent to 10 percent to move on. Lu says he makes about 50 crosses per year.

Lu also conducted trials in two locations to determine what desirable traits were present in commonly planted varieties.

Of the romaine varieties, he looked at Terapin, Manatee, Okeechobee and 70096, an unreleased UF variety. With crisphead, he looked at Gator, Raleigh and 8074.

Based on the trials, Lu says it appears that 70096 has resistance to banded cucumber beetle.
In addition, he's developed a more efficient screening method for bacterial leaf spot, an unpredictable disease that can be devastating because there are no chemical controls.

The bacterial disease, spread by wind and rain, was serious in 2010 but almost non-existent in 2011.

Expanding the search
Lu obtained 178 other germplasm lines from the Agricultural Research Service's lettuce germplasm collection in Pullman, Wash., to screen. One of those lines emerged from the screening without bacterial spot symptoms.

"So this is a good source of resistance I'm currently using," he says. "I'm trying to find out how many genes are responsible but we just started this program."

Starting this year, Lu says he hopes to have some of the better-looking breeding material in grower trials "to let them watch to see how these materials perform."

"My breeding program is for the local growers, but it has the opportunity to deliver our knowledge to the national community and international community," he says.

http://www.thegrower.com/issues/citrus-vegetable/UF-lettuce-breeder-takes-a-local-approach-to-variety-development-186041821.html

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++++

1.12 **Multinational wheat initiative aims to raise yield potential 50%**

Washington, DC, USA
December 20, 2012

Representatives from 16 countries and international organizations recently agreed to launch an initiative to increase wheat's genetic yield potential by 50 percent in the next 20 years.

The group met in Mexico City in mid-November to set up the framework for the multinational initiative, known as the **Wheat Yield Network** (WYN).

According to a release by the United Kingdom's Biotechnology and Biological Sciences Research Council (BBSRC), which pushed for the creation of the WYN, the new effort will support research and development activities to raise global wheat yields and develop new varieties adapted to different geographical regions.

The creation of the WYN follows on the heels of the establishment of the Wheat Initiative through the G20 in 2011, with which the WYN will seek to coordinate. The G20's Wheat Initiative aims to create opportunities for coordination of national and

international research programs dedicated to wheat and to enhance platforms for sharing of data between wheat researchers.

To help facilitate WYN's ambitious yield goal, WYN partners are planning to invest $50-75 million in the next five years, with details of operations and structures still to be determined.
The intention of the network is to bring together funding from governmental and non-governmental entities to support basic and applied wheat research. A key focus of the WYN will be looking at boosting wheat yields through improvements to the plant's fundamental processes including photosynthesis.

"The Wheat Yield Network will aim to improve the yield potential of wheat by improving the physiology of the wheat plant itself, then combining those improvements with all other breeding objectives across governments and institutions," said David Marshall, acting National Program Leader for USDA's Agricultural Research Service (ARS), who is the U.S. government representative to the WYN.

U.S. signatories to the new initiative include USDA and the U.S. Agency for International Development (USAID). Other participants include governmental organizations from Canada, Australia, the United Kingdom, China, Argentina, Brazil, Turkey, Germany, India, Mexico, France, Japan and Ireland. The international research organization CGIAR, which includes important international research institutions CIMMYT and ICARDA, is also a participant. To date, Syngenta is the sole industry partner.

http://www.seedquest.com/news.php?type=news&id_article=32488&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++++

1.13 **Cultivation of hybrid rice increasing in Pakistan**

Pakistan
December 27, 2012

Vice Chairman of Rice Exporters Association of Pakistan (REAP) Samee Ullah has appreciated that the cultivation of hybrid rice has been increasing the per-acre-yield of rice in the Pakistan.

Currently, hybrid rice is cultivated on an area of approximately 500,000 acres in the country. In Sindh, hybrid rice is cultivated in Larkana, Jacobabad, Kandhkot, Shikarpur, Thal, Kashmore, Badin, Tando Muhammad Khan, Golarchi, Sajawal and Thatta etc, in Balochistan, hybrid rice is cultivated in the vast areas of Jafferabad, Nasirabad and Usta Muhammad etc, while in Punjab it is being cultivated in the areas of Multan, Sadiqabad, Rahim Yar Khan, Dera Ghazi Khan, Bhawalpur etc.

The reason for the popularity of hybrid rice among the farmers is that an average yield of around 80 maunds per acre is usually achieved by them and in some cases,

progressive growers even achieve as high as 110 to 120 maunds per acre, Samee claimed.

In Pakistan the national yield per hectare of rice is still 2.387 mt/ha, which is one of the lowest in the world, Samee added. He also that maintained, IRRI-6 of Philippines introduced in the country some more than 40 years ago, the variety had now almost been degenerated.

For More: http://www.brecorder.com/agriculture-a-allied/183:pakistan/1269636:reap-hails-cultivation-of-hybrid-rice/?date=2012-12-19

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.14 **New padi variety, MR 269, to boost production**

Prime Minister Datuk Seri Najib Tun Razak launched a new padi variety, MR 269, a normal inbred variety which has a better resistance against the leaf blast disease and pests in order to increase national padi production. The launch was in conjunction with the launching of the Malaysian Agricultural, Horticultural and Agro-Tourism Exhibition (MAHA International 2012) at the Malaysian Agricultural Exposition Park Serdang (MAEPS) recently.

Najib also launched a mill specifically for the fragrant rice. The mill was upgraded from producing 500 kg of fragrant rice per day to a commercial mini factory capable of producing six to eight metric tons per day. Also present were Agriculture and Agro-based Industry Minister Datuk Seri Noh Omar, secretary-general of the ministry, Datuk Mohd Hashim Abdullah, and the director-general of the Malaysian Agricultural Research and Development Institute (MARDI), Datuk Dr Abd Shukor Abd Rahman. Mardi said in a statement that the MR 269 variety was a new strain developed by MARDI which was suitable on land in the various rice bowl areas.

For more information on MR 269, contact Azman Mohd Saad at azmanms@mardi.gov.my

Source: Crop Biotech Update December 12, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++

1.15 **House considers alternative patent royalty scheme for genetically engineered seed**

By Kevin E. Noonan

The tendency for members of the House of Representatives to exhibit ignorance of the patent system, so amply demonstrated in the "debate" over H.R. 6621 at the end of the last Congress (*see* "Congressional Misunderstandings (Apparently) Motivate H.R. 6621"), persists in the 113th Congress. The most recent example is H.R. 193, the "Seed Availability and Competition Act of 2013" introduced on January 4th by Representative Marcy Kaptur, D-OH (9th District, which includes Toledo).

The seeming intent of the bill is to substitute government bureaucrats from the Departments of Agriculture and the Treasury for private patentees in enforcing patents on genetically engineered seed. In addition to amounting to a compulsory license, Rep. Kaptur has evidently never considered that, sometimes, the scariest sentence in the English language is "I'm from the Federal government, and I'm here to help." This is not surprising; Rep. Kaptur was recently elected to her 15th term, and her background is not in patent law or agriculture: her professional training is in urban planning.

The bill requires "persons [farmers] who seek to retain seed harvested from the planting of patented seeds to register with the Secretary of Agriculture and pay fees set by the Secretary for retaining such seed, and for other purposes." Specifically, any farmer who plants patented seed *or* seed "derived from" patented seed to retain the seed for replanting is subject to two requirements. The farmer must submit a notice to the Secretary of Agriculture of the intent to retain patented seed for replanting, (§ 2(a)(1)) and to pay a fee established by the Secretary and dependent on the "type and quantity" of seed that can be retained and "any other information" the Secretary determines to be "appropriate" (§ 2(a)(2)).

The fee is paid to the Federal government (§ 2(b)) and deposited into a "Patented Seed Fund" established in the Treasury (§ 2(e)(1)(2)). The fees will be refunded to any farmer who can establish that, after paying the fees, natural disaster or "related" circumstances prevented them from replanting the seed (§ 2(c)).

The monies collected from the farmers is then paid to the patent holders by the goverment (§ 2(d)). The motivation for all these seeming legal and economic inefficiencies finally becomes evident in § 2(f), which provides that any farmer who complies with the provisions of the bill (if enacted) "shall not be bound" by any contractual, patent royalty, or licensing fees.

Not wishing to be considered un-American, Rep. Kaptur (at left) included in the bill a provision (§ 3) whereby the Treasury Department will collect a tariff amounting to the difference between the royalties or licensing fees imposed upon purchasers of patented seed in the U.S. and any lower royalties or licensing fees paid by purchasers of patented seeds in a foreign country and then imported into the U.S. Those tariffs are paid into the Patented Seed Fund, presumably for payment to patent holders who have negotiated the lesser fees in the foreign country in the first place.

It is hard to know where to begin. Clearly the political controversy engendered by the many patented seed cases brought by patentees against farmers over the past decade, and the recent kerfuffle produced by the Public Patent Foundation in its suit on behalf or "organic" farmers came to Rep. Kaptur's attention. And in some ways this is a classic "split the baby" result, where the government (and its sensitivity to political considerations) can determine the "appropriate" royalty for replanted seed and distribute it to the patent holders.

The tariff provisions might also be seen as a boon to those patentees who were unable to obtain royalties or patent licensing fee abroad commensurate with the fees they collect from U.S. farmers.

But in reality, of course, the bill imposes a compulsory license on holders of genetically engineered seed patents, who have resisted the political pressure to permit farmers to replant seed instead of purchasing seed for each planting. Although this has imposed legal and public relations costs on these patentees, the patent grant permits them to impose these restrictions (unless and until the Supreme Court decides otherwise in *Bowman v. Monsanto*). But regardless of which side has the better policy argument in that debate, Rep. Kaptur's bill is not a remedy required by the politics or economics of the situation. Indeed, it would just impose another government bureaucracy on U.S. agriculture that would not promote either agriculture or technological progress.

The bill has been referred to the House subcommittee on Rural Development, Research, Biotechnology, and Foreign Agriculture for further consideration.

Text of the bill:

A bill:
To require persons who seek to retain seed harvested from the planting of patented seeds to register with the Secretary of Agriculture and pay fees set by the Secretary for retaining such seed, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Section 1. Short title
This Act may be cited as the "Seed Availability and 5 Competition Act of 2013".

Section 2. Retaining patented seed
(a) Registration:
Any person who plants patented seed or seed derived from patented seed may retain seed from the harvest of the planted seed for replanting by that person if that person— (1) submits to the Secretary of Agriculture notice, in such form as the Secretary may require, of the type and quantity of seed to be retained and any other information the Secretary determines to be appropriate; and (2) pays the fee established by the Secretary pursuant to subsection (b) for the type and quantity of seed retained.

(b) Fees:
The Secretary of Agriculture shall establish a fee to be paid by a person pursuant to subsection (a)(2) based on the type and quantity of seed retained. The Secretary shall deposit amounts collected pursuant to subsection (a)(2) in the Patented Seed Fund established under subsection (e)(1).

(c) Refunds:
The Secretary of Agriculture may refund or make an adjustment of the fee paid pursuant to subsection (a)(2) when the person is unable to plant or harvest the retained seed as a result of a natural disaster or related condition and under such

other circumstances as the Secretary considers such refund or adjustment appropriate.

(d) Distributions:
The Secretary of Agriculture shall pay the collected fees to the appropriate patent holders, at a frequency that the Secretary determines is appropriate, from the Patented Seed Fund established under subsection (e)(1), taking into consideration the possibility of refunds pursuant to subsection (c).

(e) Patented seed fund:
(1) Establishment.—There is established in the Treasury of the United States a fund to be known as the "Patented Seed Fund", consisting of such amounts as may be received by the Secretary and deposited into such Fund as provided in this section. (2) Administration.—The Fund shall be administered by the Secretary of Agriculture and all moneys in the Fund shall be distributed solely by the Secretary in accordance with this section and shall not be distributed or appropriated for any other purpose. Amounts in the Fund are available without further appropriation and until expended to make payments to patent holders.

(f) Inapplicability of contracts and patent fees:
A person who retains seed under subsection (a) from the harvest of patented seed or seed derived from patented seed shall not be bound by any contractual limitation on retaining such seed, or by any requirement to pay royalties or licensing or other fees, by reason of the patent, for retaining such seed. (g) DEFINITION.—In this section, the term "patented seed" means seed for which a person holds a valid patent.

SEC. 3. Tariff on certain imported products
(a) Tariff
In any case in which— (1) genetically modified seed on which royalties or licensing or other fees are charged by the owner of a patent on such seed to persons purchasing the seed in the United States is exported, and (2) no such fees, or a lesser amount of such fees, are charged to purchasers of the exported seed in a foreign country, then there shall be imposed on any product of the exported seed from that foreign country that enters the customs territory of the United States a duty determined by the Secretary of the Treasury, in addition to any duty that otherwise applies, in an amount that recovers the difference between the fees paid by purchasers of the seed in the United States and purchasers of the exported seed in that country.

(b) Deposit of duties
There shall be deposited in the Patented Seed Fund established under section 2(e)(1) the amount of all duties collected under subsection (a) for distribution to the appropriate patent holders in accordance with section 2(d).

(c) Definitions
In this section— (1) the term "genetically modified seed" means any seed that contains a genetically modified material, was produced with a genetically modified material, or is descended from a seed that contained a genetically modified material or was produced with a genetically modified material; and (2) the term "genetically modified material" means material that has been altered at the molecular or cellular level by means that are not possible under natural conditions or processes (including recombinant DNA and RNA techniques, cell fusion, microencapsulation, macroencapsulation, gene deletion and doubling, introducing a foreign gene, and

changing the positions of genes), other than a means consisting exclusively of breeding, conjugation, fermentation, hybridization, in vitro fertilization, tissue culture, or mutagenesis.

http://www.patentdocs.org/2013/01/house-considers-alternative-patent-royalty-scheme-for-genetically-engineered-seed.html

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.16 **United States patent - Transgenic plants with increased stress tolerance and yield**

Washington, DC,USA
December 25, 2012

United States Patent 8,338,661 Shirley , et al. December 25, 2012 *Transgenic plants with increased stress tolerance and yield*

Abstract
Polynucleotides are disclosed which are capable of enhancing a growth, yield under water-limited conditions, and/or increased tolerance to an environmental stress of a plant transformed to contain such polynucleotides. Also provided are methods of using such polynucleotides and transgenic plants and agricultural products, including seeds, containing such polynucleotides as transgenes.

Inventors: Shirley; Amber (Durham, NC), Sarria-Millan; Rodrigo (West Lafayette, IN) Assignee: BASF Plant Science GmbH (DE) Appl. No.: 12/668,665 Filed: July 11, 2008 PCT Filed: July 11, 2008 PCT No.: PCT/EP2008/059070 371(c)(1),(2),(4) Date: January 12, 2010 PCT Pub. No.: WO2009/010460 PCT Pub. Date: January 22, 2009
Full text:

http://www.seedquest.com/news.php?type=news&id_article=32607&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.17 **Rootworms are resistant to Monsanto corn in two states**

Jan 18, 2013

By Jack Kaskey

The U.S. Environmental Protection Agency said rootworms in Illinois and Iowa have become resistant to an insecticide produced by Monsanto Co. (MON) corn, and four more states likely have resistant worms.

The resistance finding is based on a test developed at the Iowa State University rather than the regulatory definition, which is "flawed" and should be changed, the EPA said today in a report examining Monsanto's product. Likely resistance in South Dakota, Wisconsin, Minnesota and Nebraska fields need to be confirmed, the agency said.

Rootworms affect corn's ability to draw water and nutrients from the soil and were responsible for about $1 billion a year in damages and pesticide bills until seeds with built-in insecticide were developed a decade ago. The resistance finding comes more than a year after Aaron Gassmann, an Iowa State entomologist, first reported it using a new method.

"Gassmann's approach of testing for resistance is a better scientific approach than the regulatory criteria outlined," EPA entomologists said in the annual review of Monsanto's rootworm- killing corn.

At least 23 counties have damaged fields that need to be tested for resistance, EPA said.

Corn is St. Louis-based Monsanto's biggest business line with $5.81 billion in sales, or 43 percent of total revenue, in its 2012 fiscal year. The EPA's focus is Monsanto's YieldGard corn, which is engineered to produce the Cry3Bb1 protein from Bacillus thuringiensis, or Bt, a natural insecticide.

'Not Confirmed' Kelly J. Clauss, a Monsanto spokeswoman, said the company is working with growers to reduce the number of fields with unexpected damage, a sign of suspected resistance. "Corn rootworm resistance is suspected, but not confirmed, according to the regulatory definition of resistance," Clauss said by phone. "We are very much in line with the EPA in terms of what needs to be done."

A separate EPA report today recommended Monsanto work with the agency to revise the definition of confirmed resistance by March 31. Monsanto has agreed to transition growers from Yieldgard to SmartStax corn, which has a second mode of action for controlling rootworms, the EPA said.

That could cause problems for Dow Chemical Co. (DOW) and DuPont Co. (DD), which developed SmartStax. Rootworms are more likely to develop resistance to SmartStax in fields where Monsanto's technology isn't working, the agency said.
Performance Issues

Monsanto also is working with growers with performance issues to help them combat suspected resistance through crop rotation, switching to SmartStax and other means, EPA said. Problems reported to Monsanto dropped to 45,000 acres last year from 75,000 in 2011. The drop is probably due to Monsanto's success in these efforts as well as drought conditions in the Midwest, EPA said.

"Monsanto is committed to the stewardship of corn-rootworm protected traits, and the EPA is confident in the measures we are taking to promote the durability of corn rootworm technology," the company said in an e-mail.

The agency said it plans to convene a scientific advisory panel this year to evaluate the definition of confirmed resistance.

To contact the reporter on this story: Jack Kaskey in Houston at jkaskey@bloomberg.net

To contact the editor responsible for this story: Simon Casey at scasey4@bloomberg.net

http://www.bloomberg.com/news/2013-01-18/rootworms-are-resistant-to-monsanto-corn-in-two-states.html

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.18 **Threat to global GM soybean access as patent nears expiry**

January 9, 2013

USDA/Scott Bauer

The future global use of GM soybean is at stake as patent set to expire.

This October, five major seed companies came together to sign the first part of an agreement called the Generic Event Marketability and Access Agreement (GEMAA). Facilitated by the Biotechnology Industry Organization (BIO) of Washington, DC, and the American Seed Trade Association of Alexandria, Virginia, the accord is a legally binding contract that covers expirations of single-gene patents, and aims to ensure global access to genetically modified (GM) crops, even once they go off patent.

“GEMAA is the most immediate concern,” says Cathy Enright, executive vice president of BIO's food and agriculture section. “Farmers want to make sure that if they use a product that's under patent today they can continue to when it's off patent.” Because regulatory agencies in some countries require reregistration of GM crops, the accord allays concerns that companies would fail to re-apply for registration of their products, once the patent expires.

In 2014, the 20-year term for the gene patent on Monsanto's Roundup Ready soybean, which is used by >90% of US soybean farmers, will expire, and the looming deadline has raised fears among farmers that the expiration may disrupt trade. Their concern hinges on the disparity between how genetically modified organisms (GMOs) are regulated in the US and internationally. In the US, after a gene inserted into a crop is deregulated, the US Department of Agriculture (USDA) accepts its use in the crop indefinitely. But in the rest of the world, GM crops are approved for a specified time, which means that companies must periodically reapply with the regulatory agencies. In China, applications are submitted every three years, in Korea every five years, in Japan and Europe every ten.

Trade today moves smoothly because Monsanto maintains these approvals, but once the patent expires, Monsanto loses the financial incentive to continue filing. Nearly

60% of American-grown soy is exported abroad, mainly to China, Japan and Mexico, and almost all of it contains the Roundup Ready resistance gene. So in 2009, when Monsanto launched a second-generation GM soybean—Roundup Ready 2 Yield—farmers and other industry stakeholders realized that Monsanto had a *de facto* lock on the soybean trade. They feared that the seed giant would force them to adopt the next-generation trait by failing to file international approvals after expiration.

“There could be a terrible trade disruption if we had a product that was no longer registered in a foreign country. It could lock down ships. It could disrupt the entire trade system,” says farmer Ray Gaesser, vice president and chairman of the regulatory committee of the American Soybean Association in St. Louis.

Monsanto acknowledges the problem and has pledged to continue filing until 2021. “There clearly were legitimate concerns from growers and grain handlers about what happens at the end of patent expiry. Quite honestly, we hadn't faced this situation ever before,” says Jerry Steiner, executive vice president of sustainability and corporate affairs at Monsanto. “No one had prepared for that kind of thing.”

Meanwhile, another wave of gene patents are scheduled to expire around 2020, including those owned by other companies. The industry had no strategy on how to maintain the regulatory approvals once off patent.

The accord requires signatories to announce their patent expiration three years ahead of time, after which patent owners have three options: they may continue maintaining regulatory authorizations themselves, sign an arbitrated agreement to share responsibility with other companies, or discontinue maintenance by either transferring responsibility to another company or, failing that, announcing their intention to discontinue filing seven years hence.

Although it sounds straightforward, representatives from the companies and industry organizations have been gathering since 2010 for weekly meetings, sometimes several days long, to outline the legal framework for the 38-page document. “It's been a long journey,” says Matt O'Mara, director of international affairs at BIO.

O'Mara believes that at the end of most patents' lives, consortiums will form to cover the costs of maintaining approvals. So far, however, the only signatories include seed giants, BASF Plant Science of Raleigh, North Carolina, Bayer CropScience in Monheim, Germany, Indianapolis' Dow AgroSciences, DuPont Pioneer of Johnston, Iowa, and Monsanto. None of the smaller seed companies have joined. Enright remains hopeful. “If you look at the signatories in six months, I think you're going to see new names.”

Whereas GEMAA covers half the framework necessary for maintaining approvals, the signatories are now working on a second agreement called the Data Use and Compensation Agreement (DUCA) to be completed in 2013. Companies must periodically submit new data in order to maintain international approvals on crops that combine several foreign genes, or gene stacks. For gene stacks in Europe, for example, companies must submit data on the foreign genes in all their permutations. Therefore, as the number of genes in stacks rise, these data packages become exponentially larger and more expensive to maintain.

With 100 pages written so far, the accord specifies that DUCA mandate signatories to share their data in return for managing the data, for which they will collect a

designated fee. “We've got to make sure in the post-patent environment that someone is answering the phone calls from regulators, or trade is going to stop,” says O'Mara.

Of the stacked seeds on the market, about half are the result of cross-licensing between scompanies. Monsanto's Smartstax corn, for example, incorporates an insect protection gene from Dow (Herculex Xtra), an herbicide resistance gene from Bayer (LibertyLink) and its own glyphosate resistance gene in Roundup Ready 2. DUCA will ensure that a single gene going off patent won't jeopardize the other licenses in a stacked product. “Cross-licensing is the lifeblood of the seed breeding industry,” O'Mara says.

The accord emerged out of a morass surrounding Monsanto in 2009–2010, when it first commercialized Roundup Ready 2. The company became embroiled in a legal battle with DuPont over DuPont's program to stack the Roundup Ready 2 gene with DuPont's own glyphosate resistance gene. Monsanto sued for patent infringement. DuPont countered with an antitrust suit that prompted the US Department of Justice and a number of state's attorneys to begin their own antitrust investigations. “There was a lot of confusion at that time. I think a lot of competitive pressure and actions were causing some of that confusion,” says Monsanto's Steiner.

Those allegations have since faded. A Missouri judge awarded Monsanto $1 billion in its suit. And DuPont's antitrust suit, which will go before the same judge next year, will likely fail, according to legal experts. “It's just gone away after they did the dog and pony show,” says Tamara Nelsen, senior director of commodities at the Illinois Agricultural Association in Bloomington, Illinois.

After patent expiration, with GEMAA in place, the seed companies that now license Roundup will have one less bill to pay. “We still have some 600 small seed companies in the US. What we expect some of those smaller companies to do is look for more of a niche,” says Nelsen. For smaller farms without the ideal farming conditions, “you are not going to worry about buying the latest and greatest.”

At stake is the question, with a majority market share in most of America's staple crops, is Monsanto stifling competition and a potential generics market? “Ninety-three percent of soybean production is Roundup Ready,” says Nelsen. “It's still like everyone is on a Microsoft system—at least, that's how farmers feel.”

http://www.nature.com/nbt/journal/v31/n1/full/nbt0113-10c.html

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.19 **China - Golden rice trial triggers sackings, investigation**

Beijing, China
January 7, 2013

Three Chinese researchers have been fired from their positions after they co-published a study in which 24 schoolchildren in China's Hunan province were fed

genetically modified (GM) rice in 2008, Chinese authorities announced last month (6 December).

Yin Shi'an from the Chinese Center for Disease Control and Prevention (CDC), Wang Yin from the Zhejiang Academy of Medical Sciences and Hu Yuming from the provincial CDC in Hunan lost their jobs for "violating regulations, scientific ethics and academic integrity", according to a statement released by the CDC.

The three co-authored a paper together with Guangwen Tang, a researcher in a nutrition lab at Tufts University, that was published online on 1 August in *The American Journal of Clinical Nutrition*, and that used data from the controversial trial.

The study looked at 'golden rice' — a GM rice strain that contains higher levels of beta-carotene, a precursor for vitamin A — and found that the beta-carotene in the rice is as effective as pure beta-carotene in oil and better than that in spinach at providing vitamin A to children.

But Greenpeace East Asia expressed "alarm" in a press release over the publication of the study.

They said that the Chinese government had been informed in 2008 about the trial, when it assured Greenpeace that no GM golden rice had been imported for the trial and so it would not go ahead. The study was based on work funded by the US Department of Agriculture, the US Institute of Diabetes and Digestive and Kidney Diseases and China's National Technology Research and Development Program.

Tufts University is investigating to see if the original study complied with Chinese, US and Tufts standards. "As part of our review, we have convened a panel of distinguished academics from leading universities in the United States," Andrea Grossman, a spokesperson for the Tufts University Health Sciences Campus in Boston, tells SciDev.Net. "The panel's investigation is proceeding as expeditiously as possible in its effort to conduct a comprehensive and objective review."

Bao-Rong Lu, a researcher at China's Fudan University and a member of the National Biosafety Committee of China, says that the three fired researchers did not apply to the committee for approval to conduct the 2008 trial. "The researchers did not respect Chinese regulations concerning the GM organisms [GMO] management and that's a very serious problem," he says.

Firstly, Lu says, since the researchers did not apply for permission to import the GM rice to China it was illegal to conduct the trial. "Secondly, golden rice hasn't received a biosafety certification in China, so it is illegal to use these materials as food for the test in China," Lu tells SciDev.Net.

"China has a complete system of biosafety regulation for GMOs, including that for biosafety assessment trials. However, not all researchers follow the regulation," he says. "Some researchers are not aware of the system and trial procedures, or scientific ethics, and unfortunately this kind of scandal happened."

Some Greenpeace members think the sackings hide a larger issue with GM research in China. "By sacking the three individual researchers, China is dodging the bigger issues: loopholes in the regulatory systems of GMO research and the bigger question of why we need GM crops at all," says Wang Jing, a campaigner with Greenpeace

East Asia. "We know enough about their negative impacts on the environment but not enough about their long-term safety for humans." Wang says the case is another reason for China to ensure that the 21 billion yuan (around US$3.3 billion) it is investing in GM research is used wisely.

Xue Dayuan, chief biodiversity scientist at the College of Life and Environmental Sciences at the Minzu University of China, says: "The three official researchers are scapegoats". China has rules, laws and policy on GM, but a lack of supervision means no researchers have to obey the rules, adds Xue.

http://www.seedquest.com/news.php?type=news&id_article=32718&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.20 **Genetically modified food labeling measure to qualify for Washington state ballot**

January 4, 2013
Olympia, Washington

By Jonathan Kaminsky
A measure to require special labeling of genetically modified foods appeared virtually certain to qualify for the ballot in Washington state on Friday, two months after voters in California rejected a similar initiative.

Sponsors of the measure turned in petitions signed by an estimated 350,000 registered voters - at least 100,000 more signatures than required - on Thursday, a day ahead of deadline, said David Ammons, a spokesman for the Washington secretary of state.

The submission all but assures that the GMO-labeling initiative would be certified by the secretary and sent on to the state legislature, which could adopt the measure or leave it to a popular vote on the November 2013 election ballot, Ammons said.

The initiative would make Washington the first U.S. state to require that all genetically modified seeds used by farmers as well as food with genetically altered ingredients be labeled as such. "This is not just a right-to-know issue. This is much bigger than foodies," said Trudy Bialic, a spokeswoman for PCC Natural Markets, a Seattle-based food cooperative pushing for the initiative's passage. "This is about preserving export markets."

Bialic said 62 countries either ban, restrict, or require labeling of genetically modified food, and that apple and wheat farmers in Washington would face a loss of exports if those products turned out to be genetically altered without being so labeled.

Currently the U.S. government allows only a handful of food crops to be genetically modified, including corn, soy, canola, sugar beets, yellow squash, zucchini and papaya. And many popular processed foods -- including soy milk, soup and breakfast

cereals -- are made with biotech crops whose genetic traits have been manipulated, often to make them resistant to insects and pesticides.

But the U.S. Food and Drug Administration determined in 1992 that labels are not needed for genetically modified crops that are "substantially equivalent" to conventional crops.

Producers of GMO crops insist they are safe, but some health, environment and consumer advocates cite studies suggesting they can be harmful both to the environment and to animal and human health.

On the federal level, a petition demanding the FDA require all genetically modified food to be labeled was started last fall and has gathered 1.3 million signatures, said Sue McGovern, spokeswoman for the effort, called Just Label It.

The FDA has yet to respond to the petition, she said. In the meantime, some activists are hoping to make their case at the state level.

If California is any guide, Washington state's pro-labeling campaigners faces an uphill battle. California's Proposition 37, also known as the "Right to Know" initiative, was supported by more than 60 percent of likely voters in early polls. It sprang from a grass-roots effort in a state that has long led the way on a variety of environmental issues and has a growing organic and "local food" movement.

But backing for the measure crumbled in the face of a $46 million advertising blitz funded largely by seed company Monsanto Co, PepsiCo Inc, the Coca-Cola Co and other food and agriculture companies. The ads warned that the initiative would raise food prices and create a confusing set of rules for farmers and grocers. The California initiative was defeated 53 percent to 47 percent.

Monsanto, which spent over $7 million to defeat the initiative, did not immediately respond to phone messages requesting comment on the Washington state initiative.

Bialic of PCC Natural Markets acknowledged that her side lacks the money it would take to achieve financial parity against the nation's largest food makers in an election campaign.
"There's no way we'll be able to outspend them," she said. "This is a long battle. Sooner or later we're going to win, and we're hoping it's going to be in Washington."

(Reporting and writing by Jonathan Kaminsky; Editing by Steve Gorman and Lisa Shumaker)

http://www.reuters.com/article/2013/01/05/us-usa-food-washington-idUSBRE90402G20130105

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.21 **Especialistas da América Latina e Caribe vão discutir o papel da biotecnologia para o desenvolvimento sustentável**

Brasília, Brasil
2 de janeiro de 2013

Inscrições para a REDBIO 2013, que acontece em Mar del Plata, Argentina, já estão abertas.

O pesquisador da Embrapa Recursos Genéticos e Biotecnologia, Francisco Aragão, será um dos palestrantes do VIII Encuentro para Latino América y el Caribe de Biotecnologia - REDBIO 2013, que acontece entre os dias 18 e 22 de novembro, em Mar Del Plata, Argentina.

Ele vai apresentar o feijão transgênico desenvolvido pela Embrapa e aprovado pela CTNBio – Comissão Técnica Nacional de Biossegurança em 2011. A REDBIO 2013 vai reunir especialistas da América Latina e Caribe em torno do tema: "Biotecnologia e sociedade: diálogos para um desenvolvimento sustentável.

As inscrições para o evento já estão abertas e podem ser feitas pelo endereço: http://redbioargentina2013.com.ar/website/

O feijão transgênico, desenvolvido em parceria entre a Embrapa Recursos Genéticos e Biotecnologia (Brasília, DF) e a Embrapa Arroz e Feijão (Santo Antônio de Goiás, GO), é um exemplo de sucesso para a biotecnologia e para a ciência no Brasil porque foi o primeiro produto geneticamente modificado (GM) aprovado no país totalmente desenvolvido por uma instituição pública de pesquisa. Além disso, ilustra o impacto social da engenharia genética, já que o feijão é produzido basicamente por pequenos produtores, com cerca de 80% da produção e da área cultivada em propriedades com menos de 100 hectares.

As variedades geneticamente modificadas desenvolvidas pela Embrapa são resistentes ao vírus do mosaico dourado, a pior ameaça à cultura do feijoeiro no Brasil e na América Latina, e são resultado de mais de 10 anos de pesquisa, entre obtenção e regulamentação. Durante a REDBIO 2013, Aragão vai compartilhar essa experiência com os participantes, com foco na obtenção e regulamentação, desde a transformação das plantas nos laboratórios da Embrapa até a sua aprovação pela CTNBio, incluindo os testes e as análises de biossegurança e segurança alimentar, que envolveram cerca de seis anos.

A REDBIO reúne especialistas da América Latina e Caribe para discutir avanços, desafios e outras questões importantes relacionadas à biotecnologia. Este ano, em sua oitava edição, o evento terá como foco a divulgação da biotecnologia para a sociedade. Para isso, vai contar com a presença de cientistas e comunicadores.

O crescimento da biotecnologia é uma realidade no mundo e, especialmente na América Latina. Brasil e Argentina ocupam posições de destaque no ranking mundial de países que adotam a biotecnologia em suas lavouras, de acordo com dados do ISAAA - Serviço Internacional para a Aquisição de Aplicações em Agrobiotecnologia.

Mas, no entendimento da comissão internacional organizadora do evento, a biotecnologia ainda é uma área pouco conhecida por parte da sociedade. Por isso, é premente a discussão de ferramentas de comunicação que possam aumentar a sua compreensão pelo público em geral, tornando-a mais próxima do seu dia a dia.

Além disso, serão apresentadas novidades nas áreas de biotecnologia vegetal, animal e humana, como por exemplo, os avanços obtidos com células-tronco e engenharia de tecidos e órgãos, entre outros relacionados à energia, biossegurança e ecologia.
Informações e inscrições estão disponíveis no site da REDBIO 2013 pelo endereço: http://redbioargentina2013.com.ar/website/

http://www.seedquest.com/news.php?type=news&id_article=32648&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.22 **BASF abandons GM crop market in Europe**

January 16, 2013

By Ewen Callaway

The German chemical giant BASF is moving its transgenic plant operations from Europe to the United States, it says, because of widespread opposition to the technology.

The company announced on 16 January that it would move its plant-science headquarters from Limburgerhof, Germany, to Raleigh, North Carolina, and that it would no longer develop plants solely for cultivation in Europe. The division employs 157 people in Limburgerhof, plus another 63 at facilities elsewhere in Europe. BASF said that it would relocate 123 of those jobs to the North Carolina facility.

In statement, Stefan Marcinowski, a member of the BASF board of executive directors, cited “a lack of acceptance for this technology in many parts of Europe — from the majority of consumers, farmers and politicians.” The company instead plans to focus on plant biotechnology markets in the Americas and Asia.

In 2010 BASF secured European Commission approval to grow a genetically modified potato in the European Union (see A new dawn for transgenic crops in Europe?), the first such approval in more than a decade. The company marketed the potato under the name Amflora, and it was engineered to produce high levels of starch and intended for industrial use and not food. Only one other genetically modified (GM) crop, a breed of maize (corn) developed by Monsanto that produces the *Bacillus thuringiensis* (*Bt*) insect toxin, is approved for cultivation in Europe.

However, Monsanto has long stopped developing GM crops to grow in Europe, and BASF had been the only company still pursuing approval on the continent, says Jonathan Jones, a project leader at the Sainsbury Laboratory in Norwich, UK.

After the approval, which was supported by European Food Safety Authority, some EU countries announced they would refuse to allow the crop to be grown. In 2010, the European Commission proposed allowing individual countries to decide whether or not to grow GM crops (see Fears over Europe’s GM crop plan). But the proposal

stoked protests among industry officials, farmers and anti-GM campaigners and, says Jones, seems to be “dead in the water.”

“It’s a sign that Europe is not open for business in this area,” Jones says of BASF’s move. “Psychologically it’s damaging, because it’s going to deter future recruitment and future government investment. Governments aren’t going to continue to fund this area if there’s no prospect of commercial deployment in Europe.”

In a statement sent to reporters, Denis Murphy, at the University of Glamorgan, UK, said: “Europe is now in danger of becoming a scientific backwater and will be unable to assist developing countries the address food insecurity.

Several European scientists highlighted this very issue in 2010 [see 1 out of 27— European politicians score poorly in agbiotech in our sister publication *Nature Biotechnology*], and there is now a danger that we will lose, not only companies like BASF, but also academic researchers and students — as well as any influence that we have had previously in developing countries where we used to be major providers of assistance and expertise.”

BASF Plant Science will not close its smaller facilities in Ghent, Belgium and Berlin, and the company will continue its quest to secure regulatory approval to grow a blight-resistant potato in Europe.

http://blogs.nature.com/news/2012/01/basf-abandons-gm-crop-market-in-europe.html

Source: Nature News Blog

Contributed by Dominique Dufour
International Center for Tropical Agriculture
d.dufour@cgiar.org

(Return to Contents)

++++++++++++++++++++

1.23 **Bioversity International releases descriptors for tree tomatoes and its wild relatives**

January 22, 2013

Bioversity International has produced a publication that contains descriptors for tree tomatoes and its wild relatives. The tree tomato or tamarillo (Solanum betaceum Cav.) is a neglected Andean crop which is quite popular in local markets of South America especially for being consumed in juices and as a fresh fruit. The said descriptor list provides an international format and thereby produces a universally understood ‘language' for plant genetic resources data.

The said publication by Bioversity is expected to contribute to studies focusing on the analysis of genetic diversity, germplasm management, the definition of new varieties, and the search for markers of agronomic traits for crop management and improvement, besides being aimed at the common goal of enhancing the use and conservation of plant genetic resources.
PDF copy of the publication.

http://www.seedquest.com/news.php?type=news&id_article=33195&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.24 **Global Crop Diversity Trust moves headquarters to Germany**

Berlin, Germany
January 9, 2013

In early January 2013, the Global Crop Diversity Trust will move its headquarter from Rome to Bonn, Germany. The trust was established in 2004 as part of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), which aims at "the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits that arise from that use" (http://www.croptrust.org/content/international-treaty , http://www.planttreaty.org/) .

The trust aims at raising USD 400 million as trust capital. Germany has pledged USD 11 million of which it has already paid USD 10.5 million. The United States Government is represented via USAID and has pledged and paid USD 34 million. Before moving to Bonn, the trust was preliminarily located with the FAO in Rome.

The Trust's new address will be: Global Crop Diversity Trust Platz der Vereinten Nationen 7 53113 Bonn Germany

More information on the trust can be found at: www.croptrust.org Germany, and especially the City of Bonn, is eager to increase its international profile by attracting UN organizations to Bonn.

A number of UN organizations in the fields of climate change, sustainable development, and conservation are already present in Bonn. A detailed list can be obtained through the following link: http://www.bonn.de/wirtschaft_wissenschaft_internationales/uno-stadt/un_organisationen/index.html?lang=en

http://www.seedquest.com/news.php?type=news&id_article=32930&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.25 **Unlocking sorghum's gene bank - Adapting agriculture to a changing climate**

Columbia, South Carolina, USA
January 2, 2013

Climate change poses a major challenge to humanity's ability to feed its growing population. But a new study of sorghum, led by Stephen Kresovich and Geoff Morris of the University of South Carolina, promises to make this crop an invaluable asset in facing that challenge. Just published in the *Proceedings of the National Academy of Sciences* (PNAS), the paper puts genetic tools into the hands of scientists and plant breeders to help accelerate their ability to adapt sorghum to new conditions.

A hardy cereal crop that was first domesticated in the Horn of Africa some 10,000 years ago, sorghum is now cultivated worldwide, from Texas to China. Sorghum is a particularly drought-tolerant grain and an essential part of the diet for 500 million people, chiefly in sub-Saharan Africa and India. In the U.S., where it is primarily grown for livestock feed, sorghum's climate resilience was highlighted during the devastating summer drought of 2012.

A large international effort decoded the genome of the species cultivated for food, Sorghum bicolor, which was published in the journal Nature in 2009. That genome represents the genetic accounting of a single individual of sorghum. But as individual humans have genetic differences that underlie physical differences such as eye color, so do individual plants of sorghum. The focus of the current effort was to establish the connections between gene differences and physical differences – a detailed understanding of those connections will constitute a tremendous tool for plant breeders.

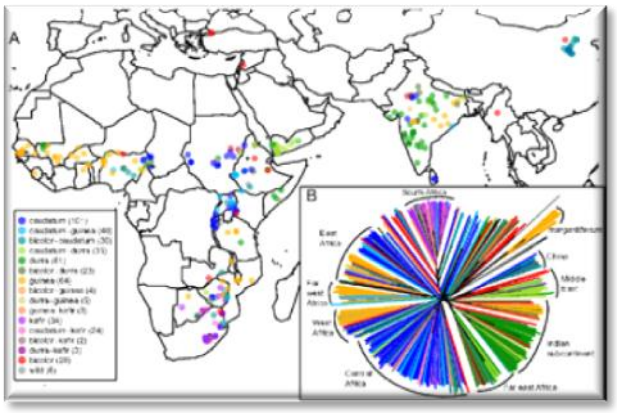
The team behind the current PNAS publication – which also included researchers at Cornell University, the International Crops Research Institute for the Semi-Arid Tropics in India and Niger, the University of Illinois and the U.S. Department of Agriculture – used genotyping-by-sequencing (GBS) to determine the individual genetic makeup of 971 sorghum varieties taken from world-wide seed collections. The scientists identified more than a quarter million single-nucleotide polymorphisms (SNPs); that is, single letters in the genetic code where individual variants of sorghum can differ.

The results were possible thanks to a tremendous genetic resource that was built over many years, and largely before genotyping was even technically possible. For almost a century, sorghum seeds from a variety of international locations have been stored in seed banks, with dates and geographic origins often noted with each sample. "We're taking advantage of the incredible diversity found in the gene bank," said Morris, a research assistant professor at USC and lead author on the paper.

One subject of particular scrutiny in the paper was the genetic control of the panicle, the structure on the top of the plant that holds the grains. This feature is an important consideration for successful breeding, particularly when climate is a consideration. Closely packed grains, for example, are preferred for maximum crop yield in dry areas, but in places with abundant rainfall, more spacing is desirable to allow grains dry out more readily and reduce crop losses from moisture-caused disease.

The researchers identified genes that likely contribute to this physical feature, and they also mapped them geographically according to the source of the original seed. The result was insight into how different variants of the genes spread according to

regional climates – which varied widely in the study, from the edge of the Sahara to the rainy highlands of east Africa.



The results will “provide resources for everyone around the world who breeds sorghum,” Morris said. “The goal is to do it faster than the way it’s been done traditionally, which takes years of growing and crossing and testing.”

That’s particularly important because the semi-arid regions where sorghum is a staple food are predicted to be most adversely affected by climate change. Sorghum varieties that currently thrive there will have to be bred for new conditions, a time-consuming process. “The challenges facing agriculture are getting more severe, so the tools that we have for crop improvement have to keep pace,” Morris said.

A further step forward will involve genomic selection, another collaborative effort planned for the coming year that will again involve Kresovich, the SmartState Endowed Chair of Genomics at USC and senior author on the PNAS paper. With that method, in which computers are used to select the most promising candidates to test in the field, “you might be able to take years off the breeding cycle,” Morris said. “Instead of having to grow thousands of varieties, you test thousands of varieties ‘in silico’ and pick a few hundred of the best for growing the next generation.”

The work was supported by the NSF under the Basic Research to Enable Agricultural Development (BREAD) project (ID:IOS-0965342) and the USDA-NIFA Plant Feedstock Genomics for Bioenergy Program (#2011-03502).

http://www.seedquest.com/news.php?type=news&id_article=32650&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.26 **Not only humans wilt in heat - developing heat tolerant crops**

Sydney, New South Wales, Australia
January 10, 2013

With heatwaves predicted to increase in intensity and duration, the importance of heat tolerant crops is becoming increasingly urgent.

Dr Daniel Tan, from the University of Sydney's Faculty of Agriculture and Environment specialises in developing heat tolerant crops.

"Heatwaves can cause major crop failures, such as that of the American corn crop last year after consecutive days of soaring temperatures in the Midwest," Dr Tan said.

The researchers used field chambers - boxes that simulate heatwaves - for their tests. In Australia crops vulnerable to heat stress include wheat, chickpea and cotton grown in the nation's grain belt region. Dr Tan and his team are developing heat resistant strains of these three crops.

"Heat means not only a reduction in the amount of crop harvested but its quality. In wheat the effect of intense heat includes a reduction in the protein quality of the grain that is harvested. In the case of chickpeas they can become sterile when heat stressed," Dr Tan said. Together with a team of PhD students and international collaborators, Dr Tan has started a program to develop Australian crops that can resist heat by using natural variations in crop genetic collections from around the world.

"We work with countries where these crops originated, for example America for cotton, and institutions where varieties of genetic crop seeds are held," said Dr Tan.

The material is tested for heat tolerance in a range of locations. Wheat varieties are tested in Australia, Mexico and, because of the potential consumer market there, China.

The tests include searching for cotton varieties which can photosynthesise successfully at high temperatures and chickpea strains that can pollinate in very hot conditions.

"While we are concentrating on crops grown in Australia our work has obvious implications for agriculture worldwide given the documented trend of rising temperatures. The vulnerability of these crops, which feed millions of people, means our work has global relevance," said Dr Tan.
The researchers are looking for naturally occurring heat-resistant variations in crops so they can release them to farmers immediately, without the technical and bureaucratic complexities of producing a genetically modified crop.

In June last year Dr Tan and his team were awarded a $1.8 million Grains Research and Development Corporation grant to develop new strains of heat tolerant wheat, concentrating on the northern grain region in Narrabri.

This project uses field chambers - large plastic boxes in which reverse cycle air conditioning simulates a heatwave - to test crops at different stages of development, especially just before pollination and at the flowering stage.

Read more about Dr Daniel Tan's work in his article for The Conversation

http://www.seedquest.com/news.php?type=news&id_article=33005&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.27 **Threat of new strains of late blight on potato**

January 4, 2013

According to the James Hutton Institute, the Sainsbury Lab, and other partners, potato blight is still a major threat to global food security in the 21st century. It is a particular problem today for emerging countries in Africa and Asia.

Through DNA-based forensic analysis, Dr David Cooke and partners describe the emergence and spread of highly aggressive lineages of the pathogen that have rapidly displaced other genotypes in Europe, making the disease more difficult to manage.

Cooke explained: "Pest and pathogen losses jeopardise global food security, as proven by the devastating spread of late blight across European crops back in 1845. The new lineage raises a worldwide food security issue as it has already spread beyond Europe, where it was 1st detected, to North Africa, India and China, threatening the livelihoods of communities relying on potato for food and income."

He says the disease is more difficult to control as it is more aggressive, fungicide resistant, and able to attack cultivars previously not considered susceptible to blight. "In a very wet [growing season], any weakness in the control strategy is exploited by the pathogen, resulting in severe crop losses."

Potato late blight (PLB) is caused by the fungus-like organism _Phytophthora infestans_ and can cause 100 percent crop loss. The pathogen can also affect tomato and some other solanaceous crops. In potato, it affects leaves as well as tubers, and in tomato, it causes lesions and rotting of leaves, stems, and fruits. The disease can spread rapidly within a crop and destroy it within a few days. Under favourable conditions, epidemics in tomatoes may be even more rapid than in potatoes.

PLB is spread by plant material (including plant debris and volunteer crop plants), wind, and water. Disease management requires an integrated approach and may include removal of pathogen reservoirs, crop rotation, preventative fungicide treatments of planting material (potato seed tubers, tomato transplants), and fungicide sprays of crops. Late blight is considered an increasing problem worldwide, and seed tuber certification schemes have been set up in many countries as an important part of PLB management.

Considerable variation in aggressiveness between different pathogen strains has been observed, but more virulent strains are emerging frequently. Where both A1 and A2 mating types of the pathogen are present, reproduction occurs sexually as well as asexually, increasing the chances of strains with additional fungicide resistances and increased yield losses developing.

It has been reported that regional differences in pathogen population diversity no longer exist in Europe, where strains like Blue 13 (ProMED-mail posts 20090406.1332 and 20100212.0505) and Pink 6 (ProMED-mail post 20100604.1851) are now dominating, and further strains, such as the new Green 33 (ProMED-mail post 20120202.1031230), are emerging. Clean planting stock and management strategies for fungicide resistance of the pathogen are considered vital to control PLB outbreaks in the future. Development of resistant cultivars is being counteracted by the adaptability of the pathogen.

http://www.seedquest.com/news.php?type=news&id_article=32889&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.28 **Potato late blight still a threat to global food security**

Dundee, United Kingdom
December 31, 2012

A pathogen responsible for a plant disease that has caused food shortages and major loss of life in the past, such as the Irish Potato Famine of 1845, still poses a significant threat to global food security. This is underlined in a new study from the James Hutton Institute, the Sainsbury Lab and other partners, which has also found that the problem is particularly acute in emerging countries in Africa and Asia.

Through DNA-based forensic analysis, research leader Dr David Cooke and partners describe the emergence and spread of highly aggressive lineages of Phytophthora infestans, the pathogen that causes potato late blight, that have rapidly displaced other genotypes in Europe, making the plant disease more difficult to manage.

Dr Cooke explained: “Pest and pathogen losses jeopardise global food security, as proven by the devastating spread of late blight across European crops back in 1845. The new lineage raises a worldwide food security issue as it has already spread beyond Europe – where it was first detected – to North Africa, India and China, threatening the livelihoods of communities relying on potato for food and income.

“The disease proved more difficult to control due to a combination of increased aggressiveness, an ability to overcome some sources of cultivar resistance and its resistance to a key fungicide. The emergence and spread of this fit and aggressive lineage within the European pathogen population highlights the evolutionary potential of the pathogen and its destructive powers.

“Total crop failure is, fortunately, a thing of the past as the potato industry is armed with knowledge on the pathogen activity, improvements in host resistance and, most importantly, a range of effective fungicides. Nonetheless, growers must remain alert; in a very wet summer such as 2012 any weakness in the control strategy is exploited by the pathogen resulting in severe crop losses.”

This research study is remarkable in that it combines field work with genomics in order to explain the pathogen's ability to overcome the resistance of the potato plant. "Such collaborations are uncommon but will be increasingly important in tackling dramatic changes in pathogen populations that threaten global food security," Dr Cooke said.

The scientific study also stresses the importance of disease management strategies for the preservation of one of the world's most important staple food crops.

Paper: Cooke, D.E.L., Cano, L.M., Raffaele, S., Bain, R.A., Cooke, L.R., et al. 2012. Genome Analyses of an Aggressive and Invasive Lineage of the Irish Potato Famine Pathogen PLoS Pathogens 8(10): e1002940.

http://www.seedquest.com/news.php?type=news&id_article=32566&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++

1.29 **CXE1 Enzyme improves flavor of ripening tomatoes**

Tasty tomatoes were found to contain less acetate esters due to the presence of enzyme CXE1.

Scientists from University of Florida's Institute of Food and Agricultural Sciences led by Harry Klee found that the presence of acetate esters, volatile compounds which are associated with plant defense and plant-to-plant communication, interfere with the development of tasty flavor in tomatoes.

The research published in the journal Proceedings of the National Academy of Science reports the discovery of the CXE1 enzyme and four other similar enzymes in their studies on tomato genes that play a role in establishing the acetate content of tomato fruit through transgenesis. Tasty tomatoes may now be developed by getting rid of acetate esters through CXE1 and other associated enzymes.

The report can be found at http://news.ufl.edu/2012/11/01/tomato-enzyme/

Source: Crop Biotech Update November 14, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

Return to Contents)

++++++++++++++++++++

1.30 **Over expression of EVA1 in potato plants confers potato virus Y resistance**

Potato virus Y (PVY) is one of the most notorious potato pathogens which causes decline in tuber quality and yield globally. Some wild potato species have resistance to PVY, however, varieties with transferred resistance from wild species are not yet commercially available.

H. Duan and colleagues from JR Simplot Company in the U.S. sequenced the genes in wild potatoes that are associated with PVY resistance. A new eIF4E-1 variant coded as Eva1 was found in Solanum chacoense, S. demissum, and S. etuberosum. They found that the protein exhibit amino acid substitutions at ten different locations when compared with the cultivated potato (Solanum tuberosum) homolog.

The researchers overexpressed the associated cDNA which conferred PVY resistance in transgenic potato plants silenced for the native eIF4E-1. Since the gene sources of Eva1 are sexually compatible with potato, molecular strategies can be employed to produce intragenic potato cultivars.

Download the complete paper at Transgenic Research journal:
http://download.springer.com/static/pdf/859/art%253A10.1007%252Fs11248-011-9576-9.pdf?auth66=1352875769_7ade04ae131a7045c2110f97bc626c1e&ext=.pdf

Source: Crop Biotech Update November 14, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++

1.31 **Wheat genetically engineered to make it nearly gluten free**

An international team of researchers has succeeded in genetically engineering wheat seeds to prevent gluten production in subsequent plants. The researchers focused their work on DEMETER (DME), the enzyme that activates the group of genes responsible for the production of gluten. Using genetic engineering techniques, they managed to suppress DME by 85.6 percent which then reduced by 76.4 percent the production of gluten in wheat seeds.

The team, with researchers from China, Germany and the United States, says that flour made from the altered seeds appears to be suitable for making bread, and that the next level of their work will determine if these grains can be used in foods for people suffering from celiac disease.

For more, read the abstract or the full paper of this research, available at:
http://www.pnas.org/content/early/2012/11/21/1217927109.abstract

Source: Crop Biotech Update November 14, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++

1.32 **Scientists reveal mechanism to enhance rapeseed's oil yield**

A research study sponsored by the UK Biotechnology and Biological Sciences Research Council (BBSRC) was able to identify method to increase the production of oil in the UK rapeseed (*Brassica napus*). Scientists used RNA interference (RNAi) to switch off the enzyme responsible for oil breakdown in the plant, specifically for the duration of seed development. This results to the accumulation of around 8% more oil in the seed.

The research team, however, believes that further work would be required to establish the efficacy of this method in the field, and also to investigate whether it could be applied to other oilseed crops, or could be successfully combined with alternative approaches to boost yield.

View Rothamsted Research's news release at
http://www.rothamsted.ac.uk/PressReleases.php?PRID=200

Source: Crop Biotech Update November 14, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++++

1.33 **Iron biofortification of rice through overexpression of OSFER2**

Scientists from the University of Calcutta developed high iron rice grain through overexpression of endogenous ferritin gene *Os*fer2.

Molecular biologist Paul Soumitra and colleagues cloned the gene from rice and overexpressed it under the control of endosperm specific *Gl*utelinA2 (OsGluA2) promoter.

After genetic engineering of Pusa-sugandi II, an aromatic *in*dica rice cultivar, the biotech seeds showed ~8-fold ferritin overexpression leading to significant increase in iron and zinc content. Increase in iron content was specific in the endosperm of biotech rice, which indicates the tissue-specific activity of the promoter.

No other differences were observed in the agronomic characteristics of biotech and non-biotech plants. These findings imply that overexpression of rice endogenous ferritin gene is an effective technique in iron biofortification of rice.

Read the abstract at
http://www.landesbioscience.com/journals/gmcrops/article/22104/

Source: Crop Biotech Update (December 5, 2012)

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++

1.34 **PSTOL1's application to other crops may have a great impact on global agriculture**

In one of his commentaries, Dr. Robert Zeigler, Director General of the International Rice Research Institute (IRRI), said that the possibility of transferring the gene Pstol1 (phosphorus starvation tolerance) to other crops, especially on cereals and legumes, could have a massive impact on global agriculture. Pstol1 is a gene from a traditional rice variety that can grow in very low phosphorus soils and still can produce a good yield. The mechanism appears to be that Pstol1 promotes much more vigorous root growth that allows the plant root system to effectively penetrate and explore the soil volume to extract its phosphorus content.

Zeigler cited the situation of farmers in Sub-Saharan Africa who will no longer have to worry in terms of phosphorus fertilizer application to their nutrient-poor acid soils, and the farmers in the US, China, Europe, Latin America, and Australia having only to add minimal amounts of phosphorus to their crops. He added that this could also have an enormous impact for the economic and environmental situation of the world as phosphorus fertilizer causes water pollution worldwide.

View Dr. Zeigler's blog at
http://www.irri.org/index.php?option=com_k2&view=item&id=12404:plant-phracking-pops-peak-phosphorus?&lang=en

Source: Crop Biotech Update January 23, 2013

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++

1.35 **Rwanda releases iron-rich beans to improve public health**

To combat iron deficiency among children and women, the Rwandan government released five new varieties of iron-rich beans this year. HarvestPlus is optimistic that farmers will respond positively to these nutritionally superior beans. Find out how different partners are working together to get beans out to more than half a million households by the end of 2013.

Read more at http://www.harvestplus.org/content/rwanda-releases-iron-rich-beans-improve-public-health-millions

Source: Crop Biotech Update January 23, 2013

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++++++

1.36 **Inheritance and stability of mutation based herbicide tolerance in cotton (*Gossypium hirsutum* L.)**

January 2013

Trey Cutts (Ph.D. student with Jane Dever)

Mutant lines of upland cotton conferring tolerance of imidazolinone herbicides have been developed through mutation breeding using ethyl methanesulfonate (EMS) in three High Plains cultivars followed by selection pressure using imazamox herbicide. While previous studies have
indicated that tolerance is controlled by a partially dominant gene in original mutated parents, little is known about the inheritance of the trait during introgression.

Therefore, inheritance studies have been initiated by selection of tolerant parental stocks and crossing these with an established cultivar (FM 958). Populations including parental lines, F2, and F3 non-selected generations, were evaluated in 2012 for early season imazamox herbicide injury from which heritability estimates were derived. Additionally, 2012 field studies also include a parental efficacy trial that evaluates treated and non-treated parents, and a parental equivalency trial that evaluates non-mutated and mutated parental cultivars to evaluate the imazamox tolerance stability.

The mutation event that resulted in partial herbicide resistance did not appear to harm plant growth and development, as yield and agronomic properties were substantially equivalent to non-mutated parent.

Yellowing of tolerant plants was evident 2 weeks post- application of herbicide, indicating current mutation events may not be commercially acceptable in terms of tolerance. The resistance trait is heritable, and non- transgenic herbicide resistance in cotton is possible with mutation events that provide more complete tolerance to target herbicide. More complete herbicide strategies, including mutation-based tolerance in combination with transgenic approaches can address effectively weed resistance issues.

Source: Texas A&M Plant Breeding Bulletin

(Return to Contents)

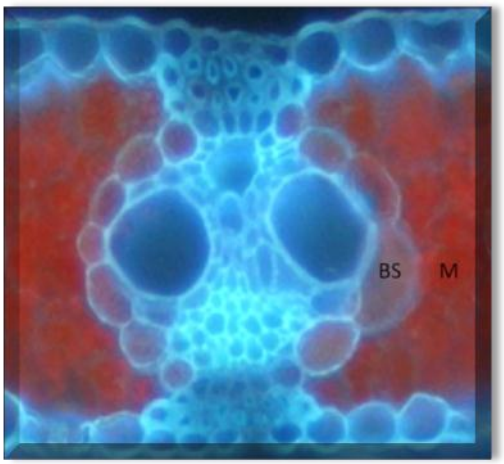
++++++++++++++++++++++++

1.37 **Scientists discover genetic key to efficient crops**

Ithaca, New York, USA

January 23, 2013

By Krishna Ramanujan



Cross section of a mature maize leaf showing Kranz (German for wreath) anatomy around a large vein. The bundle sheath cells (lighter red) encircle the vascular core (light blue). Mesophyll cells (dark red) encircle the bundle sheath cells. The interaction and cooperation between the mesophyll and bundle sheath is essential for the C4 photosynthetic mechanism. Photo: Thomas Slewinski

With projections of 9.5 billion people by 2050, humankind faces the challenge of feeding modern diets to additional mouths while using the same amounts of water, fertilizer and arable land as today.

Cornell researchers have taken a leap toward meeting those needs by discovering a gene that could lead to new varieties of staple crops with 50 percent higher yields.

The gene, called Scarecrow, is the first discovered to control a special leaf structure, known as Kranz anatomy, which leads to more efficient photosynthesis. Plants photosynthesize using one of two methods: C3, a less efficient, ancient method found in most plants, including wheat and rice; and C4, a more efficient adaptation employed by grasses, maize, sorghum and sugarcane that is better suited to drought, intense sunlight, heat and low nitrogen.

"Researchers have been trying to find the underlying genetics of Kranz anatomy so we can engineer it into C3 crops," said Thomas Slewinski, lead author of a paper that appeared online in November in the journal Plant and Cell Physiology. Slewinski is a postdoctoral researcher in the lab of senior author Robert Turgeon, professor of plant biology in the College of Arts and Sciences.

The finding "provides a clue as to how this whole anatomical key is regulated," said Turgeon. "There's still a lot to be learned, but now the barn door is open and you are going to see people working on this Scarecrow pathway." The promise of transferring C4 mechanisms into C3 plants has been fervently pursued and funded on a global scale for decades, he added.

If C4 photosynthesis is successfully transferred to C3 plants through genetic engineering, farmers could grow wheat and rice in hotter, dryer environments with less fertilizer, while possibly increasing yields by half, the researchers said.

C3 photosynthesis originated at a time in Earth's history when the atmosphere had a high proportion of carbon dioxide. C4 plants have independently evolved from C3 plants some 60 times at different times and places. The C4 adaptation involves Kranz anatomy in the leaves, which includes a layer of special bundle sheath cells surrounding the veins and an outer layer of cells called mesophyll. Bundle sheath cells and mesophyll cells cooperate in a two-step version of photosynthesis, using different kinds of chloroplasts.

By looking closely at plant evolution and anatomy, Slewinski recognized that the bundle sheath cells in leaves of C4 plants were similar to endodermal cells that surrounded vascular tissue in roots and stems.

Slewinski suspected that if C4 leaves shared endodermal genes with roots and stems, the genetics that controlled those cell types may also be shared. Slewinski looked for experimental maize lines with mutant Scarecrow genes, which he knew governed endodermal cells in roots. When the researchers grew those plants, they first identified problems in the roots, then checked for abnormalities in the bundle sheath. They found that the leaves of Scarecrow mutants had abnormal and proliferated bundle sheath cells and irregular veins.

In all plants, an enzyme called RuBisCo facilitates a reaction that captures carbon dioxide from the air, the first step in producing sucrose, the energy-rich product of photosynthesis that powers the plant. But in C3 plants RuBisCo also facilitates a competing reaction with oxygen, creating a byproduct that has to be degraded, at a cost of about 30-40 percent overall efficiency. In C4 plants, carbon dioxide fixation takes place in two stages.

The first step occurs in the mesophyll, and the product of this reaction is shuttled to the bundle sheath for the RuBisCo step. The RuBisCo step is very efficient because in the bundle sheath cells, the oxygen concentration is low and the carbon dioxide concentration is high. This eliminates the problem of the competing oxygen reaction, making the plant far more efficient.

The study was funded by the National Science Foundation and the U.S. Department of Agriculture.

http://www.seedquest.com/news.php?type=news&id_article=33203&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.38 **New low-cost barley genotyping assay launched**

United Kingdom
January 11, 2013

The James Hutton Institute and US company Eureka Genomics have launched a new custom assay for the genotyping of barley, enabling identification of over 400 SNPs

(single-nucleotide polymorphism) in a single test. The assay will offer a low-cost opportunity for researchers to identify and optimise traits such as yield, quality and environmental resilience for commercial crop production. It also opens the door for the development of new assays for other crops such as potato, blackcurrant and raspberry.

Barley is the world's fourth most important cereal crop and has significant worldwide economic value for the brewing and whisky distilling industries and animal feed, as well as US Food and Drug Administration (FDA) recognised potential for improving human health. By developing the barley panel in partnership with the James Hutton Institute, Eureka Genomics will be able to introduce the assay both in Europe and in the US next month.

Dr Pete Hedley of the James Hutton Institute said: "The collaboration with Eureka Genomics has not only enabled us to develop an efficient genotyping tool for barley, but opens the doors to apply the technology to the other main crop species of interest at the James Hutton Institute, notably potato, blackcurrant and raspberry.

"Translating these assays to our newly acquired MiSeq platform in the Genome Technology group will ensure affordable and flexible in-house genotyping over the next few years." Staff at the James Hutton Institute involved in developing the new assay were Dr Pete Hedley, Dr Joanne Russell, Dr Micha Bayer, Allan Booth and Professor Robbie Waugh.

The marker assay (LDMA) being offered by Eureka Genomics provides an improved and economical alternative to traditional technologies for profiling hundreds of SNPs (or other genetic markers) in thousands of samples using Next Generation Sequencing (NGS). The assay can be broadly applied to the detection of SNPs, CNV, presence/absence and methylation and is compatible with DNA or RNA from virtually any organism, even when genome information may be incomplete.

"The LDMA lets researchers design profiling panels that target the markers that matter most for their project, rather than wasting time and resources getting data that is irrelevant to their goals," said Andrea White, Director of Business Development for Eureka Genomics.

“The utility of the assay has been demonstrated and validated at this point and we look forward to many different research collaborations, such as we have developed with the James Hutton Institute, to expand the testing services portfolio offered by Eureka Genomics and address needs in plant, animal and clinical markets worldwide."

Details on the newly developed barley panel will be available during the Plant and Animal Genome XXI Conference in San Diego, California on 13 January 2013.

http://www.seedquest.com/news.php?type=news&id_article=32912&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++++

1.39 **Scientists learning how multiple-genome plants reproduce**

West Lafayette, indiana, USA
January 8, 2013

A study out of Harvard and Purdue universities is starting to unravel the genetic mechanisms that allow some plants to duplicate their entire genomes and continue to reproduce. Most plants, including crops, at some point in history have duplicated their genomes, giving them two or more copies of each of the instructions to build the plant. These plants have few problems reproducing normally. When scientists manipulate individuals and induce duplicate genomes, however, it is difficult - sometimes impossible - for the organism to sexually reproduce.

Being able to create polyploids, organisms with three or more genomes, such as the crops peanut, strawberry, banana, canola, cotton, wheat and others, may allow scientists to improve those crops more quickly through breeding and create new polyploidy crop species. Breeding programs that use new polyploids are cumbersome because many do not reproduce easily.

The machinery that divides the genome during sex is designed to pull paired chromosomes apart and create two cells from one. When you have four chromosomes to work with, they aren't always divided correctly," said Brian Dilkes (pictured), a Purdue assistant professor of horticulture and co-author of the findings published in the journal *PLoS Genetics*. "What this paper demonstrates is that we can use evolution as a tool to find the genes that allow plants to tolerate being tetraploids, which have four copies of their genomes.

The scientists found a species that does reproduce as both a diploid and tetraploid - *Arabidopsis arenosa*, a cousin of the standard research plant Arabidopsis thaliana. By comparing the DNA sequences of the whole genomes of plants, they detected the genetic differences between the tetraploid and diploid versions of the species.

Many genes known to play a role in meiosis, or cell division, were different in the tetraploids as compared to the diploids. In particular, the gene *Asynaptic1*, which controls the organization of chromosome pairs during reproduction, was mutated in tetraploids.

Of the plants tested, 95 percent of the tetraploids shared the same mutation in *Asynaptic1*, while 95 percent of the diploids did not contain this variant. This suggests that the mutation in *Asynaptic1* is involved in the adaptation of the meiotic machinery needed to work with four copies of the genome.

We're actually learning the mechanisms that were used in evolution to solve challenges faced by plants dealing with tetraploidy," Dilkes said. "With this understanding we will be able to manipulate crops and crop relatives to accelerate plant breeding and the inclusion of a wider genetic base in the improvement of many existing crops.

Dilkes' laboratory at Purdue was involved in analyzing the DNA of each plant tested to determine whether it was a diploid or tetraploid. He said the work would continue to determine which genes and mutations allow for sexual reproduction in tetraploid plants.

Kirsten Bomblies, an assistant professor of organismic and evolutionary biology at Harvard and principal investigator for the project, said the results are also important for human health.

Several of the genes have been shown to be critical for survival of tetraploid, but not diploid yeast, and they are also implicated in human polyploid cancers and genome instability syndromes," Bomblies said. The research was funded by the Purdue University College of Agriculture. Bomblies was supported by a Harvard University William F. Milton Fund award.

Abstract
Genetic Adaptation Associated with Genome-Doubling in Autotetraploid *Arabidopsis arenosa* Jesse D. Hollister, Brian J. Arnold, Elisabeth Svedin, Katherine S. Xue, Brian P. Dilkes, Kirsten Bomblies

Genome duplication, which results in polyploidy, is disruptive to fundamental biological processes. Genome duplications occur spontaneously in a range of taxa, and problems such as sterility, aneuploidy and gene expression aberrations are common in newly formed polyploids. In mammals, genome duplication is associated with cancer and spontaneous abortion of embryos. Nevertheless, stable polyploid species occur in both plants and animals. Understanding how natural selection enabled these species to overcome early challenges can provide important insights into the mechanisms by which core cellular functions can adapt to perturbations of the genomic environment. Arabidopsis arenosa includes stable tetraploid populations and is related to well-characterized diploids A. lyrata and A. thaliana. It thus provides a rare opportunity to leverage genomic tools to investigate the genetic basis of polyploid stabilization. We sequenced the genomes of 12 A. arenosa individuals and found signatures suggestive of recent and ongoing selective sweeps throughout the genome. Many of these are at genes implicated in genome maintenance functions, including chromosome cohesion and segregation, DNA repair, homologous recombination, transcriptional regulation and chromatin structure. Numerous encoded proteins are predicted to interact with one another. For a critical meiosis gene, ASYNAPSIS1, we identified a non-synonymous mutation that is highly differentiated by cytotype, but present as a rare variant in diploid A. arenosa, indicating selection may have acted on standing variation already present in the diploid. Several genes we identified that are implicated in sister chromatid cohesion and segregation are homologous to genes identified in a yeast mutant screen as necessary for survival of polyploid cells and also implicated in genome instability in human diseases, including cancer. This points to commonalities across kingdoms and supports the hypothesis that selection has acted on genes controlling genome integrity in A. arenosa as an adaptive response to genome doubling.

http://www.seedquest.com/news.php?type=news&id_article=32764&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.40 **Plant scientists hope to use epigenetics to improve crops**

Lincoln, Nebraska, USA
January 2, 2013

Plant scientists long have known they can alter crops genetically to improve performance; they've been doing it thousands of years. But what if they could dramatically improve crops by leaving the genes themselves unchanged but instead change how they're expressed in a way that would be passed down to future generations?

That question is at the heart of research at the University of Nebraska-Lincoln's Center for Plant Science Innovation, and the results so far are encouraging. The findings, expected to be commercialized in the next couple of years, could play a role in helping meet the world's dramatically increasing need for food, said Sally Mackenzie, Institute of Agriculture and Natural Resources plant scientist.

Specifically, scientists focused on a gene called MSH1, short for MUTS Homolog1, which is present in every plant. They discovered that if they "silenced" that gene in some plants, their growth patterns changed dramatically—dwarfed, highly branched and behaving as if they have seen high levels of stress, including cold, heat, sale, drought and high light. Then, after they reintroduced the gene and crossbred it with a plant that wasn't altered, the crossbred plant showed signs of enhanced growth, vigor, lodge resistance, high biomass production and higher yield.

Those changes in some cases were huge: up to a 100% increase in above-ground biomass, up to a 70% increase in yield in sorghum, for example. "We changed the way the plant is expressing its genes, even though we didn't change the genes themselves," Mackenzie said. The process is called epigenetics.

Mackenzie stresses these key points about her lab's work: •It's not transgene-mediated modification, which is controversial in some parts of the world and heavily regulated, thus slow to reach the market. • It's worked in several crops so far—not so-called model crops, but actual agronomically useful crops, most importantly soybean, sorghum and millet, and also tobacco and tomatoes. These changes can occur in just two generations of plants, rather than the 10 or more it can take for genetic modification to take hold. That's appealing given the sense of urgency in figuring out how to feed a world whose population is expected to reach 9 billion by 2050. The potential of epigenetics to improve other crops is unknown. It's possible that most of the potential already has been reached in corn, for example, because it's been heavily hybridized. Until now, scientists couldn't know what percentage of improvements in corn was due to genetic changes and what percentage was due, unwittingly, to epigenetics.

Besides soybean and sorghum, it seems likely there's great potential for epigenetics to improve crops such as cotton and dry beans. "And if you could do this in rice and wheat, you could perhaps change the world," Mackenzie said. "It's promising, but I don't want to overhype this," Mackenzie said. Yet to be determined is whether these effects will be stable and able to be scaled up as the techniques are commercialized and expanded to more fields and more crops.
"It's important we explore this for every potential it offers for addressing some of the challenges in agriculture," she added.

The research is funded by the Department of Energy and National Science Foundation.

http://www.seedquest.com/news.php?type=news&id_article=32688&id_region=&id_category=&id_crop=

Source: SeedQuest.com

(Return to Contents)

++++++++++++++++++++++

1.41 **Scientist discover new ways in which plants control flower production**

A research team in Cold Spring Harbor Laboratory (CSHL) in New York led by Zach Lippman has discovered a previously unknown mechanism that controls flowering in plants. Though it was believed that flowering is controlled by light and temperature, Lippman's team discovered that the timing of plant flowering also determines whether an inflorescence (reproductive shoot structures formed during flowering) was highly branched or not. Using the activity of tomato genes, the research team discovered a "molecular clock" coordinating whether meristems (where leaves or flowers are formed) give rise to branched or unbranched inflorescences.

Lippman's team found the TERMINATING FLOWER (TMF) gene, a timing mechanism that acts as an internal check on flowering. "We found a gene that when mutated converts the typical tomato multi-flowered inflorescence into one with a single flower," Lippman said.

The results of the study is published in the journal Nature Genetics.

The news release is available at CSHL website: http://www.cshl.edu/Article-Lippman/cshl-led-team-discovers-new-way-in-which-plants-control-flower-production

Source: Crop Biotech Update November 14, 2012

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

(Return to Contents)

++++++++++++++++++++++++++

1.42 **International team unravels the chickpea genome**

New genomic resources will help create better chickpea varietie

Scientists have successfully completed the draft genome sequence of chickpeas (Cicer arietinum), *reported in an article published today in* Nature Biotechnology. *The study describes the genome sequence of 90 cultivated and wild chickpea genotypes from 10 countries. This is a veritable treasure trove of genomic resources, and paves the path for modern breeding to improve this important food crop – a great boost for chickpea farmers in the developing world.*

An auspicious start to the genomics world for 2013, this study reveals more than 28,000 genes of chickpeas, which – together with an array of genotypes – provides millions of genetic markers. The initiative is summarised in the *Nature Biotechnology* article published today entitled *Draft genome sequence of chickpea* (Cicer arietinum) *provides a resource for trait improvement.*

Chickpeas are an all-important staple for food security as a principal provider of protein, and are the world's second most widely grown legume. They also enhance soil health, by fixing nitrogen and adding organic matter, meaning that farmers can intercrop chickpeas with other plants such as cereals, which benefit from the improved soil.

As a result, "Farmers will not have to apply as much fertiliser or fungicides, which both reduces costs for the farmer and helps the environment," explains Dr Paul Kimurto of Egerton University, Kenya, who is Lead Scientist for the Kenya component on improving chickpeas in the Generation Challenge Programme's (GCP) Legumes Research Initiative.

Underrated and alone, but with massive potential…

Chickpeas were formerly termed 'orphan crop', as they have a narrow genetic base – in part due to domestication, as only preferred qualities are carried on into the next generation. This, coupled with the lack of genomic data, meant that "Molecular breeding and improvement of chickpeas have been hindered by lack of genome sequence data, compared to other crops," explains Prof Suk-Ha Lee of the Department of Plant Science, College of Agriculture and Life Sciences, Seoul National University, Korea.

Prof Noel Ellis of the Institute of Biological, Environmental & Rural Sciences in Aberystwyth University, UK, concurs, adding: "This international study transforms the state of knowledge; it is not only a draft genome sequence, but also describes the genomes of 90 distinct chickpea types telling us much about the history of domestication and selection in this species. This wealth of genomic data now facilitates the development of breeding tools, and opens the door to many precise studies of gene function."

One giant step…over the milestones

Findings are bound to transform the fortunes of chickpea research, and those of chickpea farmers worldwide, particularly those who have had little choice but to plant low-yielding varieties, in addition to the devastations of drought and crop disease. Hardest hit are farmers in semi-arid environments with poor soils, poor agricultural infrastructure, and limited access to irrigation and fertilisers.

Prof Tim Close, Geneticist at the Department of Botany and Plant Sciences at the University of California, Riverside (USA) observes, "We now live in the light of the 'genome era'. The article marks a major step forward, not only for chickpeas but for legumes in general." The draft genome sequence serves as a 'family tree' for legumes, helping to clarify the roles that certain gene families have played in the evolution and domestication of chickpeas, and identifying genes for agronomically important traits to enhance other legumes.

Come together – over chickpeas…collaboratively

So how did this breakthrough come through? Dr Rajeev K Varshney, the leader of the chickpea genome sequencing project, explains that an international like-minded group of about 10 scientists came together in July 2010 at the Vth International Conference on Legume Genetics and Genomics in Asilomar, USA.

“We all agreed it was high time that we had a genome sequence for chickpeas.” Dr Varshney is also GCP’s Comparative and Applied Genomics Theme Leader, coordinator of the International Chickpea Genome Sequencing Consortium (ICGSC) and Director of the Center of Excellence in Genomics at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The sequencing project was partially funded by GCP.

Dr Varshney is elated to be part of this international *Dream Team*, comprising 49 scientists from 23 organisations in 10 countries, “I feel privileged and honoured to work with this group of scientists whose dedication made it possible to generate the genome sequence of chickpeas. Now it will be very important to link this genomic information to trait phenotypes, in order to apply the genomic information to breeding.”

This leads us to the next step: how this vast collection of resources will be put to practical use in breeding. Prof Andreas Graner, Managing Director of the Leibniz Institute of Plant Genetics and Crop Plant Research in Germany, and a member of GCP’s Executive Board, explains, “The elucidation of the evolution of the chickpea genome and its domestication history now represent the framework to systematically apply DNA-sequence-based approaches to chickpea breeding. The present findings are a stepping stone to turn conventional chickpea breeding into a predictive science.”

Setting the scene

Prof Close elaborates on the context, “There has been a paradigm shift in biological research during the past few years, driven largely by a more than 2,000-fold reduction in the cost of DNA sequencing, and simultaneous improvements in computational methods. The rise of model systems has completely reshaped the landscape: each organism can be studied directly, and its significance determined by economic, social and ecological relevance. Here, we have an example of an international, culturally diverse group of individuals who have worked together to bring this paradigm shift firmly into the realm of a crop of major importance for world food security. It is inspiring!”

Considering today’s environmental challenges, particularly in the semi-arid regions, Dr David Bergvinson, Senior Programme Manager, Science & Technology, Global Development at the Bill & Melinda Gates Foundation, adds, “We look forward to seeing how researchers around the globe will harness this resource to increase chickpea productivity against the backdrop of climate change in the developing world.”

Hopes for the future…

What are the possible impacts of this finding? Dr Jean-Marcel Ribaut, GCP’s Director, explains, “With this new genome sequencing data, chickpeas – a crop of unquestionable nutritional and agricultural importance, especially in developing countries – now have the opportunity to benefit from modern breeding. This will yield new improved varieties to assist farmers in resource-poor communities, by increasing food security, generating more income and therefore improving their livelihoods in a significant way.”

Renowned agricultural scientist and Member of Indian Parliament, Prof MS Swaminathan says, “I would like to compliment the excellent scientific work done by Rajeev Varshney of ICRISAT and his colleagues in developing a high-quality genome sequence of chickpea. I am confident that the knowledge provided by this study will help accelerate the improvement of this crop through marker-assisted breeding.”

Dr Swapan Datta, Deputy Director General – Crop Science, Indian Council of Agricultural Research (ICAR), explains the Indian context, “The chickpea genome sequence is expected to help in the development of superior varieties with enhanced tolerance to drought and resistance to several biotic stresses. India will benefit most from this genome sequence, our country being the largest producer of chickpeas.”

Dr Varshney concludes with a thought on the power of partnerships: “Collaboration can make anything possible, as it ushered chickpeas into the ‘club’ of genomic-resource-rich crops.”

Contributed by Antonia N N Okono
Communications Manager
CGIAR Generation Challenge Programme (GCP)

(Return to Contents)

==========

2 PUBLICATIONS

2.01 **Laboratory manual on GMO detection - English and Arabic**

In 2008, FAO approved a two-year Technical Cooperation Programme (TCP) project in the Near East and North Africa region entitled "Strengthening capacities towards the establishment of a regional platform for the detection of genetically modified organisms", with Jordan, Lebanon, the Sudan, Syria, United Arab Emirates and Yemen as the six participating countries.

As part of this TCP project, an advanced training course on "Detection of genetically modified organisms and biosafety for food and agriculture" took place in Aleppo, Syria on 19-24 June 2010, jointly organized by FAO, the International Center for Agricultural Research in the Dry Areas (ICARDA) and the General Commission for Scientific and Agricultural Research (GCSAR).

In the context of this training course, a laboratory manual on GMO detection was prepared, edited by A.M. Abdul Kader et al, which is now available on the web. The first half of the 322-page publication is in English while the second half is in Arabic.

See
https://apps.icarda.org/wsInternet/wsInternet.asmx/DownloadFileToLocal?filePath=3DTools_and_guidelines/Laboratory_manual.pdf&fileName=3DLaboratory_manual.pdf (10.5 MB)

Or contact alessia.laurenza@fao.org for more information.=20

Source: Update 1-2013 of FAO-BiotechNews
FAO Biotechnology website http://www.fao.org/biotech/en/

(Return to Contents)

++++++++++++++++++++++++++

2.02 **GMOs in the pipeline: E-conference summary**

The FAO e-mail conference on "GMOs in the pipeline: Looking to the next five years in the crop, forestry, livestock, aquaculture and agro-industry sectors in developing countries" took place from 5 November to 2 December 2012.

The 11-page summary document is now available, entitled "An FAO e-mail conference on GMOs in the pipeline in developing countries: The moderator's summary", by J. Ruane.

The document provides a summary of the main issues discussed by participants during this 4-week conference based on the 109 messages that were posted. From the e-mail conference, a picture emerged of a GMO pipeline that contains a considerable quantity and variety of products, indicating that the new GMOs likely to be released in developing countries within the next five years will continue to be dominated by the crop sector, where a broad range of new crop by trait combinations are in the pipeline, but may also see increased focus on new areas such as GM fish, insects and trees.

See http://www.fao.org/docrep/017/ap998e/ap998e.pdf (90 KB) or contact biotech admin@fao.org to request a copy.

All e-mail messages posted in the conference are available at http://www.fao.org/fileadmin/user_upload/biotech/docs/conf18msgs.pdf (0.9 MB).

Source: Update 1-2013 of FAO-BiotechNews
FAO Biotechnology website http://www.fao.org/biotech/en/

(Return to Contents)

---

3. WEB AND NETWORKING RESOURCES

3.01 **Genomics in food and agriculture - FAO e-mail conference**

On 4-24 March 2013, the FAO Biotechnology Forum is hosting its next e-mail conference, which has the provisional title "Current and future impacts of genomics for the crop, forestry, livestock, fishery and agro-industry sectors in developing countries".

The conference is open to everyone, is free and will be moderated. To subscribe to the conference, send an e-mail to listserv@listserv.fao.org with the following one line in the body of the message (leave the subject line blank): subscribe biotech-room3-L firstname and lastname. For example, if the subscriber's name is John Smith, then the line should be: subscribe biotech-room3-L John Smith

A background document is being prepared and will be sent to Forum members before the conference begins and placed on the Forum website, at

http://www.fao.org/biotech/biotech-forum/en/. For more information, contact biotech-mod3@fao.org.

(Return to Contents)

++++++++++++++++++++++++

3.02 **Are you linked-in to the BGRI?**

The BGRI Linked-In group is for all members of the wheat and wheat rust community. Use it to keep up with colleagues you met at the annual workshop or other meetings. Make new connections through the BGRI Linked-In network. If you have a job opening in your lab, the BGRI Linked-In connections will give you a heads-up on the best candidates. If you are looking for work, start here.

If you are already a member of Linked In, search Groups for Borlaug Global Rust Initiative and request to join the group.

If you are not already a member of Linked In, here's what to do:

— Create an account on Linked In www.linkedin.com

— Once you are registered search Groups for Borlaug Global Rust Initiative. The Search drop-down menu is defaulted to People, so select Groups.

— Join the Borlaug Global Rust Initiative Group.

— At the BGRI Linked-In Group you can start a discussion, or just browse.

Contributed by Cally Arthur
International Programs CALS
Durable Rust Resistance in Wheat
Cornell University
http://globalrust.org

(Return to Contents)

++++++++++++++++++++

3.03 **Webinar: Crop improvement in a changing environment**

2nd Annual Cornell University Graduate Student Plant Breeding Symposium to be held: Friday March 8, 2013

135 Emerson Hall, Cornell University, Ithaca NY.

Also available as an online webinar*

Please register at: http://www.cals.cornell.edu/cals/pbg/academics/synapsis/sym.cfm

Contributed by Martha T. Hamblin
Dept. of Plant Breeding and Genetics
Cornell University

mth3@cornell.edu

(Return to Contents)

---

5. POSITION ANNOUNCEMENTS

5.01 **Monsanto plant breeding and related scientist positions**

Requires a Ph.D. or M.S. in plant breeding and genetics, or related fields
For more information: http://jobs.monsanto.com/ or www.monsanto.com/careers
United States:

Discovery Breeder - Stanton, MN - Job ID: 00FFP (New Posting)

Trait Integration Breeder - St. Louis or Ankeny, IA - Job ID: 009B0

International Trait Integration Breeder - St. Louis, MO - Job ID: 00ENM

Trait Characterization Scientist - St. Louis, MO - Job ID: 00ELK

Commercial Breeder - Processing Tomato Breeder - Woodland, CA - Job ID: 00EG4

Trait Geneticist - Woodland, CA - Job ID: 00E3D

DH System Improvement Lead (Vegetables Division) - Woodland, CA - Job ID: 005ES

Field Research Conversion Manager - Juana Diaz, Puerto Rico - Job ID: 008L7
- *bioinformatics, big data, statistical genetics, modeling, etc.*

Crop Yield Statistical Modeler - St. Louis, MO - Job ID: 00F0A (New posting)

Research Scientist - Environmental Modeling Scientist - St. Louis, MO - Job ID: 009FY

Statistical Geneticists - Various Locations - Job ID: 008EA, 00EI9, 00DIV, 00DQ5

Predictive Analytics - Scientific Business Analyst - St. Louis, MO - Job ID: 0073T

Data Management and Analysis Lead - St. Louis, MO - Job ID: 00D22

International:

India:
Technology Support Lead - Bangalore, India - Job ID: 009AM

PANSEA and India Data and Marker Lead - Bangalore, India - Job ID: 00B0L

Trait Geneticist - Solanaceous Crops (Vegetables Division) - Bangalore, India - Job ID: 00CPC

Cotton Breeding, Line Development Breeder – India - Job ID: 00F14 (New Posting coming soon)

China:
Hot Pepper Breeder - China - Job ID: 006NS

Tomato Breeder - China - Job ID: 006NQ

Cucumber breeder - China - Job ID: 006NY

Tropical Sweet Corn Breeder - China/Thailand - Job ID: 009XT

Philippines - Line Development Breeder – General Santos City, Philippines – Job ID: 009E9

Israel - Pepper Breeder (Vegetables Division) - Israel - Job ID: 005OG

Kenya - WEMA Research Associate – Nairobi, Kenya, Africa – Job ID: 00E4P

South Africa - Plant Pathologist - Petit, South Africa – Job ID: 00A13

Argentina - Line Development Breeder - Córdoba, Argentina - Job ID: 0082E

Germany - Commercial Breeder – Künzing, Germany - Job ID: 00EGO

Contributed by Donn Cummings
Global Breeder Sourcing Lead
donn.cummings@monsanto.com

(Return to Contents)

++++++++++++++++++++

5.02 **Director of the office of the USDA chief scientist**

Director of the Office of the USDA Chief Scientist is Sought by the Office of the Secretary of Agriculture in Washington, DC –

The incumbent "... supervises program planning and execution by Research, Education, and Extension Office (REEO) Staff, including the following activities and functions:

> Provide expert scientific advice to the Chief Scientist on science policy, and priorities, including planning, and coordination.
>
> Facilitate the coordination and collaboration of science leadership across the Department on high priority emerging scientific issues. Including, the facilitation of goal setting for implementation, planning, and building partnerships.
>
> Promote science education, skills development, and career information across the education, extension, and research sectors through participation in outreach activities.

Assists the Chief Scientist in administering the department-wide scientific integrity policy and the Senior Science and Technology Service.

Represent the Department on relevant interagency bodies and support the Department in strengthening USDA's scientific profile ..." –

The USDA Office of the Chief Scientist provides "... scientific leadership to the Department by ensuring that research supported by and scientific advice provided to the Department and its stakeholders is held to the highest standards of intellectual rigor and scientific integrity. It also identifies and prioritizes Department-wide agricultural research, education, and extension needs ..."

Document Title: The title of the January 3, 2013 Office of the Secretary of Agriculture Job

Announcement is "Director, Office of the USDA Chief Scientist"

Organization: Office of the Secretary of Agriculture

Source: January 3, 2013 USAJOBS Position Announcement Number AG-01-2013-0001

Applications Due By: February 4, 2013
Web site: The January 3, 2013 USAJOBS Position Announcement is posted at http://www.usajobs.gov/GetJob/ViewDetails/334888500

Additional information about the Office of the USDA Chief Scientist is available at http://www.usda.gov/wps/portal/usda/usdahome?navid=OCS

Contact:
Questions may be directed to Jocelyn White who is with the USDA Departmental Management at 202 720 4766; fax: 202 720 2774; e-mail: Jocelyn.White@DM.USDA.gov

Allen Van Deynze, Ph.D.
Director of Research
University of California
Seed Biotechnology Center
Davis, CA, 95616
avandeynze@ucdavis.edu

(Return to Contents)

---

6. MEETINGS, COURSES AND WORKSHOPS

New listings may include some program details, while repeat listings will include only basic information. *Visit web sites for additional details.*

This section includes three subsections:

A. DISTANCE LEARNING/ONLINE COURSES
B. COURSES OF THE SEED BIOTECHNOLOGY CENTER AT UC DAVIS
C. OTHER MEETINGS, COURSES AND WORKSHOPS

A. DISTANCE LEARNING/ONLINE COURSES

(NEW) **UC Davis European Plant Breeding Academy Class 3 is open for registration, the class size is limited.**

The UC Davis Plant Breeding Academy is a premium professional certificate program offered in the USA, Europe and Asia. To date, the program has been attended by 114 breeders from over 50 organizations representing 26 countries thus making it the most significant program of its kind.

The European Plant Breeding Academy has gained great recognition among the European seed industry for the value that it delivers to the plant breeding community. The European Seed Association (ESA) established an "Outstanding Student Award" while Bayer CropScience awarded one full scholarship to a student in the second class. Most importantly, seed companies have expressed high level of satisfaction and repeatedly enrolled breeders in the program.

The 2013 class will maintain the core curriculum delivered in the previous classes and add modules to address the most recent development in plant breeding theory and practice, including an expanded section on molecular marker use, genome selection, non-replicated designs and GxE, using marker and pedigrees for prediction of breeding value. The format of the program allows us to move the sessions to different countries and expose the participants to variety of crops and environments.

Employers appreciate the opportunity to provide their valued employees advanced training without disrupting their full-time employment. Participants attend six 6-day sessions over approximately two years. The instructors are internationally recognized experts in plant breeding and seed technology.

Dates:
Ghent, Belgium October 21-26, 2013

Angers, France March 3-8, 2014

Gatersleben, Germany June 23-28, 2014

Enkhuizen, the Netherlands October 6-11, 2014

Almeria/Barcelona, Spain March 2-7, 2015

Davis, USA June 22-27, 2015

A discount is available for registrations before March 31, 2013.

For more information on the UC Davis European Plant Breeding Academy or the Plant Breeding Academy in the United States visit http://pba.ucdavis.edu or contact Joy Patterson at jpatterson@ucdavis.edu.

++++++++++

(NEW) **Applications now being accepted for Iowa State University's On-line Graduate Program in Seed Technology and Business**

Ames, Iowa, USA
January 8, 2013

Source: Newsletter of the American Seed Trade Association

Iowa State University's College of Agriculture and Life Sciences and College of Business have joined together to provide a program that meets the new challenges and opportunities that seed professionals face as a result of the demands of biotechnology, communications, and intellectual property protection.

The On-line Graduate Program in Seed Technology and Business (STB) provides a unique opportunity for seed professionals to grow by gaining a better understanding of the science, technology, and management that are key to the seed industry. Students can earn a degree while working anywhere in the world.

The STB program features a Master of Science in Seed Technology and Business, as well as graduate certificates in Seed Science and Technology and Seed Business Management. Curriculum includes science, technology, and business courses with a focus on decision-making in the seed sector.

The program is flexible and convenient for working professionals with content available over the Internet and on CD-ROM. The master's degree is paced for working professionals and features a 36-month study course, which includes 36 credits and a creative component project instead of a thesis. High-quality content is delivered by expert faculty and students are part of an interactive group.

Applications are being accepted until March 15 for admission in May 2013. For more information about the Master of Science Degree and graduate certificates in Seed Science and Technology and in Seed Business, contact Simi Venkatagiri at sgiri@iastate.edu, 515-294-5681, seedgrad@iastate.edu, www.seedgrad.iastate.edu

http://www.seedquest.com/news.php?type=news&id_article=32757&id_region=&id_category=&id_crop=

Source: SeedQuest.com

++++++++

(NEW) **Plant Breeding Methods - Distance Education version CS, HS 541-section 601 DE; 3 credits; lecture only**

Prerequisite: a statistics course

North Carolina State University will be offering CS,HS 541, Plant Breeding Methods in a distance education version this fall. The instructor is Todd Wehner (tcwehner@gmail.com).

This is an introductory Plant Breeding course for first year graduate students and advanced undergraduate students. The emphasis is on traditional methods of developing improved cultivars of cross-pollinated, self-pollinated, and asexually-propagated crops, and the genetic principles on which breeding methods are based. The purpose of this course is to provide the student a general background in all areas of plant breeding. The goal is to develop students who are knowledgeable in all of the areas of plant breeding, and to have sufficient understanding to work as an assistant breeder at a seed company, or to continue with advanced courses in plant breeding.

CS,HS 541 presents an overview of plant breeding methods, including germplasm resources, pollen control, measurement of genetic variances, and use of heterosis. Special topics include genotype-environment interaction, index selection, stress resistance, polyploidy, and mutation breeding. The course provides in-depth coverage of methods for breeding cross-pollinated, self-pollinated and asexually-propagated crops.

Courses usually taken before CS,HS 541 are genetics and statistics.

Courses taken after often include HS 703 (breeding asexually propagated crops), CS,HS 719 (germplasm and biogeography), CS,HS 720 (molecular genetics), CS,HS 745 (quantitative genetics), CS,HS 746 (advanced breeding), CS,HS 748 (pest resistance, now PP590), CS,HS 860 (breeding lab 1), and CS,HS 861 (breeding lab 2).

For more information on HS 541 Plant Breeding Methods, see:
http://distance.ncsu.edu/courses/fall-courses/HS.php

For more information on distance education at NC State University, see:
http://distance.ncsu.edu/

For more information on Todd Wehner, see:
http://cucurbitbreeding.ncsu.edu/

++++++++++

(NEW) **Plant Breeding Overview - Distance Education version**
HS 590-801,601; 1 credit; lecture only

Prerequisites: undergraduate biology, genetics

North Carolina State University will be offering HS 590, Plant Breeding Overview in a distance education version this fall. The instructor is Todd Wehner (tcwehner@gmail.com).

An introductory Plant Breeding course for non-majors. Emphasis is on methods of developing improved cultivars of cross-pollinated, self-pollinated, and asexually-propagated crops. Student will learn the main areas of plant breeding, including germplasm resources, male sterility, and use of heterosis. Special topics include genotype-environment interaction, index selection, disease and insect resistance, interspecific hybridization, and mutation breeding.

For more information on HS 590 Plant Breeding Overview, see:
http://distance.ncsu.edu/courses/fall-courses/HS.php

For more information on distance education at NC State University, see:
http://distance.ncsu.edu/

For more information on Todd Wehner, see:
http://cucurbitbreeding.ncsu.edu/

Contributed by Todd C. Wehner
Dept. Hort. Sci., Box 7609
North Carolina State Univ.
Raleigh NC 27695-7609

919-741-8929 (phone)
919-515-2505 (fax)
tcwehner@gmail.com
CucurbitBreeding.ncsu.edu

++++++++++

Texas A&M University to offer plant breeding doctorate degree through distance education

"We think there is an opportunity and a need, and we have the technology to meet it." Individuals interested in the graduate degrees in plant breeding distance program should contact Smith at cwsmith@tamu.edu or 979-845-3450; Dr. David Byrne, associate department head for horticultural sciences, dbyrne@tamu.edu or 979-862-3072; or LeAnn Hague, distance education coordinator in the soil and crop sciences department, leann.hague@tamu.edu or 979-845-6148. Learn more

http://www.seedquest.com/news.php?type=news&id_article=31036&id_region=&id_category=&id_crop=

Source: SeedQuest.com

++++++++++++

Distance Education in Plant Breeding at Texas A&M

Available Degrees:

Master of Science in Plant Breeding (Non-Thesis Option)

Master of Science in Plant Breeding (Thesis Option)

Contact to:

Wayne Smith
Department of Soil and Crop Sciences
2474 TAMU
College Station, TX 77843-2474
Tel. 979.845.3450 Fax 979.458.0533
cwsmith@tamu.edu

David Byrne
Department of Horticultural Sciences
2133 TAMU
College Station, TX 77843-2133
Tel. 979.862.3072
dbyrne@tamu.edu

LeAnn Hague
Distance Education Coordinator
Department of Soil and Crop Sciences
2474 TAMU
College Station, TX 77843-2474
Tel. 979.845.6148 Fax 979.458.0533
Leann.hague@tamu.edu

Additional Website
eLearning at Texas A&M University: http://elearning.tamu.edu/

++++++++++

University of Nebraska-Lincoln launches online plant breeding and genetics certificate program

http://www.seedquest.com/news.php?type=news&id_article=27326&id_region=&id_category=&id_crop=

Source: SeedQuest.com

++++++++++++

Plant Breeding Methods - Distance Education version CS, HS 541-section 601 DE; 3 credits; lecture only

For more information http://distance.ncsu.edu/courses/fall-courses/HS.php

For more information on distance education at NC State University, see:
http://distance.ncsu.edu/

For more information on Todd Wehner, see:
http://cucurbitbreeding.ncsu.edu/

Plant Breeding Overview - Distance Education version HS 590-801,601; 1 credit; lecture only

For more information on HS http://distance.ncsu.edu/courses/fall-courses/HS.php

Dr. Todd C. Wehner
Professor and Cucurbit Breeder
Department of Horticultural Science
North Carolina State University
Raleigh, NC 27695-7609
919-741-8929
tcwehner@gmail.com

++++++++++

Master of Science in Plant Breeding at Iowa State University (distance program)

Contact information is:
msagron@iastate.edu
toll-free: 800-747-4478
phone: 515-294-2999
http://masters.agron.iastate.edu

Maria Salas-Fernandez
Assistant Professor
Department of Agronomy
Iowa State Univ.
msagron@iastate.edu

++++++++++

Online Graduate Program in Seed Technology & Business

Iowa State University
http://click.icptrack.com/icp/relay.php?r=48323218&msgid=597705&act=BDP

Contact us today for more information about how you can apply:

Paul Christensen
Seed Technology and Business Program Manager Ph
515-294-8745
seedgrad@iastate.edu

(Return to Contents)

++++++++++++

B. COURSES OF THE SEED BIOTECHNOLOGY CENTER AT UC DAVIS

February 19-21, 2013, **Program Management for Plant Breeders**

Program Management for Plant Breeders will teach the principles of employee and resource management in a modern agricultural research program. This course is designed for professionals directing plant breeding and laboratory programs. The session is scheduled for February 19-21, 2013. More information on both courses will be available soon. In the meantime, if you have questions, please contact Susan DiTomaso.

http://www.seedquest.com/news.php?type=news&id_article=31273&id_region=&id_category=&id_crop=

February 12-14, 2013, **Seed Biology, Production & Quality**

This course has been expanded to include both hands-on exercises and detailed discussions of seed production and seed technology. Topics include: Flowering and

pollination, seed development and maturation, production and certification, health and phytosanitation, harvesting and conditioning, vigor and viability, storage and longevity, biotechnology and seed enhancement.

++++++++++

October 2013, **Class III of the European Plant Breeding Academy**

Registration is now open for Class III of the **European** Plant Breeding Academy. This program begins in October 2013. There is an early-bird registration discount available until March 31, 2013. For more information on the European Plant Breeding Academy contact Joy Patterson or visit the PBA.

++++++++++

European **Plant Breeding Classes**

For more information and application process visit
http://pba.ucdavis.edu/PBA_in_Europe/PBA_in_Europe_Class_II/

++++++++++

Seed Central series of monthly events

The program for the next several months can be viewed at:
http://www.seedcentral.org/calendarofevents.htm

To learn more about Seed Central, please visit www.seedcentral.org

++++++++++

C. OTHER MEETINGS, COURSES AND WORKSHOPS

February 6-8, 2012. ***Short Course:*** **QTL Mapping and Breeding Simulation,** *at The University of Western Australia, ICPBER (International Centre for Plant Breeding Education and Research), led by Dr Jiankang Wang, CIMMYT China, and Chinese Academy of Agricultural Sciences. Supported by UWA and Murdoch University, Perth, WA. This course is designed for postgraduate students, geneticists and breeders who are interested in applying SNP marker data to QTL analysis using ICIM software. SNP data provide new challenges in QTL data analysis, and ICIM handles large SNP data sets based on the latest statistical approaches in QTL analysis and visualisation of outputs."*

February 7-9, 2013, **The biennial conference, Organicology**

This incredible event is hosted by Oregon Tilth, Organic Seed Alliance, Sustainable Food Trade Association and Organically Grown Company. We have joined forces to unite the organic trade in Portland, Oregon at the Hilton Portland and Executive Center. Register Now!

Register to Attend Register to Exhibit Sponsor More info

+++++++++

(NEW) *March 8, 2013*, **Annual Cornell University Graduate Student Plant Breeding Symposium**, 135 Emerson Hall, Cornell University, Ithaca NY

Please register at:
<http://www.cals.cornell.edu/cals/pbg/academics/synapsis/sym.cfm>
Contributed by Martha T. Hamblin
Dept. of Plant Breeding and Genetics
Cornell University
mth3@cornell.edu

++++++++++

March 1 - May 31, 2013, **CIMMYT's Basic Wheat Improvement Course,** CIMMYT's Ciudad Obregon and El Batan research stations.

The Basic Wheat Improvement course is a unique and hands-on professional development opportunity for junior and early career scientists in the public, private, or non-governmental sectors.

Contact Amor Yahyaoui: ah.yahyaoui@cgiar.org For application form contact: CIMMY-TO@cgiar.org Or visit http://globalrust.org/

++++++++++++

(NEW) May 27-30, 2013, **International symposium on genetics and breeding of durum wheat** Rome, Italy.

Organized by the International Maize and Wheat Improvement Center (CIMMYT), International Center for Agricultural Research in the Dry Areas (ICARDA) and the Italian National Research Council (CNR) and National Academy of Sciences, the programme of this scientific symposium covers the origin and evolution of durum wheat; genetic resources and germplasm en hancement; breeding strategies and tools; adaptation and sustainability; disease and pest resistance; technological and nutritional quality; and structural and functional genomics.

See
http://dwis.accademiaxl.it/index.php or contact durumwheat@accademiaxl.it for more information

++++++++++

June 2-5, 2012. 2013. **Annual Meeting of the National Association of Plant Breeders.**Tampa, Florida

More information will be posted on the website soon: www.plantbreeding.org/napb/

Contributed by Barry Tillman
UF/IFAS
btillman@ufl.edu

+++++++++

June 9-13, 2013, **The 7th International Triticeae Symposium (7ITS), Sichuan Agricultural University (SAU)**, Chengdu, China

The 7th ITS will cover four scientific research topics: Session I: Systematics and Phylogeny Session II: Biodiversity and Conservation Session III: Genetics and Genomics Session IV: Breeding and Utilization

Information can be found on the website: http://xms.sicau.edu.cn/7ITS/

Contributed by Helmut Knuepffer
knupffer@ipk-gatersleben.de

June 10-13 2013, **Pre-breeding – fishing in the gene pool,** EUCARPIA Genetic Resources section meeting, Sweden, Alnarp (+ accommodations in Malmö)

The EUCARPIA PGR meeting will gather scientists, breeders and people from the genebank community from all around Europe and the world. Theme of the meeting is *Pre-Breeding - fishing the gene pool* where we will discuss how we can better use our genetic resources to cope with problems that mankind is facing.

Contributed by Helmut Knuepffer
knupffer@ipk-gatersleben.de

++++++++++

August 19-22, 2013, **Next year's BGRI**, Taj Palace Hotel, New Delhi, India.

Technical Workshop to recognize the 50th anniversary of Norman Borlaug's work in South Asia. will be held at the BGRI South Asia program center in New Delhi

+++++++++

(NEW) *September 2-6, 2013*, **InterDrought-IV Conference, Perth**, Western Australia.

For more information, visit
http://dtma.cimmyt.org/index.php/workshops/announcements/159-interdrought-iv-conference

Source: Crop Biotech Update January 16, 2013:

Contributed by Margaret Smith
Department of Plant Breeding & Genetics, Cornell University
Mes25@cornell.edu

++++++++++++

October 14-17, 2013, **11th African Crop Science Society Conference**, Yaoundé, Cameroon

For additional Information you can contact Dr. Leke Walter Nkeabeng, Vice-President ACSS Council, Chairman LOC Cameroon; P. O. Box 2123 Messa Yaounde, Cameroon; Tell: +237 79704342 (C),+237 94035711 (C), Email: lekwat@yahoo.com

Contributed by Kasem Zaki Ahmed¶Faculty of Agriculture
Minia University, El-Minia, Egypt
ahmed_kz@yahoo.com

++++++++++

(Return to Contents)

---

7. EDITOR'S NOTES

Plant Breeding News is an electronic forum for the exchange of information and ideas about applied plant breeding and related fields. It is a component of the *Global Partnership Initiative for Plant Breeding Capacity Building* (GIPB), and is published monthly throughout the year.

The newsletter is managed by the editor and an advisory group consisting of Chikelu Mba (chikelu.mba@fao.org), Elcio Guimaraes (e.guimaraes@cgiar.org), Margaret Smith (mes25@cornell.edu), and Ann Marie Thro (athro@reeusda.gov). Oriana Muriel is the Associate Editor (oriana.muriel@alumni.pitt.edu) The editor will advise subscribers one to two weeks ahead of each edition, in order to set deadlines for contributions.

Subscribers are encouraged to take an active part in making the newsletter a useful communications tool. Contributions may be in such areas as: technical communications on key plant breeding issues; announcements of meetings, courses and electronic conferences; book announcements and reviews; web sites of special relevance to plant breeding; announcements of funding opportunities; requests to other readers for information and collaboration; and feature articles or discussion issues brought by subscribers. Suggestions on format and content are always welcome by the editor, at pbn-l@mailserv.fao.org. We would especially like to see a broad participation from developing country programs and from those working on species outside the major food crops.

Messages with attached files are not distributed on PBN-L for two important reasons. The first is that computer viruses and worms can be distributed in this manner. The second reason is that attached files cause problems for some e-mail systems.

PLEASE NOTE: Every month many newsletters are returned because they are undeliverable, for any one of a number of reasons. We try to keep the mailing list up to date, and also to avoid deleting addresses that are only temporarily inaccessible. If you miss a newsletter, write to me at chh23@cornell.edu and I will re-send it.

REVIEW PAST NEWSLETTERS ON THE WEB: Past issues of the Plant Breeding Newsletter are now available on the web. The address is: http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPC/doc/services/pbn.html *Please note that you may have to copy and paste this address to your web browser, since the link can be corrupted in some e-mail applications.* We will continue

to improve the organization of archival issues of the newsletter. Readers who have suggestions about features they wish to see should contact the editor at chh23@cornell.edu.

To subscribe to PBN-L: Send an e-mail message to: mailserv@mailserv.fao.org. Leave the subject line blank and write SUBSCRIBE PBN-L (Important: use ALL CAPS). To unsubscribe: Send an e-mail message as above with the message UNSUBSCRIBE PBN-L. Lists of potential new subscribers are welcome. The editor will contact these persons; no one will be subscribed without their explicit permission.