CIMMYT
International Maize and Wheat Improvement Center

informa
No. 1914 • 10-14 November 2014

Genevieve Renard

Highlights of the 12th Asian Maize Conference

The 12th Asian Maize Conference and Expert Consultation on "Maize for Food, Feed, Nutrition and Environmental Security" convened in Bangkok, Thailand from 31 October to 1 November 2014.

Organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI), CIMMYT, the Food and Agriculture Organization (FAO) of the United Nations and the Thai Department of Agriculture (DoA), the Conference brought together around 350 researchers, policy-makers, service providers, innovative farmers and representatives of various organizations from across the public and private sector.

All Photos: Natapol Sriburasuk/APAARI.

▲ Dr. Raj Paroda, the Executive Secretary of APAARI, welcoms participants and stresses recent scientific achievements which led to higher maize annual growth than all other cereals in the region.

▲ Dr. Hiroyuki Konuma, the Assistant Director-General and FAO Regional Representative for Asia and the Pacific, delivers his address. He reminded the audience that the OECD-FAO Agriculture Outlook 2014-2023 indicated that the world utilization of maize is projected to increase by 20 percent in the next 10 years.

▲ Dr. Simon Hearn, Chairman of APAARI and Principal Advisor of the Australian Centre for International Agricultural Research (ACIAR), shares his remarks at the opening session.

▲ Participants at the opening session listen attentively.

October 30

October 30

▲ From left to right: Guests of honor Dr. Simon Hearn; Dr. Anan Suwannarat, director general, Thai DoA; , Dr. Hiroyuki Konuma; Dr. Raj Paroda; and Dr. Tom Lumpkin, CIMMYT director general; open the Conference and show the books of Abstracts and Extended Summaries.

▲ Group photo of conference participants.

▲ The co-chairs of the first plenary session, Dr. Nick Austin, Chief Executive Officer of ACIAR (center) and Dr. Tom Lumpkin (right), with rapporteur Dr. B.S. Vivek, CIMMYT maize breeder.

▲ Dr B.M. Prasanna, Director of the CIMMYT Global Maize Program, presents the first keynote lecture, a maize research-for-development scenario and the challenges and oppportunities for maize in Asia.

▼ Attendees enjoy dinner hosted by FAO.

▼ The cultural show featured elegant traditional Thai dances.

▲ Plenary Session 3 focused on the impacts of climate change on maize-based cropping systems in Asia, with, from left to right, rapporteur Dr. Christian Boeber, CIMMYT agricultural economist, Dr. William Dar, ICRISAT Director General and Dr. Simon Hearn, Chairman of APAARI and Principal Advisor of ACIAR.

▲ A participant asks a question in a plenary session.

▲ CIMMYT booth featured CSISA and MAIZE CRP banners and CIMMYT GMP posters.

▲ Dr. Ian Barker, Head of Agricultural Partnerships at the Syngenta Foundation for Sustainable Agriculture (SFSA), presents on the maize seed sector in marginal markets in Asia.

◄ Panel discussion moderator Dr. Marco Ferroni receives a 12th AMC memento.

▲ Panel Discussion on the maize seed sector in Asia through public-private partnerships. From left to right: Dr. Marco Ferroni, Executive Director of SFSA; Dr. Fan Xingming, Yunnan Academy of Agricultural Sciences (YAAS), China; Dr. Arvind Kapur, CEO of the vegetable division at Rasi Seeds; Dr. John McMurdy, Biotechnology Advisor at USAID; Shilpa Divekar Nirula, India CEO of Monsanto; and Bijendra Pal, Deputy Director of Bioseed.

October 31

▲ Participants and poster presenters from India, S.V. Manjunatha, M.G. Mallikarjuna and S. Hooda Karambir.

▲ Dr. Mark Holderness, the Executive Secretary of the Global Forum on Agricultural Research (GFAR), asks a question.

▲ Dr. Mulugetta Mekuria, SIMLESA Project Leader, presents on sustainable intensification of maize-based systems.

▲ Dr. B.M. Prasanna, Director of the CIMMYT Global Maize Progam, receives a plaque of appreciation from FAO and APAARI for his contributions to the successful organization of the conference and for strengthening regional maize research and development partnerships.

▲ Maize scientist Dr. Saira Bano from Pakistan is presented an award for best poster by Dr. Hiroyuki Konuma, Assistant Director General of FAO RAP.

◀ Dr. Tom Lupkin, CIMMYT Director General, with participants Dr. H.S. Gupta, director general of the Borlaug Institute for South Asia (BISA) and Dr. H.S. Sidhu, Senior Research Engineer, CIMMYT India.

Farmers and Scientists Meet to Further Promote Work on Wheat Biofortification

Vinod Mishra and Arun Joshi

On 2 November, 48 farmers, including nine women from the eastern Gangetic Plains of the state of Uttar Pradesh, India, convened at Banaras Hindu University (BHU), Varanasi to review the work done in the last year under participatory varietal selection (PVS) of HarvestPlus wheat lines and to plan for the coming crop cycle. The meeting was jointly organized by BHU and the CIMMYT-Kathmandu office.

The workshop was opened by Mrs. Sushma Patel, one of the women farmers. Dr. Vinod Kumar Mishra, BHU professor and principal investigator for the HarvestPlus project at BHU, welcomed the participants and emphasized the role of PVS in promoting biofortified varieties to solve the serious problem of malnutrition caused by zinc and iron deficiencies. He recognized the contributions of each of the collaborative farmers – especially the women farmers – in identifying agronomically superior biofortified wheat lines bred at CIMMYT-Mexico by Ravi Singh and Govindan Velu.

The second session was devoted to sharing experiences and outcomes from the 2013-14 crop season. Dr. Vinod Mishra shared the results of the HarvestPlus PVS trials with individual farmers. Satish Kumar Singh, BHU professor of soil science, circulated the result of soil testing of each farmer's fields and suggested solutions for proper soil health. Farmers showed a deep interest in the HarvestPlus experimental results and in the seed multiplication of high zinc wheat lines in their villages, which can benefit other farmers. Mrs. Sursati Devi, from the Pidkhir village and Mrs. Amarawati Devi, from the Sahewa village of Mirzapur, shared their experiences about the selection of superior lines and the maintenance of pure seed by practicing standard methods from harvesting to threshing. They also thanked BHU and the HarvestPlus project team for this noble cause.

A documentary on HarvestPlus, produced by the national TV channel Doordarshan, was shown to participants. In another session, experts from different fields answered farmers' questions. Dr. Chhavi Tiwari shared her experiences working with women farmers and their impact, which is due to their increasing numbers and active participation. In addition, a short training on soil sampling was given by Dr. Satish Kumar Singh. Farmers were asked to collect soil samples from their fields so that they can be tested at BHU. Farmers were assured that soil results will be provided to individual farmers within 15 days of submission.

Each of the PVS farmers was given 10 kilograms of biofortified wheat seed that had been tested in their village during the last cycle. This session was led by Dr. Ravi Pratap Singh, BHU director of the Institute of Agricultural Sciences. Dr. Singh appreciated the proactive role of the farming community and CIMMYT and BHU scientists in identifying the zinc-enriched wheat varieties which generate yields superior to other varieties. He thanked CIMMYT, Harvest Plus, the Bill & Melinda Gates Foundation and other donors for providing this opportunity to BHU.

The meeting enabled all participants to understand the achievements and opportunities for further improvement going forward.

▼ Farmers are given recommendations of PVS for biofortified wheat in the field. Photo: Biram Chaurasia.

Discussing Wheat, The "White Gold" of Afghanistan

Rajiv Sharma

Afghans call wheat by the name "white gold," and rightly so, as the crop occupies about 80 percent of total cereal acreage and provides up to 60 percent of the daily caloric intake of an average Afghan. War-torn Afghanistan is now gathering itself and picking up speed in almost all areas of life. For an agrarian economy with more than 55 percent of its wheat acreage dependent on rain, wheat security is synonymous to food security. Making available appropriate wheat varieties for diverse production domains and optimized production packages is an ongoing activity spearheaded by the Agricultural Research Institute of Afghanistan (ARIA) and duly supported by international centers like the International Maize and Wheat Improvement Center (CIMMYT) and International Center for Agricultural Research in the Dry Areas (ICARDA).

Wheat
provides up to
60 %
of the daily caloric intake of an average Afghan

To discuss these topics and to review successes in Afghanistan, CIMMYT and ARIA held the fourth annual Afghanistan Wheat Workshop from October 19 to 21 at the Ministry of Agriculture, Irrigation and Livestock (MAIL) campus, in Kabul. The annual workshop was attended by over 60 researchers representing ICARDA, the Japanese International Cooperation Agency (JICA), and the Australian Centre for International Agricultural Research (ACIAR), ARIA, MAIL and CIMMYT.

The workshop was opened by Mir Aminuddin Haidari, MAIL Deputy Minister for Technical Affairs. He said that wheat was the staple crop for 30 million Afghans and he exhorted wheat researchers to help increase wheat yield to up to 4.5 tons per hectare (t/ha) from the present level of about 3.0 t/ha. He acknowledged CIMMYT's partnership in achieving this. Dr. Rajiv Sharma, CIMMYT country representative, welcomed the participants and explained that urgent steps were needed to phase out susceptible varieties from the seed chain. Rahim Mirzad, acting director of ARIA, thanked CIMMYT for contributing to the development of varieties and for a proactive approach to disease management. He told workshop attendees that the ARIA-CIMMYT partnership conducted a total of 117 experiments last year.

The opening session was followed by presentations of research results by discipline leaders as well as individual researchers from all the research stations. A report on CIMMYT hub activities was also shared with participants in the presence of Hamdullah Hamdard, the MAIL director general of extension. He expressed appreciation for CIMMYT's 493 farmer field demonstrations and assured the full cooperation of his department in this endeavor. Presentations by discipline leads on next season's research plans filled the research planning session. During a final plenary session 10 wheat varieties were identified for release proposals, while three varieties were proposed to be phased out from the seed chain.

A Group Photo of the workshop participants.
Photo by: Shakib Amiri

Stress-resilient Maize for Asia

Miriam Shindler

Around 80 percent of maize in Asia is rain-fed. As a result, farmers are dependent on the monsoon rains and susceptible to the hazards they present. Unpredictable rain patterns can cause drought, waterlogging and excessive moisture all within the same crop season. This unpredictability is a major factor affecting maize productivity. To add to these challenges, most maize in Asia is grown under lowland tropical conditions – a perfect breeding ground for diseases and insects. Maize production is being further exacerbated by soil erosion caused by intensified land use and low soil fertility caused by poor agronomic practices.

New

stress-resilient hybrids developed by CIMMYT scientists in Hyderabad have outperformed commercially available hybrids

Asia is seeing an unprecedented demand for maize triggered by changing diets. Asia needs to double its production by 2020 to keep up with demands, but if current climatic trends persist maize yields will decrease by 17 percent due to climate change-induced heat and water stress.

High-yielding, stress-resilient maize varieties can meet this growing demand under current and changing climatic conditions. CIMMYT scientists in Asia are working with private and public sector partners using both conventional and molecular breeding approaches to develop abiotic stress-resilient maize hybrids for adaption to current and future climatic conditions.

New stress-resilient hybrids developed by CIMMYT scientists in Hyderabad have outperformed commercially available hybrids under drought and waterlogging as well as under optimal (non-stress) conditions. Once released in the market, these varieties will enable farmers to achieve high yields across a broad range of climatic conditions. During the development of these new hybrids, CIMMYT tested stress-resilient germplasm at 18 phenotyping sites across South and Southeast Asia, ensuring broad adaptation and a reliable selection.

High-Quality Maize Grain Is Fundamental for Farmers and Industry

Luisa Cabrera and Natalia Palacios

Mexico is ranked as the fifth-largest maize consumer globally and is the first country where more than 70 percent of maize production is used for direct human consumption. Farmers in Mexico grow maize mainly for self-consumption and nixtamalization, dough and tortilla industries. The end-user quality of the product is greatly determined by the quality of the maize grain. Therefore, for the Mexican market, the quality component of the final product is essential in the equation for genetic improvement.

Since the Sustainable Modernization of Traditional Agriculture (MasAgro) program was launched, a special emphasis has been placed on monitoring the quality of improved maize varieties to ensure these meet the needs of the traditional and industrial nixtamalization processes. Several training courses on grain technology have been held to identify the dough and tortilla sector needs. To help streamline the maize product chain, the Valle de México experimental field of the Mexican Institute of Forestry, Agriculture and Livestock (INIFAP-Cevamex) and MasAgro organized a theoretical and hands-on course "Maize grain quality, cost/profit for farmers and maize processing industry" on 20-21 October.

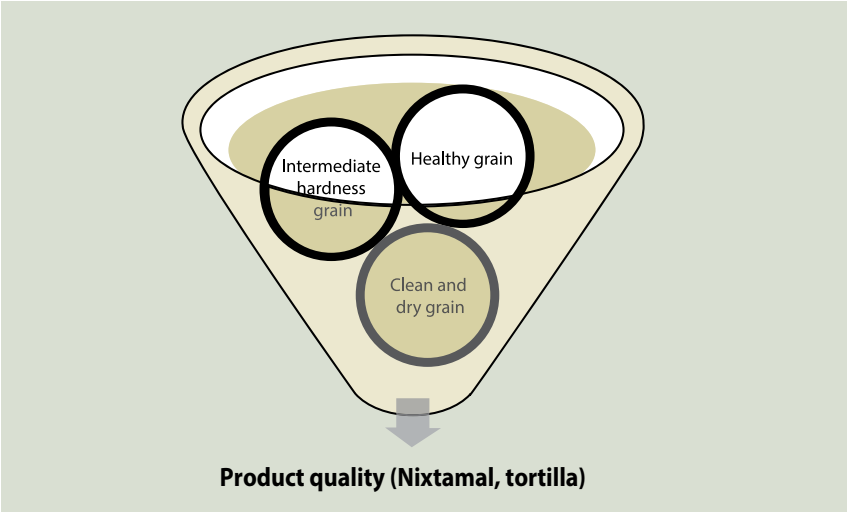
Photos: Luisa Cabrera

▲ Participants determine physical properties of maize grain.

The course drew 25 participants, including representatives of seed companies, field technical advisors, transformation agents (from mills and processing industry), by-products traders (dough and nixtamalized flour), as well as maize farmers.

According to the seed suppliers, the main reason for attending the course was their interest to know, in detail and based on scientific information, what are the specific maize grain quality requirements for the dough and tortilla industry. This information will enable them to start developing materials that meet those specifications. Representatives of mills and the maize processing industry expressed their interest in learning quick, simple and effective methodologies that can be implemented in their workplace to assess the quality of the maize they receive for processing and prevent further losses or further processing.

Although most of the milling representatives attending the course are able to empirically estimate ▸



the quality of maize grain through observation, taste and touch, there were only a few who knew in detail the critical parameters or were aware of the need to modernize their processes.

Most of the representatives of the processing industry obtain the majority of their grain from northern Mexico, and they prefer to pay freight fees to ensure they will get clean, dry, and intermediate-hardness grain (see figure above summarizing the key quality parameters for a quality tortilla). However, they have recently started to produce grain themselves or to buy it directly from farmers in central Mexico. For this reason, there was a special interest to learn about the genetic materials that have been developed specifically for this industry in that region and that meet the quality features required.

For the participants, the importance of the quality, even when compared to the price, generated a proposition: "quality defines the price and *continued market presence*." Today, milling representatives are in a transitionary and evolutionary period, and only those with an enterprising vision, who are willing to meet the market demands will maintain this ancestral and cultural Mexican legacy.

Photo: Luisa Cabrera

Participants at the "Maize grain quality, cost/profit for farmers and maize processing industry" course pose for a photo.

Climate Change:

How Large a Threat to Improved Maize Production?

Sam Storr

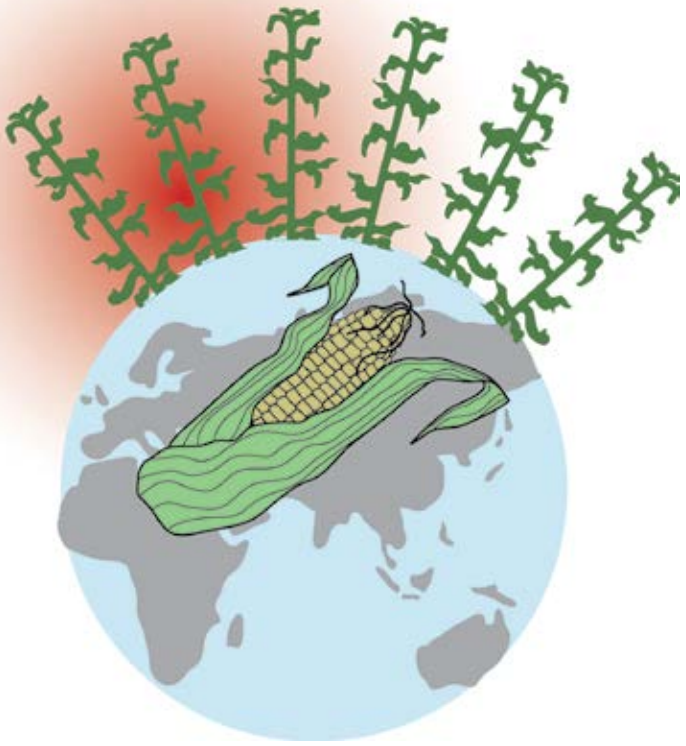
At the 12th Asian Maize Conference and Expert Consultation on Maize for Food, Feed, Nutrition and Environment Security, held 30 October to 1 November, representatives from countries in the region were united in their concern for the challenges posed by a changing climate to improved maize production and resilient food systems.

> "Mitigation doesn't have to come at a loss of productivity. Mitigation is about best agricultural practices."
>
> – Clare Stirling
> Keynote speaker

Keynote speaker Clare Stirling of CIMMYT, struck a decidedly optimistic note. "The most important point is that we're meeting the challenge. Climate change is raising questions that breeders are stepping up to." She also sought to address misconceptions about climate change mitigation: "Mitigation doesn't have to come at a loss of productivity. Mitigation is about best agricultural practices."

P.H. Zaidi of CIMMYT-India takes that approach when breeding combined drought-and waterlogging-tolerant maize. "The maize may end up like a cactus, but we don't want that. In the background we need to keep high yield." Alok Sikka of the Indian Council of Agricultural Research also agreed in his keynote lecture that adaptation measures should be holistic and responsive to local conditions.

To create the transformational change required, Stirling suggests scaling up the incremental changes adopted by farmers to a systems level, in close partnership with national institutions and decision-makers as exemplified by the Climate Change, Agriculture and Food Security (CCAFS) CGIAR Research Program climate-smart village project. "The elephant in the room is how do we overcome the barriers to adoption on the part of smallholder farmers?"



informa staff: **Scott Mall** Executive Editor • **Alberto Mondría** Editor • **Jennifer Johnson** Junior Editor
María Concepción Castro-Aragón Editor/Translator • **Marcelo Ortiz-Sánchez** Graphic Designer

MasAgro Maize Hybrids Pass Commercial Checks in Mexican Humid Tropical Regions

Alberto Chassaigne

On 23 October, representatives of Mexican seed companies, the Chapingo Autonomous University, the Mexican Institute of Forestry, Agriculture, and Livestock (INIFAP) and the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) visited CIMMYT's Ernest W. Sprague experiment station in Agua Fría, Puebla where they attended a field day on tropical maize.

Photo: Alberto Chassaigne

▲ Seed producers and MasAgro-Maize partners evaluate the performance of hybrids of the tropical maize network.

Arturo Silva, leader of the maize component of the Sustainable Modernization of Traditional Agriculture (MasAgro) project, welcomed the participants and described the priority zones, which are marginal but have a good potential. The MasAgro seed producers network efforts are focused on helping those regions use top quality hybrid seed.

Alberto Chassaigne presented the CIMMYT maize seed systems' advances and explained next year's training plans, which Chassaigne considers "the year of quality of maize seed national production."

Félix San Vicente presented the maize improvement program for Mexico's humid tropics. Participants evaluated maize ears from the front rows of each experimental plot to determine the performance of the MasAgro network tropical hybrid trials. Later, they summed up their scores and the hybrids' identities were revealed. This process showed that CIMMYT's hybrids received higher evaluations than the commercial checks, even though there were pressures from leaf diseases and increased temperatures during the crop cycle.

Apart from having information available about the performance of the network's hybrids, seed producers and MasAgro network partners also have access to tecnology to produce their seed. Ubaldo Marcos and Manuel Velázquez demonstrated eight CIMMYT tropical hybrids, along with their corresponding parents, and also showed data for each one of them that was collected over the past three years in two tropical locations – Agua Fría, Puebla and Vallarta, Jalisco. During the field data collection, recommendations were given to participants on the planting distance between seeds to achieve an adequate flowering synchronization (depending on the speed of the vegetative development of each parent, quality and quantity of male pollen, parent's height, etc.). Seed producers will have the opportunity to replicate these results in their production zones.

At the end of the course, seed producers and partners thanked CIMMYT for its hospitality and openness. They also said that MasAgro-Maize has been the engine that has helped them boost national production of maize seed, by giving them competitive germplasm and training in seed production as well as access to higher impact markets.

Japanese Embassy Delegation Visits CIMMYT

Connie Castro

On 22 October, Shin Taniguchi, second secretary and agricultural attaché of the Embassy of Japan in Mexico, accompanied by his successor, Hideaki Sasaki, visited CIMMYT's facilities. Taniguchi has been instrumental to CIMMYT-Japan relationships and in promoting continued funding from Japan for joint activities to increase global food security. On this occasion, Taniguchi came to CIMMYT to thank and say farewell to CIMMYT staff and introduce Sasaki.

Taniguchi and Sasaki met with Dr. Thomas Lumpkin, CIMMYT director general, followed by a lunch with Dr. Thomas Payne, head of the CIMMYT germplasm bank; Dr. Luz George, PMU manager; Mike Listman, WHEAT CRP communications officer; and Dr. Hans Braun, director of the Global Wheat Program.

Current research initiatives with Japan include the Development of Wheat Breeding Materials for Sustainable Food Production (SATREPS) project in Afghanistan, led by Dr. Tomohiro Ban, former CIMMYT scientist and now professor at the Yokohama City University. This project builds the capacity of Afghanistan's young scientists, who first take wheat improvement courses in Mexico, then continue their studies in Japan and then return to Afghanistan to share their knowledge and experience with their colleagues.

Japan is one of CIMMYT's long-standing supporters. Japan's financial partnership with CIMMYT began in the late 1970s, supporting key wheat pathology research. Over the years, CIMMYT-Japan research has expanded to other important areas, and among CIMMYT staff there have been, and there are, many outstanding Japanese scientists.

This year CIMMYT hosted several visits by high-level officers such as the Ambassador of Japan in Mexico, Suichiro Megata; former CIMMYT Director General Masa Iwanaga; and students from Yokohama City University, among others. These visits are proof of the long-term and successful partnership between CIMMYT and Japan.

At the end of the visit, Taniguchi received a award from CIMMYT in recognition of his valuable support.

Photos: Xochiquetzal Fonseca

▲ Shin Taniguchi receives an award from Thomas Lumpkin in recognition of his valuable support.

▲ (L to R) Tomohiro Ban, Isabel Peña, Shin Taniguchi, Hideaki Sasaki and Thomas Lumpkin are photographed at CIMMYT's Guesthouse.

▲ Tomohiro Ban, Hideaki Sasaki, Shin Taniguchi and Isabel Peña pose beside at the Norman Borlaug statue at CIMMYT.

Recent Publications by CIMMYT Staff

Knowledge Center

Modelling the effect of plant water use traits on yield and stay-green expression in sorghum. 2014. Kholova, J.;Murugesan, T.; Kaliamoorthy, S.; Malayee, S.; Baddam, R.; Hammer, G.L.; McLean, G.; Deshpande, S.; Hash, C.T.; Craufurd, P.;Vadez, V. Functional Plant Biology 41(11):1019-1034.

Cropping systems strategy for effective management of Fusarium wilt in safflower. 2014. Rao, V.N.; Sastry, R.K.;Craufurd, P.; Meinke, H.; Parsons, D.; Rego, T.J.; Rathore, A. Field Crops Research 156:191-198.

Farmers, food and climate change: ensuring community-based adaptation is mainstreamed into agricultural programmes. 2014. Wright, H.; Vermeulen, S.; Laganda, G.; Olupot, M.; Ampaire, E.; Jat, M.L. Climate and Development 6(4):318-328.

Effect of genotype on In vitro propagation of elite sugarcane (Saccharum Officinarum L.) varieties of Ethiopian sugar Estates. 2014. Gemechu Abu; Firew Mekbib; Teklewold, A. International Journal of Technology Enhancements and Emerging Engineering Research 2(6):123-128.

Phonological traits, yield components and their relationship with grain yield stability in spring wheat genotypes under terminal heat stress conditions. 2014. Zarei, B.; Naderi, A.; Jalal Kamali, M.R.; Lack, S.; Modhej, A. Advances in Environmental Biology 8(10):1177-1184.

Analysis of effectiveness of R1-nj anthocyanin marker for in vivo haploid identification in maize and molecular markers for predicting the inhibition of R1-nj expression. 2014. Chaikam, V.; Sudha, K.N.; Babu, R.; Martinez, L.; Tejomurtula, J.; Prasanna, B.M. Theoretical and Applied Genetics. Online First.

Carryover of insect pests on maize crop grown under conservation agriculture. 2014. Meti, P.; Sreenivas, A.G.; Prakash, K.; Jat, M.L.; Venkateshalu, A.; Prabhuraj, N.; Manjunath, N.; Singh, Y.K. Journal of Experimental Zoology India 17 (2) : 575-576.

Identification of high yielding wheat genotypes through evaluation of international nurseries. 2014. Sharma, R.K.;Osmanzai, M.; Singh, R.P.; Braun, H.J.; Sharma, R.C. Cereal Research Communications 42 (2) : 303-313.

Management of shoot fly and stem borers on maize. 2014. Meti, P.; Sreenivas, A.G.; Prakash, K.; Jat, M.L.; Venkateshalu, A.;Prabhuraj, N.; Manjunath, N. *Journal of Experimental Zoology India* 17 (1) : 337-340.

Population dynamics of shoot fly and stem borers of maize under conservation agriculture system. 2014. Meti, P.;Sreenivas, A.G.; Prakash, K.; Jat, M.L.; Venkateshalu, A.; Prabhuraj, N.; Manjunath, N.; Singh, Y.K. Journal of Experimental Zoology India 17 (2) : 563-566.

Informa is published by CIMMYT Communications Department. We welcome your input, preferably in both English and Spanish. The deadline for submissions is 9 a.m. on the Wednesday before publication. We reserve the right to edit all contributions. Please send proposed material to CIMMYT-International-Communications-Department@cgiar.org