SEED INFO

Official Newletter of the WANA Seed Network

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EDITORIAL NOTE

Seed Info is designed to stimulate information exchange and regular communication between seed staff in the Central and West Asia and North Africa (CWANA) region. Its purpose is to help strengthen national seed programs and thus improve the supply of quality seed to farmers.

The WANA Seed Network corner provides information on activities related to global and/ or regional cooperation and collaboration to facilitate the development of a vibrant regional seed industry. In this issue, we highlight the establishment of the Seed Technology Unit (STU) in Qatar and the capacity development of human resources by the Seed Section of ICARDA. In the Arabian Peninsula, seed and forage production of introduced tropical crops such as clover and Rhodes grass are constrained by water scarcity and soil salinity risks. The alternative is to use drought tolerant native grasses and shrubs. The STU will be engaged in research and development of native grasses and shrub species in developing crop management practices, harvesting, and post harvesting technologies and procedures for production of quality seed and propagating material. From the outset, to meet the increasing and diverse needs of the national seed programs, the Seed Section adopted a 'train-the-trainers' approach, by which primary courses held at ICARDA Headquarters lead to follow-up courses organized in-country by national seed programs. The Seed Section continues to strengthen human resource development within the region.

In the **NEWS AND VIEWS** section, Niels Louwaars from Plantum presents an article entitled *Knowledge Policy is Vital for Seed Sector.* The article highlights the need for investments in knowledge in a more complex seed value chain, from variety development to commercialization of seed to farmers. There is news from regional and / or international organizations, such as the International Union for the Protection of New Varieties of Plants (UPOV) and the African Seed Trade Association (AFSTA).

AFSTA reports on its annual seed congress held in Zanzibar and launch of its new initiative Alliance for the Seed Industry in Eastern and Southern Africa (ASIESA), a public–private partnership between AFSTA and COMESA (Common Markets for Eastern and Southern Africa). ASIESA is expected to address the challenges identified through participatory workshops by the seed industry in the region. There is also a summary on the status and future strategy for wheat seed production in Asia presented during the meeting convened by the Food and Agriculture Organization of the United Nations and Asia Pacific Association of Agricultural Research Institutions in collaboration with CIMMYT and JIRCAS.

The section on **SEED PROGRAMS** includes news from Ethiopia and Pakistan. From Ethiopia, the report covers the release of wheat and maize varieties. The Ethiopian Institute of Agricultural Research (EIAR) presented three bread wheat and two durum wheat varieties from its ongoing collaboration with ICARDA and CIMMYT, whereas the maize variety was released by the Ethiopian Seed Enterprise (ESE) – a public seed enterprise. The wheat varieties in Ethiopia are supported by United Sates Agency for international Development (USAID) seed projects for accelerating seed multiplication and popularization working with public and private sector partners to ensure availability and access to seed by farming communities across the country. News from Pakistan focused on the release of a chickpea variety by the Barani Agricultural Research Institute from material received from ICARDA.

The **RESEARCH** section captures information on adaptive research or issues relevant to seed program development in the region and beyond. This issue features an article entitled *Impact of Magnetic Seed Treatments on Synchronized Germination and Vigor Enhancement of Tomato Seed* by Irfan Afzal *et al.* from the University of Agriculture in Faisalabad, Pakistan. This paper presents the role of magnetic seed treatment in stimulating seed germination and early seedling growth of tomato.

Seed Info encourages the exchange of information between the national, regional, and global seed industries. We encourage our readers to share their views and news through this newsletter. Your contributions, in Arabic, English, or French, are most welcome.

Have a nice read

Zewdie Bishaw, Editor

WANA SEED NETWORK NEWS

This section presents information on the WANA Seed Network, including network activities and reports of the meetings of the Steering Committee and the WANA Seed Council.

ICARDA Establishes Seed Technology Unit in Qatar

Seed and forage production of tropical crops such as clover and Rhodes grass are constrained by water scarcity and high soil salinity risks in the Arabian Peninsula (AP) countries. The alternative is the use of more drought tolerant native grasses and shrubs for feed, amenity, and ornamental purposes. However, for those native grasses and shrub species, appropriate crop management practices, harvesting, and post harvesting technologies and procedures for production of quality seed and propagating material are not yet developed and widely applied in the Arabian Penninsula countries.

ICARDA is assisting in setting up Seed Technology Units (STUs) with a set of specialized facilities, and developing specific procedures and practices for assessment of forage and seed productivity and quality of native compared to the low water-use efficiency tropical species used for feed production. ICARDA is involved by providing technical assistance to strengthen capacity of human resources. This includes the design of the STU facilities, assisting in providing specifications and procurement for seed processing machines and laboratory equipment, and developing the principles and techniques of quality seed production. So far, three STUs are established, one each in United Arab Emirates, the Sultanate of Oman, and Saudi Arabia under an International Fund for Agricultural Development (IFAD) funded technology transfer project managed by the Arabian Peninsula Regional Program.

The major components of a functional STU are:

- Availability of open fields with reliable water sources for quality seed and forage production
- Availability of appropriate infrastructure to accommodate post-harvest facilities and activities such as seed processing and storage
- Availability of appropriate infrastructure to accommodate seed quality control and research facilities and activities such as physical and physiological seed quality analysis
- Availability of a suitable area for establishing a platform for bulk material drying, preliminary threshing, and seed winnowing
- Trained man power for supervision and implementation of production and post-harvest activities
- Ongoing research and production activities for seed and forage within and around the station

In May 2011, ICARDA initiated the establishment of the STU in Qatar following discussion of its functions with crop and livestock experts, researchers, and extension staff of the Ministry of Environment. A review of existing and new field and laboratory facilities at Rawdatul Faras and Uturat Agricultural Research Stations enabled the assessment and establishment of a functional STU for research and quality seed production.

A STU facility in Qatar

In March 2012, a technical backstopping mission and a training course was organized on installation, operation, and use of the STU facilities and equipment for seed production, processing, and quality control. Five participants from the Uturat Research Station participated in the installation, operation, and adjustment of the seed processing machines recently procured to equip the STU. The basic infrastructure and equipment for seed production, processing, testing, and storage are ready for use. However, additional equipment and specialized laboratory furniture such as working benches, stands for laboratory equipment, chairs, and shelves are required to start full and proper operation. When the seed quality laboratory is fully furnished, a two-week on the job-training course on seed testing will be organized at the STU.

For sustainability of the STU, it is crucial to widen the scope of its mandate by establishing linkages with other research and educational institutions, such as the colleges of agriculture and natural science and the public and private entities involved in reforestation and gardening.

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ICARDA Organizes Seed Courses

From the outset, to meet the growing and diverse needs of the national seed programs, the Seed Section adopted a 'train-the-trainers' approach, by which primary courses held at ICARDA Headquarters lead to secondary or follow-up courses organized in-country by national seed programs. This approach not only makes the training more relevant and cost effective but also allows the decentralization of these activities and helps to strengthen the culture of human resource development within the region. Several courses are conducted annually, both at the headquarters and in the region.

Background

A well-functioning formal seed system comprises all key components along the seed value chain within the agricultural research for development continuum. However, seed programs in developing countries are bedeviled by several factors, among these are management of the variety release system and availability of early generation seed for commercialization. The establishment of an effective, transparent, and independent national variety release system and seed certification scheme will enhance the flow of new varieties from research, and quality seed from companies to farmers.

Course organization and funding

A course on *Variety Identification and Maintenance and Quality Seed Production and Certification* had two components: (i) short-term (two weeks, 15–25 April 2012) and long-term (three weeks, 15 April to 3 May 2012). All participants attended the short course of two weeks, but long-term course participants stayed for one more week. The short-term course was funded through a capacity strengthening project supported by Arab Fund for Social and Economic Development for national agricultural research and seed programs in Central and West Asia and North Africa (CWANA). The long-term course participants were supported by funds from Japan International Cooperation Agency through its third-country training program for Afghanistan, Syria, and CWANA; and the Young Arab Scientists Program participant was funded through a food security project implemented by ICARDA.

The course was offered in collaboration with the Central Administration for Seed Certification (CASC), which provided the facilities and resource staff for lectures and arrangements for most of the practical sessions and field visits. Apart from CASC, the Agricultural Research Center and the Central Administration for Seed Production and their staff also provided support during the course.

Course content

Variety description and variety maintenance, as well as seed quality assurance are specialized tasks where technical and managerial skills and experience are required for implementation at the national level. The course aimed at improving the national capacity to conduct agronomic performance (Value for Cultivation and Use) and establish registration (Distinctness, Uniformity, and Stability) trials required for variety release. Moreover, the principles and techniques of seed production and quality assurance were addressed in detail.

Course delivery

The course program blended theoretical lectures with practical sessions and field visits relevant to variety identification and maintenance and quality seed production and certification. Theoretical and conceptual lectures presented by ICARDA staff were supplemented by resource persons from Egypt – this contextualized their application in a national setting, taking into account the Egyptian national seed system. All lectures were followed by hands-on practical sessions and visits to fields and/or laboratories with the aim of providing more clear understanding and the necessary skills to establish and manage variety identification and maintenance and quality seed production and certification activities in a national context.

During the long-term course, participants prepared a proposal based on identified needs using SWOT (strengths weaknesses, opportunities and threats) analysis, their present responsibilities

in their respective national programs, and the future direction of the national seed sector. The purpose was to enable the participants to prepare a proposal based on knowledge acquired through lectures, practical sessions, field visits, and country reports presented during the short-term course. Each trainee submitted a written proposal and made a concise presentation to a panel of supervisors who evaluated the proposal and provided feedback. The depth of the proposal showed the extent of understanding of the problem and the ways of addressing them, based on situation analysis in their respective countries. The assignment enabled the participants to internalize the theory and practice and adapt it to their own conditions.

Course participants

The target groups were managers and technical staff of the national agricultural research organizations involved in variety evaluation and maintenance, as well as seed production and certification officers from national seed programs. Twenty-two participants from nine countries – Afghanistan (2), Egypt (3), Eritrea (3), Ethiopia (3), Lebanon (1), Palestine (1), Sudan (3), Syria (5), and Yemen (1) – attended the course. Among the participants were individuals involved in the key components of the national seed systems: plant breeding, variety evaluation and registration, variety maintenance, and seed production and certification.

Participants during a field visit to Sakha ARC, Kafr El-Sheikh, Egypt

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NEWS AND VIEWS

News, views, and suggestions on the seed industry are included in this section. It is a forum for discussion among seed sector professionals.

Knowledge Policy is Vital for Seed Sector

Seed policies tend to focus on regulatory issues that lay out the roles of public and private sectors in the further development of the seed industry. Seed policies are then translated into seed laws and into the institutions to implement these such as seed certification agencies. In terms of research, seed policies often merely state that the government research institutes are responsible for breeding and breeder's seed production and for testing private sector and other imported varieties. However, the seed chain is extremely knowledge intensive and seed policies are not complete without a comprehensive review of knowledge development in the country, and the public investments that go with it.

A well run seed chain breaks when there is no steady influx of new varieties that meet the changing needs of farmers. Variety development requires the support of a range of disciplines, such as genetics, plant pathology, plant physiology, which in turn require a basis in molecular biology, systems biology and bioinformatics. The seed chain furthermore requires advanced seed technology in order to enhance the performance of the seed, and seed business, along with marketing and logistics skills to organize the process. A seed industry thus needs access to a wide range of knowledgeable specialists, which means that knowledge policies (research and education) have to be a key part of a national or regional seed policy.

Such knowledge components of seed policies also have to carefully demarcates the roles of the public sector from the private space. In industrialized countries, this has led to different development pathways, where for example in The Netherlands, the public sector is not involved in breeding except for some 'new crops', but concentrates its effort on breeding research that supports private sector breeders. In the USA on the other hand, public research institutes and universities release varieties of a wide range of crops either in competition with private sector

varieties or because the private sector does not invest in developing its own varieties (e.g. because the breeder's rights system is too weak).

In many industrialized countries, significant public investments go into pre-competitive research to develop new molecular technologies to assist plant breeding. An important decision is how to frame public research in such a way that it optimally serves the needs of the sector. This can be done through having private sector representatives in decision-making bodies of purely public research, or by promoting public-private partnerships that by definition focus on the needs of the co-funding private sector parties. Another discussion is how to link education programs with the needs of the sector. This can, for example, be done by involving seed sector specialists in teaching programs and by having field days or longer-term practical periods for students with the seed companies.

Not every country will be able to have all the specialists at hand, let alone develop all the curriculums to train them within the country. This means that research and education policies have to take into account international cooperation. In developing countries the relationships with the international centers for agricultural research, such as the CGIAR and advanced research institutes and universities have to be included and decisions have to be taken on which types of expertise might better be left to such bodies for the time being. However, becoming too dependent on foreign research for the seed sector also has its risks, as priorities of these international bodies may not always reflect those of the country (in terms of crops, ecologies etc.).

The bottom line is - how to frame knowledge policies in such a way that they optimally serve the goals and objectives of the seed policy? Active participation of the seed sector in research and education policies is a must.

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Status and Future Strategy for Wheat Seed Production in Asia

Introduction

Wheat is an important staple cereal widely grown in various ecological settings of Asia. Its role in food and nutrition security has been steadily increasing; however, there is a growing concern about stagnation in production and productivity in the major wheat growing countries of the region. In 2010/11, the global wheat production was about 682 million tonnes covering 227 million ha with an average productivity of 3 tonnes ha^{-1}. Asian countries produced 223 million tonnes of wheat from an area of 101 million ha during 2009/10 with a productivity level of 2.23 t ha^{-1}. In 2050, the world population is projected to be 9 billion, of which 5 billion will be in Asia. Food production needs to double to meet this huge demand; and 70% of that increase should come from productivity and the other 20–30% through area expansion. According to FAO's estimates, wheat production should increase to 302 million t in Asia to meet the needs for human consumption by 2050. Asia is a low-income region with a large number of small farmers with agriculture as their primary occupation.

Status of wheat seed sector

Seed is the most important input for crop production and therefore deserves special attention as well as investment, a need that the public sector cannot meet alone. The development of agriculture, including the seed system is progressing well in most Asian countries, barring a few like Afghanistan, Tajikistan, and Uzbekistan. Countries have undertaken several measures to improve the seed system through enabling policies, legislation, technical support, and establishment of necessary infrastructure. India's introduction of the New Policy for Seed Development in 1988, and the Protection of Plant Varieties & Farmers' Right Act, 2001 are some such steps that helped the industry to grow, fostering better public–private partnership and attracting more investment in this sector. Formation of Asia Pacific Seed Association in 1994 and launching of a South Asian Association for Regional Cooperation Seed Forum in 2010 also aimed at fostering regional cooperation in building a strong seed system in the Asia–Pacific in general and South Asia in particular.

Owing to the low profit margins, the supply of high volume–low value seed of open-pollinated varieties such as wheat remains the primary responsibility of the public seed sector in most countries. Also, in such crops, a large proportion of the seed (>75%) is generally farmer-produced and farm-saved, leaving a seed replacement rate of 10–25% in different countries. However,

some countries like Bangladesh recorded >75% seed replacement in wheat, primarily because of poor storability of seed in the high humidity and warm storage conditions at farm level. A higher seed replacement not only ensures use of quality seed for satisfactory crop establishment under variable field conditions, but is also an effective mechanism to introduce new improved varieties that can perform better under less favorable growing conditions. Using high quality seed can also substantially reduce the seed rate, which is 100–120 kg ha^{-1}.

Linking research with farmers

Farmers' participation in technology generation and seed production is an effective mechanism of improving the wheat seed delivery system. In the participatory approach, there is greater emphasis on exchange of knowledge and information between farmers and scientists. Such work has been undertaken in South Asia through National Agricultural Research Systems in collaboration with CIMMYT, which has helped faster dissemination of wheat technologies including new varieties and resource conservation technologies to farmers' fields. In Bangladesh and Nepal, farmers' participatory variety trial results are embedded in the official procedures for release to avoid delay in access to new varieties. The Indian Council of Agricultural Research has also implemented participatory seed production as a standard way of accelerating seed availability to farmers. This approach has been tried in different parts of India by encouraging partnership between the research organizations (that develop new varieties and produce seed) and small farmers in seed production, cleaning, grading, and safe storage. This also helps farmers in trying (and evaluating) newly developed varieties and selecting the best material as per their preferences. Farmers, once trained can either use their skill to produce seed for their own use or become contract seed producers for commercial seed producing agencies, or form their own producer companies for greater economic returns.

Seed cost constitutes a small fraction (5–10%) of the total cost of crop production in wheat; however, a yield advantage of 20–30% is achievable with the use of quality seed. In addition, seed is an efficient carrier of other supplements such as pesticides, nutrients, and bio-inoculants. Hence, concerted efforts should promote seed enhancement treatments for greater efficacy of pesticides, location-specific and need-based micronutrient management, and applying super-absorbent seed coatings for more efficient water use. Physical methods of stimulation of seed quality and vigor through electromagnetic treatments have also shown great promise and can be applied if adequate infrastructure and appropriate machinery is set up.

To manage the poor storability of wheat seed in humid and warm conditions, particularly in South Asia, several newly developed drying and packaging alternatives, such as super-absorbent zeolite drying beads and bags and cocoons made of fused polyethylene bilayers with gaseous barriers have been found effective for prolonged storage. The organized seed sector and research institutions have a greater role to play in this regard. The average productivity of wheat in Asia is lower than that of the world and this can be greatly enhanced if seed production and popularization of seeds of improved varieties is done among Asian farmers, especially among farmers of Central Asian countries in which robust seed production systems are absent.

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AFSTA Congress 2012: A Resounding Success

The 12th African Seed Trade Association (AFSTA) Annual Congress was held in Zanzibar on 5–8 March 2012. The President of Zanzibar accompanied by the Minister of Agriculture, Food and Cooperatives and other high delegates officially opened the congress. The congress deliberated on the developments, challenges, and opportunities in the seed subsector. Over 250 delegates attended the congress, which was organized and hosted jointly by the Government of Tanzania and the Tanzania Seed Trade Association.

Several key presentations were made: (i) the status of noxious weeds in Africa and their impacts on certified seed production and trade; (ii) the impact of climate change on agriculture; (iii) the challenges and prospects for an integrated seed market in Eastern and Southern Africa; (iv) recent developments in vegetable breeding; and (v) access by African farmers to seed technology. The Union for the Protection of New Plant Varieties (UPOV) held a half-day workshop on the back of the congress that was attended by over 100 participants.

Representatives of key regional and international bodies attended the congress, including the International Seed Federation, the International Seed Testing Association, the International Convention for the Protection of New Varieties of Plants (UPOV), the African Regional Intellectual Property Organization, and the USAID. The key participants also included representatives of the African Organization for Intellectual Property and the Common Market for East and Southern Africa (COMESA), and the World Vegetable Center, among others.

Mr Jitu Shah, the Managing Director of the East African Seed Company, was elected as the new AFSTA President; and Mr Nicholas Goble of the South African Seed Organization was elected Vice President of AFSTA for two years.

Main players at the congress were seed companies. They organized well-attended exhibition booths and did booming business at exclusive trading tables. The entire AFSTA board of directors and Secretariat congratulated the best booths, thanked all exhibitors, and encouraged more companies to take part in exhibition space in the AFSTA Congress 2013 in Mauritius. The Mauritius representative was handed the Congress flag for 2013.

AFSTA Launches Regional Initiative for the Seed Industry

The Alliance for the Seed Industry in Eastern and Southern Africa (ASIESA) – aimed at strengthening capacities of the seed industry in Eastern and Southern Africa – was officially launched in Nairobi, Kenya, on 17 May 2012. The ceremony attracted over 60 participants representing several international, regional, and national organizations and seed associations

ASIESA, a public–private partnership between AFSTA and Common Markets for Eastern and Southern Africa (COMESA), is expected to solve some challenges that were identified through open, participatory workshops by the seed industry in Eastern and Southern Africa. The Alliance aims to address challenges facing the seed industry in Eastern and Southern Africa, and is supported by USAID, AFSTA and other partners

The global seed business is worth about US$30 billion out of which sub-Saharan Africa's share is only US$800 million, representing 3%. ASIESA's vision is to establish and enhance a viable and sustainable seed industry in Eastern and Southern Africa to ensure that farmers have timely access to affordable high-quality seed and planting materials.

It is hoped that successful implementation of ASEISA in the eight ASIESA targeted countries (Ethiopia, Kenya, Uganda, Tanzania, Malawi, Zambia, Zimbabwe, and Madagascar) will lead to improved access to affordable, reliable, and timely supply of adapted genetics and traits in high-quality seeds and planting materials for the region's farmers.

Participants of the meeting to launch ASIESA in Nairobi, Kenya

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International Convention for the Protection of New Varieties of Plants

Ratification of the 1991 Act

The Government of Ireland deposited its instrument of ratification of the 1991 Act of the International Convention for the Protection of New Varieties of Plants (UPOV) on 8 December 2011. The Government of France deposited its instrument of ratification of the 1991 Act on 27 April 2012. The 1991 Act entered into force for Ireland on 8 January 2012 and for France on 27 May 2012. Ireland and France, which were already among the 70 members of UPOV, were the 48th and 49th members, respectively, to be bound by the 1991 Act.

Observers

The African Seed Trade Association (AFSTA) granted observer status for the Council, the Administrative and Legal Committee, the Technical Committee and the Technical Working

Parties of UPOV. A list of observers in UPOV bodies can be consulted (*http://www.upov.int/members/en/observers.html*).

Symposium on plant variety protection

The UPOV Council endorsed plans for the 'Symposium on the benefits of plant variety protection for farmers and growers' to be held in Geneva on 2 November 2012. The aim of the symposium is to illustrate how plant variety protection can improve incomes for farmers and growers by supporting the development and supply of new improved varieties that are suited to their needs. The symposium will also provide examples of how farmers and growers can use plant variety protection as breeders. The symposium will be webcast.

Test Guidelines

The Technical committee adopted eight new Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability (Test Guidelines) and revised eight Test Guidelines. The new Test Guidelines were for blue honeysuckle, buckwheat, canna, echinacea, hemp, heuchera and heucherella, oncidium, and shiitake. The revisions were for durum wheat, French bean, kalanchoe, kiwifruit, New Guinea impatiens, parsnip, radish, and strawberry. The guidelines which were previously only available in pdf format, are now available in word format (see http://www.upov. int/test_guidelines/en/).

Experience in examination of new plant varieties

The number of genera and species for which members of the Union have practical experience in the examination of distinctness, uniformity and stability (DUS) increased from 2679 in 2011 to 2726 in 2012 (+1.75%). Information on members of the Union with practical experience in DUS examination is freely accessible via the GENIE database (*http://www.upov.int/genie /en/*).

UPOV is an intergovernmental organization based in Geneva. For further information please contact: UPOV Secretariat: 4, Chemin des Colombettes, CH-1211 Genève 20; Tel: +41-22-3389111; Fax: +41-22-7330336; E-mail: *upov.mail@upov.int*; website: *http: //www.upov.int*

Biobest Establishes Distribution Network in Morocco

Biobest Maroc Trading (BMT) was created by Biobest, a Belgian company that has specialized in bumblebee pollination and sustainable crop management for 25 years, to distribute its own product range in Morocco. BMT can offer a better service to Moroccan crop growers thanks to shorter distribution channels and an after-sales service better adapted to the local target market, where fruitful business relationships were recently established with local distributors. To ensure future success in the region, the company has assumed entire responsibility for the whole distribution chain, from growing to the use of biological products. BMT will act as a direct distribution chain for pollinators, beneficial organisms, and biopesticides to the growers. Combined with high flexibility, ongoing technical assistance, and a personal approach, BMT will be able to offer many advantages to local growers and will also serve as a two-way communication channel between the company and its customers. At the same time, BMT will also serve to gather information on the experiences of customers with various crops. Research, development, and production units will use this expertise to develop an effective strategy against pests in North African countries.

BMT will distribute the entire range of Biobest products applicable to crops in the region. The company will therefore be able to focus on less common crops. Morocco has become a major agricultural producer, particularly in growing tomatoes and peppers. BMT will serve as the local base and allow the company to explore opportunities for sustainable management in other important crops of the future such as berries and citrus fruits.

In the past, mainly local distributors operated in the tomato and pepper markets. As a result, the need for an integrated pest management strategy in other crops was not always fully satisfied or there was no appropriate solution for numerous problems in the implementation programs. BMT will be located at the same premises as the production site of Biobest, 40 km south of Agadir, and became operational in early June. For additional information please contact: bert.synaeve@ biobest.be

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Global Status of Biotech Crops in 2011

Global adoption of biotech crop technology continues at unprecedented rates. In 2011, an additional 12 million ha were planted, representing

an annual growth rate of 8% over 2010, according to annual report released by ISAAA (International Service for the Acquisition of Agri-biotech Applications). In 2011, 160 million ha were planted (up from 148 million ha in 2010) by 16.7 million farmers in 29 countries, including 19 developing countries and 10 industrialized countries. Such adoption represents a 94-fold increase in area planted since 1996, making biotech crops the fastest adopted crop technology in recent history.

Adoption in developing countries

Adoption was faster and larger in developing countries. Developing countries leading biotech adoption are Brazil and Argentina in Latin America, China and India in Asia, and South Africa in Africa – together they represent 40% of the global population. Growth rate for biotech crops in developing countries, at 11% or 8.2 million ha during 2011, was twice as fast and twice as large as in industrialized countries with 5% (3.8 million ha). Developing countries grew approximately 50% of global biotech crops in 2011 and are expected to exceed industrial country acreage in 2012. Additionally, more than 90% of farmers worldwide (equivalent to over 15 million farmers) are small resource-poor farmers in developing countries, up 8% (1.3 million) since 2010.

Advances achieved across the world

Advances experienced throughout the world are very important to the overall global biotech commercialization. Highlights noted in the report include:

- The USA continued to be the lead producer of biotech crops globally, at 69 million ha, with an average adoption rate of approximately 90% across principal biotech crops;
- Brazil ranks second only to the USA in acreage, with 30.3 million ha planted. For the third consecutive year, Brazil had the largest increase in the world at 4.9 million ha, representing an impressive year-over-year increase of 20%;
- India marked a decade of successful cultivation of biotech cotton, which has transformed cotton into the most productive and profitable crop in the country, with 10.6 million ha planted during 2011;
- China adopted biotech cotton on 3.9 million ha or about 71.5% of cotton acreage. Growth was driven by seven million small-scale farmers who on average farm only 0.5 ha;
- The Philippines reported planting over 600 000 ha of biotech maize, a 20% increase in area. The Philippines is the only country in Asia that plants biotech maize;
- Africa has planted 2.5 million ha of biotech crops, and is making advances with field trials and the regulatory process for additional biotech crop countries and crops.

Engine for global growth

With such large growth in Brazil, global leaders are recognizing the country as an 'engine' for worldwide growth. Brazil has a fast-track approval system and has created three streams of technology to support growth. The model includes: proprietary biotech crops from the private secto r adopted on more than 30 million ha; public–private sector partnerships which have already delivered an approved product; and the capacity to develop and deliver a 'home-grown' biotech crop – a virus resistant bean. Collectively, these three streams of technology provide Brazil with a diversified pipeline of new biotech products for the country. This approach is highly effective for Brazil and a key lesson for other countries across the world.

Insight for future success

During 16 years of biotech crop commercialization, the industry learned many lessons. From regulatory and approval considerations to nurturing strong biotech pipelines, sustained growth and development has been achieved through insight and global innovation driven by industry and government alike.

Continued success in biotech crop commercialization has three requirements. First, countries must secure political will and support; second, develop innovative game-changing trait technologies which will have high impact; and third, ensure science-based, time- and cost-effective deregulation, in order to provide farmers new technologies for timely continued growth and productivity.

Outlook:

- Considerable potential lays in continued adoption of high acreage biotech crops (maize, soybean, cotton, and canola). During 2011, 160 million ha of these crops were planted, and currently there are approximately 150 million ha available for potential adoption.

Thirty million ha of the potential area is in China, which has assigned priority to biotech maize and where demand for maize as a feed crop is growing fast as the country increasingly consumes meat.

- Support for biotech crops varies across Europe, where Bt maize area in 2011 was a record 114 490 ha, up more than 25% in 2010. At the same time, BASF halted development and commercialization of all its biotech crop products for cultivation in Europe as of mid-January 2012. BASF will continue the EU regulation process for products already started such as 'Fortuna', its late blight disease resistant potato.
- Commercialization of biotech wheat in North America has been revisited. Similarly, many countries and companies worldwide are now also fast-tracking the development of a range of biotech traits in wheat to improve drought tolerance, disease resistance, and grain quality. Biotech wheat is expected to be commercialized before 2020.

The ISAAA approach for achieving adoption is based on the three pillars of knowledge sharing amongst public and private sectors and between industrial and developing countries; innovation; and creative partnerships. ISAAA recommends a three-pronged *3D Strategy*, based on timely, different, and effective *Development, Deregulation,* and *Deployment* of new biotech crop technologies. For more information or the executive summary, visit www.isaaa.org.

Source: Crop Biotech Update Special Edition, 7 February 2012

CONTRIBUTIONS FROM SEED PROGRAMS AND PROJECTS

In this section we invite national seed programs, projects, universities, and regional and international organizations to provide news about their seed-related activities.

Ethiopia Releases Wheat Varieties

In Ethiopia, both bread and durum are grown across the country from favorable high rainfall areas to dry lands mainly in the central, southeastern, northern, and northwestern highlands of the country. Currently, wheat is planted on over 1.6 million ha with annual estimated production of over 3.6 million tonnes. Average national productivity is about 1.8 tonnes ha^{-1}; and this is far less than the world average of 3 tonnes ha^{-1}. About 4.7 million households, which are predominantly subsistence farmers, are engaged in wheat production in the country. Ethiopia does not produce enough wheat to satisfy domestic demand. Accordingly, nearly 500,000 to one million tonnes of wheat grain is imported every year mainly on a concession basis or as food aid to meet rising domestic consumption.

Several constraints contribute to low wheat productivity. Among others, wheat rusts including stem, leaf, and yellow rusts are the major biotic constraints of wheat production. Ethiopian bread wheat growers faced four rust disease epidemics that led to significant yield losses during the last three decades. In 2010, yellow rust epidemics caused significant yield losses in some major wheat growing areas of the country.

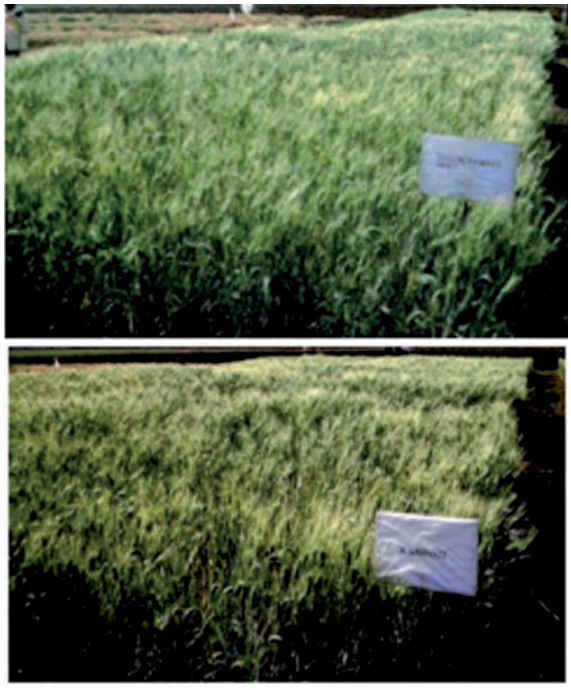
The Ethiopian Institute of Agricultural Research (EIAR) continues to collaborate with ICARDA and CIMMYT in introducing, testing, and releasing pest resistant varieties to overcome these problems. Through the concerted efforts of national and international collaboration, the national wheat program has succeeded in identifying two durum and three bread wheat varieties for release in the 2011/12 crop season.

In 2012, the National Variety Release Committee difficulty released three bread wheat and two durum wheat varieties for large-scale commercial seed production (see table below). The promising lines of bread wheat were included in a pre-release seed multiplication scheme supported by an USAID Seed Project. This strategy enabled production of a large amount of basic seed at the time of release, which was used for immediate commercialization involving both the public and private seed sectors.

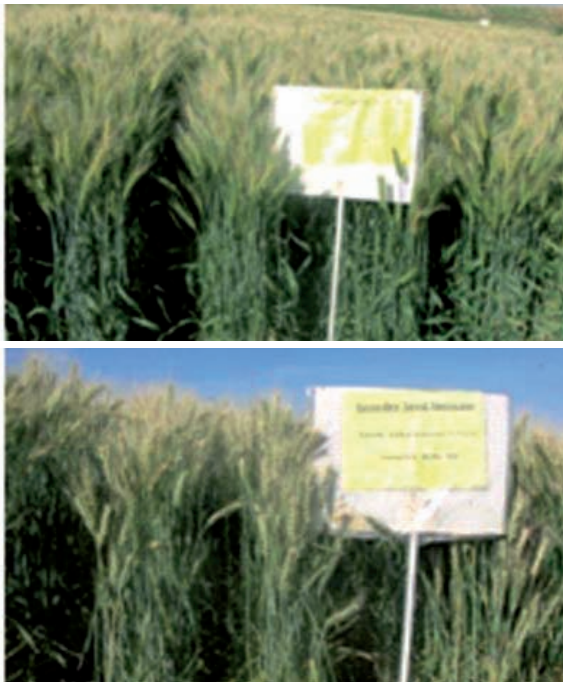
List and performance of bread and durum wheat varieties released in Ethiopia

Crop/Variety	Source	Pedigree and selection history	Yield per ha (kg)	Yield advantage (%)	Remarks
Bread Wheat					
Hulluka (ETBW5496)	ICARDA	UTQUE96/3/PYN/BAU//MILAN ICW02-00330-11AP/0TS-0AP-030AP-4KUL	4713	122	Final release
Barkume	Standard check		3862	100	
Kubsa	Commercial check		3755	97	
Hidase (ETBW5795)	CIMMYT	YANAC/3/PRL/SARA//TSI/VEE#5/4/CROC-1/ AE.SQUAROSA(224)//OPATTA CMSA00Y00810T-040M-0P0Y-040M-040SY-030M-4ZTM-0ZTY-0M-0SY	4378	133	High rainfall
Barkume	Standard check		3284	100	
Kubsa	Commercial check		3162	96	
Ogolcho (ETBW5520)	CIMMYT	WORRAKATTA/2*PASTOR CMSS99Y05558T-1M-18Y-010M-010SY-8M-0Y-0SY	3222	116	Low rain fall
Hawi	Standard check		2511	90	
Pavon 76	Commercial check		2786	100	
Durum wheat					
Mukye	ICARDA	STJ3//BCR/LKS4/3/TER-3 ICD99-0091-T-3AP-AP-6AP-AP)	3380	126	
Mangudo	ICARDA	ICAJIHAN ICD01-0251-T-9AP-TR-4AP-0AP	3530	131	
Yerer	Standard check		2690	100	
Local	Local check		2570	96	

Note: Standard check is recently released variety while commercial/ local check is widely adapted and grown variety



STJ (top) and ICAJIHAN 22 (bottom) under pre-release multiplication at Debre Zeit



ETBW5795 (top) and ETBW 5520 (bottom) under pre-release seed multiplication at Kulumsa

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Ethiopia Release First Public Seed Sector Maize Variety

Maize is an important crop and a dietary staple for millions of smallholder farmers. It is produced on nearly 2 million ha and is the rst crop among the cereals in yield per unit area. According to the Central Statistical Agency in 2012, the national average yield of maize is 2.95 tonnes ha^{-1}, followed by sorghum and wheat with 2.05 and 2.03 tonnes ha^{-1}, respectively. However, the yield potential of maize is far higher than the national average. Among the contributing factors for the yield gap is limited availability of improved varieties for diverse or heterogeneous agro-ecologies and lack of timely and adequate access to existing technologies by farmers.

To meet this challenge, the Ethiopian Seed Enterprise (ESE) is developing improved maize varieties in its research and product development unit. In March 2012, the National Variety Release Committee (NVRC) approved the release of ESE-237, a three-way-cross hybrid white maize variety for commercial production for the mid agro-ecologies of Ethiopia (1000–1800 masl). It is a cross between CIMMYT and ESE's parental inbreds (CML213, NAW4, and L17), developed by pedigree breeding method.

The variety was tested nationally over the past four years and showed a significant grain yield advantage over the checks. In 2011, the variety yielded 11 tonnes ha^{-1} on research stations and 6.7–8 tonnes ha^{-1} in farmers' fields, an average of 12–15% yield advantage over the checks (BH543 and BH540). The variety matures in around 138 days, which is also an additional advantage for farmers who are looking for early maturing varieties as an option for climate changes. Apart from its drought escape attributes, the variety is also an alternative for areas where late-coming foliar diseases of maize are the major causes of yield losses. ESE is maintaining the variety and multiplying the parental lines of the hybrid during the off-season to accelerate seed production and dissemination of the variety to farmers in the 2013 main cropping season.

Pakistan Releases New Chickpea Variety

In Pakistan, pulses are grown on 1.4 million ha across the country. Chickpea (*Cicer arietinum* L.) is an important pulse crop occupying 77% of the area and 83% of production of all pulses grown in Pakistan. From a total area of pulses, about 82% is planted in the Punjab. The rain-fed areas occupy 89% of the total area, and contribute 84% of the total production, of chickpea in the Punjab. Chickpea productivity is very low, mainly due to lack of varieties with high yield potential and resistance to drought and diseases.

The Barani Agricultural Research Institute (BARI) has proposed release of a new Kabuli chickpea line 6KCC-122 selected from the Chickpea International *Fusarium* Wilt Nursery 2005/06 received from ICARDA. It was evaluated in different local (preliminary and regular), zonal (micro), and national uniform yield trials for ve years (2006–2011) with excellent performance. In Chickpea Preliminary Yield Trials, 6KCC-122 produced 66 and 84% higher seed yield

A model farmer and ESE's extension staff in on-farm demonstration plot (Hawassa, top); farmers and NVRC technical team evaluating the candidate variety (Guten, bottom)

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than the check varieties Noor 91 and CM-2000, respectively. In Regular Yield Trials, 6KCC-122 produced 28 and13% higher seed yield than check varieties Noor 91 and CM-2000, respectively. In Chickpea Micro Yield Trials, 6KCC-122 produced 61 and 31% higher seed yield than the check varieties CM-2008 and CM-2000, respectively. The promising line 6KCC-122 was further tested in Chickpea National Uniform Yield Trials for two years during 2009/10 and 2010/11 crop seasons. In 2009/10, 6KCC-122 was planted across nine locations and ranked first among the entries; and gave 4.1 and 34% higher average grain yield compared to the check varieties, CM-2008 and Noor 91, respectively. In 2010/11, 6KCC-122 was planted across six locations, and gave an average of 7% higher grain yield (1799 kg ha^{-1}) compared to a check variety Noor 2009 (1686 kg ha^{-1}).

Performance of 6KCC-122 in National Uniform Yield Trials

Variety/line	2009/10		2010/11	
Excell	Yield (kg ha^{-1})	Rank	Yield (kg ha^{-1})	Rank
6KCC-122	1097	1	1799	3
CM-2008	1053	2	-	-
Noor 91	819	6	-	-
Noor 2009	-	-	1688	7

A new Kabuli chickpea (6KCC-122) variety (top); and pulse scientists during spot examination in farmer's field, Chakwal (bottom)

A team of scientists visited and observed the performance of 6KCC-122 at BARI and in farmers' fields in April 2012, and it was evaluated as drought tolerant and high yielding. The committee agreed that the line should be presented to the Experts Sub-Committee for discussion and its final release by the Punjab Seed Council.

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RESEARCH NOTES

Short communications on practical research or relevant information on agriculture or seed technology are presented in this section.

Impact of Magnetic Seed Treatments on Synchronized Germination and Vigor Enhancement of Tomato Seeds

Irfan Afzal, Aamir Nawaz, and Bilal Hussain[1],

Abstract

This paper presents the role of magnetic seed treatment in stimulating seed germination and early seedling growth of tomato. Seeds of two tomato cultivars i.e. 'Nagina' and 'Roma' were exposed to five different magnetic seed treatments (50, 100, and 150 mT) for 3, 6, and 9 min and control (untreated seed). Most seed treatments resulted in improved germination speed and seedling vigor of both cultivars. Magnetic seed treatment with 150 mT for 3 min maximally improved germination and seedling vigor compared to control and other seed treatments. The response of both tomato cultivars was similar for all magnetic seed treatments. Pre-sowing magnetic treatments therefore have the potential to enhance tomato seed germination and early seedling growth.

Introduction

Tomato is an increasingly popular vegetable in the world due to being an excellent source of many nutrients and secondary metabolites, especially lycopene, that are important for human health. However, higher lycopene contents may cause poor germination of tomato seeds. Sometimes

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non-dormant seeds when exposed to poor storage conditions become dormant. Seed dormancy was even reported for one-year-old tomato seeds (Liu *et al.* 1996). Seed dormancy can result in erratic and poor seedling emergence, causing problems for tomato production.

Magnetic seed pretreatments have been successfully used to break dormancy, improve germination rate and crop establishment, boost growth, development, and ultimately yield of many horticultural and agronomic crops (Moon and Chung 2000; Aladjadjiyan 2010). Magnetic field pretreatment not only increased seed germination rate, seedling growth, and yield but also reduced attack by pathogenic diseases (De Souza *et al.* 2006). Magnetic treatments are assumed to enhance seed vigor by influencing the biochemical processes that involve free radicals and by stimulating the activity of proteins and enzymes. These effects contributed to higher yield of crops under field conditions (Moon and Chung 2000).

Magnetic fields are used widely as pretreatments for seeds to increase seed vigor, seedling growth, and yield. Therefore, the aim of this study was to investigate the effects of magnetic seed treatments on germination and early seedling growth of tomato seeds under controlled conditions.

Materials and methods

Experiments were conducted on seeds of two tomato cultivars ('Nagina' and 'Roma') obtained from the Vegetable Research Institute, Faisalabad, Pakistan. These seeds were stored in a room at 15°C for six months after harvest.

The pre-sowing magnetic treatments were applied using a magnetic seed stimulator. This instrument consisted of two pairs of cylindrical electromagnet coils. Each pair of coils covered in an iron bar. The two bars were placed one above the other, and their ends held by metallic supports. The coils were connected in series and an electric current was passed through the electromagnet coils thus generating a non-uniform magnetic field in the air space (poles) between the two bars (De Souza *et al.* 2006). Dry seeds of tomato, packed in a transparent plastic bag, were placed in a Petri dish on the pole of an electromagnet. The seeds were exposed to 50, 100, and 150 mT for 3, 6, and 9 min.

Four replicates of 25 seeds each were germinated in 9-cm diameter Petri dishes on filter paper moistened with 4 mL of distilled water at 25°C in a growth chamber (Vindon, England) for 10 d. A seed was scored as germinated when the radicle was visible. The time to 50% germination (T50), mean germination time (MGT), and germination index (GI) were calculated according to standard procedures (Afzal *et al.* 2009). The root and shoot lengths were measured after final evaluation.

Results and discussion

After exposing tomato seeds to different magnetic treatments for different durations, seeds were evaluated in germination tests. The maximum germination and lower values of T50 and MGT were recorded in seeds treated with 150 mT for 3 min (Table 1). GI was improved by exposing seeds of both cultivars to 50 mT for 6 min; however, maximum GI and seedling growth was found in seeds treated with 150 mT for 3 min in both cultivars.

Enhanced germination in tomato seeds by magnetic seed treatment might be due to energetic excitement of one or more parameters of the cellular substratum (proteins and carbohydrates) or water inside dry seeds by the direct effect of the magnetic field (De Souza *et al.* 2010). Improvements in germination potential and seedling vigor due to influence of magnetic fields in seeds of cereals and vegetables were also observed by Moon and Chung (2000) and Aladjadjiya (2010). Slower germination, emergence, and seedling establishment for seeds treated with low strength (50 and 100 mT) magnetic seed treatment (Table 1) might be due to unsuitable combinations of magnetic field and exposure time (Kavi *et al.* 1983).

Magnetic treatments with 150 mT for 3 min also improved early seedling growth, as indicated by higher root and shoot lengths in treated seeds of both cultivars (Figure 1). This enhancement might be the result of an earlier start of germination as indicated by lower values of MGT and T50 (Afzal *et al.* 2009). De Souza *et al.* (2010) also ascertained that root and shoot lengths increased in magnetically treated compared to non-treated seeds.

Table 1: Effect of magnetic seed treatment on germination capacity of two tomato cultivars

Variety	Treatments	FGP (%)	T50 (days)	GI	MGT (days)
Roma	Control	44.67 bc	4.07 abc	8.44 cd	5.92 abc
	50 mT, 3 min	44.67 bc	3.23 c	10.99 bc	5.51 c
	50 mT, 6 min	56.00 b	3.37 bc	14.21 b	5.63 bc
	50 mT, 9 min	31.33 cd	3.70 bc	6.75 cd	5.58 c
	100 mT, 3 min	34.00 cd	4.70 abc	7.13 cd	5.63 bc
	100 mT, 6 min	34.67 cd	5.50 a	4.69 d	6.26 a
	100 mT, 9 min	36.67 cd	4.77 abc	6.45 d	6.11 ab
	150 mT, 3 min	92.67 a	0.75 d	36.50 a	4.73 d
	150 mT, 6 min	44.00 bc	4.65 abc	7.67 cd	6.13 ab
	150 mT, 9 min	27.33 d	4.90 ab	4.63 d	5.83 abc
	LSD at P < 0.05	**14.02**	**1.63**	**4.35**	**0.53**
Nagina	Control	44.00bc	3.94 ab	8.59 cd	6.03 abc
	50 mT, 3 min	44.00 bc	3.28 b	11.11 bc	5.56 c
	50 mT, 6 min	57.33 b	3.40 b	14.07 b	5.76 bc
	50 mT, 9 min	32.00 cd	3.67 b	6.82 cd	5.69 bc
	100 mT, 3 min	32.00 cd	4.56 ab	7.27 cd	5.63 bc
	100 mT, 6 min	33.33 cd	5.42 a	4.65 d	6.36 a
	100 mT, 9 min	34.67 cd	4.75 ab	6.46 d	6.08 ab
	150 mT, 3 min	90.67 a	0.90 c	36.12 a	4.70 d
	150 mT, 6 min	42.67 bc	4.70 ab	7.57 cd	6.08 ab
	150 mT, 9 min	25.33 d	4.72 ab	4.65 d	5.87 abc
	LSD at P < 0.05	**15.68**	**1.67**	**4.31**	**0.50**

Note: Figures followed by the same letters are not significantly different

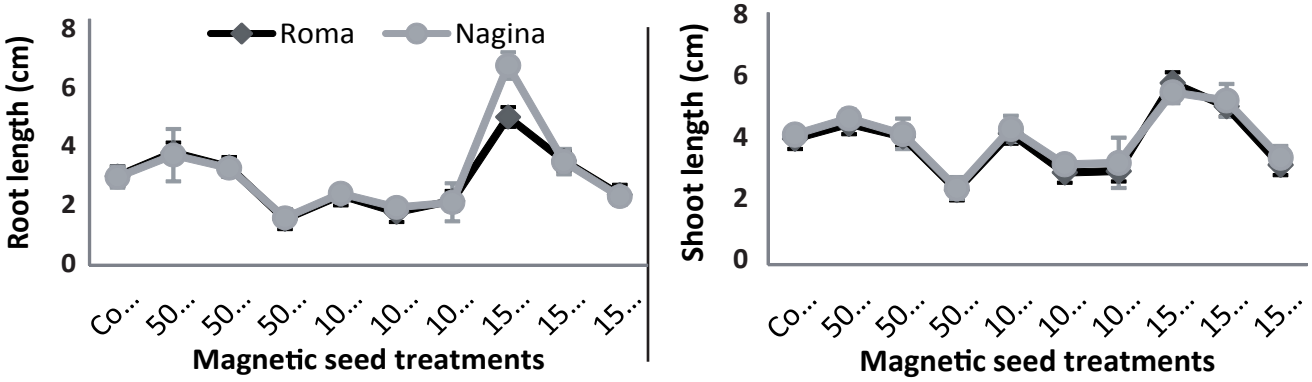

Fig. 1: Effect of magnetic seed treatments on seedling vigor of tomato cultivars

Conclusion

From this study, we concluded that magnetic seed treatments have the potential to boost germination and early seedling growth, which are yield-contributing attributes. This was shown by enhanced germination and early seedling growth potential of both tomato seeds treated with 150 mT for 3 min.

Acknowledgement

We are highly thankful to the Higher Education Commission for providing funds to conduct this research in a research project entitled 'Enhancing the performance of tomato by improving fruit lycopene content'.

References

Afzal I., S. Ashraf, M. Qasim, S.M.A. Basra and M. Shahid. 2009. Does halopriming improve germination and seedling vigor in marigold (*Tagetes* spp.). *Seed Science and Technology* 37: 436–445.

Aladjadjiya, A. 2010. Influence of stationary magnetic field on lentil seeds. *Int. Agrophysics* 24: 321-324.

De Souza, A., D. Garcia, L. Sueiro, F. Gilart, E. Porras and L. Licea. 2006. Pre-sowing magnetic seed treatments of tomato seeds increase the growth and yield of plants. *Bioelectromagnetics* 27: 247–257.

De Souza, A., L. Sueiro, D. García and E. Porras. 2010. Extremely low frequency non-uniform magnetic fields improve tomato seed germination and early seedling growth. *Seed Science and Technology* 38: 61–72

Kavi, P.S. 1983. The effect of non-homogeneous, gradient magnetic field on the magnetic susceptibility values of in sit ragi (*Eleusine coracana* Gaertn) seed material. *Mysore Journal of Agricultural Sciences* 17: 121–123.

Liu, Y.Q., R.J. Bino, W.J. Vanderburg, S.P.C. Groot and H.W.M. Hilhorst. 1996. Effects of osmotic priming on dormancy and storability of tomato (*Lycopersicon esculentum* Mill) seeds. *Seed Science Research* 6: 49–55.

Moon, J.D. and H.-S. Chung. 2000. Acceleration of germination of tomato seed by applying AC electric and magnetic fields. *Journal of Electrostatics* 48: 103–114.

MEETINGS AND COURSES

Announcements of meetings, seminars, workshops, and training courses appear in this section. Please send in announcements for national, regional, or international workshops, seminars, and training courses organized in your country for inclusion in the next issue.

Conferences

The 6th International Congress on Legume Genetics and Genomics, 3–8 October 2012, Hyderabad, India
The congress will bring together scientists working on research aspects of legume biology in model species, using genetic and genomic tools, with those working on applied aspects and breeding of food legume crop and pasture species. Topics include next-generation genomics, nutrition, development, evolution and diversity, symbiosis, abiotic stress, pathogenesis and disease resistance, translational genomics, genomics-assisted breeding, and harnessing germplasm resources. For more information, please visit: *http://www.icrisat.org/gt-bt/VI-ICLGG/homepage.htm or contact iclgg2012@gmail.com.*

Asian Seed Congress 2012, 5–9 November 2012, Bali, Indonesia
Provides excellent opportunities for its members to develop a wide range of international contacts that help them to promote business and ease trade. This is because primarily membership covers not only private and public enterprises but also representatives from government seed and agricultural agencies and national seed associations in the Asia–Pacific and beyond. Online registration *(http://apsaseed.org/ apsa_2012/) starts on 1 July 2012.*

30th ISTA Congress, 12–18 June 2013, Antalya, Turkey
This triennial congress will be held in the Antalya, Turkey; along with the *30th ISTA Seed Symposium on 12–14 June 2013* in the same venue. The Seed Symposium will cover a wide range of seed-related topics including: genetic conservation, habitat regeneration, seed pathology, seed germination and dormancy, seed quality and plant breeding, application of molecular markers, seed quality evaluation, and seed physiology and stress responses.

Participants are encouraged to present oral and poster papers dealing with a range of topics under the above theme. The research reported in offered papers can cover both the scientific basis of aspects of seed quality and its technological application in seed testing. In all sessions, we welcome papers on tropical and temperate crop species, wild species, flowers, trees and shrubs, and including species with potential for use in plant breeding and in habitat regeneration.

Papers should be submitted online only *(https://www.seedtest.org/en/abstractpaper-submission.html)* in the form of an abstract in English of 1600 characters (maximum). Papers will be presented orally and in poster form, both forms having equal status. Time constraints limit the number of oral presentations, so oral presentation may not be possible, and you may be asked to present your paper as a poster.

Courses

Distance Learning Course
Online registration for the UPOV Distance Learning Program 'Introduction to the UPOV System of Plant Variety Protection under the UPOV Convention' will open on 13 August 2012.

The timetable for the session is as follows:
- Dates of the course: 5 November to 9 December 2012
- Final exam: 3–9 December 2012

Online registration is available from 13 August to 30 September 2012. After 30 September, registration will not be possible. For Category 1 and Category 2 participants, all endorsements must be provided by 7 October. The categories of participants are as follows:

Category 1: Government officials of members of the Union endorsed by the relevant representative to the UPOV Council (*No fee*)

Category 2: Officials of observer States/ intergovernmental organizations endorsed by the relevant representative to the UPOV Council *(one non-fee paying student per State/ intergovernmental organization. Additional students: CHF1000 per student)*

Category 3: Others *Fee: CHF1000*

Please note that registration of participants in Categories 1 and 2 must be accompanied by an endorsement from the representative to the UPOV Council of the UPOV member or observer, as appropriate, formally nominating the participant. Detailed information on the course content and online registration is available on the UPOV website: *http://www.upov.int/resource/en/dl205_training.html*

LITERATURE

Books, journal articles, and other literature of interest to readers are presented here. Please send information on seed and other agriculture related publications – policy, regulation, and technology – to the Editor for inclusion in *Seed Info*.

Books

Ceccarelli, S. 2012. Plant Breeding with Farmers – A Technical Manual, ICARDA, Aleppo, Syria. There is increasing interest in participatory plant breeding (PPB), both in developing and developed countries. While there is a conspicuous body of literature in the form of both scientific papers and books, this manual aims to provide a source of information on how to implement a PPB program on the ground, with the purpose of encouraging scientists to start such programs. The manual addresses all those involved in planning and implementing PPB activities. This includes research centers, universities, non-governmental organizations, farmer associations, and government extension officials.

This manual presents some background on PPB and on participatory variety selection), but is mostly devoted to providing the reader with as much detailed technical information on the different aspects involved in successfully starting and conducting a PPB program. The manual fills a gap by making available in one document diverse information that is otherwise scattered in several different publications.

The manual shows clearly that there are no major technical difficulties in transforming a conventional breeding program into a participatory program. In fact, many of the principles and techniques described in this manual apply equally well to conventional plant breeding programs. Readers are encouraged to submit their comments, corrections, or criticisms to improve future versions of the manual.

The objectives of this manual are to:

- Introduce the reader to the concepts and methodologies of plant breeding in general, and to PPB in particular;
- Take the user through the main steps in designing and implementing PPB programs in various crops;
- Provide examples of data collection and data analysis for various types of experimental designs; and
- Discuss key issues in PPB, such as variety release, seed production, and impact.

The manual draws heavily on ICARDA's experience in conducting PPB programs in Algeria, Egypt, Eritrea, Ethiopia, Iran, Jordan, Morocco, Syria, Tunisia, and Yemen. However, a number of general principles are highlighted that entitle a research program to be called 'participatory'. Inputs and perspectives from interested readers are welcome. Contact: *s.ceccarelli@cgiar.org* or ceccarelli.*salvatore83@ gmail.com*

OECD. 2010. Challenges for Agricultural Research. As the world has changed during the past 50 years, so has agriculture – and so has agricultural research, which continues to confront new challenges, from food security to ecological concerns to land-use issues. Indeed, agricultural research has reached new heights in biology and is exploring other disciplines. It is forever changing, as are the needs of society.

The changing challenges faced by agricultural research were examined in-depth at a conference organized by the OECD's Co-operative Research Program on Biological Resource Management for Sustainable Agricultural Systems, together with the Czech Republic's Ministry of Agriculture. Participants came from all agricultural sectors and included farmers, industry, scientists, and decision makers, as well as other stakeholders. This

publication presents the 20 papers delivered at the conference. They highlight recent major progress in agricultural research outcomes and address the challenges that lie ahead. OECD Publishing ISBN: 978-92-64-09009-5; Price: $123; 304 pp; Website: *http://www.oecdbookshop.org/oecd/display.asp*

Palfrey, J.G. 2011. Intellectual Property Strategy. Most managers leave intellectual property issues to the legal department, unaware that an organization's intellectual property can help accomplish a range of management goals, from accessing new markets to improving existing products to generating new revenue streams. The book offers a short briefing on intellectual property strategy for corporate managers and nonprofit administrators. It is argued that strategies should go beyond the traditional highly restrictive 'sword and shield' approach, suggesting that flexibility and creativity are essential to a profitable long-term intellectual property strategy – especially in an era of changing attitudes about media.

Intellectual property should be considered a key strategic asset class. Almost every organization has an intellectual property portfolio of some value and therefore the need for an intellectual property strategy. A brand, for example, is an important form of intellectual property, as is any information managed and produced by an organization. The book identifies the essential areas of intellectual property – patent, copyright, trademark, and trade secret – and describes strategic approaches to each in a variety of organizational contexts, based on four basic steps.

The most innovative organizations employ multiple intellectual property approaches, depending on the situation, asking hard, context-specific questions. By doing so, they achieve both short- and long-term benefits while positioning themselves for success in the global information economy. MIT Press, ISBN: 10:0-262-51679-9; Price: $11.95; 120 pp; Website: *http://mitpress.mit.edu/main/home/default.asp*

Wollenberg, E., A. Nihart, M.L. Tapio-Bistrom and M. Greig-Gran. 2012. Climate Change Mitigation and Agriculture. Mitigating climate change – making its effects less serious – is a priority for all sectors of society but particularly for agriculture, which is already feeling the adverse effects of changed rainfall patterns and yield reduction in cereals due to raised temperature at pollination. However, agriculture is simultaneously victim and villain: raising crops and livestock directly contributes an estimated 10–12% of anthropogenic greenhouse gas emissions globally, or about one-third of emissions if indirect impacts of land-use change and land degradation are considered. This book is timely, since emissions are expected to increase in the next 30 years as population, income, agricultural intensification, and diet preferences for meat and dairy products increase, particularly in low- and middle-income countries. To let consequences take their course without attempting mitigation could be suicidal.

Climate Change Mitigation and Agriculture brings together over 100 authors, the four editors among them, many of them leading actors in all aspects of agricultural climate change. This book reviews the state of agricultural climate change mitigation globally with a focus on identifying the feasibility, opportunities, and challenges for achieving mitigation among smallholder farmers. A shocking 74% of agricultural emissions occur in low- and middle-income countries where smallholders predominate; yet even modest shifts in agricultural practices could reduce emissions if three challenges are met. First, how can institutions and incentives best support smallholder farmers to participate in and benefit from agricultural mitigation? Second, what kinds of low-cost, rapid measurement, and accounting approaches are needed to assess how smallholders' practices affect greenhouse gas emissions? Third, what are the inputs and trade-offs of mitigation on smallholders' livelihoods and food security?

All three major greenhouse gases – carbon dioxide, nitrous oxide, and methane – play a major role in agricultural emissions, but the potential beneficial impact of carbon sequestration is almost 10 times greater than the potential of reducing both nitrous oxide and methane emissions (IPCC figures). Similarly, an even larger and more immediate mitigation is possible by preventing carbon-rich forests and grasslands being replaced by agriculture, i.e. reducing or eliminating land clearance and deforestation.

Examples are drawn from Africa, Asia, Latin America, and from Australia and Canada, where lessons are applicable to smallholders in developing nations. The wealth of detail and clear presentation makes this volume a rich source of guidance for policymakers and in-field advisors and practitioners. Published by Routledge 2012, 419 pp, ISBN: 978 1 84971 393 1 (Pb); Price: £29.99; Website: *www.routledge.com*

Websites

UPOV websites

UPOV launched its redesigned website on 1 November 2011. Some features of the redesigned website include:

- PLUTO: freely accessible database of plant varieties, formerly only available in the form of a CD-ROM on subscription (UPOV-ROM Plant Variety Database);
- Multimedia presentation on UPOV;
- The Ashiro Rindo Story: video on the use of plant variety protection by gentian farmers in the Ashiro region of Japan;
- UPOV Collection of materials explaining the UPOV system;
- UPOV Lex: database of UPOV members' laws.

The Council agreed, at its 45th ordinary session, held in Geneva on 20 October 2011 that the documents of the Administrative and Legal Committee, Technical Committee and Technical Working Parties, which were formerly only accessible to members and observers, would be made publicly accessible by removal of the password requirement. The Council also agreed to removal of the password coinciding with the launching of the redesigned UPOV website on 1 November 2011.

Global Agro-ecological Zones Interactive Data Portal

A new online *Global Agro-ecological Zones (GAEZ)* data portal developed by the Food and Agriculture Organization of the United Nations (FAO) and the International Institute for Applied Systems Analysis (IIASA) aims to help unlock the planet's potential to feed a rapidly growing population. The GAEZ is a planning tool designed to help identify areas for increased global food production while maintaining the natural resource base and facing the challenge of climate change.

According to FAO estimates, world food production needs to increase 60% by 2050 to feed a world population expected to surpass 9 billion people. Much of the necessary growth must be achieved by increasing the amount of food produced on existing agricultural land, as most of the world's best farmland is already being used. Water scarcity is another limiting factor for area expansion. Intensification of food production will also occur within a changing climate, requiring adaptation and mitigation and will have to be sustainable to safeguard future use of the resources. A critical first step in sustainably intensifying food production is to close the 'yield gaps' that continue to plague the farming sector in many parts of the world.

There is a wealth of data, online on:

- *Land and water resources*, including multiple spatial layers of climate, soil, terrain, land cover, irrigation potentials, protected areas, population density, livestock density, and accessibility.
- *Agro-climatic resources*, providing major climatic indicators important for assessing crop growth, development, and yield formation. GAEZ's spatial agro-climatic inventories of the prevailing thermal and moisture regimes and growing periods are used for estimating crop suitability and potential yields.
- *Agricultural suitability and potential yields*, including information on yield constraints, crop calendars, and production potential estimates for 11 major crop groups, 49 major crops, and 92 crop types. Productivity estimates are made for rain-fed farming, with water conservation and gravity, sprinkler, and drip irrigation systems.
- *Actual yields and production*, consisting of spatially explicit crop production estimates including crop harvested area, yield, and production figures for 23 major commodities.
- *Yield and production gaps*, provide important information on locations with differences between actual achieved and potential attainable yield and production under different management scenarios.

Being geo-referenced, GAEZ allows a user to identify agricultural zones across the globe that share similar ecological conditions and are producing the same crops using the same kinds of production system, but which do not have the same production levels. This allows the reasons underlying lower production – inadequate or inappropriate agricultural practices, policies, institutions, support services, and access to markets – to be pinpointed and dealt with. The potential exists to expand food production efficiently while limiting impacts on other ecosystem values.

Given the scarcity of suitable resources in some regions, future demand, and expected negative impacts of climate change, GAEZ will allow users

to evaluate options for more widespread adoption of sustainable land and water management practices in agricultural systems at risk, recently highlighted in FAO's report (*http://www.fao.org/nr/solaw/solaw-home/en/*). These systems at risk face the threats of progressive breakdown of their productive capacity. They warrant priority attention for remedial action simply because there are no substitutes.

GENESYS: Gateway to Genetic Resources

The Global Accession Level Information System (GENESYS) is an online portal that provides information about gene bank accessions

to facilitate their use in plant improvement. The portal also has the functionality to build customized queries and request samples of accessions from the holding gene banks. The principles and goals of the portal are to make the data open and universally accessible and available to everyone. The portal publishes data supplied by external data providers in accordance with agreements between Bioversity International and those providers. For more information, terms and conditions for use you may kindly visit the website (*http://genesys-pgr.org/*)

New Journal

The International Journal of Agricultural Science, Research and Technology (IJASRT), a new broad-based journal, is an open access journal established on two key tenets. First is to publish the most exciting research in all areas of agricultural sciences. Second is to provide the most rapid turnaround time possible for reviewing and publishing, and disseminating the articles freely for teaching and reference purposes.

IJASRT is published quarterly in March, June, September, and December. Papers are welcome reporting studies in all aspects of agricultural development including: (i) Agricultural Extension; (ii) Agricultural Economics; (iii) Information Technology in Agriculture; (iv) Agricultural Management; (v) Farm Management; (vi) Rural Development; (vii) Sustainable Development; (viii) Farming

Systems; (ix) Agricultural Policy; (x) Agribusiness; (xi) Socio-economic Aspects; (xii) Marketing; (xiii) Rural & Agricultural Sociology; and (xiv) Agricultural Education. For more information, please contact the editor at *editor@ijasrt.com* or visit the website (*www.ijasrt.com*).

Newsletter

Seed World

Seed World is a go-to resource for industry professionals who require in-depth insight and analysis of the US$12 billion seed industry in USA. With critical information built from knowledge and experience going back to 1915, Seed World delivers hard-hitting editorial to seed companies, brokers, distributors, plant breeders, retailers, academic institutions, and government. For more information, please visit the website (*http://www.seedworld.com/*).

Note to Subscribers

Subscribers are encouraged to play a proactive role in making the newsletter a useful platform for information exchange. Contributions are most welcome on broader areas of seed system development; announcements of meetings, courses and electronic conferences; book announcements and reviews; web sites of special relevance to the seed sector; 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 z.bishaw@cgiar.org

About ICARDA and the CGIAR

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is one of 15 centers supported by the CGIAR. ICARDA's mission is to contribute to the improvement of livelihoods of the resource-poor in dry areas by enhancing food security and alleviating poverty through research and partnerships to achieve sustainable increases in agricultural productivity and income, while ensuring the efficient and more equitable use and conservation of natural resources.

ICARDA has a global mandate for the improvement of barley, lentil and faba bean, and serves the non-tropical dry areas for the improvement of on-farm water use efficiency, rangeland and small-ruminant production. In the Central and West Asia and North Africa (CWANA) region, ICARDA contributes to the improvement of bread and durum wheats, kabuli chickpea, pasture and forage legumes, and associated farming systems. It also works on improved land management, diversification of production systems, and value-added crop and livestock products. Social, economic and policy research is an integral component of ICARDA's research to better target poverty and to enhance the uptake and maximize impact of research outputs.

The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of countries, international and regional organizations, and private foundations supporting 15 international agricultural Centers that work with national agricultural research systems and civil society organizations including the private sector. The alliance mobilizes agricultural science to reduce poverty, foster human well being, promote agricultural growth and protect the environment. The CGIAR generates global public goods that are available to all.

The World Bank, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), and the International Fund for Agricultural Development (IFAD) are cosponsors of the CGIAR. The World Bank provides the CGIAR with a System Office in Washington, DC. A Science Council, with its Secretariat at FAO in Rome, assists the System in the development of its research program.