SEED INFO

Official Newsletter of the WANA Seed Network

ICARDA

Seed Info No. 30 **January 2006**

Published by WANA Seed Network Secretariat, Seed Unit, ICARDA, P.O. Box 5466, Aleppo, Syria
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EDITORIAL NOTE

Seed Info aims to stimulate information exchange and communication among seed staff in the Central and West Asia and North Africa (CWANA) region. The purpose is to contribute towards the development of stronger national seed programs which supply quality seed to farmers.

In this issue of *Seed Info* we report on International Seed Trade Conference 2005 for the CWANA Region held from 29 November to 1 December 2005 in Antalya, Turkey. It was the first international seed trade conference organized by the Turkish Seed Industry Association and the Seed Unit of ICARDA in which 222 persons from over 40 countries of Asia, Africa, Europe and the Americas participated. Your editor, Zewdie Bishaw and colleagues will provide a detailed report on the conference.

N.P. Louwaars, our regular contributor from Wageningen University and Research Center (Wageningen UR), is revisiting the impacts of the International Plant Genetic Resources Treaty, i.e. the Convention on Biological Diversity (CBD) and International Treaty on Plant Genetic Resources for Food and Agriculture (IT PGRFA) on the seed industry. He explores the existing mechanisms and constraints in getting access to genetic resources. We also bring you news on the Global Crop Diversity Trust (GCDT), the International Seed Testing Association (ISTA), the International Convention for the Protection of New Varieties of Plants (UPOV) and the status of biotech crops in 2005.

The section on **SEED PROGRAMS** includes news from Afghanistan, Ethiopia and Australia. The news from Afghanistan presents the approval of a national seed policy on 13 September 2005, following an official signing ceremony presided over by H.E. Mr. Obaidullah Ramin, Minister of Agriculture, Animal Husbandry and Food (MAAHF). The news from Ethiopia reports on the establishment of the Agricultural Biotechnology Research Institute and the endorsement of breeder's and farmers' rights. The Institute is expected to tap into the country's diverse genetic resources and serve as a biotechnology center for training young African scientists from the region. The country report from Australia presents news on collaborative research between ICARDA and Australia including the release of chickpea varieties from germplasm supplied by ICARDA.

In the **HOW TO** section, Abdoul Aziz Niane discusses the options for technology transfer of varieties bred through participatory plant breeding. We invite our readers to contribute to this debate and share with us their practical experience in participatory plant breeding and technology transfer options.

The **RESEARCH** section is aimed at capturing information on adapted research or issues relevant to seed program development in the region or elsewhere. Daniel Danial and Pim Lindhout from Laboratory of Plant Breeding of the Wageningen UR describe the experiences of El Proyecto de Resistencia Duradera en la Zone Andina (Preduza) project supported by the Netherlands. The project is aimed at developing crop varieties with durable disease resistance for marginal areas and resource poor farmers in the Andean Highlands of Bolivia, Ecuador and Peru using farmer participatory approaches. The Preduza approach is illustrated using the case of Saraguro in Ecuador.

Seed Info encourages exchange of information to broaden our understanding of issues that affect the global, regional and national seed industry. We encourage our readers to take the opportunity to share their views through this newsletter. Your contributions are most welcome in English, French or Arabic.

Happy New Year

Zewdie Bishaw, Editor

WANA SEED NETWORK NEWS

This section presents information related to the WANA Seed Network. It provides updates on the progress of Network activities and reports on the meetings of the Steering Committee and WANA Seed Council.

International Seed Trade Conference for CWANA Region: A Great Success

Conference organizers
The Turkish Seed Industry Association (Türk-Ted), in collaboration with the Seed Unit of the International Center for Agricultural Research in the Dry Areas (ICARDA), organized the First International Seed Trade Conference in CWANA Region (ISTC2005) from 29 November to 1 December 2005 in Antalya, Turkey, to bring together the public and private sectors from the CWANA region and beyond to stimulate regional contacts and encourage seed trade.

Conference objectives
The ISTC2005 was aimed at exploring and promoting seed trade within the CWANA region and

beyond with the following specific objectives: (i) Review the potential of seed market in CWANA region; (ii) Provide a forum to promote business contacts among seed companies; (iii) Provide opportunities for stimulating regional seed trade; (iv) Share experiences in seed trade among seed companies; and (v) Explore options for creating a regional seed trade association.

Conference participants

The conference attracted participants from (i) Private and public seed companies from CWANA region; (ii) Private seed and agricultural input suppliers from Africa, Asia, Europe and USA; (iii) Private seed equipment manufacturers from Asia, Europe and USA; (iv) International/regional/ national seed trade associations from Asia and Europe representing the private sector; and (v) International/regional research and development organizations working on seeds (FAO, ICARDA, ISF, ISTA, OECD, UPOV, CIHEAM). A total of 222 participants from over 40 countries attended the conference, making it one of the most successful seed trade congresses in the region.

Trade exhibitions

Promoting contacts and seed trade were the key elements of the ISTC2005. These objectives were successfully achieved with a high turnout of private seed companies who organized trade exhibitions. During the conference there were stands by (a) private and public seed companies, (b) manufacturers of seed equipment, and (c) input supply companies for the agricultural and seed sector. A total of 33 international, regional and national private and public seed companies, input suppliers and equipment manufacturers exhibited their product during the conference. Such regional and international congresses are becoming increasingly important in international seed trade where several business dealings are can take place.

Technical presentation

A number of key presentations covering policy, regulatory, institutional and technical issues affecting the seed industry at global, regional and national levels were presented by selected resource persons. The following topics were covered during the conference: (i) Impacts of international treaties and agreements on seed trade; (ii) The status and prospects of seed industry in CWANA region; (iii) Regulatory choices to support seed sector development; (iv) Public-private sector partnership in seed sector development; (v) Plant variety protection and its impact in seed sector development; (vi) The status and prospects of vegetable seed market in the NENA region; (vii) The role of Asia Pacific Seed Association in promoting seed trade; and (viii) The need for a regional seed association. Panel discussions were also held on policy, regulatory issues, quarantine, biotechnology and regional seed trade association. The presentations included examples from the region or elsewhere, and generated interesting discussions and exchange of views about the seed industry at national, regional and international levels.

Potential of seed market in CWANA region

The CWANA region covers an area of over 2 billion ha with an estimated population of 717 million which is expected to increase to 1.7 billion by 2030. Most countries are dependent on agriculture and have many similarities in their agroecology, farming systems, crop varieties and seeds, forming which provides a strong basis for a viable regional seed market. However, the national seed industries are largely fragmented and nationally focused with little or no seed trade among countries of the region. Moreover, there are several policy, regulatory and technical constraints which are used as tariff and non-tariff barriers for seed trade.

Recent seed trade statistics show that the WANA region alone imports over USD 250 million worth of seeds (and exports only USD 36 million worth) indicating a huge potential for regional market. The availability of a suitable environment, expertise in seed production and low production costs provide a comparative advantage for the private sector to capture the potential and opportunity of commercial seed market available within the region.

Since the mid-1980s, liberalization of national economy brought many policy and regulatory reforms in the seed sector and created an enabling environment for the development of diverse and competitive seed industry by allowing private sector participation. Such reforms led to the emergence of vibrant private seed sector in countries such as Egypt, Morocco, Pakistan and Turkey, and the establishment of national seed trade associations representing the private sector as a 'collective voice' influencing government policies. The Turkish Seed Industry Association is one of the strongest associations in the region that represent the private sector in Turkey. The association has shown great interest and staunch support for the development of a regional seed market.

Achievements and future implications

From the outset, the WANA Seed Network aimed at integrating the national seed systems in member countries through harmonization of policy, regulatory, technical and institutional issues to promote freer movement of varieties and seeds across the countries to eventually create a regional

seed market. Since 1999, the national seed trade associations in Egypt, Morocco, Pakistan and Turkey have become formal contact points with the private sector to make a joint effort to encourage the establishment of more national associations with ultimate objective of forming a regional seed trade association.

During the ISTC2005 conference consultations were held with stakeholders regarding the future of the WANA Seed Network and to explore opportunities for transforming it into a regional seed association. Leaders of the private and public sectors and policy makers from the CWANA region have endorsed the initiative. The proposal will be carefully analyzed and consolidated further through consultations among stakeholders to avoid duplication and unnecessary competition among regional associations. We anticipate that the idea of a regional seed association may become a reality with the support of all stakeholders in the seed industry. The presence of an effective voice and collective action is expected to play a greater role in influencing policy and liberalizing the seed sector and unleash the potential of the private sector for the benefit of the region.

The First International Seed Trade Conference for CWANA Region is already bearing fruit as it is already generating interest among seed trade associations in the region. Initial contacts have already been made to start a planning phase for the Second International Seed Trade Conference in 2006/7. *Zewdie Bishaw and A.J. G. van Gastel, Seed Unit, P.O. Box 5466, Aleppo Syria; Fax: ++963-21-2213490; E-mail: z.bishaw@cgiar.org or a.vangastel@cgiar.org and Ayhan Elci, Turkish Seed Industry Association, Mithatpaşa Caddesi Fazilet Apt. No: 50/4, Yenişehir, Ankara, Turkey; Fax: ++90-312-4320050; E-mail: ayhane@ turkted.org.tr*

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New Network Publication

Economic liberalization and policy and regulatory reforms have brought many changes in the agricultural sector in general and the seed sector in particular. Consequently, the national seed industries in many developing countries including the CWANA region are in a state of transition. There is a growing trend in private sector participation in the national seed industry. Hence, private seed companies are being organized into seed trade associations to represent the interest of their members at national and international levels. These seed companies trade seed at domestic levels as well as regional and international levels. It is important for members of the association to establish guidelines and code of conduct in seed trade to build confidence and to create a favorable environment for the growth of the industry.

The Secretariat of the WANA Seed Network produced a new publication entitled Code of Conduct for Seed Associations (WANA Seed Network Publication No. 29/05). The document was translated and adapted from the Egyptian Seed Association and tailored for use by member countries of the WANA Seed Network. The code of conduct will not, however, replace the rules of the International Seed Federation to which national seed associations are affiliated. The editors will be pleased to accept comments or any modifications for incorporation in revising this publication.

If you would like to have a copy please write to: WANA Seed Network Secretariat, Seed Unit, ICARDA, P.O. Box 5466, Aleppo, Syria; Fax: ++963-21-2213490; E-mail: z.bishaw@cgair.org

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Change of Telephone Numbers in Ethiopia

From 15 September 2005, the telephone lines in Ethiopia have changed from one-digit code to two-digit codes, and the telephone numbers from six to seven digits. Accordingly, the telephone line for the Country Representative of the WANA Seed Network and other agricultural research institutes and the national seed program have been changed as follows:

Agricultural Inputs Quality Control and Inspections Department, Ministry of Agricultural and Rural Development, P.O. Box 9197, Addis Ababa, Ethiopia; Tel: ++ 251-11-5520635; Fax: ++ 251-11-251-11-5519051

Ethiopian Seed Enterprise, P.O. Box 2453, Addis Ababa, Ethiopia. Tel: ++251-11-6612266-73; Fax: ++251-11-6613388; E-mail: ese@ethionet.et

Ethiopian Pioneer Hi-Bred Seeds Inc., P.O. Box 1134, Addis Ababa, Ethiopia. Tel: ++251-11-5525130; Fax: ++251-11-5510155; E-mail: pioneer@ethionet.et

Horticultural Development Enterprise, P.O. Box 60061, Addis Ababa, Ethiopia. Tel: ++251-11-519544

Ethiopian Institute of Agricultural Research (EIAR), P.O. Box 2003, Addis Ababa; Tel: ++251-11-6612572; Fax: ++251-11-6611222; E-mail: earo@dg.org.et; Website: http://www.earo.org.et

International Seed Trade Conference in Pictures

Opening Ceremony

Trade Exhibitions

Technical Sessions

Field Visits

Regional Consultation Meeting

NEWS and VIEWS

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

International Plant Genetic Resources Treaty – in the Interest of Seed Industry

The availability of new and better varieties is a key for successful development of the seed industry. Modern plant breeding also depends on the availability of genetic resources to develop new varieties that meet farmer preferences and consumer demands. The CWANA region is rich in genetic resources of important agricultural and horticultural crops such as wheat, barley, sorghum, chickpea, lentil, coffee, apple and many more crops of economic importance. However, it is estimated that the countries in the CWANA region are also dependent for 60% of their genetic resources from elsewhere outside the region. In the past, genetic resources used to be shared or exchanged freely among farmers and countries. This free exchange of germplasm, however, changed drastically after the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro, Brazil, chiefly represented by the Environment Ministries of almost all countries of the world.

The agreement on the Convention on Biological Diversity (CBD) adopted at this conference provided states with sovereign rights over their genetic resources including agricultural crops. Therefore, all countries were required to design laws to regulate the international exchange of genetic resources and seek from those who want to utilize the materials for crop improvement to share the benefits that may arise from their exploitation. Consequently, the CBD resulted in sharp decline of the exchange of genetic resources worldwide. It is, however, also difficult to predict the value of the genetic resources since conventional plant breeding may take over 10 years to yield a commercial product, and to design an effective mechanism to track individual lines obtained from the original germplasm.

The materials held at the genebanks of the International Agricultural Research Centers, however, remained available under a standard contract that requires among other things that the recipient can't claim legal ownership (patents or breeder's rights) over the materials in the form that they were received, and that information on the performance of the materials would be made available to the Centers. These international

genebanks experienced decline in the flow of germplasm materials as a result of the CBD and found it increasingly difficult to fill the gaps in their germplasm collections. For example, materials from collection missions in the Andes remained unused for several years because the regulations for exchange, and on who had the authority to release the samples, were not yet clear. The national agricultural research programs are also facing difficulties in getting germplasm from other countries, especially from outside their region. For example, the law in the Philippines requires that many different people have to grant permission – a 'Prior Informed Consent' - on the use of genetic resources collected from farmers' fields, thus giving almost a veto power to the farmer, the land owner, the local government and the national government.

In 2004, another important new treaty came into force, which creates among other things a facilitated access to genetic resources for many important food crops under what is called the 'Multilateral System'. This International Treaty for Plant Genetic Resources for Food and Agriculture (IT PGRFA), negotiated at FAO, will use one standard material transfer agreement (SMTA) for accessing genetic resources, and one multilateral mechanism for benefit sharing, if commercialized. Accordingly, those who commercialize materials while restricting access by others (e.g., through contracts, patents, plant variety protection, or V-GURTS -'terminator technology') will have to pay some share of the profit into the multilateral mechanism. In CWANA, except those in Central Asia, almost all countries of the region have formally approved the PGRFA. Iran, Morocco and Turkey have signed the treaty pending ratification. Although legally operational, many rules for implementing the PGRFA are still under negotiation including the details of SMTA, the funding strategy and a number of legal issues like the 'compliance'.

The seed industry is following the development of these treaties with great interest. For some time seed companies were not sure whether this would entail an additional cost or a benefit to their operations. They now recognize that the CBD creates more hurdles and costs for negotiating access to genetic resources. Therefore, they tend to favor the IT PGRFA, which promises a transparent multilateral access and benefit sharing regime. There is fear that the benefit sharing requirements will be costly for conventional breeders; and it is expected that the Treaty will run to a large extent on voluntary contributions by member states. There is still an argument that as long as the breeder's exemption in UPOV type laws is not curtailed (currently under debate in some seed associations) and allow the use of commercial varieties for further breeding, it may not be necessary for mandatory payments to the multilateral system. Those seed companies with a clear strategy for the future are, however, likely to contribute voluntarily because they know that their own future depends on an effective conservation of genetic resources and efficient implementation of the Treaty.

Whether the IT PGRFA becomes effective in supporting conservation and sustainable use (including breeding and seed provision), will depend on the outcome of the first meeting of the Governing Body (the Governments of countries that have ratified the Treaty) in June 2006 in Madrid, Spain. A successful meeting will pave the way for facilitated access to genetic resources whereas a failure will lead to continued uncertainty for many years to come. However, the outcome depends on the effective participation of the national delegations, and on the advice that they get from stakeholders at the national level, including seed specialists in the public and private sectors and in civil society. *N.P. Louwaars, Center for Genetic Resources, Wageningen University and Research Center, P.O. Box 16, 6700 AA Wageningen, The Netherlands; E-mail: niels. louwaars@wur.nl*

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The Global Crop Diversity Trust

The importance of crop diversity is reinforced in a number of international agreements such as the Convention on Biological Diversity (1992), the Global Plan of Action for the Conservation and Sustainable Utilization of PGRFA (1996) and the International Treaty on PGRFA (2001), but there was no mechanism to guarantee secure and sustainable funding for collections of crop diversity to support these instruments.

In October 2004, the Global Crop Diversity Trust became an independent legal entity after all the governments of the FAO member states agreed to its establishment. Its mission is to ensure the long-term conservation of crop diversity for food security worldwide.

At present there are about 1460 genebanks around the world holding an estimated 6 million accessions. Experts estimate that a USD 260 million endowment would be necessary to yield the USD 12-13 million the Trust would need to fund the critical costs of conservation in key national and international collections of crop diversity in genebanks every year.

In addition, the Trust aims to upgrade collections so that they meet the criteria eligible for long-term funding from the endowment and find adequate resources to finance its own operations. In order to meet these goals, the Trust seeks funds from a broad range of donors. Current donors include developed and developing country governments, foundations, private companies, one farmers' organization and private individuals. In 2004, donors from all these sectors pledged funds that would bring the total to over USD 56 million.

To date donors include Australia, Brazil, Canada, Colombia, Egypt, Ethiopia, Italy, New Zealand, Norway, Sweden, Switzerland and United states; foundations such as Rockefeller Foundation, Syngenta Foundation, United Nations Foundation and Gatsby Charitable Foundation; and companies like Du Pont/Pioneer Hi-Bred, Grains Research and Development Corporation and Syngenta. For more information about the conservation strategies and grants awarded, visit the website at http://www.startwithaseed.org. *Source: ISF Info, VOl XII, No 4, October 2005*

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ISTA Accreditation of Laboratories on the Detection of Specified Traits in Seed Lots

In the last Ordinary Meeting of the Association (April 2005, Bangkok, Thailand), voting delegates representing 34 national governments supported the inclusion of Rules for the testing of specified traits (including the detection, identification and quantification of genetically modified seed) into Chapter 8 of the ISTA International Rules for Seed Testing.

There will be no standard method described in the ISTA rules, but testing for specified traits (detection, identification and quantification of genetically modified seed) will be made under a performance based approach. Under this approach, the laboratory can freely choose a method, but it has to fulfill three conditions before accreditation:

1. Provide performance data on successful implementation of the method in the laboratory as prescribed in the relevant ISTA documents, with special focus on the parameter's accuracy and repeatability
2. Successfully participate in the ISTA Proficiency Test
3. Successfully participate in the ISTA Audit Program

The decision not to include a standard method in the International Rules for Seed Testing is new for ISTA. A number of intensive discussions took place with international and regional partners, International Seed Federation, International Society of Seed Technologists and Association of Official Seed Analysts, to decide the right approach to move forward.

At the end, it was decided that the methods for performing bio-molecular tests and bioassays require highly sophisticated equipment, skilled operators and specialized laboratory equipment. Furthermore, the methods are under rapid development and improvement andmay require specific laboratory optimizing and updating. Therefore, ISTA is convinced that over a period of three to five years, a performance-based approach is acceptable to achieve reliable and reproducible results in testing specified traits than working to establish standard methods.

With Governments' vote to include the performance-based approach in the ISTA Rules, ISTA will start the accreditation of laboratories on the detection of specified traits in seed lots in February 2006. The aim will be to provide reliable and reproducible testing results on international level through the ISTA accredited laboratories.

This is a tremendous step forward and will create the necessary confidence in testing results for the Governments to fulfill their monitoring tasks and for the seed trade to market their seed internationally without greater financial risks.

The relevant ISTA accreditation documents can be downloaded free from the ISTA website http://www.seedtest.org/en/content---1--1184.html which include:

1. Principles and conditions for laboratory accreditation under the performance-based approach
2. Performance data evaluation for the presence of seed with specified trait(s) in seed lots
3. The ISTA accreditation standard

For more information you may contact, ISTA, Zürichstrasse 50, P.O. Box 308, 8303 Bassersdorf, Switzerland; Fax: ++41-1-8386001; E-mail: ista. office@ista.ch; Website: http://www.seedtest.org. *Source: ISTA Press Release 05, 19 August 2005*.

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Albania and European Union accede to UPOV Convention

Albania (from 15 October 2005) and the European Union (from 29 July 2005) became full members of the International Convention for the Protection of

New Varieties of Plants (UPOV) by depositing the instruments of accession at the General Secretariat of the UPOV in Geneva, Switzerland, bringing the total number of UPOV members to 60. The EU is the first intergovernmental organization joining UPOV. Accession to the UPOV Convention will allow Albania and the EU to fully benefit from the rights conferred by the Convention, and to be recognized as a full member of this international group with clear cut obligations and rules when it comes to plant variety rights. The UPOV Convention aims to ensure a harmonized international system for the protection of plant varieties and encourage the development of new varieties of plants. It was adopted in 1961, and has been revised three times, the most recent being in 1991. As a consequence of EU membership, all plant breeders of the European Community will enjoy the same rights as other UPOV members when it comes to the protection of plant varieties. The EU also has its own Regulation on Community Plant Variety Rights, based on UPOV recommendations, which allows breeders with a distinctive plant variety that fulfils certain criteria to be granted intellectual property rights at EU level. For more information on EU protection of plant variety rights, visit the website at: http://europa.eu.int/comm/food/plant/propertyrights/index_en.htm. *Source:* http://www.upov.int/

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Global Status of Commercialized Biotech/GM Crops: 2005

The year 2005 marked the tenth anniversary of the commercialization of GM crops. ISAAA Brief 34 presented the global status of commercialized genetically modified (GM) crops or often called biotech crops in 2005. The objective is to present a consolidated set of data that will facilitate a knowledge-based discussion on current global trends in biotech crops both in developed and developing countries.

In 2005, the global biotech crops area continued to grow reaching 400 million ha (over 1 billion acre), planted by 8.5 million farmers in 21 countries since it started 10 years ago. This reflects an unprecedented high adoption rate and the trust and confidence of farmers in crop biotechnology. Farmers have consistently increased planting biotech crops by double-digit growth rates every year since they were first commercialized in 1996 indicating an increase of more than fifty-fold during the first decade of commercialization. The global area of approved biotech crops in 2005 was 90 million ha compared to 81 million ha in 2004 showing an increase of 9 million ha, equivalent to 11% annual growth rate.

A historic milestone was reached in 2005 when 21 countries grew biotech crops from 17 countries in 2004. Notably, the four new countries that grew biotech crops were Iran, Portugal, France and the Czech Republic. This brings the number of EU member countries now commercializing modest areas of Bt maize to five, *viz*; Czech Republic, France, Germany, Portugal and Spain. In 2005, the 21 countries growing biotech crops included 11 developing countries and 10 industrialized countries; they were, in order of hectarage: USA, Argentina, Brazil, Canada, China, Paraguay, India, South Africa, Uruguay, Australia, Mexico, Romania, the Philippines, Spain, Colombia, Iran, Honduras, Portugal, Germany, France and Czech Republic.

In 2005, biotech rice (Bt) was grown commercially for the first time on approximately 4,000ha in Iran by hundred farmers. Iran and China are the most advanced countries in commercialization of biotech rice, which is the most important food crop in the world, grown by 250 million farmers, and the principal food of the world's 1.3 billion people, mostly subsistence farmers. The commercialization of biotech rice has enormous implications for the alleviation of poverty, hunger, and malnutrition, not only for the rice growing and consuming countries in Asia, but for all biotech crops and their global acceptance. China has already field tested biotech rice in pre-production trials and is expected to approve biotech rice in the short-term.

In 2005, the US, followed by Argentina, Brazil, Canada and China continued to be the principal adopters of biotech crops globally, with 49.8 million ha planted in the US (55% of global biotech area) of which approximately 20% were stacked products containing two or three genes, with the first triple gene product making its introduction in maize in the US. The stacked products, currently deployed in the US, Canada, Australia, Mexico, and South Africa and approved in the Philippines, are an important and growing trend which is more appropriate to quantify as 'trait hectares' rather than hectares of adopted biotech crops. The number of 'trait hectares' in US in 2005 was 59.4 million ha compared with 49.8 million ha of biotech crops, a 19% variance, and globally 100 million "trait hectares" versus 90 million ha, a 10% variance.

The largest increase in 2005 was in Brazil (9.4 million ha compared with 5 million in 2004), followed by the US (2.2 million ha), Argentina (0.9 million ha) and India (0.8 million ha). India had by far the largest year-on-year proportional increase, with almost a three-fold increase from 500,000 ha in 2004 to 1.3 million ha in 2005.

Biotech soybean continued to be the principal crop in 2005, occupying 54.4 million ha (60% of global biotech area), followed by maize (21.2 million ha at 24%), cotton (9.8 million ha at 11%) and canola (4.6 million ha at 5%). In 2005, herbicide tolerance, deployed in soybean, maize, canola and cotton continued to be the most dominant trait occupying 63.7 million ha (71%) followed by Bt insect resistance at 6.2 million ha (18%) and 10.1 million ha (11%) to the stacked genes. The latter was the fastest growing trait group between 2004 and 2005 at 49% growth, compared with 9% for herbicide tolerance and 4% for insect resistance.

Biotech crops were grown by approximately 8.5 million farmers in 21 countries in 2005, up from 8.25 million farmers in 17 countries in 2004. Notably, 90% of the beneficiary farmers were resource-poor farmers from developing countries, whose increased incomes from biotech crops contributed to the alleviation of poverty. In 2005, approximately 7.7 million subsistence farmers (up from 7.5 million in 2004) benefited from biotech crops – the majority in China with 6.4 million, 1 million in India, thousands in South Africa including many women Bt cotton farmers, more than 50,000 in the Philippines, with the balance in the seven developing countries which grew biotech crops in 2005. This initial modest contribution of biotech crops to the Millennium Development Goal of reducing poverty by 50% by 2015 is an important development which has enormous potential in the second decade of commercialization from 2006 to 2015.

During 1996-2005, the proportion of the global area of biotech crops grown by developing countries increased every year. More than one-third of the global biotech crop area in 2005, equivalent to 33.9 million hectares, was grown in developing countries where growth between 2004 and 2005 was substantially higher (6.3 million ha or 23% growth) than industrial countries (2.7 million ha or 5% growth). The increasing collective impact of the five principal developing countries (China, India, Argentina, Brazil and South Africa) is an important continuing trend with implications for the future adoption and acceptance of biotech crops worldwide.

In the first decade, the accumulated global biotech crop area was 475 million hectares (1.17 billion acres), equivalent to almost half of the total land area of the USA or China, or 20 times the total land area of the UK. The continuing rapid adoption of biotech crops reflects the substantial and consistent improvements in productivity, the environment, economics, and social benefits realized by both large and small farmers, consumers and society in both industrialized and developing countries.

There is cautious optimism that the stellar growth in biotech crops, witnessed in the first decade of commercialization, 1996 to 2005, will continue and probably be surpassed in the second decade 2006-2015. Adherence to good farming practices with biotech crops will remain critical as it has been during the first decade and continued responsible stewardship must be practiced, particularly by the countries of the South, which will be the major deployers of biotech crops in the coming decade. *Source: CropBiotech Update Special Edition, 11 January 2006 (Highlights of ISAAA Briefs No. 34-2005; Website: http://www.isaaa. org)*

CONTRIBUTIONS from SEED PROGRAMS and PROJECTS

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

Afghanistan Approves National Seed Policy

In the last issue of *Seed Info* we reported about the National Seed Policy Forum held from 13-14 April 2005 in Kabul, Afghanistan. The workshop was organized by FAO under the auspices of the Ministry of Agriculture, Animal Husbandry and Food as part of a consultative process with stakeholders of the seed sector to discuss the draft national seed policy. A total of 82 participants attended the Forum, representing various stakeholders including the Agricultural Research Institute of Afghanistan, the public sector Improved Seed Enterprise, seed producing NGOs, new private sector seed enterprises, farmers and international agricultural research centers.

The English version of the final draft from the Forum was translated and presented to the Minister of Agriculture, Animal Husbandry and Food. The draft national seed policy document was approved during signing ceremony chaired by H.E. Mr Obaidullah Ramin, Minister of Agriculture, Animal Husbandry and Food on 13 September 2005 in Kabul, Afghanistan. The policy is consistent with a draft prepared by the Future Harvest Consortium and ICARDA in 2002. *Sam Kugbei, FAO, Kabul, Afghanistan; E-mail: samuel.kugbei@fao.org*

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Ethiopia Establishes Agricultural Biotechnology Research Institute and Endorses Bills on

Breeder's, Genetic Resources and Community Rights

Agricultural Biotechnology Research Institute
Ethiopia, with a cost of $1.8 million, will establish the first Agricultural Biotechnology Research Institute (ABRI), aimed at exploiting the region's biological resources, and providing sustainable economic development. The institute is expected to provide long-term solutions by improving plant products through modification, thereby boosting agricultural production and exports.

The ABRI is part of the overall agricultural research capacity building project funded by a World Bank loan, and will be located at Holeta Agricultural Research Center, about 45km from Addis Ababa. Its main goal is to train African researchers, and provide them with resources for experiments. In addition, ABRI will serve as a central facility for research in molecular biology, genetic transformation, diagnostics, genomics and bioinformatics–in turn, advancing agricultural biotechnology development and protecting plant genetic resources. The advantage of having a biotechnology institute in Ethiopia is its location, known to be rich in biological diversity.

ABRI research programs are expected to include a variety of fields, including propagation of local plants using plant cell and tissue culture technology, production of improved local crops using genes isolated from natural resources, investigations into animal health and reproduction, and the production of bio-fertilizers and biological controls. ABRI could also help the region with bioeconomy, or developing and commercializing new biotechnology products. *Source: The Scientist 15 No 2005 http://www.the-scientist.com*

Plant Breeders' Rights and Genetic Resources and Community Knowledge and Rights
The Ethiopian parliament endorsed two bills, providing for Plant Breeders' Rights and Genetic Resources and Community Knowledge and Rights. The proclamation providing for Plant Breeders' Rights would enable the private sector to play its role in developing and releasing new plant varieties suitable for various ecosystems in the country. Moreover, the proclamation would encourage investment and pave the way for utilizing new plant varieties released abroad.

The bill providing for Genetic Resources and Community Knowledge and Rights would have significant importance in the protection of the country's genetic resources, as well as the equitable distribution of the benefits of the resources. The proclamation would encourage farmers to use their genetic resources. For the full story, please visit: http://www.ena.gov.et/default.asp?CatId=6&NewsId=191992. *Source: CropBiotech Update 6 January 2006*

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Australia Releases Chickpea Varieties

The Western Australia Minister of Agriculture, Honorable Kim Chance, formally released two new chickpea varieties in August 2005. The ceremony took place at the Mingenew-Irwin Farmer Group's Heavy Land Field Day in Western Australia. The event was attended by over 250 farmers and industry personnel which represented another landmark in ICARDA's long-time collaboration with Australia in agricultural research.

The two high-yielding and disease-resistant varieties of chickpea, namely, Almaz (FLIP97-530-CLIMAS) and Nafice (FLIP97-503-CLIMAS), were derived from ICARDA chickpea breeding lines. Nafice and Almaz were developed through collaborative efforts between the International Center for Agricultural Research in the Dry Areas (ICARDA); the Aegean Agriculture Research Institute (AARI), Turkey; and the Centre for Legumes in Mediterranean Agriculture (CLIMA), Australia. Funds for the project were provided by the Grains Research and Development Corporation (GRDC) and the Council of Grain Grower Organizations (COGGO) Limited.

Hon. Kim Chance (right), Dr R.S. Malhotra (middle) and Prof. K. Siddique of CLIMA

'Nafice', Arabic for very precious, has bigger seeds than 'Kaniva' (Australian variety highly susceptible to ascochyta blight) and 'Almaz'; while 'Almaz', Arabic for diamond, is higher yielding. The two new varieties are well suited for winter sowing in regions of medium to high annual rainfall (400-700mm) with neutral to alkaline soils, while mild spring conditions are favorable for seed filling. They have a semi-erect growth habit, with 'Almaz' approximately 5cm taller than 'Kaniva';

produce attractive beige-colored seeds with good cooking quality; and possess significant resistance to ascochyta blight.

The new ascochyta resistant kabuli chickpea varieties, with improved yield and large seed size, would provide greater confidence and a profitable pulse option across Australia and are expected to increase chickpea production to 150,000ha, equivalent to USD 100 million.

Both varieties have been tested in South Australia, New South Wales, Victoria and West Australia and will be available to growers through the Council of Grain Grower Organizations Limited and the Australian Wheat Board during the 2006 season. *Source: The Week at ICARDA No 887/888, 8/15 September 2005*

HOW TO

In this section we provide technical/practical information that seed sector staff may find useful. The guidelines are simple instructions for technical staff involved in seed production and quality control.

How to No 32: Do We Need Technology Transfer in Participatory Plant Breeding?

In general, decades of conventional plant breeding failed to generate better adapted varieties for crops grown in less favourable environment or marginal areas. Consequently, participatory plant breeding was launched as an alternative approach. However, regardless of the breeding methods used the new crop varieties generated need to be transferred, in a systematic manner, to farmers. Conventional plant breeding and seed supply evolved into an integrated technology generation and transfer system. For participatory plant breeding, it is assumed that systematic seed supply may not be as important as it is in conventional systems. The arguments supporting this point of view are that in participatory approach those who generate and use the technology are essentially the same; hence there is no need for technology transfer. This point of view is rather simplistic and is not new. Some conventional plant breeders also believe that if you have a good variety you do not need a seed supply system because farmers will find a way to get it.

The answer to this assumption is simple. A variety is defined product and the seed need to be produced, in an organized manner and made available to farmers. This process of increasing the quantity while maintaining quality cannot be achieved without a systematic approach.

Historically, farmers developed local landraces and maintained them for centuries, but the landraces were defined by some physical, phenological or physiological traits and the number of well defined and commonly existing landraces per crop was few and the rate of replacement is rather low. In participatory plant breeding, a systematic approach to seed production cannot be ignored.

Despite the breeding methodology applied, the output is a defined product, i.e., pure-line, multi-line or populations. The final product needs to be, in an organized manner, made known and available to users in the right quality and quantity and at the right time, price and place. The simplest solution for technology transfer in participatory plant breeding, therefore, is to use the existing formal seed system and make adjustments wherever necessary. The informal seed system is compatible and an integral part of crop improvement by farmers. In contrary, participatory plant breeding is a formal sector activity that can not be sustained without support from a formal seed system. In situations where participatory plant breeding is a viable option, formal seed supply will make it more sustainable. *Abdoul Aziz Niane, Seed Unit, ICARDA, P.O. Box 5466, Aleppo, Syria; Fax: ++963-21-2213490; E-mail: a.niane@ cgiar.org (Editor's note: The views expressed here are intended to stimulate discussions among professionals and different stakeholders. We invite you to contribute to this dialogue by sharing your views and practical experiences. Contributions are welcome in Arabic, English or French)*

RESEARCH NOTES

Short communication of practical oriented research or relevant information in agriculture or seed technology are presented in this section.

The PREDUZA Approach: Helping Andean Farmers Developing High Yielding and Disease Resistant Varieties in Saraguro, Ecuador

by

Daniel L. Danial and Pim Lindhout [1]

Introduction

In Ecuador, barley and wheat are planted on approximately 60,000 and 30,000ha, respectively. Both crops are planted by small-scale subsistence

farmers and are used mainly for human consumption. Barley is also used to prepare traditional 'machica', a drink made from grounded barley.

The southern part of Ecuador is poverty stricken, with large migrant populations, and the rate of migration is estimated at around 43%. Saraguro, 500km from Quito, is situated in the province of Loja in southern Ecuador, which remains isolated and neglected by the national development plan because of its remote geographical locations. Farmers have no access to new agricultural technology including improved varieties, resulting in more poverty and an increased number of migrants to the USA and Spain. In addition, biotic stresses such as leaf rust (*Puccinia hordei*) of barley and yellow rust (*Puccinia striiformis*) of wheat are the most important factors limiting crop production. They affect both crop yield and grain quality. Such diseases can be controlled chemically, but farmers cannot afford the cost. Besides, it is hazardous both for human health and the environment. Therefore, breeding for durable resistance against these diseases is considered the most desirable and economic approach.

The Andean Region in South America

Preduza and its approach in the Andean region
El Proyecto de Resistencia Duradera en la Zone Andina (PREDUZA) is a project supported by the Netherlands government, and executed by the Laboratory of Plant Breeding of the Wageningen University. The PREDUZA project was initiated in 1997 and its mission is to develop crop varieties with durable disease resistance in the Andean region.

The PREDUZA approach combines three strategic components that are logically interconnected: (i) use of local cultivars, (ii) selection for durable resistance, and (iii) farmer participation in selection at advanced stages of breeding. Through participatory approach, PREDUZA makes use of the existing agrobiodiversity and ensures that the varieties developed fit farmers' preferences, and that local knowledge on crops and their cultivation are incorporated in the sustainable farming systems (Danial, 2003).

Results of the Preduza approach
The PREDUZA approach has been successful in increasing the effectiveness of breeding programs in the Andean region, which is reflected in an increased availability of promising entries with high level of resistance to the most important fungal diseases, improved adaptation to local farming conditions and matching farmers' preferences.

In Ecuador, the use of local cultivars in plant breeding was implemented by Instituto Nacional Autonomo de Investigacion Agropecuaria (INIAP) together with the technical support of Preduza. This resulted in releasing two barley varieties ('Canicapa' and 'Pacha') and one wheat variety (Zhalo). These varieties are characterized by high level of resistance to leaf rust and yellow rust and good agronomic traits (INIAP, plegable No 208, 209 and 210). For example, the yield of the new barley variety 'Canicapa' is 4 tonnes ha^{-1}, compared to the local check variety 'Clipper' with a yield of 0.8 tonnes ha^{-1} (Table 1). These new varieties were the results of collaborative work between INIAP researchers supported by PREDUZA and the farmer communities in Saraguro, who actively participated in selecting the varieties according to their preferences. These resulted in reducing the use of pesticides, protecting farmers' health and improving the income of farm families.

Table 1. Yield and protein content of new barley and wheat varieties under farmer condition in Saraguro

New varieties			Old varieties		
Variety	Yield t/ha	Protein (%)	Variety	Yield t/ha	Protein (%)
Canicapa	4.0	13.9	Clipper	0.8	10.2
Pacha	5.0	9.6	Clipper	0.8	10.2
Zhalao	4.7	10.7	Cotacachi	2.4	9.9

Sources: INIAP Plegable No 208, 209 and 210

Farmer participation
The experience of PREDUZA in the participatory approach has demonstrated that management and selection among large numbers of entries with a great genetic diversity is tedious and confusing for farmers. Consequently, PREDUZA has chosen to involve farmers in selection at the advanced stages of the breeding program. This improves selection efficiency in these stages directly but also at all other stages of the breeding process, as it would enhance breeders' understanding farmers' criteria.

Participatory selection was usually carried out in farmers fields with limited number of advanced lines (20-30 lines of F_5-F_6); and after three growing cycles, one or two lines are selected. Evaluation was carried out at flowering stage and after harvesting. This proved to be adequate for selection for the desired traits. Breeders came to realize that more frequent evaluation was not necessary. This is an important issue, as most of the national breeding programs have very limited funding. Moreover, plant breeders observed that the last evaluation was the most important for the selection of lines by the farmers.

Participatory evaluation/selection of harvested barley and wheat grains by farmers and breeders during an international workshop in Quito, Ecuador

Gender in participatory evaluation and selection
Plant breeders realized that the involvement of women farmers in the evaluation and selection of breeding materials has improved the quality of the evaluation. Women's selection criteria often differ partially from those of men. Men in general appeared more interested in characteristics that are of importance during growth and harvesting such as disease resistance and yield, while women were more concerned with culinary and post-harvest characteristics. In addition, it was observed that women are usually more involved in participatory selection, as they increasingly become more responsible in managing the farms and households as most of the men migrate to earn cash.

Women group evaluating and selecting barley lines in Chimborazo, Ecuador

It should be noted that participatory selection allowed the breeders to connect with farmers' priorities and preferences. Consequently, breeders had to adapt their ideas about the desired plant types. For instance, barley breeders in Ecuador were unaware that women prefer six-row barley over two-row in the Cotopaxi area.

Perception of new barley and wheat varieties
In 1995, initial evaluation of new promising lines of wheat and barley began with several communities by local INIAP researchers and agronomists. Later on PREDUZA initiated the selection program targeting local communities.

In 2004, the Regional Coordinator of PREDUZA (Daniel Danial) and the INIAP agronomist (Jorge Coronel), visited Saraguro to evaluate the new wheat and barley varieties and to assess their acceptance by the collaborating farmers in the Cochabamba community. Community members indicated that 30 years ago farmers were planting large areas of barley in Cochabama but later the barley became diseased and stunted with declining yields (seed to yield ratio of 1:1). Farmers said they were only harvesting the seed. However, with the introduction of new PREDUZA-INIAP varieties the situation changed and yields have increased many folds both in barley and wheat.

Moreover, a new barley variety 'Canicapa' has 14.9% protein content (the first barley ever produced in the Andean zone), compared to an old variety 'Clipper' (9.6%). This drastic increase in nutritional quality is expected to improve the nutritional status and health of farm families. When most farmers started adopting the new varieties they began having higher yields, saving money and

investing in cash crops especially fruit trees such as babaco (*Carica* sp) and tree tomato (*Cyphomandra betacea*) for the local market.

Constraints to adopting improved technologies
With the development of new varieties through participatory approach, the availability of seed remained a constraint to wide-scale adoption and diffusion of the new varieties by farmers because of lack of funds. The national agricultural research system prefers to produce and sell certified seed of improved varieties to local farmers at higher prices. However, in low input agriculture such as Saraguro, farmers are not able to purchase certified seed of improved varieties at a higher price. Moreover, lack of knowledge and technology in quality seed production remain a constraint to maintaining and multiplying varietally pure seed. Consequently, the improved varieties are genetically contaminated and mixed with local varieties and tend to accumulate seed-borne diseases where the full genetic potential of the new varieties decline within a short period of time and finally with no advantage over the local varieties.

The national agricultural research system (INIAP) does not have the resources to maintain and produce seed of many varieties. Therefore, farmers in the Andes are required to build on the resources they already have i.e. improving the informal seed system, which meet their seed demand for locally adapted varieties.

To improve the local seed supply, PREDUZA recommends strengthening both formal and informal seed sectors and suggests the following key research areas:

- Investigating the local seed system, focusing on indigenous knowledge of how farmers maintain, produce or source their seed for the next cropping season, which may differ by farmers, communities and crops. Detailed constraints to seed multiplication, distribution, and sourcing should be identified and examined with farmers at the local levels
- Investigating and testing different local seed production approaches with farmers or communities. This should include both technical and economic aspects, where different approaches are evaluated with farmers and their advantages and disadvantages are demonstrated to the communities
- Providing training programs for and by the farmers to implement the most suitable informal seed production systems. So far 15 seed producers have been trained for each crop
- Linking formal breeding program with informal seed system to ensure the supply of sufficient quantity of seed of cultivars that are preferred by farmers by multiplying seed with farmers or communities

A farmer from Saraguro (Mr Toalango) observing a new barley cv. Canicapa

Conclusion
The success that was achieved by PREDUZA within a short period, together with national agricultural researchers in the Andes, is the result of a well coordinated and implemented project by the Laboratory of Plant Breeding of the Wageningen University and Research Center. This success was also achieved for other crops, as PREDUZA was able to release new varieties of maize and quinoa in Bolivia (Danial, 2003; Danial *et al*., 2005). PREDUZA also expects to release more varieties in the near future but requires more time and financial support to continue its activities in the region. According to PREDUZA estimates, about 15 million indigenous people in Bolivia, Ecuador and Peru could benefit from such regional activities (Bentley and Hogenboom, 2003).

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Note[1]: D. L. Danial and P. Lindhout, Laboratory of Plant Breeding, Wageningen UR, P.O. Box 386, 6700 AJ Wageningen, The Netherlands; E-mail: daniel.danial@wur.nl; Website: http://www. preduza.org

MEETINGS and COURSES

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

Conferences

1st Mediterranean Congress on Biotechnology, 25–29 March 2006, Hammamet, Tunisia. In addition to oral and poster presentations, at least four plenary lectures and 16 symposium lectures including plenary sessions will be presented by competent speakers on all aspects of biotechnology and industry, biotechnology and environment, biotechnology and health, and biotechnology and agriculture. For more information, please contact: Samir Bejar at samir.bejar@cbs. rnrt.tn or visit the website at http://www.fmcb. africa-web.org/ *Source: CropBiotech Update 28 October 2005*

AFSTA Seed Congress 2006, 28–31 March, Entebbe, Uganda. The sixth Annual African Seed Trade Association Congress will take place from 28-31 March 2006 in Entebbe, Uganda. The Congress will provide a forum to discuss the challenges of improving agricultural research and accessing new technologies and its adoption. It will also be a forum for interaction for seed people to identify new market opportunities and investment prospects. Training on important topics of the seed industry for congress participants will be part of the program of the in 2006. For more information or registration, please contact: AFSTA Secretariat, P.O. Box 2428 - 00202 KNH, Nairobi, Kenya; Tel: ++254-20- 2727853; Fax: ++254-20-2727861; E-mail: afsta@kenyaweb.com or visit the congress website at: http://www.afsta.org/congress_page.asp

ISF World Seed Congress 2006, 29–31 May 2006, Copenhagen, Denmark. The The ISF World Seed Congress 2006 will be held from 29-31 May 2006 in Copenhagen, Denmark and is set in three different venues (Scandic Copenhagen Wallmans Cirkusbygningen,Øksnehallen) all in close proximity and within walking distance from the various hotels. Thy Congress is expected to discuss issues such as co-existence, farm saved seed, testing methods for adventitious presence of GM material in non-GM seed and phytosanitary regulations as a potential barrier to trade. Delegates will also have the opportunity to contribute to the future direction of the ISF in terms of the protection of biotechnological inventions, sustainable agriculture, and the possible use of molecular markers for protection of intellectual property, as well as the disclosure of origin in PVR applications. For more information or registration, please contact: ISF Secretariat, Chemin du Reposoir 5-7, 11260 Nyon, Switzerland; Tel: +41-22-3654425; Fax: +41-22-3654421; E-mail:register@worldseed.org or visit the congress website at: http://www.worldseed2006.com

13th Australasian Plant Breeding Conference, **18–21 April 2006, Christchurch Convention Christchurch, New Zealand**. The theme of the conference is Breeding for Success: Diversity in Action. It aims to highlight the economic, social, and environmental benefits of plant breeding in Australia, New Zealand, and South East Asia. It is organized in conjunction with the New Zealand Grassland Association Inc., and will be based on six core themes: benefits from plant improvement; genetic resources in a genomics era; environmental challenges and opportunities; plant gene technologies; added value products; and parallel breeding of plants and associated organisms.

Additional features include field tours through New Zealand to highlight practical innovation across the agriculture, horticulture, and forestry industries; and a master class in plant breeding, which will use practical examples and computer models to demonstrate the application of quantitative and population genetics in plant breeding. For details, please contact: Helen Shrewsbury, Conference Secretariat, at shrewsbh@lincoln.ac.nz, or visit the website at: http://www.apbc.org.nz

ISTA Annual Meeting 2006, June 26–29 June 2006, Glattbrugg, Zurich, Switzerland. The meeting is aimed to discuss and decide on proposals for changes to the ISTA International Rules for Seed Testing and business items of the Association, with the international participation of ISTA delegates and representatives from both the private seed sector and governments, including

experts in seed technology, scientific research and laboratory accreditation. The main subjects of the meeting will be:

- GMO testing–reports and evaluations on the international proficiency tests and update on the work of the corresponding ISTA GMO Task Force Working Groups
- Accreditation of laboratories for testing for the presence of specific traits by the performance based approach–first laboratory experiences
- Generic Method Validation - latest update and future planning on the efforts of the Working Group
- Amalgamation of the ISTA Rules–latest update on the work
- ISTA Quality Assurance Program–report and evaluation on the accreditation of laboratories worldwide

The preliminary program is now available on the ISTA website for download. Early registration is valid until 15 February 2006. For online registration: https://www.seedtest.org/stream/nl-l---1--%40a3a28d620689--31.html

Further upcoming ISTA Workshops include the following:

ISTA Purity Workshop, 26–27 January 2006
Location: Plant Health Inspectorate Service (KEPHIS), Nakuru, Kenya
Details: https://www.seedtest.org/stream/nl-l---1--%40a3a28d620689--32.html

2nd ISTA Moisture Workshop 10–13 April 2006
Location: Massey University, Palmerston North, New Zealand
Details: https://www.seedtest.org/stream/nl-l---1--%40a3a28d620689--33.html

ISTA Vigor Testing Workshop, 10–12 May 2006
Location: Station Nationale d'Essais de Semences, GEVES, Beaucouzé, France
Details: https://www.seedtest.org/stream/nl-l---1--%40a3a28d620689--34.html

Agricultural Biotechnology: Facts, Analysis and Policies, 29 June–2 July 2006, Ravello, Italy. The 2006 Conference of the International Consortium on Agricultural Biotechnology Research (ICABR) will take place in Ravello, Italy. The theme of the Conference is: Agricultural Biotechnology: Facts, Analysis and Policies. The following address links you to the call for paper: http://www.economia.uniroma2.it/conferenze/icabr2006/call_for_paper.asp

For any further information please contact: Prof. Vittorio Santaniello, Department of Economics and Institutions, University of Rome 'Tor Vergata', Via Columbia 2, 00133, Rome, Italy; E-mail: icabr@economia.uniroma2.it

Courses

Wageningen International Courses in 2006
Wageningen International (ex International Agricultural Center) will offer an eight-week program consisting of eight courses from 8 May to 30 June 2006 in Wageningen, the Netherlands. The course covers practical and policy orientation in genetic resources conservation and use through plant biotechnology, plant breeding and seed sector development. It is organized as an individual two-week course that is independent and comprehensive, but alternatively participants can combine two, three or four courses in an individual learning program tailored to their professional interest and institutional needs:

- Participatory approaches in genetic resource management
- Molecular markers in GR conservation and crop improvement
- Genebank management: conservation and promoting use
- Plant biotechnology and biosafety
- Master class on seed technology
- Integrated quality management in genetic resources
- Genetic resource policies and freedom to operate practice
- Promoting agrobiodiversity use: market and chains
- Plant variety protection

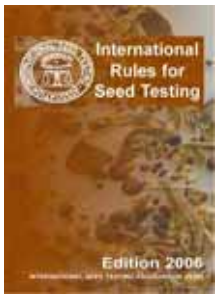
A limited number of fellowships are available from the Netherlands Fellowship Program (NFP) for nationals of a limited number of countries. For further information on the application or funding visit the website at: http://www.wur.nl/funding

LITERATURE

Literature, books and journal articles of interest to readers are presented here. Please send lists of seed publications on policy, regulation and technology to the Editor for inclusion in *Seed Info*.

ISTA. 2006. International Rules for Seed Testing, Edition 2006. ISTA's primary instrument in promoting uniformity in seed testing procedures is the 'International Rules for Seed Testing (IRST)', which provides detailed standard techniques and procedures. The publication includes 17 chapters and appendices describing the principles and definitions including tables and methods to be used. The IRST is designed for the

principal crop species, but apply in general, if not in detail, to any crop including those not covered in the text.



The IRST is approved and amended at ISTA Ordinary Meetings based on the advice of the ISTA Technical Committees. The 2006 edition includes the latest changes which were approved at the ISTA Ordinary Meeting held 27-28 April 2005 in Bangkok, Thailand. Additional information on seed testing can be found in various ISTA handbooks, but without having legal character.

The 2006 edition (valid from 1 January 2006) is available in a binder. Each year, updates in the form of a 'single paper collection' including additions or replacements of existing pages will be published, and could then be separately inserted into the binder. This system enables ISTA to provide more flexibility, enabling faster updates and improvements of the Rules.

The IRST includes annexes to chapter 7 and both binders are included in the price (CHF 379 for members and CHF 189.50 for non-members). For more details on ISTA publication visit the website at: http://www.seedtest.org/en/productrubric.html

Black, M., J.D. Bewley and P. Halmer (eds.). 2006. The Encyclopedia of Seeds: Science, Technology and Uses. The book is intended for researchers in seed science and professionals in the seed industry. This is the first reference work to cover all the major scientific themes and facets of the subject of seeds. It outlines the latest fundamental biological knowledge about seeds, together with the principles of agricultural seed processing, storage and sowing, the food and industrial uses of seeds, and the roles of seeds in history, economies and cultures. With contributions from 110 expert authors worldwide, the editors have created 560 authoritative articles, illustrated with tables, figures, black-and-white and color photographs, suggested further reading matter and 670 supplementary definitions. The contents are alphabetically arranged and cross-referenced to connect related entries. CABI Publishing; 960 pp; Price $350; Website: http://www.cabi-publishing.org

Albrechtsen, S.E. 2006. Testing Methods for Seed-Transmitted Viruses: Principles and Protocols. The book is intended for students and researchers in seed science and technology and plant pathology. This practical guide covers the commonly used detection methods for seed-transmitted viruses and viroids that affect both tropical and temperate crops. It contains 25 complete step-by-step procedures for biological, serological and molecular techniques to detect and identify such viruses. Combining helpful practical notes with more detailed explanations of the principles behind the techniques, the book describes the general characteristics of seed-transmitted viral diseases and discusses outlines for the organization and interpretation of seed health assays. The techniques reviewed are also applicable to non-seed-transmitted viral agents.

The book is in two parts and part 1 include (Introduction; Seed transmission of viruses; Ecology, epidemiology and control) and part 2 (Biological assays; Serological testing methods,; Nucleic acid-based testing methods, Nucleic acid hybridization, Epilogue) including the appendix (List of list of seed-transmitted viruses and viroids; Reagents, solutions and buffers; Suppliers of laboratory equipment and materials). CABI Publishing; 288 pp; Price $100; Website: http://www.cabi-publishing.org

Useful Internet Websites

New Open Access E-journal Launched: An open access electronic 'Journal of Land and Water' has been launched, with the aim of publishing scientific papers of international significance covering basic, applied, and strategic research in the area of land and water. The journal is also peer reviewed and will focus on the integration of the various aspects of land and water management and conservation at a range of scales. Submission of manuscripts are welcomed and should be sent through the online submission section of the journal at http://ejlw.sakia.org/. For more information, please contact: Thomas M. Stein at thomas-manuel.stein@sakia.org.

Good Seed Initiative: The site has been established by CABI Bioscience as a facility for debate, information exchange and communication about the seed needs of poor farmers and the people and processes that influence and address those needs. You can make use of the *GSI Forum* on the site to contribute and share ideas on your website. For more information you may contact: N. A. Phiri, GSI Coordinator–East Africa, CAB International, Africa Regional Centre, ICRAF Complex, P O Box 633-00621, Nairobi , Kenya; Fax: ++254-20-7122150; E-mail: n.phiri@cabi.org or visit the website: http://www.gsi-cabi-bioscience.org.

CG-Online Learning Resources: This CGIAR virtual training community site under the CGXchange is developed in collaboration with ARIADNE as the CGIAR learning objects repository. From this website you can access a repository of CGIAR Centers' learning objects and other training resources, as well as web-based training courses. You can access these sites to search and retrieve information and resources as well as enroll in courses. If you wish to contribute resources or need further information, please contact the Learning Resources Team at: E-mail: admin_cglearning@ cgiar.org. Website: http:// learning.cgiar.org

FAO Websites
The Food and Agriculture Organization of the United Nations is bringing access to its knowledge and information to a new level by launching an interactive facility to provide direct access to both the formal and tacit knowledge of its staff and technical experts.

Ask FAO allows users to post questions directly to experts in FAO, and it includes a searchable 'knowledge base' of answers to frequently asked questions covering issues as varied as how to ask FAO for technical assistance to finding out national rates of deforestation. AskFAO's website: http://www.fao.org/askfao

FAO's Best Practices website serves as a one-stop source of technical information on recommended practices and techniques in food production, rural development, natural resource management and other areas. FAO's Best Practices website: http://www.fao.org/bestpractices

For more information on both websites please contact: Charlotte A. Masiello-Riome, Communication and Promotion Officer, WAICENT Capacity Building and Outreach Branch, FAO, Rome, Italy; Tel: ++39 06 57055972; Email: charlotte.masiello@fao.org

FAO Portal on Technology for Agriculture: The FAO Research and Technology Development Service has launched a 'Technology for Agriculture' (TECA) portal. It aims to improve 'access to information and knowledge about available proven technologies in order to enhance their adoption in agriculture, livestock, fisheries and forestry'. The portal offers an array of tools including the TECA database currently containing over 500 entries organized in eight different categories. The portal is available in English, French and Spanish. For more information visit the website at http://www.fao.org/sd/teca/index_en.asp or contact teca-editor@fao.org