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Biosalinity News

Newsletter of the International Center for Biosaline Agriculture

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FROM THE EDITOR

Conserving and using genetic biodiversity is crucial to our ability to improve our lives and those of future generations.

We will only achieve this when we have access to information on what is available, its characteristics and where it can be obtained. This issue features the concept of a virtual genebank for salt-tolerant germplasm. We welcome your comments on this concept and encourage you to contact Dr. John Stenhouse, ICBA's Plant Genetic Resources Scientist with your ideas.

ICBA was deeply saddened to learn that Dr. Mervat El-Badawy, Director of the Technical Department of the Arab Fund for Economic and Social Development (AFESD) passed away recently. The Board of Trustees, Board of Directors and staff of ICBA extend their sincere condolences to Dr. El-Badawy's family and to AFESD.

Finally, a reminder that The Editor welcomes short contributions that would be of interest to readers.

Please send your submissions to:
The Editor
Biosalinity News, ICBA
P.O. Box 14660, Dubai, UAE
Email: icba@biosaline.org.ae

On-farm pearl millet and sorghum trials in Oman

ICBA and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have for some years been screening and evaluating sorghum and pearl millet genotypes for salt tolerance.

Further work in a three-year project funded by the OPEC Fund for International Development now in progress has identified varieties which have the highest salt tolerance and nutritional value. These varieties have now been taken to Oman for on-farm evaluation by Omani researchers in the Agriculture Production Research Centre (APRC), Ministry of Agriculture and Fisheries and farmers. Salt-tolerant varieties of barley will also be evaluated in the coming winter season.

On-farm demonstration in Oman of salt-tolerant varieties of pearl millet and sorghum. Planting (above left). Pearl millet two months after planting in June 2004 (above right). Pearl millet and sorghum (foreground) showing the difference in growth rates (below left). Pearl millet two months after planting in June 2004 (below right)

The growth of pearl millet planted in April was particularly impressive. Sorghum, although slow to grow at first, also yielded acceptable biomass at harvest. Sampling of establishment, heading, number of tillers, plant height, and fresh and dry weight of above ground parts took place until full maturity, and total above ground weight, number of tillers, number of heads, weight of heads and weight of seeds were measured at final harvest.

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At the heading stage, average fresh biomass production in the top ten yielding genotypes reached 44.6 t/ha in pearl millet and 36 t/ha in sorghum. The mean for all genotypes evaluated was 38.4 t/ha in pearl millet and 18.3 t/ha in sorghum.

At maturity, field dry matter production for the top ten genotypes as similar in the two species (7.9 t/ha in sorghum and 7.4 t/ha in pearl millet).

Percent protein ranged from 12-15% in the top yielding pearl millet genotypes. Percent ash ranged from 9-15% and sodium from 0.27-0.51%.

A graduate student at Sultan Qaboos University who is working at APRC and involved in the project started her thesis project in September 2004 on the sorghum and pearl millet. The thesis project will be co-supervised by ICBA and Sultan Qaboos University..

In October, a second demonstration plot was set up on a farm where the salinity is up to 15 dS/m. Here, a drainage system was installed and barley was planted in the first week of December as a winter crop.

Installation of the drainage system at the on-farm demonstration site at Rumais, Oman. Barley was planted on this site in December

ICBA NEWS

First External Program and Management Review of ICBA completed

From left to right: Prof. Philip Cocks, Dr. Don Plucknett, Dr. Shawki Barghouti and Dr. Pammi Sachdeva

The first External Program and Management Review (EPMR) of ICBA, commissioned by the Islamic Development Bank, has been completed.

The report was presented to the ICBA Board of Directors in October 2004 by the Chairman of the Review Panel, Dr. Donald Plucknett, President and Principal Scientist, Agricultural Research and Development International, USA. Dr. Plucknett will present the report to the IDB Board of Executive Directors, in its capacity as ICBA's Board of Trustees, in Jeddah in March 2005 for decisions and implementation of the recommendations.

The Review Panel comprised three members and a Secretariat: Dr. Donald Plucknett, Chairman; Dr. Shawki Barghouti, Advisor, Agricultural Science and Technology and Portfolio Management, World Bank; and Professor Philip Cocks, recently retired from his post as CEO Cooperative Research Centre for Plant-Based Management of Dryland Salinity, University of Western Australia. Dr. Pammi Sachdeva of the World Bank provided the Secretariat for the Panel.

ICBA NEWS (CONTINUED)

Prof. Dr Mervat El-Badawy of Arab Fund passes away

A fervent supporter and ambassador of ICBA and its mission, Prof. Dr. Mervat El-Badawy, Director of the Technical Department of the Arab Fund for Economic and Social Development (AFESD) passed away on 23 November 2004 in Cairo. In her passing away, the ICBA family has lost a guiding light within the donor community.

An Egyptian, Dr El-Badawy was one of the most educated ladies in the Arab world who held two doctorates from the prestigious University of Paris-Sorbonne, one in Engineering and another in Economics. In addition, she had earned two MSc degrees as well, one in Computer Science and another in Mathematical Economics and Econometrics.

Dr El-Badawy was a distinguished scientist, administrator, research manager, and policymaker. She represented AFESD at various international gatherings and drew admiration and respect from all those she interacted with. Over the years she had acquired vast knowledge of the problems that affected the economic and social development of Arab nations in West Asia and North Africa. Her contributions to the Consultative Group on International Agricultural Research (CGIAR) in various capacities have left an indelible positive influence on eminent scientists drawn from all over the world who are involved in non-profit agricultural research that benefits the poor. When she spoke at various fora, people listened.

As a Director of AFESD, she was convinced of the role ICBA could play in the Gulf and the Islamic world. She played a major role in AFESD's financial support for ICBA's activities in the Arab countries. Despite her busy schedule she took time to visit ICBA in September 2001 and wrote in the Visitor's book "I am impressed by the Center, its facilities and the enthusiasm of the scientists. The Center fills a very important gap in the research continuum not only for our part of the world but all other areas that suffer from the lack of fresh water.

Dr Mervat El-Badawy (second left) viewing a demonstration of irrigation design software during her visit to ICBA in September 2001

ICBA will be very important for the poor who live in arid zones. I am sure ICBA will have an important place on the world research map." The ICBA family pledges to live up to her vision.

SEMINAR

Seminar highlights Iran's success stories in dealing with salinity

Soil salinity problems in Iran are related to extensive unplanned irrigation and poor drainage systems. Iran's success stories in dealing with salinity include developing saline irrigation technologies for crops such as pistachio, and the establishment of specialized research centers to deal with salinity, for example the National Salinity Research Center in Yazd.

A seminar, 'Biosaline Agriculture: Prospects and Potential in Arid Regions with Reference to Iran', organized by ICBA in cooperation with the Agriculture Research and Education Organization (AREO), the Bank Keshavarzi and the Islamic Development Bank (IDB) at the 29th Annual Governors' Meeting of the IDB held in Tehran in September, focused on the achievements of applied research in biosaline agriculture regionally and internationally, and particularly on Iranian success stories.

Inter-Islamic network on Biosaline Agriculture (INBA)

International workshop on Marine and Coastal Protected Areas

An international workshop organized by the Inter-Islamic Science and Technology Network on Oceanography to evaluate the status of marine and coastal protected areas and review scientific advances will be held 23-25 March 2005 in Morocco.

For further information, please contact Professor A Chouikhi: a.chouikhi@deu.edu.tr or abdelouahab.chouikhi@deu.edu.tr or Professor Nasser-Eddine Zine: nzine@hotmail.com

Changes at ISNET

Mr. Arshad Siraj has been appointed as Executive Director of the Inter-Islamic Network on Space Sciences and Technology (ISNET) on the retirement of Mr. Muhammad Nasim Shah.

Priority Setting Meetings

CGIAR System Priorities technical meetings

Two two-day meetings will take place in FAO in Rome 28-29 January and 31 January-1 February 2005 to help in developing the Consultative Group on International Agricultural Research (CGIAR) System Priorities for 'Improved Water Management and Use in Agriculture' and 'Better Soil and Land Management and Use'.

The intention of the meetings is to refine the priority research areas through discussions to be held between the Science Council, the CGIAR Centers, advanced institutes and national programs. The outputs of the meetings will be used by the CGIAR Science Council for making decisions and recommendations to the CGIAR on future priority research in the period 2005-2015.

ICBA will participate in the meetings as an international research center external to the CGIAR and as a representative of the region.

The meetings are a key part of the CGIAR priority setting process. Participants will evaluate impact of the proposed priority research areas in terms of comparative advantage, chance of success and timelines to meet the specific goals.

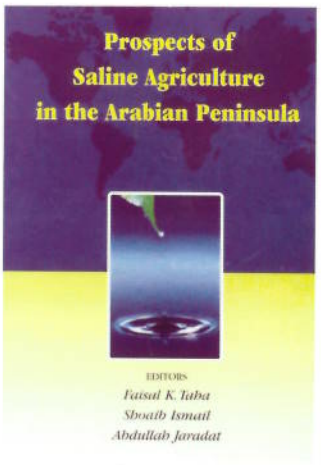
New Publications

Prospects of saline agriculture in the Arabian Peninsula

The proceedings of the International Symposium on Prospects of Saline Agriculture in the GCC Countries, held in Dubai, United Arab Emirates, in 2001, have now been published. Copies of *Prospects of Saline Agriculture in the Arabian Peninsula* edited by FK Taha, S Ismail and A Jaradat may be obtained from ICBA.

ICBA Annual Report 2003

The *ICBA Annual Report 2003* is also now available in English and Arabic. To request a copy, please contact ICBA.. Email: icba@biosaline.org.ae



Consultative Group on International Agricultural Research (CGIAR) Challenge Program on Food and Water

ICBA has now joined the CGIAR Challenge Program on Food and Water coordinated by IWMI as a partner in the development of a project proposal 'Development of technologies to harness the productivity potential of salt-affected areas of the Indo-Gangetic, Mekong, and Nile river basins'. The proposal, submitted by the International Rice Research Institute (IRRI), was approved for funding and an inception workshop was held in the Philippines in March 2004 during which detailed work plans were developed. ICBA's work in the project will focus on salt-affected areas in Egypt, Bangladesh and Iran.

Collaborators in the project are: IRRI, Philippines; Bangladesh Agricultural Research Institute (BARI), Bangladesh; Rice Research and Training Center, Egypt; Rice Research Institute of Iran; Central Rice Research Institute, India; Central Soils Salinity Research Institute, India; Narendra Dev University of Agriculture and Technology, India; Cuu Long Delta Rice Research Institute, Vietnam; ICRISAT; and the University of California, Davis.

ICBA's roles in the project are firstly to identify salt-tolerant cultivars of crops that fit into rice-based cropping systems for salt-affected areas of Bangladesh, Egypt and Iran, and secondly to provide promising crops and varieties with salt tolerance to be validated in target areas.

Activities were initiated in late 2004 with screening at ICBA of fodder beet and fodder brassica species, as potential off-season crops for the Nile delta of Egypt and the Caspian Sea coast of Iran. Selected varieties or lines will be made available for field testing in Egypt and Iran late in 2005.

OPEC Fund approves US$400,000 grant to strengthen human resources in biosaline agriculture

Dr. Mohammad Al-Attar, Director General, ICBA (left), and Mr. Suleiman Al-Herbish, Director General OPEC Fund (center), signing the grant agreement

The OPEC Fund for International Development recently approved a grant of US$400,000 to ICBA for capacity development. The grant builds upon the successes of an earlier capacity-building scheme carried out by ICBA in 2001-2003, which was also co-financed by the OPEC Fund, to target the biosaline agriculture needs of National Agricultural Research Systems (NARS) in arid, least-developed countries.

The capacity-development activities will include intensive short courses, on-the-job skills development and traveling workshops in North Africa, West and Central Asia.

The OPEC Fund is one of the major partners in the establishment of ICBA, having provided grants totaling US$1.65 million towards its initial construction (US$1 million in 1999), the installation of irrigation and drainage in the experimental fields at headquarters (US$250,000 in 2000), strengthening human resources (US$200,000 in 2002) and helping develop salinity-tolerant sorghum and pearl millet varieties (US$200,000 in 2003).

Virtual genebank for salinity-tolerant plant genetic resources

Dr. John Stenhouse, Plant Genetic Resources Scientist, ICBA

Many plant species are able to grow in the presence of salinity. Among conventional crop species, these range from most fruits and vegetables that tolerate only low salinity levels to others such as barley, pearl millet, beets and date palm, which tolerate moderate to high levels.

Among undomesticated species, halophytes that originate from seashores, estuaries and saline depressions in dryland areas are able to grow and produce in highly saline conditions. Many of these halophytic wild species with potential economic and environmental uses have been identified over the last fifty years. Similarly, many varieties and accessions of crop species that have better than average salinity tolerance have been documented over the years. But few of these species, varieties and accessions have been systematically stored and it is often difficult to acquire seed or other propagation material for testing and evaluation.

ICBA has recently established a genebank of salinity tolerant plants. The genebank is located at ICBA's headquarters at Al Ruwayyah, just outside Dubai, United Arab Emirates and comprises short-, medium- and long-term seed stores. The holdings of the genebank currently stand at over 8000 accessions of approximately 250 species, mainly forages. Field genebanks, where living material of selected species is maintained, complement the seed held in cold storage.

However, ICBA's genebank is constrained by its location and by the nature of much halophyte germplasm. The UAE has an extreme desert climate with very high temperatures during much of the year; many species with temperate adaptation are not able to grow and reproduce well in this environment. The seed production and quality of many of the wild, undomesticated halophyte species is also often poor, even in the most favorable conditions. The result is that producing seed for distribution to interested scientists will often be impossible or extremely costly in Dubai and ICBA genebank will only be partially able to fill the gap in supply of salinity-tolerant plants for testing and evaluation around the world.

Prof. Shaun Coffey, Chief, CSIRO Livestock Industries, inspects accessions in the genebank during his visit to ICBA in April

To remedy this situation, ICBA proposes creating a "virtual genebank", an Internet-based information system that will provide details of salinity tolerant plant species, where they are available and how they can be accessed. The aim is to create a single window for identifying plant species suitable for various uses in saline environments and for obtaining seed or other planting material.

There are already many web resources that describe salinity tolerant plant species and some that provide information on seed availability. So what will ICBA's virtual genebank add? Firstly, it will provide an umbrella under which existing resources can be brought together to provide a one-stop shop for information on salinity-tolerant plants. It will do this by providing links to the existing resources and by describing their content to help guide users to the precise information they require. Secondly, it will provide objective assessment of different species' performance, based on ICBA's own experience and feedback from users. Thirdly, and most importantly, it will provide the links between information on plant reactions to salinity and the

Virtual genebank for salinity-tolerant plant genetic resources (Continued)

Living genebank at ICBA headquarters in Dubai

Participants of a short course on in-situ germplasm conservation at ICBA

sources of the plants themselves, the information that is so often lacking.

What sort of plant genetic resources will be included? ICBA's collection is currently comprised largely of forage and dual-purpose grain and forage germplasm. This will form the basis for the information system initially. However, it will gradually be expanded to include other categories of plants - fruit and vegetable species and cultivars, ornamental and landscaping plants, wild species for rehabilitation of degraded saline land, trees for forestry and environmental enhancement. In short, it will focus on any plants that can be used in management of salinity-affected environments for economic production, environmental protection or other purposes.

Who will benefit from ICBA's virtual genebank? All users and suppliers of salinity-tolerant plants should gain. These will include plant scientists seeking candidate species for testing for different purposes in different saline plant production environments, plant breeders requiring tolerant parents for their crossing programs for salinity tolerance and landscaping practitioners who need suitable plants for greening of saline amenity areas. They will include genebank scientists who have identified salinity tolerant accessions in their holdings and wish to promote their use and private sector suppliers of salinity tolerant plants.

ICBA invites any individuals or organizations with interest in the creation of a virtual genebank of salinity tolerant plant genetic resources to contact Dr. John Stenhouse at j.stenhouse@biosaline.org.ae to express views on priorities, identify resources or provide any other information or comments.

ICBA strengthens capacity in management of soil salinity

Dr. Shabbir Shahid, Soil Scientist

Dr Shabbir Shahid joined ICBA in October 2004 for a one-year assignment to strengthen ICBA's soil laboratory capacity and provide support to projects in aspects of soil salinity.

Dr Shahid holds a Ph.D degree from the University of Wales, Bangor, UK and has over 24 years of professional experience in teaching, research and development in Pakistan, UK, Kuwait and the United Arab Emirates. The major focus of his research has been on soil salinity and related issues in irrigated agriculture, reclamation and rehabilitation, in arid and semi-arid region soils. Recently he developed a national project to tackle salinity problems in degraded agricultural lands of the UAE.

CAPACITY DEVELOPMENT

ICBA-ICARDA-IWMI workshop in Tashkent

ICBA, in collaboration with the International Center for Agricultural Research in the Dry Areas (ICARDA, Aleppo, Syria) and the International Water Management Institute (IWMI, Colombo, Sri Lanka)held a workshop on 'Principles and Application of Biosaline Agriculture in Arid and Semi-Arid Regions with Reference to Central Asia and the Caucasus' in Tashkent, Uzbekistan, 2-10 September.

Participants of the ICBA-ICARDA-IWMI workshop, Tashkent, Uzbekistan, in September

The objective of the workshop was to exchange information on research and development in biosaline agriculture and problems of salinity and to discuss the directions for future collaborative work. Over 60 participants from Central Asia and the Caucasus attended.

Opening addresses were given by His Excellency Mr. E. Ganiev, Deputy Prime Minister, Uzbekistan, Prof. T. Khudoibedyev, Rector of the Tashkent Institute of Irrigation and Mechanization, and Governor of the Islamic Development Bank, His Excellency Mr. I. Najmeddinov, Minister of Agriculture and Water Management, Uzbekistan and Dr. Mohammad Al-Attar, Director General, ICBA.

The three international centers, ICBA, ICARDA and IWMI, are responding to a significant demand for capacity building to deal with widespread salinity problems in the Central Asia and Caucasus region. The challenges in the region offer great opportunities for the three international centers, in partnership with national institutions, to achieve lasting impact on agricultural production through capacity building, and the development of technologies and plant production systems for sustainable and profitable agriculture in saline conditions.

Sponsors of the workshop were the Office of His Highness the President of the UAE and the Islamic Development Bank. The ICARDA Office in Tashkent provided technical and logistic support.

Course on management of salt-affected ecosystems to be held in February 2005

A course aimed at university graduates in agricultural science, environmental engineering and environment-related specialties who are involved in management, reclamation and rehabilitation of degraded environments will be held at ICBA headquarters 5-8 February 2005. The course 'Management of salt-affected ecosystems' is co-sponsored by the Office of his Highness the President of the UAE, the UAE Ministry of Agriculture and Fisheries, and the Islamic Development Bank.

Organized by ICBA and Global Scan Technologies LLC, Dubai, the course will identify and characterize soil salinity problems, explore the use of remote sensing and geographic information systems in salinity mapping, and present various alternatives for management and use of salt-affected ecosystems.

Capacity development for rebuilding agriculture in Afghanistan

Rebuilding agriculture in Afghanistan is a priority, yet this war-torn country has a severe shortage of professionals who have the skills and knowledge to do this. With the support of the Islamic Development Bank, ICBA and ICARDA will organize a short course at ICBA in 2005 for 15 Afghani agriculturalists which will give them practical skills to deal with saline environments.