

Biosalinity News

Newsletter of the International Center for Biosaline Agriculture

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FROM THE EDITOR

Biosalinity News is produced three times a year by the International Center for Biosaline Agriculture (ICBA). The electronic version appears on ICBA's website www.biosaline.org.

In this issue we feature the role of plant genetic diversity in developing salt-tolerant crops and an article on the salinity problems facing Pakistan. In addition, there are news items on new projects, training courses, and networks.

This newsletter is a forum for exchange of news and information among people interested in research and development activities in saline agriculture. Your help and input is welcome.

The Editor is pleased to receive short articles on research and development in saline agriculture that would be of interest to those involved in biosaline agriculture. We also welcome announcements of seminars, workshops, meetings and training courses, news of state-of-the-art saline agriculture, and relevant new publications. Please send your submissions to:

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Making the most of genetic diversity

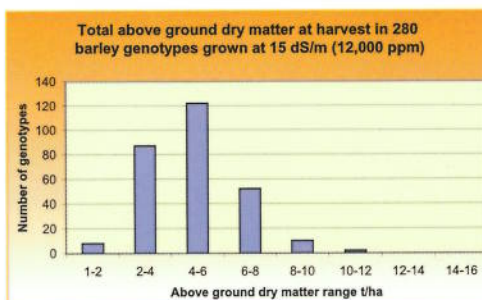
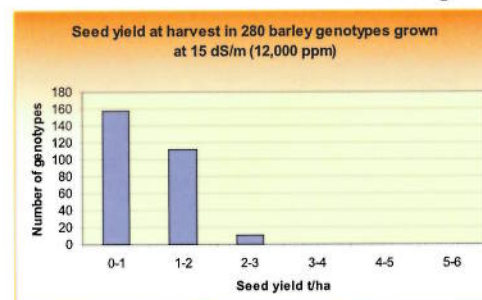
In many arid and semi-arid regions, as pressure on freshwater increases, farmers are faced with having to use less water and water of lower quality. Now, in some areas, the only water available is brackish or saline.

To use brackish and saline water productively in agricultural systems, farmers need plant species that have a 'taste for salt' and will grow and produce economic yields in saline conditions.

Building on considerable previous work on salinity tolerance of crop species, ICBA is focusing on identifying germplasm with enhanced salinity tolerance, targeting cereal crops in particular.

One cereal crop which is adapted to a wide range of environments and is well known for its tolerance to salinity is barley. Working with the wide genetic diversity of barley, ICBA and the International Center for Agriculture in the Dry Areas (ICARDA) are identifying the most salt-tolerant varieties. Findings show that at high salinity levels, among the 280 barley genotypes screened, there are genotypes that produce seed yields of 2-3 tonnes per hectare. These yields are within the economic range for barley production.

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Evaluation of salinity tolerance in 280 barley genotypes

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MAKING THE MOST OF GENETIC DIVERSITY

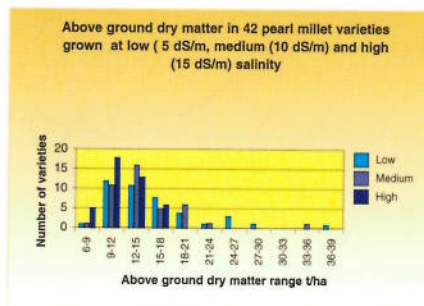
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Similarly, several elite pearl millet varieties developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and evaluated for salt-tolerance at ICBA show good potential for both seed and biomass production at high salinities (up to 15 dS/m).

The next step is to evaluate 15-25 of the most salt-tolerant genotypes in large-scale field tests at both ICRISAT and ICBA, and in farmers' fields in the United Arab Emirates and Oman.



Several elite pearl millet varieties developed by ICRISAT and evaluated for salt-tolerance at ICBA show good potential for both seed and biomass production at high salinities (up to 15 dS/m, 12,000 ppm)



Wide genetic diversity within barley, pearl millet and sorghum species makes it possible to further improve salinity tolerance through selection and breeding.

SEMINARS AND MEETINGS

Seminar in Kazakhstan



Participants at the seminar on 'Prospects of Biosaline Agriculture Globally and in Kazakhstan', Almaty, Kazakhstan, 30 August 2003

ICBA, in collaboration with the Kazakhstan Academy of Sciences, held a seminar on 'Prospects of Biosaline Agriculture Globally and in Kazakhstan', prior to the Islamic Development Bank (IDB) Annual Governors' meeting in Almaty, Kazakhstan, 30 August-3 September.

Dr. Amadou Boubacar Cisse, Vice President (Operations), IDB, in his opening address at the seminar, emphasized the role of science and technology in IDB's Technical Cooperation Program. The agricul-

tural sector is a high priority for economic and social development and efforts to achieve this objective must be linked to procurement and transfer of technologies that increase agricultural production and improve the environment.

Prof. Dr. Faisal Taha, in his presentation stressed that one of the major constraints facing agricultural production in many countries in arid and semi-arid regions is salinization of soil and water and the lack of know-how to utilize large amounts of brackish groundwater for agricultural production. IDB established ICBA in 1999 to address the challenges of combating salinity and utilizing marginal water and soil.

Prof. Sabit Baizakov, Academician-Secretary, Agriculture Division, Kazakhstan, outlined the salinity problems in Kazakhstan. ICBA and the Academy of Sciences in Kazakhstan have signed a Memorandum of Understanding (MoU) identifying many scientific and technical areas of collaboration.

CGIAR Annual Meeting, Nairobi



The ICBA stand at the CGIAR AGM, Nairobi, Kenya, October

ICBA participated in the partner's exhibition at the Annual General Meeting of the Consultative Group on International Agriculture, held in Nairobi, Kenya in October.

The stand featured posters on 'Crops with a taste for salt' and 'Halophyte forage production'.

ICBA LINKAGES AND PARTNERSHIPS

ICBA signs Memorandum of Understanding with Kazakhstan

ICBA and the Academy of Sciences in Kazakhstan have signed a Memorandum of Understanding (MoU) identifying many scientific and technical areas of collaboration.

A joint project on 'Cultivation of halophytes in order to increase efficiency of degraded pastures of salted lands' is being developed.

ICBA and HH President of UAE's Private Office Sign Memorandum of Understanding



HE Mr. Mohamed Rashed Harmash Al-Mansouri, Assistant Deputy Manager, Agricultural Department of the Private Office of HH President of the UAE, and Dr. Mohammad H. Al-Attar, Chairman of the Board of Directors and Director General, ICBA, signing the MoU

ICBA signed recently an MoU with the Private Office of HH President of the UAE in Abu Dhabi. The agreement aims to develop research for the utilization

of saline water resources in agriculture. ICBA and the Private Office will prepare, design and implement projects on forage and field crops, forestry, land reclamation and irriga-

NEW PUBLICATIONS

ICBA Annual Report 2002, 1422/1423H

ICBA's Annual Report 2002, 1422/1423H, is now available in English, Arabic and French. To obtain a copy of the report, email or write to ICBA giving your full postal address and stating your language of preference.



tion water resources aiming at increasing the production of food, forages and trees in the United Arab Emirates.

Free online access to bibliographic databases for Global Biosaline Network members

Members of the Global Biosaline Network are reminded that they can request direct web access to the bibliographic databases AGRIS and AGRICOLA. Direct access provides speedy and efficient searching. Members can also request searches on CAB ABSTRACTS® through the ICBA Librarian.

AGRIS is the information system for agricultural sciences and technology of the Food and Agriculture Organization of the United Nations (FAO). AGRICOLA (AGRICultural OnLine Access) is a bibliographic database encompassing agriculture and allied disciplines. CAB ABSTRACTS® is a bibliographic database covering agriculture and the management and conservation of natural resources.

To obtain the password for direct web access to AGRIS and AGRICOLA, or request a search on CAB ABSTRACTS®, members should send an email to ICBA at library@biosaline.org.ae.

To join the Global Biosaline Network, fill in the on-line application at <http://www.biosaline.org/join.cfm>.

INTER-ISLAMIC NETWORK ON BIOSALINE AGRICULTURE (INBA)

Publications



INBA recently published the INBA Brochure and Statutes, approved by the the Organization of the Islamic Conference Standing Committee on Scientific and Technological Cooperation (COMSTECH) Secretariat. Both the documents have been sent to ministries in OIC member countries with invitations to join the network. In addition, invitations have been sent to the Islamic Development Bank (IDB) and R&D organizations in OIC member countries.

Workshop on Whitefly-Transmitted Geminivirus of Cotton

A three-day workshop on “Genome Characterization of Whitefly-Transmitted Geminivirus of Cotton and Development of Virus-Resistant Plants Through Genetic Engineering and Conventional Breeding” was held at ICBA from September 28-30, 2003. The workshop was the final meeting of a project undertaken by the University of Arizona (USA), John Innes Centre (UK) and the National Institute of Biotechnology and Genetic Engineering (Pakistan). The five year project was sponsored by the International Cotton Advisory Committee and funded by the Common Fund for Commodities.

The main purpose of the workshop was to disseminate results of the project. Delegates from many countries including China, Egypt, India, Pakistan, Sudan, Syria, Turkey, UK, USA and Uzbekistan and Common Fund for Commodities and International Cotton Advisory Committee attended the workshop.

Cooperative Research

ICBA and INBA have begun collaborative research projects with Iran (National Salinity Research Center, Yazd) and Pakistan (Pakistan Agricultural Research Council) and will begin projects with Bangladesh and Jordan shortly.

In Iran, a collaborative project was initiated with the National Salinity Research Center at Yazd in January 2003. The project will evaluate the nutrient requirements of halophytic forages under irrigation with saline water and compare the effectiveness of different irrigation systems for the production of halophytic forages, and their effect on soil salinity.

In Pakistan, ICBA, and PARC will compare the performance of silvo-horticultural systems under various irrigation treatments to improve the productivity of salt-affected soils and evaluate water management strategies.

ICBA'S RESOURCE MOBILIZATION

Harnessing Salty Waters to Enhance Sustainable Livelihoods

A project proposal submitted by ICBA to the Comprehensive Assessment of Water Management of Agriculture has been selected as one of the eight projects to be funded under the Comprehensive Assessment Competitive Research Grant Scheme.

This US\$75,000 project will be funded by grants from the Government of Netherlands and Government of Switzerland awarded to the Comprehensive Assessment

of Water Management in Agriculture.

A detailed workplan is being developed and the project will be implemented beginning January, 2004.

The Comprehensive Assessment of Water Management in Agriculture is being coordinated by the International Water Management Institute (IWMI), Colombo, Sri Lanka.

The project will target four countries in West Asia and North Africa: Egypt, Tunisia, Jordan and Syria.

ICBA'S RESOURCE MOBILIZATION (CONTINUED)

Workshop to develop multi-country forage project



Senior scientists from Jordan, Palestine, Pakistan, Syria, Tunisia and Oman at the workshop at ICBA, 7-8 June

Recognizing the problems related to salinity in the West Asia and North Africa (WANA) region, ICBA is leading the development of a multi-country, multi-donor project proposal to grow forage with saline water on marginal land. ICBA believes that the involvement of countries in the region is essential to produce concrete results that farmers can use.

ICBA invited senior scientists from Jordan, Palestine, Pakistan, Syria, Tunisia and Oman to attend a two-day workshop at ICBA, 7-8 June 2003, to provide inputs and assist in developing the draft proposal.

ICBA's research shows that forages irrigated with saline water can play a crucial role in growing crops on marginal lands and rehabilitating rangeland ecosystems. Forage produced by irrigation with saline water could lead to sustainable agriculture on marginal land and rangelands and provide additional income to farmers.

Strengthening research in saline agriculture in UAE

ICBA has launched a new initiative to strengthen the collaboration between ICBA and the UAE Ministry of Agriculture on increasing the productivity of saline water in the United Arab Emirates, its host country.

Dr. Mehdi Altimimi, an expert on forage and grazing plants at the Ministry of Agriculture and Fisheries, is collaborating with scientists at ICBA in three areas of research.

The first area of research is to investigate the response of different biotypes of *Cenchrus ciliaris* to different levels of salinity in irrigation water. Similarly, the second area of research looks at the response of *Lasiurus scindicus* and African *Cenchrus ciliaris* to different levels of salinity. The third area is a project to collect salt-tolerant and halophyte species from the east coast of the United Arab Emirates.

Dr. Mehdi has a Ph.D. in forages and grazing plants from the University of Wales, UK. In addition to a distinguished university career at Salah Aldeen University and Baghdad University in Iraq, Sana'a University and Hodaidah University in Yemen, and Sabha University in Libya, Dr. Mehdi has published three books on forages and field crops and more than 40



Dr. Mehdi Altimimi

scientific papers in international and regional journals.

The close cooperation of Dr. Mehdi with ICBA provides a major impetus to the program of research on salt-tolerant forages.

FOCUS ON SALINITY

Salinity Problems Facing Pakistan

Dr. Zahoor Aslam

Coordinator Saline Agriculture Farmer Participatory Development Project
Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad, Pakistan

About six million hectares of land in Pakistan are affected by moderate to severe salinity problems of various kinds. Salinization of soils has occurred both naturally, and as a result of poor irrigation practices. The salinity/sodicity problems vary, depending on the soil parent material, land form, relief, climate and land use. The calcareous parent material of most soils, the physiographic and hydrological interactions occurring in a land form, and the micro-relief of a site, play substantial roles in soil salinization and sodication. Salinity in such soils is a product of natural soil forming processes



Field salinized due to faulty irrigation practices

operative since centuries hence, and is called primary or fossil salinity.

A considerable area of cultivated land in Pakistan, however, was undoubtedly also affected by salinity after the development of the canal irrigation system. This kind of salinity, identified as secondary salinity, is relatively temporary and can be easily eliminated by adopting appropriate rehabilitation measures. The important phenomena/activities, which have contributed to the development of secondary salinity are, lateral seepage



Transplanting Acacia ampliceps sapling in a saline field

from canals leading to waterlogging and subsequently salinity problems, and irrigation by poor quality tube-well water.

Overall, climate has been the chief determinant of the kind and extent of salinity in different parts of Pakistan. In general, salinity is least extensive in the northern, sub-humid parts, and most extensive in the southern, arid parts of the country. Salt composition, similarly, varies

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Cotton field on saline land in the Saline Agriculture Development Project in Pakistan

Salinity Problems facing Pakistan

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with climate, being dominated by carbonates in the sub-humid regions, by carbonates and sulphates in the semi-arid parts and by sulphates and chlorides in the arid areas. Sixty percent of salt-affected land in Pakistan also has sodicity problems (saline-sodic), having a pH value of more than 8.5, and sometimes around 10.

A wide range of management options is available for preventing or managing salinity problems in Pakistan. In general, technical, economic, social and political considerations are major influences on the implementation of management options.

Saline agriculture is perhaps the best option for economic utilization of salt-affected soils for the time being, because it is a low-input (cheap) technology, is easily understood and adapted by farmers, and involves no foreign material or technical input. This technology has been tested at the laboratory level, at out-field stations, and on the farms of some progressive farmers.

The major component of this technology is the development of agriculture systems using crops tolerant to salt and/or drought or water logging, such as grasses, shrubs and trees, for food, feed or fuel production. Saline aquaculture and livestock production is an integral part of this programme for maximizing the income from salt-affected soils.

At present the Pakistan Atomic Energy Commission is geared to share this technology with scientists and technicians of ten different countries through an International Atomic Energy Agency (IAEA) Inter-Regional Model Project. This project will disseminate this technology to farmers and educate them on implementation of the technology on 25,000 acres of salt-affected land in all four provinces of Pakistan through the 'Saline Agriculture Farmer Participatory Development Project in Pakistan'. The photographs illustrate the implementation of this technology in the project.

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Acacia ampliceps plantation



Laeptochloa fusca growing in a saline field. This grass provides forage for domestic animals.

NEW BOOK

The second edition of *Saltland Pastures in Australia - A Practical Guide* is now available. Written by Australia's foremost authority on saltland pastures, Dr. Ed Barrett-Lennard, the book aims to make saltland pastures accessible to the widest possible audience.

The book is available for A\$25 plus postage and handling from CanPrint.

Email: lwa@canprint.com.au

TRAINING

Course on in-situ germplasm conservation at ICBA

In collaboration with the OPEC Fund for Economic Development, and the Islamic Development Bank (IDB), ICBA held a 5-day specialized training course on "In-situ germplasm conservation" at its headquarters at Al Ruwwayah, Dubai.

Participants from Afghanistan, Egypt, Jordan, Pakistan, Syria, Sudan, and the United Arab Emirates attended the course.

The aim of the course was to familiarize participants with the concepts underlying in-situ germplasm conservation.

Among the topics covered in the course were collection and restoration of mountain germplasm in the UAE, the role of biodiversity in sustaining arid land ecosys-

tems, on-farm conservation of crop biodiversity, and in-situ conservation of non-crop species.

At the end of the course, all participants received full course documentation on CD-ROM. The course included presentations, videos, discussions, and a field trip to Dibbah Agricultural Research Station, the mountains of the Eastern region, and the Fujairah coast.

The leader of the course was Dr. John Stenhouse, Plant Genetic Resources Scientist, ICBA. Course presentations were also given by Dr. Abdullah Dakheel, Field and Forage Crops Scientist, ICBA, and Dr. Al-Tamimi, Forage Crop Specialist, UAE Ministry of Agriculture and Fisheries.



Participants of the course on in-situ germplasm conservation (left). Participants in the shadehouse with Dr. John Stenhouse and Dr. Mehdi Altimimi (right)



Training course on biosaline agriculture to be held in Kazakhstan, May 2004

ICBA, in collaboration with the Kazakhstan Academy of Sciences, ICARDA, and other partners in Central Asia and elsewhere, is planning to convene a seminar and training course on the Aral Sea and Biosaline Agriculture in Almaty in May 2004.

Dr. Al Attar, Chairman of the ICBA Board of Directors and Director General, made the announcement at the seminar on 'Prospects of Biosaline Agriculture Globally and in Kazakhstan', held prior to the IDB Annual Governors' meeting in Almaty, Kazakhstan, 30 August-3 September.