



Soil Science News

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EDITORIAL

Good Soil Health: The Foundation for Sustainable Agriculture

How do you know if your soil is healthy? What are the characteristics and functions of healthy agricultural soils? These are broad questions that challenge soil scientists, environmentalists, agronomists, and engineers involved in the business of Soil Science. For answering the questions, we require a better understanding of the complex soil ecosystem, i.e., interactions between soil fauna, microorganisms and soil chemical and physical attributes. Soil health can be defined as 'the capacity of a soil to function as a vital living system, within an ecosystem and land use boundaries, to sustain plant and animal production, maintain or enhance water and air quality, and promote plant and animal health'. Thus, healthy agricultural soils would be those used within their capability to enhance production without being degraded or degrading their environment.

Healthy agricultural soils would be able to balance a range of functions to meet needs of both farmers and the community. Healthy soils' function is to sustain soil biota and plant life, store and cycle water and nutrients, decompose organic matter, inactivate toxic compounds, and protect water quality. It implies that the interactions among the soil's internal components will be optimal and that the interactions of the soil with its external environment and the production system will be sustainable. Soil degradation and poor water quality are symptoms of poor soil health. Soil biological activity, surface cover, organic matter content, pH and water availability are highly interactive and, hence, are important soil health properties.

Because, many agricultural practices increase the soil's vulnerability to degradation processes such as erosion, salinisation, nutrient mining, soil structure deterioration and contamination. These degradation processes reduce the functional capacity of soils.

Hence soil and water quality degradation can be thought of as symptoms of poor soil health. The challenge for management of agricultural soils is to develop production systems strategies that not only prevent soil degradation but also improve soil health.

The biological, chemical and physical properties of healthy soils enable them to function with resilience to disturbances from agricultural practices. Therefore, for maintaining and improving soil health, there is a need for measurable indicators to evaluate the sustainability of management

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NEWS AND VIEWS

Boron and Molybdenum Transport in Moss

Dr. Naimatullah Bughio, Land Resources Research Program, NARC, Islamabad has studied essentiality of boron (B) and molybdenum (Mo) in moss and has isolated associated genes for their transfer into higher plants at Laboratory of Plant Functional Biotechnology, Biotechnology Research Center, The University of Tokyo, Japan.

Moss (*Physcomitrella patens*) is a bryophyte and despite its different anatomy, shares 60 % genome with higher plants. Light harvesting and signaling systems have been discovered in this plant. Therefore, this tiny plant has been declared a new model plant.

Moss protonema were grown up to 60 days on BCDAT and BCDATG agar medium containing varying levels of B and Mo. Boron and Mo deficiency retarded the growth of moss. In the absence B there were few gametophores and lesser branching. Similarly, Mo deficiency affected the gametophore number and protonemal morphology. Few gametophores and constricted protonema were observed under Mo deficient conditions. Boron, sulphate and Mo transporter gene homolog sequences of *Arabidopsis thaliana* were obtained by searching moss EST data base. *Sult;5.2* is a sulphate transporter with Mo transport activity and *NIP; 5.1* and *BOR1* are responsible for B transport in *Arabidopsis*. About 700 bp 5' and 3' sequences of several sulphate and B transporter clones were identified and completely sequenced. Three of them were selected for further studies. *Sult;5.2* had an ORF of 1476bp; *NIP;5.1* 870bp and *BOR1* 1875bp. The cDNA for *Sult;5.2* was PCR-amplified with primers containing *SacI* and *XhoI* sites. *NIP5.1* and *BOR1* were amplified with primers

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Immobilization of Heavy Metals in Copper Mines Tailing Soils

Dr. Muhammad Khan Khattak, Department of Soil & Environmental Sciences, NWFP Agricultural University, Peshawar has conducted his Post Doc research on "Immobilization of Heavy Metals in Copper Mines Tailing Soils" using chemical and biosolid compost as amendments at the University of Wales, Bangor (UK) from November 2005 to September 2006.

Organic and inorganic amendments proved better for reducing heavy metals phyto-availability in the acidic copper mine soils. He also worked on the effect of salinity on C and N cycling and found that the soil respiration and nitrification processes were significantly reduced by salinity but the ammonification process was enhanced.

PROMOTIONS, APPOINTMENTS, AND POSTINGS

Dr. Nisar Ahmad, Chief/Project Director, National Fertilizer Development Centre (NFDC), Islamabad has retired and re-appointed as Project Director, Pakistan Planning & Management Institute, Islamabad.

Dr. Amanullah Bhatti, Professor (Rtd), Department of Soil and Environmental Sciences, NWFP Agricultural University, Peshawar has been appointed as "Eminent HEC Scientist" and posted at the Department of Soil and Environmental Sciences, NWFP Agricultural University, Peshawar.

Dr. A. Rashid, Chief Scientific Officer/DDG (INRES), NARC, Islamabad has been promoted as Chief Scientist-II (PBS-21).

Mr. Hadayatullah Chhajro, Director (Agri. Ext.), Upper Sindh has been promoted as Director General (Agri. Research), Sindh.

Dr. Shahid Mahmood, AC, Soil and Water Testing Laboratory, Thoker Niaz Baig, Lahore has been appointed Director, Rapid Soil Fertility Survey and Soil Testing Institute, Lahore on current charge basis.

Mr. Nisar Mehmood-ul-Hussain, Deputy Director, Adaptive Research Station, Vehari has assumed the charge of Director, Soil Salinity Research Institute, Pindi Bhattian on current charge basis.

Dr. Rehmatullah, Associate Professor, has been promoted as Professor, **Dr. Zahir A. Zahir**, Assistant Professor as Associate Professor, and **Dr. Azeem Khalid**, **Dr. Muhammad Saqib**, **Dr. Hafiz Naeem Asghar**, and **Dr. M. Javed Akhter**, Lecturers as Assistant Professors, at Institute of Soil & Environmental Sciences, University of Agriculture, Faisalabad.

Prof. Dr. Safdar Ali, Department of Soil Science, University of Arid Agriculture, Rawalpindi has assumed the charge of Chairman after the retirement of Prof. Dr. Muhammad Yousaf.

Dr. Sabir Hussain Shah, Acting Director, Soil & Plant Nutrition Directorate, ARI, Tarnab, Peshawar has been promoted as Director. Initially, he was posted at Soil and Plant Nutrition Directorate, ARI, Tarnab, Peshawar and later on posted as Director, Sugarcane Research Institute, Mardan.

Mr. Zamir Hussain, Asstt. Agri. Chemist (Soils) has been promoted as Agricultural Chemist (Soils) and posted at ARI, Tarnab, Peshawar.

Mr. Rashid Ahmad, Asstt. Agronomist, ARS, Kohat has been promoted as Agronomist. Initially he was posted at ARS, Kohat and later on transferred to ARI, Tarnab, Peshawar.

Mr. Ruhullah, Assistant Soil Fertility Officer, ARI, Tarnab, Peshawar has been promoted as Soil Fertility Officer.

Mr. Abbas has been promoted as Soil Physicist and posted at ARS, Mingora, Swat.

Dr. Muhammad Younus Nadeem, Associate Agricultural Chemist (Soils) has assumed the charge of Agricultural Chemist (Soils), Ayub Agricultural Research Institute, Faisalabad.

Dr. Riaz Ahmad Sial, AC, Residual Pesticide Laboratory, Kala Shah Kaku has assumed the charge of Agricultural

Chemist (Pesticide), Plant Protection Institute, Faisalabad

Dr. Ihsanul Haq Mehmood, AAC, Soil Fertility Laboratory, Pakpattan has assumed the charge of AAC, Pesticides Quality Control Laboratory, Multan

Mr. Ashfaq Ahmad Rahi, of AAC, Pesticides Quality Control Laboratory, Multan has assumed the charge of AAC, Soil and Water Testing Laboratory, Sahiwal.

Mr. Ghulam Abbas Mand, Pesticides Quality Control Laboratory, Kala Shah Kaku has assumed the charge of AC, Pesticide Residue Research Laboratory Kala Shsh Kaku on contract basis.

Sh. Muhammad Akram, AC, Soil and Water Conservation Research Institute, Chakwal has assumed the charge of AC (SF), Soil and Water Testing Laboratory, Thoker Niaz Baig, Lahore.

Dr. M. Ibrahim, Director (Rtd.), Salinity Research Institute, Pindi Bhattian has joined the National Sugar Mill, Sargodha as a Deputy General Manager/ Advisor.

Dr. Javed Akhtar Memon, AAC, Rohri has been promoted as AC (SF), ARI, Tandojam.

Mr. Muhammad Hussain Khushik, AC (SF), ARI, Tandojam has assumed the charge of Soil Fertility Officer, ARI, Tandijam.

Mr. Mukhtar Ahmad Channa, AAC, Thatta, has been promoted as AC (Soils), ARI, Tandojam.

Mr.Shaheed, AAC (Soils), ARI, Tandojam has been promoted as Agricultural Chemist.

Dr. M. Roshan Wagan, Professor, Department of Soil Science, SAU Tandojam has assumed the charge of Principal, Z. A. Bhatto Agriculture College, Dokari.

Mr. Skandar Ali Bughio, AAC, Rice Research Institute (RRI), Dokari has been promoted as AC (Soils), RRI, Dokari.

Mr. Altaf Channd, AAC, Wheat Research Institute (WRI), Sakrand has been promoted as AC, WRI, Sakrand.

Congratulations to all from Soil Science News!

Soil & Environment: Call for Papers

Soil Science Society of Pakistan has been publishing "Pakistan Journal of Soil Science" since 1980s. Recently, the Journal has been renamed as "Soil & Environment". Research/Review articles regarding different aspects of soil, environment and allied disciplines are invited for publication in the coming issue of the Journal. The scientists/researchers are requested to participate in this professional activity for sharing of their scientific achievements. Instructions for authors can be downloaded from www.sss-pakistan.org. Manuscripts may be submitted to Professor Dr. Muhammad Arshad (T.I.), Editor-in-Chief, Soil & Environment, Institute of Soil & Environmental Sciences, University of Agriculture, Faisalabad-38040, Pakistan

E-mail: bio@fsd.paknet.com.pk

FOREIGN VISITS AND FELLOWSHIP

Dr. Naimatullah Bughio, Land Resources Research Program, NARC, Islamabad has resumed his duties after completing a two-year Postdoctoral Fellowship of Japanese Society for Promotion of Science. He worked on sulphur, boron and molybdenum transport in moss (*Physcomitrella patens*) in the Laboratory of Plant Functional Biotechnology, Biotechnology Research Centre, the University of Tokyo

under the supervision of Dr. Toru Fujiwara.

Prof. Dr. Jamal Khan Khattak, Department of Soil & Environmental Sciences, and **Prof. M. Tariq Jan**, Department of Agronomy, NWFP Agricultural University, Peshawar, and Life Members of SSSP, have resumed their duties after completing their Postdoctoral Fellowships at the University of Wales, Bangor, UK.

Dr. Inayatullah Rajper, Associate Professor, Department of Soil Science, Sindh Agriculture University Tandojam has resumed charge after completing six-month Islamic Development Bank Post-Doctoral Research Fellowship at Putra University, Malaysia.

RESEARCH GRANTS

Dr. A. Rashid, Chief Scientist-II/DDG (INRES), NARC, Islamabad has been awarded a 5-year PSDP Nationally Coordinated Research Project (Rs. 36.500 million) entitled “*Management of Micronutrients for Sustaining Major Cropping Systems and Fruit Orchards*”. The project comprises of the following components:

Project Director/Coordinator:

Dr. A. Rashid, CS-II/DDG (INRES), NARC, Islamabad

| Cropping System/ Fruits | Project Incharge |
|--------------------------------------|---|
| Sugar Crops-based Systems | Mr. M. Younis Arain , SSO, Sugar Crops Research Institute, Thatta |
| Maize-based and Cotton-Wheat Systems | Mr. Ejaz Rafique , SSO, Land Resources Research Program, NARC, Islamabad. Dr. Fayyaz Hussain , SSO, Land Resources Research Program, NARC, Islamabad |
| Rice-Wheat System | Dr. Jawed Akhtar Memon Agri. Chemist (Soil Fertility), ARI, Tandojam |
| Banana (Sindh) | Mr. Hafeeullah Khan , Director (Soils), ARI, Sariab, Quetta |
| Deciduous Fruits (Baluchistan) | Mr. Mir Abbas Khattak Agri. Chemist (Soils), ARI, Mingora, Swat |
| Deciduous Fruits (NWFP) | Dr. Shahid Mahmood , Director, Rapid Soil Fertility Survey and Soil Testing Institute, Lahore |
| Citrus & Mango (Punjab) | |

RECENTLY COMPLETED PhD

Mr. Munir Hussain Zia, Technical Services Officer, Fauji Fertilizer Company has been awarded PhD degree by University of Agriculture, Faisalabad (UAF). The title of his thesis was “*Use of brackish water for sustainable crop production and reclamation of saline-sodic soils*”. The studies were supervised by Prof. Dr. Abdul Ghafoor, Director

Research, UAF, Dr. Ghulam Murtaza, Institute of Soil & Environmental Sciences and Prof. Dr. Bashir Ahmad, Vice Chancellor, UAF.

TRAINING

Mr. Nabi Bux Jamro, AAC, Khairpur, **Mr. Muhammad Aslam Rajput**, AAC, Karachi, **Mr. Amjad Hussain Sujrah**, AAC, Shahkarpur, and **Mr. Sajidullah Vistro**, AAC, Sakrand have been selected by Sindh Agriculture (Research) Department under “Capacity Building of Sindh Agricultural Research Scientists” project for six months in-service training and placed in Land Resources Research Program, NARC, Islamabad.

RETIREMENT

Prof. Dr. Amanullah Bhatti, Department of Soil & Environmental Sciences, NWFP Agricultural University, Peshawar got retired on 1.6.2006. Dr. Bhatti did M.Sc in 1975 from University of Beirut, Lebanon and PhD in Soil Physics in 1990 from Washington State University, Pullman, USA. He began his professional career as Research Assistant in 1968, and later was promoted as Assistant Agricultural Chemist. In June 1982, Dr. Bhatti was appointed as Assistant Professor at NWFP Agricultural University, Peshawar and promoted as Associate Professor in 1993 and as Professor in 1998.



Dr. Bhatti has a long research experience in soil fertility, soil physics, spatial variability and in geostatistics. He has authored five books, two book chapters and more than 100 research papers in journals of international repute. He has successfully completed 15 national/international research projects. Based on his excellent performance and on recognition of his services in the field of education and research, the

Government of Pakistan bestowed upon him various national awards including Best University Teacher Award, Research Productivity Allowance and President of Pakistan's “Izaz-e-Faeelat” Award. He has supervised 63 M.Sc and 3 Ph.D students during his career. Dr. Bhatti is an Honorary Member of Soil Science Society of Pakistan.

Professor Dr. Muhammad Yousaf, Chairman, Department of Soil Science, University of Arid Agriculture, Rawalpindi has retired from his professional service. Dr. Yousaf possesses a distinguished academic career as he was scholarship holder throughout his academic career, earned Gold Medal in MSc. (Hons) at University of Agriculture Faisalabad in 1976, and was awarded Quaid-e-Azam Scholarship for higher studies. Dr. Yousaf completed Ph.D. in 1983 from University of California, Riverside, USA.

Dr. Yousaf started his professional career as Agricultural Officer and served Punjab agricultural Department as EADA and Deputy Director, after which he joined the University of Arid Agriculture. He has published a large number of research articles in journal of international repute and has supervised 16

M Sc and 6 PhD students.

Dr. Muhammad Ibrahim, Director, Soil Salinity Research Institute, Pindi Bhattian has retired on 9-6-2006 after 35 year of devoted professional career. He earned BSc and MSc degrees from University of Agriculture, Faisalabad and M. and PhD degrees from University of Hawaii, USA.



Dr. Ibrahim started his professional career in 1971 as Assistant Research Officer, Chemistry Section, Ayub Agricultural Research Institute, Faisalabad. He was promoted as Assistant Agri. Chemist in 1976, Agri. Chemist in 1985 and Director, Soil Salinity Research Institute, Pindi Bhattian in May 2006. He has published more than 75 research

papers of which 15 are in foreign journals. Government of Pakistan recognized his work by awarding him with Rs. 2 lacs chase prize as productivity allowance. He has served Soil Science Society of Pakistan for 20 years, including 4 terms as Treasurer, 2 terms as Secretary and one term as Vice President. Dr. Ibrahim is a Fellow, Soil Science Society of Pakistan.

Mr. Abdul Ghani, Soil Fertility Officer, Agricultural Research Station, Mingora, Swat has retired after completion of his service. He is an excellent soil scientist and a great researcher. He has long practical experience in the field of soil fertility and plant nutrition and has published most of his research findings in journals of international repute and as extension packages.

We pray for good health and prosperous retired lives of our respected colleagues.

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practices, i.e. soil organic matter management, water and nutrient management, erosion control and pest and disease management. Let us remember that only a sustainable and environmentally safe production system can build and maintain a healthy soil resource base.

Boron and Molybdenum Transport in Moss

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Containing *BamHI* and *XbaI* sites. These fragments were

cloned into pYES2 and subsequently transferred into yeast 1169 and 4741 strains. The spotting test was performed for B resistance and Mo content was determined by ICP-MS. The functional analysis revealed that *Sult;5.2* possesses Mo transport activity and *NIP;5.1* and *BORI* have B transport activity. The clones are being further analysed for their involvement in influx and efflux of B and Mo transport across the membrane. The DNA analysis suggested that these are membrane proteins and have several trans-membrane domains. Genomic DNA analysis revealed two introns for *Sult;5.2* four for *NIP;5.1* and 15 for *BORI*. These experiments suggested that B and Mo are essential nutrients for moss and this plant is a rich source of plant genes; hence an excellent model for plant biologists. For further details one may visit *PhycoBase* maintained by National Institute of Basic Biology, Okazaki, Japan.

NEW BOOKS

Principles of Soil and Plant Relations by M.B. Kirkham. Elsevier, Amsterdam, Boston, 2005, xvii, 500 pp. This textbook is developed from lectures for a graduate class in Soil-Plant-Water Relations. The book follows water as it moves through the soil-plant-atmosphere continuum, focusing on water in the soil and whole plant, combining soil physics, plant physiology, and microclimatology. Price: GBP 44.99.

Orders to: in Europe, Middle East and Africa: Elsevier Customer Service Department, Linacre House, Jordan Hill, Oxford OX2 8DP, UK. Email: eurobkinfo@elsevier.com.




Crops and Environmental Change by S.G. Pritchard and J.S. Amthor. 2005, xii, 421 pp.

The subtitle of this book is: An introduction to effects of global warming, increasing atmospheric CO₂ and O₃ concentrations, and soil salinization on crop physiology and yield. This book is about the effects of environmental changes on the physiology, growth, and yield of major field crops. The goal is to provide an introduction to the ramifications, both positive and negative, on these ongoing environmental changes for present and future crop production and food supply.

Price: US\$ 49.95 (softcover), US\$ 69.95 (hardcover).

Orders to: The Haworth Press, 10 Alice Street, Binghamton, NY 13904-1580, USA. Email: orders@haworthpress.com

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