



# Biosalinity News

Newsletter of the International Center for Biosaline Agriculture

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## FROM THE EDITOR

The news in this first issue of 2006 is good. Our principal benefactor, the Islamic Development Bank (IDB), has significantly increased its contribution in support of our research agenda - a clear signal of the Bank's continuing interest in our work.

Important information about the status of ICBA's large multilateral Forage Project is also reviewed in this issue. The project, now a year old, is progressing well. After an intensive 2-day meeting of the Technical Committee to map out the strategy for the coming year, the Steering Committee convened to discuss and approve the new roadmap.

We are very pleased to feature an interview with Dr Louise Fresco, Assistant Director-General of FAO, who explains the role of the new department she heads, as well as its relevance to ICBA and biosaline agriculture.

Also in this issue, Drs Karl Biel and Nicholas Jensen contribute a short article concerning their proposal of a revolutionary new concept for halophytes they call photohalosynthesis.

As always, we remind readers that short articles or letters are welcome.

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## FAO and biosaline research

**Dr Louise O Fresco, Assistant Director-General of FAO's Agriculture, Biosecurity, Nutrition and Consumer Protection Department, visited ICBA in early February to find out about our activities in biosaline agricultural research and to explore possible avenues of cooperation. The following is an interview with Dr Fresco conducted by your editor.**

*First of all, can you tell us about the new focus of your department?*

The Agriculture, Biosecurity, Nutrition and Consumer Protection Department of FAO has been extended to encompass the entire food chain. We like to call it *from farm to plate*. This covers everything from pre-production practices to the distribution of products to consumers. In other words, in addition to carrying out FAO's major programs on agricultural production and support systems, we are also responsible for working on food quality and consumer protection. This new thrust is quite innovative, because the integration of agriculture and food quality does not exist in most government institutions in FAO member countries. We may well lead the way.



*Dr Fresco on a field visit at the ICBA campus.*

*Continued on page 2*

## Mexico 2006 - 4th World Water Forum



The World Water Forum, which took place 16-22 March in Mexico City, was the fourth in this series of high-level meetings. Like the previous three meetings in Morocco, the Netherlands and Japan, the Mexico Forum attracted wide participation from ministers of water and environment from all over the world, along with scientists, environmentalists, and private sector representatives. The estimated 15,000 participants were offered a dazzling array of lectures, exhibits and presentations.

ICBA was represented at the Forum by Board Chair Mr Fawzi AlSultan, Director General Dr Mohammad Al-Attar and Director Technical Programs Professor Dr Faisal Taha. Along with three partner organizations - the Islamic Development Bank (IDB), the Arab Water Council and the Seawater Foundation - ICBA hosted a session entitled *Innovations in Biosaline Agriculture*.

This topic, one of 150 selected from over 550 nominations, attracted over 150 participants. The standing-room-only session was chaired by IDB Vice President Operations Dr Amadou Boubacar Cisse, who also gave the opening address. After introductory remarks by Mr AlSultan, four cases of local action were presented, including one by Prof Taha. The presentations were followed by a panel discussion, and concluding remarks were given by Dr Al-Attar.

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*FAO ...Continued from page 1*

*What prompted the changes?*

They are part of a reform process aimed at ensuring that FAO is relevant and effective in a changing global environment. It is also a response to the Millennium Development Goals. We observe three notable trends today. First, global figures indicate that population growth is slowing down more dramatically than had been anticipated – people in developing countries are having fewer children and having them later. Second, the rate of economic development is increasing faster than expected, and demand for agricultural products is booming. With economic growth, we see rapidly changing food preferences and increasingly demanding standards of food quality. The third trend is the impact of agriculture on the environment, and of economic growth in general on our natural resources. Taken together, these trends indicate that we need to review our way of looking at the world.

*What place does biosaline agriculture have in FAO's new focus?*

Our role is to assist countries in making important choices about the future of their agriculture and food sectors. ICBA's research, like ours, is important in helping countries to make responsible decisions concerning the long-term impact of agriculture on both people and the environment.

Salinity, the specific focus of ICBA, has an enormous impact on agriculture in many countries. FAO looks at salinity the way it looks at other constraints to farming. There are two approaches to confronting any agricultural constraint. One is the curative approach, the other is the preventative one. Take the example of salinization brought about through the deployment of poor irrigation techniques. In the curative approach, you wait for a problem to occur, identify its cause, then deal with it. In the preventative approach, you endeavor to avoid the problem entirely. By convincing policymakers of the likely outcome of a poor irrigation scheme, for example, it is possible to prevent the problem from occurring in the first place. Moreover, dealing with salinity always needs to be part of a wider approach to agricultural productivity.

*What, in your view, are some of the key decisions ICBA needs to consider?*

ICBA is extraordinarily well placed to influence policy on agricultural research wherever salt-affected water and soil are found. I know that traditionally you have

focused on arid and semi-arid environments, but you now need to ask yourselves if it is time to expand your research to embrace other saline environments that exist in such places as the semi-humid tropics.

Although the word 'international' appears in your name, your research has so far been limited mainly to the Central/West Asia and North Africa (CWANA) region. I know there is substantial interest in biosaline agriculture in Latin America. You could consider looking at the possibility of forging new partnerships in that region. The upcoming World Water Forum in Mexico, where ICBA will be the focus of one of the sessions, is a perfect venue to pursue this avenue.

Another topic I would like to see ICBA address concerns plant protection. No center has a better knowledge base than ICBA on the mechanisms involved in salt tolerance. If these mechanisms can be extended to tolerance of pests and diseases, the ramifications would be of enormous impact.

Also, I am very interested in your research thrust on ecological engineering. Saline effluent water produced by industries has long been thought of as waste. Finding ways to use this effluent to grow crops, especially vegetables, is of major importance. Horticulture and aquaculture are the two growth industries in agriculture, and ICBA is in a key position to provide relevant research for both.

*What do you recommend concerning the issue of intellectual property rights?*

As I'm sure you're aware, IPR is a major concern at FAO. Every scientific research organization needs to formulate and articulate a clear policy on IP. Once you have it, you will gain credibility amongst your peers. Under the International Treaty for Plant Genetic Resources, FAO is assisting member countries to standardize plant material transfer agreements. I would encourage ICBA, in consultation with the CGIAR, to start developing its IPR policy.

*What are the key issues for the future of agriculture in the developing world?*

As time goes on, agriculture in the strict sense will employ an ever smaller percentage of the world's population. So one might say that its 'constituency' is shrinking. But every human being is a consumer of food, so the constituency of the Agriculture, Biosecurity, Nutrition and Consumer Protection Department of FAO and ICBA is actually every person on this planet.

**You need to ask yourselves if it is time to expand your research to embrace other saline environments such as the humid tropics.**

### IDB approves increased budget for ICBA



In a press release dated 6 March, the Board of Executive Directors of the Islamic Development Bank announced its latest allocation of USD 361 million. Included in this amount was a dramatic increase for ICBA. His Excellency Dr Ahmed Mohammed Ali, President of

IDB, said 'The approvals included new development projects...and USD 2.6 million Additional Grant to support the Budget of the International Center for Biosaline Agriculture.'

The Additional Grant boosts the Bank's total ICBA budget to USD 4.6 million for 2006, a spectacular jump of nearly 130% from the 2005 allocation. This dramatic show of support for ICBA's research agenda is a clear indication of the Bank's long-term commitment to improving the livelihoods of the peoples of the Islamic world through ICBA.

### New Minister visits ICBA

Dr Mohammad Saeed Al-Kendi, the UAE's new Minister of Environment and Water, paid a courtesy call on ICBA on 11 March. Expressing his solidarity with ICBA, Minister Al-Kendi said, 'Together, we will accomplish much because ICBA's goals and our goals are the same.'



*The Minister (center) touring the campus.*

### IDB official right at home at ICBA



His Excellency Mr Mudhaffar Al-Haj, Vice President of the Islamic Development Bank, visited ICBA on 7 February. Mr Al-Haj, a UAE national, apologized for not having visited the center earlier. Addressing the staff at an impromptu meeting, he said, 'I

would like you to know although the original agreement between the IDB and ICBA was for only ten years, we want it to continue.' Mr Al-Haj also mentioned that soon the Dubai branch will host three IDB-supported entities – ICBA is one, and the two new ones will deal with financial and legal issues.

### Staff changes

#### New staff

**Dr Nurul A Akhand** joined ICBA in February as Irrigation Management Scientist. Dr Akhand, a Canadian, holds a PhD from the University of Arizona. He has a strong professional background in research planning and management of irrigation and drainage systems and water quality.



**Dr Kristina Toderich** was appointed Plant Scientist at the ICBA-ADB project in Tashkent, Uzbekistan, on 10 March. Prior to this position, she was Head of the Department of Desert Ecology and Water Resources Research, Uzbekistan Academy of Science. Dr Toderich, who is fluent in six languages, is the first full-time ICBA staff member to work outside of the UAE.

**Dr Mahmoud Ali Abdelfattah**, a Soil Scientist with Environment Agency-Abu Dhabi (EAD), has been seconded to ICBA to help implement the Soil Survey Project for Abu Dhabi. Dr Abdelfattah, an Egyptian, is an expert in GIS and remote sensing.



**Irene Galang** (left) joined the ICBA team as General Accountant in December 2005. Miss Galang, a Filipina, previously worked with the Petroleum Authority of Thailand. **Abdul Qader Abdul Rahman**



(right), an Iraqi, joined as Agricultural Research Station Technician in March.

#### Departures



**Sami Barakeh** (left), Financial Supervisor, departed in December 2005 to join a private firm in Abu Dhabi. **Wameedh Monther Yousif** (right),



ICBA's Farm Technician, left the Center in February to take up a new job in Dubai. **Ghazi Abu Rumman** (left), Agricultural Engineer, left ICBA in February to pursue graduate studies in Australia. We wish the departees, all of whom joined ICBA in 2001, all success in their future endeavors.

## CONFERENCES AND WORKSHOPS

### Forging ahead with forage

ICBA's largest ever project also has its largest ever title: *Saving Freshwater Resources with Salt-tolerant Forage Production in Marginal Areas of the West Asia and North Africa (WANA) Region – an Opportunity to Raise the Income of the Rural Poor*. At ICBA we refer to it simply as the Forage Mega Project.

Properly referred to as a multi-country, multi-million-dollar activity, it involves the national systems of seven countries (Jordan, Oman, Pakistan, Palestine, Syria, Tunisia and the UAE) and is supported by three donors (the International Fund for Agricultural Research, the Arab Fund for Economic and Social Development and the OPEC Fund) to the tune of about USD 4 million.

The project is now a year old, and the major players convened at ICBA headquarters to take stock of the progress made thus far. The Technical Committee, chaired by Prof Faisal Taha, Director Technical Programs, met the last two days of February to discuss the status of the project and to thrash out the details of future activities. Achievements were reviewed and a work plan and budget for 2006 were agreed upon. On the evening of the second day, the Technical committee members met individually with their bosses in the Steering Committee to debrief them



*The Steering Committee (above) and Technical Committee (below) in the field.*

on the proceedings of the two-day meeting. Finally, the Steering Committee convened on 1 March to review the Technical Committee's suggestions and to approve the new work plan and budget. Much of the discussion focused on training – what sort of courses were needed, where they should be held and who should attend them. Dr Abdullah Dakheel, technical coordinator for the project, noting that certain countries have comparative advantage in certain areas, suggested that expert consultations could fill gaps, and that if the experts were drawn from the participating countries, this would provide opportunities for the countries themselves to take the lead.

Once the Work Plan and Budget for 2006 were approved, and the ICBA/country agreements signed, the matter of the next meeting was discussed. Director General

Al-Attar pointed out that since the meeting would take place halfway through the project, it would be of special importance. Dr Abdel Nabi Farclous, Director General of Jordan's National Center for Agricultural Research and Technology Transfer, offered to host the meeting at Amman, suggesting that this venue would facilitate visits to both Syrian and Palestinian field sites, as well as to those in Jordan.

### ICBA takes center stage in Kuwait

Director General Al-Attar led an ICBA delegation to the 7th Gulf Water Conference, a primary function of the Water Science and Technology Association. The conference, which took place in Kuwait 19-23 November, also featured papers by two ICBA scientists: Dr Bassam Hasbini, former Irrigation Management Scientist, and Dr Shabbir Shahid, Salinity Management Scientist. Both papers were published in the Conference Proceedings. One happy result of the conference was Dr Al-Attar's success in convincing the Kuwait Oil Company to follow the ICBA approach of using reed beds to treat oil process water and using it for irrigation.

### WETEX 2006



*ICBA made its presence felt at the annual Water and Environment Technology (WETEX) exhibition at the Dubai World Trade Center, 13-15 March.*

## INTER-ISLAMIC NETWORK ON BIOSALINE AGRICULTURE (INBA)

### COMSTECH meets in Islamabad

The 12th General Meeting of COMSTECH was held in Islamabad, Pakistan, 21-24 February. COMSTECH, an abbreviation for the Standing Committee on Scientific and Technological Co-operation, is a high-profile arm of the Organization of the Islamic Conference (OIC). The meeting attracted 230 Ministers and delegates from 37 countries and various international organizations. INBA was represented by its President, Dr Mohammad Al-Attar, and Dr Shoaib Ismail, INBA Coordinator.

The inaugural session was chaired by Mr Shaukat Aziz, Prime Minister of Pakistan and Co-Chairman of COMSTECH, who stressed the need for closer cooperation within the OIC member countries on science and technology. Also addressing the session were Their Excellencies Dr Ahmed Mohammad Ali, President, Islamic Development Bank, and Prof Dr Ekmeleddin Ihsanoglu, Secretary General, OIC.



*INBA President (and ICBA DG) Dr Mohammad Al-Attar on the dais with the Regional Director, Islamic Educational Scientific and Cultural Organization (ISESCO), Tehran.*

Commenting on Dr Al-Attar's report on INBA activities, COMSTECH Coordinator General Professor Atta-ur-Rahman emphasized the need for host countries to provide regular financial support to strengthen INBA and other inter-Islamic networks.

## MEETINGS AND COURSES

### Soil Survey Workshop

In collaboration with Environment Agency Abu Dhabi (EAD), ICBA organized and hosted a training workshop called Soil Survey Concepts and Framework as a capacity building exercise for UAE nationals. The participants tackled such topics as satellite imagery, GIS, database management, Real Time Salinity Logging System, soil survey procedures and interpretation of survey results. They also received hands-on experience on soil profile description and classification. The training, which took place 11-15 February, was a partnership milestone with UAE nationals.



### Upcoming meetings

*4th World Water Forum.* Mexico City. Co-conveners: World Water Council and CONAGUA. 16-22 Mar 2006. [www.worldwaterforum4.org.mx/home/home.asp](http://www.worldwaterforum4.org.mx/home/home.asp)

*International Workshop on Crop and Forage Production Using Saline Water in Dry Areas.* Birjand, Iran. Co-conveners: University of Birjand, Centre for Science and Technology of the Non-Aligned and Other Developing Countries. 7-10 May 2006. [cfps@birjand.ac.ir](mailto:cfps@birjand.ac.ir) or [www.namstct.org/anniranw.htm](http://www.namstct.org/anniranw.htm).

*International Training of Trainers on Wetland Management,* a course focusing on the facilitation of multi-stakeholder processes and curriculum development. Wageningen, The

Netherlands. 8-26 May 2006. [www.iac.wur.nl/iac/courses/applform\\_88\\_05\\_2006.cfm](http://www.iac.wur.nl/iac/courses/applform_88_05_2006.cfm).

*Global Conference on Renewable Energy Approaches for Desert Regions.* Amman, Jordan. Convener: His Majesty the King of Jordan, Abdulla II. 18-22 Sep 2006. [www.ju.edu.jo/conferences/gcreader/index.htm](http://www.ju.edu.jo/conferences/gcreader/index.htm).

*International Conference on Biosaline Agriculture and High Salinity Tolerance.* Convener: Ministry of Scientific Research, Technology and Competency Development of Tunisia. Hotel Melia El Mouradi, Gammarth, Tunisia. 3-8 Nov 2006. [www.ecopark.rnrt.tn/icba\\_hst06](http://www.ecopark.rnrt.tn/icba_hst06) and [icba\\_hst06@yahoo.com](mailto:icba_hst06@yahoo.com).

## FOCUS ON SALINITY



### ICBA associates propose revolutionary new concept for halophytes: **Photohalosynthesis** **Karl Biel and Nicholas Yensen**



*Two scientists, Professor Karl Y Biel of Russia and Dr Nicholas P Yensen of the USA, have discovered new conceptual mechanisms in halophytes. According to these scientists, some of their discoveries may also apply to all terrestrial plants and even possibly to certain aspects of human physiology. The incorporation and amplification of these mechanisms into other plants would increase crop productivity under salty conditions while permanently removing salt and improve the soil quality.*

productivity (Figure 1) under salt stress. The application, besides increasing plant productivity,

According to the new concept of photohalosynthesis (Biel and Yensen 2005a, Yensen and Biel 2006), certain

mechanisms can function to varying degrees within different halophytes, xerophytes and glycophytes. The concept has ramifications that may apply to all plants and even to some aspects of human medicine (Biel and Yensen 2005b).

The discovery of the photohalosynthesis concept resulted from examining the salt-handling processes in salt grasses. This novel vision of bioenergetics and photoprotection of tissues opens a path to new agricultural and medical developments. For instance, the new salt-tolerant lines can rebuild soil structure and are expected to have higher

can permanently remove soil salt to form a fertile, aerated soil. Significantly, the process may be genetically applied to fresh water plants.

This discovery was made by combining biological processes and known laws of physics, among them oxygen radical elimination, ion movement restrictions, photo-electrical effect, the scattering of light-waves, electron distribution characteristics and cation pump mechanisms. In photohalosynthesis, these processes serve for protection and the collection of photon energy, according to the general equation:



Haloconduction, halo-aspersion, halosynthesis and UV light protection are universal concepts that apply to many plants and animals via mechanisms functioning in salt glands, papillae and other surface structures of a wide range of species, suggesting that the concept of photohalosynthesis may have a broad and extensive future.

Some patents are already in progress and the inventors are presently negotiating for the rights to apply this new concept to a host of new applications, with special importance to arid countries.

The authors welcome communication from biosaline agriculture researchers. Professor Biel can be contacted at the Institute of Basic



*Figure 1. Illustration of a proprietary rhizocaniculating Distichlis line. Sharp penehrizomes open heavy clay soils (left) and even asphaltic soils and oil spill sites, wherein the deep aerenchymatous roots can penetrate into anaerobic and impermeable aquacludes. The roots may extend over 2 meters deep in active search of eliminating hypersaline waters. The salt is conducted to the leaf surface (right) where a proprietary process may remove many tons of salt per hectare per year.*

Biological Problems of Russian Academy of Sciences, Pushchino, Moscow Region 142290, Russia (karlbiel@isp.com). Dr Yensen is available at NyPa International, Tucson AZ 85705, USA (nickyensen@aol.com).

## References

**Biel KY and Yensen NP.** 2005. The hypothesis of halosynthesis, photoprotection, soil remediation via salt-conduction, and potential medical benefits. In: Complex Systems under Extreme Conditions. RG Khlebopros and VG Soukhovolsky, Eds. Krasnoyarsk, Russia: 86-115.

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**Yensen NP and Biel KY.** 2006. Soil remediation via salt-conduction and the hypothesis of halosynthesis and photoprotection. In: Ecophysiology of High Salinity Tolerant Plants. MA Khan and DJ Weber, Eds. Springer: 313-344.

## Salinity monitoring improved

ICBA's ability to monitor salinity has taken a giant leap forward with the installation of a Real Time Dynamic Automated Salinity Logging System. The system allows an improved understanding of the dynamic behavior of salinity in the soil. Hourly data logging of salinity and temperature using sensors connected to a 'smart interface' enables direct and dynamic monitoring.

Each salinity sensor is fitted with an interface that contains all the required information to allow autonomous operation, including power requirements and logging interval. The resolution offers highly precise and accurate recording that can be viewed directly in the field without the need of a laptop computer. Data can also be accessed in the field by memory stick or remotely using a mobile phone



*Dr Peter Cull of ICT International Australia with ICBA's soils team.*

modem. The data are then available for graphing and interpretation in Excel™.

The salinity station is operated simply by plugging in a salinity sensor. The Smart Logger then searches the database, automatically identifying the number of sensors connected and logging them at hourly intervals.

The system was installed in a grass field irrigated with 10, 20 and 30 dS/m salinity water. Salinity sensors were buried at 30 cm and 60 cm.

The dynamic changes of soil salinity

within an irrigation cycle have shown the effect of water salinity on the salt concentration in the root zone of the grass and how this is constantly changing under irrigation.

ICBA purchased the system from ICT International Australia. Dr Peter Cull installed the system and led a training course on its operation.

## LETTERS TO THE EDITOR

Dear Editor

*Arid and semi-arid land and salinity are the main issues of Iranian agriculture. Part of these lands must be irrigated, which increases the salinity of soil and water. To enable agricultural activities it is necessary to focus on salinity and drought in agricultural research.*

*ICBA and Ministry Jihad-e Agriculture of Iran are cooperating in solving the problems of arid and semi-arid regions. The Agricultural Biotechnology Research Institute of Iran (ABRII), under the supervision of both the Agricultural Research and Education Organization (AREO) and the Ministry of Jihad-e Agriculture, is working on the biotechnological aspects of this problem. ABRII is tackling the major constraints of crop production in Iran, including transformation and QTLs as well as*

*physiological and proteomic approaches. The major target is to develop plants with higher yields under salt stress.*

*During the recent visit of ICBA Director General Dr Mohammad Al-Attar to ABRII, it became clear that an excellent opportunity exists for collaboration on the issues of salinity and drought. ICBA has superior knowledge about the techniques of irrigation systems and agronomy, and we have excellent facilities for Molecular Biology and Biotechnology. Together, we can solve common problems.*

*ICBA's Biosalinity News and the ABRII Newsletter are two ways of informing and exchanging results in this area.*

*Dr Mojtaba Khayam-Nekouei  
Director General, ABRII*

## ICBA LIBRARY AND INFORMATION SERVICES

The ICBA Library provides a small focused collection of print and electronic documents to support the research and administrative activities of the Center, as well as the members of the Global Biosaline Network (GBN) and the Inter-Islamic Network on Biosaline Agriculture (INBA). Located centrally in the main ICBA building in Dubai, the Library is staffed by a part-time librarian, Carla Mellor.

The Library resources include books and monographs, serials, reprints, CD-ROMs, videos, pamphlets, and other ephemeral materials, in English, Arabic and French, on subjects relating to soil salinity, plant breeding, crop production, halophytic plants, water use and scarcity, irrigation and drainage engineering, poverty and development, as well as copies of all Center publications.

Materials are acquired through purchase and donations. To date the collection comprises more than 2500 books and non-print media in English and in Arabic, serials, and over 300 reprints.

The book collection is organized into broad subject categories in accordance with the Library of Congress Subject Classification, such as Plant Breeding, Soil Science, Irrigation and Drainage, Halophytes. Reports are organized by the issuing organization and journals are arranged by title.

Reference and document delivery services are provided. The Library subscribes to three key agricultural research databases, CAB Abstracts, AGRIS and Agricola.

1. The CAB (Commonwealth Agricultural Bureau) Abstracts database covers the subject of agriculture in the broadest sense. It includes agronomy,

biotechnology, crop protection, economics, environmental degradation and remediation, genetics, rural development, irrigation and much more. Journals, monographs, conferences, books, annual reports and other sources from more than 130 countries are scanned regularly for inclusion in the CAB database to produce approximately

200,000 new records per year.

Nearly all the records have informative English abstracts prepared by the CABI team of scientists. A specialized thesaurus of index terms has been developed to provide easy access to the database.

2. AGRIS, the International System for the Agricultural Sciences and Technology, is an international citation or bibliographic database containing the collections from the participating national, intergovernmental or international

centers. These collections are published regularly by the FAO.

3. The Agricola (Agricultural Online Access) Database contains citations to agricultural literature acquired by the National Agricultural Library and cooperating institutions, and subfiles of related subjects, such as food and nutrition and agricultural economics, supplied by various information centers.

*The ICBA Library Specialist, Carla Mellor, welcomes enquiries from ICBA staff, members of our information networks and subscribers to Biosalinity News.*



*ICBA's Director General and Board Chairman visiting the Library.*

## NEW PAPERS

**Omar S, Bhat NR, Shahid SA and Assem A.** 2005. Land and vegetation degradation in war-affected areas in the Sabah Al-Ahmad Nature Reserve of Kuwait: a case study of Umm Ar Rimam. *Journal of Arid Environments* 66:475-490.

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