جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM
AND AGRICULTURAL INNOVATION

WINNERS BOOK
2018 - 2019 - 2020

WINNERS BOOK 2018 - 2019 - 2020
ISBN 978-9948-35-681-3

Designed by: Mohammed Issa

P.O.Box: 3614 - Abu Dhabi - United Arab Emirates
Tel.: 00971 2 304 9999
Fax: 00971 2 304 9990
sg@kiaai.ae www.kiaai.ae

@kiadpai
Khalifa International Award
Khalifa Award for Date and Agriculture

The late Sheikh

Zayed Bin Sultan Al Nahyan

May God bless his soul

H.H. Sheikh

Khalifa Bin Zayed Al Nahyan

President of the United Arab Emirates

Founder and Patron of the Award

(God Protect Him)

H.H. Sheikh

Mohammad Bin Zayed Al Nahyan

Crown Prince of Abu Dhabi

Deputy Supreme Commander of the UAE Armed Forces

H.H. Sheikh

Mansour bin Zayed Al Nahyan

Deputy Prime Minister

Minister of Presidential Affairs

Patron & Supporter of Date Palm Cultivation

H.H. Sheikh

Nahayan Mabarak Al Nahayan

Minister of Tolerance

Chairman of the Award's Board of Trustees

In the footsteps of Sheikh Zayed

After 12 years of success and pioneering in the agricultural and date palm sector at the local and international levels, thanks to the guidance of H.H. Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE – May Allah protect him -, the support of H.H. Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, and the follow-up of H.H. Sheikh Mansour Bin Zayed Al Nahyan, Deputy Prime Minister and Minister of Presidential Affairs, we are proud of the great successes achieved by Khalifa International Award for Date Palm and Agricultural Innovation at the national and international levels.

This unpreceded success gives us a genuine sense of being comfortable and motivated to move forward based on the international best practices, especially that the Award has become the focus of attention of researchers, farmers, producers, international organizations and everyone passionate or interested in palm date and agricultural innovation all over the world.

The Khalifa international Award for Date Palm and Agricultural Innovation has become a consistent methodology and a clear vision that aim at the development of date palm and agricultural innovation based on the wise vision of the late Sheikh Zayed bin Sultan Al Nahyan, "may his soul rest in peace", in his capacity as the founding leader and spiritual father of the United Arab Emirates, and in light of his vital role in building the state and its agricultural renaissance, where the UAE Desert has been transformed, thanks to his efforts, into a green paradise by planting millions of date palms and trees. He has left his remarkable impacts throughout UAE by conquering the desert and turning it into a green paradise out of his deep belief in the sanctity and importance of preserving the environment and increasing the green area.

Sheikh Zayed – may his soul rest in peace – always said that preserving our environment is an important part of the heritage and history of UAE. He said that our fathers and grandfathers lived on this land, and coexisted with their environment on land and sea, and they have come to realize the need to preserve it, out of their delicate instinct and pure sense.. they took from it only as much as they needed. Moreover, they left behind a good source of giving for the next generations. This is the true definition of sustainable development as approved by the United Nations. Sheikh Zayed, "May Allah have mercy upon him", was genuinely in love with trees, and his constant motto was: “Cut a path, but don't cut a tree”, he also said: "Give me agriculture, I will give you civilization". Agriculture and civilization are the epitome and title of Sheikh Zayed's thought.

To mark 2020 we emphasize the importance of the role of Sheikh Zayed -May his soul rest in peace- as he is the one who established the first pillar to support and develop the date palm growing and agricultural innovation sector in order to achieve sustainable development at the national and international levels.

Nahayan Mabarak Al-Nahayan

Minister of Tolerance, and Chairman of the Board of Trustees of Khalifa International Award for Date Palm and Agricultural Innovation

The success and giving continue

The UAE has paid significant attention to the agricultural sector in general and to the date palm tree in particular due to its importance in the life of the desert area inhabitants. The date palm tree constitutes the main source of food, accommodation and the living and work tools and a part of the cultural and national identity. Moreover, UAE is prestigiously positioned worldwide in this field thanks to the vision of the award patron, His Highness, the President, Sheikh Khalifa Bin Zayed Al Nahyan (God protect Him), who follows the steps of the late Sheikh Zayed bin Sultan Al Nahyan (God bless his soul), the founding father of the United Arab Emirates and founder of its agricultural renaissance who turned the UAE desert into a green paradise through the cultivation of millions of date palm trees and different types of trees, leaving his fingerprint at the UAE level in turning the desert into a green paradise thanks to his strong belief in the protection of environment and expansion of the green area.

Over the past decade, the great success achieved by Khalifa International Award for Date Palm and Agricultural Innovation has given the Award more responsibilities to retain such success. This gives us tranquility, confidence and motivation to go ahead with the development of the Award which has acquired a prestigious importance at both the Arab and international levels.

These continuous successes would not have been achieved but with the significant attention and support paid by His Highness Sheikh Khalifa bin Zayed Al Nahyan, the President of the United Arab Emirates and with the generous patronage by His Highness Sheikh Mohammed bin Zayed Al-Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, as well as the continuous support by His Highness Sheikh Mansour bin Zayed Al Nahyan, Deputy Prime Minister of the United Arab Emirates and Minister of Presidential Affairs and the follow-up by His Highness Sheikh Nahyan Mubarak Al Nahyan, Minister of Tolerance and Chairman of the Award Board of Trustees, to develop this sector, keep the resources and support the food security through the initiatives and events aimed at achieving the sustainable development in accordance with the international best practices.

Since its inception, the Award has set certain standards and conditions for the selection of the winners and the honored guests and has adopted a fixed scientific approach in all the Award categories. It sheds light on the key researchers and farmers of date palm trees. Dozens of the scientific researches submitted to the Award have contributed in setting fixed rules and bases for the date palm tree cultivation, production, manufacturing and marketing and in the people's motivation for agricultural innovation to achieve the sustainable development.

To mark 2020, we, at the General Secretariat of Khalifa International Award for Date Palm and Agricultural Innovation, have undertaken to achieve the vision of the founding father of the United Arab Emirates and the wise leaders, may Allah protect them, to develop and support the sector of Date Palm and Agricultural Innovation and to enhance the prestige of the UAE at the regional and international levels.

Prof. Abdelouahhab Zaid

Secretary General of Khalifa International Award for Date Palm and Agricultural Innovat


2018
Tenth
Session

Honored
Tenth Session 2018

- **H.E. Dr. Helal Humaid Saed Alkaabi / United Arab Emirates.**
- **H.E. Mohammed Rashid Al-Otaiba / United Arab Emirates.**
- **H.E. Abdelouahhab Saleh Al Rajhi / Kingdom of Saudi Arabia.**
- **H.E. Dr. Abdel Moneim Al Banna / Arab Republic of Egypt.**
- **H.E. Dr. Hans Hassle / Sweden.**


جوائز
WARDS

H.E. Dr. Helal Humaid Saed Alkaabi

Secretary General of
The Abu Dhabi Council for
Quality and Conformity
United Arab Emirates

- Member of the Board of Trustees of the Khalifa International Award for Date Palm and Agricultural Innovation, Born in 1968, Al Ain, United Arab Emirates.
- Received a Bachelor's degree in Agricultural Sciences in 1993, specializing in Plant Production and Prevention, Faculty of Agricultural Sciences, United Arab Emirates University, with distinction, and first in the batch.
- Received a Master's degree in Environmental Sciences in 1999, majoring in Environmental Sciences and Date Palm Tissue Culture, Faculty of Science, United Arab Emirates University, with distinction.
- Received his Diploma in Date Palm Tissue Culture Propagation in 2004, Imperial College, University of London, UK.
- Received a Diploma in Plant Biotechnology in 2004, Imperial College, University of London, UK.
- Received his PhD in Plant Tissue Science and Biotechnology in 2004, Imperial College, University of London, UK.
- He has received several scientific awards including:

* Award for Scientific Excellence, United Arab Emirates University, UAE; 1993, 1999.
* Sheikh Rashid Award for Scientific Excellence, Dubai, UAE, 1993, 1999, 2006

- Published several scientific papers in the field of Plant Tissue Culture Propagation and Genetic FingerprintingTechniques.
- National Director of the Palm and Date Development Research Program Project and Plant Tissue Transplant Laboratory, UAE University, July 2000, June 2008
- Executive Director of The District Services Sector - Acting Downtown Sector, Al Ain City Municipality, September 2012-April 2013.
- Vice Chairman of the Emirates International Accreditation Centre, Government of Dubai, January 2017 until the present date.
- Secretary General of the Abu Dhabi Council for Quality and Conformity, Government of Abu Dhabi, November 2017 until the present date.


جائزة خليفة الدولية لتمكين التمر والأمن الغذائي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
Tenth Session 2018
الدورة العاشرة

H.E. Mohammed Rashid Al-Otaiba

CEO of Jenaan Agricultural Investment Company
United Arab Emirates

- Jenaan Agricultural Investment Company is a private company with its head office in Abu Dhabi, United Arab Emirates. Founded in 2005, it works closely with the Government of Abu Dhabi to support the UAE food security, which imports more than 90% of its food requirements. It also invests in the agricultural value chain.
- It has a long-term contract with the Abu Dhabi government to provide hay and forage to farmers in Abu Dhabi. Through various partnerships in host countries, Jenaan has its own farm operations to supplement hay and forage through a number of companies as part of food investments in the United States, Spain, Sudan, Ethiopia and Egypt and mainly works in the production of livestock feed along with rice, wheat and maize.
- Vision: To become a world-class and the world's leading companies in the agricultural business, maintaining the highest quality standards for products and services that will ensure valuable client's satisfaction.
- Mission:
- To develop and produce a diversified portfolio of agro-related products, technologically lead the industry, continuously improve production, product quality, and increase clients' satisfaction through optimal utilization of the company's resources.
- To become the Employer of Choice in our field through our employer branding initiatives and the continuous efforts of hiring competent talents from the local and international market.
- To maintain a long-term strategic partnership between Jenaan Investment and the Government of Abu Dhabi in the Food Security Program under the umbrella of the Abu Dhabi Agriculture and Food Safety Authority (ADFSA).


جائزة خليفة الدولية لنخيل التمور والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM
AND AGRICULTURAL INNOVATION
Tenth Session 2018
الدورة العاشرة 2018

H. E. Abdelouahhab Saleh Al Rajhi

President of The Rajhi Group
Kingdom of Saudi Arabia

- Holds a bachelor's degree in agricultural sciences from King Saud University in Saudi Arabia and holds several degrees in administrative and agricultural engineering courses.
- Served as Vice President of Al Rajhi Saudi Company Group from 1991 to date.
- The group's activities and companies have diversified in various fields of industrial, commercial, technical, agricultural and even real estate. These include Net Network, Commercial Power Agencies, Al-Majd Marble Factory, Al Rajhi Safety Tools Center and many other companies that have proven their competitiveness in their respective fields.
- Eng. Abdelouahhab is a member of several industries, including the National Subcommittee on Date Palms, Council of the Chamber of Commerce and Industry, a member of the local committee nominated by the Ministry of Labor and Social Affairs, a member of the Engineering Committee and a member of the Board of Directors of Nadek.
- Zadina Dates Trading Company is owned by one of the companies of the Group Engineer Abdul Wahab Saleh Al Rajhi headquartered in Riyadh, Saudi Arabia, and is a leader in the marketing and export of dates, maamoul and sweets in Saudi Arabia and abroad and are working to improve the quality of the product until they reach to Taste The consumer that we always strive to satisfy and they have four branches in Saudi Arabia (Riyadh, Qassim, Jeddah and Dammam) and also have a distribution team covering all parts of the Kingdom, and also have a specialized factory to produce the finest types of confectionery and sweets in the Kingdom of Saudi Arabia (Jeddah City).
- In addition to five exhibitions in the Arab Republic of Egypt specialized in the sale and marketing of the finest types of Saudi dates and a factory in Cairo that produces the tastiest types of Oriental and Western sweets. At the global level, the company has achieved successes in international forums by participating in most international exhibitions as well as exporting to most countries of the world.


Tenth Session 2018

H.E. Dr. Abdel Moneim Al Banna

Former Minister of Agriculture and Land Reclamation
Arab Republic of Egypt

- Graduated from the Faculty of Agriculture, Ain Shams University, 1981.
- Received his Master's and PhD Degrees from the Faculty of Agriculture, Cairo University (his study was on plant growth organizations entitled " The Use of Natural Growth Regulators and Their Impact on Plant Tissue Culture"., and then he traveled to USA and completed his research and studies there).
- Served as Director of the Tissue Culture Laboratory, then Head of the Central Palm Center, and then head of the Horticultural Research Laboratory.
- Member of the International Committee of Joint Research Projects of the International Center for Agricultural Research in Dry Areas (ICARDA), Vice President of the Agricultural Research Forum of Africa (FARA) and Chairman of the Socialist Committee for National Strategic Crops Campaigns and member of the Board of Directors of the National Authority for Remote Sensing and Space Sciences, and Vice President of the International Council of Dates in the Kingdom of Saudi Arabia.
- Member of the Coordinating and Technical Committee for Egyptian-Italian Cooperation Projects, a member of the Board of Directors of the National Water Research Center in the Ministry of Irrigation, a member of the Board of Directors of the Academy of Scientific Research and Office of the Academy of Scientific Research and Director of the Institutional Twinning Project for the modernization of the Agricultural Research Center in cooperation with France, Italy and the Netherlands through the European Union.
- Appointed as Deputy of the Agricultural Research Center for Production Affairs, then Deputy of Research Affairs of the Center and finally, Head of the National Center for Agricultural Research.


جائزة خليفة الدولية لنخيل التمور
INTERNATIONAL AWARD FOR DATE PALM
AGRICULTURAL INNOVATION
الدورة العاشرة 2018
th Session 2018

H.E. Dr. Hans Hassle

Secretary General, Plantagon, Stockholm, Sweden

- Hans Hassle has more than 30 years of experience in the business sector and for 15 years served as CEO of Swedish communication agency Vision and Reality Communication AB in Stockholm. Since 1986, Hans has been a pioneer of Corporate Citizenship and Corporate Social Responsibility (CSR) and together with his wife Karin Hassle runs his own management company evolution? AB. He developed early strategical tools for Corporate Citizenship and Brand Management analyzing values and daily practices connected to brand strategy. Hans was appointed by the Swedish Government to the Ethical Committee of Karolinska Medical Institute in Stockholm (Regionala Etikprövningsnämnden vid Karolinska Institutet). evolution? AB runs social business in Burma, invests knowledge capital in social enterprise, educates leaders in sustainable leadership as well as assists organisations in implementation of the Companization governance model. In 2012, Hans Hassle became an official member of the World Entrepreneurship Forum and joined the Forum's Think Tank as one of 88 members. Hassle was in 2010 and 2011 nominated Sustainable Leader of the Year by the Swedish Association of Environmental Managers and In 2012, he was awarded CEO of the Year, Sweden by European CEO as well as put on the World Finance 100 list in 2012. Hassle is co-author of the Global Compact Research Report Sweden published by UN Global Compact in 2004 and Author of the book "Business as Usual is over", published in 2012. Hans Hassle served as CEO of Plantagon International AB from January 2008 until May 2016. He is now Secretary General of Plantagon International Association. 2016 Hassle was appointed member of ADC Forum Advisory Council..


الدورة العاشرة Tenth Session 2018

Winners
Tenth Session 2018

The category of Distinguished Innovative Studies and Modern Technology

- **Dr. Muriel Gros-Balthazard / France.**

The category of Pioneering Development and Productive Projects

- **Mr. Mohammad Suhail Al Mazrouei / United Arab Emirates.**

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector, (Equally Between):

- **Dr. Luigi Porcella PhD / Future Innovative Right Solutions Technologies, Italy.**
- **The Platform / United Arab Emirates.**

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation

- **Abdallah Ben Abdallah, PhD / Tunisia.**

Dr. Muriel Gros-Balthazard
Universite de Montpellier, France

The category of
Distinguished Innovative Studies
and Modern Technology

The Discovery of Wild Date Palms in Oman

Reveals a Complex Domestication History, Involving Centers in the Middle East and Africa

For many crops, wild relatives constitute an extraordinary resource for cultivar improvement [1, 2] and also help to better understand the history of their domestication [3]. However, the wild ancestor species of several perennial crops have not yet been identified. Perennial crops generally present a weak domestication syndrome allowing cultivated individuals to establish feral populations difficult to distinguish from truly wild populations, and there is frequently ongoing gene flow between wild relatives and the crop that might erode most genetic differences [4]. Here we report the discovery of populations of the wild ancestor species of the date palm (Phoenix dactylifera L.), one of the oldest and most important cultivated fruit plants in hot and arid regions of the Old World. We discovered these wild individuals in remote and isolated mountainous locations of Oman. They are genetically more diverse than and distinct from a representative sample of Middle Eastern cultivated date palms and exhibit rounded seed shapes resembling those of a close sister species and archeological samples, but not modern cultivars. Whole-genome sequencing of several wild and cultivated individuals revealed a complex domestication history involving the contribution of at least two wild sources to African cultivated date palms. The discovery of wild date palms offers a unique chance to further elucidate the history of this iconic crop that has constituted the cornerstone of traditional oasis polyculture systems for several thousand years [5].

RESULTS AND DISCUSSION

The Identification of Wild Date Palms

Archeological evidence suggests that date palms have been used for millennia in North Africa, the Middle East, and as far as northwestern India [5], where they are

still of huge social and economic importance [6]. Yet, their domestication history remains poorly understood, with recent genomic studies hinting at a contribution of multiple wild populations as evidenced by the surprisingly large genetic differentiation between cultivated individuals from Africa and the Middle East [7–10].

Although no wild populations have been described to date [11], uncultivated date palms occur across the entire distribution area [12, 13]. However, whether they are feral (derived from cultivated individuals but not tended) or truly wild is not known. Recently, we discovered uncultivated populations in remote, mountainous locations in Oman that exhibit unusually rounded seeds resembling those of the sister species Phoenix sylvestris [14, 15].

Table 1. *Phoenix* spp. Accessions Analyzed

	Total	Seed Morphology	Microsatellites	Whole-Genome
African/South European cultivated *P. dactylifera*	275	161 (3,210)	231	3
Middle Eastern/ Indian/Pakistan cultivated *P. dactylifera*	173	110 (2,143)	141	13
wild *P. dactylifera*	102	39 (763)	102	3
P. atlantica	37	0	37	1
P. sylvestris	74	38 (760)	58	1
Archeological material from *P .dactylifera*	4	4 (4)	0	0
Total	665	352 (6,880)	569	21

Here we present a systematic screening of 102 individuals sampled from nine such candidate wild populations (Table 1; Table S1), corroborating their outlier status. We first compared the shape of 763 seeds from 39 of these individuals to 5,353 seeds from 271 cultivated date palms from the entire distribution area and 760 seeds from 38 Phoenix sylvestris individuals (Table 1; Table S1). Normal mixture modeling of seed shapes captured by elliptic Fourier transforms [16] clustered most of the wild candidates with the sister species P. sylvestris (Figure 1A), and not with cultivated individuals. This was also the case when assigning individuals to three clusters (Figure S1). Additionally, the rounded seeds of the putatively wild individuals matched the shape of four archeological seeds from Kuwait (Table S1; Figure S1) that date back to the assumed onset of cultivation in the region about 5000 BCE according to archaeological evidence [5].

We next compared the genetic diversity and structure of all 102 putatively wild individuals to 372 cultivated date palms and 58 P. sylvestris individuals using 17 autosomal microsatellites (Table 1; Table S1; Data S1A). The putatively wild individuals had a significantly larger diversity (allelic richness [AR] 6.74; private allelic richness [PAR] 1.25; Table S2) than cultivated individuals from the Middle East (AR 6.21; PAR 0.46; Table S2). Interestingly, the limited genetic data used in this screen was sufficient to identify the putatively wild individuals as a unique cluster, both in an admixture analysis (Figure 1B; Figure S2) and in a principal component analysis (PCA) (Figure 1C; Figure S2). Finally, a population tree shows the putatively wild individuals at the base of the Middle Eastern clade (Figure 1D).

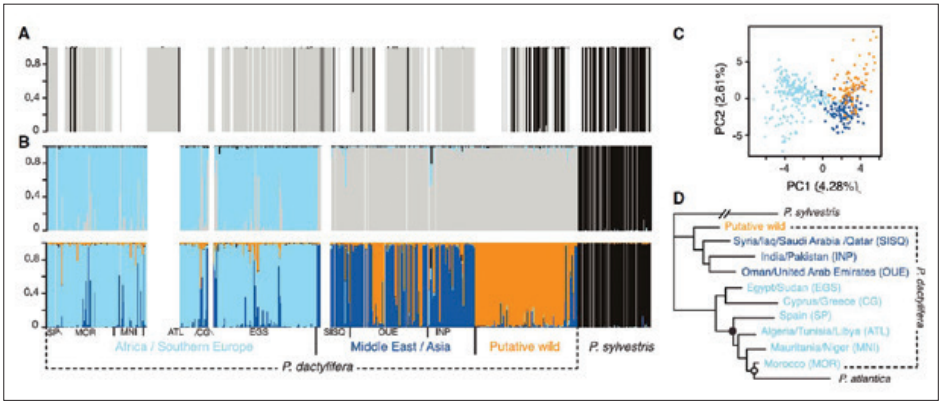


Figure 1. Date Palm Population Structure as Inferred from Seed Morphology and Microsatellites

Mixture proportions based on seed shapes of 348 Phoenix samples modeled as a mixture of two normal distributions.

(B and C) Admixture proportions with K = 3 (B, top) and K = 4 (B, bottom) and principal component analysis (C, variance explained in parentheses) of 532 Phoenix samples inferred at 17 microsatellite markers. Results in (B) are "stacked" underneath the corresponding sample from (A).

(D) Neighbor-joining tree of the same samples grouped by geographic location and setting P. sylvestris accessions as outgroup. White and black circles indicate

nodes with >50% and >95% bootstrap support, respectively.

Color coding: black, P. sylvestris and P. atlantica; dark blue, Middle Eastern/Indian/Pakistan cultivated date palms; light blue, African/South European date palms; orange, putative wild date palms. See also Figures S1, S2, and S4 and Table S2.

Mr. Mohammad Suhail Al Mazrouei

United Arab Emirates

The category of
Pioneering Development
and Productive Projects

Liwa Dates ... an experience house in exploring the future of the date industry

1- Success of Liwa Dates Factory consisted a foundation stone and a pillar of processing industry in the region in general, being the first factory offering direct services to dates producers in the country and has prompted many citizens to imitate the idea and construct more than one similar factory, a fact that makes us more than overjoyed.

2- The services Liwa Factory has provided to farmers was a leverage to the other services offered by the rest of dates factories at state level and has led to introducing farmer services in the same mechanism we have applied with a great effect on the date producers of citizen farmers.

3- We are out of competition framework as we hold a national strategic vision and goal which we endeavor to achieve beyond the framework of traditional business. All the other date factories at state level, however, are companions and friends of ours, sharing us the same goal and even giving us a greater incentive to provide more attention and giving to be the model of innovation and excellence we are now. Because the ultimate beneficiary is certainly the farmer as there is a room for everyone in the date palm sector, even to a much larger extent than what it is so far.

4- Liwa Dates Factory has allowed Emirati national youth a great opportunity to get closely acquainted with dates industry and the opportunity of sustainable training for skill development, exchange of experiences and for providing them with technical and logistic assistance for encouraging them to establish similar projects, particularly all over the Western Region, Abu Dhabi, national territory.

5- Citizens of the Western Region have come to know our services and Liwa Factory is a landmark which they are proud of in Liwa and the region.

6- We are proud of the good impression Liwa Dates Factory has created among the people of the Western Region in particular. It has become a landmark in the present and future public life of the region and pride source for them. The Factory, being a development project, constitutes an economic value and a distinct social imprint contributing to the economic development process in the region and sustainable development of the country in general.

7- Liwa Dates Factory created indirect job-opportunities to a lot of farmers and date producers in the Western Region. Farmers now have easily available opportunities to produce and market their fine dates, either themselves or through our sale outlets spreading all over towns and retail markets and major outlets on UAE level.

8- Liwa Dates Factory has contributed to development of date's industry on country level in general and has become a model and school for farmers' service.

9- Liwa Dates Factory has contributed to development of the infrastructure of date's industry on country level and has also contributed to transition of date's industry in the Western Region from traditional to modern framework.

10- Liwa Dates Factory constituted a significant turning point in the Western Region with economic, social and heritage returns that have brought good to the local community in general.

11- Liwa Dates Factory established the first auction of the finest dates in the region and the country in 2016, which contributed in opening new marketing channels to farmers and increasing the economic return to them, and introducing the local and international audience with the luxury date products in the region and tourist attractions.

12 - The distinguished production of Liwa-Dates factory is characterized by innovative development thinking and the method of implementation are unconventional from other date factories in the region. The products are an interconnected chain and express themselves by each stage of the date palm tree growth. Where we have more than 35 non-traditional food products based on part of the fruit growth stages of date palm tree.

13- Participation of the Liwa Dates Factory in local and foreign festivals in order to introduce producers and manufacturers to develop date industry.

The size of the development project and the quantity, quality, and excellence of production

The production capacity of Liwa- Dates Factory is the largest in the private sector in the country. The production value is more than 5000 tons per year. The added value of our products is much more than a traditional food because it has been able to imitate the language of the age in terms of creative design, attractive and charming to different ages (children, youth, girls, businessmen, ladies…).

A- If we look at a product (Tamrilla) specifically designed to the category of children will find that this product is the first of its kind in the world. It is a cream date for sandwiches or sweets… Other similar products competed in a short period. These products achieved the satisfaction of children and adults. The distribution of this product has been assigned to major distribution companies in the Middle East and Africa, under the name goody.

B- Our products have won the admiration of the young generation because it touched the taste of young people with a modern design with a fast and useful style. Such as dates covered with chocolate, nuts, dried fruits, etc. meet various social occasions.

C- Our products also meet the wishes of the mothers, society- ladies and the businessmen through the series of luxury dates, which were presented in innovative packages, designed for each customer according to his/her own taste in a modern way. It has become a replacement for imported and unhealthy products.

The diversity of production in terms of the number and quality of produced items.

Since the very beginning, our main concern has been to adopt distinguish, creative and innovative approach in our products as a strategic input in the world of dates industry towards having a foothold among the older competitors through offering the best creative, finest and optimum products, both technically and as far as marketing is concerned, whether in terms of customer service (both inside and outside the country), product development (in quantity and quality) or openness to local and international markets to meet their requirements as far as conformity of the product to the acknowledged international standards.

The world-class Liwa-Dates plant is unique in its variety of date-based products under one roof. The number of products we have launched in the local or Arab markets is more than 35, ranging from a traditional product (canned dates, vacuumed or chocolates)... To modern products of dates stuffed with nuts and dried fruits which can be limited on the basis of stages of dates' growth.


Tenth Session 2018
الدورة العاشرة

Dr. Luigi Porcella PhD

Italy

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector (Equally)

ELECTRAP

In ELECTRAP insects are captured and disabled using pulsed emission from MASER (Microwave Amplification by Stimulated Emission of Radiation). Inside the core Electrap device is placed the specially designed Phero-Kairo 925+, a pheromone lure (Ferrolure) and the formulation of the kairomone (ethyl acetate).

The invention has been granted a patent by the UAE and in the GCC. Electrap functions on the principle of MASER, where a fully inside mirrored 'Resonance Chamber'(core Electrap device), loaded by natural light, incessantly reflecting the light, starts a resonance process till the saturation of the light reflection inside the chamber, thereby emitting the infrared electromagnetic radio waves loaded by the lures molecules and attracting the insects.

In Electrap the said Resonance Chamber is mounted horizontally in the trap and the semiochemicals (Pheromone and Kairomone), specially manufactured by ChemTica in Costa Rica, when placed inside, can last for 4 to 6 months without renewal.

Once RPW adults enter into the Electrap, escape of the trapped weevils is prevented due to the presence of the one-way bristles crown at the entrance. Subsequently the trapped weevils die due to quick dehydration.

The dismountable bottom support allows an easy periodical removal of the dead weevils. It is pertinent to mention that the Electrap, besides being bait and water free, is also without any insecticide as often used in traditional traps to kill the trapped weevils. So is fully fitting for the "ORGANIC" farming.

All of it means that ELECTRAP, approved by United Nations, Abu Dhabi Baladyia, KSA Ministry of Agriculture and many others, is the most effective and less expensive solution against RPW!

The Background

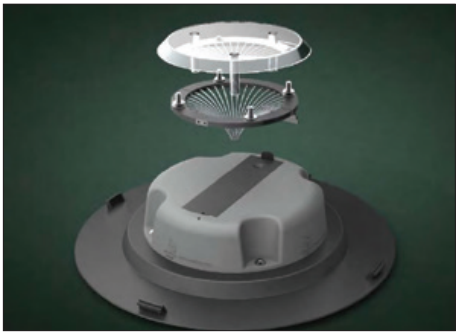
FIRST (Future Innovative Right Solutions Technologies, UAE) has developed a revolutionary trap for the Palm Red Weevils (Rhynchophorus Ferrugineus-RF), severely affecting palm tree and dates industry.

The red palm weevil (RF) invaded the Gulf States in the mid-1980s, and has caused havoc with date plantations ever since. The beetle-like weevil is widely found in southern Asia and Melanesia where it is a well known threat to coconut plantations as well as date palms. The weevil expanded its territory westwards very rapidly.

The pest was recorded for the first time in the United Arab Emirates in 1986, Saudi Arabia in 1987 and in Iran in 1992. It crossed the Red Sea into North Africa and by 1995 it had infested over 10,000 farms across Arabia. In infested plantations, yields have been estimated to have dropped from 10 tonnes to 0.7 tonnes per hectare, according to the Food and Agricultural Organisation (FAO). And the situation is going worst and worst, despite the already started campaigns.

After decades of disappointing results, pheromone and kairomone traps haven't performed up to their original expectations. They're not overly effective and may only capture 10 to 25% of the insects in a given area, based on anecdotal information. As a result, pheromone and kairomone traps have been downgraded from insect management devices to insect monitoring devices.

If traps were made to be more effective, their market value would increase and alternative control measures (such as repellent



spraying) could be reduced or eliminated. In order for this to happen, insect trap efficacy would have to increase dramatically. Specifically aiming to your worst enemy: the Red Palm Weevil!

The Main Concept

A literature review turned up no evidence whatsoever that physical contact ever occurred between the scent (i.e. an insect pheromone and kairomone) and the purported receptors (odorant receptor proteins found on the dendritic membranes). Instead, detection might be occurring at a distance which suggests electromagnetic effects may be mediating this whole process. Therefore, vibrational frequencies became the prime candidate for an alternate theory.

If these vibrational frequencies are involved, then theoretically, smell can be both amplified and squelched. Both of these phenomena have been successfully demonstrated in the laboratory, and ELECTRAP® capitalizes on the former.

Specifically, the breakthrough discovery revealed that placing a scent in a highly reflective cavity resulted in heightened activity among Palm Red Weevils.

Over 4,000 experiments have been completed to date, and the surprising results are telling us that the efficiency is increased more than 300% whilst the management cost is reduced by more than 50%.

In fact, as a matter of an example, the pheromone and kairomone lures last for lengthily periods of time. There's no need to replace the pheromone and kairomone lures according to manufacturer's recommendations.

Moreover, also if ELECTRAP® should be cleaned periodically as the level of infestation warrants, the trap is still highly effective without meticulous cleaning.

The ELECTRAP® is considerably more sensitive than the standard traps on the market. We can make an immediate impact upon a particular infestation, and over a few short seasons can exercise complete control. In addition to being highly effective, our trap differs from all other RPW traps currently on the market.

Environmental Aspects

The materials composing ELECTRAP are: (1) Polypropylene + glass fibre, (2) Nylon 66, (3) Polymethyl methacrylate, (4) ABS. with an expected life span of, at least, ten years if not crushed by traumatic events.

All the parts are UV treated, with a very high melting point (within 200 and 400 Celsius), stable to decomposition with no any dispersion in the air under any weather conditions, 100% recyclable.

The device doesn't need any power supply, nor cable or battery operated, not implying, therefore, any related emission and/or any possible battery leakage.


Tenth Session 2018

The Platform

United Arab Emirates

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector (Equally)

Utilizing Artificial Intelligence and Internet of Things technologies

Cognitive Palm Tree is an innovative autonomous technique that utilizes cutting edge technologies to detect the existence of Red Palm Tree Weevil (RPW) in low cost way.

Using Low Power Internet of Things (LPWA IOT) sensor empowered by Artificial Intelligence/Machine Learning, we have built new technique of detecting RPW.

We are relying on acoustic detection as well as acceleration/vibration analysis, both ways are used simultaneously in low cost manner, to maximize the device efficiency.

We transfer the data collected from each palm tree to internet based server that collect numerous data samples from all palm trees from different farms.

We developed Artificial Intelligence/Machine Learning model that is deployed on IBM WATSON Machine Learning and data science environment “over internet server”, that continuously analyze acoustic and vibration samples collected directly from palm tree via cheap LPWA IOT acoustic and vibration sensing device connected to internet via NBIOT/LTEM chipset.

Using this technique, we can provide farmers and government a geographic map that indicate RPW activity with exact infested palm trees locations. This help farmer to identify existence of Red Palm Tree Weevil in early stage.

THE PLATFORM, has developed the above architecture for Cognitive Palm Tree.

Below is geographical of Red Palm Weevil infection map, with first reporting date of RPW.

The Red Palm Weevil is native to southern Asia and the Melanesia region. Since the 1980s it has rapidly expanded its geographical distribution and has so far been found in at least 60 countries including European countries as well. It reached the

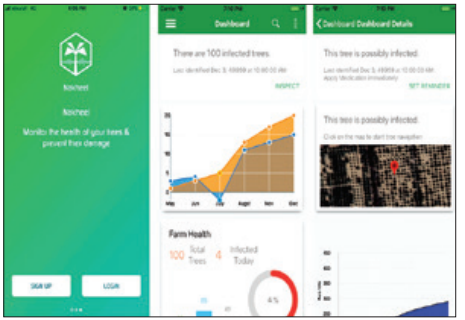
United Arab Emirates in about 1985, spreading through the Middle East. It was found in Egypt, Jordan and other countries. It is considered a pest of global significance.

FAO (Food and Agriculture Organization) has recently declared that Red Palm Tree Weevil has increased its area of infection, and became major threat facing dates industry, serious measures must be taken. Moreover, FAO has put clear strategy to confront this insect. Those measures include increase the research in state of art methods that can be used to confront this insect and end up with early detection technique.

As per FAO, the cost of damage in dates industry because of Red Palm Tree Weevil has exceeded 8 million USD annually, this cost just covers disposal of infested palm trees, this cost doesn't include the governmental precaution programs to protect the palm tree farms from any prospected invasion of RPW, this cost also does not include the loss of annual dates production.

Moreover, FAO has indicated loss of 90 million Euro due to RPW in European countries till 2013 only.

Recent reports indicate that in the Mediterranean region, palms worth up to 483 million Euros have been destroyed or in-



A picture of some of the information permanently obtained by the farmer Through a smart application on the phone gives indicators of the health of the farm palm And also about injuries and their specific location.

Archival photo taken during development experiments of the device linked to the palm

fested, primarily by RPW. However, this figure remains a significant underestimate of the total economic value of affected palms because no study has accounted for all the ecosystem services they provide.

In the Spanish region of Murcia over 7 million Euros were spent on various measures to combat RPW mainly on the removal of infested palms. Between 2004 and 2009, in the autonomous community of Valencia around 20,000 palms, were killed by RPW, where losses were estimated to be 16 million Euro

(source: FAO http://www.fao.org/3/a-ms664e.pdf March-2017)

The Idea, Early Detection Technique-Cognitive Palm Tree Cognitive Palm Tree is an advanced technique to detect the existence of Red Palm Tree Weevil using Low Power Internet of Things (IOT) technology integrated with Artificial Intelligence/Machine Learning algorithm.

We develop Artificial Intelligence (AI)/Machine Learning(ML) model that analyze acoustic and vibration samples that are continuously collected directly from palm tree via cheap acoustic and vibration sensing device, connected to internet via NBIOT/LTEM chipset and Mesh network that connect all palm trees across the whole farm to the internet.

Using this technique, we can provide farmers and government live RPW geographic existence map and always updated database that indicate where is RPW existing with exact infected palm trees location. This helps farmer, farm owners and governmental sectors to identify existence of Red Palm Tree Weevil in early stage and track its activity across the region with minimal cost.

Simply we insert acoustic and vibration sensor empowered by low power low cost Mesh
network (ZigBee) that reach internet through low power low cost NBIOT/LTEM access point devices, then those acoustic and vibration samples are always analyzed by Artificial Intelligence/Machine Learning model that is able to differentiate the Red Palm Tree weevil activity patterns among other sounds and vibrations that can exist around the palm tree, this Machine learning model keeps learning new acoustic and vibration patterns as long as new infection samples are uploaded to internet server.

By utilizing both low power low cost internet of things (IOT) with Artificial Intelligence(AI)/Machine Learning(ML), we provide new innovative and unique technique to detect Red Palm Tree Weevil's Larvae in early stage with accurate and always updated results, we are also able to create Geo-Reference map that helps farmers and governments to tackle the RPW in lower cost and effort.

Using Cognitive Palm Tree, the palm tree is always under monitoring of Artificial Intelligence brain. This Technique overcome many constrains of using the legacy techniques of detecting Red Palm Tree Weevil. THE PLATFORM, has developed the below End to End architecture for Cognitive Palm Tree.


Tenth Session 2018

Abdallah Ben Abdallah, PhD

Tunisia

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation

I am the Son of a farmer “date Grower” in the south of Tunisia and I have my own plantation of date palm “Deglet Nour”, I was Agronomist Engineer specialised on date palm and did my PhD also on date Palm. I spent my whole life working on date palm first as Director of the first Date Palm Research Centre in the South of Tunisia then since 2003, I started working, through FAO, in the service of date palm growers all over the world. With the confirmed experience that I have acquired during the 30 years of my professional career and the various assignments and increasing responsibilities I have been discharging during these years and with my linguistic abilities, I can confirm that I have consequently developed through these years a solid relevant experience and helped many date growers in many countries .

Through the various duties I have been carrying out during my active life, I have dealt with overall responsibilities for monitoring and reporting on activities related to date palm agricultural development, worked closely with national authorities and collaborated with national, regional as well as international development and funding institutions. I have also played critical roles in development endeavours in the countries where I worked. I provided when and where I was given the possibility, leadership on food and agriculture policy. I assisted, and sometimes lead, in formulation of programs and projects and in the identification of priorities for future assistance. I also lead implementation of projects and field activities as well as actively participated in program development efforts in my home country as well as in other countries like Namibia, Yemen, Burkina Faso, Saudi Arabia, Egypt & Eritrea with FAO.

Noteworthy to mention that (i) my whole life was dedicated to date palm culture and date growers in my country where I was director of the first date palm Research Centre and (ii) that I have followed this national work by an international work in many countries.

Professional Career

1986-1996	Director & Head of Laboratory- Date Palm research center in Tunisia (Tozeur)
1997-1999	Regional Coordinator, FAO/UNDP Project on fruit crops INRAT, Tunis
1999- 2000	Researcher in Fruit Crops Biotechnology Laboratory INRAT – TUNIS
2001-2002	Team Leader of FAO Project for the Improvement of Date palm Production in Yemen
2002-2003	Team Leader of FAO Project for the introduction of Date palm Production in Burkina Faso
2004- 2007	Chief Technical Advisor of FAO project: Date Production Support Programme in Namibia
2007- 2011	Chief Technical Advisor of FAO project: Establishment of the National Date Palm Research Center in AlHassa – Saudi Arabia
2012-2016	Chief Technical Advisor of FAO project: Establishment of an International Date Palm Research Center in AlHassa – Saudi Arabia From May 2016: Researcher in INRA-Tunis - Tunisia
Jul – Oct 2016	Consultant FAO – Preparing Strategy for the Development of Date palm Sector in Egypt. Team Leader of Date Palm TCP
Nov 2016- Dec 2017	Team Leader of FAO Project for the development of date palm in Eritrea

Country Achievements on Date Palm by Abdallah Ben Abdallah

Country	Project Title / Assignment
ERITREA [20016-2017]	1- To strength the Tissue Culture laboratory at NARI & to train laboratory staff to date palm micro-propagation 2- To highly capacitate date palm farmers and other value chain actors handling and raising improved date palm planting materials with superior skills.
EGYPT [20016]	1- Preparing the National Strategy for Developing the Date Palm Sector in Egypt 2- Preparing and leading a Technical Cooperation Project to Implement this Strategy in Siwa Oasis
Saudi Arabia [2007-2016]	Establishment of the National Date Palm Research Centre of Al- Hassa, Saudi Arabia [FAO] & Establishment of an International Date Palm Research Centre, Al-Hassa, Saudi Arabia [FAO]
Namibia [2004-2007]	Date Production Support Programme [FAO]
Burkina Faso [2002-2003]	Improvement of date palm Production in Burkina Faso [FAO]
Yemen [2001-2002]	Rehabilitation of Date Palm Orchards in Yemen [FAO]
North Africa & Middle East (Regional Project) (Morocco- Algeria-Tunisia-Libya-Egypt-Syria and Iraq) [1997-1999]	Control of Virus and Virus like Diseases of Fruit Crops Including Date Palm [FAO/UNDP]
Tunisia [1986-2001]	Varietal identification, evaluation, standardization and utilization of in-vitro plants of date palm in the South of Tunisia
	Date palm multiplication, mainly by in vitro techniques
	Date palm and wheat breeding using Biotechnology
	Tissue culture for selection, breeding and multiplication of date palm
	Head, Fruit Crops Biotechnology Laboratory, (INRAT–Tunis)
	Director, Date Palm Research Centre, Degache, Tozeur
	Research on new strategies of date palm multiplication (Phoenix dactylifera L (PhD Programme)
	Contribution to the study of the fructification of date palm (Cv: Deglet Nour) : Pollination and Metaxenie (Masters Programme)


Photographed By: Faisal Ali Khalaf


2019
Eleventh
Session

Honored
Eleventh Session 2019

- **H.E. Staff Major General Pilot Faris Khalaf Al Mazrouei / United Arab Emirates.**
- **H.E. Eng. Ibrahim Al-Shahahdah / Hashemite Kingdom of Jordan.**
- **H.E. Salah Basheer Al-Nifeedy / Republic of Sudan.**
- **H.E. Dr. Mohammed Djerbi / Republic of Tunisia.**


Agriculture Organization
ted Nations
MINISTRY OF PRESIDENTIAL AFFAIRS
جوائز الدورة الحادية عشرة
ELEVENTH SESSION AWARDS
مؤتمر وزراء الزراعة للدول المنتجة وال
e of Agricultural Ministers of
ucing and Processing Countries

H.E. Staff Major General Pilot
Faris Khalaf Al Mazrouei

Chairman of the Cultural Programs and Heritage Festivals Committee
United Arab Emirates

His Excellency Staff Major General Pilot Faris Khalaf Al Mazrouei was appointed as Chairman of the Cultural Programmes and Heritage Festivals Committee – Abu Dhabi, on 16 April 2015.
His Excellency holds other positions and he is a board member of the following entities:

Positions:
- Chairman of the General Authority for the Security of Ports, Borders and Free Zones
- Chairman of the Higher Organising Committee of the International Defence Exhibition (IDEX), and the Naval Defence Exhibition (NAVDEX)
- Commander-in-Chief of Abu Dhabi Police

Board Member:
- Member of the Executive Council of Abu Dhabi
- Chairman of NIMR Company for military vehicles
- Vice Chairman of Emirates Defence Industries Company (EDIC)
- Board Member of Abu Dhabi Ports
- Board Member of the Environment Agency – Abu Dhabi (EAD)
- Board Member of the Federal Transport Authority - Land & Maritime
- Board Member of the Federal Authority for Identity & Citizenship

H.E. Eng.
Ibrahim Al-Shahahdah

Minister of Agriculture
and Environment
Hashemite Kingdom of Jordan

Qualifications:

- Bachelor from Faculty of Agricultural Engineering, majoring soil and irrigation / University of Jordan 1998-1999.
- Diploma of National Resource Management / Royal Jordanian National Defense College 2010-2011.
- Master of Management and Strategic Planning / Mutah University 2011-2012.

Practical experience

- General Manager of the Arab Company for White Ciment Industry.
- Member of the Board of Directors of Arab Company for White Ciment Industry.
- Member of the 17th House of Representatives of Jordan.
- Chairman of the Agriculture and Water Committee in the House of Representatives.
- Member of the Services Committee in the House of Representatives.
- Director of Al-Tafila Center for Agricultural Research and Extension
- Member of the Agricultural Engineers Union
- Lecturer at the Royal Jordanian National Defense College
- Director of Al-Tafila Center for Agricultural Research and Extension
- Director of Al-Shubak Center for Agricultural Research and Extension.
- An agricultural researcher in the National Agricultural Research Center and Extension.


وزير ال
المملكة ال
hi Al-Sh h
ricult
n o

H.E. Salah Basheer Al-Nifeedy

Vice Chairman of Al-Nifeedy Limited Holding Group
Republic of Sudan

The journey of Basheer Al-Nifeedy, Group founder, started on 1934 as a seller of soap in Khartoum. His business flourished and achieved local and international success in logistics services, trade, real estates, industrial development, banking and other industries. Now, eighty five years later, Al-Nifeedy Group is undertaking operations and partnerships in Africa, Europe, Middle East and North America and is fully committed to preserve the legacy of the founder of “inherited authenticity” and principle of “family” related to the company’s operational philosophy that forms the basis of the family and makes us distinguished.

The value of “family” is considered a clear commitment in human capital represented by the family members and employees walking side by side. The most significant asset is a dedicated and highly skilled workforce that enables us to serve our customers effectively. Hence, the value of “family” differentiates Al-Nifeedy Group from other companies. Over the years, Al-Nifeedy Group has set a clear approach of core values and has been keen to honor its commitments and fulfill its promises.

The Group’s investment in terms of skills and resources focuses on four key areas: community, infrastructure, market and people. This enables us to integrate our programs into everything we carry out in Al-Nifeedy Group. Moreover, there are some areas that we believe to have a major impact, which are logistics, real estate, automobiles and agriculture recently.

Today, the business success is made by the second generation of Al-Nifeedy, however, as the third generation of the family becomes more involved, succession planning becomes a sustainable approach of critical importance to face the challenges as we live in a changing world.

- He was the first one how introduced tissue culture derived date palm plants in Sudan during 1993.
- He did receive the merit award of Sudan Presidential Office (2018).
- A strong supporter and active of action member of the Sudan Date Palm Association since its establishment.

H.E. Dr. Mohammed Djerbi

Former Senior Technical
Expert at FAO
Republic of Tunisia

Dr. Mohamed Djerbi, born in 1941, is an agronomist of the National Institute of Agricultural Sciences in Tunisia and has a PhD in Agricultural Sciences in the field of plant protection from France.

Dr. Djerbi started his career as a professor of higher education in plant protection at the National Institute of Agricultural Sciences in Tunisia. He completed a lot of researches and contributed to the qualification of graduate students and researchers. He joined the Food and Agriculture Organization of the United Nations (FAO) in 1978. He dedicated 26 years for the service of date palm and the protection of date palm oases in the countries of Arab Maghreb. He devoted his entire efforts and a large part of his career as a whole for the service of date palm and dates in many countries of the world.

Dr. Djerbi started his career with FAO as a senior expert for Bayoud disease Control Project in Morocco (1978-1988). Through this project, he qualified and prepared most of the current date palm specialists in the Maghreb region (Algeria, Morocco and Tunisia).

He then served as an expert team leader and a chief expert in Bayoud disease Control Project in Algeria (1988-1992) and worked as a senior expert in Tunisia under the United Nations Development Program and FAO to cleanse fruit trees, including date palm from viruses, and to qualify nursery owners to produce virus-free seedlings during the period: (1992-1997).

From 1997 to 2004, he worked as an expert team leader and a program coordinator for FAO in Riyadh, Kingdom of Saudi Arabia.

Dr. Djerbi has 26 years of wide experience and extensive knowledge, as the number of his researches published in scientific magazines exceeds 40. He supervised several Masters and PhD studies in the field of date palm protection. His most important books include (Date Palm Diseases) and a French book on date palm cultivation (Precis de Phoeniciculture).


ing Countries
habi

Winners

Eleventh Session 2019

The category of Distinguished Innovative Studies and Modern Technology (Equally Between):

- **Dr. Mark Alfred Tester / Saudi Arabia.**
- **Dr. Hoda Badry Mohammed Ali / Germany.**

The category of Pioneering Development and Productive Projects (Equally Between):

- **Desert Fruit / Namibia.**
- **Saham Agr / Morocco.**

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector

- **Groasis / Netherlands.**

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation (Equally Between):

- **Dr. Julian Schroeder / University of California, USA.**
- **Dr. AbdulBasit Oudah Ibrahim / Iraq.**


الفائزون في الدورة الحادية عشرة
Winners 11th Session 2019
[متساوية بين]
(Equally Between)
[متساوية بين]
(Equally Between)
[متساوية بين]
(Equally Between)
DESERT FRUIT FOUNDATION

Dr. Mark Alfred Tester
King Abdullah University of Science and Technology
Saudi Arabia

The category of
Distinguished Innovative Studies
and Modern Technology (Equally)

The genome of Chenopodium quinoa

introduction

Chenopodium quinoa (quinoa) is a highly nutritious grain identified as an important crop to improve world food security. Unfortunately, few resources are available to facilitate its genetic improvement. Here we report the assembly of a highquality, chromosome-scale reference genome sequence for quinoa, which was produced using single-molecule realtime sequencing in combination with optical, chromosome-contact and genetic maps. We also report the sequencing of two diploids from the ancestral gene pools of quinoa, which enables the identification of sub-genomes in quinoa, and reduced-coverage genome sequences for 22 other samples of the allotetraploid goosefoot complex. The genome sequence facilitated the identification of the transcription factor likely to control the production of anti-nutritional triterpenoid saponins found in quinoa seeds, including a mutation that appears to cause alternative splicing and a premature stop codon in sweet quinoa strains. These genomic resources are an important first step towards the genetic improvement of quinoa.

Agriculture is estimated to use 80% of all water in the Middle East. Much of this water use is clearly unsustainable as groundwater reserves are being rapidly depleted. Clearly, consumption of water is the greatest threat to the long-term sustainability of agriculture in the region – including the iconic date palm. One contribution to reducing groundwater demand, and thus slowing or even stopping the depletion of groundwater reserves, is to substitute as much saltwater as possible for freshwater. However, the use of saltwater must be done with care to minimize impacts of saltwater irrigation on soil structure and shallow aquifers. Nevertheless, there are many environments where such saltwater irrigation can be managed appropriately. Saltwater-based agricultural systems can also be developed in controlled environments, such as greenhouses. Professor Tester has recently established a

company, Red Sea Farms, to supply saltwater greenhouses where 80-90% of freshwater is replaced with saltwater in a way that is both environmentally sustainable and economically viable (https://redseafarms.com).

Salt-tolerant crops are required for saltwater-based agricultural systems. New opportunities exist for developing such crops by combining genomics and high-throughput phenotyping, which enable accelerated genetic studies and crop improvement. In Professor Tester's research program, these technologies are applied to increase the salinity tolerance of existing crops (such as rice, barley and tomato) and to accelerate the domestication of plants that already exhibit high levels of salinity tolerance (such as quinoa). In the spirit of this latter approach, Tester and his colleagues have targeted quinoa as a salt-tolerant crop with great potential for the Middle East, where irrigation with currently unused brackish water would provide locally grown, high-quality grain along with opportunities for an innovative agricultural industry in the Middle East. Quinoa has been partially domesticated, but still has many traits requiring significant improvement for it to become a major commodity crop. To provide a foundation for genetic studies, Professor Tester led an international consortium of researchers to generate the first high-quality sequence of the quinoa genome, work that was published last year in Nature and that was featured on the cover.

This research from the Nature paper is now being expanded with extensive field studies in10 countries, including UAE, where an association mapping population of 1,000 lines of quinoa is being grown and phenotyped. The field studies employ drones, which provide images that are analyzed using sophisticated algorithms that incorporate computer vision and machine learning. All the quinoa lines now being grown have also had their genomes re-sequenced, which will provide an unprecedented genomic and genetic resource for quinoa globally.

The recent article in Nature describes a significant agricultural innovation that is particularly worthy of the Khalifa International Award. This work has the potential to make a significant impact on agriculture in this region. Jarvis et al. (2017) The genome of Chenopodium quinoa.

Quinoa (Chenopodium quinoa Willd., 2n = 4x = 36) is a highly nutritious crop that is adapted to thrive in a wide range of agro-ecosystems. It was presumably first domesticated more than 7,000 years ago by pre-Columbian cultures and was known as the 'mother grain' of the Incan Empire1. Quinoa has adapted to the high plains of the Andean Altiplano (> 3,500 m above sea level), where it has developed tolerance to several abiotic stresses 2–4. Quinoa has gained international attention because of the nutritional value of its seeds, which are gluten-free, have

a low glycaemic index5, and contain an excellent balance of essential amino acids, fibre, lipids, carbohydrates, vitamins, and minerals6. Quinoa has the potential to provide a highly nutritious food source that can be grown on marginal lands not currently

suitable for other major crops. This potential was recognized when the United Nations declared 2013 as the International Year of Quinoa, this being one of only three times a plant has received such a designation. Despite its agronomic potential, quinoa is still an underutilized crop7, with relatively few active breeding programs8. Breeding efforts to improve the crop for important agronomic traits are needed to expand quinoa production worldwide. To accelerate the improvement of quinoa, we present here the allotetraploid quinoa genome. We demonstrate the utility of the genome sequence by identifying a gene that probably regulates the presence of seed triterpenoid saponin content. Moreover, we sequenced the genomes of additional diploid and tetraploid Chenopodium species to characterize genetic diversity within the primary germplasm pool for quinoa and to understand sub-genome evolution in quinoa. Together, these resources provide the foundation for accelerating the genetic improvement of the crop, with the objective of enhancing global food security for a growing world population.

Evolutionary history of quinoa

Quinoa resulted from the hybridization of ancestral A- and B-genome diploid species19. Single-gene sequencing studies previously identified pools of North American and Eurasian diploids as candidate sources of the A and B sub-genomes, respectively20–22, with hybridization occurring somewhere in North America. To understand genome structure and evolution in quinoa further, we sequenced, assembled, and annotated the A-genome diploid C. pallidicaule (commonly called cañahua or kañiwa) and the B-genome diploid C. suecicum21. A high proportion of orthologous gene pairs in quinoa showed similar rates of synonymous substitutions per synonymous site (Ks), indicative of a whole-genome duplication event (Fig. 1b). This probably represents the hybridization of ancestral diploid species, because a similar peak was not observed in C. pallidicaule or C. suecicum (Fig. 1b). Using mutation rates calculated for Arabidopsis thaliana23 and for core eukaryotes24, we estimate the tetraploidization to have occurred 3.3–6.3 million years ago.

Analysis of sub-genome structure

By mapping sequencing reads from C. pallidicaule and C. suecicum onto the quinoa scaffold assembly, and by performing BLASTN searches of each diploid against the quinoa assembly, 156 and 410 quinoa scaffolds (totalling 202.6 and 646.3 Mb) were assigned to the A and B subgenomes, respectively (Fig. 2a, Supplementary Data 6). A mini-satellite repeat (18-24J) previously shown to be more abundant in the B subgenome26 is over-represented in scaffolds assigned to the B sub-genome (Supplementary Data 6). Nine chromosomes were assigned to each sub-genome (chromosomes hereafter designated as CqA or CqB, followed by the chromosome number), with the B sub-genome accounting for a larger percentage of both the genetic (1,087 cM) and physical (660 Mb) sizes than the A sub-genome (946 cM, 524 Mb). This result was not unexpected, given the differences in the estimated genome sizes of C. suecicum (815 Mb) and C. pallidicaule (452 Mb) based on k-mer analyses.


King Abdullah University
Science and Technolog

Dr. Hoda Badry Mohammed Ali

Germany

The category of
Distinguished Innovative Studies
and Modern Technology (Equally)

Gene-specific sex-linked genetic markers in date palm (*Phoenix dactylifera* L.)

During the past decade, there have been numerous attempts to identify sex-linked molecular genetic markers that can be used to discriminate among male and female trees in date palm (*Phoenix dactyliferous* L.). In our approach to address this biological problem, we applied a comparative genomics approach and used a candidate sex-linked Tormozembryo Defective (TOZ19) gene found to be male-specic in aspen. Using BLAST against the date palm genome assembly, we found a putative Transducing Beta-like Protein 3 (TBL3) gene in date palm that was highly homologous to the TOZ19 gene and sequenced it in three male and four female trees from four economically important date palm cultivars from Egypt.

Based on the obtained multiple nucleotide sequence alignments, male- and female-specic date palm haplotypes were indented by screening single nucleotide polymorphisms (SNPs). Subsequently, a respective gene fragment in additional ve date palm samples comprising three females and two males were cloned and sequenced to independently corm the previously indented putative sex-linked SNPs. The three putative sex-linked SNPs can be used now to discriminate male and female date palms at their seedling stage. This will further enhance and pave the way for commercial date palm cultivation through seeds.

The indented molecular markers are relatively easy, cheap, fast, and reproducible sex ident cation tools. Female date palms are either homozygous or heterozygous, while male date palms are hemizygous at the putative sex-linked loci.

Sexual dimorphism is common in the animal kingdom, but most plant species are monoecious (bisexual) producing either flowers containing both stamens and styles or separate male and female flowers on the same plant. Only * 6% of angio-

sperms are dioecious and differences between males and females are mostly detectable only during flowering, while the rest of the time plants show no signs of sexual dimorphism (Barrett and Hough 2013). Meanwhile, early determination of sex is very important commercially for some crop trees, such as for the dioecious *Phoenix dactylifera* L. (date palm) that belongs to the palm family Arecaceae. The sex determination is also an important evolutionary problem that is still not well-understood genetically in many plant species despite numerous studies.

The Phoenix genus comprises 14 species including date palm (Barrow 1998), which is a diploid species with 18 pairs of chromosomes (2n = 36; Mathew et al. 2014). Date palm is a dioecious species and, therefore, strictly outcrossing. Date palm plays an important role in the social, economic, religious, and cultural life of people in the Middle East, North Africa, and Pakistan (Al-Dous et al. 2011; Cherif et al. 2013). Date palm trees are propagated either from seed or vegetative offshoots. Propagation via seeds is unsuitable for commercial date palm production because half of the progeny are males that are economically worthless. However, conventionally sex discrimination is only possible at the time of flowering, usually after 6–8 years (Al-Dous et al. 2011; Mathew et al. 2014). Therefore, there is a high demand for developing effective methods of early sex identification based on genetic approaches. There have been previous attempts to use molecular genetic markers to discriminate sex in date palm with limited success, and there still exist a general ambiguity and lack of clarity in the use of genetic markers for sex determination in date palm, such as Random Amplified Polymorphic DNA (RAPD) and Restriction Fragment Length Polymorphism (RFLP) (Abdallah et al. 2000; Trifi et al. 2000), Inter Simple Sequence Repeats (ISSR) (Younis et al. 2008; Dhawan et al. 2013; Al-Ameri et al. 2016), Amplified Fragment Length Polymorphism (AFLP) (Adawy et al. 2014), and Simple Sequence Repeat (SSR) (Elmeer and Mattat 2012; Cherif et al. 2013; Maryam et al. 2016). To solve this biological problem, we adopted a novel comparative genomics approach and used a candidate sex-linked tormozembryo defective (TOZ) gene, which was found to be male specific in European aspen (*Populus tremula* L.) and quaking aspen (P. tremuloides Michx.) and is potentially involved in early stages of flower development (Pakull et al. 2015).

Materials and methods

Date palm samples Leaf samples were collected from twelve date palm trees-seven female and five male trees-growing in a plantation near Burg Migheizil village, Egypt, in 2014. The date palm samples represented five different economically important cultivars: Samani, Bent Aisha, Hayany, Orabi, and Zaghloul. All leaf samples were cut and thoroughly air-dried, and stored in the labeled zip-lock plastic bags. Additional five date palm samples comprising three females (Zaghloul, Bent Aisha, and one unknown variety) and two males (unknown varieties) from Egypt were used for verification.

Candidate sex-linked gene selection and PCR primer design

Seven sex determination related candidate genes were discovered in the Populus trichocarpa Hook. Genome region located in the central region of chromosome 19 corresponding also to the sex-linked region in quaking or trembling aspen (Populus tremuloides Michx.)

2 Genet Resour Crop Evol (2018) 65:1–10 (Kersten et al. 2014). Among the four candidate genes involved in flower development, Potri.019G047300.1 ‘‘TOZ19’’ (similar to Arabidopsis thaliana (L.) Heynh. TOZ AT5G16750.1) is of particular interest because it is predicted to be involved in the transition from the vegetative to the reproductive meristem, a very early stage of flower development and hence was selected for this study. It was found to be male-specific
in aspen (Pakull et al. 2015).

The TOZ19 consensus gene sequence was blasted against the date palm genome sequences in the NCBI Genbank database (https://blast.ncbi.nlm.nih.gov/ Blast.cgi). A highly homologous date palm gene was found in an unplaced genomic scaffold (DPV01 pds000016) and annotated as a putative Transducin Beta-like Protein 3 (TBL3) gene (LOC103701598).

We subsequently used this TBL3 gene as a reference template to design four PCR primer pairs (Abubakari 2016; Table 1) and to amplify the target region of * 1 Kbp using the CodonCode Aligner 6.0.1 software (CodonCode Corporation, Dedham, MA, USA).

DNA extraction and PCR amplification

The DNA extraction was done in accordance with the DNeasy Plant Mini Kit protocol (Qiagen, Hilden, Germany). A total volume of 14 lL was used for the PCR reaction per sample. This volume comprised of 1 lL of DNA sample, 6.8 lL of distilled water, 1.5 lL of MgCl2 (50 mM), 1.5 lL of 10x PCR buffer, 1 lL for each forward and reverse primers (5 lM), 1 lL of dNTPs (2.5 mM) and 0.2 lL of Taq Polymerase (Hot Star, Qiagen, Hilden, Germany). The PCRamplification program (Touchdown) was as following: initial denaturing step of 95 C, for 15 min, followed by 30 cycles of denaturing at 94 C for 1 min, annealing at 58–60 C for 1 min, extension at 72 C for 1 min, and then 25 cycles of denaturing at 94 C for 1 min, annealing at 50 C for 1 min, extension at 72 C for 1 min. Final extension was at 72 C for 20 min, and hold (pause) at 16 C. The PCR products were checked up on 1.5% Agarose gel in 1 9 TAE buffer. DNA fragments were cut out from the agarose gel under UV light and purified using the innuPREP Gel Extraction Kit (Analytik Jena AG, Jena, Germany) according to the manufacturer’s instructions for the further DNA sequencing of amplified fragments.

Desert Fruit

Namibia

The category of
Pioneering Development
and Productive Projects (Equally)

Introduction

Desert Fruit is located in the southern part of the Karas region of Namibia, bordering on the Orange River which is the international border between South Africa and Namibia. The coordinates for the farm are 28°30'45.88"S, 19°41'47.46"E.

The farm was purchased in 2004 and the first date palm trees were planted in 2005 with further annual plantings up to 2018. The first trees planted were tissue culture trees imported from Marionet laboratory in Dubai, subsequent plantings have been a combination of tissue culture trees and own production of off shoots.

The total area of the farm is 636.52ha of which 166,51ha is planted to date trees with a further 30ha of arable land still available to plant. In August 2019 an additional 727.65ha of the neighboring farm was purchased which has 180 - 200ha of arable land available to plant on.

Desert Fruit has a typical desert climate with low rainfall (50mm per annum) and low humidity with significant fluctuations between day and night temperatures during the winter. The average summer temperature is 42°C with peak temperatures reaching 52°C in January.

Abstract, Pioneering Development and Productive Project, Khalifa awards Desert Fruit, Namibia. Desert Fruit is one the biggest date farms in Namibia, the first dates were planted in 2005 and today has 166,51 hectares planted with four (4) main varieties. The harvest forecast for 2019 is 1000 tons and will increase to 2500 tons at full production. In terms of production we have taken a very holistic approach to produce high quality dates by trying to improve the soil health which creates healthier trees that promote improved human health.

Soil without biology is geology. We follow a strict Integrated Pest Management system and only use chemical applications when the pest or disease reaches a determined economic threshold. We are constantly looking and researching innovative ways to improve all the aspects of date production with numerous trials being done and more planned.

All dates are processed and packed on the farm in our pack house which is the biggest and most modern date packing facility in the Southern Hemisphere, with an capacity to pack and handle 2500 tons. Desert Fruit is GLOBAL G.A.P accredited for production and packing, BRC will be implemented in March 2019. Future additions to this facility will include value adding processes to optimize the income from of low-quality dates.

The Desert Fruit Foundation is a registered non-profit association that was started by the owners of the Company with the main aim of uplifting the local community with the main focus on education for the youth and farm workers. All the staff's children aged between 3 – 7 years old have access to the Desert Fruit Kidz creche which is located on the farm. As of January 2019, we are starting with our first internship program with post-graduate students from the University of Namibia.

Desert Fruit is one of the biggest agricultural projects in Namibia and plays an important role in developing the local and national economy through employment, education, direct foreign investment and foreign exchange inflows from export date sales entering the country. To date the owners have invested US$32m into this project with an additional US$4,3m to be invested in workers housing during 2019.

Social impact of the project

Desert Fruit has 241 full time employees which consist of the following:

• 17 Management • 6 Junior managers • 9 Team leaders • 154 General workers (farm and pack house) • 4 Creche staff • 8 Domestic staff • 19 Gardens and Maintenance • 21 Operators and tractor drivers • 3 Store clerks.

From February to June an additional 350 casual workers are employed to help with the harvest and packing process. This labour is sourced from the surrounding towns and farms in this area. As the farms production grows the amount of casual labour

required will increase to around 500 workers for this period, at full production during the harvest and packing season Desert Fruit will employ around 750 people of which 250 will be permanent positions.

Our monthly labour and management cost for all the permanent staff is N$2 140 000 (US$152 850) which included free housing, water and electricity. In the harvest and packing season this cost goes up to N$2 735 000 (US$195 000) per month.

To put the social impact of this farm into context the closest town to Desert Fruit is Araimsvlei which has a population of 400 people of which 35% of the people are unemployed. The biggest town in the area, Karasburg has a population of 4000 people. The Namibian minimum wage for farm workers is N$1 400 per month, at Desert Fruit our minimum wage is N$2 355 per month with free housing, electricity and water. Desert Fruit has had an agreement in place with the Farm Workers Union that for the last 4 years the workers have had annual increase of 10% per annum, this agreement is to be re-negotiated in 2019.

Given that the neighboring farms are all livestock farms that employ around 1 person per 2 500 hectares, 4 people per 10 000 hectare farm the contribution to the local economy and social impact of Desert Fruit is huge for this area and Namibia in general. Desert Fruits goal is to bring about a more ecologically, sosio-culturally and economically sustainable and equitable environment. Namibia has a population of 2,543 million people, according to the latest statistics, agriculture in Namibia is responsible for 20% of all employment in the country which makes it the biggest employer in the country. This has dropped from 29% in the last three years hence the importance of high value agriculture projects like Desert Fruit. The unemployment rate in Namibia is 34% with 43% of the youth (17 – 30 years) being unemployed, what is noticeable is that 70% of the unemployed in Namibia have not gone past junior secondary school.

The Desert Fruit work force is made up of most of the ethnic groups from all over the country which results in a large portion of the individual family's income being sent back to these areas to sustain family and dependents and in doing so the benefit is not just local but national as well. It is estimated that one salary sustains 4-6 people.

We have just started to build a new housing complex that will house all our permanent and seasonal labour on the farm. The cost of first phase of this project is N$60 million (US$4 285m).

The workers were involved in the design and layout of the town plans and houses to accommodate their own cultural requirements and try and create a nice family living environment. Recreational facilities like a soccer field have also been included in the town planning.

As the closest town is 160km from Desert Fruit all workers are transported to town at the end of the month to do their monthly shopping. The farm also has a shop for the workers that they can buy from during the week.


NAMIBIA

SAHAM AGR

Morocco

The category of
Pioneering Development
and Productive Projects (Equally)

SAHAM AGRI, subsidiary of the Saham Group, has launched in 2014 the biggest Medjool farm in the world with more than 52.000 Medjool palm trees in a 500 hectares farm near the city of Boudnid in Tafilalet region in South Eastern Morocco.

Saham Group is an International Company operating in many countries in Africa, Middle East, Europe, America and Asia. Saham Group core activities are outsourced services, real estate, education, healthcare and Agriculture.

Guided by the desire to put people at the heart of its priorities, Saham Agri, through Saham Foundation, has also committed to fighting against inequality, as well as to promoting access to care, education and jobs for the most marginalized in society. The goal being to achieve wider integration into society as a whole.

In order to fight against the biggest inequality in Morocco, our company has identified the Tafilalet region, which is the homeland of the Medjool palm tree to be one of the poorest regions in Morocco. The Tafilalet region has suffered the most in Morocco from the Fusarium Oxysporum Albedinis disease (commonly called “Bayoud”) which destroyed during the last 50 years more than 10 million palm trees (2/3 of the Moroccan palm grove).

The social and economic situation of the palm grove inhabitant and particularly the Tafilalet region has largely deteriorated during the last 50 years.

Therefore, our company, SAHAM AGRI has decided to change the social and economic situation of this area by launching the biggest Medjool palm tree plantation in the Tafilalet region and more precisely near Boudnid city. The Medjool date is considered to me the Queen of the Dates.

SAHAM AGRI has set up near Boudnid city a modern Medjool palm tree plantation with a state-of-the-art irrigation equipment and is surrounded by a team of the world’s leading experts in the Medjool field. SAHAM AGRI project will help the Moroccan government to compensate the loss of Medjool palm trees in the palm grove.

SAHAM AGRI's project is a leading project in the Medjool field and the Date Palm field in Morocco as well as in the world. Our company has planted more that 500 hectares of Medjool and has more than 1627 hectares of free land near Boudnib city to be planted. Our target in the following years is to set up a unique plantation of more than 2.127 hectares of Medjool plantations. Our goal is to become one of the major players in the World Date Palm business.

Executive Summary

Saham Agri was founded with the purpose of creating a sustainable agricultural project in a poor region of Morocco where our project could have an important socio-economic, educational and environmental impact.

• In order to fight against the biggest socio-economic inequalities in Morocco, our company has identified the Tafilalet region, which is the homeland of the Medjool palm tree to be one of the poorest regions in Morocco. The Tafilalet region has suffered the most in Morocco from the Fusarium Oxysporum Albedinis disease (commonly called as "Bayoud") which destroyed during the last 50 years more than 10 million palm trees (2/3 of the Moroccan palm grove). The social and economic situation of the palm grove inhabitant and particularly the Tafilalet region has largely deteriorated during the last 50 years.

• Therefore, our company, SAHAM AGRI has decided to change the social and economic situation of this area by launching the biggest Medjool palm tree plantation in the Tafilalet region and more precisely near Boudnid city. The Medjool date is considered to be the Queen of the Dates in the world.

• Our project is the leading Majhoul Date Palm project in Morocco and one of the leading projects in the world.

Morocco offers outstanding conditions for dates growing and especially Majhoul dates (commonly known as Medjool dates) thanks to its climate but also to accessible and cheap labour force. Morocco is also one of the most stable country in the region from a political and economic point of view ensuring optimal doing business conditions.

• Saham Agri was founded with the purpose of creating a sustainable agricultural project in a poor region of Morocco where our project could have an important socio-economic, educational and environmental impact.

• Saham Agri's goal is to provide a premier-quality Majhoul dates for the export market. This ambition is demonstrated through it's sustainable project:

• Building the biggest Majhoul farm in the world with a planted surface of 500Ha (+126ha to be planted in the next 2 years) and

1.500 Ha to be planted in the next 5 years. A unique Majhoul production capacity going forward of over 7000 tons of Majhoul dates that can extend up to 28.000 tons of Majhou;
• Deploying the latest technologies and equipment related to irrigations and energy efficiency, in order to optimize water and electricity consumption;
• Accumulating a unique know-how thanks to international experts and site visits to other farms across the world (USA, UAE, Tunisia, Palestine, Jordan, etc.);
• Formalizing processes and deploying a state-of-the-art ERP in compliance with international standards;
• Offering international training for it's technicians on the Modern Majhoul Growingin ;
• Global GAP compliance process and certification to be implemented upon our first production in 2020;
• Planning to build an integrated packing house in 2019 to control the whole value chain of the industry.

The biggest Majhoul farm in the world / A combined surface of over 2000Ha
Ourplantationis 100% organogenesis invitro tissue culture from authentic Moroccan Majhoul palm trees. All our plants have been certified as Authentic Majhoul by an International French Laboratory as well as by the Moroccan Health Agency ONSSA

The reason we used tissue culture Majhoul palms trees is to avoid to bring the Fusarium Oxysporum Albedinis disease from the palm grove in the desert areas into our farms. The Moroccan government has been working with us in order to provide us with Majhoul palm trees free of diseases in order to set up new plantations outside the infected areas.The area between the city of Boudnib and Meski where our farms are located is a quarantined zone.

Saham Agri' sstory began in 2014 and since then, we have been able to set up the biggest and safest Majhoul plantation in Morocco and in the world thanks to our high standards of hygiene, safety and infrastructure:
• Drive-through and walk-through disinfection basins
• Staff biometric authentication
• Aself-sufficient ecosystem
• Aremarkable infrastructure (irrigation, electricity, modernequipments, etc.)


of
es
الدَّولةَ
لِنَخِيـ
وَالا

Groasis

Netherlands

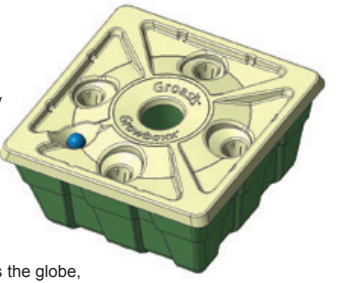
The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector

Groasis has developed the Groasis Ecological Water Saving Technology. This is a planting technology that has the 'Triple 90 benefits›:
1- it is 90% cheaper than drip irrigation
2- it uses 90% less water than drip irrigation
3- it guarantees over 90% survival rate
The Groasis Ecological Water Saving Technology is used in 42 countries world wide, amongst them the UAE, with great success. It consists of 5 steps that can be taken together, or individually:
1) Causing increased water infiltration into the soil with the Groasis Terracedixx
2) Make planting holes that leave the capillary system intact - this can be done by hand, or with the Groasis capillary drill
3) Use mycorrhizae (fungi) that support the root system and replace fertilizers
4) Use the Growboxx plant cocoon - an Intelligent bucket - for a healthy microclimate and water to plant trees in combination with vegetables without using irrigation
5) Use the BioGrowsafe plant protector against grazing animals

Awards:
Groasis has received many awards for its groundbreaking technology. Amongst them:
1- in 2016 Groasis was awarded National Icon of The Netherlands by the Dutch government for being one of the 3 most innovative companies of the country with a high social and sutainable impact.
2- in 2017 United Nations' World Food Programme selected Groasis as one of the 3 Innovation Accelerators for it 'Zero hunger by 2030' target.
3 -in 2018 Groasis was selected as Number 1 of the Small Business Entities Top 100 of Most Innovative Companies of The Netherlands.
4- With the Groasis Ecological Water Saving Technology we can plant the UAE - and all other countries that suffer from heat and drought - without using irrigation.

Our Vision

make 2 billion hectares of degraded land productive again in order to
1) eradicate hunger
2) mitigate water scarcity
3) lessen climate change The patented and proven Groasis Ecological Water Saving Technology allows planting on degraded land without using irrigation.



Users of the technology profit from its "triple 90 benefit»

1) the cost of making degraded land productive again reduces by 90%
2) water use is reduced by over 90% and
3) the plant survival rate is in excess of 90%

This has all been reliably demonstrated over 12 years of pilot plantings in over 40 countries across the globe,

and has been validated by independent, renowned, parties.
The technology has wide ranging applications such as agroforestry, ecosystem restoration, landscaping and urban farming.

The Problem

Mankind faces seven interconnected challenges

1) Poverty

2) Unemployment 500mn small scale farmers support the livelihoods of >2bn people and produce 80% of the food in developing countries Small scale farms are the primary source of employment and the only pathway out of poverty 52% of the land used for agri culture is moderately or severely affected by soil degradation

3) Food shortage Food demand will increase by 60% by 2050 Majority of growth needs to come from improved crop yields In the next 25 years we need to produce as much food as in the past 10,000 years

4) Water scarcity Irrigation consumes 70% of global freshwater Water demand will increase 50% by 2050 About 2/3 of 2050 population will suffer from water stress

5) Rural urban migration Globally, 66% of the global population is expected to have migrated to urban environments by 2050

6) Climate change Greenhouse gas emissions (GHG) need to fall by >50% to 21 22Gt by 2050 to meet 2 2°C target GHG will grow by 75% to 85Gt by 2050 (BAU) >60Gt target gap (1.3x today's

7) Land degradation Every year 12mn hectare of arable land is lost due to drought & desertification (equivalent to half of the United Kingdom) Land degradation affects 1.5bn people or 74% of the poor globally.

Dr. Julian Schroeder

University of California, USA

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation (Equally)

Julian Schroeder did his PhD research at the Max-Planck Institute for Biophysical Chemistry in Goettingen (Germany) with Nobel Laureate Erwin Neher and was a von Humboldt Postdoctoral Fellow at UCLA School of Medicine (USA). He received awards, including the Presidential Young Investigator Award (National Science Foundation USA), the American
Society of Plant Biology Charles-Albert-Shull Award (1997), the DFG Heinz-Maier-Leibnitz Prize (Germany), the Blasker Award in Environmental Science (USA), is Churchill Overseas Fellow at Cambridge University (UK) and with collaborators shared the Cozzarelli Prize from PNAS (2010) and a top 10 breakthrough of the year selected by Science (2009).

He has served on several advisory boards, including Co-Director of the Food and Fuel for the 21st Century Center. He was Humboldt Fellow at the MPI for Biochemistry, visiting Professor at the ETH Zurich and is a member of the U.S. National Academy of Sciences, a Fellow of AAAS and the German National Academy of Science Leopoldina, President of the American Society of Plant Biologists (1994) and Chinese Academy of Sciences International Professor.

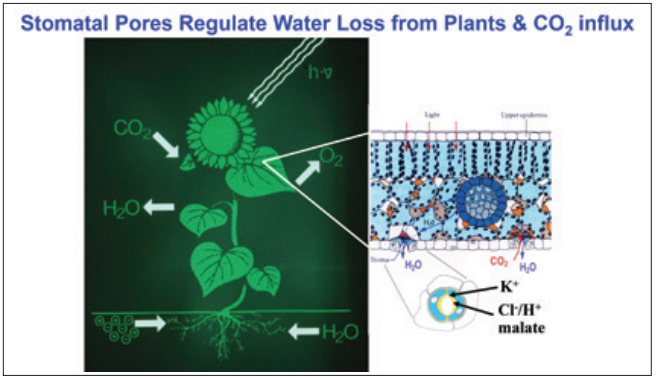
Research

Identifying the basic molecular mechanisms by which plants respond to and mount resistance to environmental stresses is fundamental to understanding stress resistance mechanisms to these “abiotic” in plants and is an important goal for developing future strategies for engineering stress resistance in plants. Several abiotic stress mechanisms that we are characterizing are directly linked to water, including drought stress-induced signal transduction mechanisms, salinity resistance mechanisms and how plants respond to the continuing rise in the atmospheric CO 2 concentration.

Our laboratory's research is directed at the signal transduction mechanisms and pathways that mediate resistance to environmental ("abiotic") stresses in plants, in particular responses to elevated CO 2, drought, salinity stress, and heavy metal stress. These abiotic stresses have substantial negative impacts and reduce global plant growth and biomass production. These environmental stresses are also relevant in reference to climate change and to expanding available arable land to meet the food and energy needs of the growing human population.

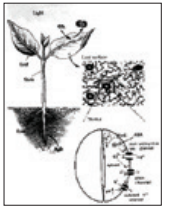
Our research is elucidating the molecular and cell biological stress-induced signal transduction cascades in higher plant cells, examining the chain of events by which plant cells respond to elevated CO 2, the drought stress hormone abscisic acid and salinity stress to mount specific resistance and adaptation responses. We have developed and adapted interdisciplinary and systems biological approaches to guard cells, which control water loss and CO 2 intake in plants and which have become a key model system for understanding dynamic cellular signal transduction and ion channel functions in plants.

Stomatal pores in the epidermis of leaves allow CO 2 influx into leaves from the atmosphere and also mediate transpirational water loss of plants (see figure). Two guard cells surround each pore and control the opening and closing of stomata. In guard cells, cell biological, molecular, patch clamp and time-resolved calcium imaging studies on genetic signaling mutants in Arabidopsis are allowing us to identify and characterize stress-induced signal transduction mechanisms and cascades. We are combining these analyses with new genomic, systems, bioin-



formatic and proteomic approaches towards discovering new signaling mechanisms and principles. We have identified CO 2 binding proteins and early CO 2 signal transduction mechanisms, including ion channels in guard cells through which elevated CO 2 closes stomatal pores. We have recently identified new early signal transduction mechanisms and contributed to the characterization and co-identified receptors for the plant stress hormone abscisic acid and have obtained molecular genetic, cell biological, genomic, biophysical whole plant physiological evidence for new genes and mechanisms in guard cells that reduce water loss of Arabidopsis during drought.

A second effort in the lab focuses on identifying genes that mediate salt (sodium) stress resistance and heavy metal uptake and detoxification in plants. In this research we identified the plant HKT transporter family and showed its central role in mediating salinity resistance in the reference plant, Arabidopsis thaliana. Research on the staple crops rice and wheat is showing that this same HKT transporter mechanism plays a major role in determining salinity resistance. HKT gene-focused molecular breeding efforts are indicating major improvements in yield, illustrating how basic Arabidopsis research is leading to innovation in agriculture.



Our research into heavy metal stress led to the parallel discovery of the genes encoding the central heavy metal detoxification enzymes in plants, phytochelatin synthases. Furthermore recent research has identified the long sought family of transporters that mediate heavy metal accumulation in plant vacuoles. These basic research advances can provide key tools for avoiding toxic heavy metal and arsenic accumulation in edible plant tissues, a problem facing millions of people today leading to cancer and other diseases. Furthermore, these basic research advances can contribute key tools for engineering plants for environmental remediation (bioremediation) by removal of heavy metals from soils.

Members in our lab are being trained in interdisciplinary and systems biological techniques while pursuing individual research projects.

See Publication List at:

269 Publications from that +15 in Nature +11 in Science +25 in Proceedings National Academy of Sciences USA +10 in Cell +30 in Plant Cell +10 in Cell +30 in Plant Cell

https://labs.biology.ucsd.edu/schroeder/publications.html

Dr. AbdulBasit Oudah Ibrahim

Iraq

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation (Equally)

• Nationality: Iraqi

1) B. Sc. Agricultural Sciences (Horticulture and Date Palm) University of Al-Basra (1977).

2) M. Sc. Agricultural Sciences (Horticulture Dept.), Physiology of Date palm, University of Baghdad (1980).

Thesis title: Seasonal Changes in Concentration of NPK Nutrients in the Leaves, Fruits and Orchard Soil of Some Commercial Date Palm Cultivars.

3) . Ph. D. Agricultural Sciences (Horticulture and Date Palm Dept.), Physiology of Date Palm, University of Basra (1995).

Thesis title: The Physiological Relationship between Growth Regulators and Fruits Characteristics of Date Palm, Hillawi Cultivar.

Administrative positions

1- Director of the Date Palm Research Center, from 26/2/1995 to 2/10/1997 Basra University.

2- Head of Horticulture and Date Palm Department from 2/10/1997 to 22/4/2001, Basra University.

3- Dean of Faculty of Agriculture, Basra University from 23/4/2001 to 24/4/2003.

4- Head of date palm program (The Arab Center for the Studies of Arid Zones and Dry Lands) ACSAD from 16\10\2005to 1/5/2011.

5- Director of Plant Resources Dept. (The Arab Center for the Studies of Arid Zones and Dry Lands) ACSAD from1\6\2007t01/5/2011.

6- Working with international researchers team to prepare project proposal to plantation one million date palm trees in Oman Sultanate.12-20/10/2010.

7- Judgment the application of General Commission for Scientific Agricultural Research of Syria submitted to Islamic Development Bank (IDB) prize for science and Technology for 2011.

8- Date palm horticulture expert in Million date palm plantation in Oman Sultan-

ate.10/5/2011. Till now
9- Part-time Consultant for National Center for Date Palm (NAKHL) Saudi Arabia / Riyadh 01/11/2014 -1/11/2015.
10- Part-time Consultant for Indonesian Date Palm Association (IDPA) 2017 till now.

Academic and Research experiences

First - published scientific research (49 research=33 Arabic+16English).

Second- Teaching experiences

- Courses to students of preliminary studies (undergraduate).

Date palm cultivation and production, Physiology and anatomy of date palms, Date palm Classification and cultivars, General plant, Morphology and anatomy, Environment and pollution, Growth regulators, Tissue culture.

- Courses to postgraduate student

Advanced date palm physiology, advanced, physiology of fruit trees, advanced growth regulators, advanced plant physiology.

Third- Supervision on post-graduate students

10 Master Degree Theses, and 5 Ph. D. Theses.

Fourth- Papers and scientific articles published

• Articles published in The Blessed Tree magazine (UAE) (13=10arabic+3English).
• Articles published in date palm and Dates Magazine (KSA)(6)
• Articles published in the Agriculture and Water in the Arab World

Magazine (ACSAD).(2)

• Iraqi Date palm .net wok

Publication 48 articles and studies on archaeological history, scientific and Agricultural Extension

Scientific journals

1- Editor-in-Chief of Basrah Journal of Date palm research, 2001-2003
2- Editor-in-Chief of Basra Journal of Agricultural Sciences, 2001-2003
3- Editorial Board of the Arab Journal of Dry Environments, 2008-2011
4- Editorial board of the Journal of Agriculture and Water in the Arab World. 2008-2011

Practical experience in date palm field

- Technical and scientific expertise in date palm plantation and date production.

- Applied experience in the design and implementation of palm farms using integrated packages and good agriculture practices (GAP) in date palm service more than 18 years.
- Expertise in the field of propagation of date palm and conservation of promising cultivars and establishment of field Gene bank
- Supervising date palm plantation and growing stages, pollination, technical service and dates production for 18 years.
- Field experience in the establishment and management of date palm orchards (farms) and preparation of date palm projects.
- Publication of guidance and awareness articles about the date palm in the Iraqi date palm network site.

Practical experiences in date palm development for the Arab countries

Jordan Kingdom /Syrian Arab Republic / Republic of Yemen / Republic of Iraq
Republic of Egypt / Sultanate of Oman / Saudi Arabia Kingdom
Bahrain Kingdom / Republic of Algeria / Republic of Indonesia
Cooperation with international organizations

Islamic Development Bank (IDB)

1- Presented an integrated study to establish a regional center for Date Palm and Dates Research in the Arab World, in2008, which included (Mission, Objectives, Activities, Scientific Departments, Service and administrative units).
2- Preparation a project to develop dates processing and date palm products in the Arab world.
3- Comprehensive study about reality and future of dates marketing and Suggested programs for improvement in the Arab world
4- Improve productivity and quality of date palm fruits and other fruit trees and plants associated with by application of organic farming system.

International Food and Agriculture Organization (FAO)

Implementation of training program with the of FAO Iraq / Office and Iraqi Date palm General Authority for rehabilitation and building capacity of Iraqi engineers, where 6 courses were implemented during the period 2008-2011.

International Center for Agricultural Research in the Dry Areas (ICARDA)

Arab Organization for Agricultural Development (AOAD)

Chairman of team for Preparing country report for Sultanate of Oman, Kingdom of Bahrain and State of Qatar in relation to Dates Value chain (2018).

Photographed By: Ahmed Salem Juma'a Al-Bayraq


2020
Twelfth
Session

Honored
Twelfth Session 2020

- **H.E. Mariam bint Mohammed Saeed Hareb Almheiri / United Arab Emirates.**
- **H.E. Dr. Samir Al-Shaker Al Noaman / Republic of Iraq.**
- **H.E. Dr. Mustafa Lasram / Republic of Tunisia.**

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شـــــؤون الـــرئـــاســـــة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمـــــارات
THE EMIRATES

صاحب السمو الشيخ
خليفـــة بن زايـد آل نهـيان
رئيس دولة الإمارات العربية المتحدة
مؤسس الجائزة وراعيها «حفظه الله»

المكرمون بجائزة خليفة الدولية لنخيل التمر والابتكار الزراعي

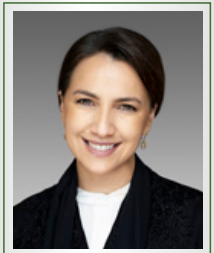
The Honored of Khalifa International Award for Date Palm and Agricultural Innovation

Twelfth Session 2020 الدورة الثانية عشرة

Dr. Mustapha Larsam
Former Director General
National Institute of Agronomic Research
Republic of Tunisia

Dr. Samir Al-Shaker
International Expert in
Date Palm Cultivation and Date Production
Republic of Iraq

H.E. Mariam bint Mohammed Saeed Hareb Almheiri
Minister of State for Food Security
United Arab Emirates



H.E. Mariam bint Mohammed Saeed Hareb Almheiri

Minister of State for Food Security
United Arab Emirates

Her Excellency Mariam bint Mohammed Saeed Hareb Almheiri was appointed as Minister of State for Food Security following the Cabinet reshuffle of October 2017. Her responsibilities include overseeing the development of the necessary infrastructure that would ensure the country's food security objectives, in line with UAE Centennial 2071 Plan.

In addition, H.E. represents the UAE federal government in the Food and Agriculture Organisation of the United Nations (FAO) as well as the International Center for Biosaline Agriculture (ICBA). She is also a member of the Board of Directors in the Abu Dhabi Agriculture and Food Safety Authority (ADAFSA), the Board of Trustees of the Dubai Future Foundation (DFF) and the World Economic Forum's Global Future Council on Food Systems Innovation. She has also been nominated to lead some unique projects in the field of aquaculture under the initiatives of H.H. the President of UAE, through the Ministry of Presidential Affairs to establish the foundation needed for this new economic sector to develop and thrive in the country. In addition, she is also a member of the overseeing council of the recently launch Ministry of Possibilities.

H.E. Almheiri previously served as Assistant Undersecretary for Water Resources and Nature Conservation Affairs at the Ministry of Climate Change and Environment, where she was appointed to oversee the Biodiversity, Fisheries, Coastal & Marine Sustainability and Marine Research departments.

H.E. Mariam Almheiri received her bachelor and master's degrees in Mechanical Engineering from the Rheinisch-Westfälische Technische Hochschule (RWTH) in Aachen, Germany.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة TWELVTH SESSION

Honored Persons المكرمون

H.E. Mariam bint Mohammed Saeed Hareb Almheiri

Minister of State for Food Security
United Arab Emirates

H.E. Dr. Samir Al-Shaker

International Expert in Date Palm Cultivation and Date Production
Republic of Iraq

Name: Sameer Abdulhameed Ahmed Al Shaker Al Noamani
Birthdate: Sulaimaniyah, 20/09/1935

Academic Achievements:

1. Bachelor of Agriculture: Cairo University, Giza, Egypt
2. Master of Food Industries: University of Georgia, USA
3. Ph.D.: Food Science: University of Georgia, USA

Educational Experience:

1.Teaching bachelor's and master's degree students, food industries, assistant professor.
2. Head of the Food Industry Department.
3. Dean of the Faculty of Agriculture, University of Baghdad.

Research Experience:

1. Director General of Agricultural Research and Water Resources, Council for Scientific Research in Iraq.
2. A scientific researcher who presented and published 42 papers and studies in the field of horticulture and date technology.

International Expertise:

1. Iraq's Permanent Representative to the United Nations, Food and Agriculture Organization (FAO)
2. Member of the Executive Board of the International Fund for Agricultural Development (IFAD)
3. Chairman of the Standing Committee on the Food Constitution codex for dry fruits and vegetables
4- Expert in the Arab Federation of Food Industries, Arab League
5. Coordinator of the Date Palm Global Network (DPGN)
6- Member of the Scientific Committee of the Khalifa International Award for Date Palm and Agricultural Innovation
7- Technical Director of the UAE Date factory, Al Saad UAE.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة TWELVTH SESSION

Honored Persons المكرمون

Dr. Samir Al-Shaker

International Expert in
Date Palm Cultivation and Date Production
Republic of Iraq

H.E. Dr. Mustafa Lasram

Former Director General
National Institute of Agronomic Research
Republic of Tunisia

-Engineer in Agronomy, born in 1941, graduated from the Ecole Nationale Supérieure Agronomique de Toulouse, France (1967), obtained a Master's degree in Advanced Studies in Plant Biology from the Faculty of Sciences, Orsay - Paris VII, France in 1969, and an Advanced Diploma specialized in Biology and Plant Breeding from the Development Research Institute, Paris, France, in 1969 (became the Institut de Rescherche Dévelopment, IRD since 1998).

From 1978 to 1991: Director General of the National Institute for Agronomic Research Institute, Tunisia.

From 1991 to 1997: Secretary-General of the International Centre of Mediterranean Agronomic Studies in Paris (CIHEAM).

From 1997 to 2001: In-charge Officer at the Ministry of Agriculture and Water Resources in Tunisia, monitoring the research of higher education and vocational training programmes in the agricultural sector.

From 2001 to 2006: Served the Republic Presidency programme 21-21 for operation (2001-2003)

Since 2006: Retired, Freelance Consultant.

- Implemented the study in date palm tree pollination using different pollen origins. The use of this pollen induced an early ripening that includes the type of Deglat Noor to avoid the damage of autumn rains and harm the income of the farmer by importing and using the pollen "Fard 4" from the United States of America. A hybrid type of seeds from Deglat Noor and Hallawy were planted in order to study its specialties.
- Acquired the skeletal devices for National Institute for Agricultural Research analysis laboratory that was used for soil, water and plant and serve farmers and analyze their soil samples (1985 funded by the United States of America)/
- Established the first date palm research centre (1984) in the National Institute for Agronomic Research in the Southern part of Daqash, near the city of Tozeur, with the support of the Food and Agriculture Organization.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة TWELVTH SESSION

Honored Persons المكرمون

Dr. Mustapha Larsam

Former Director General
National Institute of Agronomic Research
Republic of Tunisia

Winners

Twelfth Session 2020

The category of Distinguished Innovative Studies and Modern Technology

- **Dr. Ikram Blilou / King Abdullah University of Science and Technology / Saudi Arabia.**

The category of Pioneering Development and Productive Projects

- **American University of Beirut / Lebanon.**

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector

- **Al-Nakhli / United Arab Emirates.**

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation, (Shared equally between):

- **Dr. Hasnaâ Harrak / Kingdom of Morocco.**
- **Professor Dr. Kazuo Shinozaki / Japan.**

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شـــــؤون الـــرئـــاســـة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمـــــارات
THE EMIRATES

صاحب السمو الشيخ
خليفـــة بن زايـد آل نهيان
رئيس دولة الإمارات العربية المتحدة
مؤسس الجائزة وراعيها «حفظه الله»

الفائزون بجائزة خليفة الدولية لنخيل التمر والابتكار الزراعي

The Winners of Khalifa International Award for Date Palm and Agricultural Innovation

Twelfth Session 2020 الدورة الثانية عشرة

12

فئة الدراسات المتميزة والتكنولوجيا الحديثة
Distinguished Innovative Studies and Modern Technology

فئة المشاريع التنموية والإنتاجية الرائدة
Distinguished Pioneering Development & Productive Projects

فئة الابتكارات الرائدة والمتطورة لخدمة القطاع الزراعي
Pioneering and Sophisticated Innovations Serving the Agricultural Sector

فئة الشخصية المتميزة في مجال النخيل والتمر والابتكار الزراعي
Influential Figure in the Field of Date Palm and Agricultural Innovation

(Equally Between) (مناصفة بين)

أ.د. كازو شينوزاكي
اليابان
Prof. Kazuo Shinozaki
Japan

د. حسناء الحراق
المملكة المغربية
Dr. Hasnaa Harrak
Kingdom of Morocco

النخلي
Al Nakhli

مؤسسة النخلي
دبي، دولة الإمارات العربية المتحدة
Al-Nakhli
Dubai, United Arab Emirates

1866 AUB American University of Beirut الجامعة الأميركية في بيروت

الجامعة الأمريكية بيروت
الجمهورية اللبنانية
American University of Beirut
Lebanon

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

جامعة الملك عبدالله للعلوم والتقنية
المملكة العربية السعودية
KAUST
Saudi Arabia

Dr. Ikram Blilou
King Abdullah University of Science and Technology
Saudi Arabia

The category of
Distinguished Innovative Studies
and Modern Technology

Date palm: Developmental mysteries unveiled.

Being sessile, plants had to develop sophisticated strategies to adapt and survive in their continually changing environment. Unlike animals where organogenesis occurs during embryogenesis, plants form organs post-embryonically and throughout their life cycle. In addition, when confronted to physical damage, plants have the ability to rewire their developmental program to regenerate new tissues and organs. Plants can also thrive in challenging environments. The desert ecosystem is an excellent example to illustrate this developmental plasticity. In such hostile conditions, plants have adopted various strategies to survive in soils with limited water and resources, mostly by relying on their root system, the only organ that is directly in contact with the soil and thus senses all changes in their surroundings.

The Date palm (*Phoenix dactylifera* L.) is a landmark for the desert; it is one of the main fruit trees cultivated in the Middle East and North Africa. Date fruits are known for their high nutritional value in addition to being an important source for antioxidants. Despite being a major crop for desert agriculture, date palm research if facing major challenges because of the long generation time and its dioceses state. These challenges hinder conducting genetics and functional biology studies and prevent attempts toward establishing breeding strategies for improving production in date palm. Hence, efforts were invested in genomics, proteomics, and metabolomics. Moreover, studies involving developmental and molecular biology, essential for providing the basic knowledge underlying date palm developmental programs have been lacking and thus, processes of date palm adaptation to the desert environment remain poorly understood.

In this study, we report a comprehensive d analysis of date palm growth, from germination to seedlings stages. We have implemented the state of art technology, including high-resolution microscopy imaging, non-invasive X-ray micro-Computed Tomography (micro-CT), transcriptomics, cell biology and histology. To date, no reports have combined all these technologies to understand date palm organogenesis and morphogenesis. We describe 3 adaptive developmental strategies during early date palm development

Adaptive strategy 1: remote germination+ embryonic dormancy

First, we characterized a fundamental and yet poorly described developmental program in date palm: the remote germination. We monitored the growth from germination to the seedling stage, and we revealed that date palm germination consists of two important events, one early event occurring when the cotyledonary petiole, a structure with a root-like morphology, emerges and grows away from the seed coat. For anatomical characterization of the emerged cotyledonary petiole, we used longitudinal sections obtained either by microtome or vibratome; the sections were then stained and imaged with light and confocal microscopes. Our primary observations indicated no morphological differences between the embryo isolated from seed and the early emerged cotyledonary petiole. Markers for the cell cycle indicates low cell division rates at this stage of development. Together these data suggest that the embryo remains dormant within the cotyledonary petiole. Our hormones measurement assays revealed an accumulation of hormones associated with dormancy state.

To map the shoot and root meristem within the embryo and to distinguish tissue lineages, we performed RNA in situ hybridization experiments, using specific gene sequences marking specific cell types. Our findings revealed that during the cotyledonary petiole carries away a dormant embryo that stays attached and nourished through the vascular tissue, a feature reminiscent of the umbilical cord in mammalian systems. This halted phase in the development is similar to diapause in animals used as a survival strategy against the harsh environment and predators

Adaptive strategy 2: Protective organogenesis

The second germination event occurs a few weeks later as the cotyledonary petiole, continues to elongate and grow away from the mother seed. This even correlates with the embryo awakening and exit from dormancy. All cells initiate successive rounds of cell division, elongation, proliferation followed by organogenesis and morphogenesis; the result is a seedling that emerges out from the surrounding tissues. Hence, unlike other plant species where the above-ground organs emerge immediately after germination. In date palm, the entire seedling remains encapsulated and protected inside

the cotyledonary petiole. The germination mode reflects a unique developmental program where the date palm protects the delicate and young growing tissues from the surrounding threats (drought, pathogens, and insect herbivores).

Adaptive strategy 3: an efficient root system with unique features

After emerging from the cotyledonary petiole, the leaves arise at the surface, and a seedling is developed where the roots and leaves can be easily distinguished. From this stage onward, the date palm seedling will rely on its root system. The roots are important organs not only for soil anchorage but also for water and nutrient acquisition. Growing on desert soil characterized by high levels of salinity, we were compelled to examine the root system architecture of date palm to divulge traits of adaptation to desert soils. To examine the growing roots of date palm plants in a non-invasive manner, we implemented for the first time in date palm research X-ray micro-Computed Tomography (X-ray micro-CT) to create a 3 dimensional (3D) images of growing date palm roots palm. Based on differential absorption of X-rays by the sample, this powerful technique can acquire 3D images for living plants with high spatial resolution and without disturbing the samples allowing visualizing the whole plants in a non-destructive manner. X-ray micro-CT imaging revealed interesting features in date palm roots, including the elongation of the cotyledonary petiole, the emerging leaves and most interestingly different root types originating from the main roots including polyp like structures growing vertically. These structures are termed pneumatophores, while pneumatophores grow upwards toward the surface of the soil, date palm exhibited secondary roots growing horizontally. These different root types in date palm systems reflect another mode of adaptation to the scarcity of water. The agravitropic pneumatophores are designed to efficiently uptake water during occasional and unexpected rainfalls.

Adaptation to drought and salinity conditions correlates with suberized and lignified root tissues. Detailed analysis of the root anatomy of date palm using high-resolution microscopy imaging, cell biology and histology revealed that date palm tissues consist of multiple suberized epidermal layers, two types of cortex tissues termed outer and inner cortex depending on their position vis-à-vis the vasculature. Within the cortex layers, we found specialized aerenchyma and atypical suberized and lignified cells called fiber cells. At the center of the root, the endodermis surrounds the vasculature composed of highly suberized and lignified xylem tissues. These lignified tissues within the root form a barrier to prevent water loss by balancing ion fluxes and monitoring the passage of ions through the vasculature. These features correlate with the adaptation capacity of the date palm to grow in soils with high salinity. Transcriptomic analysis of root tissues showed enrichment of Aquaporin genes in addition to genes involves in response to beneficial microorganisms. While Aquaporins would promote water uptake, the root-associated bacteria will promote tolerance to salinity in date palm.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة
TWELVTH SESSION

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

Distinguished Innovative Studies and Modern Technology

King Abdullah University of Science and Technology

Saudi Arabia

American University of Beirut

Lebanon

The category of
Pioneering Development
and Productive Projects

Climate-Smart Livelihoods Initiatives and Market Access Tailoring (CLIMAT)

The Environment & Sustainable Development Unit (ESDU), hosted at the Faculty of Agricultural and Food Sciences of the American University of Beirut, is an inter-disciplinary research and development center specialized in rural community development, local food systems and sustainable agriculture. For more than 20 years, ESDU has been promoting sustainable rural livelihoods all over Lebanon and the MENA region by focusing on participatory development and capacity building with particular attention to smallholder farmers, women and youth in the rural areas. ESDU works on embedding development into relief in a region where conflicts have been multiplying and poverty has been exacerbated.

In light of the harsh socio-economic conditions of rural communities in Lebanon, and in line with ESDU's mission to foster rural livelihoods and food security, CLIMAT – Climate Smart Livelihoods Initiatives and Market Access Tailoring – was a one-year project (October 2018 – October 2019) implemented in West Bekaa and Northeast Baalbeck of Lebanon by ESDU in partnership with Cooperation without Borders (CWB), a local NGO in Northeast Baalbeck. This project was funded by the German Cooperation through the World Food Program (WFP) - under WFP program "Enhancing the livelihoods of Syrian Refugees and vulnerable Lebanese host communities through Food for Training (FFT)". CLIMAT aimed to sustainably improve the skills, capacities and livelihood opportunities of vulnerable Lebanese and Syrian refugees through the promotion of climate-smart livelihoods in a region facing political and economic instability and serious poverty and food insecurity rates.

Context

The targeted areas (Northeast Baalbeck and West Bekaa) are located in the Bekaa valley and are among the most remote and vulnerable regions in Lebanon

hosting around 555,149 Lebanese and 338,577 Syrian refugees. About 80% of the households residing in these areas live under the Survival Minimum Expenditure Basket (87 USD), and the region has amongst the lowest employment-to-population ratios. The Bekaa is the biggest agricultural area accounting for about 50% of total used agricultural land. Nevertheless, this sector has been facing many challenges which are being exacerbated by the Syrian crisis and by the current economic crisis. The significant influx of Syrian refugees – the Bekaa hosting around 38% of total refugees - has exacerbated employment challenges for both refugees and hosting communities and has imposed further stress on social services, natural resources and job market. Unsustainable resource management has been leading to overexploitation, pollution and waste of resources. In addition, lack of access to information on sustainable agricultural practices and lack of innovative techniques are causing continuous decline in agricultural productivity and thus increasing pressure on the deprived rural population. Weak marketing system is another constraint facing agricultural production in Lebanon in general and small-scale production in the Bekaa region in particular. In addition to all these challenges, climate change is one of the major threats affecting and shaping the future of food security.

Areas of Intervention

Through CLIMAT, access to knowledge and market, gender and inequality, and sustainable food production were addressed targeting three value chains: i) small ruminant production (including herd and natural pasture management, livestock health, dairy production and artisanal rugs production and natural dying), ii) alternative and climate-smart agricultural crop production (including berries, floriculture, aromatics, freekeh production and processing, barley sprouts production, seedling production, hydroponic tomato and sustainable agricultural practices), and iii) agro-food processing (sun-drying of fruits, vegetables and herbs). The project adopted the “seed to table” approach intervening throughout the whole value chains through:

1- Capacity building: Training/coaching sessions were provided for farmers, women and youth on climate-smart sustainable agricultural practices, and food processing with a special focus on food safety measures. In order to promote sustainable practices following the Farmers Field School Approach, agricultural demonstration plots were developed and are sustained beyond the project period to offer farmers extension services and subsidized seedling services.

2- Assets support: Local community kitchens were assessed, and five kitchens were selected and upgraded based on participatory approach. Upgrading was associated with training on food processing, kitchen management and food safety.

3- Facilitating market linkages: A market strategy was developed by marketing experts, and its implementation was set into action. The main identified lines of intervention include: 1) combining product innovation and authenticity; 2) diversification of

activities; 3) responsive communication and marketing strategy; and 4) fully functional alternative food value chain network. CLIMAT marketing activities included ensuring high quality product and combining product innovation and authenticity through training and coaching sessions, marketing small-scale products under Food & Roots marketing unit established by ESDU (the unit offers small-scale farmers access to safe packaging and labelling); and supporting producers' access to new markets (farmers markets, national events, and niche markets).

Approach

Based on the Theory of Change approach, CLIMAT aimed at empowering vulnerable communities through building capacities, providing assets support and supporting access to markets based on the following approaches.

1- Sustainability and Participatory Approach - CLIMAT followed participatory and sustainability approaches focusing on the involvement of targeted communities in decision making and project implementation, promoting sustainable use of natural resources, and supporting poverty alleviation and food security through providing alternative sustainable livelihood strategies. By building the capacities of vulnerable communities, the project fosters local people to take action on issues themselves and promotes sense of ownership and empowerment so that beneficiaries gain greater control over their development.

2- Gender Mainstreaming - The project provided women, who are among the most vulnerable groups within their communities, special consideration throughout its activities. By providing women a safe space to communicate, CLIMAT further promoted social cohesion and social empowerment. Providing women access to knowledge and to the market promotes their decision-making power and offers them the potentials to invest their skills in new livelihood strategies, hence fostering their economic empowerment. Joint training sessions of women and men by highly engaged outreach officers promotes higher awareness for cooperation across gender roles, and the promotion of women in marketing activities increased the awareness of the role women play in food production.

3- Innovative Approach - The project targeted process and marketing innovation applied to traditional agro-food productions, aiming at: introducing innovative food production, combining between product innovation and authenticity, making production processes more sustainable and strengthening the linkages among producers, markets and consumers.

4- From Seed to Table - The project adopted a holistic approach, from seed to table, through the promotion of sustainable agricultural practices, the promotion of innovative and climate-smart agro-food processing, and the facilitation of a market-driven rationale and strong community-driven mechanisms.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شـــؤون الـرئـاســة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمـــارات
THE EMIRATES

12

2020 الـــدورة الثـانـيـة عـــشـــرة
TWELVTH SESSION

1866 AUB American University of Beirut الجامعة الأميركية في بيروت

Distinguished Pioneering
Development & Productive Projects

American University of Beirut

Lebanon

Al-Nakhli

United Arab Emirates

The category of Pioneering and Sophisticated Innovations Serving the Agricultural Sector

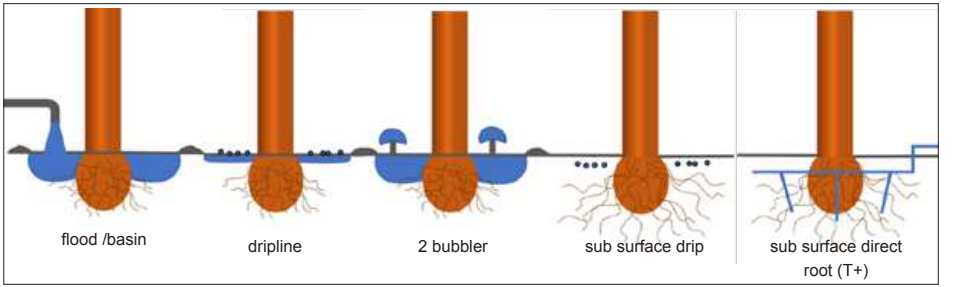
"The impact of using the Subsurface -TERRAPLUS tube (T+) system on irrigation amounts and yield for date cultivation in Dubai"

Name of Principal Investigator(s):
Mr. Khalil Ur Rahman Mohamed Bashir Butt
Mr. Mohamed Khalifa Bin Thaleth Operations Director

Abstract:
The world population is to reach 9.3 billion in 2050, the population explosion will affect mainly the world food demand, researchers predict that the demand for food will rise by 60%. Demand for food, directly affects the necessity of increasing agricultural output, as agriculture is the main food producer and the driving force of most countries' economy. Dates are an important food source, with a unique caramel-like flavor and a smooth, comforting texture. The dates also have many health benefits: very nutritious, high in fiber, rich in proteins, vitamins, iron, copper, zinc, magnesium and potassium. The new interest in plant-based diets has elevated the status of the dates. A veritable nutritional food, it has become a favorite in vegan cuisine and a prized ingredient in vegetarian pastries. Date Palm farming has therefore a bright future. Date Palm farming is vital in the UAE, both culturally and economically. The UAE is the world's 4th largest date producer, accounting for 12% of the world's production. But date Palm farming is a major water consumer, irrigation of date palm currently accounts for about one-third of all groundwater takes in the UAE . Providing solutions to reduce substantially the amount of water used for date palm farming, will have a significant impact on the UAE overall water consumption. The Middle

East and North Africa (MENA) region is one of the most water-scarce areas in the world and despite that, its average daily water consumption per capita is one of the highest in the world, due mainly to its agricultural irrigation needs (60-70% of its daily water usage). To produce food, one requires water, and our region and the world are already today facing water scarcity, in the coming years the increase in demographics will boost the demand for water even more. Governments need to ensure water sustainability rapidly, groundwater is depleting, desalination is a costly and non-ecological process and treated sewage water availability is limited.
Water sources are mainly underground aquifers in addition to wells. Other sources of water have also been explored, such as the utilization of treated wastewater (to little extent). Adoption of methods of irrigation (such as bubbler irrigation, which is a localized, low pressure, solid permanent installation drip irrigation system), particularly in well-irrigated groves is slowly gaining momentum. The application of traditional irrigation system is putting a pressure on the existing water resources and, consequently led to the waste of large volumes of this valuable resource. The 2 bubbler basin irrigation system is a often used irrigation system. It was the successor of the basin flood irrigation and was already able to save a lot of water in comparison to its predecessor. Nowadays, about 40% of the area is irrigated by bubbler irrigation systems. Indeed, the adoption of modern irrigation techniques is more than needed today for arid region. This is mainly to increase water use efficiency and productivity of the grown date palms.

The different irrigation methods available



Several studies indicated that subsurface direct root irrigation is the most effective technology to improve water use efficiency as well productivity. Irrigation and fertigation as well aeration can be done via the same unique system.

In order to provide solutions to optimize water usage in agriculture, forestry and parks (key for water and food sustainability), a revolutionary exudation* irrigation system was adopted and tested at trial area. It is formed by a technical textile pipe that produces a continuous controlled flow of water that is uniform throughout its length and surface. This irrigation system is a clear example of innovation, thanks to its flexible structure and pores.

*EXUDATION IRRIGATION is a system that takes water to the ground through its pores. This happens when the water pressure inside the pipe is enough to push it out. It is a system based on a very simple principle, is ecological and achieves a continuous and uniform flow throughout the length of the pipe, as the pores are all over its surface.

Date farming, food security and UAE Water Security Strategy 2036 states that water as one of the essential aspects, mainly to save water. A sophidticed subsurface irrigation porous tube system was tested to reduce water use and irrigation requirements for the cultivation of date palms and to increase productivity. Al Nakhli sector with long term vision and extensive knowledge about the precarious situation of water resources in the UAE has achieved with Terraplus, a modern subsurface irrigation system to make a big step further in using the avaiilablew water for irrigation purposes. The main objective of the trial was to evaluate the effect of modern subsurface T+ irrigation on the irrigation water volumes both economically and technically. During trial the 2 bubbler basin irrigation system that was already in place in the area was compared with newly adopted subsurface irrigation system.

Subsurface Irrigation tube created by Terraplus, have a woven polyester and nano-tech impregnated porous hose that can penetrate the root zone to an unlimited depth. With direct root irrigation, we have observed that deeper roots were developed and creating a larger rhizosphere. Test on date palm trees resulted in 45-50% irrigation water reduction and we have achieved an almost 5-7% higher yield in terms of overall productivity. Since the application of water through this system is the first step and tested recently to cater to the date palm growth, the date palm trees will create even bigger and better root growth mediated water uptake. Therefore, it will become more efficient and will lead to further reduction of water losses due to evaporation. As per the experimental trials and results obtained, we have achieved to save 45-50 cbm per date palm per year. The innovative technology use in date palm production is significant towards the profitability of the date sector and even as crucial for the government to achieve its Water Security Strategy 2036 goals.

Keywords: Date palm farming, agriculture, water security, Subsurface Irrigation (Terraplus), direct root zone irrigation, water conservation.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة
TWELVTH SESSION

النخلي
Al Nakhli

Pioneering and Sophisticated Innovations
Serving the Agricultural Sector

Al-Nakhli

Dubai, United Arab Emirates

Dr. Hasnaâ Harrak

Kingdom of Morocco

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation (Equally)

Dr. Hasnaâ Harrak was born in Larache in Kingdom of Morocco, where she received her primary and secondary education. She has graduated as State Engineer in 1992 in Food and Agricultural Industries from the Hassan II Institute of Agronomy and Veterinary Medicine in Rabat. She has also earned her PhD in 2007 in Agronomic Sciences (Technologies of Agricultural Industries) jointly from the same institute and the Agricultural Research Centre for International Development (CIRAD) in Montpellier, France.

Since 1995, Dr. Hasnaâ Harrak has been conducting research on dates quality and valorization at the National Institute for Agricultural Research (INRA), Regional Centre for Agricultural Research in Marrakesh. She currently holds the position of Research Director in the same institute.

During twenty-five years of her professional life conducted with seriousness, total commitment and self-abnegation, Dr. Hasnaâ Harrak has accumulated varied experiences and rich know-how in fields of research and development on dates postharvest valorization. Her research and development activities can be qualified as a work:

• Carried out on a vital sector for Moroccan oases population of over two million inhabitants contributing in 40 to 60% in the income of farmers and whose dates production has exceeded 140 000 tons in 2019.

• Having scientific, technological, and marketing characters helping valorization of dates with obvious positive repercussions on sustainable development in date producing regions;

• With innovative approach allowing the promotion of the traditional date products on the national and international markets, while preserving the women traditional know-how of date processing;

• Greatly contributing to the modernization of the date sector and to the increase of competitiveness of dates focalizing on the quality of dates and date products which

takes into account the laws and standards in force relating to good manufacturing and hygiene practices, to commercial quality and to origin-linked quality through the distinctive signs of origin and quality.

The obtained results highlight the significance of Dr. Hasnaâ Harrak contribution in order to raise date production to the level of strategic products in Morocco. The main dates research and development achievements have concerned the following aspects:

• Study of typicity and nutritional, commercial, technological and organoleptic qualities of dates through physical, physicochemical, biochemical and sensory characterization;

• Contribution to the inventory and archiving women traditional knowledge of dates processing which concern more than twenty date local products (paste, syrup, juice, powder, etc.);

• Quality improvement and valorization of date preparations based on traditional know-how of the oases women (e.g. date juice locally named Tassabount or Takachoult and date paste locally named Tassabount or Toummit);

• Adaptation and development of processing technologies to date cultivars of low market quality to improve its commercial value;

• Adaptation and development of preservation technologies to date cultivars of high market quality;

• Contribution to the establishment of national and international date standards and to the development of date labels especially distinctive signs of origin and quality. In this context, Dr. Harrak has contributed to recognition of protected geographical indications of dates Bouittob of Tata, dates Outoukdim of Toudgha Tinghir, dates Bousthammi noire of Drâa and agricultural quality label of dates Najda;

• Realization of documentary and exploratory studies on date valorization in Morocco: Study and analysis of date postharvest valorization and study of date marketing.

The achievements of Dr. Hasnaâ Harrak activities also include:

• Conception, coordination and implementation of research and development activities of INRA research programs in the framework of the national agricultural strategy “Green Morocco Plan” inaugurated by His Majesty King Mohammed VI in 2008, and of several agreements, projects, programs and networks established between INRA and national and international partners:

- Millennium Challenge Account (MCA) Program established in the framework of cooperation between USA and Morocco;
- Program for Agricultural Research for Development (PRAD) established between France and Morocco;
- IFAD/FADES/IBD Network for Research and Development of date palm in North Africa and Middle East, coordinated by ICARDA;
- IPGRI/UNDP/GEM Project of date palm in the Maghreb;
- “Date palm technical packages” agreement established between INRA and AOAD;

- European Union program to support the sectoral agricultural policy in Morocco (PAPSA);
- Microproject: “Contribution to the improvement of date marketing in Morocco” in collaboration with the German Technical Co-operation and the Regional Offices of Agricultural Development in Tafilalet and Ouarzazate;
- Water Management and Integrated Rural Development Project in the Drâa Valley (GEDINDRA) in the framework of the cooperation between Belgium and Morocco (Belgium agency for development and Regional Office of Agricultural Development in Ouarzazate);
- National Programs for Southern oases development (POS) and for Tafilalet Oases Development (POT) funded by Southern Development Agency and United Nations Development Program;
- Regional Fund for Promotion of Employment (FREPE) in the framework of the National Initiative for Human Development (INDH).

• Realization of theoretical and practical trainings, technical assistance and technology transfer benefiting to engineers and technicians of extension organisms and many professional organizations of women and farmers (associations, cooperatives, economic interest groups) operating in the field of dates valorization in different Moroccan oases (Drâa, Tafilalet, Tata, Toudgha, Guelmim, Figuig, etc.). Such scientific and technical tasks have allowed the beneficiaries to produce marketable products of good quality. These trainings were also undertaken abroad to the benefit of researchers, technicians and producing families.

• Production, as author and co-author, in collaboration with national and international partners, more than 160 scientific and technical publications (books, articles, communications and professional reports). These publications have contributed in enriching the national and international literature on the date palm tree and especially in fulfilling a gap in scientific and technical information, relating to the quality and postharvest valorization of Moroccan dates.

• Participation in several national and international scientific and development seminars, workshops and events, and carrying out scientific and technical missions of expertise and advanced trainings in Morocco and abroad (Algeria, France, Kuwait, Saudi Arabia, Spain, Sweden, Switzerland, Tunisia, Turkey, United Arab Emirates and United States of America), in the fields of agricultural and food industries in general and dates technology and quality in particular, for building skills and sharing knowledge.

• Participation in several radio and television interviews, programs and documentaries in Morocco and abroad, by presenting research activities and achievements and raising awareness on the importance of dates valorization and its role in developing date palm sector, improving life of oases people and responding to consumer requirements.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة
TWELVTH SESSION

Influential Figure in the Field of
Date Palm and Agricultural Innovation

(Equally)

Dr. Hasnaa Harrak

Kingdom of Morocco

Professor Dr.
Kazuo Shinozaki
Japan

The category of Influential Figure in the Field of Date Palm and Agricultural Innovation (Equally)

Professor Shinozaki is a world renowned Molecular Plant Physiologist who elucidated the response of plants to environmental stresses, in particular heat, salt and drought, and discovered resistance mechanisms at the molecular level. He identified key elements such as transcription factors, signaling pathways, and hormone control mechanisms, using Germanic methods. He and his wife Professor Kazuko Yamaguchi-Shinozaki (University of Tokyo), have demonstrated the presence of both, ABA-independent and ABA-dependent regulatory systems governing drought-inducible gene expression. In addition, they opened the way for application of knowledge derived from basic research to breeding of drought-tolerant plants, recently including high-throughput crop phenotyping. The sophisticated integrated plant Phenotyping System developed by Shinozaki et al. allows around-the-clock observation of 120 plants under precise control of soil water condition by a combination of a conveyer belt system, Computer imagining an analysis, and automatic weighing and watering.
- Professor Shinozaki studies Biology at Osaka University (BSC1972, graduated in 1974 from Nagoya University and received his Doctorate of Science (DSC) in 1977 from his Graduate School of science, where he also started his professional career. From 1987 to 1989 he studied plant Transgenic Technology at Rockefeller University, New York. In 1989 he took office as Chief Scientist at the Riken Plant Molecular Biology Laboratory in Tsukuba and became Director at the Riken Plant Science Center in Yokohama in 2005.
Professor Shinozaki received numerous prizes, awards and honors:
1- Professor Shinozaki was named Corresponding Member of the American Society of Plant Biologists in 2015. He also won the Japanese Society Award in 2009.
2- Professor Shinozaki received the 2016 Persons of Cultural Merit Award of Japan. The award is the nation's second highest honor, awarded to those who have made a significant contribution to the development and enrichment of culture and is only rarely given to natural sciences.

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

وزارة شؤون الرئاسة
MINISTRY OF PRESIDENTIAL AFFAIRS

الإمارات
THE EMIRATES

12

2020 الدورة الثانية عشرة
TWELVTH SESSION

Influential Figure in the Field of
Date Palm and Agricultural Innovation

(Equally)

Prof. Kazuo Shinozaki

Japan


Photographed By: Al-Jaohra Abdullah Al-Tuerji

جائزة المُزارع المُتميز
والمُزارع المُبتكر

الفوعة
AL FOAH

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM
AND AGRICULTURAL INNOVATION

Photographed By: Kareem Saheb


2018
First
Session

Winners
First Session 2018

Category of the Large farms

- **First Winner: Mr. Rashed Saeed Mohammed Sultan Al-Ariany**
- **First Winner repeated: Mr. Saeed Hmooda Khamis Al-Ariany**
- **Second Winner: Mr. Hameed Saeed Mohammed Sultan Al-Ariany**
- **Second Winner repeated: Mrs. Mira Khalfan Abdullah Al-Nuaimy**


جوائز الدورة العاشرة
TENTH SESSION AWARDS
المؤتمر الدولي السادس لنخيل
INTERNATIONAL DATE CONFERENCE

Rashid Saeed Sultan Al Aryani

First place winner

The Most Distinguished & Innovative Farmer Award

First Session
2018


جائزة المُ
والمُ


جائزة خليفة الدولية لنخيل التمور والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
جائزة المزارع المتميز والمزارع المبتكر
Saeed Hamouda Khamis Al Aryani
Winner of First Place
The Most Distinguished & Innovative Farmer Award
First Session
2018


Hamid Saeed Sultan Al Aryani
Second place winner
The Most Distinguished &
Innovative Farmer Award
First Session
2018


جائزة المزارع المتميز
والمزارع المبتكر


The Most Distinguished &
Innovative Farmer Award
First Session
2018
Mirah Khalfan Abdullah Al Nuaimi
Second place winner


Photographed By: Haitham Al-Farsi


2019
Second
Session

Winners

Second Session 2019

Category of the Small farms

- First Winner: Sheikha / Anoud bint Rashid bin Ahmed Al Mualla
- Second Winner: Mr. Saeed Abdullah Juma Haroon Al Ali

Category of the Middle farms

- First Winner: Mr. Saeed Abdullah Hassan bin Al-Qadisi Al-Habsi
- Second Winner: Mr. Hamad Al-Hur Rashid Rashed Al-Hurr Al-Suwaidi

Category of the Above-average farms

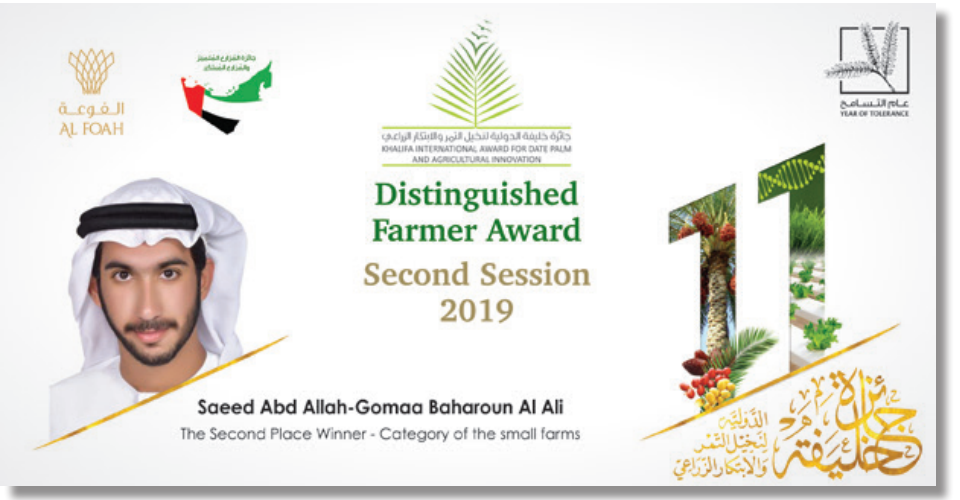
- First Winner: Mr. Khalifa Abdullah Khamis Mohamed Al Mazroui
- Second Winner: Mr. Mohammed Saeed Salem Jaid Al Qubaisi

Category of the Large farms

- First Winner: Mr. Sultan Saeed Muhammad Sultan Al-Eryani
- Second Winner: Mr. Muhammad Ali Murshid Al-Murar


الفائزون بجائزة المزارع المتميز والمزارع المبتكر
الدورة الثانية 2019
فئة المزارع الصغيرة
الشيخه عنود بنت راشد بن أحمد المعلا
الفائز بالمركز الأول
فئة المزارع المتوسطة
سعيد عبد الله حسن بن الذيم الحيسي
الفائز بالمركز الأول
فئة المزارع فوق المتوسطة
خليفه عبدالله خميس محمد المزروعي
الفائز بالمركز الأول
فئة المزارع الكبيرة
سلطان سعيد محمد سلطان العرياني
الفائز بالمركز الأول


AL FOAH
الفوعة
جائزة المزارع المتميز والمزارع المبتكر
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session
2019
Sheikha Anoud Bint Rashed Bin Ahmed Al Mualla
The First Place Winner - Category of the small farms
11
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


AL FOAH
الفوعة
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Saeed Abd Allah-Gomaa Baharoun Al Ali
The Second Place Winner - Category of the small farms
جائزة خليفة الدولية
الدورة الحادية عشرة
لنخيل التمر والابتكار الزراعي


الدورة الثانية
2019


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Saeed Abdullah Hassan Bin Al Qadeem Al Habsi
The First Place Winner - Category of the medium farms
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


2019


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Hamad Al-Hurr Rashid Al-Hurr Al-Suwaidi
The Second Place Winner - Category of the medium farms
11
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


2019


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Khalifa Abdullah Khamis Mohammed Al Mazrouei
The First Place Winner - Category of the above-medium farms
11
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


2019


AL FOAH
الفوعة
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session
2019
Mohammed Saeed Salem Ja'id Al Qubaisi
The Second Place Winner - Category of the above-medium farms
11
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي

الفوعة
AL FOAH

جائزة المزارع المتميز والمزارع المبتكر

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

Distinguished Farmer Award

Second Session 2019

Mohammed Saeed Salem Ja'id Al Qubaisi

The Second Place Winner - Category of the above-medium farms


الفوعة
AL FOAH
جائزة المزارع المتميز والمزارع المبتكر
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Sultan Saeed Mohd Sultan Al-Ariani
The First Place Winner - Category of the large farms
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


2019


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
عام التسامح
YEAR OF TOLERANCE
Distinguished Farmer Award
Second Session 2019
Mohammed Ali Morshed Al Marar
The Second Place Winner - Category of the large farms
11
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي


Photographed By: Mohammed Taeeb Al-Blouchi


2020
Third
Session

Winners
Third Session 2020

Category of the Small farms

- **Second Winner: Mrs. Hamama Hussein Khalifa Quraosh Al Qubaisi**

Category of the Middle farms

- **First Winner: Sheikha / Ahoud Faisal Abdullah Al-Mualla**
- **Second Winner: Mr. Ahmed Khalifa Saif Al Mazroui & his partners**

Category of the Above-average farms

- **First Winner: Mr. Sultan Ahmed Ghanem Al-Suwaidi**
- **Second Winner: Mr. Saeed Khalifa Saif Al Mazroui & his partners**

Category of the Large farms

- **First Winner: Mr. Abdullah Ali Rashid Abdullah Al Hamoudi**
- **Second Winner: Mr. Muhammad Ahmad Saif Al Mazroui**

جائزة المزارع المتميز والمزارع المبتكر

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

الإمارات
THE EMIRATES

Distinguished Farmer Award

Third Session 2020

Category of the small farms

Hamama Hussein Al Qubaisi
Second Winner

Category of the Middle farms

Sheikha Ahoud Al-Mualla
First Winner

Ahmed Al Mazroui & his partners
Second Winner

Category of the Above-average farms

Sultan Ahmed Al-Suwaidi
First Winner

Saeed Al Mazroui & his partners
Second Winner

Category of the Large farms

Abdullah Ali Al Hamoudi
First Winner

Muhammad Ahmad Al Mazroui
Second Winner


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
THE EMIRATES
Distinguished Farmer Award
Third Session 2020
Hamama Hussein Khalifa Quraosh Al Qubaisi
Second Winner - Category of the small farms
12


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
THE EMIRATES
Distinguished Farmer Award
Third Session 2020
Sheikha Ahoud Faisal Abdullah Al-Mualla
First Winner - Category of the Middle farms
12


AL FOAH
الفوعة
THE EMIRATES
الإمارات
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
Distinguished Farmer Award
Third Session 2020
Ahmed Khalifa Saif Al Mazroui & his partners
Second Winner - Category of the Middle farms
12


AL FOAH
THE EMIRATES
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
Distinguished Farmer Award
Third Session 2020
Sultan Ahmed Ghanem Al-Suwaidi
First Winner - Category of the Above-average farms
12


AL FOAH
THE EMIRATES
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
Distinguished Farmer Award
Third Session 2020
Saeed Khalifa Saif Al Mazroui & his partners
Second Winner - Category of the Above-average farms
12


AL FOAH
الفوعة
THE EMIRATES
الإمارات
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
Distinguished Farmer Award
Third Session 2020
Abdullah Ali Rashid Abdullah Al Hamoudi
First Winner - Category of the Large farms
12


AL FOAH
جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION
THE EMIRATES
Distinguished Farmer Award
Third Session 2020
Muhammad Ahmad Saif Al Mazroui
Second Winner - Category of the Large farms
12