



# FOR YOUNG OMANIS, THE FUTURE IS NOW

*Science and technology are at the forefront of Oman’s development policies. By supporting basic and applied research, The Research Council is nurturing a new generation of scientists who can succeed in globalized world.*

 by Cristina Serra

“Its feet shall be in a stream of water, and its head in the furnace of Heaven.” So reads an Arab proverb that celebrates the ability of date trees to thrive in extremely harsh conditions.

Dates are essential to Omani’s economy but they must be healthy and beautiful too.

In an awards ceremony for young Omani scientists held during the TWAS General Meeting in Oman, researchers described their efforts to control harmful fungi that reduce date tree productivity and surface cracks that make the fruits less marketable.

The meeting offered The Research Council (TRC) of Oman a venue to launch its first Annual Research Forum, to showcase the best of Oman’s research in fields of national importance such as energy, industry, environment, education and health.

The best six research projects under the Faculty Mentored Undergraduate Program were honoured during a ceremony. In addition, in the frame of Oman’s first National Research Award, several presentations received public praise as well as honours.

Date palm (*Phoenix dactylifera* L.) fields occupy nearly 50% of the cultivated land in Oman, with 35,000 hectares yielding more than 278,000 tons of fruit every year. But palms and their fruits are sensitive: noxious pests may affect cultivation and wipe out farmers’ work, with a heavy economic impact. Not surprisingly, young Omani scientists have taken

on a challenging task: preserving the health of these trees.

Abdullah Mohammed Al-Sadi is an associate professor in the department of crop sciences at Sultan Qaboos University (SQU). He earned his PhD in 2007 from the University of Queensland, Australia, and is now focused on date palm health.

In a recent study with colleagues from the College of Agricultural and Marine Sciences, Al-Sadi inspected 111 date palm trees from 29 varieties. The team proved that as many as 35 different fungi may sit on the roots of date palms, causing roots to go rotten and reducing the yield.

“We found 22 new species of noxious fungi never reported before in Oman, of which 13 are new fungal pathogens of date palm in the world,” Al-Sadi explained after the ceremony. “Filling a knowledge gap about the most important national crop was critical.”

“These results suggest that some fungal species were introduced from abroad, and this should urge competent authorities to strengthen quarantine measures,” added Al-Sadi, whose work won praise at TWAS meeting. His team won the TRC’s 2014 National Research Award for PhD holders in the area of biological and environmental resources.

The team’s results were first published in peer-reviewed journals and then explained to the agricultural community during farm visits.

What happens if roots are healthy but dates

▼ Omar S. Al-Abri [right] while carried out tests on expandable tubes.





▲ Abdullah Mohammed Al-Sadi is conducting research into date palm health.

have surface cracks, or are not the right size and shape? They cannot be exported, and even locally they are hard to sell.

Sawsana Al-Rahbi, a masters student in the department of soils, water and agricultural engineering at SQU, is addressing this issue. With colleagues, she has authored a paper on detecting date surface cracks using computer-vision techniques and a mathematical algorithm they developed.

The quality of the research and its relevance in Oman's economy has qualified her team to win TRC's 2014 National Research Award for non-PhD holders.

"Visual inspection and manual selection of dates to spot poor-quality fruits is time-consuming and costly. Besides, it often relies on personal judgment," Al-Rahbi explained. Their algorithm has allowed identification of high-crack, low-crack and no-crack dates obtained from factories in Oman, with 84% accuracy.

"This is a good starting point to explore more sensitive techniques and aim at even better results," she observed.

#### INNOVATION FLOWS THROUGH TUBULAR TECHNOLOGY

By establishing The Research Council in 2005, Sultan Qaboos bin Said Al Said set the stage to make Oman a regional hub for innovation. In a decade's time, TRC has supported research in areas such as culture, social sciences, community service and telecommunications.

Among those honoured in the first National Research Award was Omar S. Al-Abri, a PhD student and research assistant in the department of mechanical and industrial engineering at SQU. Al-Abri is studying expandable tubing technology, a technique used abroad since the 1990s but relatively new for Oman.

Oman is a world leader in oil and natural gas production; 86% of government revenues come from these two commodities, totalling 40% of Oman's gross domestic product in 2012.

“Filling a knowledge gap about the most important national crop was critical.”

*Abdullah Mohammed Al-Sadi*

But Oman's complex geology makes exploration and production an expensive challenge. Oil extraction, recovery and transportation with conventional techniques pose several problems: New reservoirs are difficult to access. It's difficult to maintain the proper size of the drill-hole. Pipes age and decompose. Failure to meet these requirements often leads to unprofitable production or missing the target well.

"Oman soil has zones of high permeability, fractures, fault-like areas which may hamper drilling," Al-Abri explained. "That's why we are exploring the new, for Oman, expandable tubular technology, as an alternative to old procedures."

The approach that Al-Abri and Tasneem Pervez are testing relies on the development of mathematical models that mimic the behaviour of tubular expansion process while drilling. This is a cost-effective approach that might help reduce the time needed to conduct expensive experiments and simulation practices.

"We hope that our mathematical model helps assist in designing and promoting the use of expandable tubes in Oman, while enhancing local expertise," said Al-Abri. "This should allow collecting more precise and reliable data, maximizing success and reducing failures." ■

