

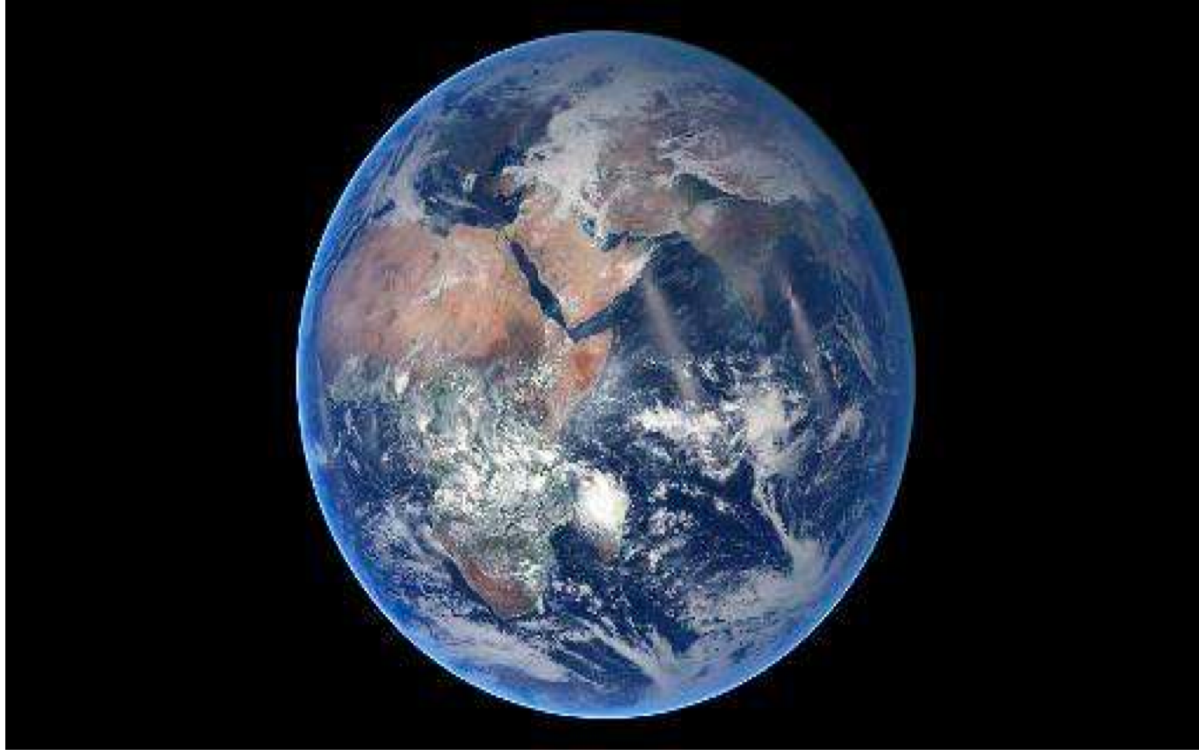


From Lab to Field Building Resilience

مركز خليفة للتقانات الحيوية والهندسة
الوراثية

**Khalifa Center for Genetic
Engineering and
Biotechnology**

Future



World population will increase to 10 billion by 2050

A Sustainable Vision

To channel the genetic system of plants and its surroundings for a sustainable agriculture in UAE: from Lab to Fields

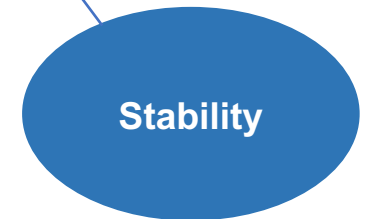
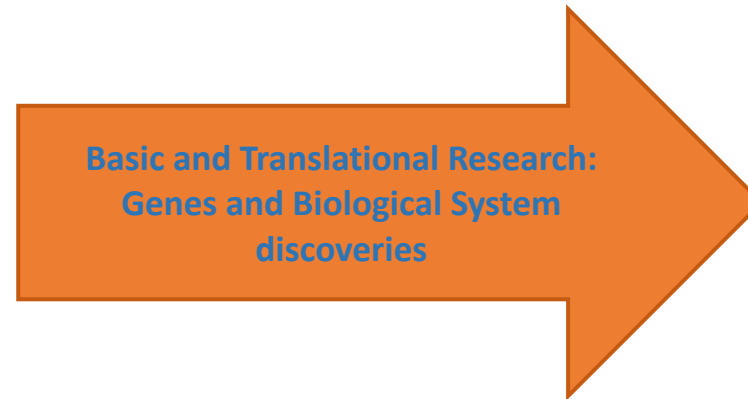


Strategy

Discovery-based Research



Learning environmental stresses
tolerance from desert plants



Hydro-efficient, heat tolerant
and other agronomical traits


Research Platforms



Genomic and
related fields



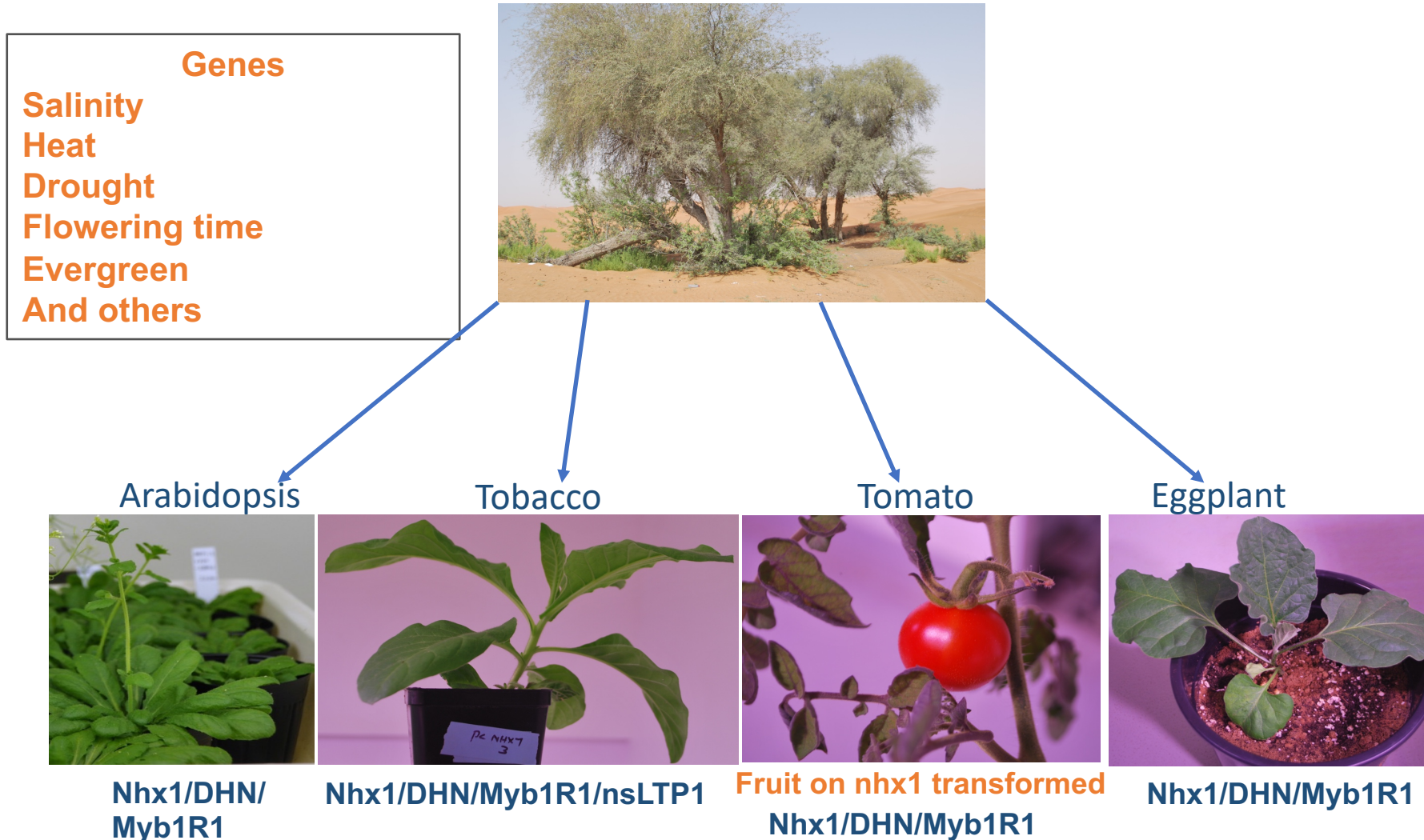
Basic, Functional,
and Translational
Research



Crop
Development
Genetic
engineering and
genome editing

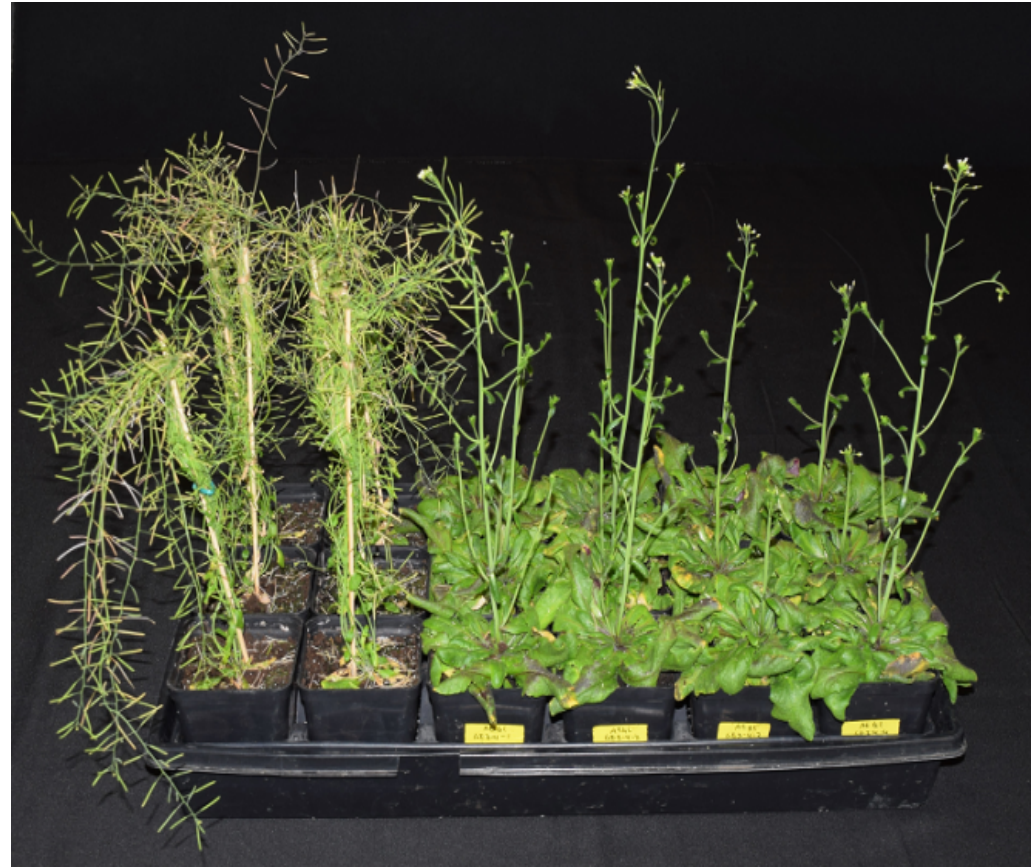


An Example: developing plants tolerant to abiotic stress: Genetic Transformation by Genes from Ghaff and other desert trees



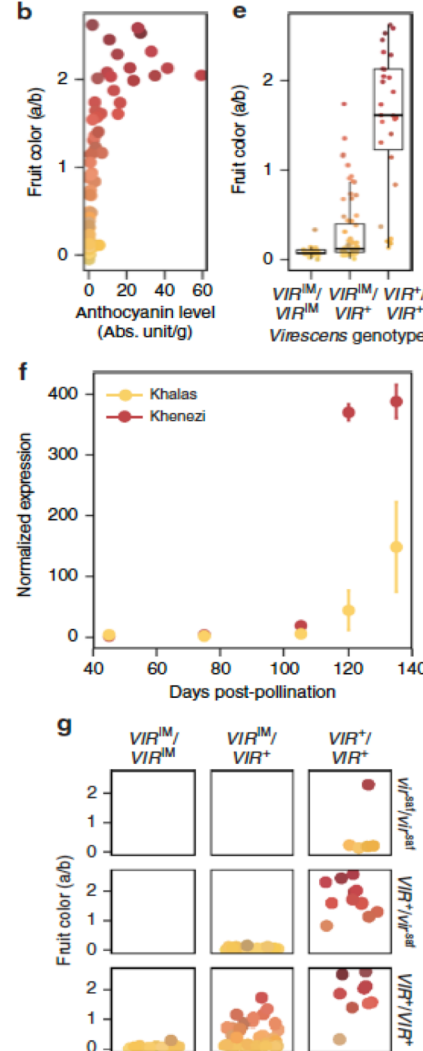
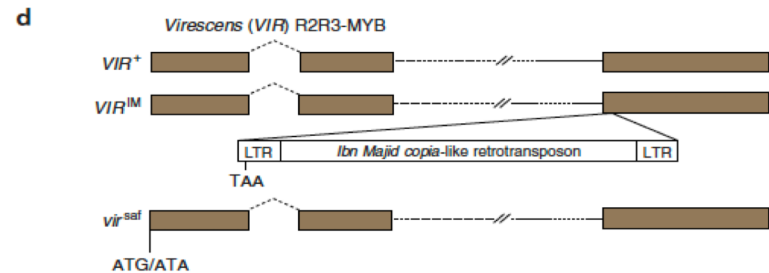
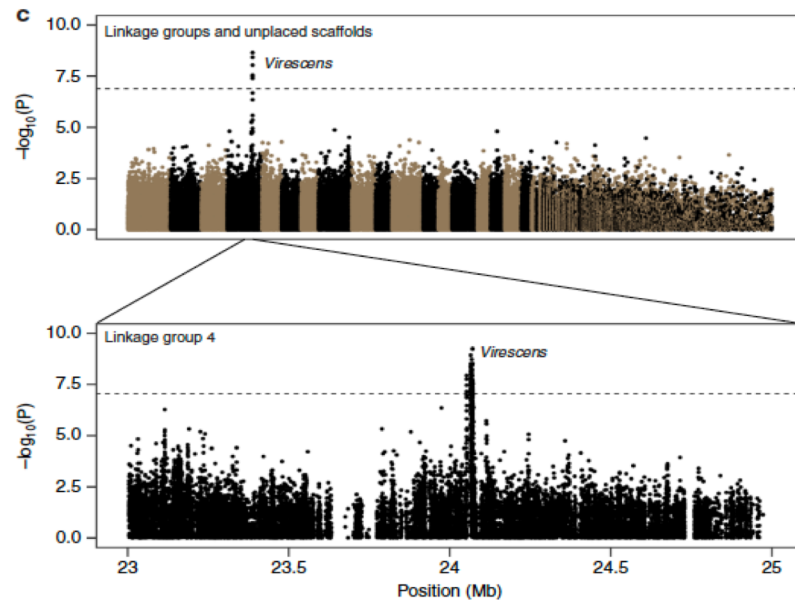
Cutting Edge Technology

Genome editing



Discover Genes for Important Agroeconomic Traits in Plants: Sugar Content in Dates

Genome wide association mapping (GWAS) in 162 varieties of date palm
fruit characteristics of agronomic values



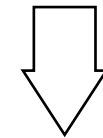
ARTICLE

<https://doi.org/10.1038/s41467-019-12604-9>

OPEN

Genome-wide association mapping of date palm fruit traits

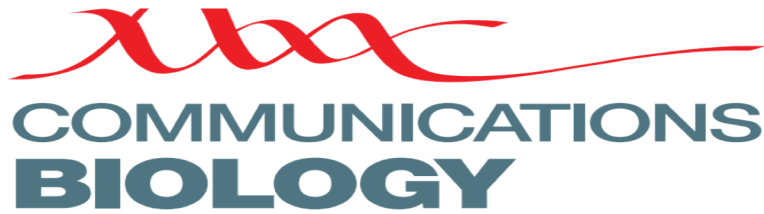
Khaled M. Hazzouri^{1,2,15}, Muriel Gros-Balthazard^{1,15}, Jonathan M. Flowers^{1,3,15}, Dario Copetti^{4,5,6}, Alain Lemansour⁷, Marc Lebrun⁸, Khaled Masmoudi⁹, Sylvie Ferrand¹, Michael I. Dhar¹, Zoë A. Fresquez³, Ulises Rosas^{3,10}, Jianwei Zhang⁴, Jayson Talag⁴, Seunghee Lee⁴, David Kudrna⁴, Robyn F. Powell¹¹, Ilia J. Leitch¹¹, Robert R. Krueger¹², Rod A. Wing^{4,13}, Khaled M.A. Amiri^{2,14*} & Michael D. Purugganan^{1,3*}



Sucrose
Glucose
Fructose
Acidity
Aroma



Genome and Genome Engineering



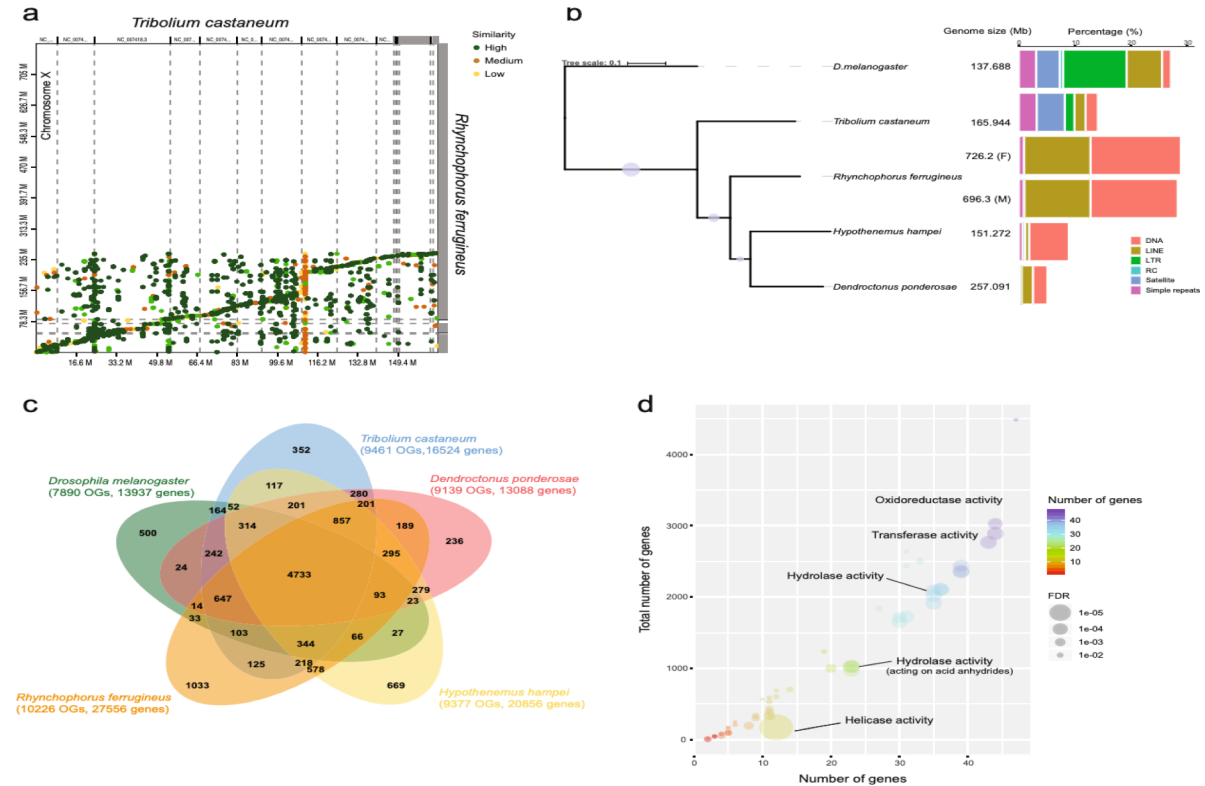
ARTICLE

<https://doi.org/10.1038/s42003-020-1060-8>

OPEN

The genome of pest *Rhynchophorus ferrugineus* reveals gene families important at the plant-beetle interface

Khaled Michel Hazzouri¹, Naganeeswaran Sudalaimuthuasari¹, Biduth Kundu², David Nelson³, Mohammad Ali Al-Deeb², Alain Le Mansour⁴, Johnston J. Spencer^{1,5}, Claude Desplan³ & Khaled M. A. Amiri^{1,2}



g. 2 Comparative genomics and analysis of orthology. a Synteny plot between the red palm weevil *R. ferrugineus* and the red flour beetle *T. castaneum*

Providing Solution for increasing Organic Farming: Microbes from Local Soil



- 1) **Production of microorganism from local soil**
- 2) **Addition of isolated microorganism to organic matters to increase plant production**
- 3) **Study of these beneficial microorganism and isolate important genes that can be used to modified plants**



“Smarter Plants”: Synthetic and Systems Biology



Develop plants with flexibility and adaptability to environmental challenges and population density