

Researchers release a new genome sequence of the date palm

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Date palms. Credit: NYU Abu Dhabi

Researchers at NYU Abu Dhabi's Center for Genomics and Systems Biology (NYUAD CGSB) and the UAEU Khalifa Center for Genetic Engineering and Biotechnology (KCGEB), working with other institutions, have developed an improved assembly of the genome for the date palm using long-read sequencing technology. This improvement over the current versions of the genome will help advance further research, and also inform the propagation practices of this essential

MENA region food source.

In addition, the researchers have identified the genes and mutations that lead to color change and the levels of major sugars in date palm fruit—including the genes for the enzyme invertase that breaks down sucrose into glucose and fructose. The mapping of these fruit color and sugar genes was conducted using [genome-wide association studies](#) (GWAS). GWAS has been used for mapping important disease genes in humans, and this is the first time it has been applied to date palms.

While date palms (*Phoenix dactylifera*) are one of the earliest domesticated tree crops in the world and remain a major fruit crop in North Africa and the Middle East, few genomic resources exist. This, combined with long generation times, has limited evolutionary genomic studies of this perennial species. In the paper Genome-wide association mapping of date palm fruit traits, published in the journal *Nature Communications*, the researchers report that they have produced an improved genome assembly for date palms that is 18 percent larger and more contiguous than existing genome assemblies. This long-read [genome sequence](#) assembly, coupled with access to two large, mature date palm orchards in the United Arab Emirates, allowed them to conduct genome-wide association mapping in this species. As a result, they successfully mapped the previously-identified sex determination locus and genes for both fruit color and sugar level polymorphisms.



Date Palms. Credit: NYU Abu Dhabi



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Lead scientist and Silver Professor of Biology, New York University and part of NYU Abu Dhabi Center for Genomics and Systems Biology, Michael Purugganan commented: "As we face challenges in food security for the future, we will need to continue to study the genome of food crops like date palm to help us in our struggle to provide food security in the world. Our progress in expanding the genome of the date palm is finally unlocking some of the secrets that explain how this tree species has continued to thrive in varied, challenging ecosystems."

The sequencing of the [date palm](#) genome and the first GWAS mapping in this fruit tree was an international effort led by NYUAD and KCGEB,

and also included researchers in the US, Switzerland, France, UK, Saudi Arabia, and Mexico.

More information: Khaled M. Hazzouri et al. Genome-wide association mapping of date palm fruit traits, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-12604-9](https://doi.org/10.1038/s41467-019-12604-9)

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