Domestication of date palms in Siwa Oasis and across the
Middle East and North Africa: Articulating the scales of
ethnography and of domestication over the long term

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Studying date palm agrobiodiversity in the oasis of Siwa (Egypt), by combining ethnobotany and genetics, we demonstrated:

- The existence of “ethnovarieties,” i.e., voluntary collections of multiple clones sharing mostly phenotypic characteristics under the same local name, as a way to manage agrobiodiversity.
- Siwa’s cultivated date palms form a third genetic cluster, with a large and unique diversity, compared to the previously described Middle Eastern and North African date palms.
- Siwa region’s feral date palms are also distinct, sharing alleles with another Phoenix species (P. theophrasti), a gene pool for local farmers.

INTRODUCTION
The history of the date palm (Phoenix dactylifera L.) as a cultivated plant is still poorly known, despite some major advances made using genetic tools1. An unexpectedly high differentiation between African and Middle Eastern populations was discovered and its origins was only recently explained by the North African date palms being introgressed by a wild relative: Phoenix theophrasti Greuter2. Moreover, ways of assessing the current agrobiodiversity of the cultivated date palm do not yet seem well established4.

OBJECTIVES: To better seize the long- and short-term domestication process of this cultivated and emblematic crop, the date palm, our approach combines anthropology (ethnoecology) with population genetics (using 17 microsatellite markers).

An original folk categorization system by Siwa inhabitants

Some named types are true cultivars as supposed to be in oasis phoeniculture: they share not only a formal identity, important for Isawa people, but also a genetic identity. Some are (what we coined) “ethnovarieties,” i.e., voluntary collections of multiple clones sharing mostly phenotypic characteristics under the same local name.

The existence of “ethnovarieties” results from a cultural practice of oasis farmers towards date palm trees and from their way to think of them5-6.

The same idea applies to the notion we call “categories”, a way to name other date palms that are not or poorly reproduced by off-shoot by the local community.

An original, large and unique biodiversity in Siwa

While we expected Siwa diversity to be found within the known African cluster, we found that it constitutes a separate population.

Feral date palms, collected in abandoned oasis around Siwa share alleles with Phoenix theophrasti, the species that is known to have introgressed African date palms2.

Siwa date palms show a very large diversity and a diversity that is unique to this oasis.

The origins of Siwa date palms is a mystery, Genomic data and our island theory of oases will further help us understanding this unique diversity.


References method, haploid sample size = 18

Letters indicate Tukey’s groups derived from Tukey’s test

1 Phoenix dactylifera L., Arecaceae
2 Phoenix dactylifera L., Phoenixaceae
3 Phoenix dactylifera L., Phoenixaceae
4 Phoenix dactylifera L., Phoenixaceae
5 Phoenix dactylifera L., Phoenixaceae
6 Phoenix dactylifera L., Phoenixaceae
7 Phoenix dactylifera L., Phoenixaceae
8 Phoenix dactylifera L., Phoenixaceae
9 Phoenix dactylifera L., Phoenixaceae
10 Phoenix dactylifera L., Phoenixaceae
11 Phoenix dactylifera L., Phoenixaceae
12 Phoenix dactylifera L., Phoenixaceae
13 Phoenix dactylifera L., Phoenixaceae
14 Phoenix dactylifera L., Phoenixaceae
15 Phoenix dactylifera L., Phoenixaceae
16 Phoenix dactylifera L., Phoenixaceae
17 Phoenix dactylifera L., Phoenixaceae
18 Phoenix dactylifera L., Phoenixaceae

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Siwa oasis (Egypt), at the crossroads of ancient Trans-Saharan routes and of the oriental and western genetic cluster