

W909 Ancient Chloroplast and Nuclear Genomes Provide Insights into the Evolutionary History of Quinoa (Chenopodium quinoa Willd.)



Number: W909

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Body

Quinoa (*Chenopodium quinoa*), an important crop for the global food security, was domesticated in the Andean highlands of South America about 7,000 years ago, where wild relatives still grow today. Archaeological studies have reported quinoa remains dating back to 4,000 years before present, but the ancient genetic diversity remains uncharacterised. Recent sequencing studies of the quinoa nuclear genome suggested domestication took place independently in highland and coastal environments. However, the origin and exact timing of domestication, and the genomic relationships among the tetraploid relatives (*C. hircinum* and *C. berlandieri*) of quinoa are not fully understood. Here, we report the nuclear and chloroplast genome sequences of four ~1,400 years old archaeological samples of *C. quinoa* from the highlands of northern Argentina. Phylogenetic analyses show that wild, weedy and cultivated accessions from different species cluster in a monophyletic clade, indicative of historical hybridisation of closely related tetraploid species of *Chenopodium*. Two of the identified chloroplast haplogroups in the ancient samples appear to be absent from modern quinoa accessions, indicating a genetic bottleneck in the recent past. Further, sequence alignment to the nuclear and chloroplast reference genomes of *C. quinoa* identified a large number of nucleotide polymorphisms in the ancient specimens, providing resources for further analysis of domestication history as well as genetic changes in loci of breeding value.

Sessions



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Sunday, Jan 12 11:10 AM

Garden 1 - Handlery Hotel

(/pag_2020/event/0440b0d19152860f8c0d9eca09534044)