Feeding the Gap: A modern experimental cultivation project towards the creation of new tools that explore past agriculture

TESI DOCTORAL

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'*Feeding the Gap*': Contemporary, controlled experiments on the impact of agricultural practices and heating conditions on Aegean barley (*Hordeum vulgare*) landraces.

The aim of this PhD is to explore how different landraces of one of the key cereals for Europe react under different management regimes and how these may be reflected on the morphology of grains after carbonisation, this being the standard means of preservation of archaeological plant remains in the Mediterranean. To do so, twenty-one barley (*Hordeum vulgare*) Greek landraces were selected and experimentally grown under field conditions at the premises of ELGO Demeter of Thermi, Thessalonikis in Northern Greece.

The agronomical data analysis has demonstrated the physiological variability of the landraces under different cultivation regimes, as well as the impact of genome and environmental conditions on the yield performance of every landrace. Selected landraces' harvested grains were subjected into different lab-induced heating treatments to explore the impact of carbonisation on the external morphology of fresh, dehusked grains.

The extensive reference collection of fresh and heat affected dehusked grains of 3 landraces grown under 4 cultivation regimes has undergone multiple analysis -including 3D scanning, and the data are used for comparisons of the 3D morphology of the grains. Through this analysis, the interactions amongst barley landraces, growing conditions and heating treatments are explored, potential trends are discussed, and hypotheses are being

suggested regarding the effect of heating on grains' morphology, as well as the post-depositional survivability of certain landraces and cultivation regimes.

This PhD study's results provide new insights into barley landraces and cultivation regimes and opens up the possibility of extensive 3D GMM applications on Aegean archaeobotany.