





Proceeding Paper

Fava Santorinis: Brining Added Value to a Protected Designation of Origin (PDO) Product through the Security of the Traditional Cultivar and Farmers Network [†]

Elissavet Ninou ^{1,*}, Fokion Papathanasiou ², Christos Alexandris ³, Elisavet Chatzivassiliou ⁴, Garyfallia Economou ⁵, Dimitrios Vlachostergios ⁶, Konstantinos Koutis ⁷, Anthoula Tsipi ⁸ and Ioannis Mylonas ^{8,*}

¹ Department of Agriculture, International Hellenic University, 57400 Sindos, Greece

² Department of Agriculture, University of Western Macedonia, 50100 Koila Kozanis, Greece; fpathana-siou@uowm.gr

³ Cooperative Union of Thiraic Products, SantoWines Winery, Pyrgos Kalistis, 84700 Santorini, Greece; alexandris@santowines.gr

⁴ Plant Pathology Laboratory, Faculty of Crop Science, Agricultural University of Athens, Iera Odos 75, 11855 Athens, Greece; echatz@aua.gr

⁵ Laboratory of Agronomy, Faculty of Crop Science, Agricultural University of Athens, Iera Odos 75, 11855 Athens, Greece; economou@aua.gr

⁶ Institute of Industrial & Forage Crops, ELGO-DIMITRA, Kourtidou 56–58 & Nirvana, 11145 Athens, Greece; vlachostergios@elgo.gr

⁷ AEGILOPS—Network for Biodiversity and Ecology in Greece Ano Lechonia, 37300 Agria Volos, Greece; koutisresfarm@gmail.com

⁸ Institute of Plant Breeding and Genetic Resources, ELGO-DIMITRA, Kourtidou 56–58 & Nirvana, 11145 Athens, Greece; anthitsipi@gmail.com

* Correspondence: lisaninou@gmail.com or lisaninou@agr.teithe.gr (E.N.); ioanmylonas@yahoo.com (I.M.)

[†] Presented at the 17th International Conference of the Hellenic Association of Agricultural Economists, Thessaloniki, Greece, 2–3 November 2023.



Citation: Ninou, E.; Papathanasiou, F.; Alexandris, C.; Chatzivassiliou, E.; Economou, G.; Vlachostergios, D.; Koutis, K.; Tsipi, A.; Mylonas, I. Fava Santorinis: Brining Added Value to a Protected Designation of Origin (PDO) Product through the Security of the Traditional Cultivar and Farmers Network. *Proceedings* **2024**, *94*, 49. <https://doi.org/10.3390/proceedings2024094049>

Academic Editor: Eleni Theodoropoulou

Published: 18 February 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract: The characterization of “Fava Santorinis” as a PDO product does not protect the cultivated genetic material that produces this product, since this is not registered as a traditional cultivar in the National Common Catalogue. The failure to include this information presents a significant hazard to the genetic diversity of these cultivars, potentially resulting in the loss of their distinct traits, reduced crop yields, and quality. Furthermore, it seeks to comply with established procedures for characterizing and subsequently register this traditional cultivar in the National List of Varieties. The “Santorini Fava” (*Lathyrus* sp.) is a renowned agricultural product that is unique to Santorini, and it has played a pivotal role in upholding the island’s traditional agriculture. Today, the local agricultural cooperation continues the cultivation of this crop, preserving it as an indispensable facet of the island’s cultural heritage. The objective of the project M16SYN2-00135 is to guarantee and secure this indigenous variety, from which the PDO product in question originates, by applying official description protocols and making use of the existing know-how for the description of the genetic material, the definition of the landrace, and its description for registration in the National Catalog of Varieties. At the same time, the sustainable management of viral diseases and the rational management of its seed production will lead to an increase in productivity, its stabilization, and ultimately, its shielding. The product will be utilized by the cooperative contributing to the sustainability of the holdings and the prevention of commercial exploitation of the traditional variety beyond the area of origin based on the best practices for the preservation of the varieties.

Keywords: Fava Santorinis; *Lathyrus clymenum* L.; biodiversity protection; local varieties; added value

1. Introduction

“Fava Santorinis” is a PDO product [1] that is produced from the seeds of the botanical species *Lathyrus clymenum* L., a leguminous crop cultivated on the Cyclades islands in the South Aegean Sea; it is confirmed that the seeds of *Lathyrus clymenum* L. were found in archaeological residues dated back to the 16th century B.C. [2]. However, the PDO characterization does not protect the genetic material from which “Fava Santorinis” is produced, since this is not registered in the National Common Catalogue. This work is in alignment with the application of the EC 2008/62/EK (official Greek Gazette) FEK 165/30-01-2014 that provides the necessary regulations to protect the traditional cultivar. The legume Fava Santorinis (*Lathyrus* sp.) has all the attributes that have been qualified by researchers, such as Zeven [3], Camacho Villa et al. [4], and Newton et al. [5], for landraces. Observing the beginning of agriculture at the end of the 8th millennium BC., the archaeobotanical traces support the local origin and the continuous route of the lathyrus in the Aegean until the present day [6,7]. Presently, the local agricultural cooperative persists in cultivating this crop, safeguarding it as a vital element of the island’s cultural legacy. It is imperative to highlight that without protective interventions, there is an inevitable risk of genetic erosion, endangering the ongoing cultivation of “Fava Santorinis” on the island. Currently, “Fava Santorinis” is cultivated on approximately 150 hectares, and its cultivation plays a pivotal role in the local agricultural community of Santorini, contributing significantly to the economy, which is estimated at EUR one million.

The aim of project M16SYN2-00135 is to ensure the protection and preservation of this native variety, from which the PDO product in question is derived. This will be achieved through the implementation of official description protocols and by leveraging existing expertise to characterize the genetic material.

2. Materials and Methods

The pilot study for the 1st year of the project focused on assessing the landraces and identifying plants that show improved productivity and quality and maintaining all the characteristics of the plants producing the products. The genetic material used was seed of the “Santorini Fava” variety, which came from the Association of Cooperatives of Theraic Products SANTO. The experiment was carried out on the farm of the Institute of Genetic Improvement and Plant Genetic Resources in Thessaloniki therme in the 2022–2023 growing season. In total, seeds were sown in 500 plant positions. The positions were 50 cm apart. All observations were taken at the individual plant level and related to a range of agronomic and descriptive traits (Table 1).

Table 1. Mean value and coefficient of variation (CV %).

Characteristic	Mean Value	CV (%)
Number of Pods/Plants	12.3	48.0
Pod Length (cm)	5.0	11.0
Pod Width (cm)	0.9	10.2
Pod Thickness (cm)	0.6	12.0
Number of Seeds per Pod	4.1	26.0
Seed Yield (g/plant)	6.1	78.0

Implementation methodology:

1. Study of genetic variability, description of the variety, and removal of deviating genotypes: In the pilot fields of min 4 ha, assessment of genetic variability will be conducted, and an improvement program will be implemented with a mild selection scheme to remove low-yielding plants that deviate and carry viral diseases and are not resistant in drought.

2. Compilation of file: At the final stage, a full description of the variety will be made as required by the protocol, and the file will be compiled for registration by the Cooperative. Even for a complete profile, molecular techniques and qualitative analyses of seeds will be conducted.

3. Training for proper seed production and production: This involves actions to train the cooperative's staff and farmers to produce high-quality healthy seed material and improve agricultural practices to produce the product.

3. Results and Discussion

Utilizing landraces for breeding purposes is a strategy that is employed to enhance both the yield and yield consistency within agricultural systems that are characterized by limited inputs [8]. The stagnation of yields in specific regions can largely be attributed to the restricted genetic diversity that is found in recently developed high-yielding varieties [9]. Consequently, the introduction of well-adapted germplasm from the primary centers of diversity for the crop can prove to be advantageous.

An essential prerequisite for enhancing a landrace is the identification of the existing genetic variability within that landrace. This step is crucial to establishing an effective breeding program aimed at improving landraces. The statistical measures for the performance components of "Fava Santorini" are given in Table 1. The greatest variability was observed in the characteristic of seed yield per plant, indicating the possibility of selection within the population for this characteristic, which would increase and stabilize the performance of the landrace. From the description, it was revealed that the "Fava Santorini" variety is an annual plant, reaching a height of 25–53 cm. The middle and upper leaves form two to six leaflets with a spiral arrangement. The green pods end in a curved tip. The dry pods have moderate constrictions, and the shape of the cross-section is elliptical. The seeds are brown or green in color, with a smooth surface and a spherical shape.

4. Conclusions

This multifaceted approach of the project M16SYN2-00321, funded in the context of the Agricultural Development Program 2014–2020 (Measure 16), and in particular Sub-Measure 16.1–16.2, will enhance the safeguarding and subsequent utilization of this valuable resource through:

- The registration and identification of the landrace that presents the PDO product based on the new legislation and EU directives by applying the description protocol.
- The definition of the mentioned protected variety and application for registration in the National List of Varieties.
- The establishment and implementation of an innovative framework/process for the dissemination of good conservation/seed production practices of the landrace in the region of origin to ensure certification and adequate purity of the seed. It will be implemented by the SANTO cooperation with the support of the researchers of different research institutes and agricultural universities.
- Authentication with morphological and qualitative characteristics and DNA techniques.
- Consulting services to improve farming techniques for farmers: field schools, e-learning, online applications, and networking through an online platform.
- Documentation of reduced product inputs.

Author Contributions: Conceptualization, E.N. and I.M.; methodology, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T.; validation, I.M., F.P., E.N. and A.T.; formal analysis, investigation, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T.; resources I.M., F.P., E.N. and A.T.; data curation, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T.; writing—original draft preparation, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T.; writing—review and editing, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T.; visualization, I.M., F.P. and E.N.; supervision E.N., I.M. and A.T.; project administration, E.N., I.M. and A.T.; funding acquisition, E.N., I.M., C.A., E.C., G.E., F.P., D.V., K.K. and A.T. All authors have read and agreed to the published version of the manuscript.

Funding: This work was funded in the context of the Agricultural Development Program 2014–2020 (Measure 16), and in particular Sub-Measure 16.1–16.2. Establishment and operation of Operational Groups of the European Innovation Partnership for the productivity and sustainability of agriculture (Project No M16SYN2-00135).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are only available on request due to privacy restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32010R0901&qid=1706524114607> (accessed on 1 September 2023).
2. Korpetis, E.; Ninou, E.; Mylonas, I.; Ouzounidou, G.; Xynias, I.N.; Mavromatis, A.G. Bread Wheat Landraces Adaptability to Low-Input Agriculture. *Plants* **2023**, *12*, 2561. [[CrossRef](#)] [[PubMed](#)]
3. Villa, T.C.C.; Maxted, N.; Scholten, M.; Ford-Lloyd, B. Defining and Identifying Crop Landraces. *Plant Genet. Resour.* **2005**, *3*, 373–384. [[CrossRef](#)]
4. Newton, A.C.; Akar, T.; Baresel, J.P.; Bebeli, P.J.; Bettencourt, E.; Bladenopoulos, K.V.; Czembor, J.H.; Fasoula, D.A.; Katsiotis, A.; Koutis, K.; et al. Cereal Landraces for Sustainable Agriculture. A Review. *Agron. Sustain. Dev.* **2010**, *30*, 237–269. [[CrossRef](#)]
5. Valamoti, S.M. Grain versus Chaff: Identifying a Contrast between Grain-Rich and Chaff-Rich Sites in the Neolithic of Northern Greece. *Veg. Hist. Archaeobotany* **2005**, *14*, 259–267. [[CrossRef](#)]
6. Kotsakis, S.-M.V. Kostas Transitions to Agriculture in the Aegean: The Archaeobotanical Evidence. In *The Origins and Spread of Domestic Plants in Southwest Asia and Europe*; Routledge: London, UK, 2007; ISBN 978-1-315-41761-5.
7. Available online: <https://ec.europa.eu/agriculture/eambrosia/geographical-indications-register/details/EUGI0000013927> (accessed on 1 September 2023).
8. Pecetti, L.; Boggini, G.; Gorham, J. Performance of Durum Wheat Landraces in a Mediterranean Environment (Eastern Sicily). *Euphytica* **1994**, *80*, 191–199. [[CrossRef](#)]
9. Annicchiarico, P.; Pecetti, L. Yield vs. Morphophysiological Trait-Based Criteria for Selection of Durum Wheat in a Semi-Arid Mediterranean Region (Northern Syria). *Field Crops Res.* **1998**, *59*, 163–173. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.