



HELLENIC AGRICULTURAL
ORGANIZATION - DEMETER



Berry genetic resources in Greece: conservation and cultivation

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<http://www.ipgrb.gr/index.php>

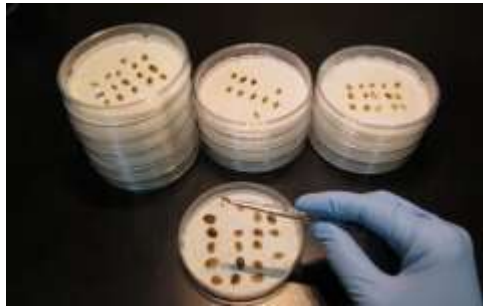


- Cereals
- Cotton
- Tobacco
- Cannabis
- Rice
- Deciduous trees
- Acorns
- Greek native flora
- Aromatic medicinal plants
- Greek Gene Bank
- Balkan Botanic Garden of Kroussia
- Plant collection, conservation, utilization
- Breeding
- Precision agriculture



GREEK GENE BANK

- ✓ Conservation of national plant genetic resources (local landraces and wild crop relatives) threatened by genetic erosion or extinction, for the benefit of future generations,
- ✓ > 14.000 accession numbers of local landraces and wild crop relatives,
- ✓ > 250 local varieties of vines.





Balkan Botanic Garden of Kroussia: protection, conservation and sustainable use of plant genetic recourses.



Relative ongoing projects (national and international level)

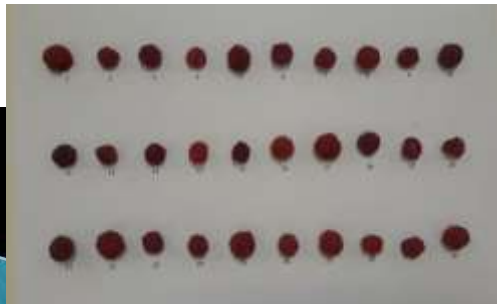


- ✓ **Title:** Highlighting of local traditional and native wild fruit trees and shrubs (EcoVariety, T1EΔK-05434),
- ✓ **Duration:** 2018-2021
- ✓ **Partners:**
 1. University of Ioannina, Faculty of Agriculture (Arta)- Coordinator
 2. HAO-Demeter, IPBGR- Scientifically responsible
 3. SYSTADA – Systems of Forest and Environmental Development
 4. Verus+ Informatics and Development Systems (Thessaloniki)
 5. Nurseries Vitsios (Arta)
 6. Nursery Agriherb (Vasilika)
- ✓ **Study of 8 wild species:** *Rubus ideaus*, *Vaccinium myrtillus*, *Sambucus nigra*, *Prunus spinosa*, *Rosa canina*, *Cornus mas*, *Rhus coriaria*, *Amelanchier ovalis*,
- ✓ **Objectives for the native wild species**
 - Species selection, botanical collections
 - Documentation (geographical & ecological information, botanical name, accession numbering, DNA barcoding)
 - Asexual propagation
 - Evaluation (crop characteristics, fruit analysis)
 - Pilot sustainable utilization and promotion



Methodology

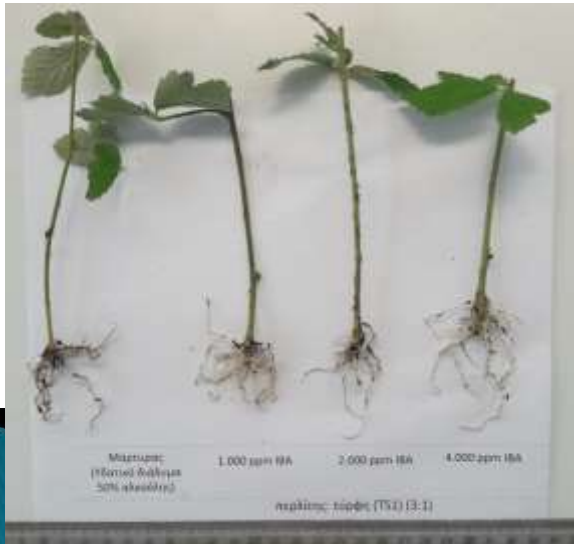
- ✓ Bibliographic overview to prepare, organize and carry out the botanical expeditions
- ✓ Botanical collections in sites of Northern Greece
- ✓ Collection of propagation material, leaves for DNA analysis, soil sample and fruit sample for analysis
- ✓ Documentation of the material (geographical & ecological information, botanical name, accession numbering, DNA barcoding)



Rubus idaeus (red raspberry, *Rosaceae*)

Ex situ
conservation of 5
populations

16 known sites in
the wild in total
(for further
study)



***Vaccinium myrtillus* (European blueberry *Ericaceae*)**



Ex situ conservation
of 3 populations

15 known sites in the
wild in total (for
further study)

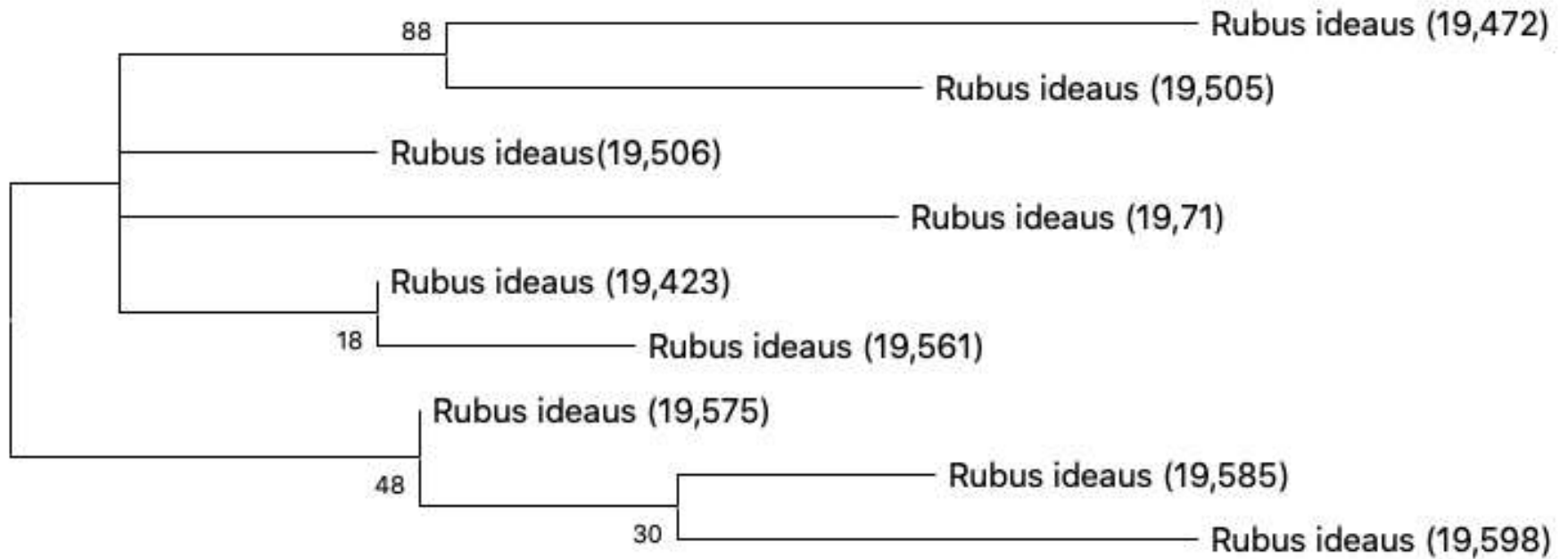


In BBGK's collection ex situ: Fragaria vesca (strawberries, Rosaceae)

Ex situ
conservation
of 3 wild
populations



Identification of *Rubus ideaus* using ITS2 DNA barcoding region



0.0010



F.A. (Phil) Aravanopoulos,
Forest Genetics Lab
Aristotle University of Thessaloniki (FGL–AUTH)
Greece



ARISTOTLE
UNIVERSITY OF
THESSALONIKI

Species – FGL–AUTH

- ▶ 1. Strawberry tree, *Arbutus unedo*: range-wide collection of populations in Greece, genetics and morphology diversity studies (in progress)
- 2. Elderberry, *Sambucus nigra* identification of populations range-wide
- 3. Yew, *Taxus baccata* genetics, epigenetics and metabolomics (in progress)



Taxus baccata, Mt. Olympus

Status – FGL–AUTH

Species	DNA Bank	Ex situ collection	Phenotypic data	Genetic analysis	Populations identified
<i>Arbutus unedo</i>	X		X	X	X
<i>Sambucus nigra</i>					X
<i>Taxus baccata</i>	X	X	X	X	X

RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALIZATION IN AGRI-FOOD SECTOR

MANAGEMENT AUTHORITY OF WESTERN GREECE REGION

Title: Selection of strawberry genotypes for variety breeding and integration into modern commercial production systems


Acronym: FragaGen

Budget: 215,700 €

Participants: Berryplasma World LLC (<http://berryplasma.gr/>)
Department of Agriculture, University of Patras, Greece (Assoc. Professor V. Papatotiropoulos)
Department of Pharmacy, University of Patras, Greece (Assoc. Professor F. N. Lamari)

Aim: Evaluation of advanced selections of strawberry genotypes already developed by Berry Plasma LLC
Selection of superior ones for variety breeding and integration into modern commercial production systems

WP1: Cultivation of ten advanced selections of strawberry genotypes and comparison with commercial varieties (e.g. Camarosa, Fortuna, Victory, Rociera). Selection of the most promising ones

- Evaluation based on agronomic and production traits: size, shape, texture, weight, color, and number of fruits per plant, % of commercial fruits at maturity, vegetative development, blooming, concentration of sugars, acids, anthocyanins etc.
 - Selection of superior genotypes
- 


WP2: Final evaluation of selected genotypes – Large scale cultivation – Development of commercial varieties.

- Large scale cultivation of the selected genotypes (3000 plants/genotype).
- Selection of the most advanced ones as commercial cultivars

WP3: Molecular and chemical characterization of the genotypes selected in WP2

- Sensorial evaluation of aroma and taste of fruits
- Determination of volatiles (lactones, esters, aldehydes, ketones, furans) through microdistillation and GC/MS analysis
- Determination of the antioxidant compounds such as polyphenols, anthocyanins, ascorbic acid, DPPH, FRAP
- Determination of sugar non-volatile compounds
- Genetic characterization of the selected genotypes with molecular markers (SSR's SNP's)
- Expression profiling of selected genes responsible for aroma and taste in strawberry fruits (*SAAT*, *FaFAD1*, *FaOMT*, *FaPG1*)
- RNAseq analysis for the detection of genetic markers related to size and aroma of strawberry fruits.

Constraints to efficient conservation of wild population

- ❖ The quality and availability of accession-level information
 - ❖ Lack of adequate funds is the greatest impediment leading to deficiencies in labour, infrastructure, and materials, and to postponement of regeneration activities beyond the ideal interval
 - ❖ Availability of resources for regeneration, collecting, and research
 - ❖ Lack of skilled staff is a constraint especially evident in more difficult or poorly researched species and genotypes
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So, we think that this group will help a lot towards the conservation and exploitation of Greek berries.
Thank you!

