SUBERBO: Sustainable Berry Boost (Proof of CONCEPT/0618/0014)

E-NEWSLETTER

ABOUT US

The Host Organization (Mountain Berries Pitsilia N.V.) is a newly formed company which operates in Pitsilia Region, Troodos where soft fruits can thrive away from extreme arid conditions. Established by Nicolas Valanides, as a startup to promote Soft Fruit Organic production, the company currently manages 7000 m^2 ha of raspberries, blackberries, strawberries and blueberries. These crops have been selected as novel fruits for the region, mainly due to prospects for high profitability within a time frame of 2 years upon planting. During the last years, the company proceeded to own funded in field experimentation with the aim to evaluate suitability of cultivars under the edaphoclimatic conditions of the area and to optimize production protocols. The area of cultivation is fully irrigated and trained linearly with V-shape bushes using stainless steel posts and wires for support. The company was established in 2018, aiming to increase local berry production, currently producing red and gold raspberries, blackberries, strawberries, gooseberries, red currants, black currants and norther highbush blueberries.

SUBERBO GOALS

Sustainable Berry Boost project was developed to explore the potential to eco-friendly production methods, to sustainably increase not only organic berry production but also organic agriculture in the Mountainous Region of Troodos. The project has conducted field trails to evaluate the efficacy of both microbial biofertilizers & algal extract bio-stimulants. SUBERB pursued the following specific scientific and technological objectives:

1. Increase yield of red raspberries, both on quantitative and qualitative terms through a sustainable approach that will encompass the use of ABs SUBERB will pursue the following specific scientific and technological objectives:

2. Increase yield of red raspberries, both on quantitative and qualitative terms through a sustainable approach that will encompass the use of ABs
3. Prove that ABs can be used to minimize climate change drought/heat conditions
4. Ameliorate abiotic heat/drought stress conditions that will additionally reduce production expenses linked to fertilization and irrigation management practices
5. Extend the growing season with the possibility to offer fruits ‘off-season’, thus providing a competitive advantage to expand the local berry market growth and secure and increase the earnings of soft fruits farmers
6. Evaluate organically accepted growth promotion methods
7. develop and publicly release efficient production protocols, adapted to Cypriot conditions

8. Increase employment prospect in arid/mountainous and neglected areas of the Republic of Cyprus

FIELD AND LABORATORY MEASUREMENTS

The working package included both field and laboratory work. Field work included plant growth, irrigation, nutrition, pest control and training management. Moreover, marking the plants and dividing the project into 4 main plots with 2 sub-plots each to efficiently manage treatment as well as samples was a big part of the project load. Additionally, field measurements were conducted every week from July- October, whilst laboratory trails were conducted, and measurements were conducted from October-December. The evaluation of the biostimulants efficacy was carried out according to the following parameters:

FIELD TASKS

I. **Physiological features:** stomatal conductance (*gs*), chlorophyll fluorescence ($^{Fv}/_{Fm}$), chlorophyll content (SPAD)]

II. **Agronomic features** [total yield (kg/m), shoot relative growth (mm/day), total number of laterals and flowers]

III. **Soil moisture** [water capacity (%)]

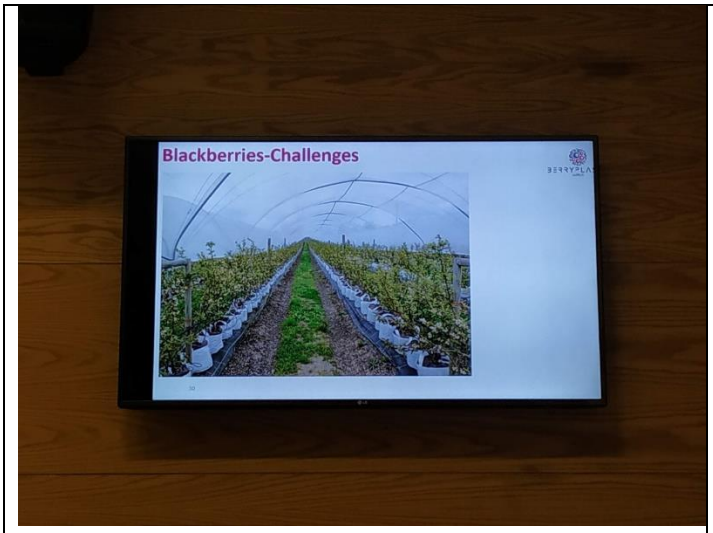
LABORATORY TASKS

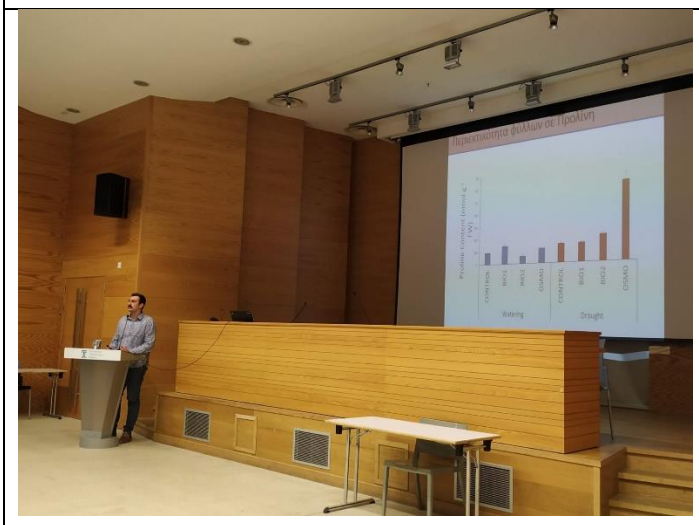
IV. **Quantification of cellular damage indicators:** [proline, photosynthetic pigments (chlorophylls, carotenoids), H_2O_2, Malondialdehyde)

V. **Qualitative attributes** [color parameters (L*, a*, b*, hue angle), tissue firmness, soluble solids content, titratable acidity, total antioxidant activity]

WORKSHOP

With the collaboration of the SAB members professors Dr.George Manganaris and Dr. Vasileios Fotopoulos a co-organized practical workshop was held at CUT permits. Utilizing social media platforms and university scientific contacts people were invited to the workshop. Apart from the social media, invitations were given to the farmers, the scientific community and the industry for the workshop. Where an oral presentation was given by the Coordination on the current results of the project. Moreover, a member of the SAB was invited from Greece to show their relevant R&D work and breeding program on soft fruits, as well as the global market competitiveness. At the same workshop Professor Dr.Bruno Mezzeti was invited to give a brief presentation on current trends , from the Polytechnical University of Merche, Italy. Mails given by the attendees at the workshop were targeted as a list to promote the projects report as e-newsletters.


Blackberries-Challenges




Sustainable Berry Boost (SUBERBO):
Εφαρμογή βιο-διεγερτών έναυσης ως μια νέα
έξυπνη γεωργική πρακτική για την ενίσχυση του
όγκου παραγωγής και των ποιοτικών
χαρακτηριστικών στα Σμέουρα (Rubus idaeus L.)

Affiliation Scheme

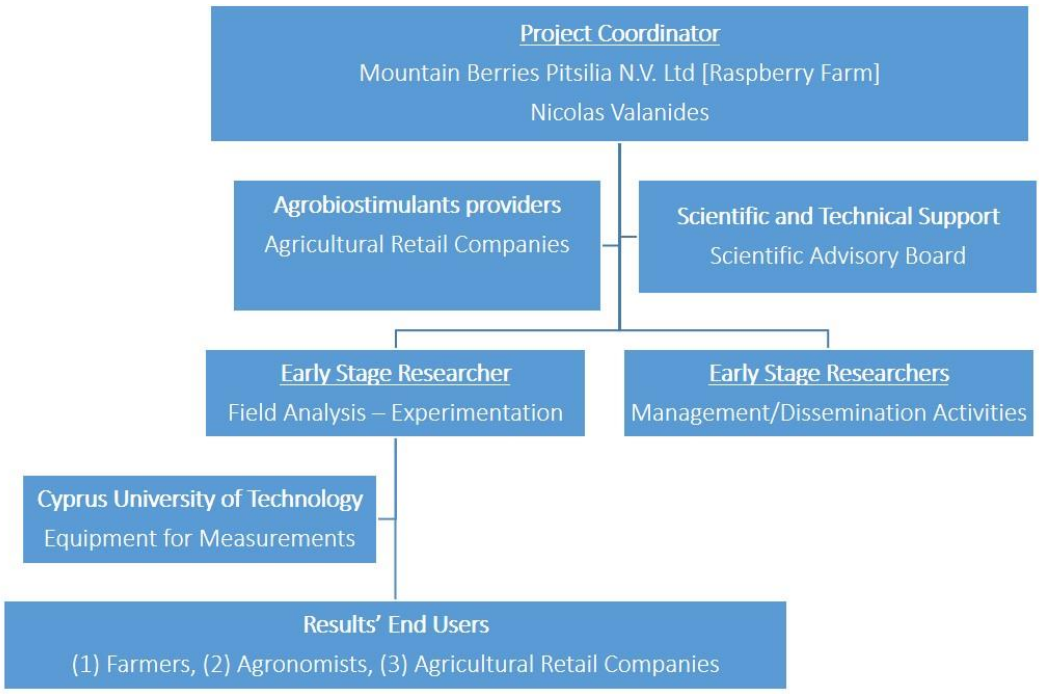
The project coordinator (Nicolas Valanides) representing the Host Organization will be responsible of generating all deliverables for the project, consulting with the Scientific Advisory Board(SAB) and the Researchers (Dr. Antoniou and Mrs. Kosma), in terms of decisions on how to smoothly operate on the deliverables, including data dissemination to end users (Figure 2).The Hosting Organization is closely collaborating with Cyprus University of Technology to utilize specialized field and Laboratory equipment. The Scientific Advisory Board is also providing technical and scientific support **(Graph1).**

Scientific Advisory Board

- Dr. George Manganaris, Associate Professor, Cyprus University of Technology
  Expertise: fruit production, postharvest physiology and technology
- Dr. Vassileios Fotopoulos, Associate Professor, Cyprus University of Technology
  Expertise: plant priming, plant abiotic stress physiology
- Dr. Evangelos Tsormpatsidis, R & D manager in Berryplasma Worldwide

Expertise: soft fruit production protocols, soft fruit production

Graph 1. Flow chart demonstrating the participants of this project and their role concerning the project's management.



RESULTS

Cultivation of soft fruits like strawberries, blackberries, blueberries and raspberries is receiving accumulating interest and an exponential worldwide demand over the last years, mainly due to their proven health-promoting properties. The latter are considered as added value products but its cultivation in Cyprus is restricted to few hectares, mainly due to lack of the necessary expertise. The aim of the current project was to test the efficacy of agricultural biostimulants (ABs) and its potential to be commercially applied in a sustainable production system. These compounds, also mentioned as priming agents (PAs) are generally recognized as safe since they do not leave any harmful residues on fruits and are abundant in natural environments. Furthermore, they have been shown to trigger crop protection mechanisms, against biotic and abiotic stress factors in an array of agricultural commodities. However, there is a lack of scientific evidence regarding their efficacy in raspberry plants. The current project was tightly aligned with the 2014-2020 Smart Specialisation Strategy for Cyprus (S3Cy) that identified the agricultural sector as a priority area with high but unexplored potentials. The main deliverable of this project includes the development of a publicly accessible recommended management production protocol that recommends the use of a combination of inorganic and organic material such us *Ascophyllum nodosum* extract, glycine-betaine, g-aminobuteric acid, mannitol, auxins and gibberellins in order to enhance production volumes of raspberry plants.

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