



SHEET

Sunburn and HEat prediction in canopies for Evolving a warning Tech solution

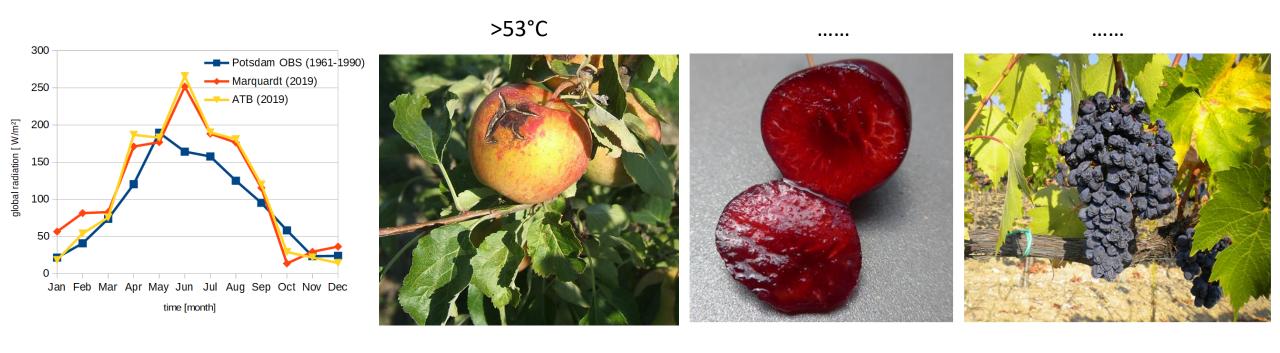
Nikos Tsoulias, Laszlo Baranyai, Brunella Morandi, Trim Bresilla, Bastian Wingerath, Alice Lucchi, Manuela Zude

Kick-off cofunded Projects Seminar 17-18th March 2021





Goal and context







Goal and context









Objectives

The objectives of the project SHEET capture

- (i) the analysis and modelling of apparent temperature distribution at the fruit surface employing terrestrial remote sensing
- (ii) validation of the temperature distribution model and findings on the fruit damage considering the peak and duration of radiation and temperature degrees
- (iii) prototype of a warning IoT solution to inform growers on the risk of damage by means of a mobile application





SHEET project's contribution

Ambition	Impact
Application of remote sensing for developing a thermodynamic and big data based model & Open source software tools (temperature distribution model, fruit detection, fruit temperature analysis, fruit damage assessment)	temperature distribution in canopy and fruit
Scientific approach to find and explain effects and interaction of high temperature in orchards and vineyards & Validation of findings to enable transfer to other crops	Real-time support for fruit growers, storage management, and marketing & Contributing to climate resilience
Pragmatic IoT solution with fully implemented cyber security routines & Cost-effective solution for stakeholders	Reducing food waste along the supply chain of fresh fruit & Enhancing the economic sustainability for stakeholders along the supply chain





Technology readiness level

TRL:

- 8 (fruit detection and thermal imaging solution),
- 7 (fruit assessment),
- 8 (case specific temperature distribution model),
- 5 (temperature distribution model for varying canopies),
- 6 (mobile App as warning solution)















Workpackages

WP 6: Dissemination (all, <u>ATB</u>) WP 7: Coordination (ATB, all)

WP 1: Analysis and documentation of fruit damage (<u>UNIBO</u>)

- 1.1 Characterization of damage (UNIBO)
- 1.2 Development of protocol for fruit damage detection (UNIBO)
- 1.3 Validation (UNIBO, ATB)

WP 3: Field experiments in three locations capturing apple, cherry, and grape (UNIBO)

- 3.1 Coordinating field experiments (UNIBO)
- 3.2.1 Experiments on apples (UNIBO, ATB)
- 3.2.2 Experiments on cherries (ATB)
- 3.2.3 Experiments on grapes (UNIBO)
- 3.3 Tresholding for the warning system (SZIU, UNIBO, ATB)
- 3.4 Validation (HK, ATB, UNIBO, SZIU)

WP 2: Fruit analysis (ATB)

2.1.1 Registration LiDAR 3D point cloud, alignment of thermal data in apple (ATB) 2.1.2 3D point cloud, thermal imaging in grape and sweet cherry (ATB, UNIBO) 2.2 RGB-D imaging (UNIBO)

WP 4: Modelling fruit temperature distribution, analyzing time series (SZIU)

- 4.1 Requests (SZIU)
- 4.2 Temp. distribution model (SZIU)
- 4.3 Time series (SZIU, UNIBO, ATB)

WP 5: Prototype of warning IoT solution to inform growers (<u>MACIO</u>)

- 5.1 Data repository (MACIO, ATB)
- 5.2 Backend and frontend (MACIO)
- 5.3 Validation (all), 5.4 Redesign (MACIO)















Workpackages

WP 1: Analysis and documentation of fruit damage (<u>UNIBO</u>)
1.1 Characterization of damage (UNIBO)
1.2 Development of protocol for fruit damage

- detection (UNIBO)
 1.3 Validation (UNIBO, ATB)

Dissemination (all, <u>ATB)</u> Coordination (ATB, all)

6:

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Partners

- Hungary / Budapest / Szent Istvan University (SZIU)
- Italy / Bologna / Department of Agricultural and Food Sciences (UNIBO)
- Germany / Kiel / macio GmbH (MACIO)
- Italy / Bologna / HK Horticultural Knowledge srl (HK)
- Germany / Potsdam / Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) (Coordinator)















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Cooperation with stakeholders

Project year

Regular web meetings and updates on the

project meeting and website and social media joint measuring campaign of WP2+3(apple) in Potsdam, Germany

WP2+4 meeting and participation in IHC 2022 in Angers, France

ebsite and social media Regular web meetings and updates on the

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cooperation with Start-up and Agriphotonics networks in Hungary, Germany, and Italy

workshop with stakeholders (Italy)

workshop with stakeholders (Germany)

Germany Kick-off meeting Potsdam,

project meeting in **Budapest**, Hungary

measuring campaign

with hands-on

considering the fruit

damage assessment

and climate data in

Bologna, Italy















Cooperation with stakeholders

Scientific conferences (ISHS, IEEE)

Operational Groups of European Innovation partnership: OGs Smart Sustainable and Specialized Orchard (2019 – 2022), SAL.VA.RE.BIO.VIT.E.R. (2017 – 2020), Versuchs- und Kontrollring für Obstund Gemüsebau in Brandenburg AquaC+ (2017 – 2021), PRIMEFRUIT (2018 – 2021) University Bologna working with local cooperatives and consortia Experimental fruit station Müncheberg > MaluSun project (2022 – 2025)

Startups in Italy (**HK**, Apofruit), Germany (CrocusLabs), Hungary (SKC Consulting) AgriPhotonics – bilateral Network gathering 30 companies in Israel and Germany OptecBB – 115 companies and research institutions















Dissemination and outreach

- Publications and presentations to the scientific community
- SHEET website setup and NEWS updates
- Social media will be employed to inform about activities and results.
- Communications in journal for growers (<Informatore Agrario>, <Obstbau>, <Besseres Obst>,
 <frutticoltura>, etc.)
- Press releases, Videos
- Communication with networks

















LET'S KEEP IN TOUCH!

Please feel always free to reach out to us.

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WEBSITE

www.ictagrifood.eu

#globalwarming
#fresh_fruit
#fruit_storage
#thermalimaging
#thermodynamics
#horticulture



Thank you for your attention!