



Blueberry  
Europe

2018

**FROM SCIENCE TO FORK**  
DALLA RICERCA AL CONSUMO

TRENTO - ITALY, 12-14/11/2018



FONDAZIONE  
EDMUND  
MACH



**CiF**

**SantOrsola**  
Piccoli produttori, grandi sapori.

ATTIVITA' REALIZZATA  
NELL'AMBITO DEL PROGETTO DI RICERCA E SVILUPPO  
'APPLE & BERRY' LP 6/99 ART. 5  
DELLA PROVINCIA AUTONOMA DI TRENTO



## **Scientific Committee**

Chad Finn, Oregon State University, USA

Massimo Iorizzo, Fruitnet.com, USA

Lara Giongo, Fondazione Edmund Mach, Italy

Gianluca Savini, Sant'Orsola, Italy

Gianfranco Anfora, University of Trento, Italy

Brian Farneti, Fondazione Edmund Mach, Italy

Francesco Emanuelli, Fondazione Edmund Mach, Italy

## **Organizing Committee**

Luca Lovatti, Consorzio Innovazione Frutta Trentino, Italy

Floriana Marin, Fondazione Edmund Mach, Italy

Paula Poncetta, CIF & Fondazione Edmund Mach, Italy

Marcella Grisenti, Fondazione Edmund Mach, Italy

Paolo Martinatti, Fondazione Edmund Mach, Italy

Matteo Ajelli, Fondazione Edmund Mach, Italy

Cristina Castellani, Fondazione Edmund Mach, Italy

Gonzalo Cervantes, Fondazione Edmund Mach, Italy

Paolo Zucchi, Sant'Orsola, Italy

Sara Fontanari, Sant'Orsola, Italy

Daniela Mott, Sant'Orsola, Italy



### **Fondazione Edmund Mach**

In order to improve agriculture in what was then Tyrol, in 1874 the Austro- Hungarian Empire approved the institution of an agricultural school to be located in the Augustinian monastery of San Michele all' Adige. After the First World War, the Agricultural Institute of San Michele (IASMA) came under the control of the Italian government which in turn passed it over to the authority of the Autonomous Province of Trento since 1948. In 2008 the Institute's organisations and activities were transferred to a new legal body, the Fondazione Edmund Mach (FEM), a public agency under private law. Since 2008 the Research and Innovation Centre (CRI), within FEM, focuses its research on genetics and genomics of fruit plants, agrifood and nutritional quality, biodiversity and molecular ecology, sustainable agro-ecosystems and bioresources, and computational biology. These research areas were selected to meet the interests and needs of local economy. A brand new Campus with 200 m<sup>2</sup> of greenhouses, 30 hectares of breeding fields and state of the art technologies are other relevant traits. In 2008 an external site for berries research was developed, where labs and fields grow in the most typical berries area in Trentino. A young and dynamic environment, international researchers, collaborations with universities and institutions throughout the world: all these together place the Centre in a global context, which encourages the exchange of ideas and the development of innovation and produces internationally-recognised results.

### **Sant'Orsola**

Sant'Orsola is an Italian farmer association specialized in production and sale of berries: strawberries, blackberries, raspberries, blueberries, red and white currants, wild strawberries, baby kiwis, late-fruiting cherries and gooseberries. Founded in the early 1970s as an association of volunteers, it became a cooperative in 1979 and a few years later achieved the important recognition of "Producers' Organization" from the European Community. Sant'Orsola is represented by more than 800 members from Trentino, Calabria, Sicily and Veneto regions. Every day each member commits to the passion that makes unique the Sant'Orsola's small fruits. Sant'Orsola currently is the main Italian brand in the berries category and its headquarter is located in Trentino.

Sant'Orsola has started an intense and continuous Research & Development work to select the best varieties of strawberries and berries. Expert hands cross in natural ways pollens and flowers of different varieties of the same species in order to identify those that are best suited to ensure a top quality production for taste, quality, storability and resistance to disease and winter cold.

### **Cif**

CIF (Fruit Innovation Consortium) is a private company active from 2012. Members of CIF are : APOT and Fondazione Edmund Mach.

APOT is an APO of the Producer Organisations: La Trentina and Melinda. The two PO's represents 90% of the total fruit production in the Trentino Province. In total, through APOT, we represent the fruit innovation for 5.000 growers, 8.000 hectares and 450.000 t of fruit sold in the market.

CIF develops and promotes new apple varieties from different breeding programs. Within this project the CIF has two main tasks: addressing the objectives of growers and commercial structures and validate new selections primarily produced in the province of Trento.

CIF collaborate in the development of new selections and varieties coming from different apple breeding programs in the world and also is active in cooperating in strawberry (BerryLab) and blueberry (FEM) variety development and testing of new sweet cherry and apricot variety.

CIF is also involved in several projects with the objective to increase the sustainability in fruit production through: orchard design (Apple Pedestrian Orchard), enhancing the development of new and local varieties (blueberry and Dro Plum) and better control of pests (Sterile Insect Technology).

## MONDAY 12.11

17:00 - 17:30 Participants registration  
 17:30 - 19:00 Welcome drink

## TUESDAY 13.11 "SCIENTIFIC DAY"

08.00- 09.00 Participants registration

09.00- 09.30 **Opening of the Conference**

**Breeding and horticulture**  
**FIRST SESSION**  
**chairperson: Chad Finn**

09.30- 10.00 **Chad Finn (USDA ARS, Usa)**  
 Breeding of northern and southern highbush blueberry

10.00- 10.20 **Rolf Nestby (NIBIO, Norway)**  
 The possibility of better exploiting the wild European blueberry (*Vaccinium myrtillus* L.)

10.20- 10.40 **David Charles Percival (DALHOUSIE UNIVERSITY, Canada)**  
 Unmanned Aerial Vehicle use for Phenotype and plant growth and development assessment in wild blueberry production

10.40- 11.00 *Coffee break*

11.00- 11.20 **Pedro Bràs de Oliveira (INIAV, Portugal)**  
 Early and late highbush blueberry production in substrate

11.20- 11.40 **Felix Koschnick (NIEDERSACHEN, Germany)**  
 Blueberry growing in Europe, remarks on the northern season 2018, what will happen in the future, where are the opportunities

11.40- 12.00 **Angela Koort (ESTONIAN UNIVERSITY OF LIFE SCIENCES, Estonia)**  
 Comparison of bioactive compound content of new half-highbush blueberry cultivar 'Are' with selected blueberry clones

**Genetics & genomics****SECOND SESSION**

chairperson: Massimo Iorizzo

12.00 - 12.30 **Massimo Iorizzo** (NORTH CAROLINA STATE UNIVERSITY, Usa)  
Genome and genomic tools in northern and southern blueberry

12.30 - 12.50 **Francesco Emanuelli** (FEM, Italy)  
Blueberry genetics: germplasm evaluation and QTL mapping

12.50 - 13.10 **Luca Bianco** (FEM, Italy)  
From genomes to genomic tools: bioinformatics at FEM

question time

13.20 - 14.00 *Lunch*

**Blueberry fruit quality and postharvest****THIRD SESSION**

chairperson: Lara Giongo

14.00 - 14.30 **Lara Giongo** (FEM, Italy)  
A glance on blueberry fruit quality

14.30 - 14.50 **Nenad Magazin** (UNIVERSITY OF NOVI SAD, Serbia)  
6-benzyladenine affects chemical composition of northern highbush  
blueberry (*Vaccinium corymbosum* L.) fruits

14.50 - 15.10 **Cinzia Mannozi** (UNIVERSITY OF BOLOGNA, Italy)  
Effects of different polysaccharides-based coatings on quality of fresh  
Blueberries during storage

15.10 - 15.30 **Rosalba Lanciotti** (UNIVERSITY OF BOLOGNA, Italy)  
Innovative strategies to increase safety, quality and sustainabilities of  
Berry productions

15.30 - 15.50 **Brian Farneti** (FEM, Italy)  
Tailored storage management can positively affect blueberry fruit quality

15.50 - 16.45 Posters short presentation (five minutes talk)



## WEDNESDAY 14.11 "TECHNICAL COMMERCIAL DAY"

- 08.00 - 09.00 Registration
- 09.00 - 09.30 **Authorities' opening**  
**Luca Lovatti (CIF, Italy)**
- 09.30 - 09.45 **Global overview and market summary of blueberry**  
**Chairperson: Mike Knowles (FRUITNET, United Kingdom)**
- 09.45 - 10.00 **Blueberry business development**  
**Adrian Wallbridge (FALL CREEK FARM AND NURSERY, Spain)**  
European overview of the blueberry business, consumption and main differences among main areas
- 10.00 - 10.15 **Nursery and Certification**  
**Frans Claassen (NAKTUINBOUW, The Netherlands)**  
Blueberry nursery pipeline and plant quality
- 10.15 - 10.30 **Pierluigi Lucchi, Marco Cardoni, Luigi Catalano (CIVI, Italy)**  
CIVI Italia role within plant propagation material certification scheme: proposal for soft fruits
- 10.30 - 10.45 **Substrates**  
**Joris Böinck (LEGRO, The Netherlands)**  
Soil to substrate
- 10.45 - 11.15 *Coffee Break*
- 11.15 - 11.30 **Production**  
**Gianluca Savini (SANT'ORSOLA, Italy)**  
Italian blueberry production and market
- 11.30 - 11.45 **Post-harvest**  
**Luca Montanari (UNITEC, Italy)**  
Sorting and optical selection

# PROGRAMME

- 11.45 - 12.00 **Packaging**  
**Matteo Camillini** (INFIA, Italy)  
R-PET 100% Packaging Sostenibile
- 12.00 - 12.15 **Supermarkets**  
**Sabina Wyant** (TESCO, United Kingdom)  
The status quo and what the future holds
- 12.15 - 12.40 **Resume of the 13th scientific session**  
**Lara Giongo** (FEM, Italy), **Chad Finn** (USDA ARS, Usa)
- 12.40 - 13.00 **Discussion**  
moderated by **Mike Knowles**
- 13.00 - 13.15 **Authorities' closing**  
**Sergio Menapace** (FEM, Italy)
- 13.15 - 15.00 *Lunch and Networking*
- 15.00 - 18.00 Tour to Sant'Orsola and Fondazione Edmund Mach

## Breeding and Horticulture

1. Chad Finn                      chad.finn@ars.usda.gov
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3. David Charles Percival      David.Percival@DAL.ca
4. Pedro Brás de Oliveira      pedro.oliveira@iniav.pt
5. Felix Koschnick              felix.koschnick@lwk-niedersachsen.de
6. Angela Koort                  angela.koort@gmail.com

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## Genetics and genomics

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9. Luca Bianco                  luca.bianco@fmach.it

- Genome and genomic tools in northern and southern blueberry \_\_\_\_\_ p. 23
- Blueberry genetics: germplasm evaluation and QTL mapping \_\_\_\_\_ p. 23
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## Fruit quality

10. Lara Giongo                  lara.giongo@fmach.it
11. Nenad Magazin              nrmagazin@polj.uns.ac.rs
12. Cinzia Mannozi              cinzia.mannozi2@unibo.it
13. Rosalba Lanciotti          rosalba.lanciotti@unibo.it
14. Brian Farneti                brian.farneti@fmach.it

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## Pests and diseases

15. Gianfranco Anfora          gianfranco.anfora@unitn.it
16. Dalphy Harteveld          dalphy.harteveld@wur.nl
17. Alberto Grassi              alberto.grassi@fmach.it
18. Daniele Prodorutti          daniele.prodorutti@fmach.it

- Current status of *Drosophila suzukii* management in Trentino, research achievements and perspectives for sustainable control \_\_\_\_\_ p. 27
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**[13] Innovative strategies to increase safety, quality and sustainabilities of berry productions**

[5]

Francesca Patrignani, Lorenzo Siroli, Vincenzo Castellone, Rosalba Lanciotti  
Department of Agricultural and Food Science, University of Bologna, Cesena, Italy

Berry fruits are well known for their health promoting features, due to their high levels of vitamins, antioxidants and bioactive compounds (i.e. flavonoids, anthocyanins and phenolic acids). However, they have very short shelf life, due to the rapid water loss, tissue senescence and growth of spoilage microorganisms, resulting in high losses in the food-supply chain. In addition, fresh produces, including berries, due to the lack of thermal treatments before consumption, are frequently associated to food-borne pathogen outbreaks. In this framework, an innovative cardboard packaging, releasing over time natural antimicrobials effective against several spoilage and pathogenic microorganisms, was set up and patented. The innovative antimicrobial packaging was validated both in laboratory conditions and in real distribution chains on several fruit typologies, including strawberries and raspberries of different provenience, variety and harvesting period. The huge number of data showed that the innovative packaging induced significant reductions of the spoilage microorganism cell loads. In fact, the cell loads of total mesophilic bacteria, yeasts and moulds were always 2-3 log cycles lower in the samples packed in the innovative antimicrobial packaging than those packed in the current benchmarks (traditional corrugated cardboards and/or reusable plastic packaging). The antimicrobial cardboard significantly increased the fruit shelf life and reduced the waste amounts, compared to the current benchmarks, independently on the complexity of distribution chains and the raw material features. In real distribution chains, increases of strawberry shelf-life up to 2 days were observed. Also in raspberry significant increases of shelf-life associated to waste reductions were obtained. The sensory analysis over storage time showed the positive effect of the innovative packaging on raspberry sensory parameters, such as odor, color, taste and overall quality.

**[14] Tailored storage management can positively affect blueberry fruit quality**

Brian Farneti (1), Matteo Ajelli (1), Iuliia Khomenko (2), Marcella Grisenti (1), Paolo Martinatti (1), Paula Poncetta (1,3), Eugenio Aprea (1), Francesco Emanuelli (2), Franco Biasioli (2), Lara Giongo (1)

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3 CIF Fruit Innovation Consortium, Trento, Italy

Fruit postharvest is traditionally investigated in terms of flavor and texture because of their crucial impact on fruit acceptability and consumer satisfaction. Blueberry (*Vaccinium* spp.) edible quality highly depends on cultivar genetics, growing conditions, and postharvest handling. The aim of this research was to unravel the variability of the main quality traits of *Vaccinium* germplasm, with attention to fruit quality changes during storage under different atmospheric storage conditions. Forty blueberry accessions, representing different *Vaccinium* species, were assessed at harvest and after six and eight weeks of storage at 4 °C under normal and modified atmosphere (18% CO<sub>2</sub>: 7% O<sub>2</sub>). Besides the analytical assessment of the main quality traits -such as soluble solids, acidity, texture, color and weight loss- the aroma was accurately monitored by PTR-ToF-MS (proton transfer reaction-time of flight-mass spectrometry) and SPME-GC-MS (solid phase microextraction- gas chromatography-mass spectrometry). In addition, a deeper investigation of four selected blueberry cultivars (Brigitta Blue, Centurion, Northland, and Star) has been performed during two months of storage under four atmosphere conditions (O<sub>2</sub> concentrations: 21%, 12%, 7% and 1%). Results revealed an extremely high variability on quality among *Vaccinium* genotypes, especially for VOCs. This variability was magnified during storage especially at low oxygen condition, since several esters are synthesized ex-novo. The synthesis of these compounds may be the result of a fruit-specific process to prevent the over accumulation of ethanol, caused by anoxic stress. This investigation provides explanatory information for an optimized market segmentation, such as for domestic and export, and parental choice for those breeding programs aimed to enhance fruit quality and storability of blueberries.