

## SUMMER SCHOOL 2018

# Emerging pests and diseases in horticultural crops: innovative solutions for diagnosis and management



July 2<sup>nd</sup> - 6<sup>th</sup>, 2018

Centre of Competence for Innovation in the Agro-environmental field

AGROINNOVA

Largo Paolo Braccini 2 – Grugliasco (Turin) - Italy



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634179*



**SIPaV**  
Società Italiana di Patologia Vegetale  
Italian Phytopathological Society

## **Introduction**

EMPHASIS project (Effective Management of Pests and Harmful Alien Species – Integrated Solutions) aims to ensure a European food security system and the protection of biodiversity and of ecosystem services while developing integrated mechanisms of response measures (practical solutions) to predict, to prevent and to protect agriculture and forestry systems from native and alien pests threats.

The reduction in available plant protection products and the requirement of EU Member States to promote low pesticide input and implement IPM principles, as a result of EU hazard-based legislation, is a key driver for the development of alternative and sustainable pest strategies. However, the key to attaining greater uptake of alternative strategies is through providing products or methodologies that can perform as well as traditional pesticides, whilst at the same time providing the same ease of use and cost effectiveness.

The overall goal of EMPHASIS is to develop and promote the take-up of practical and effective solutions to prevent and protect European crops from native and alien pest threats, improving productivity and resilience of European agriculture, in the context of climate change.

The course is made up of three sections:

- innovative strategies for diagnosis and management in horticultural crops;
- emerging pests in horticultural crops;
- use of LAMP technology.

This course aims to train young researchers on epidemiological issues related to emerging pests and pathogens, and on innovative management strategies in horticultural systems. It also aims to provide skills about the use of innovative and effective diagnostic systems.

Molecular methods based on DNA analysis are widely used in plant disease diagnostic, due to their high efficiency, sensitivity, specificity and rapidity for early detection and identification of a broad range of plant pathogens and pests. Loop-mediated isothermal amplification (LAMP) is an emergent molecular tool offering rapid, accurate, and cost-effective diagnosis of plant diseases. LAMP assay enables to use fast DNA extraction methods suitable for on-site application. In addition this assay uses an enzyme tolerant to chemical inhibitors often found in environmental samples, making this method an excellent tool for the *in-field* detection of plant pathogens.

The purpose of the course is to familiarize trainees with the basic principles of LAMP as diagnostic tool and to train them on *in-field* DNA extraction methods and common instruments/reagents of a LAMP assay. The course will provide for trainees the basis for designing, performing and troubleshooting a LAMP assay, according to EPPO Standard PM 7/98.

Training about LAMP technology will be structured on two levels (Basic and Advanced) to address different training needs of participants.

## **Organized by:**

Centre of Competence for Innovation in the agro-environmental field AGROINNOVA –Largo Paolo Braccini 2 – Grugliasco (Turin) – Italy

## **Date:**

July 2<sup>nd</sup> – 6<sup>th</sup>, 2018

**LAMP Basic course:** July 2<sup>th</sup> – 5<sup>th</sup>, 2018

**LAMP Advanced course:** July 2<sup>th</sup> – 6<sup>th</sup>, 2018

**Venue:**

Centre of Competence for Innovation in the agro-environmental field AGROINNOVA –Largo Paolo Braccini 2 – Grugliasco (Turin) – Italy

**Open to:** up to 20 PhD students, post-docs, researchers, technicians and specialists in the horticultural and seed fields.

**Language:** Italian (Basic course) and English (Advanced course).

**Lecturers:**

Michael P. Andreou  
Neil Boonham  
Lara Bosco  
Rosa Caiazzo  
Chiara Ferracini  
Giovanna Gilardi  
Elena Gonella  
Maria Lodovica Gullino  
Massimo Pugliese  
Davide Spadaro  
Jenny Tomlinson

**Tutors:**

Sara Franco Ortega  
Fabiano Sillo  
Luana Giordano

**REGISTRATION:**

Registration is open at the following link within the deadline of May 31st 2018:

<https://www.eventbrite.com/e/emphasis-summer-school-tickets-34566975755?utm-medium=discovery&utm-campaign=social&utm-content=attendeeshare&aff=escb&utm-source=cp&utm-term=listing>

**Participation fees**

This course is organised in the context of the EMPHASIS project, funded by the Horizon 2020 Research and Innovation program (grant agreement n. 634179).

Participation, including didactic material, is free of charge. Travel, subsistence and accommodation costs are at participants' own charge.

**Course accreditation:** The summer school is accredited (3 University courses credits for Basic Course and 5 University courses credits for the Advanced Course) by the PhD Programme Agricultural, Forest and Food Science (Doctoral School of Sciences and Innovative Technologies, University of Torino).

**Information**

Ms. Grazia Pagano

Centre of Competence for Innovation in the agro-environmental field (AGROINNOVA)

University of Torino

Largo P. Braccini, 2

10095 Grugliasco (Turin) – Italy

Tel. +39 011 6708703

mobile: +39 3371425964

e-mail: [graziarosa.paganogiorgianni@unito.it](mailto:graziarosa.paganogiorgianni@unito.it)

**July 2nd 2018**

**Innovative strategies for diagnosis and management in  
horticultural crops**

9:00-9:30 AGROINNOVA and the EMPHASIS project (M.L. Gullino)

9:30-10:00 Introduction to the course (M.L. Gullino)

10:00-11:00 **SESSION I.** Main emerging diseases (M.L. Gullino)

11:00-11:30 **Break**

11:30 – 13:00 **SESSION II.** Soil and foliar pathogens: integrated pest management strategies (G. Gilardi)

13:00-14:30 **Lunch break**

14:30 – 15:30 **SESSION III.** Production and use of compost to control soil-borne pathogens (M. Pugliese)

15:30 – 17:00 **SESSION IV.** Practical laboratory and greenhouse session.

**3 July 2018**

**Emerging pests in horticultural crops**

9:00-9:30 Introduction

9:30-10:00 **SESSION I.** The accidental introduction of exotic insect pests (C. Ferracini)

10:00-11:00 **SESSION II.** Case studies: *Halyomorpha halys* and *Popillia japonica* (L. Bosco)

11:00-11:30 **Break**

11:30-12:30 **SESSION III.** Case study: *Drosophila suzukii* (C. Ferracini)

12:30-13:00 **SESSION IV.** A symbiotic control approach to emerging pests and vectors (E. Gonella)

13:00-14:00 **Lunch break**

14:00-15:00 **SESSION V.** Practical session in the laboratory. Mass rearings of *Drosophila suzukii*, *Halyomorpha halys* and their natural enemies (L. Bosco and C. Ferracini)

15:00-17:00 **SESSION VI.** Practical session in the laboratory. Application of cellular and molecular techniques for the symbiotic control (E. Gonella).

## July 4<sup>th</sup>- 5<sup>th</sup>, 2018

### LAMP Basic Course

#### July 4<sup>th</sup>, 2018

9:00-11:00. **SESSION I.** New alien species. Detection “*in situ*” and traditional identification of pathogens in different crops. Use of lateral flow devices. (*Davide Spadaro*).

11:00-11:30. **Break**

11:30-13:00. **SESSION II.** Introduction to molecular techniques (PCR, Real Time PCR). Application to diagnostic purposes. Generic introduction to LAMP. Available kits from OptiGene (*Rosa Caiazzo*).

13:00-14:00 **Lunch**

14:00-15:00 **SESSION III.** LAMP vs other molecular tools. Advantages of LAMP for the “*in situ*” detection. (*Fabiano Sillo*)

#### July 5<sup>th</sup>, 2018

9:00-10:00. **SESSION IV.** Practical session in greenhouse. Sampling healthy and diseased plants. (*Sara Franco Ortega*)

10:00-11:00. **SESSION V.** DNA extraction from environmental samples. (*Fabiano Sillo*)

11:00-11:30 **Coffee break**

11:30-12:30. **SESSION VI.** LAMP assay using Real Time PCR instruments. (*Fabiano Sillo*)

13:00 – 14:00 **Lunch**

14:00-15:00 **SESSION VII.** Results and discussion. (*Sara Franco Ortega, Fabiano Sillo*)

**July 4<sup>th</sup>-6<sup>th</sup> 2018**

## **LAMP ADVANCED COURSE**

### **July 4<sup>th</sup>, 2018**

15:00-16:00. **SESSION I.** New alien species. Detection “*in situ*” and traditional identification of pathogens in different crops. (*Davide Spadaro*).

16:00-17:00. **SESSION II.** Design of LAMP assays. Key points in the assay. Visualization of the results, reagents and equipment. (*Jenny Tomlinson*)

17:00-18:00. **SESSION III.** Primer design (I). (*Jenny Tomlinson*)

### **July 5<sup>th</sup>, 2018**

9:00-10:00. **SESSION IV.** Practical session in greenhouse. Sampling healthy and diseased plants. (*Rosa Caiazzo*)

10:00-11:00. **SESSION V.** DNA extraction from environmental samples. (*Sara Franco Ortega*)

11:00 – 11:30. **Coffee break**

11:30-12:30. **SESSION VI.** LAMP assay using Real Time PCR instruments. (*Rosa Caiazzo*)

12:30-14:00 **Lunch**

14:00-16:00. **SESSION VII.** Background to OptiSense and its involvement in LAMP. Introduction to Genie II, Genie III and the new Genie HT. Description of operation of Genie instruments including a live run. Data and signal processing – how can fluorescence measurements produce meaningful results? Customised user interfaces. Future developments. (*Michael P. Andreou*)

16:00-17:00 **SESSION VIII.** Results and discussion. (*Rosa Caiazzo*)

### **July 6<sup>th</sup>, 2018**

9:00-11:00. **SESSION IX.** Primer design (II). Practical demonstration of the design by using specific software. (*Jenny Tomlinson*)

11:00-11:30. **Break**

11:30-13:00. **SESSION X.** LAMP Troubleshooting. Final considerations. (*Neil Boonham, Jenny Tomlinson*)



	July 2 <sup>nd</sup> , 2018	July 3 <sup>rd</sup> , 2018	July 4 <sup>th</sup> , 2018	July 5 <sup>th</sup> , 2018	July 6 <sup>th</sup> , 2018
9:00	EMPHASIS	INTRODUCTION		SESSION IV	SESSION IV
9:30	INTRODUCTION	SESSION I	SESSION I		SESSION IX
10:00	SESSION I	SESSION II		SESSION V	SESSION V
10:30	SESSION I	SESSION II		SESSION V	SESSION V
11:00	Break	Break	Break	Break	Break
11:30	SESSION II	SESSION III	SESSION II	SESSION VI	SESSION VI
12:00	SESSION II	SESSION III	SESSION II	SESSION VI	SESSION X
12:30		SESSION IV			
13:00	Lunch break	Lunch break	Lunch break	Lunch break	
13:30	Lunch break	Lunch break	Lunch break	Lunch break	
14:00		SESSION V	SESSION III	SESSION VII	SESSION VII
14:30	SESSION III	SESSION V	SESSION III	SESSION VII	SESSION VII
15:00	SESSION III	SESSION VI	SESSION I		
15:30	SESSION III	SESSION VI	SESSION I		
16:00	SESSION IV	SESSION VI	SESSION II	SESSION VIII	
16:30	SESSION IV	SESSION VI	SESSION II	SESSION VIII	
17:00			SESSION III		
17:30			SESSION III		
18:00					