

COST Action CA16107




"EuroXanth: Integrating science on *Xanthomonadaceae* for integrated plant disease management in Europe"

Program of the 1st Training School on “Prognosis & Advanced Diagnosis of *Xanthomonadaceae*”

Heraklion - Crete, Greece

February 12-16, 2018

ORGANISERS

		
Technological Educational Institute of Crete – (TEI Crete) University of Applied Sciences Crete – (UASC)	Foundation for Research and Technology - Hellas (FORTH)	University of Crete (UoC)
Department of Agriculture	<ul style="list-style-type: none">• -Institute of Molecular Biology & Biotechnology,• -Institute of Computer Science,• Institute of Electronic Structure & Laser	Department of Biology

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Region of Crete (<http://www.crete.gov.gr/>)

Municipality of Heraklion (<https://www.heraklion.gr/en>)

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 **TEI of Crete**
Technological Educational Institute of Crete

 **ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ**
REGION OF CRETE

 **MUNICIPALITY OF**
HERAKLION

Day 1: Monday, 12th February 2018

(Place: UASC/ TEI Crete)

Shuttle bus from Hotel “LATO” - Heraklion to “Agroktima - Agricultural Farm” of TEI Crete / UASC leaves @ 08.00 am

Theory – Preparatory steps for “Hands on” experience – Introduction to Prognosis (*Know thyself*)

Time	Subject
08:30 – 10:00	Introduction / Orientation: Self-presentation of all Trainers and Trainees (3min max/ person) <i>Coordinators:</i> Prof. F. Ververidis (Head Organizer), Dr. R. Koebnik (EuroXanth Coordinator)
10:00 – 11:00	Classification of the genus <i>Xanthomonas</i>: species and pathovars <i>Instructor:</i> Dr. Jacques (France)
11:00 – 11:30	Coffee Break
11:30 – 12:30	<i>Xanthomonas</i>: plant diseases symptomatology, regulated organisms (EPPO Lists, EU Directive) <i>Instructor:</i> Prof. Catara (Italy), Prof. Goumas (Greece)
12:30 – 13:30	Classification of the genus <i>Xylella</i>: species and subspecies / hosts / symptoms <i>Instructor:</i> Dr. Jacques (France)
13:30 – 14:30	Lunch Break
14:30 – 15:30	Current detection methods for <i>Xylella fastidiosa</i> <i>Instructor:</i> Dr. Dreo (Slovenia)
15:30 – 16:30	<u><i>Hands-on: selected Xanthomonas species/ strains</i></u> Short visit to greenhouses for an introduction to symptomatology caused by different xanthomonads on various crops (artificial inoculations) <i>Instructors:</i> Dr. Holeva, Prof. Goumas (Greece)
16:30 - 17:00	Coffee Break
17:00– 18:00	Sample collection from infected material (artificially infected plants, etc.) Isolation from leaves/seeds (choice of isolation-media, techniques) <i>Instructors:</i> Prof. Goumas, Dr. Trantas, Ms. Mpalantinaki, Ms. Pagoulatou (Greece)
18:00 - 19.30	Isolation plates, picking, purification (pure cultures for characterization, pathogenicity tests (Koch’s post.), DNA preparation) Crude plant-extracts can be used for a specific PCR detection method <i>Instructors:</i> Prof. Goumas, Dr. Trantas, Ms. Mpalantinaki, Ms. Pagoulatou (Greece)

Shuttle bus from “Agroktima - Agricultural Farm” of TEI Crete / UASC to Heraklion @ 19.40

Day 2: Tuesday, 13th February 2018

(Place: TEI Crete / UASC)

Shuttle bus from Hotel “LATO” - Heraklion to “Agroktima - Agricultural Farm” of TEI Crete / UASC leaves @ 08.00 am

How to properly prepare samples from my infected tissues – “Hands on” experience

Time	Subject
08:30 – 09:30	Brief introduction to currently available diagnostic techniques to certified governmental labs to handle quarantine bacteria of <i>Xanthomonadaceae</i> in Greece <i>Dr. Holeva, Prof. Goumas (Greece)</i>
09:30 – 10:30	Tips & tricks for performing official diagnostic protocols for regulated plant pathogenic <i>Xanthomonas</i> <i>Instructor: Prof. Catara (Italy)</i>
10:30– 11:00	Coffee Break
11:00 – 12:00	Evolutionary histories of xanthomonads and their pathogenicity factors <i>Instructor: Dr. Jacques (France)</i>
12:00 – 13.00	Latest updates on <i>Xylella fastidiosa</i> epidemic in Italy <i>Instructor: Dr. Massimiliano Morelli (Italy)</i>
13:00 – 14:00	Lunch Break
14:00 – 15:00	Molecular typing in the context of plant pathology: from fingerprints to VNTRs <i>Instructor: Dr. Koebnik (France)</i>
15.00 – 16.00	VNTRs – How to identify them in genome sequences and how to develop primers (design pipeline and websites) – Computer exercises <i>Instructor: Dr. Koebnik (France)</i>
16:00 - 16:30	Coffee Break
16:30– 18:00	What can you can with the generated data? Tools and databases for molecular typing (Phylogeny.fr, PubMLST, PAMDB, MLVAbank) – Computer exercises <i>Instructor: Dr. Koebnik (France)</i>
18:00 – 19:00	Pathogenicity tests (inoculation techniques) Molecular techniques: Pure cultures (DNA prep or boiled cells) + specific PCR on crude extracts <i>Instructor: Prof. Catara (Italy), Dr. Sarris, Prof. Goumas (Greece)</i>

Shuttle bus from “Agroktima - Agricultural Farm” of TEI Crete / UASC to Hotel “LATO” -Heraklion @ 19.15

Day 3: Wednesday, 14th February 2018 - (Place: TEI Crete / UASC)

Shuttle bus from Hotel “LATO” - Heraklion to “Agroktima - Agricultural Farm” of TEI Crete / UASC leaves @ 08.15am

**“Further tools on Prognosis & Advanced Diagnosis on *Xanthomonadaceae*” –
Private Companies / Demonstration and “Hands on” experience**

Time	Subject
Presentation of new diagnostic commercial tools PART (A) – Rapid detection of plant pathogens using isothermal amplification techniques <i>(Dedicated to AGDIA's AmplifyRP testing platform. It uses Recombinase Polymerase Amplification (RPA), a patented isothermal amplification technology that enables highly specific and sensitive DNA or RNA analysis of plant pathogens in any type of testing environment. http://www.agdia-biofords.com)</i>	
08:30-09:00	Rapid detection tools – From serological to molecular techniques <i>Instructor: Dr. Amato (AGDIA Inc, Managing Director)</i>
09:00-09:45	Recombinase Polymerase Amplification (RPA) and its applications in plant pathogen detection – Focus on Detection techniques for <i>Xylella fastidiosa</i> <i>Instructor: Dr. Amato (AGDIA Inc, Managing Director)</i>
09:45-10:00	Coffee Break
10.00- 12.00	Hands on detection of <i>Xylella fastidiosa</i> with Agdia AmplifyRP® <i>Instructor: Dr. Amato (AGDIA Inc, Managing Director)</i>
12.00-13.00	Lunch Break
Presentation of new diagnostic commercial tools PART (B) – Diagnostic tools with bead-coupled spoligotyping system <i>(Dedicated to BEAMEDEX with particular focus on the detection and typing of the quarantine pathogen such as <i>Xanthomonas citri</i> and/or <i>Xanthomonas oryzae</i>. https://www.beamedex.com)</i>	
13.00-14.00	Presentation of the BEAMEDEX company, its know-how, products and expertises <i>Instructors: Dr. Ripoll and Dr. Gomgnimbou (BEAMEDEX, France)</i> The Luminex platform : history, principles, evolution The IGEPE and Beamedex start-up : history, assays development, expertises and services, perspectives
14.00-15.00	Introduction of the concept of spoligotyping and approaches on how to perform the analysis and how to interpret the data <i>Instructors: Dr. Ripoll and Dr. Gomgnimbou (BEAMEDEX, France)</i> -Running a spoligotyping assay : theory, steps, post-experience data processing, results interpretation -Pitfalls, troubleshooting, towards more complex SNPs based assays: allele call procedures
15.00-15.30	Coffee Break
15.30-18.30	On-site demonstration of the technology on human/plant pathogen samples (DNA). (A) Hybridization on beads, -detection on MagPix, (B) Raw results transformation into xls macros, (C) Transforming data into knowledge using databases and clustering analysis <i>Instructors: Dr. Ripoll and Dr. Gomgnimbou (BEAMEDEX, France)</i>
18.30-19.30	How to develop a new assay (technically, juridically, time frame, etc.)? (A) Prerequisites genomic analysis, (B) In progress models: timeframe, method, requirements, participants <i>Instructors: Dr. Ripoll and Dr. Gomgnimbou (BEAMEDEX, France)</i>

Shuttle bus from “Agroktima - Agricultural Farm” of TEI Crete / UASC to Heraklion @ 19.45

21:00	Training School Dinner at MERASTRI TAVERN (Cretan delicacies - gourmet kitchen)
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Day 4: Thursday, 15th February 2018

(Place: ITE - FORTH)

Shuttle bus from Hotel “LATO” - Heraklion to “**KORONEKES**” **EVOO Mill factory**, leaves @ 08.30 am

Genome sequencing techniques, as tools for diagnosis / Demonstration

Time	Subject
09:00 – 13:30	© Visit at “KORONEKES” Commercial Cold extraction Extra Virgin Olive Oil (EVOO) Mill Factory (http://koronekes.gr/) – ©Extra virgin olive oil tasting© © Visit at “DOMAIN PATERIANAKIS” winery of organic wines http://www.paterianakis.gr
13:30 – 14:30	Lunch Break
14:30 – 15:30	Development of integrated diagnostic tools for pathogen detection in plants and food samples <u>Theoretical Demonstration</u> Instructors: Prof. Electra Gizeli (Greece)
15:30 – 16:30	Introduction to microbial communities – Analysis tools – Interconnection to Xanthomonadaceae Instructor: Ass. Prof. Ladoukakis (Greece)
16:30-17:00	Coffee Break
17:00-18.00	Concentration and Environmental distribution has possible sampling bias for detection methods Instructor: Dr. Joana Costa (Portugal)
18:00 – 19.00	Genome sequencing techniques for microbial genome sequencing <u>Theoretical Demonstration - A</u> Instructors: Dr Pantelis Topalis (Greece)

Shuttle bus from “ITE-FORTH” Crete to Hotel “LATO” -Heraklion @ 19.15

Day 5: Friday, 16th February 2018

(Place: FORTH)

Shuttle bus from Hotel “LATO” - Heraklion to “ITE-FORTH” Crete leaves @ 08.30 am

**Bioinformatics and Imaging techniques – Analysis of NGS data from *Xanthomonadaceae* samples
/ Demonstration and “Hands on” experience**

Time	Subject
09:00 – 10:00	Introductory seminar to phylogenetics and population genomics methods <i>Instructors: Dr. P. Pavlidis, Ass. Prof. Ladoukakis (Greece)</i>
10:00 – 11:00	Genome sequencing techniques for population genomics and phylogeny <u>Theoretical Demonstration - B</u> <i>Instructors: Dr. Pavlidis, Ass. Prof. Ladoukakis (Greece)</i>
11:00 – 11:15	<i>Coffee Break</i>
11.15 – 12.30	Introduction to diagnostic imaging techniques for detecting microbial communities in plants <i>Instructors: Dr. Zacharakis, Dr. Tserevelakis (Greece)</i>
12:30 – 13:30	<i>Lunch Break</i>
13.30 - 16.00	“Hands on” preparing the samples for specific imaging <i>Instructors: Dr. Zacharakis, Dr. Tserevelakis, Dr. Trantas, Dr Sarris (Greece)</i>
16.00 - 17.00	Closing Session – Evaluation comments of Trainees to the whole event of Training School – Happy Hour <i>Coordinators: Dr Ralf Koebnik, Prof. Filippas Ververidis</i>
<u>END OF THE 1ST EUROXANTH TRAINING SCHOOL</u>	

Shuttle bus from “ITE-FORTH” Crete to Hotel “LATO” -Heraklion @ 17.15

THE ORGANIZING COMMITTEE.

Local Instructors / Trainers:

1. **GIZELI Electra, Professor.** [Clinical diagnostics, Biophysics and Integrated Structures (lab-on-chip)], Institute of Molecular Biology & Biotechnology-FORTH, Crete (IMBB-FORTH) & Department of Biology, University of Crete,
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<http://www.imbb.forth.gr/en/research-en/nanobiotechnology/item/65-electra-gizeli>
2. **GOUMAS, Dimitrios, Professor.** [Plant pathologist, Bacteriologist, Expert on *Xanthomonas*], Department of Agriculture, TEI Crete / UASC,
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<https://www.teicrete.gr/mscagro/en/%CF%85%CF%80%CE%BF%CF%83%CE%B5%CE%BB%CE%AF%CE%B4%CE%B5%CF%82/dimitrios-goumas>
3. **LADOUKAKIS, Emmanuel, Assistant Professor.** [Molecular & Population Genetics], University of Crete, Department of Biology, University of Crete
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4. **PAVLIDIS, Pavlos, Senior Researcher.** [Bioinformatics], Institute of Computer Science, ICS-FORTH,
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5. **SARRIS, Panagiotis, Associate Professor.** [Molecular diagnostics, Plant innate immunity, Plant-Pathogen Interactions], Institute of Molecular Biology & Biotechnology-FORTH, Crete (IMBB-FORTH) & University of Exeter, School of Life and Environmental Sciences, UK),
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<http://www.imbb.forth.gr/imbb-people/el/sarris-members/item/2695-dr-panagiotis-f-sarris>
6. **TOPALIS Pantelis, Senior Researcher.** [Bioinformatics], Institute of Molecular Biology & Biotechnology-FORTH (IMBB-FORTH),
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7. **TRANTAS, Emmanuel, Researcher.** [Molecular Diagnostics of Plant Pathogens], Department of Agriculture, TEI Crete / UASC,
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8. **TSEREVELAKIS, George Researcher.** (Physicist, Engineer on Laser optics, Non-invasive diagnostic imaging methods of pathogen detection), Institute of Electronic Structure and Laser, IESL-FORTH,
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9. **VERVERIDIS, Filippos, Professor.** [Plant Biochemistry & Biotechnology, Metabolic engineering of natural bioactive substances as plant protective tools], Department of Agriculture, TEI Crete / UASC,
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10. **ZACHARAKIS, Ioannis, Senior Researcher.** [Physicist, Engineer on Laser optics, Non-invasive diagnostic imaging methods of pathogen detection], Institute of Electronic Structure and Laser, IESL-FORTH,
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<http://www.iesl.forth.gr/people/person.aspx?Id=54>

EXTERNAL INSTRUCTORS / TRAINERS

EuroXanth COST members:

11. **CATARA, Vittoria, Professor.** [Plant Pathology], University of Catania, Department of Agriculture, Food and Environment, Catania, Italy,
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12. **COSTA, Joana, Senior Researcher.** [Phytopatology; Characterization and valorization of natural resources; Microbiota], FitoLab, Phytosanitary Laboratory, Instituto Pedro Nunes, Coimbra, Portugal,
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13. **DREO, Tanja, Senior Researcher.** [Biotechnology and Systems Biology], National Institute of Biology, Department of Biotechnology and Systems Biology, Ljubljana, Slovenia,
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14. **HOLEVA, Maria, Senior Researcher.** [Plant pathologist, Bacteriologist,], Benaki Phytopathological Institute, Department of Phytopathology, Laboratory of Bacteriology, Athens,
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15. **JACQUES, Marie-Agnés, Senior Researcher.** [Microbial ecology, plant pathology], Institut de Recherche en Horticulture et Semences, French National Institute for Agricultural Research, Angers, France,
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16. **KOEBNIK, Ralf, Senior Researcher.** [Comparative genomics and transcriptomics of xanthomonads], Institut de Recherche pour le Développement, Interactions Plants Microorganisms Environment, Montpellier, France,
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PRIVATE COMPANIES

Related to Diagnostics of Xanthomonadaceae

1. **AMATO, Marcos, Dr., Managing Director, AGDIA** Company representative (RTD Organisation) Developments on molecular diagnostics on *Xanthomonadaceae*,
marcos.amato@agdia-emea.com,
<https://orders.agdia.com/products>
2. **RIPOLL, Clement, Dr.** [BEAMEDEX, CEO], and **GOMGNIMBOU Kireopori Dr.** [BEAMEDEX, President], **BEAMEDEX:** Company representatives (RTD Organisation) Developments on molecular diagnostics on *Xanthomonadaceae*,
clementripoll@yahoo.fr,
<https://www.beamedex.com/products-and-services/>





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