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Contact: harissa@agr.hr
www.agr.hr

Preparation of the joint agreement within the Consortium on the use of DTHs

Prof. Dimitris Tsitsigiannis (Agricultural University of Athens-AUA) and Prof.

Magdalena Cara (Agricultural University of Tirana -AUT)

Harmonization and Innovation in PhD Study Programs for Plant Health in Sustainable Agriculture –HarISA is a Erasmus+ project Co-funded with the suport of the European Union. Project Number: 598444-EPP-1-2018-1-HR-EPPKA2-CBHE-JP (2018-2472 / 001-001)

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Contact: harissa@agr.hr
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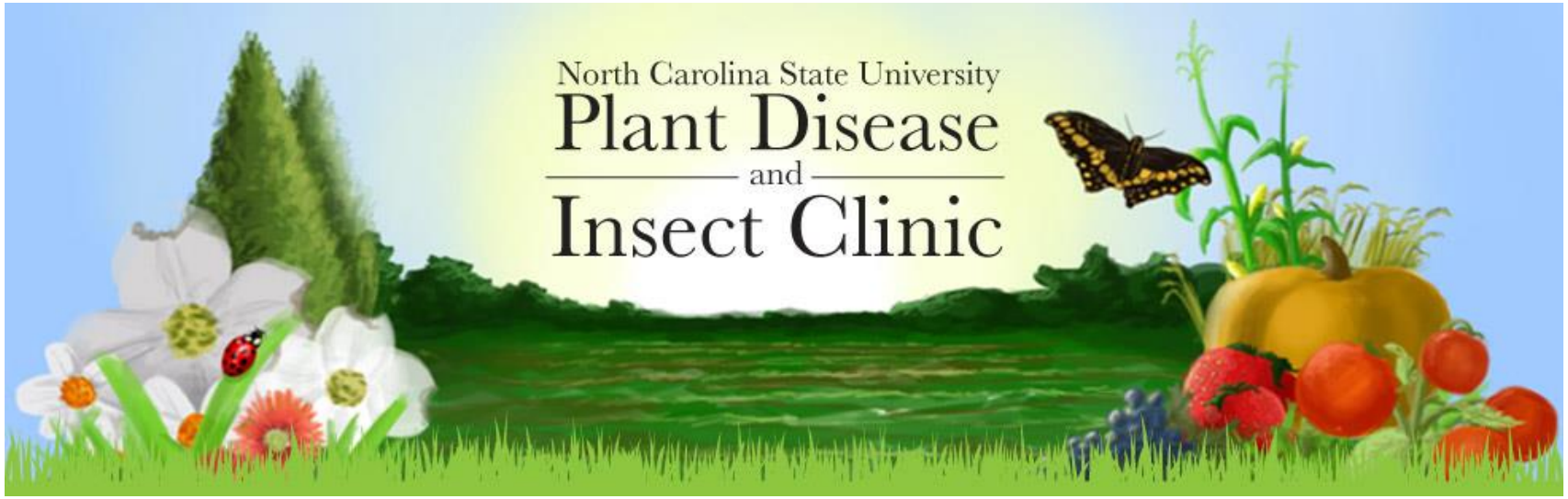
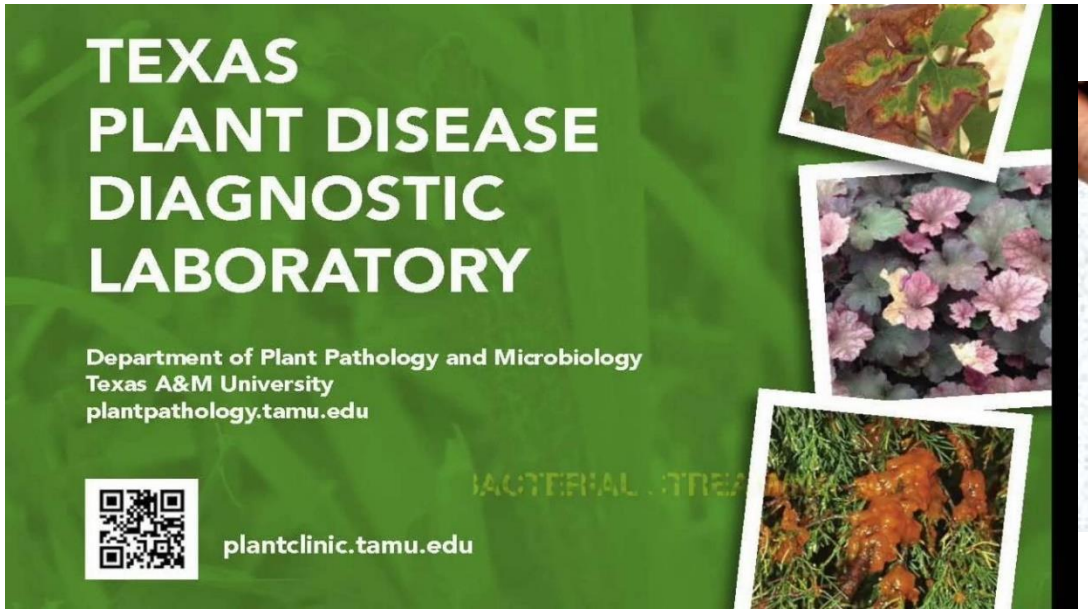
Description of WP 4

Diagnostic and training hubs (DTH) will be established at PIs in **partner countries** and equipped with additional **equipment** in order to serve as the **future regional centers of excellence** in the selected specific fields.

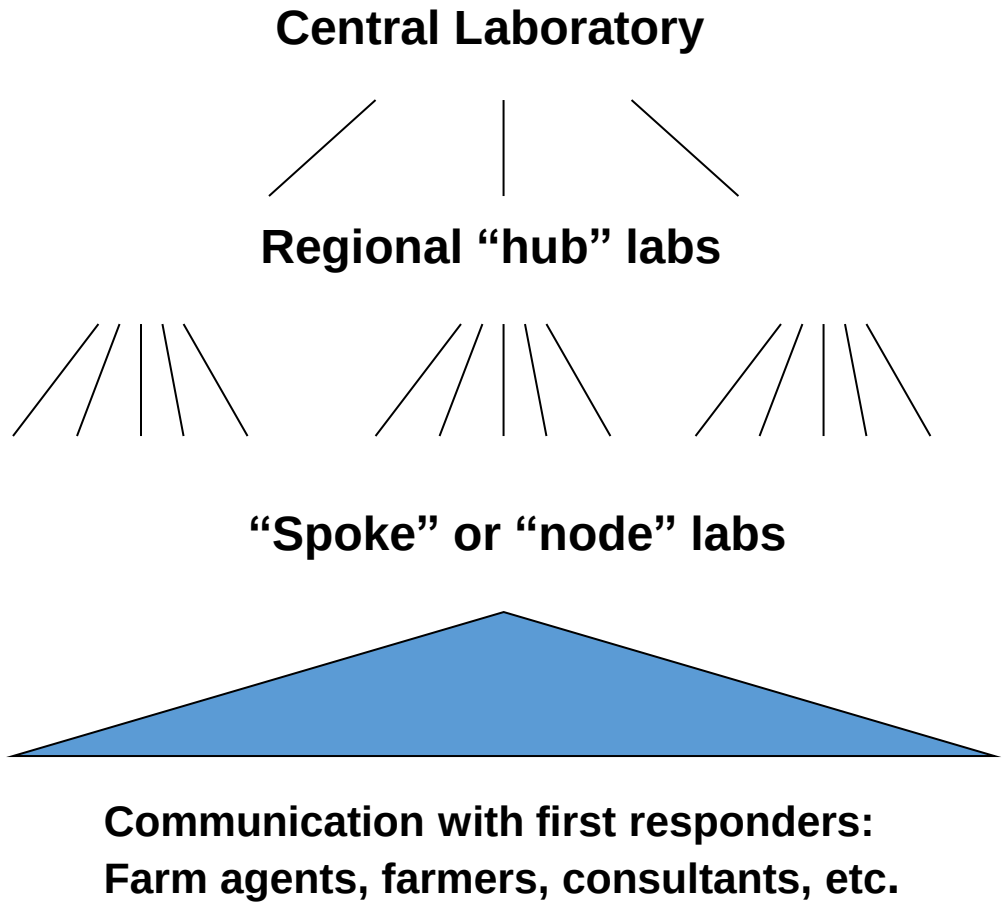

North Carolina State University
Plant Disease
and
Insect Clinic


University of Minnesota
Driven to Discover℠
Plant Disease Clinic


TEXAS
PLANT DISEASE
DIAGNOSTIC
LABORATORY
Department of Plant Pathology and Microbiology
Texas A&M University
plantpathology.tamu.edu
plantclinic.tamu.edu


Healthy
plants
healthy
planet
PLANT CLINIC
Jefferson County
Washington State University
Extension

Networking to Improve Diagnostic Efficiency (MODEL)



- Organized system of laboratories and personnel communicating with one another and working together
- Hierarchical structure
- Example: U.S. National Plant Diagnostic Network

Erasmus+
Co-funded by the European Union

Objectives

- To develop the **selection criteria** and identify the excellence of scientific groups within the PIs from partner countries
- To **upgrade existing facilities** in service of PhD students', staff and professionals' needs
- To establish **diagnostic and training hubs** with high expertise in particular fields available to serve as regional centers for education and spreading knowledge

Introduction

Healthy Plants = Healthy World

- Plant disease diagnostics **has been called art and science.**
- Establishment of **Diagnostic and Training Hubs** (DTH) is one of the priority tasks of the international network of universities including researchers and doctoral students in plant health.

- The core of DTHs is the plant protection laboratories, which are already equipped with infrastructure suitable for the identification of plant pathogens/pests by advanced molecular methods, in the framework **Erasmus+ CBHE - HarISA project**.

The goal of the DTH:

- to harmonize protocols (Standard Operating Procedures),
- conduct training programs,
- introduce distance diagnostic and
- data management web portal.

Networking to Improve Diagnostic Efficiency

Material and methods

- Establishment of a **network of diagnostic laboratories** of partner universities in ERASMUS PLUS CBHE.
- **Identified Capacity Development (**Inventory of **existing equipment** and purchase of **new equipment)**.
- **Inter-calibrations between laboratories and proficiency tests** that are mandatory in accreditations, especially with PCR, Real - Time PCR & LAMP, etc.
- Carrying out **joint diagnoses and publication with harmonize protocols**.
- **Mutual cooperation agreement** between laboratories as a HarISA product
- Preparation of training program for Ph.D. Students and young researches.
- **Expanding the network** with partners interested in cooperation.


Preliminary
Results

Establishment of a network of diagnostic laboratories.

Diagnosis Training Hubs

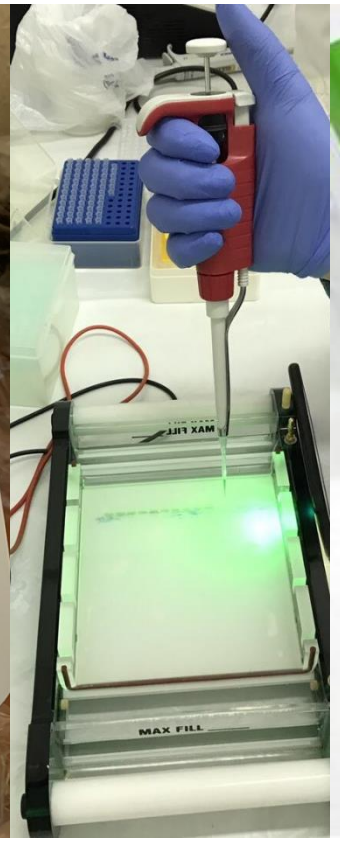
This network is led by the Agricultural University of Tirana (AUT) and supported by universities of EU countries.

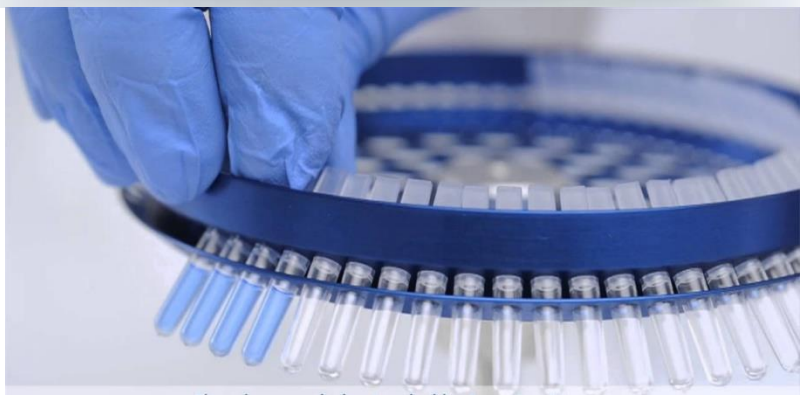
1a. Agricultural University Tirana (AUT)
1b. University F.S. Noli Korce (UNKO)
2a. University of Sarajevo (UNSA)
2b. University of Mostar (SVEMO)
3a. University of Belgrade (UB)
3b. University of Novi Sad (UNS)
4. Biotechnical University of Montenegro (UOM)

Identified Capacity Development

- Equipment
- Access to biotech materials and supplies
- Updated pest lists
- Access to library/reference materials
- Diagnostics standardization across labs (SOPs)

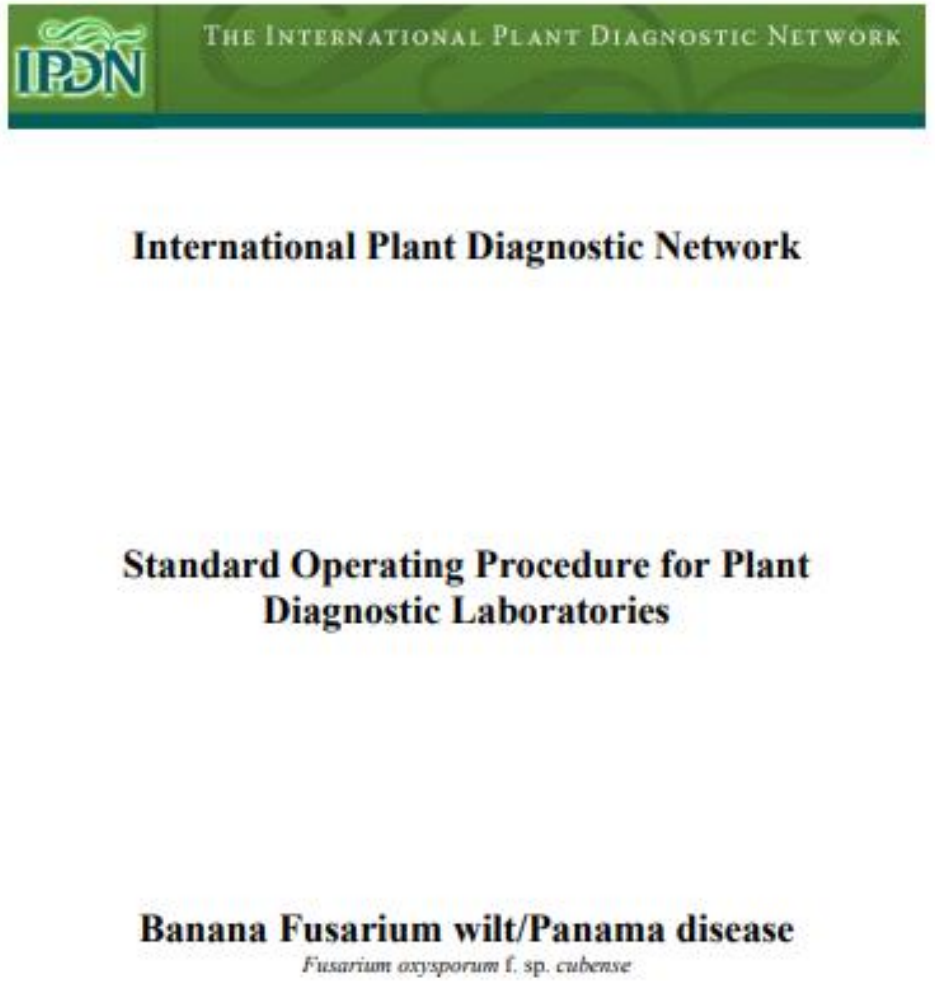
New equipment





Standard Operating Procedures

- Background
- Sampling
- Symptoms & Signs
- Media recipes
- Morphological caracterisation
- Serological & Biochemical tests
- DNA/RNA extraction
- PCR protocols & identification
- Sequencing & Phylogenetic analysis
- Widely tested and validated



http://www.sun.ac.za/english/faculty/agri/plant-pathology/ac4tr4/Documents/Revised%20SOP_Panama_IPDN.pdf

Sampling preparation for ELISA, DTBIA, PCR and LAMP

+ 5-8 ml
buffer (1:10)

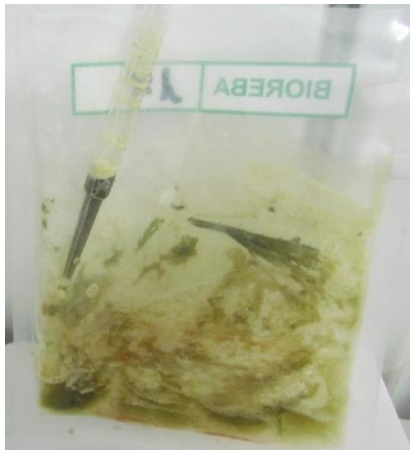
Fig. 5 Tissue extracts for ELISA test in DPP laboratory.

0.5-0.8 gr inde te mostres perfaqesuese

Liquid-nitrogen

Process 100 mg

DNA extraction or
ELISA/LAMP sap preparation

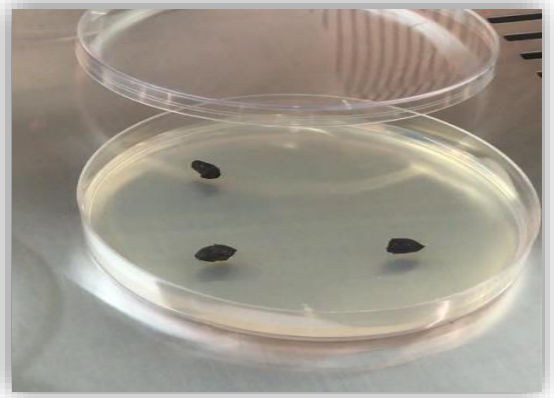


1 ml crude sap

ISOLATION PROCEDURES

1. External lesions and/or slight internal rot

Surface sterilization by NaOCl (2%) for 2 min, rinsed for 1 min by sterile distilled water and air-dried in sterile conditions



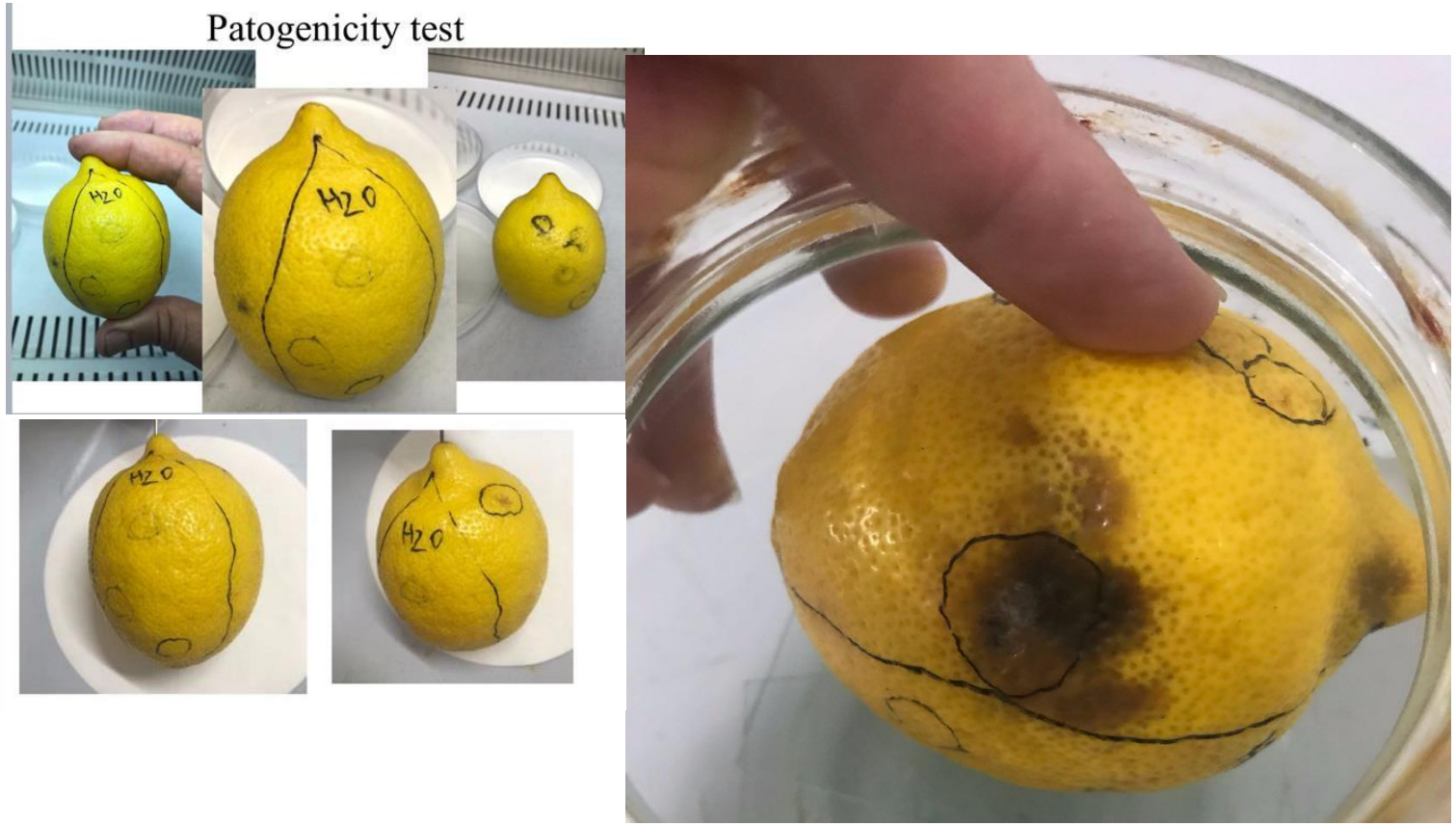
2. Severe and liquid rot

Sterilization by spraying a 70-90% ethanol solution followed by air-drying in sterile conditions

Small tissue portions plated on semi-selective Potato Dextrose Agar (PDA) amended with ampicillin and streptomycin (250 mg/L each)

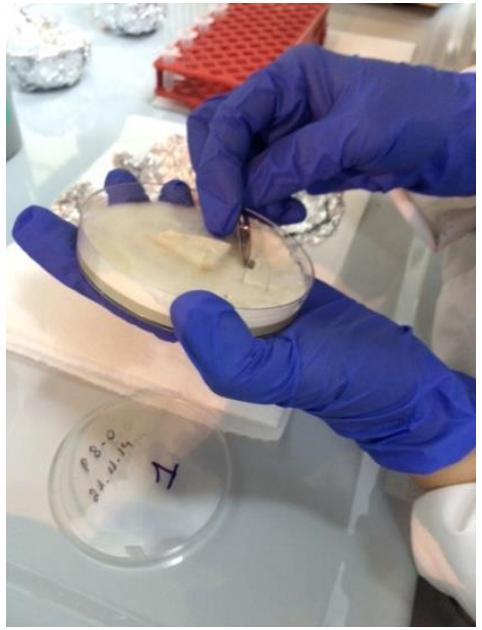
(Mincuzzi *et al*., 2020; Garganese et al., 2016)

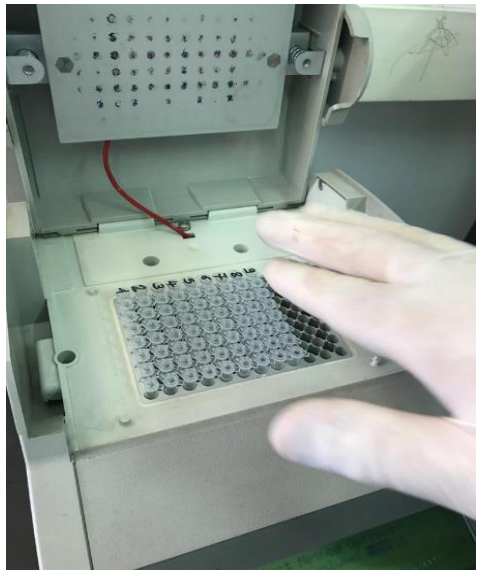
Patogenicity test

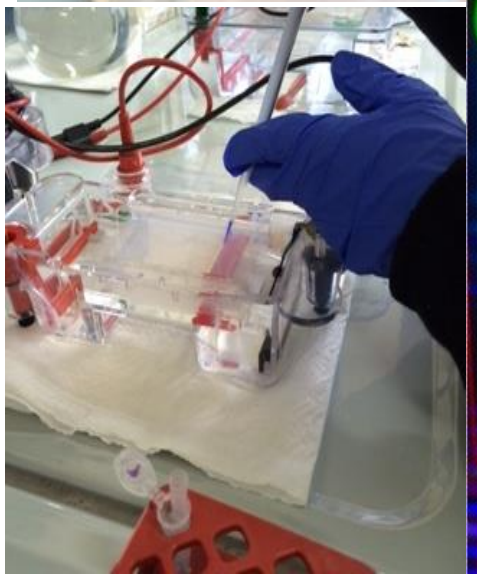


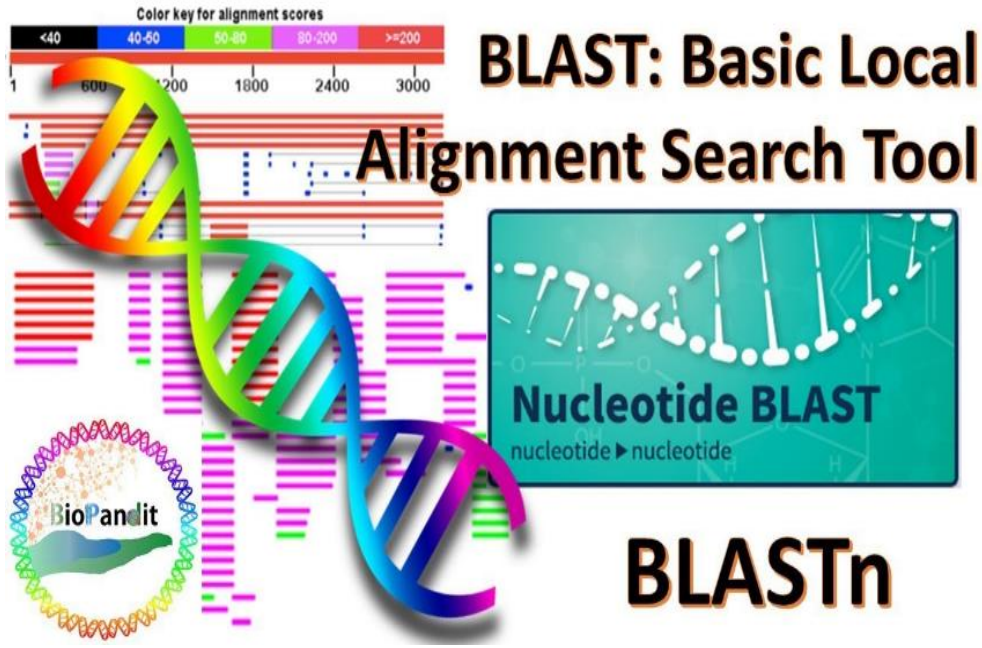
Colletotricum gloesporoides

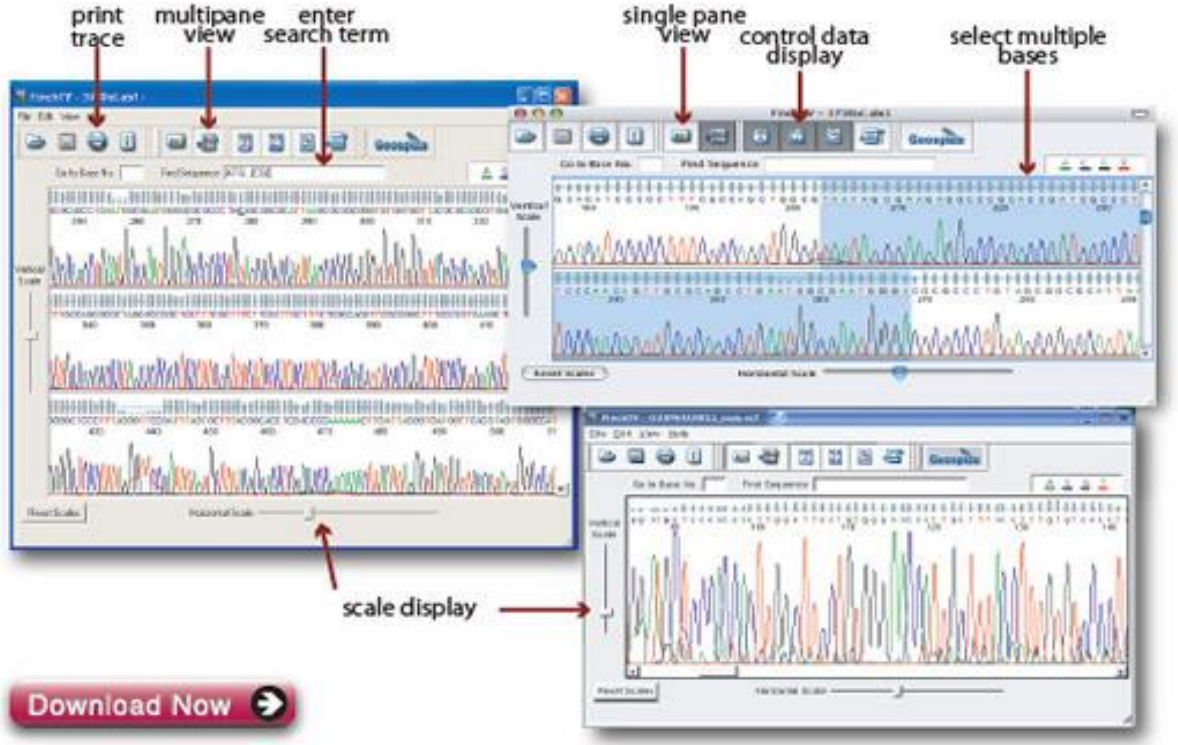
DNA/RNA extraction, PCR, Sequencings











BLAST sequence analysis (accession KY751715) at GenBank revealed 99% similarity with P. capsici AJ854285.

BLAST sequence analysis (accession KY751715) at GenBank revealed 99% similarity with P. capsici AJ854285.

Previous

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Details Figures Literature Cited Related

DISEASE NOTES

OPEN

First Report of Phytophthora Blight of Cucurbit Caused by *Phytophthora capsici* in Albania

M. Cara, T. Yaseen, and J. Merkuri

Affiliations

Published Online: 26 Oct 2017 | https://doi.org/10.1094/PDIS-03-17-0353-PDN

e-Xtra

TOOLS SHARE

In the past 2 years, greenhouse vegetable production in Albania has increased up to 200% (ATA 2014). In 2016, surveys were conducted in Lushnja Province (central-west Albania), [illegible] cucumber greenhouses were collected to determine the causal

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January 2018

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ISSN: 0191-2917
e-ISSN: 1943-7692

Metrics

Inter-calibrations between laboratories and proficiency tests

- 1st international external quality assessment studies for laboratory diagnosis of *Xylella fastidiosa*. (35 Laboratories).
- Intercalibrations have been performed between AUT and the University of Bari and CIHEAM for some plant pathogens. (*Colletotricum gloesporoides, Rhizopus arizus, Alternaria alternata,* etc.
- Intercalibrations with the University of Catania for *Colletotricum gloesporoides* in citrus.
- Intercalibrations with the Agricultural University of Athens for *Colletotricum acutatum* in olives.

XF ACTORS

Xylella Fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy

POnTE

PestOrganisms ThreateningEurope

EU-XF- PT-2017-02:
Proficiency testing for the evaluation of molecular and serological diagnosis of *Xylella fastidiosa*

Organizers

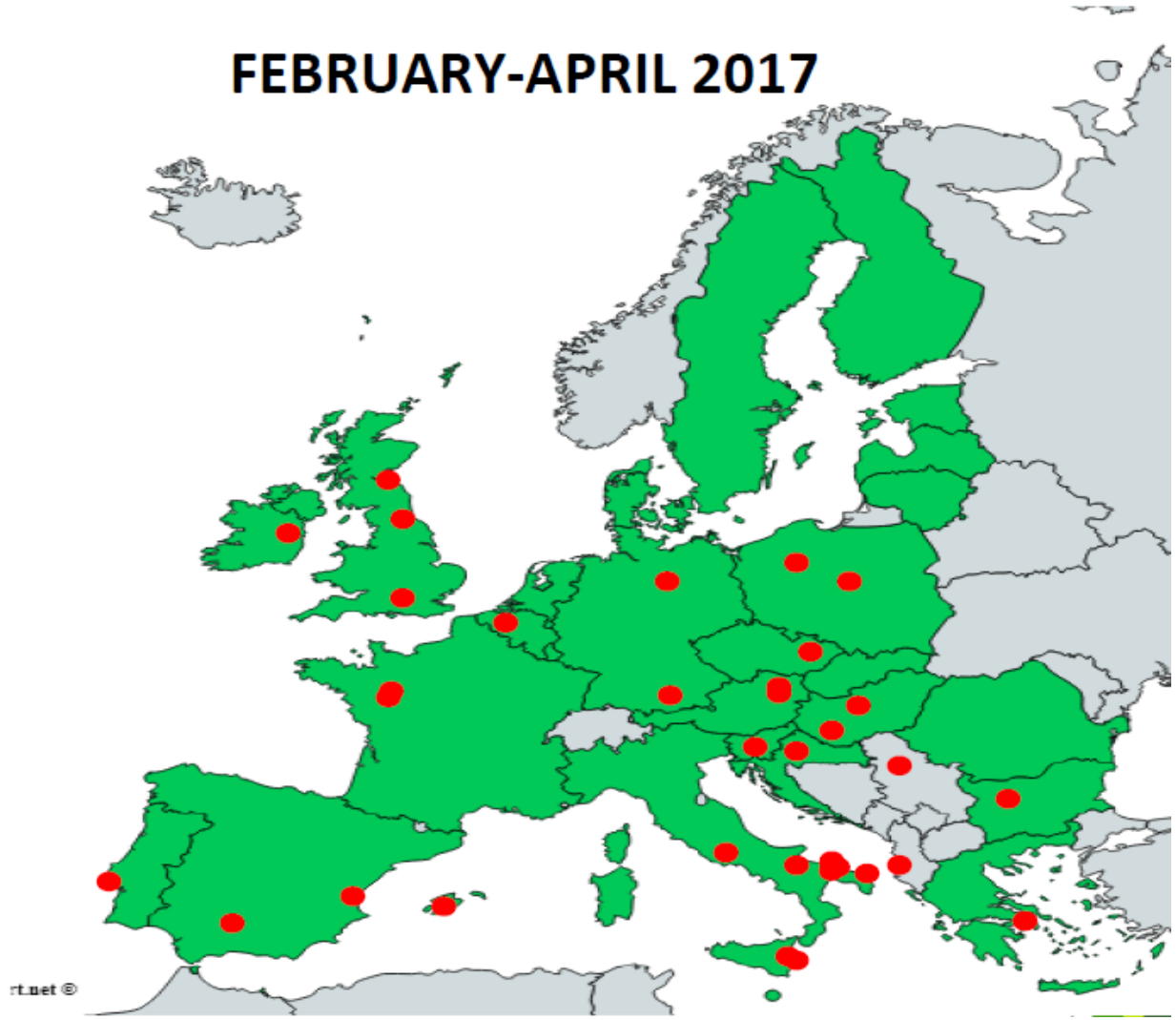
UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO
DISSPA – DIPARTIMENTO DI SCIENZE DEL SUOLO, DELLA PIANTA E DEGLI ALIMENTI

IPSP
Istituto per la Protezione Sostenibile delle Piante
Consiglio Nazionale delle Ricerche

Supported by anses

(organized in accordance with EPPO 7/122 and ISO/IEC 17043 guidelines)

18 EU/non-EU Countries
35 participating laboratories
identified by an anonymous alphanumeric code to ensure results confidentiality

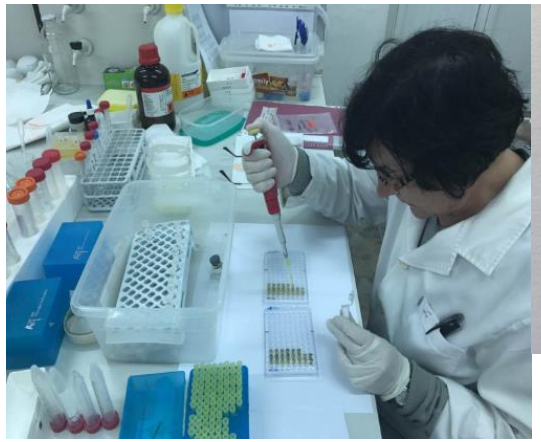


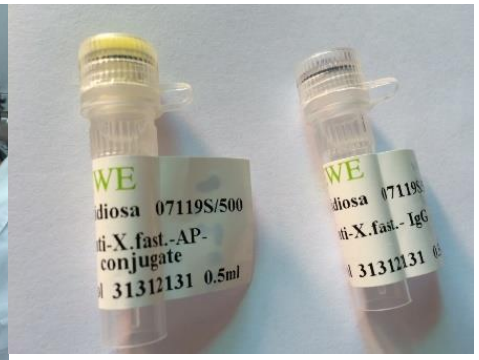
Proficiency test (PT) Xylella in Albania

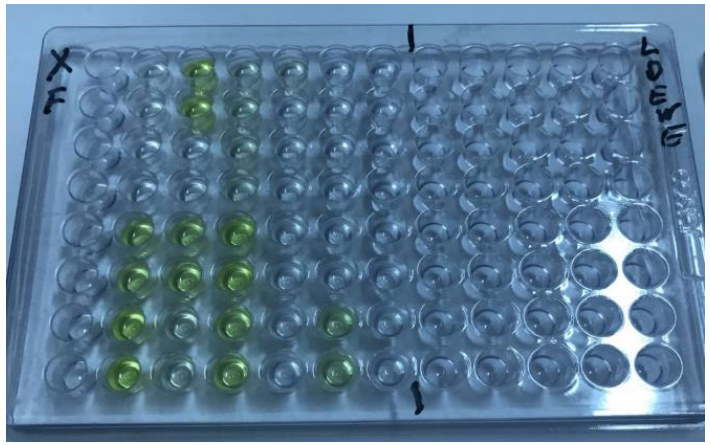
test performance study

1. ELISA – Kit LOEWE
2. ELISA – Kit Agritest
3. PCR - CTAB extraction
4. PCR – Mericon kit extraction
5. In lab validation with RT-LAMP

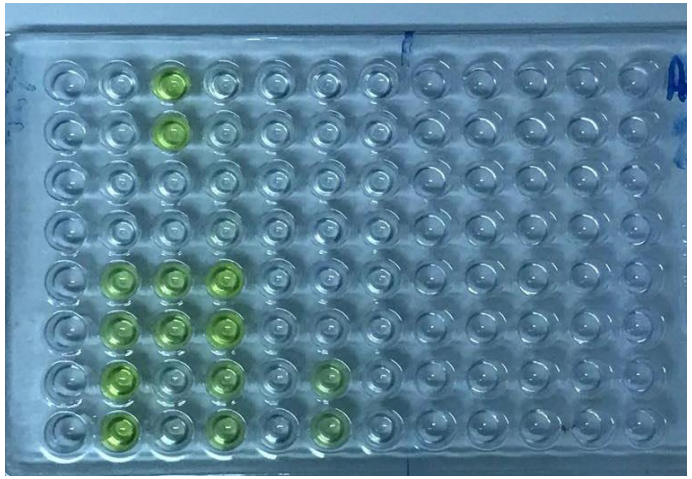
ELISA tests with 2 kits





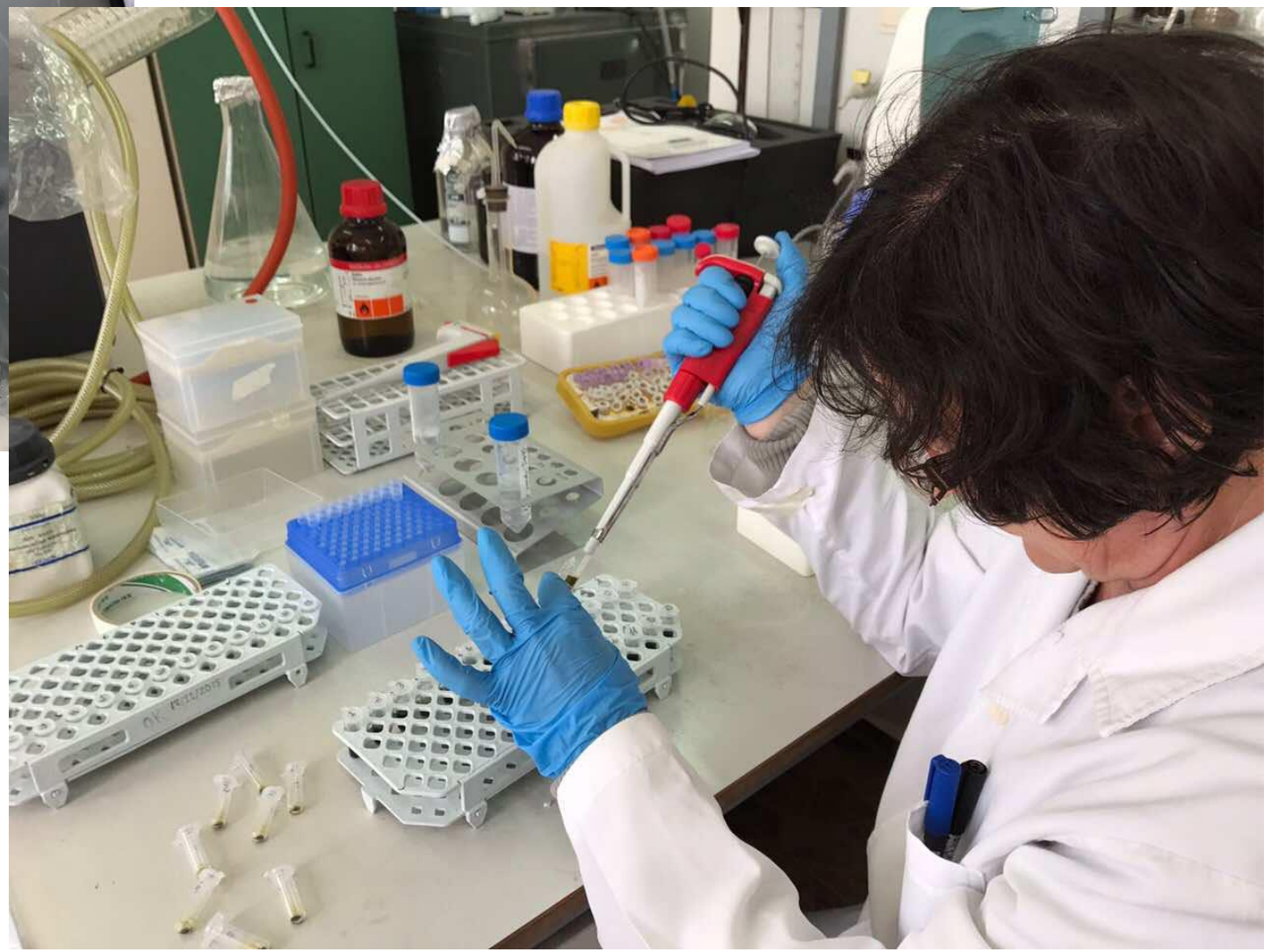


AGRITEST
PLANT HEALTH MANAGEMENT

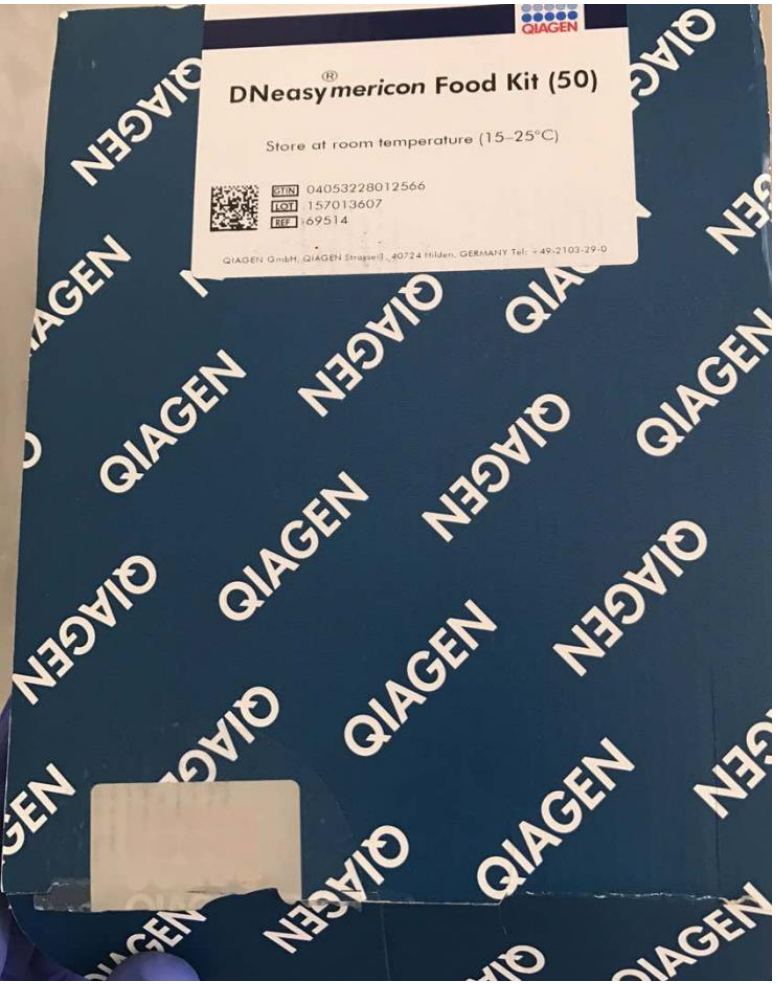


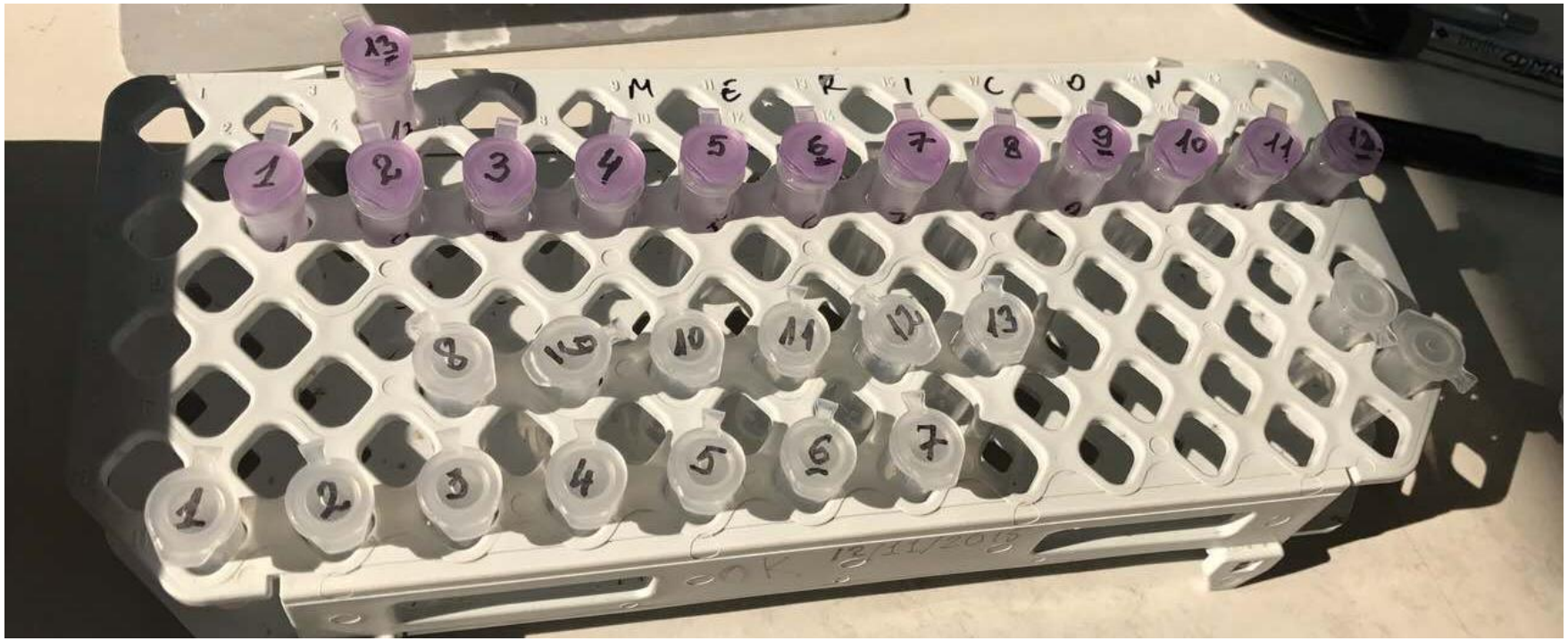
Validation data are available on EPPO validation database! http://dc.eppo.int/validationlist.php

CTAB extraction

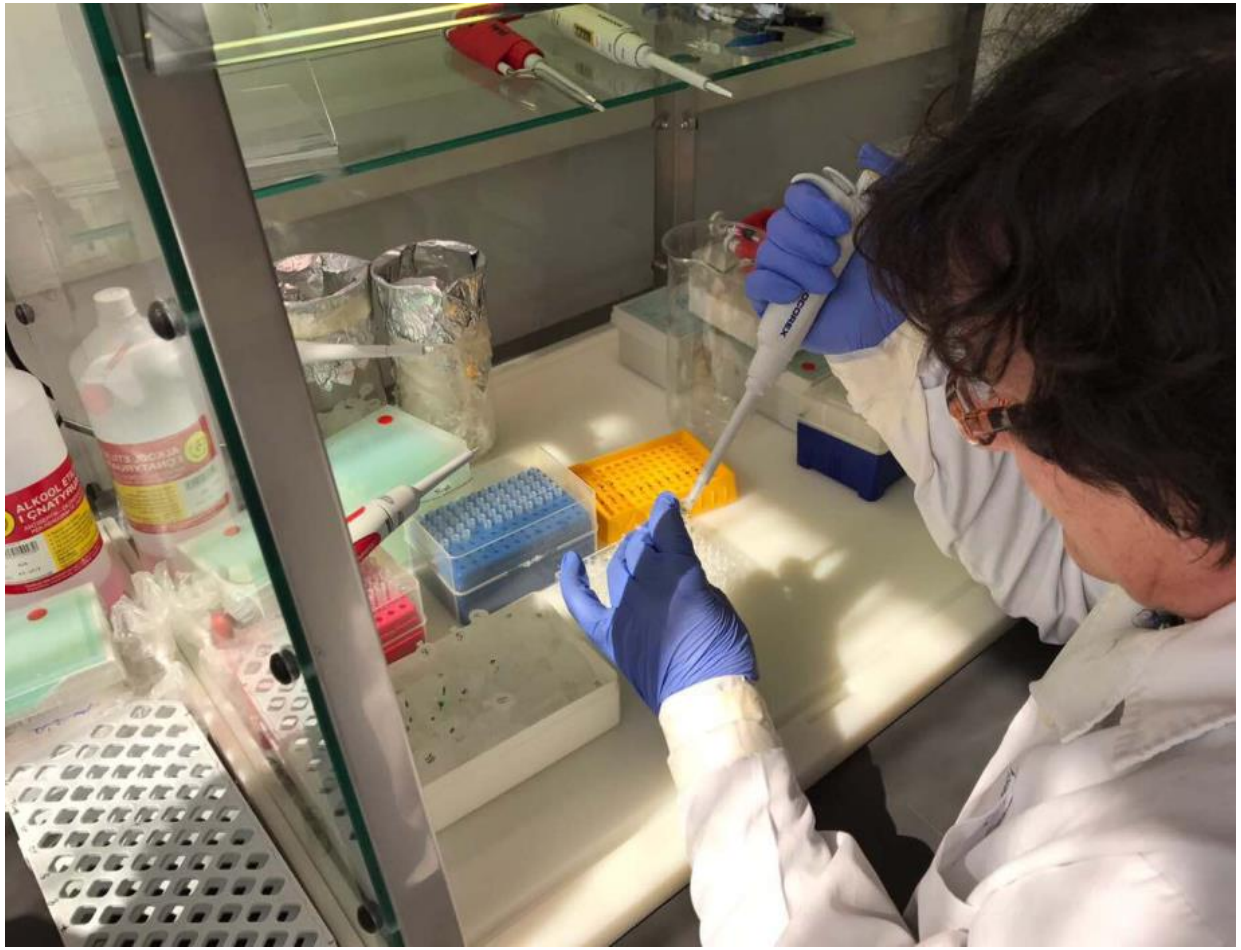


QIAGEN - Mericon kit extraction





Polymerase Chain Reaction
Minsavage 1994



CATEGORIZATION OF THE LABORATORIES BASED ON THEIR PERFORMANCE

Based on the values (%) recovered for the “accuracy”
the laboratories were categorized as:

Lab categorization	level of accuracy
highly proficient	100%
proficient	90-100% (1 PD, 1 ND)
non-proficient	<90% (>1 PD, > 1 ND)

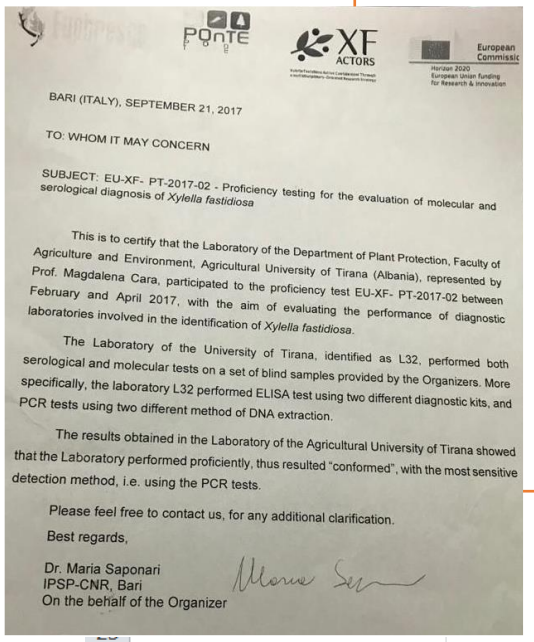
The declaration of conformity to the PT assigned to “highly proficient” and “proficient” labs

Performance Criteria

Sensibility

Specificity

Accuracy



PONTE XF ACTORS European Commission

BARI (ITALY), SEPTEMBER 21, 2017

TO: WHOM IT MAY CONCERN

SUBJECT: EU-XF- PT-2017-02 - Proficiency testing for the evaluation of molecular and serological diagnosis of *Xylella fastidiosa*

This is to certify that the Laboratory of the Department of Plant Protection, Faculty of Agriculture and Environment, Agricultural University of Tirana (Albania), represented by Prof. Magdalena Cara, participated to the proficiency test EU-XF- PT-2017-02 between February and April 2017, with the aim of evaluating the performance of diagnostic laboratories involved in the identification of *Xylella fastidiosa*.

The Laboratory of the University of Tirana, identified as L32, performed both serological and molecular tests on a set of blind samples provided by the Organizers. More specifically, the laboratory L32 performed ELISA test using two different diagnostic kits, and PCR tests using two different method of DNA extraction.

The results obtained in the Laboratory of the Agricultural University of Tirana showed that the Laboratory performed proficiently, thus resulted "conformed", with the most sensitive detection method, i.e. using the PCR tests.

Please feel free to contact us, for any additional clarification.

Best regards,

Dr. Maria Saponari
IPSP-CNR, Bari
On the behalf of the Organizer

Decoding	Results obtained	Accordance/Discordance
11M	Positive	PA
5M	Positive	PA
4M	Positive	PA
7M	Positive	PA
3M	Positive	PA
12M	Positive	PA
10M	Positive	PA
9M	Positive	PA
8M	Positive	PA
1M	Negative	NA
2M	Negative	NA
6M	Negative	NA
13M	Negative	Not evaluated

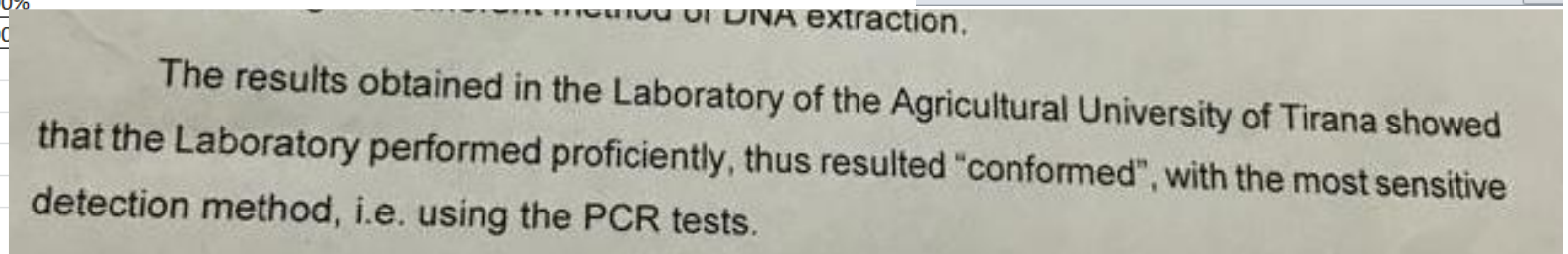
APPROVED

Total	
N+	9
N-	3
N	12

Performance criteria: sensibility, specificity, accuracy

Laboratory Code	L01
Sensibility	100%
Specificity	100%
Accuracy	100

L32
100%
100%
100%



method of DNA extraction.

The results obtained in the Laboratory of the Agricultural University of Tirana showed that the Laboratory performed proficiently, thus resulted "conformed", with the most sensitive detection method, i.e. using the PCR tests.

Kit and device icgene

enbiotech.eu/en/

enbiotech

company products research and development contacts languages

Company

Enbiotech works in the field of molecular diagnostics, develops and manufactures products and services that are fast and simple to use in the plant pathology, food and environmental safety sectors.

In 2010 a group of researchers with expertise in molecular biology, microbiology, chemistry and biotechnology, create enbiotech with the ambition of transferring new technologies to market by collaborating in an integrated manner with important scientific centers.

RT LAMP kit

Extraction Strip

Primer MIX Strip

Budge Xylella screen glow & FD

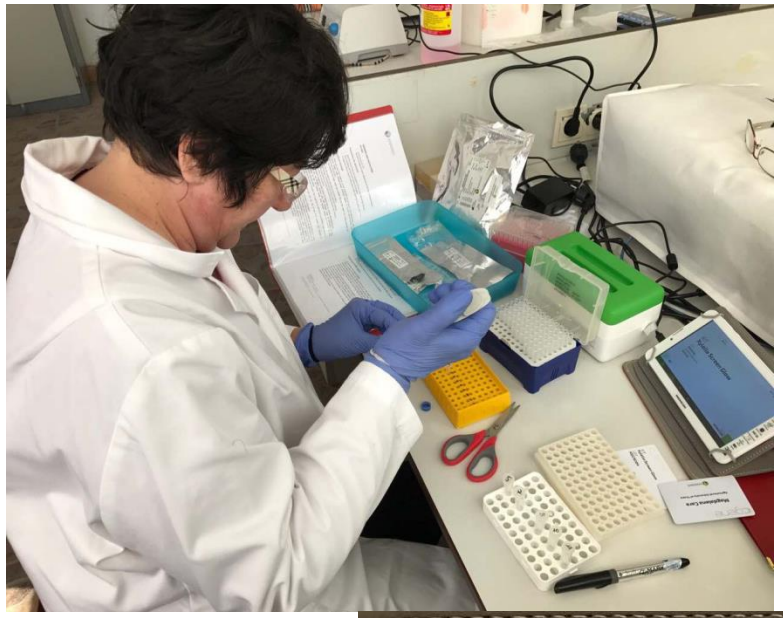
LAMP MIX

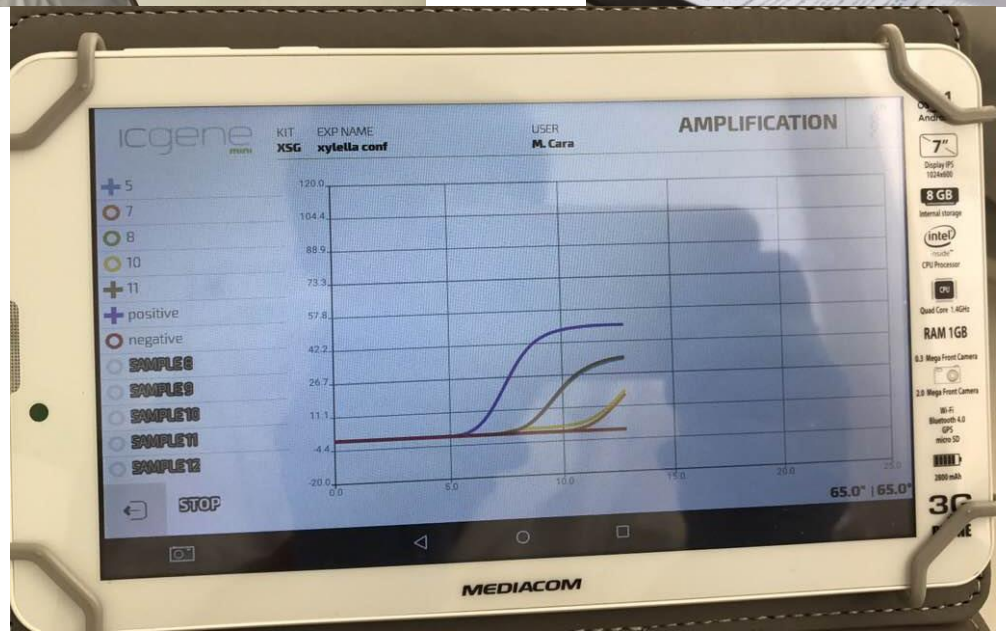
Mineral oil

Positive control

Negative control

Real time LAMP





Albanian J. Agric. Sci.

23 OCT

Loop mediated isothermal amplification: an innovative gene amplification technique for plant diseases

MAGDALENA CARA[1*], THAER YASEEN[2], RENATA BAŽOK[3], DARKO VONCINA[3], ORGES CARA[1]

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[2]C.I.H.E.A.M. – Istituto Agronomico Mediterraneo di Bari/ Via Ceglie 9, 70010 Valenzano (BA), Italy.

[3]University of Zagreb Faculty of Agriculture, Svetošimunska 25, 10000 Zagreb, Croatia

*Corresponding author e-mail: magdacara@ubt.edu.al

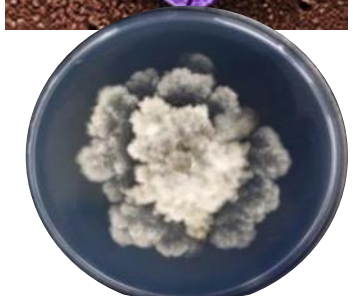
Abstract:

Nowadays, molecular diagnostic methods of plant pathogens evolved in a fast way, the use of rapid and easy to use detection method is fundamental to prevent pathogens cross border and spread to enhance food quality and security. Real – Time Loop-mediated isothermal amplification (RT-LAMP) is a novel molecular detection method that specifically detects genomic DNA by using a set of six oligonucleotide primers specific to different regions of a target gene and *Bacillus stearothermophilus* (*Bst*) DNA polymerase protein. This method has been recently modified to be use as a RT-LAMP and then widely applied in many fields for on-site detection and ability to be used in cross border control of plant health, such as quarantine disease diagnosis. The application of rapid and simple DNA extraction method (10 min at 65°C) shortened the detection assay to less than one

LAMP –Loop-Mediated Isothermal Amplification (Notomi *et al.*, 2000)

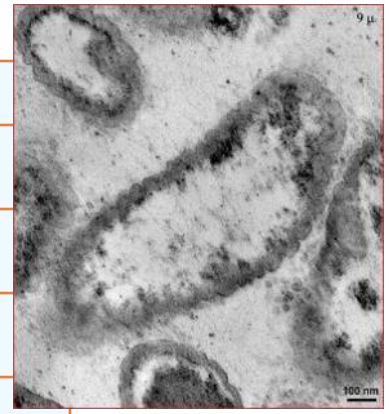
- Sensitive, less time-consuming than conventional PCR, do not require skilled operators.
- Reaction occurs at isothermal conditions (65 °C), using one enzyme *Bst* DNA polymerase.
- Possible on-field application in a simple heat-block.

- Bacteria
- Viruses
- Fungi
- Protista
- Worms



Examples of LAMP application in Plant pathology

Disease	Pathogen	References
Tomato and potato late blight	*Phytophthora infestans*	Hansen et al., 2016
Fusarium wilt of chickpea	*Fusarium oxysporum* f.sp. ciceris	Ghosh et al., 2015
Grapevine yellow	Flavescence dorée	Kogovšek et al. (2015)
Grape powdery Mildew	*Erysiphe necator*	Thiessen *et al.,* 2013
Fire blight	*Erwinia amylovora*	Temple and Johnson, 2011; Bühlmann *et al*., 2012; Moradi *et al.*, 2012
Citrus Bacterial Canker	*Xanthomonas spp.*	Rigano *et al*., 2010
Grey Mould	*Botrytis cinerea*	Tomlinson *et al*., 2010
Pierce's disease, citrus veinal chlorosis, almond leaf scorch, Olive Quick Decline	*Xylella fastidiosa*	Harper *et al.,* 2010 Yaseen *et al.*, 2015



Carrying out joint diagnoses and publication with harmonize protocols

Research article

Received: 18 December 2017 Revised: 13 June 2018 Accepted: 17 June 2018 Published online in Wiley Online Library: 9 September 2018

(wileyonlinelibrary.com) DOI 10.1002/jib.521

Isolation of *Rhizopus arrhizus* from Albanian barley

Magdalena Cara,[1] Simona M. Sanzani,[2]* Annamaria Mincuzzi,[2] Antonio Ippolito,[2] Orges Cara[1] and Jordan Merkuri[3]

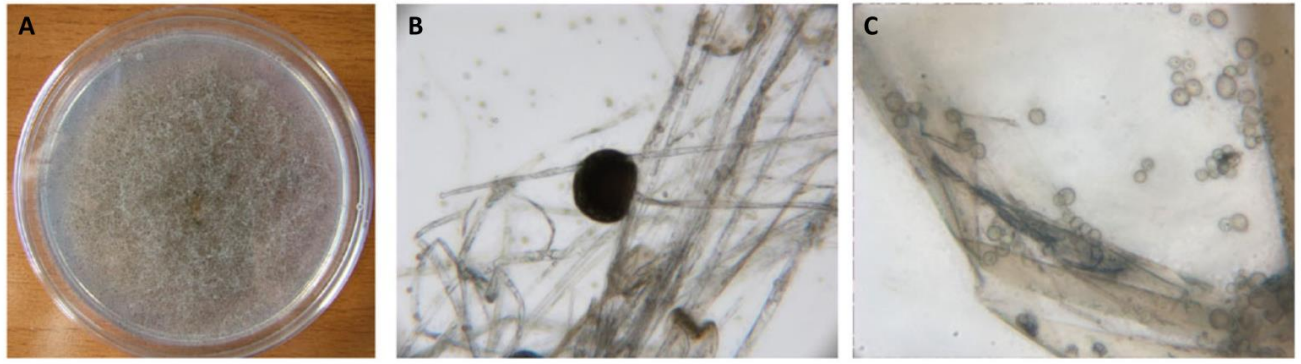


Figure 1. Macro- and microscopic characteristics of *Rhizopus arrhizus* on PDA at 25°C in the dark. [Colour figure can be viewed at wileyonlinelibrary.com]

sustainability

MDPI

Article

Optical Characterization of *Alternaria* spp. Contaminated Wheat Grain and Its Influence in Early Broilers Nutrition on Oxidative Stress

Nikola Puvača [1,*], Snežana Tanasković [2], Vojislava Bursić [3], Aleksandra Petrović [3], Jordan Merkuri [4], Tana Shtylla Kika [5], Dušan Marinković [3], Gorica Vuković [6] and Magdalena Cara [4]

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Find NCBI SARS-CoV-2 literature, sequence, and clinical content: https://www.ncbi.nlm.nih.gov/sars-cov-2/

GenBank Send to: Change region shown Customize view

Rhizopus oryzae strain RO1 small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence

GenBank: MG599472.1

FASTA Graphics

Go to:

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LOCUS       MG599472               593 bp    DNA     linear   PLN 19-SEP-2018
DEFINITION  Rhizopus oryzae strain RO1 small subunit ribosomal RNA gene,
            partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA
            gene, and internal transcribed spacer 2, complete sequence; and
            large subunit ribosomal RNA gene, partial sequence.
ACCESSION   MG599472
VERSION     MG599472.1
KEYWORDS    .
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            Mucoromycotina; Mucoromycetes; Mucorales; Mucorineae;
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Analyze this sequence
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Rhizopus oryzae strain RO1 small subunit ribosomal RNA gene, partial sequen Nucleotid

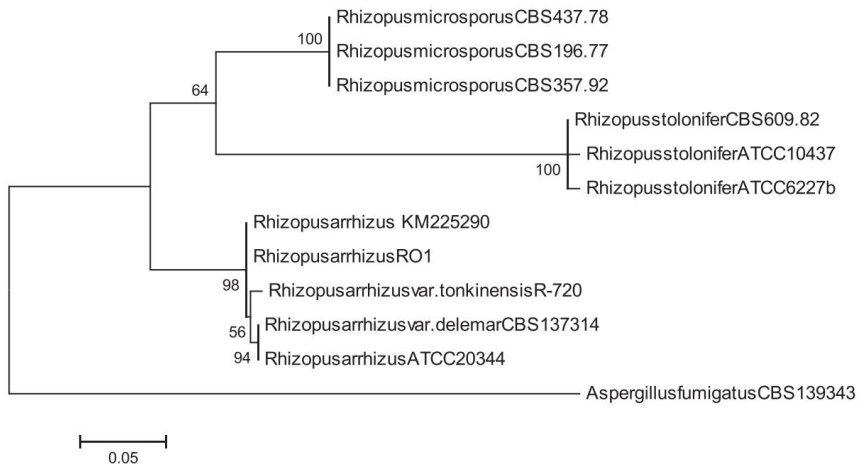

Figure 2. Phylogenetic analysis of *Rhizopus arrhizus* isolated in this study (RO1) and related sequences from GenBank. *Aspergillus fumigatus* was used as the out-group taxon. evolutionary history was inferred by using the Maximum Likelihood method. The tree with the highest log likelihood (−1685.5953) is shown. The percentage of trees in which associated taxa clustered together is shown next to the branches. The tree is drawn to scale, with branch lengths measured in the number of substitutions per site. Evolutio analyses were conducted in MEGA6.

ncbi.nlm.nih.gov/nuccore/MG599472.1

```
  AUTHORS   Cara,M., Sanzani,S.M., Mincuzzi,A., Ippolito,A., Cara,O. and
            Merkuri,J.
  TITLE     Isolation of Rhizopus arrhizus from Albanian barley
  JOURNAL   J. Inst. Brew. (2018) In press
  REMARK    Publication Status: Available-Online prior to print
REFERENCE   2  (bases 1 to 593)
  AUTHORS   Cara,M., Sanzani,S.M., Mincuzzi,A., Ippolito,A., Cara,O. and
            Merkuri,J.
  TITLE     Direct Submission
  JOURNAL   Submitted (01-DEC-2017) Department of Soil, Plant, and Food
            Sciences, University of Bari Aldo Moro, Via Amendola 165/A, Bari
            70126, Italy
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      541 gtaactttca aactatgatc tgaagtcagg tgggattacc cgctgaactt aag
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Crop Protection 137 (2020) 105291

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journal homepage: www.elsevier.com/locate/cropro

Short communication

Colletotrichum gloeosporioides sensu stricto as causal agent of anthracnose on pomegranate fruit in Albania

Magdalena Cara [a], Annamaria Mincuzzi [b], Jordan Merkuri [c], Hekuran Vrapi [a], Orges Antonio Ippolito [b], Riccardo Baroncelli [d], Simona Marianna Sanzani [e,*]

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[b] *Department of Soil, Plant, and Food Sciences, University of Bari Aldo Moro, Via Amendola 165/A, 70126, Bari, Italy*
[c] *Didactic and Scientific Research Center, Durres, Albania*
[d] *University of Salamanca, Instituto Hispano-Luso de Investigaciones Agrarias (CIALE), Villamayor, Spain*
[e] *CIHEAM BARI, Via Ceglie 9, 70010, Valenzano (BA), Italy*

Fig. 3. Bayesian inference phylogenetic tree of *Colletotrichum gloeosporioides* species complex demonstrating the strain from this study (in bold) belongs to *C. gloeosporioides sensu stricto*. The tree has been reconstructed from a combined multi-locus sequence alignment. Bayesian posterior probability (BPP) values (above 0.50) are represented by thickness of the node.

plant disease

First Report of *Colletotrichum acutatum* Causing Anthracnose on Olives in Albania

Journal:	*Plant Disease*
Manuscript ID	Draft
Manuscript Type:	Plant Disease Note
Date Submitted by the Author:	n/a
Complete List of Authors:	Cara , Magdalena; Agricultural University of Tirana, Department of Plant Protection, Faculty of Agriculture and Environment Iliadi, Maria; Agricultural University of Athens, Crop Science Lagogianni, Christina; Agricultural University of Athens, Crop Science Paplomatas, Epapeimondas; Agricultural University of Athens, Crop Science Merkuri, Jordan; Didactic and Scientific Research Center Tsitsigiannis, Dimitrios; Agricultural University of Athens, Crop Science
Keywords:	Fungi < Causal Agent, tree fruits < Fruit < Crop Type, Pathogen detection < Subject Areas, Etiology < Subject Areas

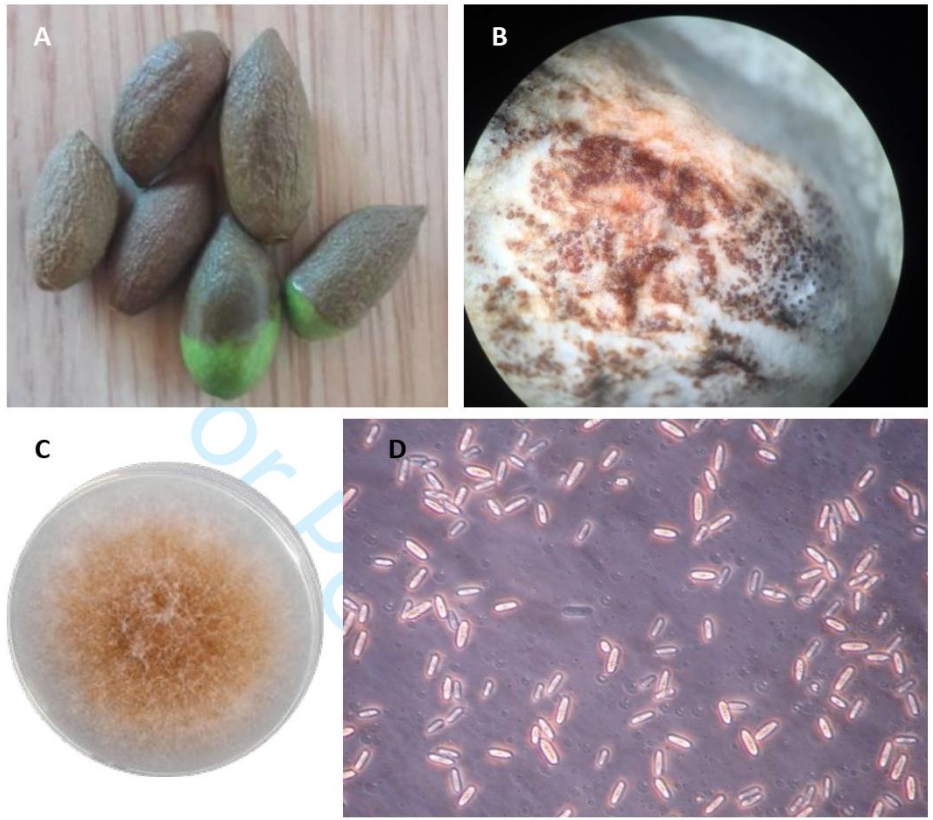

Figure S1. Symptoms of anthracnose on olive fruits and morphology of the *Colletotrichum acuta*

Symptoms of mummified olive fruits (A), acervuli of *C. acutatum* on olive fruits after artificial in

(B), colony growth on PDA (C) and conidia (D) (5 days on PDA, 400X magnification).

cells

Article

Twig and Shoot Dieback of Citrus, a New Disease Caused by *Colletotrichum* Species

Mario Riolo [1,2,3,†], Francesco Aloi [1,4,†], Antonella Pane [1,†], Magdalena Cara [5,*] and Santa Olga Cacciol

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2 Council for Agricultural Research and Agricultural Economy Analysis, Research Centre for Olive, Citrus and Tree Fruit- Rende CS (CREA- OFA), 87036 Rende, Italy
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* Correspondence: magdacara@ubt.edu.al (M.C.); olgacacciola@unict.it (S.O.C.)
† These authors have equally contributed to the study.

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Short Notes

Detection and phylogeny of viruses in native Albanian olive varieties

Toufic ELBEAINO[1,*], Magdalena CARA[2], Shpend SHAHINI[2], Pasko PANDELI[1]

[1] *Istituto Agronomico Mediterraneo di Bari, Via Ceglie 9, 70010 Valenzano (BA), Italy*
[2] *Agricultural University of Tirana, Department of Plant Protection, Albania*
*Corresponding author. E-mail: elbeaino@iamb.it

Summary. Forty samples representing 14 native Albanian and two foreign olive varieties were collected from an olive varietal collection plot in the Valias region (Tirana, Albania). The samples were assayed by RT-PCR for presence of olive-infecting viruses, including arabis mosaic virus (ArMV), cherry leaf roll virus (CLRV), cucumber mosaic virus (CMV), olive latent ringspot virus (OLRSV), olive latent virus 1 (OLV-1), olive leaf yellowing-associated virus (OLYaV), strawberry latent ringspot virus (SLRSV) and by PCR for the bacterium *Xylella fastidiosa* (Xf). Ninety-eight percent of the samples were infected with at least one virus. OLYaV was the most prevalent (85% of samples), followed by OLV-1 (50%), OLRSV (48%), CMV (28%), SLRSV (3%) and CLRV (5%), whereas ArMV and Xf were absent. Fifty-five percent of the samples were infected with one virus, 13% with two viruses, 20% with three, and 5% with four. Analyses of the nucleotide sequences of the Albanian virus isolates generally showed low genetic variability, and that most were phylogenetically related to Mediterranean isolates, in particular to those from Greece and Italy. Five olive trees, representing three native cultivars ('Managiel', 'Kalinjot' and 'Kushan-Preze') and one foreign ('Leccino'), were found to be plants of the *Conformitas Agraria Communitatis* ("*CAC*") category i.e. free of ArMV, CLRV, SLRSV and OLYaV. Only one tree of the native cultivar 'Ulliri i kuq' was free of all tested viruses, so this is plant material of the "Virus-tested" category. Olives derived from both categories could be used for propagation of standard quality plant materiel in a future certification programme for olive in Albania. This is the first report of CLRV, OLRSV, CMV and OLV-1 in Albania. The study also reveals the precarious health status of native olive varieties in the Valias varietal collection plot. However, the discovery of six plants representing two certifiable categories is a first step in a future olive tree certification program in the country.

OPEN ACCESS

Citation: T. Elbeaino, M. Cara, S. Shahini, P. Pandeli (2021) Detection and phylogeny of viruses in native Albanian olive varieties. *Phytopathologia Mediterranea* 60(1): 165-174. doi: 10.36253/phyto-11985

Accepted: January 30, 2021

Published: May 15, 2021

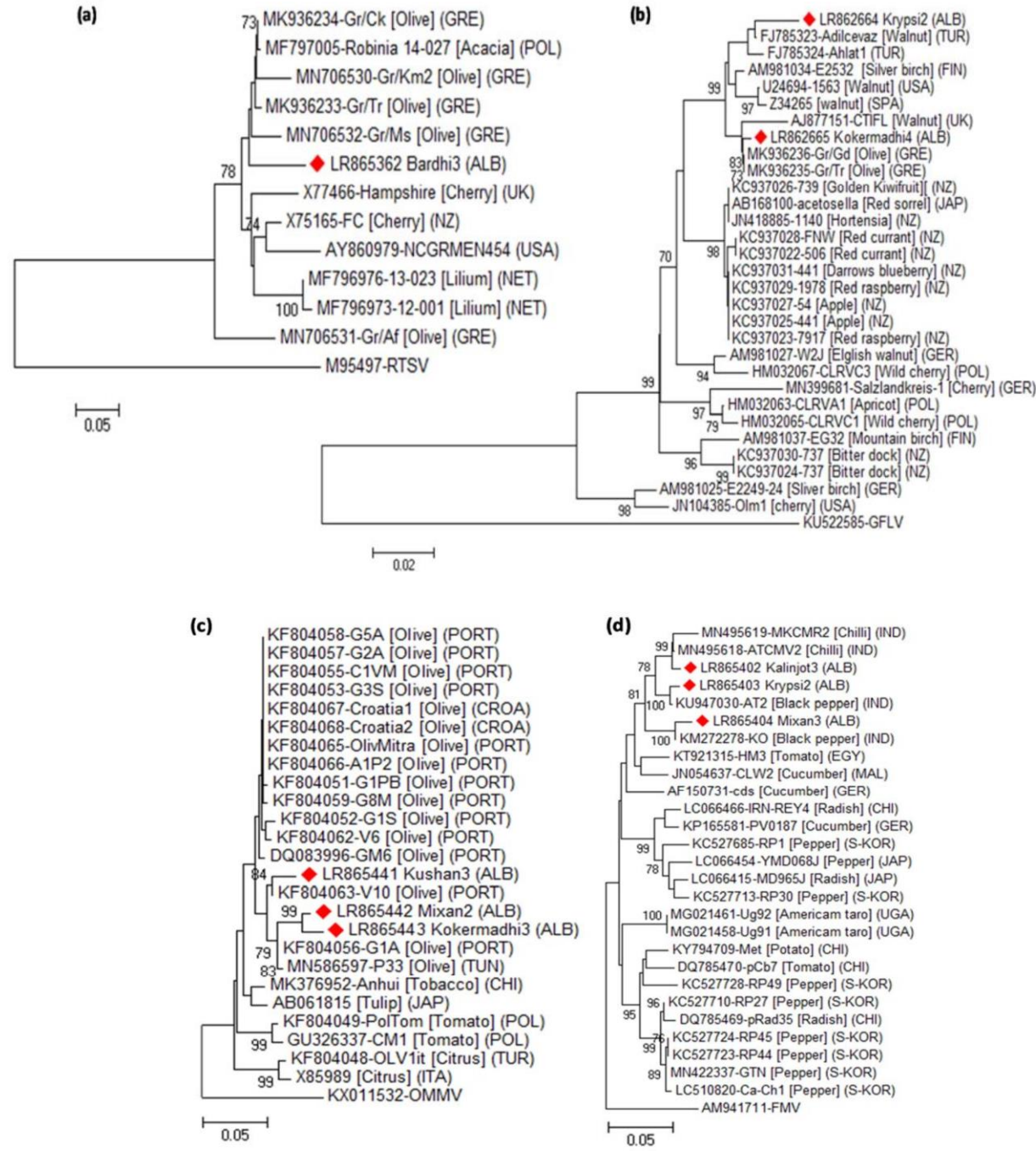
Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Editor: Nihal Buzkan, Kahramanmaraş Sütçü Imam University, Turkey.

Table 2. Olive samples collected from the varietal collection plot of Valias region (Tirana, A[illegible] assayed by RT-PCR for the presence of seven olive-infecting viruses. * *CAC* category plants; ** *tested* category plant.

N°. cv	Cultivar	N°. sample	ArMV	SLRSV	CLRV	OLYaV	OLRSV	CMV	OLV-1
1	Boç	1	-	-	-	+	+	-	-
		2	-	-	-	+	+	-	-
		3	-	-	-	+	+	-	-
2	Managjel	1*	-	-	-	-	+	-	+
		2	-	-	-	+	+	-	+
3	Frangu	1	-	-	-	+	-	-	+
		2	-	-	-	+	-	-	+
		3	-	-	-	+	-	-	+
4	Kushan	1	-	-	-	+	-	-	+
		2	-	-	-	+	+	-	+
		3	-	-	-	+	-	-	+
5	I bardhi i Tiranes	1	-	-	-	+	+	-	+
		2	-	-	-	+	+	-	+
		3	-	+	-	+	+	-	+
6	Kalinjot	1*	-	-	-	-	+	+	-
		2*	-	-	-	-	-	+	-
		3	-	-	-	+	-	+	-
7	Krypsi i Krujes	1	-	-	-	+	+	+	-
		2	-	-	+	+	+	+	-
		3	-	-	-	+	+	-	-
8	Kokermadhi i Beratit	1	-	-	+	+	-	+	-
		2	-	-	-	+	-	+	+
		3	-	-	-	+	-	+	+
9	I holli i Himares	1	-	-	-	+	+	-	-
		2	-	-	-	+	+	-	-
		3	-	-	-	+	+	-	-
10	Mixan	1	-	-	-	+	-	+	-
		2	-	-	-	+	-	-	+
		3	-	-	-	+	-	+	-
11	Lecino Valias	1	-	-	-	+	+	-	-
		2	-	-	-	+	-	-	-
		3*	-	-	-	-	-	-	+
12	Frantoio-Valias	1	-	-	-	+	+	-	-
		2	-	-	-	+	+	+	+
13	Kushan-Preze	1*	-	-	-	-	-	-	+
		2	-	-	-	+	-	-	+
14	I bardhi i Tiranes-Preze	1	-	-	-	+	-	-	-
		2	-	-	-	+	-	-	+
15	Mixan-Preze	1	-	-	-	+	-	-	+
16	Ulliri i kuq-Preze	1**	-	-	-	-	-	-	-
	No infected trees		**0**	**1**	**2**	**34**	**19**	**11**	**20**
	% infected trees		**0**	**2.5**	**5**	**85**	**47.5**	**27.5**	**50**



Results “on going study”

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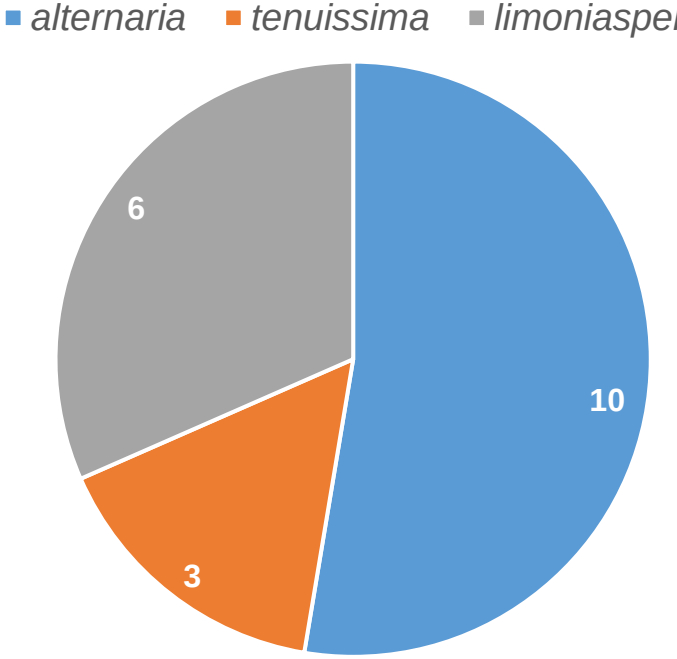

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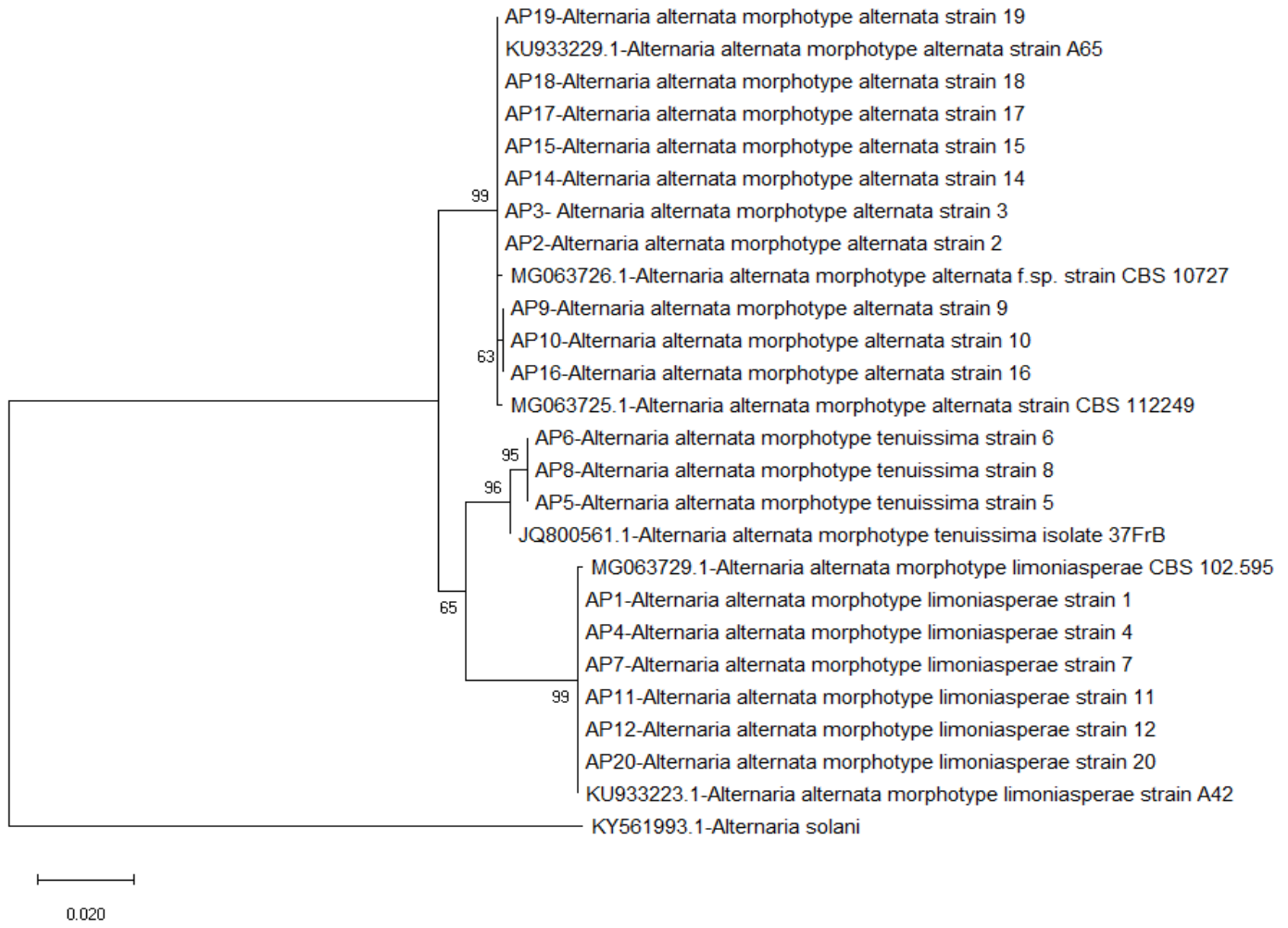

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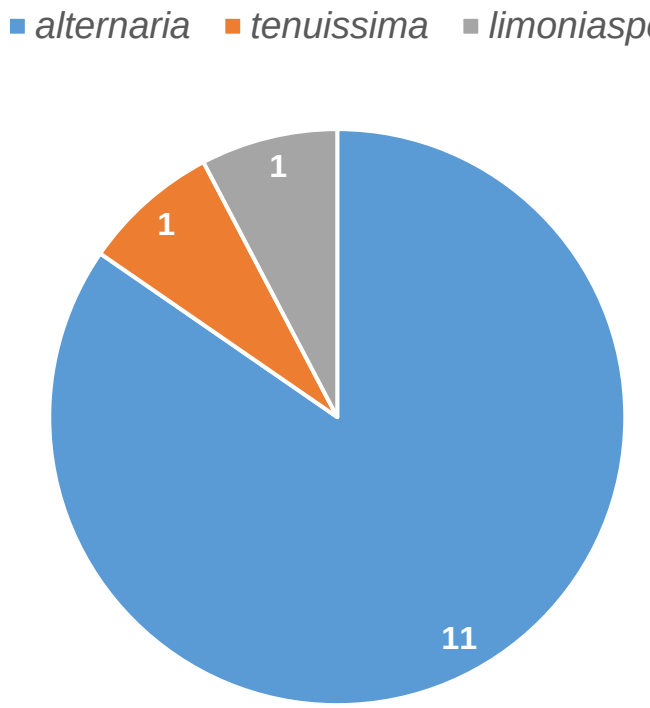
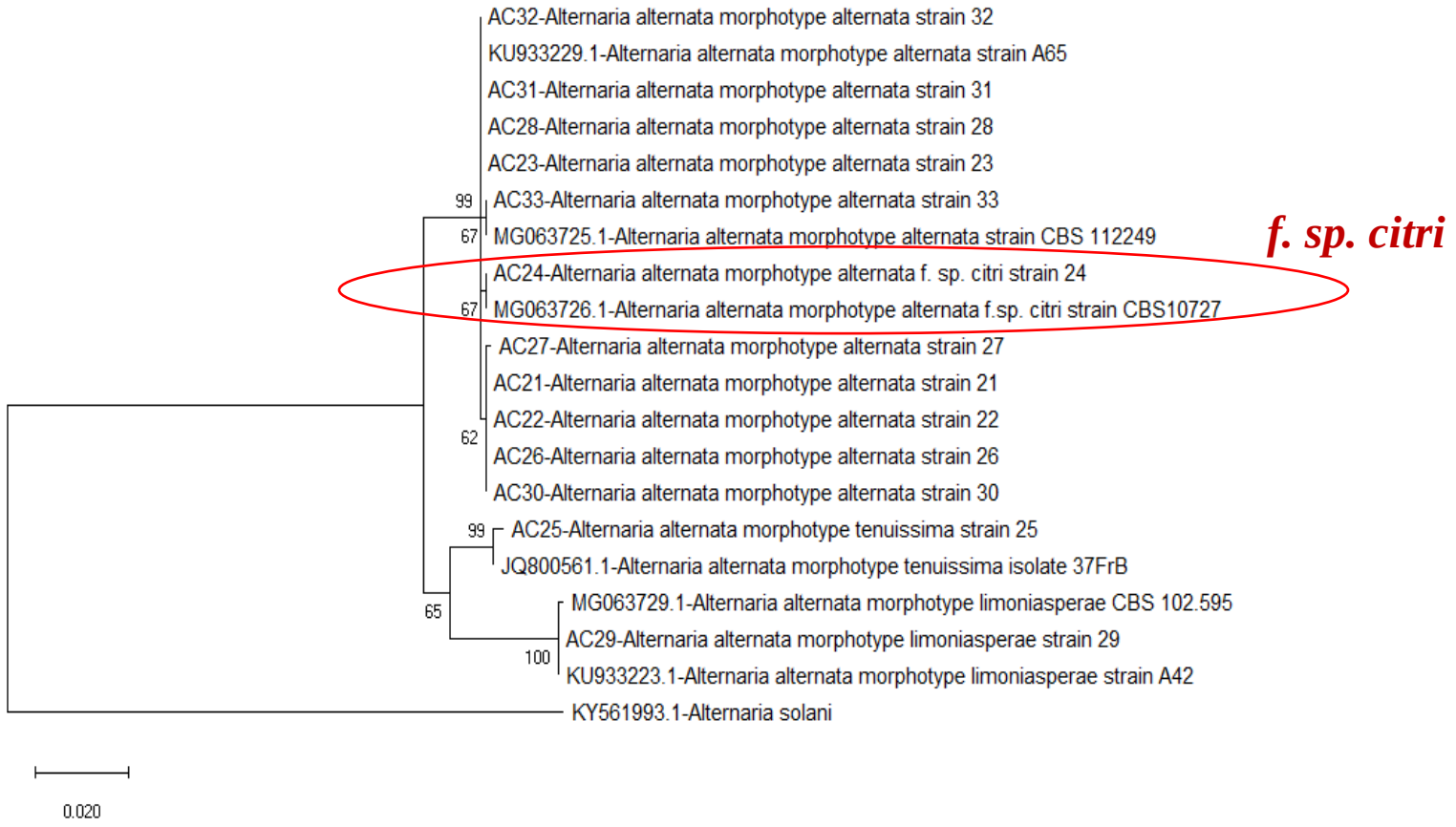


CITRUS STRAINS



f. sp. citri

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Eur J Plant Pathol
https://doi.org/10.1007/s10658-021-02240-9

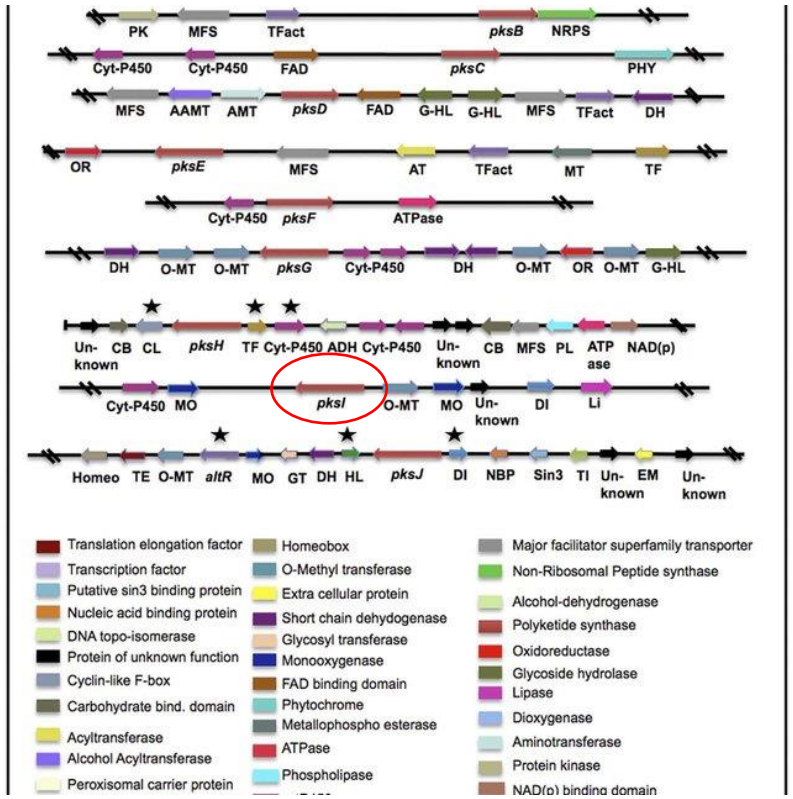
Mycotoxigenic fungi contaminating greenhouse-grown tomato fruit and their alternative control

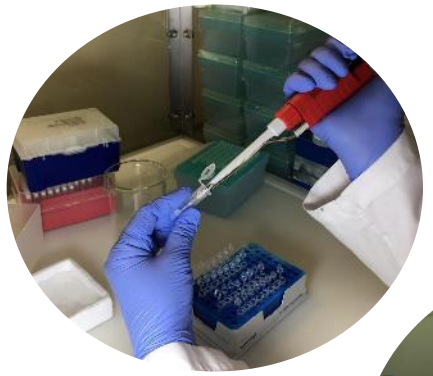
Simona Marianna Sanzani · Ferielle Djenane · Ornella Incerti · Naouel Admane · Annamaria Mincuzzi · Antonio Ippolito

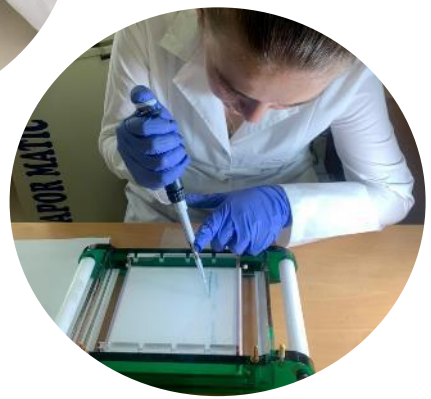
Detection of key genes of biosynthesis of secondary metabolites

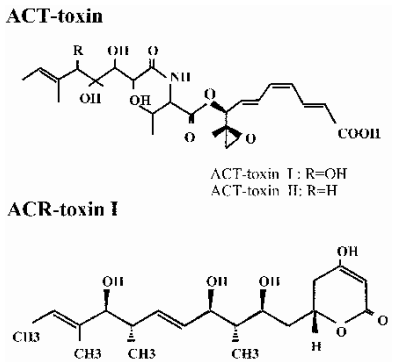
Mycotoxins AOH/AME ***pksI***

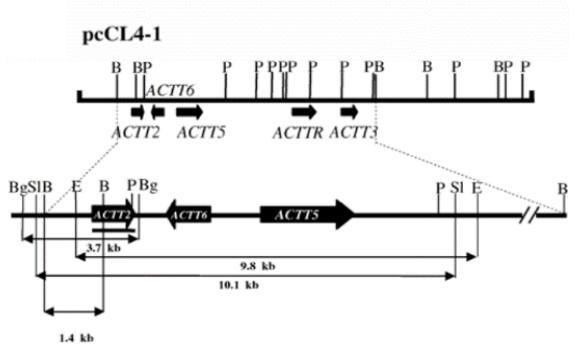
Phytotoxins ACT & ACR ***actt1-2 & acrt1-2***











PLOS ONE

RESEARCH ARTICLE

Characterization of Citrus-Associated *Alternaria* Species in Mediterranean Areas

Francesca Garganese[1], Leonardo Schena[2], Ilenia Siciliano[3], Maria Isabella Prigigallo[2], Davide Spadaro[3,4], Anna De Grassi[5], Antonio Ippolito[1], Simona Marianna Sanzani[1]*

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Results “on going study”

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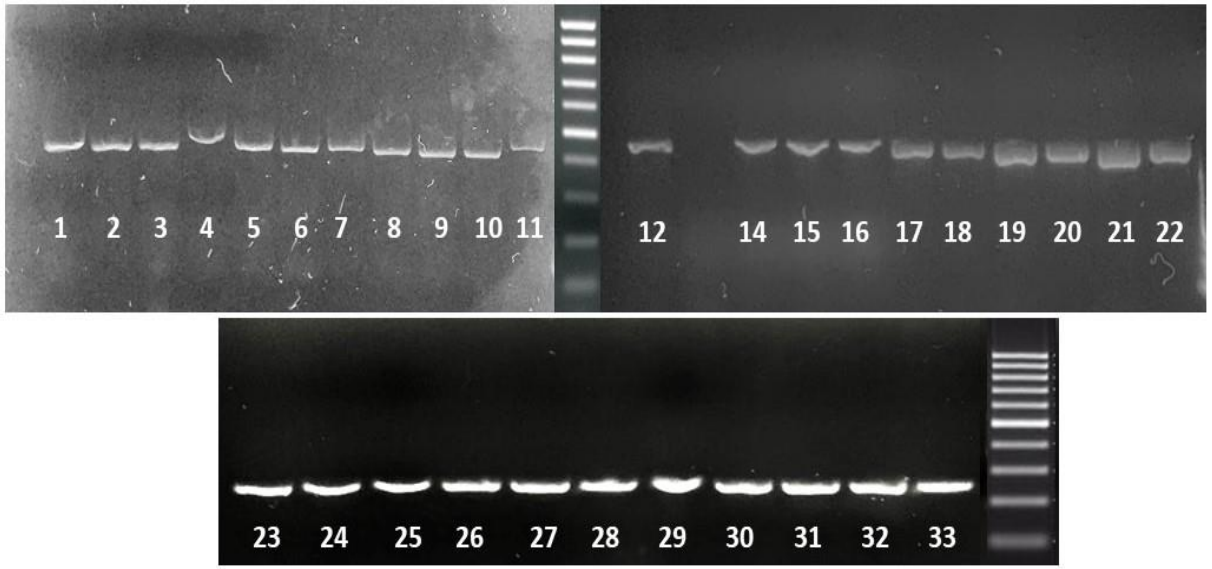
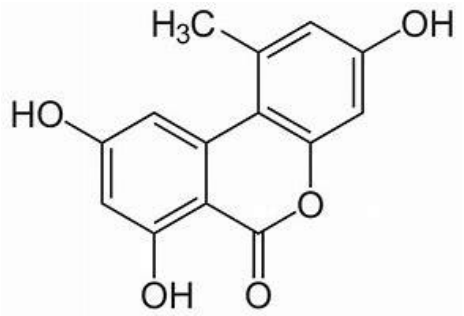
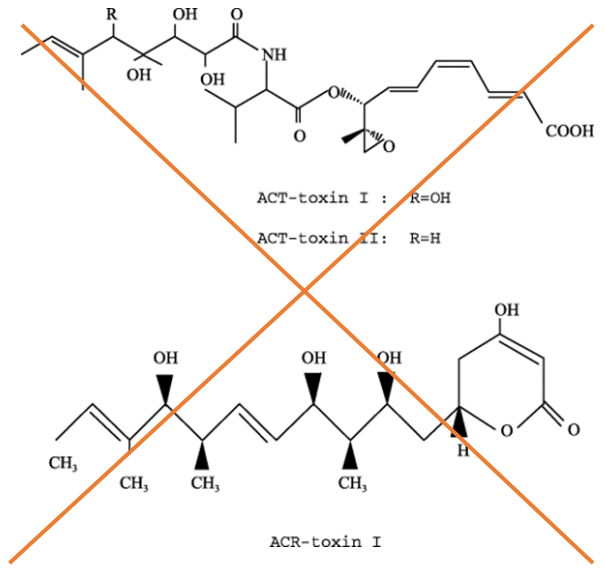
PRESENCE OF *PKSI* GENE







Preliminary results of DTHs

<u>Sequencing and registration in repositories of economically relevant pathogens, some of them:</u>

- *Colletotricum gloeosporioides* in citrus and pomegranate,
- *Phytophthora nicotianae* and *P. citrophthora* in citrus,
- *Colletotricum acutatum* in olive,
- *Phytophthora capsici* in cucumber, *etc*.
- More than 70 sequences were registered in GenBank.
- 32 strains of Alternaria alternata are already submitted in ncbi
- These pathogens are stored in standard cultural collections at the AUT and in partner universities.

Mutual cooperation agreement between laboratories as a HarISA product

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AGREEMENT OF SCIENTIFIC COOPERATION

I General

University of Sarajevo, Faculty of Agriculture and Food Sciences and University of.... Faculty of ... (hereinafter referred to as „Parties") wishing to promote scientific, academic and educational cooperation between two Institutions, in the terms stated henceforth, have concluded the present Agreement of Scientific Cooperation.

This Agreement aims to provide a general framework for facilitating institutional collaboration and cooperation between the Parties in areas of common interest.

II Subject of the Agreement

Cooperation will be implemented through, but may not be limited to, the following activities:

- Networking and mutul exchange of academic staff, research personnel, students, and other associates for lectures, visits and transfer of knowledge,
- Joint educational, training and research activities,
- Participation in the implementation of expert activities,
- Realization of scientific-educational programs of doctoral and postdoctoral studies and projects,
- Joint participation and applying for funds designated for research and education,
- Joint organization of conferences, symposia, congresses, semianrs, courses, summer schools, workshops, and other meetings,
- Exchange of proessional literature, textbooks, and other university publications.
- Exchange of information in fields of interest to both Parties.

In the implementation of specific cooperative programs, a writen agreement covering all relevant aspects including funding and other obligations to be undertaken by each party will be negotiated, mutually agreed and formalized in writing, prior to the commencement of the program.

III Duration of the Agreement

This Agreement will become effective upon the date of signature of both institutions. It will be in force for five (5) year and may be renewed by the Parties for further period.

Amendments and changes will be possible only in case of written consent by both Parties and will be added to this Agreement.

This Agreement may be terminated before the expirary of the five (5) year period only upon written consent of both Parties. Either Party wishing to make changes or terminate the Agreement shall notify the other institution in writing os such intention no later than six (6) months before the suggested changes or termination should come into effect. The Agreement cannot be terminated if this action will jeopardize the implementation of any of the agreed activities, or before the deadline set for completion of such activities.

IV Implementation of the Agreement

Each institution will appoint a contact person to coordinate the implementation of this Agreement. Both Parties have committed not to execute activities related to this Agreement without previous consultations.

Both Parties agree that all financial agreements necessary to implement this Agreement must be negotiated and will depend upon availability of funds. Neither institution shall have any financial obligation to the other institution based on this Agreement.

In witness whereof, the parties hereto affix their signatures below this

For University of Sarajevo Faculty of Agriculture and Food Sciences	For University of ... Faculty of ....
Prof. dr. Muhamed Brka, Dean	Prof. dr. .... Dean
Date: Nr.:	Date: Nr.:

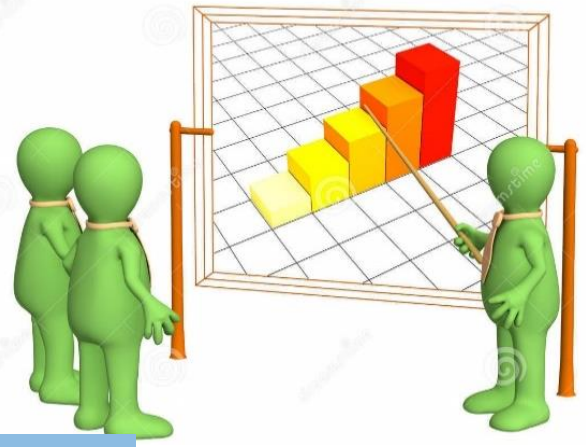
Harmonization and Innovation in PhD Study Programs for Plant Health in Sustainable Agriculture –HarISA is a Erasmus+ project Co-Funded with the suport of the European Union. Project Number: 598444-EPP-1-2018-1-HR-EPPKA2-CBHE-JP (2018-2472 / 001-001)

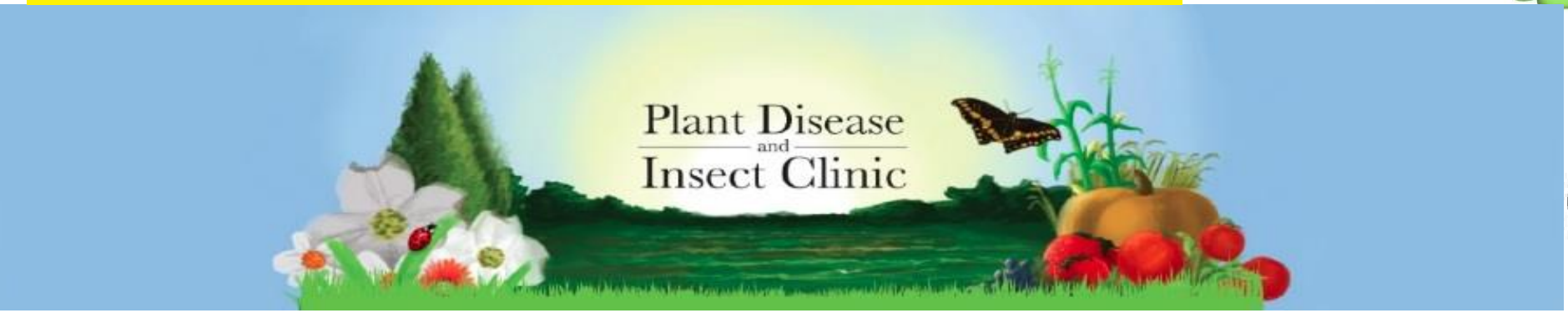
Preparation of training program for Ph.D. Students and young researches.

2020

Manual on

PLANT HEALTH CLINIC





training hubs

Expanding the network with partners interested in cooperation.

- Dept. Agriculture, Food and Environment, University of Catania (ERASMUS ICM)
- CIHEAM, Bari (Master thesis supervisor)
- Plant Pathology Lab, Faculty of Agriculture, Forestry and Natural Environment, Aristotle University of Thessaloniki (ERASMUS ICM applic.)
- University of the West of Scotland – (ERASMUS ICM)
- CNR – Bari Italy (Bilateral Project)

Projects that support DTH

- Horizon Europe – focus for all researchers
- ERASMUS PLUS CBHE & ICM
- Jean Monnet (Module, chair, network, excellence center)
- COST Action (excellent networks, COST Inclusiveness Target Countries (ITCs)
- Maria Sklodowska Curie – Ph.D. students
- National and Bilateral projects – Ph.D. students

Erasmus+

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