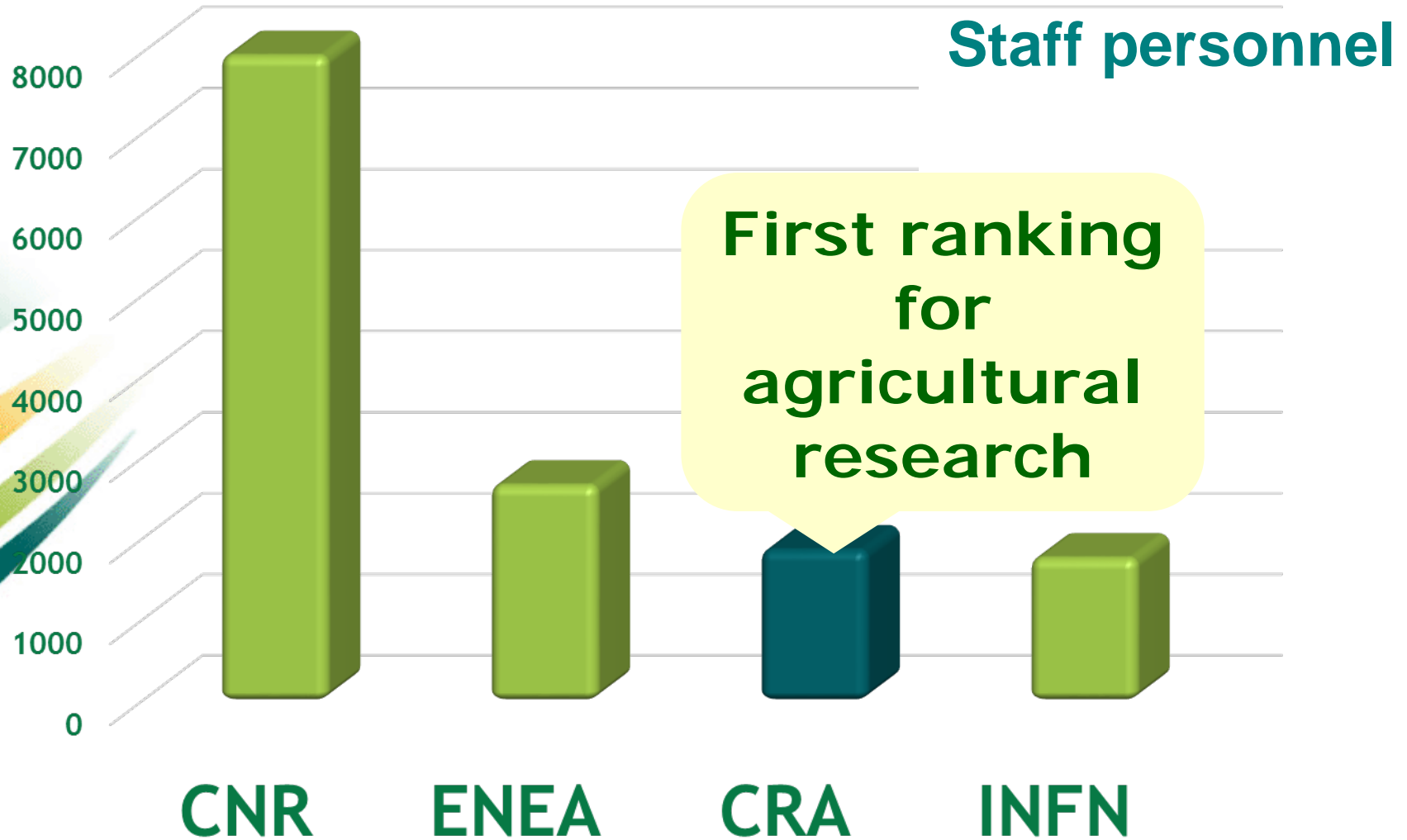




The Agricultural Research Council (CRA)

... WHO WE ARE ...
... WHAT WE DO....

... third ranking institutional research body in Italy ...



CRA – Research competencies

Scientific and experimental competencies in the main agricultural and food chains:

- Cereals, grain food and forage;
- Olive, vegetable and seed oils;
- Fruit arboriculture;
- Wine;
- Citrus fruit;
- Horticulture and floriculture;
- Wood and industrial cultures;
- Meat and dairy;
- Agro-industry processes;
- **Plant protection.**

... 5000 ha experimental farms...



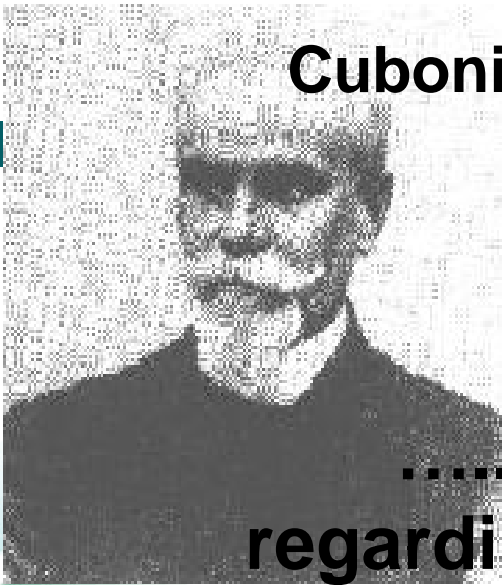
Plant Pathology Research Center

CRA-PAV



Cuboni

Founded in 1887



..... To carry out studies and researches regarding diseases and alterations of plants and plant products also in post-harvest, caused by parasites and weeds, by viruses and by unfavourable environmental factors, and develops methods and physical, chemical and biological tools able to prevent and control the diseases and alterations".



Human resources 2015

Permanent position

Researchers **25 UNITS**

Technicians **19 UNITS**

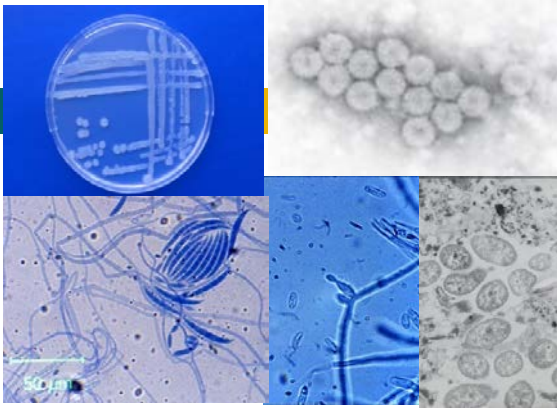
Administratives **18 UNITS**

No permanent positions

Post doc, doctorates.. **7 UNITA'**

(1 BdS – 3 AdR)

Contracts **12 UNITA'**



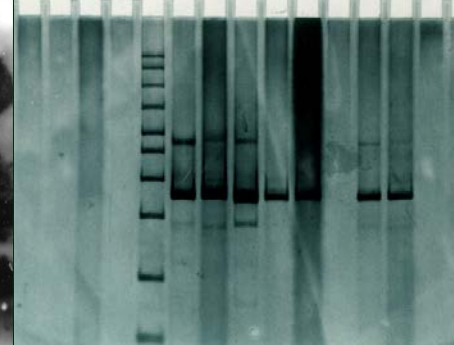
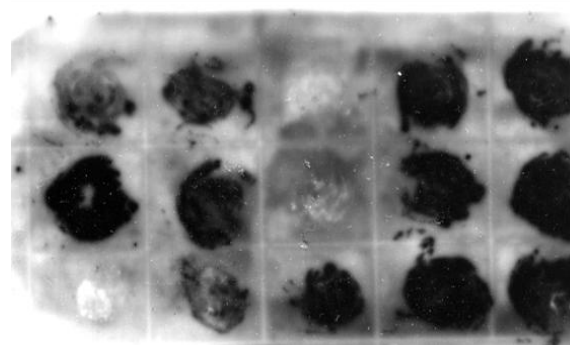
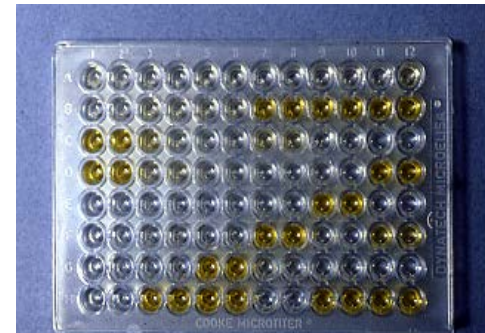
Growth on selective media

**Diagnosis and development
of diagnostic tools for
the most important diseases
of agricultural and
forest environments.**



**Assays on biological
indicator plants**

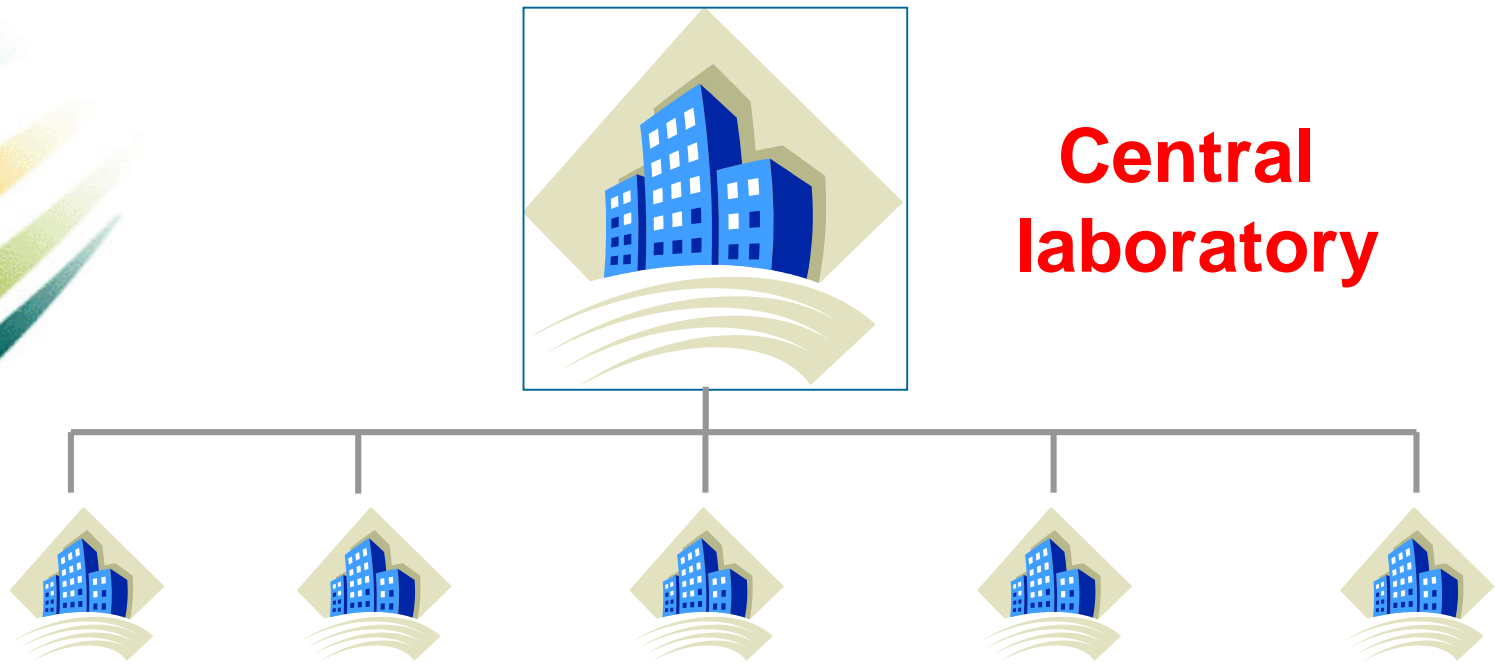
**Molecular and
serological
diagnostic
methods**





20 Regions

In the frame of Italian roles on phytosanitary aspects (D.L. n. 214 / August 19/2005) a national laboratory organization is defined as follows:



Laboratories distributed on the territory

National Reference Laboratory



**Network of laboratories distributed
on the entire Italian territory**

Tasks:

1. To establish official diagnostic protocols
2. To transfer official protocols to the Network
3. To train Network personnel
4. To maintain an official pathogens collection
5. To organize proficiency tests
6. To provide technical-scientific support to the competent authorities

CRA-PAV:
laboratory accredited
UNI ISO 17025
for
seven test methods



Official agreement with Regional Plant Protection Units:

- Lazio
- Sicilia
- Abruzzo
- Umbria

Official samples received from:

- Other Regions:
Liguria, Basilicata,
Emilia-Romagna, Toscana,
Campania, Molise
- Private companies (nursery)



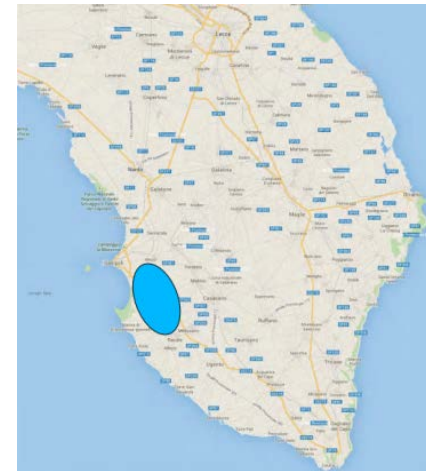
2

- ➔ Characterization, etiology and epidemiology of major crop diseases.
- ➔ Studies on soil-borne and seed transmitted fungi
- ➔ Forest decline
- ➔ Urban tree diseases and control strategies.



Xylella fastidiosa and the Olive Quick Decline Syndrome (OQDS)

The “Quick decline syndrome” appeared a few years ago in a restricted area near Gallipoli (Apulia, Italy)



Grapevine and Citrus were never found infected



Sardinia: in 2001 and 2009
Sicily: since 2008
Campania: in 2011

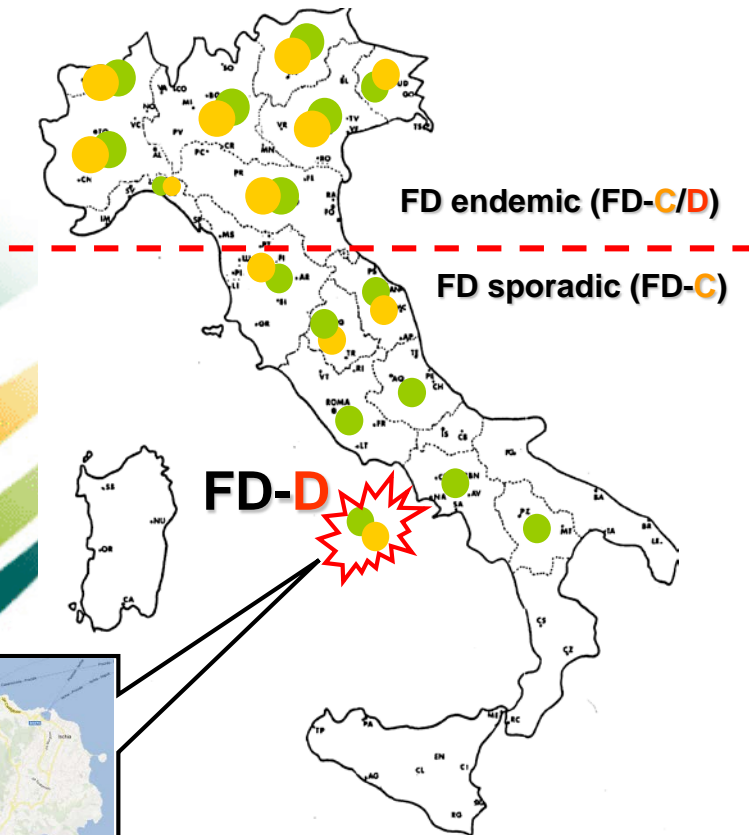
- Surveys
- PepMV strain identification and characterization
- Epidemiological studies and diagnostic ringtest (PEPEIRA partner)
- Diagnostic protocol validation at national level



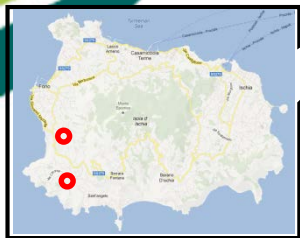
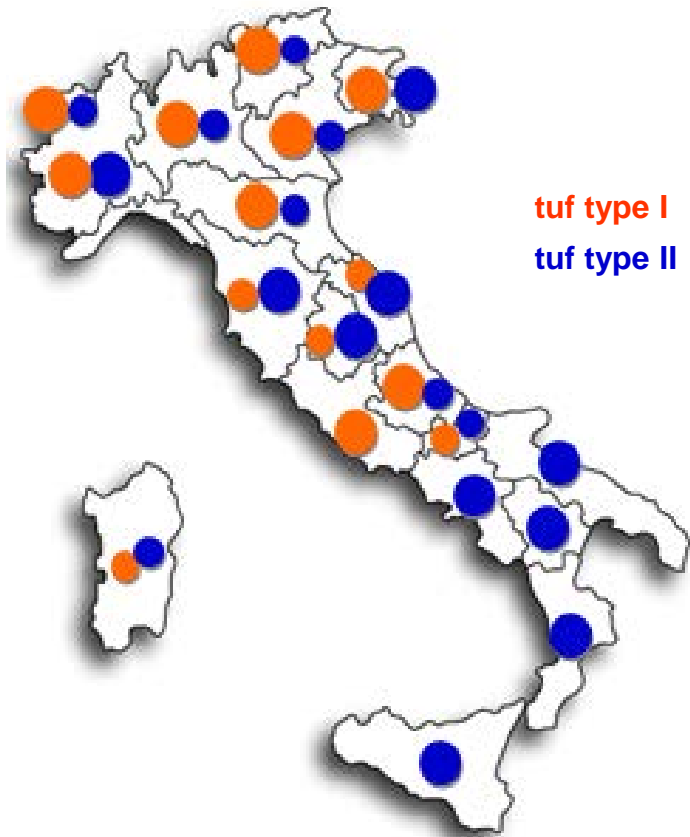
FLAVESCENCE DOREE

BOIS NOIR

- FD phytoplasma
- *S. titanus*



Distribution map of stolbur isolates infecting grapevine



2011 New FD focus on
Isle of Ischia



3

Production of GMOs for virus resistance



Viruses cannot be directly controlled by chemical application on infected plants → **Plant resistant to viruses**



When virus resistance genes are not available in nature → **Production of GM plants**

Production of GMOs for virus resistance

In the '90s CRA-PAV produced
transgenic tomato plants resistant to CMV



Production of GMOs for virus resistance

CRA-PAV has produced transgenic model plants resistant to the quarantine *Plum pox virus* the etiological agent of **sharka**



Plants are resistant to all PPV strains including the **Egyptian PPV strain El Amar**

RNA interference technology (RNAi)

- **no transgenic proteins** are produced for PPV resistance
- **consumers' acceptance**



4 Pest management

Conventional:

Evaluation of pesticides: capability, persistence, residues

Integrated control:

Optimization of pesticides use

Reduction of chemical residues

Reduction of environment impact (water, soil, crop, air)

Organic farming:

Reduction of the use of plant protection products

Reduction of chemical residues

Reduction of environment impact

Identification of natural products for pathogen control

Use of natural compounds to control plant diseases

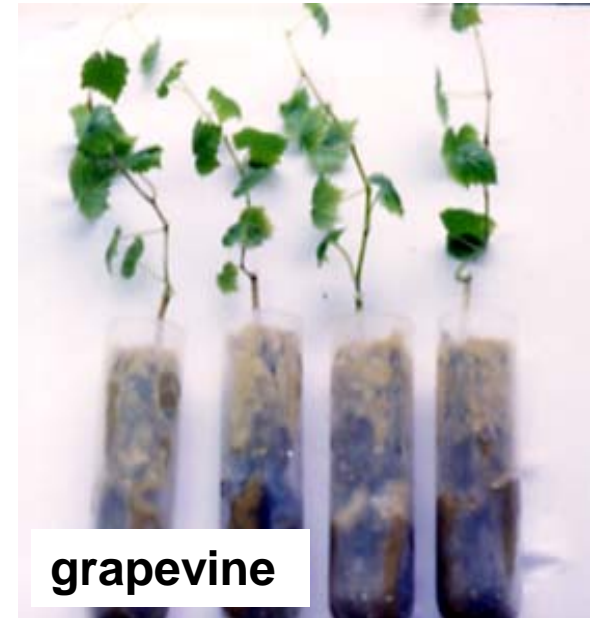
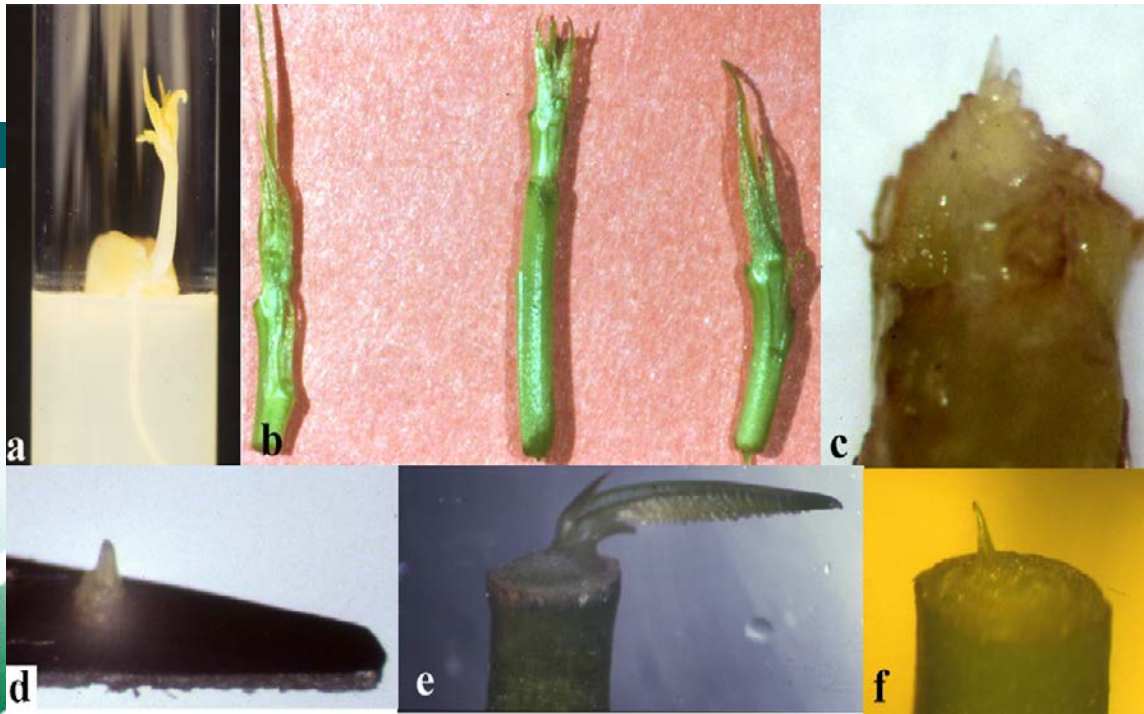
Control of powdery mildew in zucchini using tea tree oil

Seed treatment with essential oils:
clave oil, tea tree oil, thimo oil



Soil amendaments using
brassica green manures or
Trichoderma spp to control
soil plant pathogens

Development of innovative techniques to free plant germoplasm from viruses



In vitro
micrografting
applied to stone
fruits



artichoke

PIANTE C₃ LA APICI
PRONTE PER SAGGIO



*Ministero delle politiche agricole
alimentari e forestali*

OTHER ACTIVITIES SUPPORTING THE NATIONAL PLANT PROTECTION ORGANIZATION



National collection of micro-organisms of agricultural and industrial interest

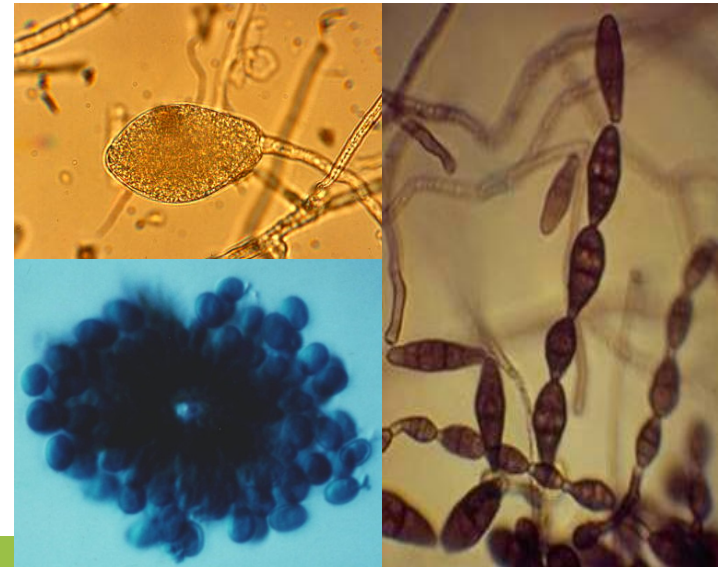


Culture collections allow to maintain microbial diversity

To preserve several isolates or strains of the same pathogen is important for:

**Optimization of diagnostic protocols
Production of resistant germoplasm
Pest Risk Analysis**

**The study of the variability of
pathogen population helps
in understanding
the evolution of the considered
micro-organism**





The Center takes part in National certification services and contributes in defining the protocols for propagating stocks

Nuclear stock



Apricot	38
Peach	32
Plum	37
Walnut	8
Almond	8
Cherry	9
Olive	33
Rootstocks	6



14/05/2018

Grapevine nuclear stock

43



14/05/2018