

CERTIFICATION OF OLIVE NURSERY PRODUCTIONS

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Viruses and other infectious agents (viroids, phytoplasmas, phloem- and xylem-limited bacteria) are primary plant pathogens. They are widespread and detrimental to vegetatively propagated crops in particular. Over time, these crops have undergone a severe sanitary deterioration on a worldwide basis

Control of plant viruses is essentially preventive, being based, among other things, on the sanitary improvement of the crops (sanitary selection and sanitation) and on the certification of nursery productions

MEASURES THAT REGULATE NURSERY PRODUCTIONS

Voluntary measures

Technical criteria for the production of **certified propagating material**

Compulsory measures

Technical rules for marketing propagating materials of fruit trees destined to fruit production
[Conformitas Agraria Communitatis (CAC)] (Decree 14/4/1997)

CERTIFICATION: WHAT IS IT?

Certification can be defined as a procedure whereby candidate mother plants to be used as source of material for propagation, undergo controls and, whenever necessary, treatments to secure absence from any number of pathogens, as specified by regulations officially issued, or endorsed, by competent governmental agencies.

CERTIFICATION: WHAT DOES IT APPLY TO?

Certification can be applied to any cultivated plant species, regardless of whether it is propagated vegetatively (cuttings, buds, tubers, bulbs, setts, offshoots, etc.) or through seeds.

Thus, both vegetable and woody crops are liable to enter certification schemes.

CERTIFICATION: WHAT ARE THE CONDITIONS NEEDED FOR ITS IMPLEMENTATION?

1. Existence of the problem: i.e. occurrence of sanitary conditions objectively calling for a public intervention;
2. Compelling request by growers, involvement and convinced participation of nurserymen
3. Unfailing support by scientific institutions and availability of technology for reliable detection and elimination (sanitation) of diseases and their agents
4. Commitment of governmental authorities to support the programme financially, legally and logistically;

CERTIFICATION: HOW LONG DOES IT LAST?

Certification is an integral part of sanitary improvement programmes and is often the only way to restrain certain diseases of woody crops. Hence, it is a long-lasting endeavour that must go on indefinitely, first to attain the desired health level of the crop considered, then to maintain this level through time.

CERTIFICATION: IS THERE A NEED FOR IT?

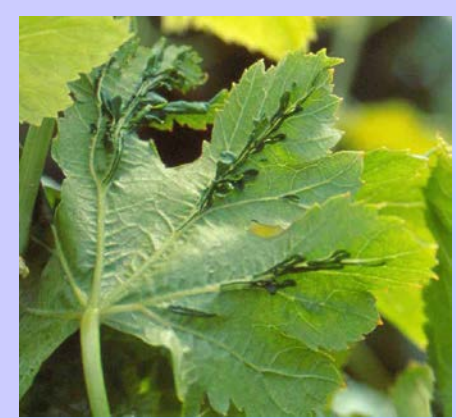
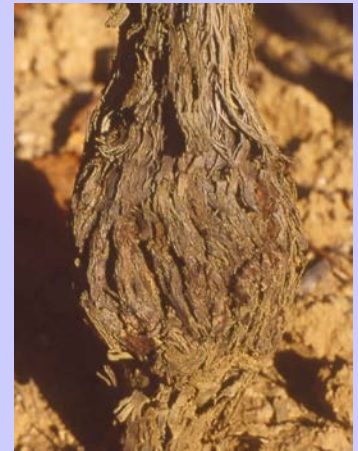
Affirmative, since a progressive sanitary deterioration of vegetatively propagated crops has taken place on a worldwide basis over the years because of:

1. Increased domestic and international demand and trading of nursery products,
2. Insufficient knowledge of the sanitary problems affecting the crops,
3. Presence of latent infections in certain varieties and/or rootstocks,
4. Lack of appropriate sanitary control of propagating material being marketed.

The above and inefficient quarantine have contributed to the generalized dissemination of a number of infectious disease agents (viruses, viroids, conducting tissue-limited prokaryotes)

FOR EXAMPLE

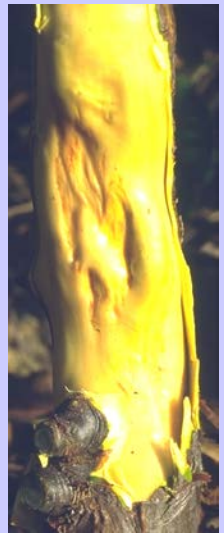
Grapevines are affected by more than 70 different infectious agents



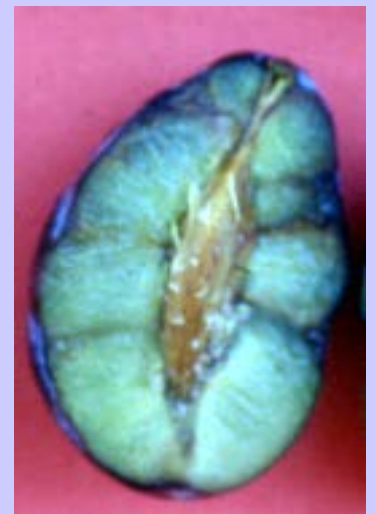
Citrus are affected by about 30 different infectious agents



**Pome fruits are affected
by 21 different
infectious agents**



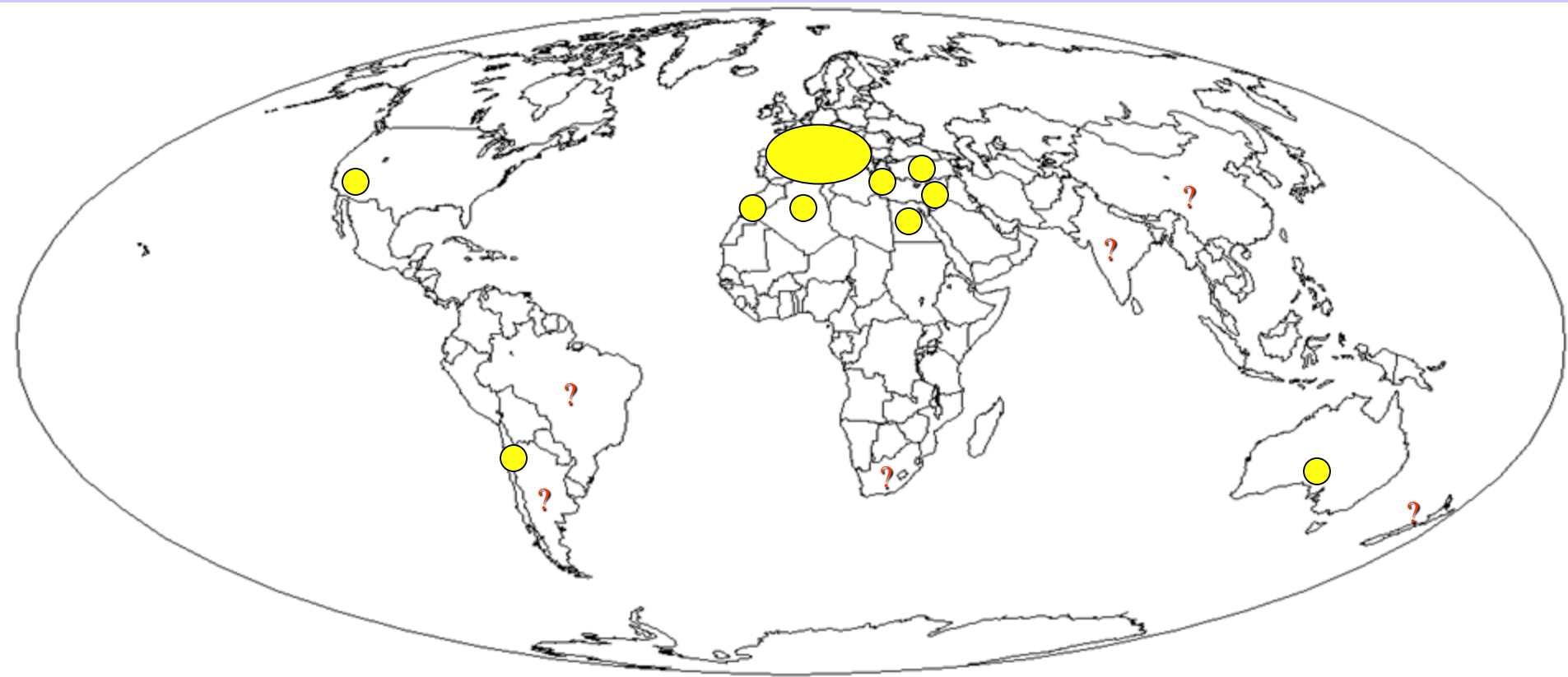
Stone fruits are affected by 45 different infectious agents



Olives are affected by 18 different infectious agents (15 viruses and 3 phytoplasmas)

Virus	Taxonomic position (family and genus)	Countries of record (No.)
Strawberry latent ringspot virus (SLRSV)	<i>Secoviridae</i> , (genus undetermined)	8
<i>Arabis mosaic virus</i> (ArMV)	<i>Secoviridae</i> , <i>Nepovirus</i>	6
Cherry leafroll virus (CLRV)	<i>Secoviridae</i> , <i>Nepovirus</i>	9
<i>Olive latent ringspot virus</i> (OLRSV)	<i>Secoviridae</i> , <i>Nepovirus</i>	4
<i>Cucumber mosaic virus</i> (CMV)	<i>Bromoviridae</i> , <i>Cucumovirus</i>	13
<i>Olive latent virus 1</i> (OLV-1)	<i>Tombusviridae</i> , <i>Necrovirus</i>	9
<i>Olive latent virus 2</i> (OLV-2)	<i>Bromoviridae</i> , <i>Oleavirus</i>	4
<i>Olive latent virus 3</i> (OLV-3)	<i>Tymoviridae</i> , <i>Marafivirus</i>	8
<i>Tobacco necrosis virus</i> (TNV)	<i>Tombusviridae</i> , <i>Necrovirus</i>	1 (PT)
<i>Olive mild mosaic virus</i> (OMMV)	<i>Tombusviridae</i> , <i>Necrovirus</i>	1 (PT)
<i>Olive leaf yellowing-associated virus</i> (OLYaV)	<i>Closteroviridae</i> (genus undetermined)	18
<i>Olive vein yellowing-associated virus</i> (OVYaV)	<i>Alphaflexiviridae</i> , <i>Potexvirus</i>	1 (I)
<i>Tobacco mosaic virus</i> (TMV)	<i>Virgaviridae</i> , <i>Tobamovirus</i>	1 (I)
<i>Olive semilatifolius virus</i> (OSLV)	Unclassified	1 (I)
<i>Olive yellow mottling and decline-associated virus</i> (OYMDaV)	Unclassified	1 (I)

Geographical distribution of olive viruses



1. Italy (1979)
2. Portugal (1990)
3. Jordan (1994)
4. Turkey (1996)

5. Spain (1998)
6. Israel (1999)
7. Egypt (2001)
8. USA (2001)

9. Lebanon (2005)
10. Syria (2005)
11. Albania (2006)
12. Croatia (2009)

13. Tunisia (2009)
14. Malta (2009)
15. Greece (2011)
16. Morocco (2011)
17. Chile (2011)

18. France (2011)
19. Cyprus (2011)
20. Algeria (2011)
21. Australia (2011)
22. Palestine (2011)

CERTIFICATION: PROCEDURES AND REQUIREMENTS

Certification is an interdisciplinary endeavour requiring phytopathological (primarily virological) and pomological competences.

Typically, certification schemes are based upon:

1. pomological and sanitary selection in the field,
2. assessment of the sanitary status of selected plants and their sanitation (if needed),
3. technological evaluation of the produce (if needed)

The outcome of these activities is a "registrable stock", i.e. a selection true to type and possessing, as a major and qualifying trait, a well-established sanitary status.

TYPES OF CERTIFICATION

- (i) *Voluntary*. A widespread form of certification required by growers and regimented by regulations issued by a "certifying authority" (i.e. usually a branch of the country's Ministry of Agriculture, or the equivalent), which cannot be forcefully imposed.
- (ii) *Compulsory*. A type of certification enforced whenever it becomes essential to prevent the dissemination of threatening diseases liable to spread through propagative material. "**Mandatory control**" of specific diseases (e.g. sharka, tristeza , yellows) is a form of compulsory certification.

CATEGORIES OF CERTIFIED MATERIAL

Virus-free: materials free from all known viruses and virus-like agents known for any given species at the time of by-laws promulgation

Virus-tested: materials free from viruses and virus-like agents as required by the specific certification scheme

CERTIFICATION: DOES IT DIFFER FROM "CLEAN STOCK PROGRAMMES"?

Most certainly yes, because clean stock programmes encompass only sanitary operations aimed at producing sanitarily improved mother plants, whereas certification schemes include pomological selection (thus quality improvement) and guarantee a given sanitary status, the varietal conformity, and a well-defined origin

The bases for olive selection in Italy

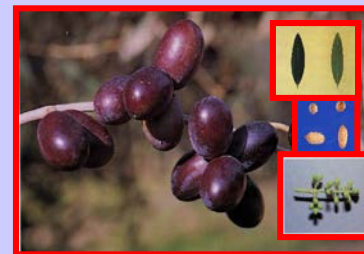
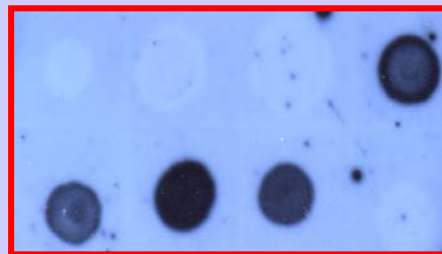
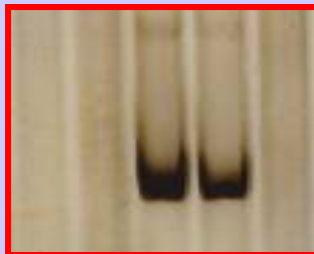
Groves no less that 25 years of age



5 to 10 plants per grove

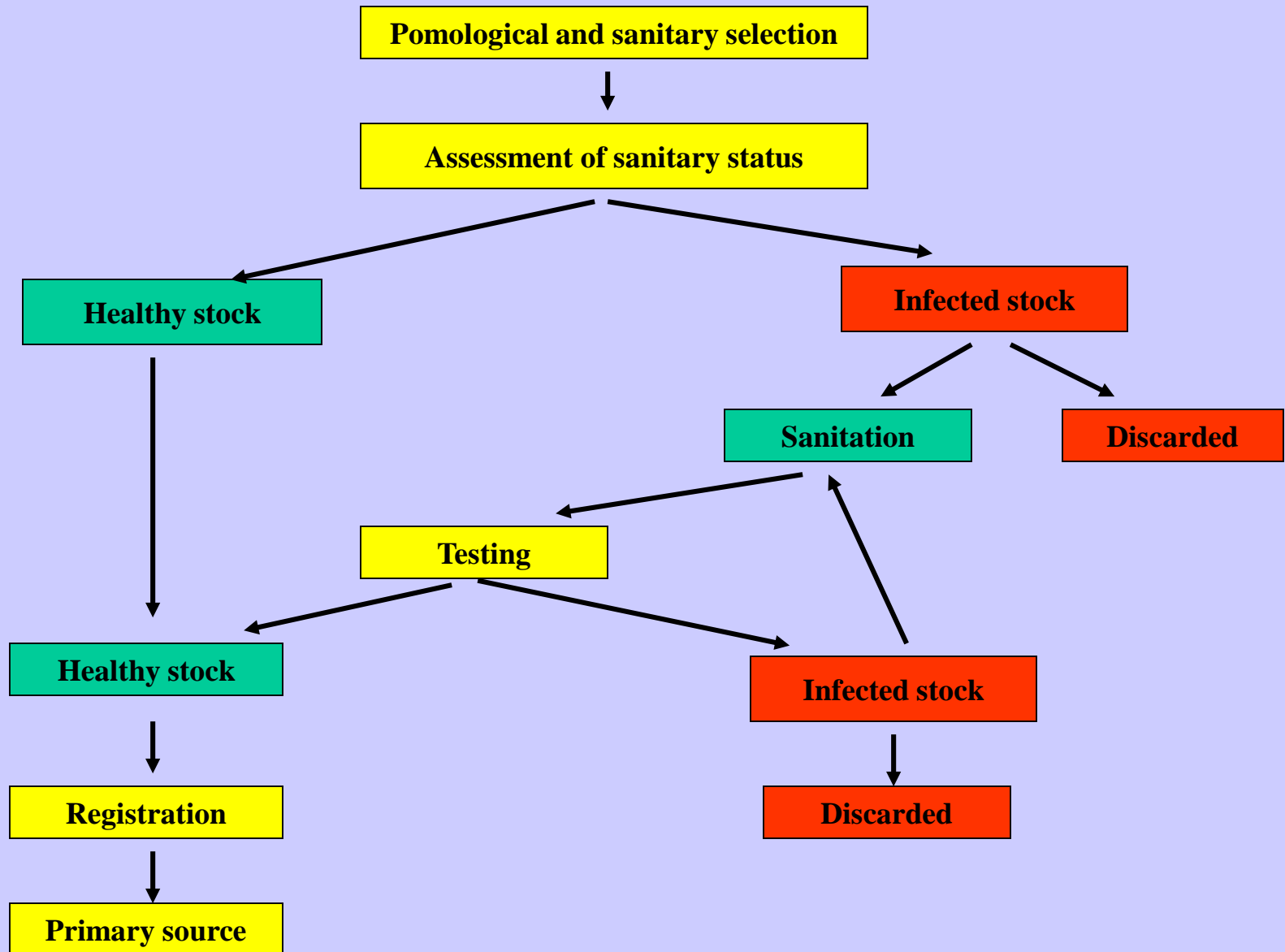


Sanitary and pomological checks



OBTENTION OF PRIMARY SOURCES

Nuclear stocks





PRIMARY SOURCE (Nuclear stock)

Primary sources are registered mother plants obtained by a conservative breeder through pomological and sanitary selection. Primary sources are maintained by the conservative breeder under screen or glass



PROPAGATIVE MATERIAL CATEGORIES

PRE-BASIC

Materials or plants derived directly from a primary source, grown under screen or glass

BASIC

Materials or plants derived directly from pre-basic sources.

Plants of basic category may be grown outdoors and are identified by a white label

PROPAGATIVE MATERIAL CATEGORIES

CERTIFIED

Materials or plants derived directly from basic sources. Plants of certified category are usually grown outdoors in nurseries.

Certified mother plants and materials are identified by a blue label



MINISTERO DELLE POLITICHE AGRICOLE E FORESTALI

Servizio Nazionale di Certificazione Volontaria

REGIONE PUGLIA - Servizio Fitosanitario Regionale

Osservatorio per le Malattie delle Piante - BARI

Piantone di olivo innestato Portinnesto: **OLIVASTRO**

Cv **LECCINO** (selez. IAM-UBA/0er-47)

Categoria: **CERTIFICATO** Stato sanitario **VIRUS ESENTE**



QUALITÀ CE - ITALIA

Cod. Prod.: 02506990726

Cod. Fornitore: BA 0002 / FRU

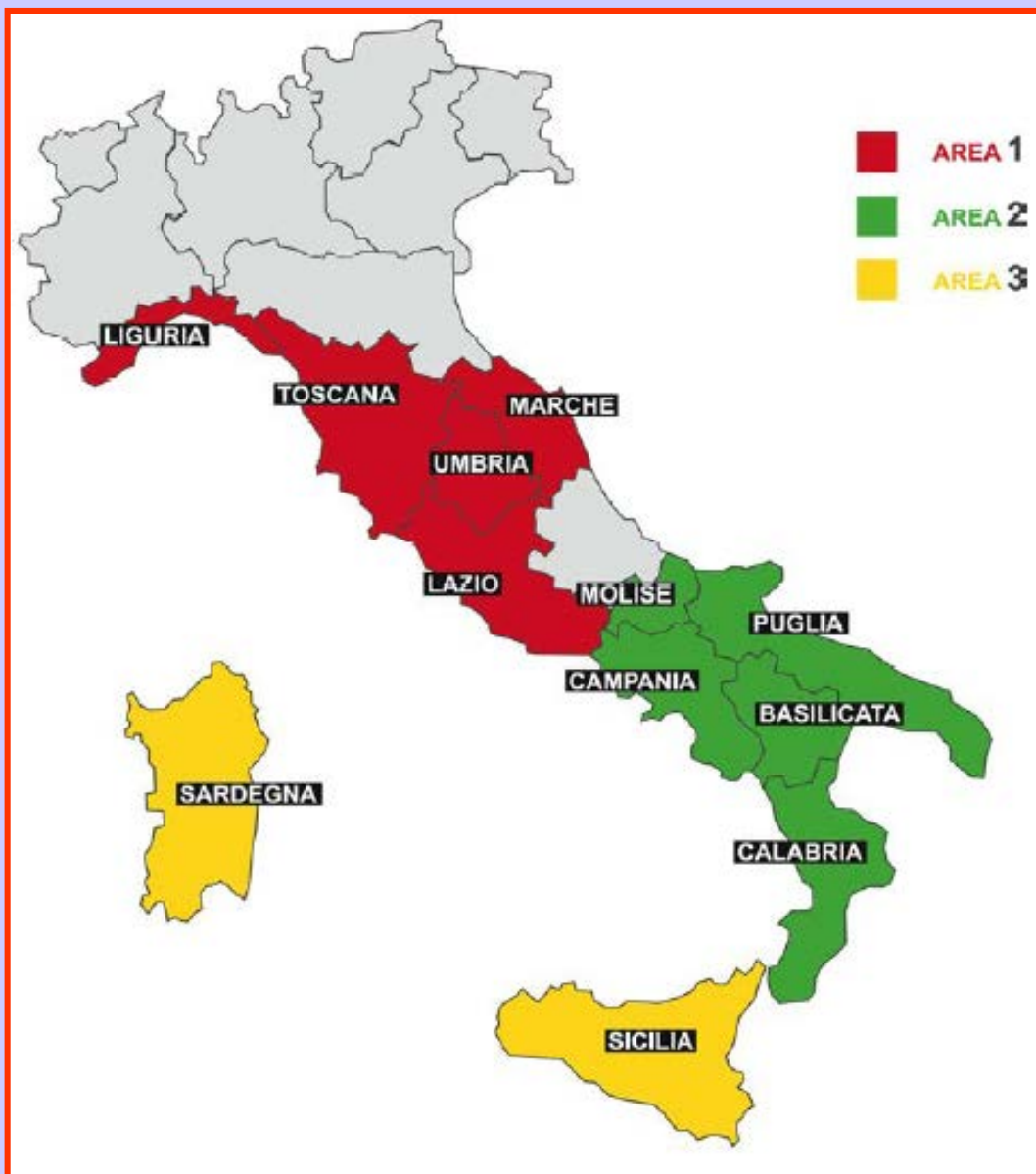
Olea europaea

Serie **VE/ 05** N° 098089

PROPAGATIVE MATERIAL CATEGORIES:

STANDARD

Plants and materials that have not undergone certification procedures. Trueness to type but not sanitary status is guaranteed.
Mother plants and materials of standard category are identified by a orange label



The Italian certification program involves 12 Regions, 25 Research Institutions, and covers some 200 cultivars and clones.

What are Italian olive nursery
productions certified for?

Pathogens included in the Italian certification scheme



Part II - Testing protocols for plant health assessment

Causal agent / Disease	Acronym	Biomolecular tests		
		+	result	-
VIRUSES				
Arabis mosaic	ArMV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Cherry leafroll	CLRV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Strawberry latent ringspot	SLRV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Cucumber mosaic	CMV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Olive latent 1	OLV-1	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Olive latent 2	OLV-2	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Olive yellow leaf associated	OLYaV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
Tobacco necrosis	TNV	<input type="checkbox"/>	RT-PCR	<input type="checkbox"/>
		<input type="checkbox"/>	Hybridisation	<input type="checkbox"/>
PHYTOPLASMAS				
Phytoplasmas		<input type="checkbox"/>	PCR	<input type="checkbox"/>
FUNGI		ISOLATION		YEAR/S
		Result		
		+	-	
<i>Verticillium wilt: Verticillium dahliae</i>				
BACTERIA				
Olive knot				
<i>Pseudomonas savastanoi pv savastanoi</i>				

Symptoms induced by virus and phytoplasma infections





Olive knot, caused by *Pseudomonas savastanoi*, is the most common bacterial disease of olive. Symptoms are galls that develop on twigs and branches.

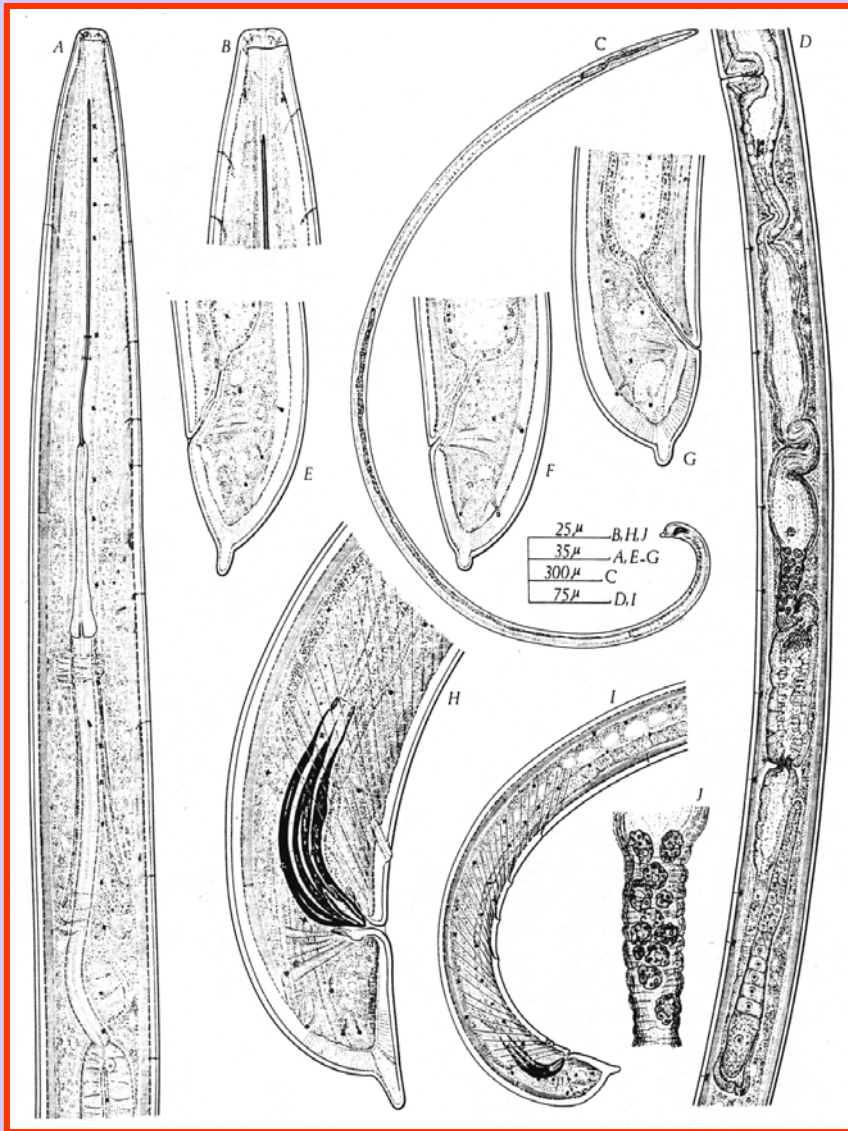
VERTICILLIUM WILT

Is a major disease of olive that affects trees in nurseries, commercial groves and landscape plantings.

The disease is expanding in all Mediterranean olive-growing areas, especially in the young and intensive plantings, also because of the use of **infected propagative material**



In addition, soils of nurseries that enter the certification programme must be free from



Xiphinema diversicaudatum
 the vector of *Arabidopsis* mosaic
 virus (ArMV) and Strawberry
 latent ringspot virus (SRLV),
 both of which infect olive

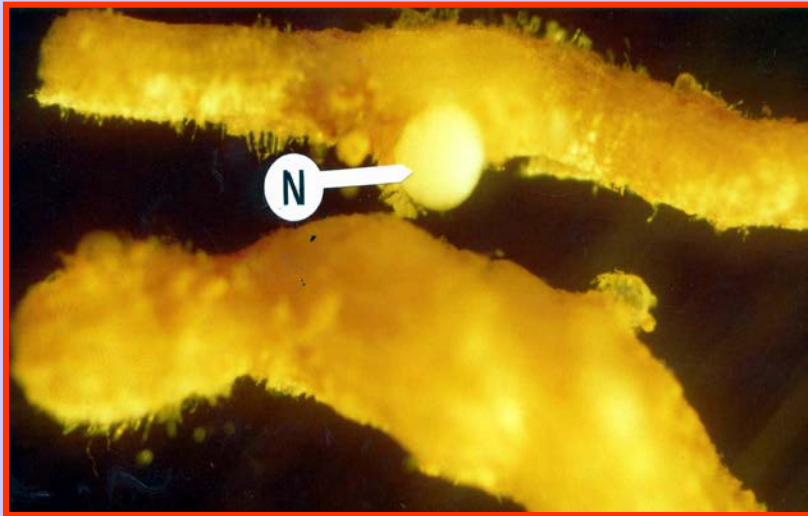
Root knot nematodes *Meloidogyne javanica* and *M. incognita*



Mature female



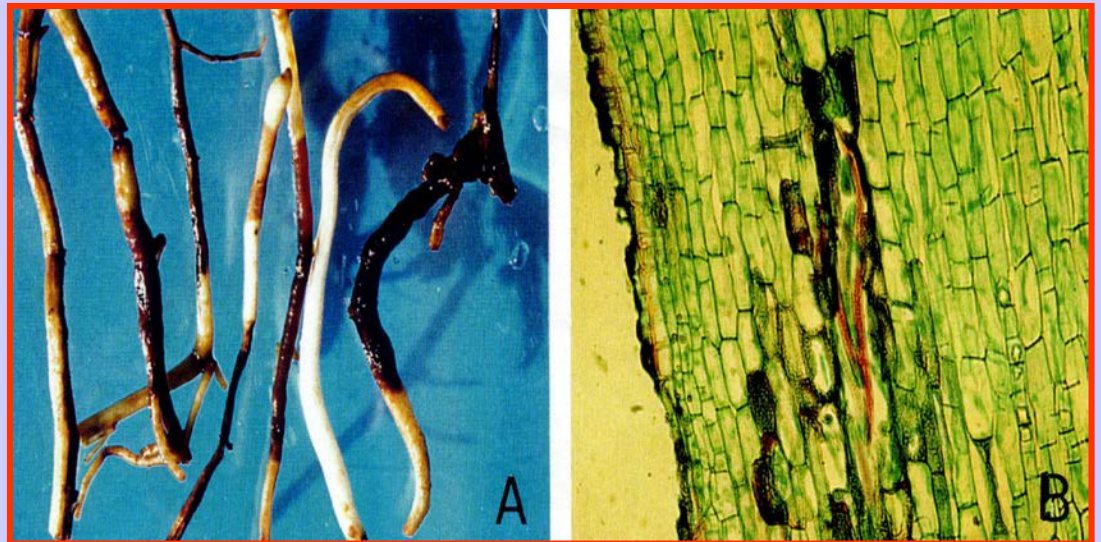
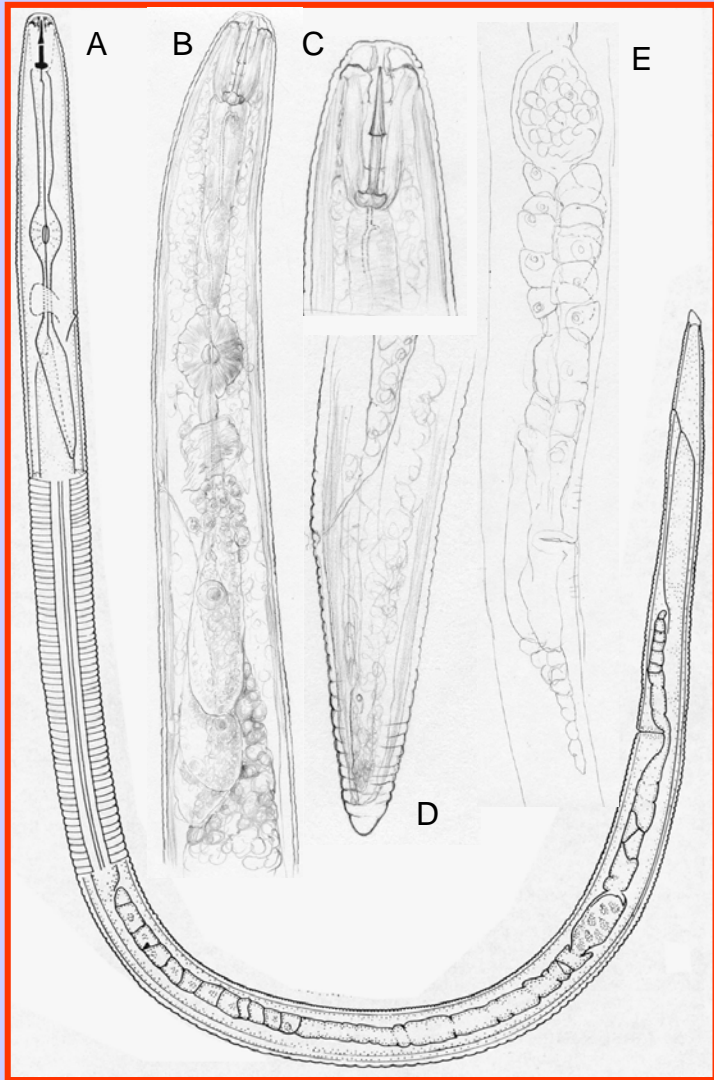
Severe galling of olive roots



Female protruding from a root

Pratylenchus vulnus, the lesion nematode

Nematodes (N) in the cortical tissues of an olive root



Root injuries



Ministero delle politiche agricole alimentari e forestali

DIPARTIMENTO DELLE POLITICHE COMPETITIVE
DEL MONDO RURALE E DELLA QUALITÀ

Direzione Generale della Competitività per lo Sviluppo Rurale
COSVIR XI – Servizio Fitosanitario Centrale

*National Service for
Voluntary Certification:*

*Recognized Varieties
and Clones List
Provisions Collection*

Roma, March 2011





NEW EMERGENCY

Xylella fastidiosa as
a component of a
olive disease called



Quick Decline Syndrome

Thanks for the attention