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Certification of Citrus in Italy

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SUMMARY - An account is given of the evolution of the Italian legislation in the field of production and marketing of propagating material of citrus. The organisation of the certification procedure for the production of nursery material is illustrated based on the Ministerial Decree of 29 October 1993. While waiting for the enforcement of the above Decree, some source plants are temporarily utilized since they are free from tristeza, psorosis complex, concave gum, cristacortis, impietratura, infectious variegation, stubborn, cachexia and exocortis diseases. In Apulia the premultiplication step has been initiated and the regional certification scheme is currently being recognized. The possibility of establishing increase blocks also during the phases of premultiplication so as to meet the demands of material during the first years of activity of the system is included.

Key words: citrus, virus, virus-like, certification, Italy

RESUME *- Dans le présent travail, on parcourt l'évolution de la législation italienne en matière de production et de commercialisation du matériel de multiplication agrumicole, en illustrant l'organisation de la certification de ces espèces selon le Décret Ministériel du 29 octobre 1993. En attendant l'application de ce décret, une phase transitoire est actuellement en vigueur où on reconnaît certaines sources d'approvisionnement indemnes de CTV ainsi que des maladies du complexe de la psorose, de la concavité gommeuse, de la cristacortis, de l'impietratura, de la panachure infectieuse, du stubborn, de la cachexie et de l'exocortis. Dans les Pouilles, la phase de prémultiplication a été entamée et le système de certification régionale est en phase d'être reconnu. Entre temps, pour faire face aux nombreuses demandes de matériel, il serait nécessaire, pendant les premières années d'application du décret ministériel, d'établir des parcelles d'intensification du matériel végétal aussi pour la phase de prémultiplication.*

Mots-clés: *agrumes, virus, virus-similaires, certification, Italie*

Introduction

Citrus are among the crops most affected by pathogens transmitted through the propagating material (Roistacher, 1991).

Although destructive diseases such as tristeza (found in a few isolated foci), greening and other diseases transmissible by winged vectors have never been reported from Italy, the sanitary status of our orchards is seriously compromised (Catara, 1984; D'Onghia, 1998). This is due to the spread of diseases of the psorosis complex or viroid diseases which, although transmissible only through propagating material, impair the development, productivity and longevity of plants in some given circumstances (graft combinations, susceptible varieties, virulent virus strains, etc.). Given the ineffectiveness of chemical treatments, control is mainly based on prevention. It encompasses the application of certification, i.e. a set of technical and legal procedures able to ensure the quality of the final propagating material which originates from selected source plants individually tested for virus freedom and checked for their varietal trueness (Roistacher, 1993).

In 1973 (Ministerial Decree of 30 March, 1973), in Italy a ten-year citrus development and genetic and sanitary improvement programme was set up and funded by *Cassa per il Mezzogiorno* (Russo, 1977; Russo e Lo Giudice, 1980; Martelli and Russo, 1983). Except for lemon, the project included the main cultivated species (orange, clementine, mandarin, tangelo and grapefruit) whose selection and certification were carried out according to the following flow diagram.

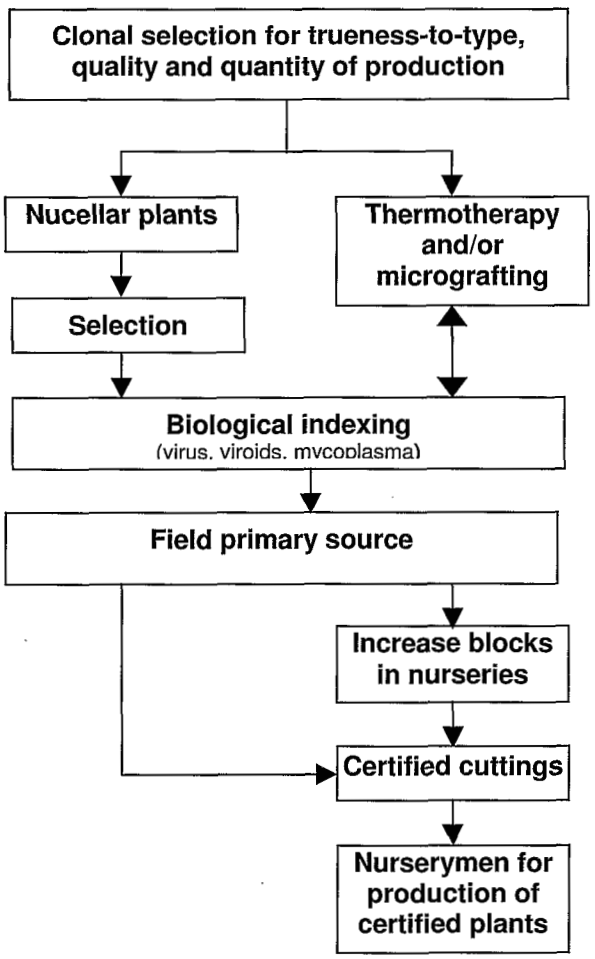

Figure I – Genetic and sanitary improvement programme of citrus in Italy (Martelli and Russo, 1983)

This programme was mainly geared onto agronomic aspects thereby enabling to update the varietal composition of the citrus industry. Sanitary aspects, although considered, were neglected.

In 1991 a voluntary certification programme was implemented in Italy (MD of 2 July, 1992 n. 289) and in 1993 the "Technical Regulations for the Production of Certified Citrus Propagating Material" were issued (MD of 29 October, 1993).

The current certification scheme will align Italy with the countries that are more actively involved in the genetic and sanitary improvement of citrus.

Organization

The MD of 29 October, 1993, which follows the general indications of MD 289/91, defines the technical characteristics of citrus propagating material entering certification in terms of sanitary status (Table III) and varietal trueness, identifies the subjects involved and defines the tasks within the framework of the certification service (Table II).

Table II – Organization of the voluntary certification system of citrus (1993 MD).

Phases	Responsibility	Cropping conditions	Controls			
			Trueness to type		Sanitary	
			Type	Responsibility	Type	Responsibility
Conservation for premutiplication	MIPA	Screenhouse	Phenologic	ISA	Test*	ISA
Premultiplication	ISA or Agencies recognized by MIPA	Screenhouse	Phenologic	ISA	Test*	ISA
Multiplication	Nurseries (Associations, Consortia)	Open field	Phenologic	Regional Phytosanitary Services	Test** Visual	Regional Phytosanitary Services
Propagation	Nurseries	Open field	Biometric characteristics	Regional Phytosanitary Services	Visual	Regional Phytosanitary Services

MIPA Ministry of Agricultural Politics
ISA Research Institute for Citrus
* Mother plants are tested every three years for viroids and every 6 years for virus, Spiroplasma and virus-like diseases
** 10% of mother plants are tested every year for viroids, virus, Spiroplasma and virus-like diseases

Conservation Centre for Premultiplication (CCP)

CCP is organized and run under the responsibility of Istituto Sperimentale per l'Agrumicoltura (ISA), Acireale.

It is primarily aimed at maintaining at least two plants descending from the first multiplication of primary sources under insect-proof greenhouses (ensuring isolation from surface water and outdoor conditions) and at supplying "pre-basic" propagating material to premultiplication centres. Plants are grown in pots containing sterile soil mixture.

Premultiplication Centre (PC)

ISA is in charge of premultiplication which, however, may also be implemented by other public agencies identified by MIPA. The PC is designed to maintain two or more plants, according to the importance of the variety, descending from the first multiplication of the "pre-basic" material and to produce basic plants for multiplication centres. Basic mother plants are grown under screenhouse.

Multiplication Centre (CM)

CMs are outfits recognized by MIPA for the production of "certified" propagating material (seeds and scions) for nurseries. Certified mother plants are grown in plots free from citrus stumps, from *Pratylenchus vulnus* and with low populations of *Tylenchulus semipenetrans* (not above four larvae/gram of soil or one hundred females/gram of roots) and of *Phytophtora spp.*(not higher than three propagules/gram of dry soil). Lemon mother plants are established in soils where the same specie was not grown for at least five years. Furthermore, lemon plants are covered with a white net to prevent mal secco infections. The plot, to be maintained for no more than 30 years for scion mother plants and 40 years for seed producers, will have a 100-meter respect area and be isolated from the flow of surface water. Over one thousand scions and no more than four thousand buds may be taken from each single mother plant.

Increase Block

Plants, descending from the PC, are grown in pots under cover, located 50 meters apart from commercial citrus groves and for 18 months from grafting. The density does not exceed eight plants per square meter and containers filled with substrates having the characteristics of mother plot soils and layered on a mulched surface. The increase block is to be sufficiently sized to produce two thousand scions from at least twenty thousand plantlets .

Nursery

Nursery must be authorized by the regional phytosanitary service and designed to grow certifiable propagating material (rootstocks and plants) which will be certified following inspections. Plots must be eligible from the sanitary and agronomic viewpoint and located 15 meters apart from standard citrus groves and nurseries and 50 meters apart from mal secco-susceptible species.

Controls

According to 1993 MD, sanitary and trueness to type controls for healthy conditions, in the conservation for premultiplication and premultiplication phases, are carried out by ISA or by agencies entrusted by ISA and officially recognized by MIPA respectively.

Controls in the multiplication phase and in the nursery are carried out by the regional administrations joining the national voluntary certification service.

The *certified* material issued from the enforcement of the national rules for voluntary certification is given status of "*virus-tested*" and "*virus-free*" (Table II).

Table II – Pathogens and tests included in the protocol for "*Virus-tested*" and "*Virus-free*" propagating material of citrus

Virus-free	Virus-tested	Agent	Suggested indicator	Test (*)
	Viruses			
Tristeza	Tristeza	CTV	Mexican lime	ELISA, dsRNA
Vein enation		CVEV	Mexican lime	
Variegation	Variegation	CVV	Lemon or Etrog citron 861S1	ELISA
Crinkly leaf		CCLV	Lemon or Etrog citron 861S1	
Psorosis	Psorosis	CPsV	Pineapple, Hamlin, Navelina oranges	
Ring spot		CRSV	Grapefruit or Etrog citron 61S1	
Kumquat disease		KdV	Troyer citrange	
Mosaic		CiMV	Dweet tangor	ELISA
Satsuma dwarf		SDV	Dweet tangor	ELISA
Tatter leaf		CTLV	Citrange	ELISA
	Viroids			
Exocortis	Exocortis	CEVd	Etrog citron 861S1	dPAGE
Cachexia	Cachexia	CCaVd	Parson's special mandarin	dPAGE
Citrus viroids	Citrus viroids	CVd	Etrog citron 861S1	dPAGE
	Virus-like diseases			
Concave gum	Concave gum		Pineapple orange	
Cristacortis	Cristacortis		Pineapple orange	
Impietratura	Impietratura		Grapefruit	
Rough lemon incompatibility			Rough lemon	
	Spiroplasma			
Stubborn	Stubborn	*Spiroplasma citri*	Pineapple orange	ELISA, culturing

(*) A negative serological test does not replace the bioassay

Current situation

In Italy, while waiting for the enforcement of the 1993 MD, citrus nursery productions are qualified according the MD 30/03/73.

Given the high sanitary deterioration of this species (Catara, 1984; D'Onghia, 1998), it is necessary to optimize the use of existing resources given the lack of primary sources as laid by the 1993MD.

In order to meet the requirements of certified material, the MIPA has recognized "sources of supply" grown outdoor on the basis of the phytosanitary documentation submitted by the owners of the sources and of the inspections implemented by regional phytosanitary services. This certification requires mandatory freedom from CTV. Absence of other diseases (psorosis complex, infectious variegation, concave gum, cristacortis, impietratura, exocortis and cachexia) is specified in the phytosanitary documents.

As to the enforcement of EEC Directives (Dir. 92/34 of 28 April, 1992; Dir. 93/48 of 23 June, 1993) on the sanitary conditions for the marketing of propagation material (*Conformitas Agraria Comunitatis*–CAC), the MIPA has not yet issued any decree (Table III).

Table III – List of harmful pests affecting citrus quality by EEC Dir. 93/48 of 1993 (CAC)

Genera or species	Harmful pests
Citrus	**Insects, mites and nematodes, in all the steps of their development:** - *Aleurothrixus floccosus* - *Meloidogyne spp.* - *Parabemisia myricae* - *Tylenchulus semipenetrans* **Fungi** - *Phytophthora spp.* **Viruses and virus-like pathogens** - *Viroids: exocortis, cachexia-xyloporosis* - *Diseases inducing psorosis like symptoms on the leaves: psorosis, ringspot, cristacortis, impietratura, concave gum* - *Infectious variegation* - *Citrus leaf rugose*

At the regional level, Apulia has already initiated the premultiplication phase through the Agricultural Research and Experiment Centre "Basile Caramia" of Locorotondo, in pursuance of the 1993 MD, with the use of material issued by the Spanish certification system.

Furthermore, the regional administration has officially requested the recognition of the existing certification system (facilities, propagating material, organization, etc.).

In order to favour the availability of propagating material based on the 1993 MD, it might be advisable to introduce increase blocks also in the premultiplication phase (Figure II).

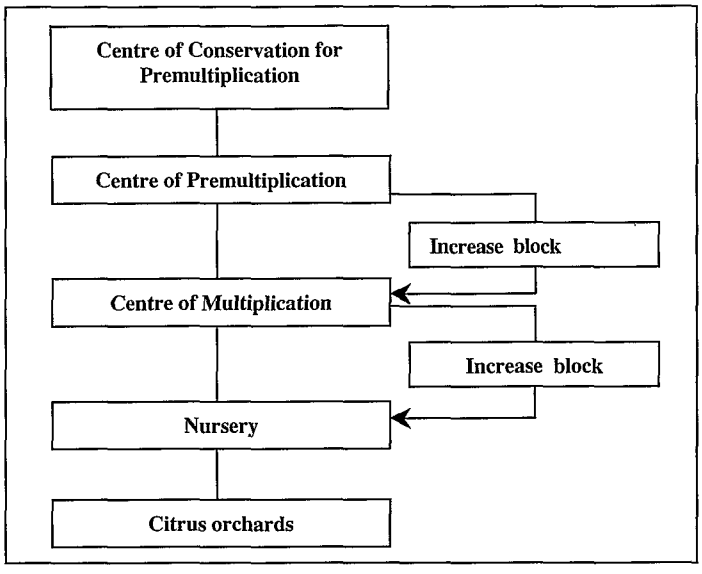

Figure II - Increase blocks in the premultiplication and multiplication phase to speed up the availability of certified citrus plants

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