

# The Citrus Certification Program of Cyprus

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**ABSTRACT.** In an effort to improve the productivity of citrus in Cyprus, virus-free citrus budwood was introduced in the 1970s and subsequent years, mainly from California. This citrus material and material produced locally by micrografting comprised the basis of a compulsory certification program. The production of certified citrus planting material is based on prebasic stock maintained in insect-proof screenhouses under the responsibility of the Agricultural Research Institute. The citrus mother plants are kept under the responsibility of the Department of Agriculture (DA) in insect-proof screenhouses. Certified citrus planting material is produced either by the DA or by private nurseries under insect-proof screen. The implementation of the legislation of the citrus certification scheme is carried out by a nine-member board under the Minister of Agriculture, consisting of technical staff of the Ministry and representatives of the private sector.

Citrus represents a major and valuable crop in Cyprus and it is one of the most important export crops of the island. About 7,000 ha are presently cultivated with citrus with an annual production of about 160,000 tons. About 70% of the total citrus fruit production is exported in the form of fresh fruit. Earnings from exports are about 11 million Cyprus pounds annually, which represents about 20% of Cyprus total agricultural exports.

Efforts to improve the productivity of citrus industry started in the 1970s when new citrus budwood of improved varieties, derived mainly from nucellar mother trees, was imported from California. From this material a mother plantation of about 3 ha was established to serve as the main budwood source for the establishment of new citrus groves.

The main species and varieties of the mother plantation at that time were the following:

**Oranges:** Washington Navel, Frost Valencia and Jaffa.

**Grapefruit:** Marsh seedless and Red blush.

**Mandarins:** Clementine, Willow leaf, Satsuma, Wilking, Lee, Ortanique, Orlando tangelo, Robinson and the local Arakapas mandarin (which was obtained locally and was not virus-tested).

**Lemons:** Eureka, Lisbon and Lapithou lemon (obtained locally and not virus-tested).

Since that time, new introductions of virus-tested citrus material derived from shoot-tip grafted varieties, have been established, and these, along with the earlier nucellar material and some clones of the local Lapithou lemon sanitized by micrografting (1), comprised the basis of the Certification Scheme of citrus budwood.

A repository of virus-tested citrus budwood was formed during the last 3-4 yr and is under the responsibility of the Agricultural Research Institute (ARI) in an insect-proof screenhouse at the research station of the Institute at Akhelia. The planting material included was tested for *Citrus tristeza virus* (CTV), *Citrus psorosis virus* (CPsV), impietratura, concave gum, *Citrus variegation virus* (CVV), *Citrus exocortis viroid* (CEVd) and related viroids, Citrus cachexia viroid (CaCVd) and stubborn. Indexing was mainly biological using plant indicators (2), and for CTV detection the ELISA technique was used in addition to biological indexing. All necessary precautions and measures are being taken for the safe maintenance of this citrus material which constitutes the pre-basic stock. The species and varieties included in the pre-basic block are shown in Table 1.

The pre-basic or foundation block provides citrus budwood to the mother blocks of the Department of

Agriculture (DA), which are also kept under insect-proof screen.

The production and marketing of citrus budwood and citrus plants was the sole responsibility of the DA in the past, because no private nurseries existed and operated in this sector. From the 1980's onwards, private nurseries have been established and taken over a great part of the production of sour orange seedlings used as rootstocks and budded citrus plants. This situation made it necessary to enforce legislative measures in order to regulate and guarantee the marketing of healthy citrus plants and budwood. Legislation enforced in 1994 provides for the production and marketing of propagative planting material, plants and plantlets not only of citrus, but also of deciduous fruit trees, olive trees, ornamentals, vegetables, strawberries etc. The legislation has been now redrafted and is in line with the relevant Directives and Decisions of the European Union. With respect to citrus the scheme for certification provides for the following:

1. The production of certified citrus planting material is based on the pre-basic stock of the ARI.
2. The production of budwood is exercised by the DA in insect-proof screenhouses. The units of the Department cover all the

needs of Cyprus citrus industry. The private nurseries use material produced in this unit.

3. Nurserymen who want to establish their own mother stock have to follow the same rules. For this purpose they have to use budwood material derived from the mother blocks of the DA and maintain the material in insect-proof screenhouses for no longer than 5 yr.
4. The mother plants of the DA are indexed yearly for CTV and are replaced after the fifth year with virus-tested material derived from the pre-basic stock of the ARI.
5. Certified planting material is produced only in insect-proof screenhouses, where all precautions are taken for its protection.
6. The implementation of the relevant legislation and the certification of citrus budwood material and citrus plants is the responsibility of a nine-member board under the Minister of Agriculture, Natural Resources and Environment. The president of the board is the Director of the DA or his representative. Five members come from the technical staff of the DA and the ARI and three members represent the private sector and the union of graduate agriculturists.

TABLE 1  
CITRUS ACCESSIONS INCLUDED IN THE PRE-BASIC CITRUS BLOCK AT THE AKHELIA  
STATION OF THE AGRICULTURAL RESEARCH INSTITUTE

Valencia oranges	Frost Valencia, Valencia Delta, Midnight, Chapman
Navel oranges	Washington navel, Navelina, Newhall, Gillette Lane late, Fisher, Cara-Cara (red flesh)
Red oranges	Sanguinelli, Ruby, Tarocco, Moro
Other oranges	Jaffa
Grapefruit, hybrids & pummelo	Marsh seedless, Star Ruby, Rio Red, Oroblanco, Melogold, Chandler
Mandarins and hybrids	Clementine, Nova, Fortuna, Robinson, Murcott Sunburst, Kinnow, Ortanique, Ellendale, Orlando, Page, Monreal, Caffin Temple, Sue-Linda Temple, Fina
Lemons	Lapithou STG 77, STG 174, STG 201, STG 212, STG 267

Authorized inspectors of the DA at the district level, who are University graduates with specialization in horticulture and/or plant protection, carry out the inspection of the nurseries.

The DA keeps a post-entry plant quarantine station at Kornos, an area free of commercial citrus groves. Citrus budwood material, which is introduced from overseas, is budded on healthy sour orange seedlings in insect-proof screen-houses at this quarantine station. All grafted plants are then indexed

on standard indicator plants for CTV, CEVd and related viroids, CPsV, impietratura, CVV, CCaVd and stubborn (2). For CTV an ELISA test is also carried out on 2-3 mo old flush growth of the budded plants.

In addition to the introductions and the sanitation of the local lemon, efforts are in progress to clean some other local cultivars with good or desirable horticultural characteristics, including the local Arakapas mandarin and the local Jaffa orange.

### LITERATURE CITED

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