An Alternative Approach on Citrus Certification in Turkey

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ABSTRACT. The production of healthy, high quality citrus trees requires, at a minimum, the establishment of a sanitation and a certification program. However, in many citrus-producing countries such programs have neither been established nor are they functional or efficiently enforced. An example of this situation is Turkey which has two excellent sanitation programs but no reliable certification program. To overcome this problem, in 1993 the Subtropical Fruits Research and Experimental Centre Adana, Turkey, established a "private" Çukurova Citrus Certification Program (ÇCCP). This program generally follows certification programs set up by other citrus-producing countries but does not have any legal authority to impose restrictions. The Centre took over mass propagation of virus-tested budwood, phytosanitary control of private nurseries and the certification of trees. Under the umbrella of the ÇCCP, four commercial nurseries are currently producing 100,000 trees a year. The capacity of these nurseries will almost double in 1996 and new nurseries will join the program.

In many countries, citrus certification is an essential step in producing high quality healthy citrus trees (5, 10, 14). In areas with endemic vector-transmitted viruses such as citrus tristeza virus (CTV), certification programs guarantee highly productive plantings by regulating the rootstock policy (10) or by pre-immunizing nurseries trees with a local protective mild CTV strain (1, 8, 13). A mandatory certification program can prevent or eliminate destructive pathogens before they enter the mainstream of budwood supply (11) or the citrus industry of a region.

Functional certification programs are often established after a destructive disease has spread rapidly (10) or if the citrus industry of a country is under the threat of being invaded by such a disease or vector species (12). In some countries, however, it may be difficult to convince the government to establish a reliable certification program although sanitation programs may already exit. Turkey, where two sanitation programs had previously been established (3, 4), may serve as an example for this situation.

The Turkish citrus industry has urgent need to establish a functional citrus budwood certification program. Citrus trees are propagated with budwood of uncertain origin in hundreds of small nurseries (7). Due to this traditional horticultural practice, virus and virus-like diseases have spread uncontrolled to all citrus-growing areas in Turkey (3). Farmers are knowingly violating plant quarantine regulations and importing budwood from tristeza-contaminated areas dramatically increasing the possibility of introducing CTV and other exotic pathogens. The rapid spread of a new whitefly-transmitted disease, citrus chlorotic dwarf (CCD), in the Çukurova region in the last few years is an example where this has happened since the present Turkish certification program has no means to prevent dissemination of infected budwood or trees (2, 6).

Present status of citrus certification. The Turkish government passed a certification law for fruit trees including citrus in 1991. This program is voluntary and consists of two different parts. The first part deals with fungal and bacterial diseases, nematodes and insect pests of citrus; the second part handles some selected citrus virus and virus-like diseases. Only State agencies or universities are allowed to propagate nursery trees certified as virus-tested. Navarro (9) pointed out that

citrus propagation in certification programs should be based on protected foundation blocks, foundation blocks in the field, budwood increase blocks and blocks of nursery trees. The Turkish certification program does not regulate or even mention these basic steps. Thus, the horticultural and sanitary status of budwood sources is not controlled; only citrus nurseries are inspected to detect virus diseases just before trees are to be certified. The advantage and outcome of such a certification program for the Turkish citrus industry remains questionable.

Since this legalized program does not satisfy the requirements of reliable citrus certification, the Subtropical Fruits Research and Experimental Centre in Adana established the "private" Çukurova Citrus Certification Program (ÇCCP). The ÇCCP generally follows programs set up by other citrus production countries, however, without any legal authority to impose restriction or to inspect nurseries at any stage of propagation and production.

Foundation blocks. The mother trees used in the ÇCCP are virus-tested plants recovered through thermotherapy and shoot-tip grafting. They originated from outstanding varieties selected in Turkey and from germplasm introduced from abroad. These mother plants are grafted on trifoliate orange rootstocks, maintained in an insect-proof screenhouse in 50-l containers, and are regularly indexed for virus and virus-like diseases. This protected foundation block is now the main source of budwood for the country.

In addition, a 5-ha foundation block was established at the Centre in 1991-92. This block consists of trees propagated with budwood from the protected foundation block. We maintain three to six trees per accession. No budwood has been collected from this block up to now, since the trees have not produced enough normal crops to evaluate their horticultural status and to confirm their trueness-to-type. In the summer and autumn of 1995, trees in the foundation block were re-indexed for vector and mechanically transmitted diseases for the first time.

Budwood increase blocks. Two budwood increase blocks are maintained in insect-proof, temperature controlled greenhouses at the Centre. The increase blocks are established with budwood from trees maintained in the protection foundation block and buds are scheduled for collection for only a 2-yr period. During this period, the plants are cut back not more than three times and between 150 to 200 buds are harvested per tree. At present, we produce about 350,000 buds annually requiring not more than 500 m^2 of greenhouse space. The increase blocks are periodically inspected and any trees which show abnormal growth are removed but are not further indexed for virus or virus-like pathogens.

Certified nursery trees. Certified nursery trees are currently produced at the Centre and at three private nurseries. Nurseries who want to participate in this program have to follow strict rules set up by the Centre and to establish a minimum of facilities: insect-proof greenhouses, double door entrance, copper-treated footpaths, and a sterilized soil-less potting mixture. Nursery trees are propagated with virus-tested, certified budwood. During propagation, unacceptable or off-type plants must be removed and adequate insect and pathogen control is essential.

Each year a production plan is prepared to arrange for the number of nursery plants and varieties to be produced during the next season. The Centre provides budwood and all information and technical support on nursery tree production. The nurseries are inspected biweekly to monitor the sanitary and horticul-

tural status of trees including the potting mixture and the maintenance of the greenhouses. If the trees are produced according to the certification regulations, they are certified as pathogen-free, high quality plants by the Centre. If any producer does not follow the rules, trees will not be certified and no budwood will be provided in the following years as long as unacceptable practices are not remedied.

DISCUSSION

The ÇCCP is a very successful program and highly accepted by citrus growers in the Çukurova region. The number of nursery trees produced under this umbrella cannot satisfy the demand for virus-tested plants. This program only provided 100,000 plants in 1995 and about 210,000 in 1996. The citrus industry in the Çukurova region, however, requires more than one million trees per year to maintain the production at the present level. Fortunately, many growers are willing to wait for nursery trees for up to two years. The three private nurseries participating in the ÇCCP are presently enlarging their production capacity so that the number of trees produced will almost be doubled in 1997. Still, cooperation with new nurseries is highly desirable and we will continue to encourage participation of new nurseries with the program.

We are aware that the ÇCCP will only be profitable as long as no exotic citrus diseases are introduced into Turkey which have the capability to destroy the citrus industry within a few years. On the other hand, the success of this program clearly shows that a "private" certification program may be an acceptable alternative for those countries where no legislative measures are planned or present certification programs are not satisfactory.

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