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SUMMARY - Loquat culture in Israel occupies 300 ha in organized highly productive plantations. Almost all the cultivated varieties are local selections. Fig tree is well known but its culture was limited last years. Persimmon culture had a large development from the 70's to 1982. The major variety is 'Triumph'. Post-harvest technology is well developed.

Key words: Israel, loquat, fig, persimmon, varieties, post-harvest.

RESUME *- La culture du néflier du Japon en Israël occupe 300 ha en plantations régulières très productives. La plupart des variétés cultivées sont des sélections locales. Le figuier a été, traditionnellement, bien connu. Sa culture reste, plutôt, extensive et son développement a été limité ces dernières années. La culture du kaki a connu un grand développement depuis les années 70 jusqu'en 1982. La variété la plus utilisée est 'Triumph'. La technologie post-récolte est bien maîtrisée.*

Mots-clés *: Israël, néflier du Japon, figuier, kaki, variétés, post-récolte.*

Persimmon

Very few persimmon orchards existed in Israel before the late seventies. A great push to the industry was given by Gazit who, together with his students, developed an industrial method to remove the astringency of persimmons by a carbon dioxide treatment instead the previous inefficient lime water treatment. Subsequently, the development of the industry was further enhanced by the possibility of prolonging the marketing season by the use of cold storage, and by educating the public to consume the fruit. Within a few years, the persimmon became an appreciated fruit in the local market, and exports to several countries have been developed, with sales of about 4000 tonnes annualy.

There was rapid growth in planting of persimmon to a peak planted area of about 1500 ha in 1982, when problems arose in the local markets. Then, cultivation of some orchards, mainly the bad ones, was abandoned, so that today there are about 1200 ha cultivated in Israel. During the last 3 years, plantings have continued at a growth rate of 10% per year, mainly due to the absence of attractive alternatives in horticulture.

Cultivars

The main cultivar in Israel is 'Triumph', which is sold under the trade name 'Sharon Fruit', which occupies about 90% of the persimmon area. Its main disadvantage is its astringency which must be removed by means of an artificial treatment (CO_2), which shortens the shelf life of the fruit. Another limitation of 'Triumph' is its sensitivity to hot weather during fruit-set period. This causes severe fruit abscission, so that in some years almost all the yield may be lost.

About 9% of the persimmon area is planted with 'Oku gosho'. This cultivar was mistakenly called 'Fuyu' or 'Cal Fuyu'. However, since it has male flowers, it is not 'Fuyu', which has only female flowers. It is not astringent (PCNA) and it matures earlier and is vegetatively weaker than 'Triumph'. The rest of the area is planted with few minor cultivars; 'Jiro', 'Izu', 'Soruga', and 'Hachiya'.

In a collection, we have some new cultivars, including 'Ichikeiki Jiro', 'Meakewa Jiro', 'Fuya', 'Late Fuyu Mutant' and 'Matsumoto Wase Fuyu'.

Rootstocks

Almost all the persimmon trees in Israel are grafted on seedlings of *Diospyrus virginiana*. This rootstock is adaptable to a wide range of soils, from light soils to non-aerated soils. As an abnormal development appeared on some of those rootstocks, a selection of a good source of seeds was made.

Only very few trees are grafted on *D. kaki* seedlings. Their fruit seems to mature a few days earlier than that of trees grafted on *D. virginiana*, but some trees suffer from leaf burn.

D. lotus was tried many years ago, but did not succeed, probably because it was grafted with a non-compatible cultivar.

Orchard layout

Orchards are raised either as round trees planted 6x6 m apart and then pruned to maintain the separation, or as a hedge, with 6 m between the rows and 3 or 4 m between the trees in the row. Another system is to create a hedge by bending branches when the trees are trained; the upper parts of branches are not pruned and therefore earlier yields are obtained than with pruning, in which branches are cut back.

Pruning

Each cultivar needs different pruning according to its productivity and to its vegetative strength. 'Triumph' for example, which is very strong, needs only light pruning whereas the 'Oku Gosho', which is vegetatively weak and very productive, needs very severe pruning.

As a general rule, cutting back promotes strong vegetative growth, while bending branches decreases vegetative growth and promotes fruit production.

Irrigation and Fertilization

All persimmon orchards in Israel are irrigated. The annual water consumption is around 7500 m^3/ha, in addition to 500 mm of rain. When water application is reduced, fruit size tends to decrease.

Fertilizers are applied with the water. The main nutrient given is nitrogen ca. 200 Kg N per ha, and some potassium, at about 125 Kg K_2O per ha. No serious fertilization experiments have been carried out in Israel.

Harvesting and post harvest

The fruit of most cultivars is very sensitive to pressure, therefore great care should be taken during harvesting. Pressure marks appear on the fruit subsequently, especially if it is stored. Care should be taken also during transportation to the packing house and afterwards.

The fruit of 'Triumph' can be stored for about 3 months in cold storage at -1°C. Other cultivars differ in their storability; some can be stored for only about 1 month, after which their pulp turns grey. Immediately after being stored for a long time, the fruit looks attractive but its shelf life is very short.

Pests, diseases and disorders

The main pest of persimmon in Israel is the Mediterranean fruit fly. It is treated all over the country either by the Fruit Board of Israel or by the farmers. Some other pests, such as the mealy bugs present minor problems and they are treated only when they appear.

A major disorder in 'Triumph' fruit is the incidence of small cracks and blackening of the rind around and below the calyx. There is controversy among the researchers as to its cause; some claim that it is *Alternaria alternata*, while others claim that it is a physiological disorder resulting from exposure of the fruit to high humidity. There is a correlation between wet weather during harvest time and the severity of the symptoms. Similar phenomena also appear during storage and reduces the storage life and the amount of marketable fruits remaining after storage.

Loquat

There are in Israel about 300 ha of commercial loquat orchards. In addition, many trees are grown in home gardens all over the country.

Commercial orchards are located mainly along the Mediterranean coast, from Haifa to the southern border. There is a concentration of orchards around Zichron Ya'acov, where about 30% of the Israeli loquat is cultivated. There are also some orchards near the Sea of Galilee, where early fruit is produced, thanks to higher temperatures which accelerate ripening.

Most of the loquat crops are consumed in Israel itself. Some export shipments have been sent to Europe in the course of the years but owing to competition, mainly from Spanish fruit, they were economically unsuccessful.

Cultivars

The most popular cultivars are the Israeli selections: 'Akko 1' and 'Akko 13'. Some other selections are grown on a small scale, such as 'Zikkim' and 'Yehuda'. Imported cultivars such as 'Tanaka', 'Golden Nugget' and others are also among the commercial varieties. In collection we have cultivars which are not grown commercially including 'Nagasaki Wase', 'Mogy' and 'Pheluchi'. In one of the collections there are "old" cultivars such as 'San Michael', 'Heards Mammoth' and others which have disappeared from the commercial orchards in the course of time.

Rootstocks

The only rootstock used today is the loquat seedling. As no significant differences among individual trees grafted on that rootstock have been observed, no selection of particular trees for vegetative propagation has been made.

Many years ago, some loquat trees were grafted on quince. These plants suffered from zinc deficiency and some trees were mechanically broken at the graft union. This rootstock is no longer in use.

Tree shape and pruning

Since the cultivation of loquat involves a lot of hand labour, which is expensive in Israel, the trees have to be low in order to enable thinning and harvesting to be carried out from the ground. While in the past planting distances were 6x6 m, today the tendency is to plant 6x4 or 5x3 and to keep the trees low by annual pruning.

Pruning is done right after harvest. It has been found that a branch has to have seven leaves in July in order to flower in the autumn of the same year. Late pruning will promote vegetative growth, without flowering in the same year. Pruning during the hot summer results in severe shock to the trees.

Netting

As severe damage to the fruit is caused by bats and birds, many orchards are covered by shade nets (around 20% shade). The shade which diminishes red

blemishes to some extent causes damage to the fruit rind and delays maturity by about 10 days.

Productivity

The loquat in Israel is very productive. Yields of 40 tonnes per ha can be obtained regularly. However, such crops have low commercial value, as the fruit is too small. Thinning is carried out in order to reduce yield and to increase fruit size. A yield of about 25 tonnes per ha of large fruits is desired.

Harvest

The fruit is very sensitive to touch and therefore is generally harvested directly into 1 or 2 Kg plastic containers, without any further sorting.

Products

Loquat in Israel is consumed only as fresh frui; no products have been prepared from it.

Problems

The most important problems are various injuries to the fruit rind which downgrade fruit quality. Reduction of labour investment, mainly in thinning and in harvest are also of considerable importance to the industry.

Fig

The fig has been cultivated in Israel for thousands of years. It is one of the seven species mentioned in the Bible. Sitting in the shade of a fig tree is one of the symbols of a peaceful period. In ancient times, the dried fruit was served as "canned" fruit for the winter time. Already in ancient times treatments such as enhancement of ripening were used by farmers.

Distribution

Figs grow all over Israel as non-irrigated trees or extensive orchards, except where there is not enough rainfall. Until the 50's there were around 1000 ha of fig orchards, most of which were destroyed by the Batocera, which was introduced to Israel with imported wood from tropical Africa.

Limitation

Figs for the fresh fruit market need daily harvest and it is, therefore, a very labour intensive crop. As labour in Israel is expensive and sometimes not available, the fig is grown only where such labour is available.

Cultivar

There are around the country about 100 types, some of which are quite close to each other. The 'Nazareth' type is very common.

Barba figs

Recently a small industry of very early barba figs was established. The maturation of these figs is concentrated in about three weeks in any particular orchard, and therefore their cultivation is more efficient than that of other types. The early fruit, although not very tasty, commands high prices. We have about 10 ha of barba figs in Israel, some of which are grown under nets to protect them from the fig fly. Except for barba figs there is no research on figs in Israel; It is cheaper to import processed fruit than to prepare the products locally.

Pomegranate

The pomegranate has been grown in Israel for thousands of years. Like the fig it is one of the seven species mentioned in the Bible, which represents the ancient Israeli agriculture. It appears on coins and in the decoration of ancient buildings.

The pomegranate is cultivated in mixed orchards, generally where there is a supply of water.

In modern agriculture, there are today about 250 ha. Soon after the establishment of Israel, in the 50's, the area was much larger. The fruit was planted because it can be grown in a wide variety of soils, even less aerated ones, and it is relatively easy to raise. However, owing to a limited market in Israel and abroad, the area was reduced, and probably will not be increased in the future unless there should be an increased demand.

Local consumption

Most pomegranates in Israel are consumed from August, when the early cultivars such as 'Ras El Bared' ripen, to late September and October, when the main cultivar 'Wonderful' is harvested. There is some storage of pomegranate until Christmas, when it is exported for the holiday. This export to Europe amounts to a few hundred tonnes annually. The fruit is probably used for decoration and only very few for consumption.

There is no signs of greater demand. In Israel, also, it is used for decoration during the harvest holiday which takes place in September or October, but people buy it for eating as fresh fruit too.

Cultivar Collection

There is a collection of the local types in the Newe Ya'ar experimental station of the Agricultural Research Organization.

Cultivation

Propagation is done by cuttings, planting distances are 5-6 m between the rows and 3-5 m in the row. The plants are raised as low bushes with few stems, and kept low in order to provide ease of harvesting and to facilitate efficient spraying against pests.

The pomegranate is ferti-irrigated with about 5000 m^3 of water per ha annually. Increased irrigation would be advantageous.

Research

There has been some research on post-harvest problems such as blackening of the rind, optimization of storage conditions, etc. It was found that more fruit is damaged during storage if immature fruit is stored. An attempt has been made to develop a machine which separates the edible part of the fruit from the rest.

Prickly pear

Prickly pear is widespread in Israel, mainly as a fence plant in Arab villages where it separates fields. As such it is an extensive non-irrigated crop. The fruit which begins to mature in early July is consumed locally and until recently, only very small amounts of fruit reached organized markets.

The main extensively grown cultivar is a thorny, orange cultivar. The propagation of the prickly pear is vegetative and most of the plants are similar. However, other types occur among the plants which show different types of "leaves" and fruits. Growers have selected some with a different appearance, mainly for home gardens, with some for large-scale cultivation. One of the selections is almost thornless; it has been named 'Offer' and forms the basis for modern cultivation of the prickly pear. Orchards of this cultivar are planted in rows 4x5 m apart and irrigation and fertilizers are applied. The fruit is brushed in packing houses and is sold in fruit shops like any other fruit.

Recently, cultivars from around the world were introduced to Israel by researchers in Ben-Gurion University, who are doing most of the research on cacti in Israel. They deal with several types of cacti as well as the prickly pear, such as pitaya, and have carried out very good work on the physiology of these crops.

In the last few years no more plantings of prickly pear have been carried out owing to saturation of the local market.