

# LITCHI PRODUCTION IN ISRAEL

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## ABSTRACT

A review is given of the author's visit to the Israeli litchi industry. Planting densities, pruning, fertilization, propagation, postharvest treatments and marketing aspects are discussed. Figures are given for exports between 1986 and 1991.

## OPSOMMING

'n Oorsig van die skrywer se besoek aan die Israelse lietsjie-industrie word gegee. Plantdigthede, snoeipraktyke, bemesting, voortplanting, na-oesbehandelings en bemarkingsaspekte word bespreek. Statistiek van uitvoere tussen 1986 en 1991 word gegee.

## INTRODUCTION

This report follows a study visit to Israel during April to July 1993. During this visit period the author studied litchi cultivation in Israel by reading reports and visiting areas of production. These are only personal impressions and are not intended as proposals for litchi cultivation in South Africa.

The litchi (*Litchi chinensis* Sonn), which originated in southern China, was introduced into Israel by Prof C Oppenheimer in 1934. Three varieties were originally introduced: Mauritius from South Africa; Bengal from India and Floridian from California. However, commercial litchi growing only started from 1970 to 1980. Several plots were planted in the western Galilee and along the coastal plain (Fig 1). Lately many growers have become interested in this fruit crop and litchi plots

are being planted in most regions of Israel, except in the Negev and Arava regions where there is limited experience with litchi growing (Kadman & Slor, 1982; Oppenheimer, 1947 and Pivovaro, 1974).

## PRUNING

Recent work in Israel indicates that prun-



Fig 2 Small trees are obtained by pruning without reducing the amount of flowering (Photo M Goren).

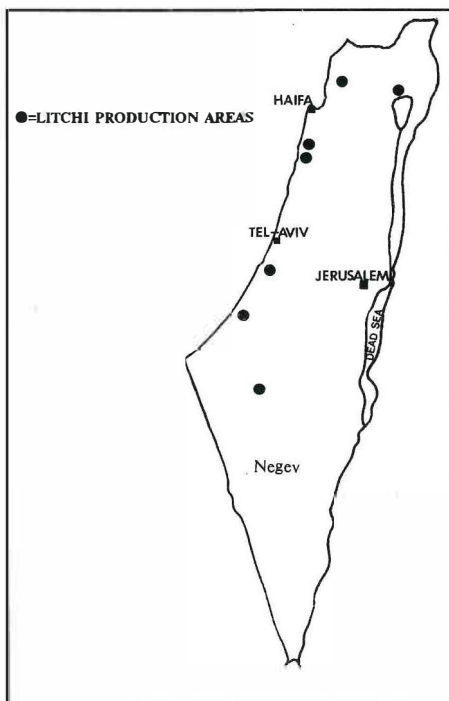


Fig 1 Litchi growing areas in Israel.

At the end of 1990 the area planted to litchi orchards reached between 130 and 140 hectares, but according to Goren (personal communication) the total area of litchi growing has increased up to 200 ha, mainly because of the recent success in exporting.

The main commercial cultivars are Mauritius (early cultivar) and Floridian (late cultivar), but five other cultivars are also commercially grown on a smaller scale. These are Kaimana, Late Seedless, Garnet, Early Large Red and No May Chee. Currently more promising cultivars are being examined at the Volcani Institute, Bet Dagan.

## PLANTING

It is generally accepted that a 25-year-old litchi tree, in any production area, may attain a diameter of 12 m and will therefore require adequate aeration and light



Fig 3 Hedge pruning Mauritius tree after harvest with heavy machinery (Photo M Goren).

ing at a specific time of the year can restrict tree size without inducing excessive vegetative growth. Flowering could also be induced in vegetative trees by pruning unwanted flushes in winter. Trees are pruned annually just after harvest for Mauritius and Floridian (harvesting is from the end of July until the beginning of August).

Small trees are obtained by this pruning, without reducing the amount of flowering (Fig 2). Applying this system would enable farmers to grow new orchards at a very high density (500-600 trees/ha). The pruning is done by heavy machinery (Fig 3) and the recommended method is to do topping at a height of 2,5 m and hedge pruning to leave a space of 2 m between rows.

experimented with autumnal water stress and in all cases the treated trees gave significantly higher yields. In 1991, the Experimental Service of the Israeli Department of Agriculture recommended the routine application of autumnal water stress for litchi orchards (Homsy & Karniel, 1991).

Overhead sprinklers are commercially used for the protection of litchi trees against frost damage in winter. The sprinklers are placed in such a way as to give the plants adequate coverage. The success of this method is based on two well-known phenomena: (1) when water freezes, heat energy is released and (2) a mixture of ice and water exposed to temperatures below freezing point, remains at 32°F until all the water is frozen. The

opened root system. It is recommended that the fertilization used for young trees should be only half the normally recommended concentrations. The concentrations of NPK used for the young trees are N:20-30 ppm; P:3-5 ppm and K:15-20 ppm. In heavy soils the young trees are not fertilized with either phosphorus or potassium in the first year after planting. Experience with mature litchi orchards is still meagre, but according to leaf analysis it is recommended to fertilize between 120-150 kg/ha nitrogen every year. The amount of potassium used in orchards with heavy yields, is 80-100 kg/ha and the amount of phosphorus is 1/6 or 1/7 of the amount of nitrogen. As a general recommendation the fertilizers N, P and K could be supplied in the ratio 12:2:8. Fertilizers are given through the irrigation

## IRRIGATION

Two irrigation systems are used in Israel, depending on the type of soil and age of the trees. Drip irrigation is used for heavy soils and micro jet irrigation for sandy soils. Time of irrigation is determined by making use of a Class A evaporation pans or tensiometers installed 30 cm from the drippers or sprinklers at depths, of 30, 60 and 90 cm.

Although regular irrigation and fertilization results in highly satisfactory vegetative growth, farmers still experience low annual yields of 3-4 tons per hectare. However, Stern *et al* (1993) found that six weeks of autumnal water stress, terminated by winter rains, significantly increased flowering and yield in litchis in Israel. In the autumns of 1989 and 1990, a large number of litchi growers in Israel

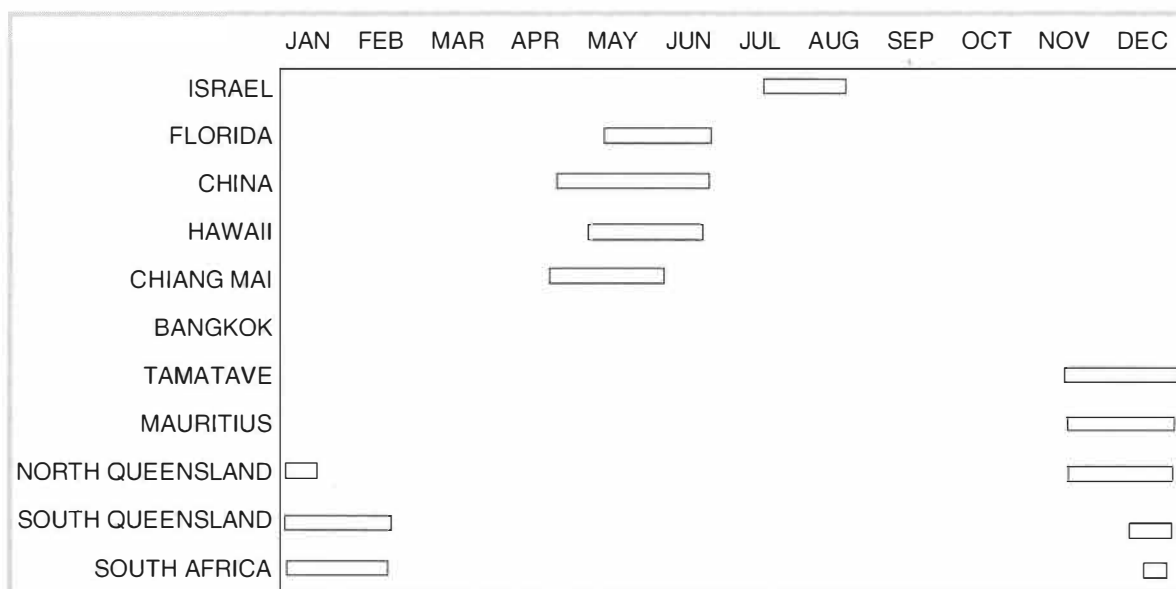


Fig 4 World production seasons of litchi (figure obtained from The Fruit Board of Israel).

heat of fusion provides the necessary heat to prevent the temperature from dropping below freezing point.

## FERTILIZATION

Fertilization is done through the irrigation systems as in other crops. Young trees are fertilized throughout the year except after the first month of planting, when the trees have not yet grown a well devel-

systems according to the season and are calculated according to the amount of nitrogen required. Fertilization is stopped at the onset of the water stress period.

## PROPAGATION

Air-layering continues to be the most widely used commercial method of propagating litchis in Israel. Another successful method is cuttings from the new season's growth. Cuttings with a diameter of 4-7 mm and 25 cm long are cut from the new season's growth. After thinning out of some leaves, the cuttings are treated with talc + rooting hormone + 1% Benlate and are then placed in 750 ml pots in 50% peat moss + 50% polystyrene (or perlite). Cuttings are heated to 30°C and mist-sprayed to keep a high relative humidity. Roots develop after one month, and then the plants are hardened off for two months. Trees can be transplanted in Spring (April) if the propagation was started during the previous autumn (November).

TABLE 1 Israeli exports to the EEC from 1986 to 1991 (tons)

	1986	1987	1988	1989	1990	1991
Exported	58.7	70.0	44.4	106.5	85.9	188.0
Local	2.0	-	-	-	0.1	-
Waste	4.0	1.8	1.7	4.3	2.0	4.5
US \$/ton	4300	5468	5737	4454	7373	4344

Source: The Fruit Board of Israel

## HERBICIDES

Because young litchi trees are sensitive to herbicides, it is recommended that herbicides be used only between the rows and the weeds close to trees be mowed. From the third year after planting, different herbicides are used but preparations containing 2,4-D are never used.

## PESTS AND DISEASES

The only serious problem experienced by litchi growers in Israel is the occurrence of the Mediterranean fruit fly (*Ceratitis capitata*) and fruit bats. Crows also cause some damage to fruits. Another problem which is a well known phenomenon of Mauritius, is the occurrence of brown spots on the fruit. This problem is evident in the hot areas near the sea of Galilee. The reason for these spots is still unknown.

## PRODUCTION, MARKETING AND EXPORT

In 1981 the total commercial litchi produc-

tion in Israel was 15 tons. It increased rapidly and in 1986 the total export was 58.7 tons. The export trends from 1986 to 1991 are given in Table 1. A possible reason for the small amount of fruit sold on local markets is the fact that the Israeli season does not coincide with any other country in the northern hemisphere (Fig 4) and local prices do not compare favourably with prices obtained on European markets (Table 1). Virtually the whole crop is exported to the EEC, primarily to England.

## POSTHARVEST TREATMENTS

More than 90% of the litchi crop is exported to Europe and therefore post-harvest treatments are very important to ensure good market prices. The litchis are treated with SO<sub>2</sub> for 20 minutes and after a few hours with HCl. Although a highly satisfactory colour of the fruit is attained, problems arose with the HCl treatments because of an aftertaste. Experiments are still being done on the use of HCl in the postharvest treatments.

## RESEARCH

Although the litchi industry is still small compared to other countries, it is growing very rapidly. Research priorities are the selection and breeding of new early and late cultivars and the control of postharvest diseases. Studies are also done on the reproductive biology of the litchis.

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