

MORE ON AVOCADOS IN ISRAEL

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As a graduate of subtropical horticulture from University of California at Los Angeles, and as an individual who has been making a living growing avocado nursery stock and fruit, I consider it a pleasure to tell the avocado growers of California about the young but fast growing avocado industry in Israel.

Before going further I should mention that when we first tried our luck with the avocado 30 years ago we had the footsteps of a then already-thriving California avocado industry to walk in. We have received immeasurable assistance from the California avocado industry since that time.

The avocado in Israel is a crop which has risen from virtual obscurity 25 years ago to a crop that today covers nearly 2,500 acres. And this is in a country the size of Riverside County, the bulk of which is non-arable, and which faces an ever-increasing shortage of irrigation water.

Twenty years ago there was a total estimate of about 4,000 avocado trees in this country, mostly seedlings. The bulk of the population at that time had never seen an avocado.

Ten years later, when the commercial planting got under way, the land planted to avocados was about 400 acres. About that time the real boom of planting commenced, and acreage has multiplied six-fold since then.

Today avocados have become part of the diet of an ever increasing part of the population and the fruit is advertised on the radio and in the press.

Some of the orchards are planted by private individuals but most of the acreage is owned by cooperative settlements (Kibbutzim) which have gotten the idea to join in on this brand new and promising crop. Many of these Kibbutzim already have planted 50 acres each. Their orchards are handled by highly qualified farmers, many of whom, although relatively new at it, have mastered the management of their orchards with remarkable skill.

What has brought about this planting?

1. The few scattered orchards which existed before this time showed promise.
2. Many farmers in the citrus belt looked for a tree crop to diversify their citrus farm.
3. The avocado is a crop which so far in this country does not require any control measures against diseases or pests.
4. The modest but ever-increasing shipments of fruit to Western Europe promised

that the avocado might become a fruit which for a change, would not glut the market, but continue to render reasonable returns to the grower.

5. The government which encourages any production for export, assists the grower by various means, such as short term advancements at low interest for the fruit before harvest, and contributions for advertisement of the avocado abroad.
6. Last, but not least, is the horticultural enthusiasm which drives many farmers in this country to try their luck with this new and promising crop.

Until about five years ago the government encouraged the planting of new avocado orchards with long term loans carrying low interest. In the meanwhile the planting of avocado orchards boomed, and today the government tries to stem the tide by setting up restrictions. The planting of a new avocado orchard (with most other orchard species) these days requires a license. Such a license is issued only after the applicant submits proof that his land is suitable for avocados, and that he has a lasting supply of suitable irrigation water. On top of all that the applicant may not be granted the planting permit because an annual quota has been set up for new avocado acreage. Last year's quota amounted to less than 200 acres for the whole country. The quota has been set up in order to avoid over-planting for an as yet undeveloped market.



Avocado orchard at Kibbutz Yakum, located at Central Coastal section, one mile from the Mediterranean Sea. Trees are 2½ years from planting. At far left are cypress trees which will serve as permanent windbreak; at far left, elephant grass serving as a temporary windbreak.



Tying budlings in field-grown avocado nursery.

The Fruit Production and Marketing Board was set up a few years ago when it became evident that a severe crisis, due to overproduction, was facing an ever-increasing number of fruits. This board carries legislative power over the planting of new orchards of most species, and the marketing of their fruit. Most of the avocado crop is packed and sold for the local and export markets by this board.

Returns to the grower so far have been quite good. Prices to the grower averaged about 15-20 cents per pound for fruit of good varieties. Prices generally increase towards the end of the season.

Natural limitations to the spread of the avocado exist mainly because of the ever more limited amounts of suitable irrigation water. Unfortunately, the water of the giant Jordan River Project, diverting water from the north to the parched desert areas in the south, is considered unsuitable for avocado irrigation because of its high chlorine content.

Seedlings of the West Indian race have been outstanding in their resistance to salinity. Relative resistance has also been found in a few individuals of the other two races.

Another reason that has brought about the slowing down of new avocado planting is the difficulties anticipated in the marketing of the large quantities of fruit expected a few years hence. During the past 10 years Israel's avocados have been sent to Western Europe at an increasing rate, from a modest 10 tons in 1955-1956 to over 500 tons in 1964. However, the difficulties encountered in transportation and the limits of the new and undeveloped market have called for caution in the expansion of the existing acreage.

NURSERY PRACTICES

Growing grafted avocado stock was once considered an art confined to only a very few individuals. This situation has changed altogether and today the grower can select good trees from among a great number of avocado nurseries.

About 10 years ago the first attempts were made to grow tip and side grafted avocados

in containers. The success of this method brought about the complete takeover of container-grown nursery stock which today is produced on a large scale and mostly under partial shade. The production of field grown plants is still continued on a small scale.

Newly planted trees have been previously protected individually from three sides with burlap which was pulled around three stakes, in the center of which the newly planted tree grew. This expensive and laborious method has been generally abandoned after it was proved by some grower who neglected to erect it, that avocado trees, provided they are white-washed, do better without such construction.

ROOTSTOCKS

In the early days anything that grew an avocado seedling was used for rootstock purposes. The bulk of the trees, however, were grown on Mexican stock, mostly for reasons of convenience and economy.



Setting semi-sprinkler at new location.



In the past avocados were planted with individual protection.

In one experimental orchard on sandy loam, planted in 1949, trees on Guatemalan rootstock (variety, Nabal) grew more vigorously than those on Mexican stock and produced slightly larger yields. They also showed less tip burn. However, Guatemalan stock on cancerous and heavy soils in general proved to be disastrous because of their strong tendency to chlorosis caused by iron deficiency.

Today Mexican rootstocks are used generally. West Indian stock is used on a limited scale where salinity is a problem.

SOILS

Avocados have been planted on a wide range of soils, from coarse sand to heavy clay. The two extremes have proved not to provide the best of growing conditions. On the very sandy soils the trees are stunted and production is poor. On the very heavy, poorly

drained soils trees are dying back, especially in the winter, and chlorosis is a problem. The best orchards are located on soils of medium texture, and most orchards are now planted on such soils.

INTERPLANTING WITH BANANAS

A trial interplanting of avocado trees with bananas, brought about the gradual adoption of this method. Thus, in recent years, a large proportion of the total new acreage has been interplanted with bananas. The bananas afford shelter and protection from strong winds. The young avocado trees enjoy optimal growing conditions among the bananas which as a rule are heavily irrigated, manured, fertilized and kept meticulously free of all weed growth. Under such conditions the avocado trees usually grow at an unbelievable rate and, after three years when the bananas must be removed, the trees have attained the size of a five-year-old tree under normal growing conditions.

This method is not all roses, however. The trees which have been grown to this large size under protected conditions (or glass house conditions, as some say) afford no good resistance to strong winds, and when the first storm comes along such trees fall easily and extra effort must be applied to support them.

IRRIGATION

Sprinkler irrigation has been practically the only method of irrigation used in avocado orchards in Israel. Portable aluminum pipe has been used mostly, a permanent overhead system with galvanized pipe dominating in those orchards which were interplanted with bananas.

Recently the trend in irrigation has been toward installation of permanent and semi-permanent underhead sprinkler systems. Flexible plastic pipe is largely used. All equipment including the various fittings and sprinklers is locally manufactured. Such methods are saving a great amount of labor and make very frequent application of water practicable. Irrigation intervals as close as every five days are now practiced. Such frequencies are essential where soils are sandy or especially porous. Such frequent intervals, however, would not have been considered practical 10 years ago. It goes without saying that better irrigation practices will greatly improve yields.

DISEASES

It seems that propagation material of the avocado has been introduced into this country indiscriminately in the early years, as sun-blotch is widespread.

A few years back, when orchard planting was at a peak, occurrence of sunblotch among newly planted trees became alarming. Consequently a campaign among nurseries to eliminate infected propagation material was introduced, and some indexing for sunblotch has been done.

This has been followed by a program to provide nurserymen and growers with certified mother trees for both seed and scion material.

There have been cases of tree die-back, and roots of such trees have been repeatedly checked for *Phytophthora cinnamomi*. So far this fungus has not been found in this country to the best of my knowledge.

VARIETIES

The picking season starts in October with the Ettinger. This variety originated locally as a seedling. It produces large, shiny, pear-shaped fruits of good quality. It must be picked during a short period of 8-10 weeks or it becomes over-mature. The tree has a strong upright tendency and must be specially trained in order to remain within reach.

In December the harvest of the Fuerte commences. This variety is the most important one in Israel, and commands the highest prices, both inland and abroad. Its harvest period lasts until March.

The Hass was introduced into this country in the late Forties. Since its first commercial plantings 10 years ago it has been widely planted. It is doing poorly on light, sandy soil and seems to be more affected by salinity than other varieties.

It matures here during the spring months but is often picked earlier. As a matter of fact, it has been observed for a number of years that this remarkable variety acquires eating quality as early as October. The only trouble with it seems to be a lack of eye appeal.

The Nabal is an old-timer. It is a heavy producer of good quality fruit. Its picking season is during the spring, unless the fruit is knocked down earlier by heavy storms which are not uncommon during the winter.

Many other varieties from California and Florida are being grown experimentally. One of them, the Wurtz, is planted lately on a semi-commercial scale. It appeals to the grower with its dwarf, willow-like tree size and good looking, Fuerte-like fruit.

YIELDS

A good avocado orchard in this country is expected to yield about five metric tons per acre. Although this figure is superseded in some years by some outstanding orchards, the average yield of bearing orchards is much lower, owing to a wide number of reasons, such as unsuitable soil or topography, wrong varieties, neglect, sunblotch, chlorosis, and salinity of the irrigation water. I may add at this point my opinion that the phenomenal expansion of the avocado acreage in this country has been achieved at too fast a rate. Although research into various problems is being carried out, mainly by the Department of Subtropical Horticulture which is staffed by very qualified personnel, it seems that research cannot and does not keep pace with the extremely rapid expansion. Many problems remain to be solved.