

Avocado in Israel -1998

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INTRODUCTION

Avocado, as a commercial growth, has been in Israel since the beginning of the 60's. It reached its largest range during 1986-87, eg. 11,000 hectare. Later there was a decline in the range of areas due to low and unstable yields (6-7t/ha). In the last ten years, agrotechnical changes were introduced which improved the vegetative growth of the orchards, and at the same time brought a rise in yields and stability of bearing. These changes will shortly be discussed in this review.

Today, the size of the industry is approximately 7,000 hectares and the annual production during the last 3 years is around 75,000 tonnes of which 60-70% are exported. The industry bases itself on three main varieties: Hass (30%), Ettinger (27%) and Fuerte (24%). Other varieties are Reed, Nabal, Pinkerton and Ardith (0028). The tendency is to go on keeping a wide range of varieties in order to lengthen the marketing season and to supply the demands of the various European markets.

MAIN CHANGES OCCURRING IN THE AVOCADO INDUSTRY IN RECENT YEARS

Changes are in three main areas:

- irrigation
- use of plant growth regulators (p.g.r.)
- pruning and shaping the orchard

• Irrigation

The main concept is to avoid stress all year round and through all the stages of growth.

The aim is to reach the flowering and fruit-setting period (in Israel March-May) with a tree being covered with foliage and looking "healthy". To achieve this, an optimal irrigation management must be maintained during the summer months (April-October). The average water doses has risen in recent years by 20-30%. However, despite the high cost of water in Israel, it is clear to the avocado growers that this production factor cannot be cut.

Another change that took place in order to prevent water stress is irrigation intervals. The general tendency is short intervals. The recommendation is daily irrigation and in specific cases even a few times per day.

• Plant Growth Regulators (p.g.r.)

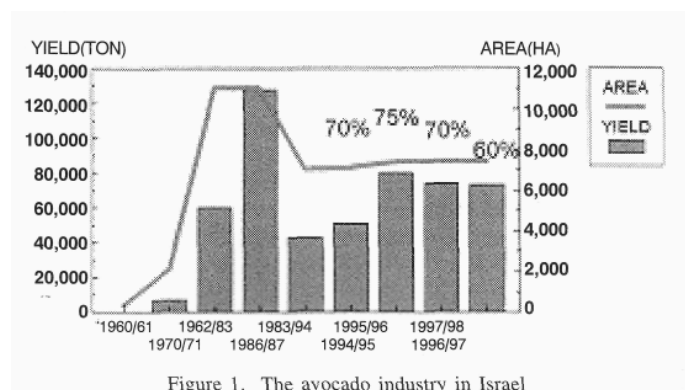
The introduction of plant growth regulators (GA synthesis inhibitors) enables the control of vigorous vegetative growth of the avocado during crucial periods. It should be emphasized that treatments with growth regulators compel an orchard with strong trees whose vegetative growth is good and their foliage healthy but using growth regulators on weak trees can cause considerable damage. After long and thorough inspection of the subject of growth regulators in R & D (research and development) commercial treatments were administered to most of the significant varieties. (Hass, Fuerte, Ettinger and Pinkerton) In Reed and Ardith the subject is still under R & D. The use of growth regulators has brought a significant rise in yields in all the varieties, and in others an improvement in size (Hass, Ettinger, Pinkerton). It seems to us that the subject of growth regulators has high potential and other treatments, as well as new substances must be inspected so that more improvements in yield and fruit quality will be reached.

• Pruning

The leading concept ruling in Israel was that one mustn't interfere with tree development and growth. As a result, the orchards became crowded and closed, which led to a decrease in yields and gradual tree degeneration. The attempt to overcome the problem by thinning did not lead to satisfactory results. Today, the current approach is the intensive pruning of orchards. It is performed in all the varieties once or more often a year. Intensive pruning achieves three main goals:

- tree size control
- improvement of light penetration
- canopy juvenility

It should be noted that there is not yet agreement concerning the pruning method of avocado trees. However, there is no difference of opinion on the basic need for pruning.



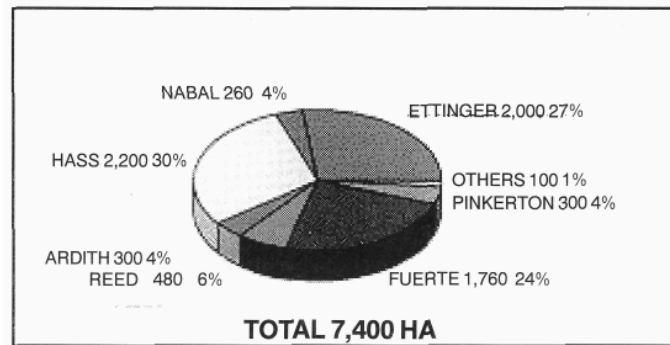


Figure 2. Avocado area by cultivars

- IRRIGATION
- PLANT GROWTH REGULATORS
- PRUNING AS A TOOL FOR:
 - TREE SIZE
 - PENETRATION OF LIGHT
 - CANOPY JUVENILITY

Figure 3. Main changes in the last 5 years

- EXPECTED SIZE OF THE INDUSTRY
8,000 - 9,000 HA
- EXPECTED PRODUCTION
20 TON/HA, marketable yield

Figure 4. Major goals for the next 10 years

MAIN CONCEPT - PREVENTING STRESS

THE DETERMINING OF WATER DOSAGE

MONTH	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
EVAPORATING - INDEX	0.30	0.35	0.50	0.65	0.80	0.85	0.85	0.85

Figure 5. Irrigation in avocado

ANNUAL AVERAGE WATER DOSAGE

- COASTAL AREA: 8,000-9,000 m³/ha
(max. dose 80m³/ha/day)
- INTERIOR VALLEYS: 10,000 - 13,000 m³/ha
(max. dose 100 m³/ha/day)

IRRIGATION INTERVALS:

SPRINKLERS : DAILY

DRIP IRR. :1-3 TIMES A DAY

Figure 6. Annual average water dosage

VARIETY	INCREASING PRODUCTIVITY	INCREASING FRUIT SIZE	IMPROVING FRUIT SHAPE
FUERTE	☒		
HASS	☒	☒	☒
ETTINGER	☒		☒
PINKERTON	☒		☒

P.G.R. IN R & D
 REED - DECREASING FRUIT SIZE
 ARDITH - PRODUCTIVITY (FRUIT DROPS)
 GENERAL - GROWTH CONTROL AFTER PRUNING

Figure 7. Use of plant growth regulators in avocado

• PRODUCTIVITY	30%
- P.G.R.	
- IRRIGATION	
- PRUNING METHODS	
- POLLINATION	
• FRUIT QUALITY	40%
- TREATMENTS IN THE ORCHARD	
- POST-HARVEST	
• PLANT PROTECTION	10%
- BIOLOGICAL PEST CONTROL	
• RECLAIMED WATER	10%
• NEW VARIETY	10%
- INTRODUCTION	
- BREEDING PROGRAMME	

Figure 8. Research and development

CONCLUSION

These changes brought improvements in yield and fruit quality. Orchards in which these management improvements were implemented, had an average yield of 15-18 t/hectare for the last three years. In spite of these improvements, it is clear to the avocado growers in Israel that conditions of the European and local markets compel a constant improvement in yield and fruit quality. These are the main topics of the R&D programme in Israel in the coming years.