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EFFECT OF IRRIGATION TIME ON HARVEST DATE, YIELD, QUALITY AND MARKETING OF GUAVA FRUITS UNDER DRIP IRRIGATION IN SANDY SOIL.

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ABSTRACT

This study was carried out in the season of 2002 and 2003 on common guava trees grown in a private orchard at EL-Noubaria (Beheira Governorate). In this study we reported four dates to start irrigation in orchard of guava. Control (mid February), (1) first date (first April), (2) second date (first May), (3) third date (first June) and (4) fourth date (first July).

These irrigation dates were chosen to obtain late crop (winter crop) without using chemical materials or workers to remove leaves. The method we are following in this study is not expensive compared to others. The fruits were held at 20-22 °C and relative humidity 75 % [control - first April - first May] and the fruits of the other dates were held at 11±2 °C and relative humidity 85-90%. The difference in room temperature due to the time of appear crops of guava. The obtained data indicated that irrigation time at 1st June and 1st July significantly decreased yield, but increased firmness, soluble solid contents, total sugars, acidity, vitamin C and phenol contents compared with irrigation times in the control and the two others (mid February and 1st of April and May).

Concerning fruits behavior held at room temperature, irrigated times at 1st June and 1st July showed a significant decrease in fruit firmness, contents of V.C, acidity and phenols and an increase in SSC, total sugars, pectin, loss in weight and decay after 7 days from picking owing to the higher temperature in summer days, fruits irrigated at early times (control, mid February and 1st April) the decay % reached about 100 % due to summer temperature. From this study the two late dates of irrigation (June and July) are very effective to obtain late crop of guava (winter crop).

The winter crop of guava fruits from trees irrigated at 1st June and 1st July are good quality and its high price covered greatly the reduce in the yield.

INTRODUCTION

In Egypt, guava trees (*Psidium guajava*, L.) grow successfully in new lands in desert, specially under drip irrigation system. Until now this tree do not occupy enough places in desert. The main guava crop appears in Egyptian local markets in summer. The crop is cheap and of low quality and it's marketability is very short because fruits are affected by high temperature in summer season which causes browning of colour, fast decay and short shelf life. Some researches try to obtain late crop (winter crop) of guava by using many ways like removing of leaves and flowers by workers or by spraying chemical materials like ethephone, naphthalene acetic acid and urea. All these ways are expensive and the way which is used in this research less expensive when compared with another ways.

The objective of this study :

1. Turn the summer crop of guava to late crop to obtain fruits of good quality and high shelf life which is suitable for marketability and export.
2. Help farmer in desert regions to obtain high prices for guava crop.

MATERIALS AND METHODS

The present work was carried out during 2002 and 2003 seasons on common guava to study the effect of irrigation time on harvest date quality and marketing on guava fruits under drip irrigation in sandy soils. In this study, trees of guava 12 years old growing in a private orchard at EL-Noubaria (Beheria Governorate) were used. Trees were planted at 5 x 4 meters and received the cultural practices commonly adopted in that area. The selected trees were almost uniform as possible concerning their vigor and freedom from diseases. During two seasons, 60 trees were selected [5 treatments – 3 replicates containing 4 trees]. The trees were arranged in randomized block design for various dates applied. In this study, we take four dates to start irrigation : Control "mid February", (1) First April, (2) First May, (3) First June and (4) First July.

When the fruit reached the harvesting stage (yellow colour stage) sample of fruits were picked and as soon as possible send to the laboratory. A sample of 20 fruits was taken for each replicate before storage and the following characteristics were determined at harvest :

1) Fruit weight (gm).
2) Fruit dimensions (cm) recorded by vernier caliper.
3) Fruit firmness measured by using a motorized penetro-meter fitted with an 8 mm probe (Topping, 1981).
4) Flesh weight (gm). 5) Core weight (gm).
6) SSC % measured by hand refractometer according to Chen and Mellenthin (1981).
7) Acidity (%) : Five ml sample of fruit juice was used to determine the titratable acidity by the titration of 0.1 N sodium hydroxide in the presence of phenolpthalene as an indicator according to A.O.A.C. (1980).
8) SSC / acid ratio.
9) Vitamin (C) : For determining of ascorbic acid (vit. C), 5 ml samples of fruit juice were used, 5 ml of oxalic acid solution added to each sample and titrated with 2.6 dichloro-phenol-indophenol solution. The ascorbic acid content was expressed as milligrams ascorbic acid per 100 ml fruit juice (A.O.A.C. 1980).
10) Total sugars were determined in fresh fruits as mg/100 ml juice samples according to Somogyi (1952).
11) Pectin content (%) was estimated in guava fruit pulp, according to the method of Carre and Haynes (1922).
12) The total phenols (%) in peel, pulp and core of the fruit were determined according to the method of Swain and Hillis (1959).

Determinations of shelf life :

Guava fruits were packed in open carton boxes. Each box was considered as a replicate containing 40 fruits. Guava fruits of the control, first date and second dates of irrigation were held at room temperature (20-22 °C & 75 R.H), while, guava fruits of the third and fourth dates were stored at 11±2 °C and relative humidity (85-90 %). The different in temperature in room

ambient was due to the harvesting time of guava. Samples on carton boxes were taken in each sample period (7 days interval) to be subjected to the following determinations :

1) Decay percentage due to diseases (gm).
2) Fruit losses percentage (gm).
3) Total loss (decay + loss in weight) %. 4) Fruit firmness.
5) SSC %. 6) Acidity %. 7) SSC/acid ratio. 8) Vitamin (C).
9) Total sugars. 10) Pectin content % in pulp.
11) Total phenols % in peel, pulp and core.

The statistical analysis of the data was carried out according to the methods described by Snedecor and Cochran (1973).

RESULTS AND DISCUSSION

A) Date of harvest :

Data shown in Table (1) cleared that guava fruit from the summer crop harvest (control, first and second date of irrigation) required a short time from flowering to harvest due to the high temperature in summer. While, winter fruit (third and fourth date of irrigation) required long time to reach ripe stage that is due to low degree of temperature in winter time, that agree with the results of Mukai *et al.* (1992) and Mecardo *et al.* (1998).

Table (1) : Effect of irrigation date on full bloom and harvest date in guava under drip irrigation in sandy soil during seasons 2002 and 2003.

Treatments	Full bloom		Harvest date	
	2002	2003	2002	2003
Control "Mid February"	12 April	25 April	25 July	28 July
First "April"	5 May	9 May	22 August	28 August
First "May"	18 June	20 June	23 September	26 September
First "June"	10 August	16 August	26 January	24 January
First "July"	2 September	9 September	10 February	15 February

B) Yield and fruit quality :

Data in Table (2) indicated that yield significantly decreased in treatments (third and fourth date of irrigation) compared with control and other irrigation dates. It is obvious from Table (2) that the price of late guava winter crop (treatments of third and fourth dates of irrigation) is very high. The feddan gives high price compared with control and other treatments. Data in Table (3) show clearly that significant different was observed between the fruit weight, flesh weight, core weight and fruit diameter. Data in the same Table showed unsignificancy in fruit length as the mean of fruit length ranged between (8.1-8.4 cm).

Table (2) : Effect of irrigation date on yield and total price/feddan of guava during seasons 2002 and 2003.

Treatments	Yield/tree (kg)		Total yield "kg" feddan"200 tree"		Price/kg P.T.		Total price/feddan Egyptian pound	
	2002	2003	2002	2003	2002	2003	2002	2003
Control"Mid February"	71.0	71.0	14200	14200	45	40	6390	5680
First "April"	65.0	62.0	13000	13200	45	50	5850	6600
First "May"	60.0	61.0	12000	12200	55	60	6600	7320
First "June"	40.0	42.0	8000	8400	130	130	10400	10920
First "July"	35.0	36.0	7000	7200	175	160	12250	11520
L.S.D at 5 %	1.528	1.532	305.50	311.36	4.183	3.910	329.493	314.405

It is clear from Tables (4 and 5) that the third and fourth dates of irrigation gave significant increase in fruit firmness, soluble solids content (SSC %), total sugars, acidity and vitamin (C) in comparison with the control, first and second dates of irrigation in two seasons. The obtained results are in harmony with those reported by Mecardo *et al.* (1998) and Bariana and Dhaliwal (2002).

The obtained data in Table (6) indicated that pectin in fruit pulp [water soluble pectin (WSP)] at harvest significantly increased in control, first April and May of irrigation in comparison with first June and July of irrigation, that is may be due to the fast ripening of fruits and effect of high temperature during harvesting time.

Data in the same Table (6) indicated that, the total phenols in fruit peel, pulp and core significantly increased in the treatments of late dates of irrigation compared with control and other treatments in the two seasons of study. These results are in line with those reported by Hussein *et al.* (1998).

Fruit quality at room temperature :

C) Fruit firmness (lb/in²):

Data in the Table (4) indicated that in treatments of third and fourth dates of irrigation significant decrease in fruit firmness and hardness declined with the progress of storage times was occurred. That may be due to the degradation of insoluble protopectin to simple soluble pectins, which increased with the progress of fruit shelf life. These results are in harmony with those obtained by Rofael (1985) and Chen and Zhang (2001).

Soluble soilds content (SSC %) and total sugars % :

It was noticed in Table (4) a gradual increase in SSC % and total sugars with the progress of shelf life period, which may be due to the degradation of starch to simple soluble compound like sugars with the enzyme activities in guava fruit α-amylase as a major component of SSC % and total sugars % in fruit. These results agree with those obtained by Rofael (1985) and Augustin and Osman (1988).

Total acidity :

Data in Table (5) show clearly that acid values gradually decreased as the shelf life period advanced. These results agree with those obtained by Bhullar and Farmahan (1980).

Table (3) : Effect of irrigation date on fruit, flesh and core weight, fruit Length and diameter in guava under drip irrigation in sandy soil during seasons 2002 and 2003.

Treatments	Fruit weight "gm"			Flesh weight "gm"			Core weight "gm"			Fruit length "cm"			Fruit diameter "cm"		
	2002	2003	Mean	2002	2003	Mean	2002	2003	Mean	2002	2003	Mean	2002	2003	Mean
Control "Mid February"	152.0	155.0	153.5	120.2	121.4	120.8	31.8	33.6	32.7	8.2	8.3	8.25	5.2	5.4	5.3
First April	156.0	153.0	154.5	122.3	120.3	121.3	33.7	32.7	33.2	8.5	8.3	8.4	5.4	5.3	5.35
First May	149.0	150.0	149.5	116.5	118.2	117.35	32.5	31.8	32.15	8.2	8.0	8.1	5.0	5.0	5.0
First June	150.0	152.0	151.0	130.4	133.5	131.95	24.2	26.6	25.4	8.2	8.3	8.25	5.2	5.0	5.1
First July	155.0	150.0	152.5	128.8	126.7	127.75	26.2	23.3	24.75	8.4	8.3	8.35	5.3	5.5	5.4
L.S.D at 5 %	5.029	4.682	---	4.193	3.987	---	0.900	0.867	---	N.S	N.S	---	0.173	0.159	---

Table (4) : Effect of irrigation date on firmness, SSC % and total sugars % in guava fruits under drip irrigation in sandy soil during seasons 2002 and 2003.

Treatments	Firmness (lb/in²)						SSC (%)						Total sugars (%)					
	At harvest		Period in days				At harvest		Period in days				At harvest		Period in days			
			7		14				7		14				7		14	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Control Mid February	6.3	6.2	---	---	---	---	8.7	8.6	---	---	---	---	5.5	5.69	---	---	---	---
First April	7.85	7.8	---	---	---	---	8.7	8.6	---	---	---	---	5.9	5.5	---	---	---	---
First May	7.8	7.7	---	---	---	---	8.9	8.8	---	---	---	---	5.85	5.80	---	---	---	---
First June	10.5	10.6	8.95	8.9	7.7	7.7	9.8	9.5	10.5	10.2	11.2	11.0	6.66	6.60	6.90	6.80	7.35	7.30
First July	10.6	10.6	8.9	8.8	7.8	7.5	9.7	9.7	10.5	10.5	11.4	11.3	6.40	6.55	6.70	6.72	7.28	7.20
L.S.D at 5 %	0.304	0.321	0.258	0.224	0.224	0.192	0.293	0.308	0.304	0.261	0.326	0.282	0.197	0.209	1.98	0.171	0.212	0.183

Table (5) : Effect of irrigation date on acidity, SSC/acid ratio and vitamin (C) in guava fruits at harvest and during shelf life.

Treatments	Acidity (%)						SSC/acid ratio						Vitamin (C) mg/100 ml juice					
	At harvest		Period in days				At harvest		Period in days				At harvest		Period in days			
			7		14				7		14				7		14	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Control Mid February	0.40	0.40	-----	-----	-----	-----	21.5	21.75	-----	-----	-----	-----	110.9	115.5	-----	-----	-----	-----
First April	0.44	0.42	-----	-----	-----	-----	19.32	20.71	-----	-----	-----	-----	112.3	116.8	-----	-----	-----	-----
First May	0.45	0.45	-----	-----	-----	-----	19.55	19.77	-----	-----	-----	-----	115.9	118.3	-----	-----	-----	-----
First June	0.48	0.49	0.44	0.43	0.40	0.39	19.79	20.0	23.18	24.42	27.5	28.72	210.6	214.3	183.5	180.5	150.6	143.6
First July	0.49	0.47	0.43	0.43	0.40	0.40	19.80	20.64	25.0	24.42	28.25	28.50	212.4	217.5	170.0	172.2	149.8	146.7
L.S.D at 5 %	0.016	0.014	0.011	0.012	0.010	0.012	0.657	0.628	0.609	0.704	0.802	723	6.134	6.111	4.467	5.137	3.494	4.182

SSC/acid ratio :

The data in Table (5) show that SSC/acid ratio was almost similar to that found with soluble solids content.

Vitamin "C" :

Concerning changes in vitamin "C" during shelf life data in Table (5) show gradual decrease in vitamin "C" with the progress of shelf life period. The loss of ascorbic acid content "V.C" was attributed to the rapid conversion of L-ascorbic acid into dihydro-ascorbic acid in the presence of L-ascorbic acid oxidase. These results agree with those obtained by **Rofael, (1985).**

Pectin content % in fruit pulp :

The result in Table (6) also reveal the effect of the two late irrigation dates on water soluble pectin content (wsp) which gradually increased in fruits with the progress of shelf life time, which is due to the progress of the fruit ripening during shelf life. **Chandra *et al.* (1996)** working on guava cv. Allahabad safeda fruits packed in paper boxes and stored at 12±3 °C for 16 days. After 8 days the high value of water soluble pectin (wsp) 1.04 % is agree with the obtained data.

Total phenols % :

Data presented in Table (6) clarify a general decrease in total phenols of fruit peel, pulp and core with the advance of the shelf life period. These results agree with those found by Rofael, (1985).

Total loss % (loss in weight and decay) :

Data in Table (7) concerning the effect of the two late irrigation dates on the total loss percent (weight loss + decay) of guava under room conditions for 14 days at 11±2 °C. Brown (1983) storage fruits of guava at 10 degrees extended post harvest life by about 2 weeks. Adel A. Kader (2006) recommended the optimum temperature 8-10 °C for mature partially–ripe guavas (storage potential = 2-3 weeks) and optimum relative humidity (90-95%). It is clear that loss percent due to decaying organisms was the chief factor caused the highest total loss % in guava fruits irrigated at first June and July (winter crop). Since, after 14 days of shelf life period the loss due to decay amounted (22.8 & 23.9 %) and (24.5 & 26.3 %) for fruits irrigated at first June and July respectively in the two seasons of this study.

The same Table show that loss due decay after 7 days in fruits of late dates of irrigation were zero percentage (0.0 %). Loss in weight was the main factor causing the highest loss % of fruits irrigated at first June and July during 7 days of shelf life in the two seasons. Since, decay percent was (0.0 %) for the same two treatments during the same time (7 days).

I) Fruit weight loss % :

Data in Table (7) show that fruit gradually increased in loss weight with the progress of shelf life period. The weight loss is a result of water loss from fruit tissue and partially of the respiration process. Data in the same Table show that fruit from the winter season crop (two late irrigation dates) gave the lowest physiological loss in weight. This result agree with those reported by **Sidiqui *et al.* (1991).**

Table (6) : Effect of irrigation date on pectin in fruit pulp (%), total phenols in fruit peel pulp and core % in guava at harvest and during shelf life.

Treatments	Pectin in fruit pulp(%)						Total phenols in fruit peel (%)					
	At harvest		Period in days				At harvest		Period in days			
			7		14				7		14	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Control Mid February	1.03	1.02	—	—	—	—	1.32	1.28	—	—	—	—
First April	1.03	1.03	—	—	—	—	1.30	1.30	—	—	—	—
First May	1.02	1.03	—	—	—	—	1.33	1.30	—	—	—	—
First June	1.01	1.01	1.14	1.12	1.34	1.35	1.45	1.42	1.25	1.20	—	—
First July	1.00	1.00	1.13	1.14	1.33	1.37	1.47	1.44	1.24	1.22	—	—
L.S.D at 5 %	0.033	0.031	0.029	0.033	0.034	0.039	0.047	0.043	0.031	0.035	—	—

Treatments	Total phenols in fruit pulp (%)						Total phenols in fruit core(%)					
	At harvest		Period in days				At harvest		Period in days			
			7		14				7		14	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Control Mid February	0.55	0.54	—	—	—	—	0.42	0.41	—	—	—	—
First April	0.55	0.55	—	—	—	—	0.42	0.42	—	—	—	—
First May	0.62	0.63	—	—	—	—	0.40	0.39	—	—	—	—
First June	0.67	0.66	0.53	0.52	—	—	0.53	0.51	0.39	0.40	—	—
First July	0.67	0.67	0.50	0.53	—	—	0.55	0.56	0.43	0.44	—	—
L.S.D at 5 %	0.021	0.020	0.013	0.015	—	—	0.017	0.015	0.010	0.012	—	—

Table (7) : Effect of irrigation date on loss in weight %, decay % and total loss % in guava fruits during shelf life

Treatments	Loss in weight (%)					Decay (%)					Total loss (%)				
	0-time	Period in days				0-time	Period in days				0-time	Period in days			
		7		14			7		14			7		14	
		2002	2003	2002	2003		2002	2003	2002	2003		2002	2003	2002	2003
Control Mid February	---	---	---	---	---	---	---	---	---	---	---	100	100	100	100
First April	---	---	---	---	---	---	---	---	---	---	---	100	100	100	100
First May	---	---	---	---	---	---	---	---	---	---	---	100	100	100	100
First June	---	8.20	7.70	18.80	17.20	---	---	---	22.8	24.5	---	8.2	7.7	41.6	41.7
First July	---	8.60	8.0	18.10	18.40	---	---	---	23.9	26.3	---	8.6	0.8	42.0	44.7
L.S.D at 5 %	---	0.212	0.226	0.466	0.509	---	---	---	0.590	0.073	---	1.359	1.839	1.977	1.986

II) Fruit decay % :

The result in Table (7) indicate that the loss due to decay significantly increased in control and early dates of irrigation after 7 days, since, the value reached (100 %). The two late dates of irrigation gave values of (0%). The fruits in control and early dates of irrigation are held at room conditions of 20-22 °C due to the time of appear crops of guava. High temperature caused rapid browning of fruits and granulation became serious and the commercial quality of the fruits fastly declined. These results go in line with those reported by Chen *et al.* (2001).

To succeed in applying this discipline of irrigation in farms we should follow some steps :

1) Farms should be surrounded by (*Casuarina equisefolia* L.) because fruiting is coming late and the trees are expose to heavy winter wind which causes fruit drop.
2) Trees must be at least 6-7 years old because small trees are greatly affected by sun heat, heat in sand soil and water stress in soil specially in time which we prevent water causes cracks in trunk leading to trees dying.
3) Water table found in desert are at least at 5 meters depth.
4) Painting trunk of trees by dereton and lime to reduce effect of sun and soil heat.
5) During period of stopping irrigation we must be sure that valve of water are closed tightly to prevent any drip of water that passes to the trees.
6) Pruning trees directly before starting irrigation in farms.
7) Following high balanced program in feeding trees by using manure, micro, and macro elements to push trees to fast growing, flowering and fruiting in the remain period of the season.
8) Farmer must increase the number of irrigation hours above the recommended rate in normal orchards of guava to obtain good vegetative growth.

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تأثير ميعاد الري علي ميعاد جمع المحصول والجودة والتسويق في الجوافة تحت ظروف الري بالتنقيط في الأراضي الرملية

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معهد بحوث البساتين – مركز البحوث الزراعية – جيزة – مصر

أجري هذا البحث لدراسة تأثير بدء ميعاد الري علي ميعاد جمع المحصول والجودة والتسويق في ثمار الجوافة العادية تحت ظروف الري بالتنقيط في الأراضي الرملية خلال عام ٢٠٠٢ و ٢٠٠٣ علي أشجار عمر ١٢ سنة منزرعة في منطقة النوبارية بمحافظة البحيرة .

وكانت مواعيد بدء الري المستخدمة: منتصف فبراير (كنترول)- (١) أول ابريل –(٢) أول مايو – (٣) أول يونيو – (٤) أول يوليو واختيرت مواعيد مختلفة لبداية الري بغرض إختيار الميعاد المناسب للوصول إلي مرحلة تمام جفاف الأوراق كبديل عن إستخدام المواد الكيميائية رشا علي الأشجار أو إستخدام العمالة لازالة الأوراق وبالتالي تأخير ظهور المحصول حيث أن الطريقة التي استخدمت في البحث غير مكلفة ماديا إذا قورنت بالطرق الأخرى.

في هذا البحث خزنت الثمار في درجة حرارة الغرفة – كنترول –الميعاد الأول والثاني في درجة الحرارة ٢٠-٢٢ °م (والرطوبة النسبية ٧٥ %) والميعاد الثالث والرابع خزنت الثمار في درجة حرارة الغرفة على درجة ١١±٢°م والرطوبة النسبية ٨٥-٩٠ % (مع ملاحظة أن الفرق في درجة الحرارة في الغرفة يرجع إلي ميعاد ظهور وجمع المحصول).

وجد أن بداية الري في أول يونيو وأول يوليو ذو تأثير كبير علي ميعاد ظهور المحصول وميعاد الجمع وتحسين صفات الجودة والتسويق لثمار الجوافة مقارنة بمواعيد الكنترول – أول أبريل – أول مايو.

كذلك أدت المعاملة الثالثة والرابعة إلي قلة المحصول وإرتفاع معنوي في صلابة الثمار ونسبة المواد الصلبة الكلية والسكريات الكلية والحموضة وفيتامين (ج) والفينولات الكلية مقارنة بالكنترول والميعاد الأول والثاني في الري .

أما بالنسبة لسلوك الثمار في درجة حرارة الغرفة حدث إنخفاض معنوي في صلابة الثمار والحموضة وفيتامين (ج) والفينولات الكلية. وكذلك زيادة معنوية في نسبة المواد الصلبة الكلية والسكريات الكلية والبكتين والفقد في الوزن والعفن بزيادة مدة التخزين وذلك بالنسبة للمعاملة الثالثة والرابعة في مواعيد الري. أما بالنسبة للكنترول والميعاد الأول والثاني في الري فقد وصلت نسبة العفن (١٠٠%) بعد ٧ أيام بسبب إرتفاع درجة الحرارة في ذلك الوقت.

ومن هذا البحث يمكن التوصية بأن بداية الري في أول يونيو وأول يوليو يعتبر هام في تأخير ميعاد ظهور المحصول إلي جانب أن الظروف الجوية تكون مناسبة في هذا الوقت لإعطاء محصول ذو صفات جودة عالية من حيث التسويق والتداول. كذلك يتحقق للمزارع من هذا البحث عائد مادي مرتفع بالرغم من قلة المحصول حيث أن السعر يكون مرتفع في ذلك الوقت من السنة.

وللنجاح في تطبيق هذا البحث فيجب علي المزارع مراعاة عدة عوامل :

١- يجب أن تكون المزرعة محاطة بمصدات رياح من الكازورينا لأن الإثمار متأخر وتتعرض الأشجار لرياح شديدة تسبب سقوط الثمار.
٢- عمر الأشجار يجب ألا يقل عن ٦-٧ سنوات لأن الأشجار الصغيرة تتأثر بحرارة الشمس وحرارة التربة إلي جانب تعرضها لإجهاد مائي في فترة توقف الري , حيث يتسبب ذلك في حدوث تشقق في جذع الأشجار مما يتسبب في موتها.
٣- مستوي الماء الأرضي لا يقل عن ٥ متر و ذلك متوفر بالأراضي الصحراوية.
٤- طلاء جذع الأشجار بالجير والديريتون لتقليل أثر حرارة الشمس وحرارة التربة.
٥- أثناء فترة منع الري يجب التأكد من أن صمامات الري (المحابس) مغلقة بإحكام بحيث لا تسمح بمرور أي نقطة مياه إلي الأشجار.
٦- تقليم الأشجار مباشرة قبل البدء في الري.
٧- إستخدام برنامج غذائي عالي ومتوازن لتغذية الأشجار بإستخدام الأسمدة العضوية والعناصر الصغرى والكبرى في التغذية لدفع الأشجار للنمو السريع والتزهير والأثمار في الفترة الباقية من الموسم.
٨- يجب علي المزارع زيادة ساعات الري عن الموصي بها للحصول علي نمو خضري جيد خلال الفترة الباقية من الموسم.