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THE PERFORMANCE OF SOLO AND SUNSET PAPAYA CULTIVARS UNDER THE ENVIRONMENT OF EGYPT
B: INFLUENCE OF FLOWERING WAVES ON POLLEN VIABILITY, FRUIT SET AND FRUIT QUALITY

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Abstract: The influence of flowering waves on pollen viability, fruit set and fruit quality of Solo and Sunset papaya cultivars under the arid land environment was studied during 1996 and 1997 seasons.

Results indicated that under the environmental conditions of Giza, Egypt, papaya trees started to form flower buds from March towards mid-May. Normal flower opening appeared during April till July with a duration average of 40 days from emergence to anthesis.

Pollen viability was significantly higher in Sunset cv compared to Solo cv. Pollen viability of April flowering was found to have the lowest value compared to the other flowering waves (May, June and July)

The initial fruit set (IFS) of May flowering was the highest in both cvs followed by July flowering and the lowest IFS values were always for April flowering. The highest horticultural fruit set (HFS) values were found in October (May flowering), while the lowest HFS values were found in September (April flowering) in both cvs during both seasons. IFS and HFS values were significantly higher in Sunset cv compared to Solo cv.

Fruit number per tree was higher in Sunset cv compared to Solo cv. On the other hand, yield per tree was higher in Solo cv compared to Sunset cv. The highest fruiting contributed was found in May flowering, whereas the least contribution was found in December (July flowering) in both cvs during both seasons.

Fruit weight, size and pulp weight (%) were significantly higher in Solo cv compared to Sunset cv. October fruiting (May flowering) had the highest values in fruit weight and size, compared to other fruiting dates.

TSS, TSS/acid ratio, total sugars and reducing sugars were significantly higher in Sunset cv. The lowest TSS, TSS/acid ratio, total sugars and reducing sugars were found in September (April flowering) compared to those of other fruiting dates. Ascorbic acid and crude protein content were statistically higher in Solo cv compared to Sunset cv.

Key words: Papaya, flowering waves, pollen viability, fruit set, fruit quality.

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Introduction

Papaya is the preferred common name for "*Carica papaya* L.". The plant is usually dioecious, with either male or female flowers. However,trees with hermaphrodite flower also occur, (Samson, 1980). Papaya fruit is usually cylindrical on hermaphrodite trees and more round on female trees.

World production of papaya was estimated by FAO, 2004 to be 6,504,369 metric tons. Brazil, Thailand, Nigeria, India, Mexico and Indonesia are the leading producers of papaya.

In Egypt, papaya stills not a popular fruit crop although it grows successfully under Egypt environment. The papaya trees are planted in scattered sites in Aswan, El-Kanater,at universities, research Institutes, orchards and in some special home gardens. (Abd El-Kareem, 1996).

Papaya plant produces its flowers during a long period, from June to October. Early flowering is due to hot temperature (36°C), while, the coolest ones (20°C) resulted in delay flowering. In the tropics areas flowering is all year round but in subtropical, flowering is impaired during certain seasons (Aziz *et al*., 1976; Allan *et al*., 1987 and Cohen *et al*. 1989). Under Egypt, environment papaya plants started flowering in the second half of Feb. (Abdel-Kareem, 1996). Suitable temperature for pollen germination was 22 to 26°C (Sharma and Bajpai, 1969; Allan *et al*., 1987 and Cohen *et al*., 1989). Papaya fruit set, as well as yield and fruit quality were influenced by cultivars and environment, specially temperature during the pre-anthesis period (Kuhne and Allan, 1970; Selvaraj *et al*., 1982b; Cohen *et al*., 1989; Rodriguez *et al*., 1990; Yadava *et al*., 1990 and Abdel-Kareem, 1996).

The objective of this work was to study the influence of flowering waves on pollen viability, fruit set and fruit quality at harvest.

Materials and Methods

This study was conducted in the Horticulture Research Institute Orchard at Giza and in the laboratory of Horticulture Department, Faculty of Agriculture, Assiut University during two successive seasons of 1996 and 1997 on Solo and Sunset papaya cvs. Three years old healthy Solo and Sunset papaya cvs, ten trees from each cultivar were randomly selected for this investigation. The selected trees were planted at 2x2 meters apart and grown in loamy sand soil and subjected to the same horticultural practices.

Generally, the following measureements were determined as follow:

Pollen grains viability

Pollen viability was determined by staining in acetocarmine dye (Sharma and Bajpai, 1969).

Fruit set:

Initial fruit set was estimated one month each flowering waves; i.e. April, May, June and July corresponding fruits appeared from each of these months were marked and observed until reaching their normal size at maturity during September, October, November and December, respectively.

Initial fruit set percentage (IFS) was calculated as follows:

$$= \frac{Total\ number\ of\ initial\ set\ fruits}{Total\ number\ of\ flower\ at\ anthesis} x\ 100$$

Horticultural fruit set (HFS) percentage was calculated as follows:

$$= \frac{Total\ number\ of\ retained\ fruits\ (normal\ size)}{Total\ number\ of\ flower\ at\ anthesis} x\ 100$$

Yield: Yield per tree was estimated as number of fruit × average fruit weight.

Fruit physical and chemical characteristics:

Fruits were harvested at colour break (1/3 - 1/2 skin colour turning to yellow). They were kept at room temperature (24±2°C) for ripening, which normally completed 3-4 days after harvesting. Five fruits were taken at random from each wave for determination of some physical and chemical characteristics:

A- Physical characteristics:

Fruit weight (g) and pulp weight (%) were recorded as well as, fruit size was measured.

B- Chemical constituents of fruit at harvest:

1. Percentage total soluble solids (TSS) in papaya pulp was estimated by a hand refractometer.

2. Acidity was determined in pulp juice by NaOH titration according to A.O.A.C. (1975) and was calculated as citric acid/100 g fruit according to Selvaraj *et al*. (1982a).

3. Reducing and total sugars were evaluated according to Lane and Eynon's titrimetric method as outlined in A.O.A.C. (1975).

4. Vitamin "C" content was estimated as milligrams ascorbic acid per 100 grams pulp using direct titration method by 2,6-diclorophenol indophenol (A.O.A. C., 1975).

5. Nitrogen was estimated as ammonia by micro-kjeldahl method and the values were multiplied by 6.25 to get crude protein (A.O.A.C., 1975).

Combined analysis of randomized complete block design with ten replicates, one tree per each was used. The data was calculated and means were separated for

statistical significance at 5% level (Gomez and Gomez, 1984).

Result and Discussion

Flowering and fruit set:

Under the environmental conditions of Giza, Egypt, papaya trees started to form flower buds from March continuously to second half of May. Normal flower opening was found to appear during April till July with a duration average of 40 days from emergence to anthesis.

Data in Table (1) indicated that pollen viability was much significantly higher in Sunset cv (42.03 and 43.54%) compared to Solo cv (38.70 and 40.44%) in both seasons, respectively. Pollen viability was generally lower in April flowering for both cvs and both seasons. This may be due to environmental condition compared to the other flowering dates (May, June and July). These results are in line with early finding by Sharma and Bajpai (1969) and Cohen *et al*. (1989). In addition, environmental effects of low temperatures (April) and high temperature (June and July) produced relatively less viability values. These results supported early finding of Allan *et al*. (1987) who found that a very hot day/night (36/28°C) regime caused poor pollen viability. Pollen viability was best at intermediate to hot temperatures.

Moreover, data in Table (2) indicated that initial fruit set (IFS) in Sunset cv was higher (63.52 and 65.36%) compared to Solo cv (54.15 and 56.42%) for both seasons, respectively. The highest IFS values were found in May flowering in Solo (56.41, 58.13%) and Sunset cvs (65.58, 67.86%) and the lowest IFS values were always for April flowering (50.00, 53.59%) and (61.72, 62.16%) for Solo and Sunset cv. in both seasons, respectively; such data may be explained as environmental conditions may reduce insects activity for pollination. These results are in agreement with those found by Kuhne and Allan (1970) and Selvaraj *et al*. (1982b) as IFS was influenced by mean temperature during the pre-anthesis period.

Data in Table (3) showed that horticultural fruit set (HFS) was found to be signfiicantly higher in Sunset cv (40.98, 42.78%) than in Solo cv (30.76, 31.52%) in both seasons, respectively. The highest HFS values were found in October (May flowering) 32.95, 32.69% for Solo cv and 43.51, 44.31% for Sunset cv, during both seasons; respectively.While the lowest HFS values were found in September (April flowering) (27.47, 30.38%) and (40.67, 41.08%) for Solo and Sunset cvs during both seasons, respectively. Such results may be due to increasing or decreasing the initial fruit set during May or April flowering, respectively.

Fruit number and yield

Data in Table (4) indicated that fruit number per tree was higher in

Table (1): Pollen grains viability (%) of different flowering periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
April	33.22	37.28	35.80	40.00	34.51	38.64	36.57
May.	42.92	44.85	42.58	45.09	42.75	44.97	43.86
June	39.20	42.65	42.54	44.80	40.87	43.73	42.30
July.	39.45	43.33	40.85	44.25	40.15	43.79	41.97
Average	38.70	42.03	40.44	43.54			

LSD 0.05 cv x period 1.29
Cv x year 0.91
Cv x period x year 1.83

Table(2): Initial fruit set (IFS) % of different flowering periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
April	50.00	61.72	53.59	62.16	51.79	61.94	56.86
May.	56.41	65.58	58.13	67.86	57.27	66.72	61.99
June	54.19	63.14	56.39	64.76	55.29	63.95	59.62
July.	56.00	63.64	57.58	66.67	56.79	65.15	60.97
Average	54.15	63.52	56.42	65.36			

LSD 0.05 cv x period 1.30
Cv x year 0.92
Cv x period x year 1.84

Table(3): Horticulture fruit set (HFS) %. of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	27.47	40.67	30.38	41.08	28.93	40.88	34.91
Oct.	32.95	43.51	32.69	44.31	32.82	43.91	38.37
Nov.	31.94	41.57	31.20	42.38	31.57	41.98	36.78
Dec.	30.67	38.18	31.82	43.33	31.25	40.75	36.02
Average	30.76	40.98	31.52	42.78			

LSD 0.05 cv x period 0.95
Cv x year 0.67
Cv x period x year 1.35

Table(4): Fruit number of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	10.8	12.5	10.2	11.6	10.50	12.05	11.28
Oct.	19.8	20.1	20.3	22.3	20.05	21.20	20.63
Nov.	9.4	10.6	8.3	8.9	8.85	9.75	9.30
Dec.	4.2	4.8	4.0	4.5	4.10	4.65	4.38
Average	11.05	12.0	10.7	11.83			

LSD 0.05 cv x period 0.96
Cv x year 0.68
Cv x period x year 1.35

Sunset cv (48 and 47.3) compared to Solo cv (44.2 and 42.8) in both seasons; respectively. Therefore, October fruiting contributed with almost 46.09% in Solo cv and 44.51% in Sunset cv , also the least contribution was found by December fruiting 9.43% in Solo cv and 9.76% in Sunset cv of fruit number per tree during both seasons

Data in Table (5) showed that average fruit yield per tree was significantly higher in Solo cv (35.02 kg av. two seasons) compared to Sunset cv (26.13 kg av. two seasons). However, October fruiting was contributed with almost 47.71% in Solo cv and 46.15% in Sunset cv, also the least contribution was found by December fruiting 8.45% in Solo cv and 8.69% in Sunset cv of fruit yield per tree during both seasons. These results might be explained by lower temperature during November and December. These results are in agreement with those found by Yadava *et al* (1990) where significant differences were found among cultivars in fruit yield

Fruit physical and chemical characteristics:

a) Physical characteristics:

Data in Table (6) revealed that fruit weight was significantly higher in Solo cv (789.5 and 780.4 g) compared to Sunset cv (532.9 and 535.7 g) in both seasons, respectively. For instance, fruit weight in October (May flowering) was found to be the highest compared to other fruiting dates (833.27 and 568.97 g (October), vs. 806.72 and 549.86 g (September), 777.73 and 531.38 g (November) and 721.75 and 492.52 g (December) in Solo and Sunset cvs; respectively for both seasons.

Table(5): Fruit yield per tree in (Kg) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	8.76	6.83	8.18	6.42	8.47	6.63	7.55
Oct.	16.71	11.53	16.70	12.59	16.71	12.06	14.39
Nov.	7.27	5.56	6.49	4.79	6.88	5.18	6.03
Dec.	3.07	2.29	2.86	2.24	2.96	2.27	2.62
Average	8.95	6.55	8.56	6.51			

LSD 0.05 cv x period 0.84
Cv x year 0.59
Cv x period x year 1.18

Table(6): Fruit weight (g) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	811.5	546.7	802.0	553.1	806.75	549.90	678.33
Oct.	843.9	573.4	822.6	564.5	833.25	568.95	701.10
Nov.	773.1	524.2	782.4	538.6	777.75	531.40	654.58
Dec.	729.7	487.0	713.8	498.0	721.75	492.5	607.13
Average	789.5	532.9	780.4	535.7			

LSD 0.05 cv x period 10.06
Cv x year 7.11
Cv x period x year 14.23

Data in Table (7) indicated same trend in fruit size (844.35 and 837.50 cc) in Solo cv compared to (558.35 and 562.45 cc) in Sunset cv in both seasons. October fruiting also showed the highest fruit size 890.6 and 592.3 vs. 867.7 and 576.6 cc (September), 835.4 and 556.7 cc (November) and 770 and 516 cc (December) in Solo and Sunset, respectively during both seasons.

Data in Table (8) indicated that pulp weight (%) was found to be significantly higher in Solo cv (86.41 and 86.39%) compared to Sunset cv (85.49 and 85.61%) in both seasons; respectively. However, there was no significant differences appeared among different dates of ripening in pulp weight (%) for both cvs and both season.

These results are in agreement with those found by Nakasone *et al*. (1973),Shah and Shanmugavelu (1975a), Pal *et al*. (1980), Yadava *et al* (1990) and Abd El-Kareem (1996). They concluded that there were significant differences in physical traits among cultivars. In addition, environmental effects on relatively less physical characteristics values were also proved by early findings of Kuhne and Allan (1970), Aziz *et al*. (1976), Chan (1979), Allan *et al*. (1987) and Fioravanço *et al*. (1994).

b) Chemical characteristics:

Data tabulated in Table (9) showed that TSS values were significantly higher in Sunset cv (14.28 and 14.39%) compared to Solo cv (12.38 and 12.42%) in both seasons; respectively. The lowest TSS values were found in September fruiting (12.12 and 14.07%) compared to those of other fruiting dates (October, November and December).

Also, data in Table (10) presented that TSS/acid ratio had the same trend where Sunset cv (21.35 and 21.43) was much higher compared to Solo cv (19.47 and 19.48) in both seasons, respectively

Moreover, data in Table (11) indicated that total sugars content had also the same trend which Sunset cv had (12.51 and 12.58%) compared to (10.46 and 10.49%) in Solo cv. September fruiting showed the lowest total sugars values (11.96 and 12.15%) in Sunset cv and (10.17 and 10.25%) in Solo cv. in both seasons, respectively.

Also, data in Table (12) indicated that reducing sugars contents had the same trend where Sunset cv (10.04 and 10.19%) was significantly higher compared to Solo cv (8.36 and 8.39%) in both seasons, respectively. September fruiting showed the lowest reducing sugars values (9.68 and 9.91%) in Sunset cv and (8.19 and 8.26%) in Solo cv compared to other fruiting dates during both seasons.

In addition, data in Table (13) indicated that ascorbic acid contents were much significantly higher in Solo cv (52.23 and 50.86 mg/100g) compared to Sunset cv (45.94 and 47.12 mg/100g) in both seasons, respectively. No significant differences appeared among different dates of ripening in ascorbic acid content in both cvs during both seasons.

Data in Table (14) illustrated

that crude protein contents had the same trend where in Solo cv (0.535 and 0.525%) was statistical higher compared to Sunset cv (0.490 and 0.488%) in both seasons, respectively. No significant differences appeared among different dates of ripening in crude protein content in both cvs during both seasons.

These results are in agreement with those found by Nakasone *et al*. (1973), Shah and Shanmugavelu (1975b), Pal *et al*. (1980) and Abd El-Kareem (1996) where significant differences were found among cultivars. In addition, environmental effects on relatively less chemical constituent values were also shown by early findings of Kuhne and Allan (1970), Aziz *et al*. (1976) and Fioravanço *et al*. (1994).

It is evident from the obtained results that the importance of May flowering waves highly contributed in yield with good fruit quality. So, it is worth notable that manipulation of all agricultural agro-techniques commonly practicised during the spring period.

Table(7): Fruit size (cc) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	871.6	537.8	863.8	579.4	867.7	558.6	713.15
Oct.	899.8	598.2	881.4	586.4	890.6	592.3	741.45
Nov.	830.0	549.8	840.8	563.6	835.4	556.7	696.05
Dec.	776.0	511.6	764.0	520.4	770.0	516.0	643.0
Average	844.35	558.35	837.50	562.45			

LSD 0.05	cv x period	10.90
	Cv x year	7.71
	Cv x period x year	15.42

Table(8): Pulp weight (%) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	86.43	85.53	86.18	85.63	86.31	85.58	85.94
Oct.	86.28	85.42	86.37	85.57	86.32	85.50	85.91
Nov.	86.27	85.54	86.39	85.73	86.33	85.64	85.98
Dec.	86.64	85.56	86.63	85.49	86.64	85.53	86.09
Average	86.41	85.49	86.39	85.61			

LSD 0.05	cv x period	0.16
	Cv x year	0.11
	Cv x period x year	0.22

Table(9): Total soluble solids (%) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	12.10	14.0	12.14	14.12	12.12	14.07	13.10
Oct.	12.50	14.4	12.52	14.50	12.51	14.45	13.48
Nov.	12.26	14.2	12.32	14.40	12.29	14.30	13.29
Dec.	12.64	14.5	12.68	14.54	12.66	14.52	13.59
Average	12.38	14.28	12.42	14.39			

LSD 0.05	cv x period	0.12
	Cv x year	0.09
	Cv x period x year	0.17

Table(10): TSS/acid ratio of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	19.21	21.02	19.09	21.14	19.15	21.08	20.11
Oct.	19.53	21.49	19.75	21.51	19.64	21.50	20.57
Nov.	19.47	21.26	19.43	21.43	19.45	21.35	20.40
Dec.	19.69	21.64	19.63	21.64	19.66	21.64	20.65
Average	19.47	21.35	19.48	21.43			
LSD 0.05	cv x period			0.2			
	Cv x year			0.14			
	Cv x period x year			0.28			

Table(11): Total sugars (%) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	10.17	11.96	10.25	12.15	10.21	12.06	11.13
Oct.	10.60	12.69	10.52	12.75	10.56	12.72	11.64
Nov.	10.37	12.52	10.45	12.64	10.41	12.58	11.50
Dec.	10.68	12.88	10.75	12.79	10.72	12.84	11.78
Average	10.46	12.51	10.49	12.58			

LSD 0.05	cv x period	0.17
	Cv x year	0.12
	Cv x period x year	0.24

Table(12): Reducing sugars (%) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	8.19	9.68	8.26	9.91	8.23	9.79	9.01
Oct.	8.59	10.36	8.52	10.47	8.56	10.41	9.49
Nov.	8.41	10.22	8.46	10.38	8.44	10.30	9.37
Dec.	8.24	9.91	8.31	10.00	8.27	9.96	9.11
Average	8.36	10.04	8.39	10.19			

LSD 0.05 cv x period 0.12
Cv x year 0.09
Cv x period x year 0.18

Table(13): Ascorbic acid (mg/100g) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	52.04	45.64	50.34	47.76	51.19	46.70	48.94
Oct.	53.59	46.54	51.49	48.20	52.54	47.37	49.95
Nov.	53.16	46.28	50.82	47.41	51.99	46.84	49.41
Dec.	50.13	45.30	50.77	45.09	50.45	45.20	47.82
Average	52.23	45.94	50.86	47.12			

LSD 0.05 cv x period 1.15
Cv x year 0.81
Cv x period x year 1.62

Table(14): Crude protein (%) of different fruiting periods of Solo and Sunset papayas during 1996 and 1997 seasons.

Period (Month)	1996		1997		Average		
	Solo	Sunset	Solo	Sunset	Solo	Sunset	Season
Sept.	0.54	0.48	0.52	0.49	0.53	0.49	0.51
Oct.	0.53	0.49	0.52	0.49	0.53	0.49	0.51
Nov.	0.54	0.50	0.53	0.48	0.54	0.49	0.51
Dec.	0.53	0.49	0.53	0.49	0.53	0.49	0.51
Average	0.535	0.49	0.525	0.488			

LSD 0.05 cv x period 0.01
Cv x year 0.007
Cv x period x year 0.014

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تقييم صنفى الباباظ " سولو وصن ست " تحت الظروف البيئية لمصر
ب – تأثير موجات التزهير على حيوية حبوب اللقاح وعقد وخصائص الثمار

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يهدف البحث إلى دراسة تأثير موجات التزهير على حيوية حبوب اللقاح وعقد وخصائص ثمار الباباظ صنفى سولو وصن ست .

ويمكن تلخيص النتائج كالتالى :

– يبدأ تكون البراعم الزهرية لأشجار الباباظ تحت الظروف البيئية لمحافظة الجيزة – مصر من مارس حتى منتصف مايو .

– يبدأ التفتح الطبيعى للازهار بعد تكوين البراعم بحوالى 40 يوم وذلك خلال أبريل وحتى يوليو.

– سجلت حيوية حبوب لقاح موجة التزهير الأولى (أبريل) قيماً أقل منها للموجات الأخرى .

– كانت حيوية حبوب اللقاح صنف صن ست أعلى مقارنة بحبوب لقاح صنف سولو .

– كانت أعلى نسبة للعقد الأولى والنهائى للثمار فى موجات تزهير مايوبينما كانت الأقل هى موجة أبريل .

– كانت نسبة العقد الأولى والنهائى أعلى فى الصنف صن ست مقارنة بالصنف سولو .

– يتفوق الصنف صن ست فى عدد الثمار / نبات بينما تفوق الصنف سولو فى المحصول/نبات.

– أعطى إثمار أكتوبر أعلى نسبة مساهمة فى المحصول بينما الأقل كانت لإثمار ديسمبر .

– أعطت موجة تزهير مايو (أثمار أكتوبر) أثقل الثمار وزناً والأكبر حجماً مقارنة بمواعيد التزهير الأخرى. كما كانت ثمار الصنف سولو هى الأكبر والأثقل مقارنة بثمار الصنف صن ست وعلى النقيض كانت نسبة اللب بثمار الصنف صن ست أعلى منها بثمار الصنف سولو . ولم تظهر موجات التزهير المختلفة تأثيراً على نسبة اللب .

– سجل أقل قيم لمحتوى الثمار من المواد الصلبة والسكريات ونسبة المواد الصلبة إلى الحموضة فى ثمار سبتمبر (موجة تزهير أبريل) مقارنة بالمواعيد الأخرى . كما كانت نسبة هذه المكونات أعلى بثمار الصنف صن ست مقارنة بثمار الصنف سولو .

– لا يؤثر موعد نضج الثمار على محتواها من فيتامين C والبروتينات . بينما أظهرت ثمار الصنف سولو محتوى أعلى من هذه المركبات مقارنة بثمار صنف صن ست .

من هذه الدراسة يتضح أهمية الاهتمام بالأشجار خلال فترة الربيع حيث أن أزهار مايو يعطى محصول عال ذو خصائص ثمرية جيدة مقارنة بمواعيد التزهير الأخرى .