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EFFECT OF DIFFERENT BUNCH WAVES AND DAYTIME POLLINATION ON FRUIT SET AND QUALITY OF ZAGHLOUL DATE PALM UNDER ASSIUT CONDITION

Rafat A.A. Mostafa and Mokhtar M. Shaaban

Dept. of Horticulture, Fac. Agric., Assiut University, Assiut, Egypt.

Abstract: The effect of different daytime pollination and bunch burst waves on fruit set and quality of Zaghloul dates were investigated. Pollination the early, middle and later inflorescence burst waves at morning (8-9 a.m), noon (12-1 p.m.) and afternoon (3-4 p.m.) were achieved. Results indicate that the initial fruit set, ultimate retention and consequently bunch weight were significantly decreased by pollination at noon (12-1 p.m.) compared to pollination at either morning or afternoon. In addition, the middle inflorescence burst wave gave the highest fruit set and fruit retention percentages, as well as bunch weight in comparison to early or late inflorescence burst waves. Further, the interaction between the daytime pollination and inflorescence waves, the middle wave pollinated at afternoon produced the highest fruit retention percentage and consequently heaviest bunch weight. On the other hand, the least values of fruit retention and bunch weight were obtained on the latest wave pollinated at noon.

Middle inflorescence wave gave the heaviest fruit weight whereas the daytime pollination had no significant effect on such traits. Moreover, pollination at either morning or afternoon as well as middle inflorescence wave were accompanied with improving the dates chemical characteristics.

It is concluded from the foregoing results that choosing the middle inflorescence burst wave, as well as, pollination of Zaghloul date palm at morning or afternoon to obtain a considerable yield with best fruit quality.

Key words: date palm, bunch burst waves, daytime, pollination, inflorescence.

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Introduction

The date palm (*Phoenix dactylifera* L.) is one of the world's oldest cultivated tree crops. It has been a rich source of sugars and numerous minerals that are necessary for life and essentially required for good health and to support life (Popenae, 1973 and Mertz, 1981).

The genus *Phoenix* is characterized by dioecious plants with separate male and female trees. Pollination is necessary for successful fruit set and fruiting in date palm. Artificial pollination is considered the only way for commercial date production (Ream & Furr, 1969). The pollination efficiency is affected by several factors and consequently fruit set is highly dependent on these factors. Such factors, the pollination time, flowering period of male palm, the type of pollen, its viability and amount, the female flowers receptivity and the environmental conditions. High relative humidity was shown to damage date pollen grain, whereas high temperature induces poor germination of pollen grains (Brown and Perkins, 1969 and Brown, 1983). Pollination is preferably performed in the middle of the day, to avoid dampness (Popenae, 1973). Ream & Furr (1969) and Khalifa *et al.* (1983) found that 10 to 15% higher fruit set from pollination between 10 a.m and 3 p.m than early morning or late afternoon. Any time between 10 a.m and 3 p.m is considered suitable for pollination in Egypt. Pereau-Leroy (1958) recommended not to pollinate in the early morning or late afternoon, because of the negative effect of low temperature on the fruit sets.

The high fruit set and fruit quality were obtained from pollination Sewy date palm before sunset and afternoon, while, the lowest values were detected when pollination was carried out in the early morning under El-Fayoum environmental conditions (Moustafa *et al.*, 1986). More recently, high fruit set and fruit quality were recorded on Zaghloul date palm that pollinated before sunset (3-4 p.m), whereas, the lowest values were detected when pollination was carried out in the mid-day (11-12 a.m) and in the morning (6-7 a.m) (Salama, 2006). But Al-Bajallani *et al.* (1989) stated that the day time of pollination had no significant effect on fruit set percentage, number of seeded fruit, total yield and ripening of fruits.

So, the purpose of this investigation was to study the effect of different bunch burst waves and daytime pollination on fruit set and fruit quality of Zaghloul date palm cultivar under Assiut conditions.

Materials and Methods

Field work of this investigation was conducted throughout two successive seasons of 2006 and 2007 on 42 years old Zaghloul date palms, at the experimental orchard of Assiut University, Assiut, Egypt. Nine date palms that are uniform in vigour and in good physical condition, free of insect damage and diseases were selected. The number of spathes per palm were adjusted to nine, three for each date of inflorescence burst waves. The experimental included two factors (A & B). The first factor (A) consisted from three daytime of pollination, morning (8-9 a.m), noon (12-1 p.m) and afternoon (3-4 p.m). Whereas the second factor (B) include three date of inflorescences burst waves (earliest, middlest and latest).

Pruning was performed to maintain bunch/number of mature leaves ratio 1:8. Pollination was uniformed in respect of source and method to avoid residues of metaxenia. It was carried out at three different daytime morning (8-9 a.m), noon (12-1 p.m) and late afternoon (3-4 p.m). The other horticultural practices such as irrigation, fertilization, hoeing and pest control were used as usual. The experiment was set up in split plot randomized complete block design with nine replications one bunch each per treatment. Data concerning the temperature (°C) and relative humidity % during the pollination periods of the present study are given in Table (1). They were obtained from Assiut Meteorological station.

After one month from pollination and jest before harvest five female strands per bunch were randomly selected from each replication to estimate the initial and retention fruit set, respectively. The fruit set percentage was calculated as following equation:

$$\text{Fruit set \%} = \frac{\text{Number of setting (retention) fruits on the strand}}{\text{Total number of flowers per the strand}} \times 100$$

All bunches were harvested at the peak of colour development. Bunches weight was recorded and 30 fruits were picked at random

from each bunch for the determination of physical and chemical fruit properties as outlined in A.O.A.C. method (1975).

Data were statistically analysed and differences among treatments were compared using the least significant differences (L.S.D.) test according to Gomez and Gomez (1984) and Snedecor and Cochran (1990).

Table(1): Temperature (°C) and relative humidity (%) at Assiut during pollination periods of Zaghloul date palm in 2006 and 2007 seasons.

Date	Morning						Noon						Afternoon					
	8		9		10		12		1		2		3		4		5	
	Temp.	Hum.	Temp.	Hum.	Temp.	Hum	Temp.	Hum.	Temp	Hum.	Temp.	Hum.	Temp.	Hum.	Temp	Hum.	Temp.	Hum.
2006																		
10/3	10.2	47	13.4	47	16.2	47	18.2	39	18.8	34	19.2	34	20.0	37	20.0	34	19.0	39
11/3	10.6	54	13.6	59	16.0	51	20.0	43	21.4	37	22.0	37	23.0	35	21.8	37	21.0	37
12/3	11.8	47	15.8	42	18.4	40	22.4	23	23.6	22	24.8	19	26.2	19	25.8	18	24.4	18
13/3	14.6	27	17.8	28	20.0	27	23.0	27	24.6	26	25.8	26	26.0	24	26.0	23	24.8	22
14/3	14.0	33	18.2	37	21.0	31	25.0	26	26.2	21	27.4	21	27.4	18	27.2	20	24.6	18
15/3	14.8	34	17.2	39	20.2	37	23.4	35	23.4	33	23.6	31	24.0	29	23.4	29	23.4	31
16/3	13.2	39	15.6	45	18.2	37	22.6	33	23.2	31	23.4	33	23.4	33	23.6	35	23.2	35
17/3	13.2	46	16.0	48	20.4	42	22.0	33	23.0	33	23.6	31	24.0	33	22.4	33	21.2	33
18/3	12.8	47	15.4	48	18.2	40	21.6	37	23.2	33	24.2	33	24.0	31	23.8	29	23.2	27
19/3	16.0	26	19.2	31	22.2	22	25.2	1	28.0	16	30.2	16	31.2	16	30.6	15	29.6	16
20/3	15.4	27	17.4	59	20.4	46	25.6	32	27.2	25	28.0	25	28.4	25	28.0	27	26.4	27
21/3	17.4	37	22.4	41	25.2	32	29.0	24	30.6	22	32.2	20	33.4	17	34.2	16	33.0	17
22/3	18.4	18	22.8	26	27.0	24	30.2	17	31.4	17	32.6	18	32.8	15	33.0	16	31.6	15
23/3	18.2	17	23.2	26	26.2	18	29.4	11	31.4	11	33.4	11	34.8	11	33.8	12	31.6	12
24/3	20.0	22	25.0	20	28.2	18	30.4	16	31.8	16	31.8	16	32.8	16	32.2	16	31.0	16
25/3	16.4	38	18.8	45	22.0	43	23.8	33	23.6	29	24.2	31	25.0	31	25.2	33	25.0	29

Source: Assiut Meterological authority station.

Table(1): continue.

Date	Morning						Noon						Afternoon					
	8		9		10		12		1		2		3		4		5	
	Temp.	Hum.	Temp.	Hum.	Temp.	Hum.	Temp.	Hum	Temp	Hum.	Temp.	Hum.	Temp.	Hum	Temp.	Hum.	Temp.	Hum.
2007																		
10/3	16.0	39	21.0	38	25.0	32	28.0	15	29.0	13	30.0	14	30.0	12	29.0	16	28.0	23
11/3	20.0	12	20.0	16	25.0	10	25.0	18	26.0	17	27.0	18	27.0	18	27.0	18	26.0	20
12/3	15.0	47	18.0	45	21.0	38	22.0	35	25.0	28	25.0	26	25.0	24	25.0	26	24.0	27
13/3	16.0	52	17.0	59	20.0	46	23.0	31	24.0	29	25.0	26	26.0	23	25.0	24	25.0	22
14/3	14.0	51	16.0	55	17.0	52	20.0	40	21.0	31	21.0	33	21.0	33	21.0	33	21.0	33
15/3	11.0	44	14.0	48	14.0	48	17.0	34	18.0	32	17.0	30	17.0	23	17.0	34	18.0	33
16/3	11.0	44	14.0	51	15.0	51	17.0	39	19.0	32	19.0	28	20.0	27	20.0	26	19.0	28
17/3	12.0	37	15.0	45	16.0	48	19.0	35	20.0	26	20.0	30	20.0	30	20.0	26	20.0	28
18/3	11.0	65	13.0	67	16.0	55	18.0	42	20.0	37	20.0	33	21.0	28	20.0	33	20.0	35
19/3	14.0	33	19.0	37	20.0	33	23.0	27	23.0	25	25.0	28	24.0	27	25.0	28	25.0	28
20/3	19.0	8	19.0	11	23.0	10	28.0	10	28.0	11	27.0	12	28.0	19	27.0	17	26.0	14
21/3	15.0	27	19.0	32	22.0	31	24.0	22	26.0	20	26.0	18	26.0	14	26.0	16	25.0	18
22/3	17.0	27	21.0	28	23.0	27	26.0	21	28.0	17	29.0	16	29.0	13	29.0	11	29.0	11
23/3	24.0	13	27.0	13	30.0	10	32.0	18	33.0	7	36.0	8	36.0	8	35.0	9	34.0	7
24/3	16.0	60	18.0	52	18.0	45	18.0	49	19.0	46	19.0	46	20.0	37	17.0	48	17.0	45
25/3	13.0	56	15.0	51	17.0	42	21.0	21	22.0	23	22.0	23	22.0	23	22.0	23	20.0	25

Source: Assiut Meterological authority station.

Results and Discussion

The presented data in Table (2) showed the effect of different daytime pollination and bunch waves on fruit set and bunch weight of Zaghloul date palm during 2006 and 2007 seasons.

It is obvious from these data that the results took similar trend during the two studied seasons. Pollination at noon significantly decreased both initial fruit set and ultimate retention compared to pollination at either morning or afternoon. The highest fruit set percentage recorded when pollination carried out at morning. Meanwhile, there was insignificant differences in fruit set percentage when pollination carried out at either morning or afternoon. The obtained fruit set percentages were (64.50, 54.98 and 63.32%) and (60.79, 52.43 and 59.77%) for pollination at morning, noon and afternoon during the two studied seasons, respectively.

On the other hand, the highest fruit retention was found when the pollination carried out at afternoon. The recorded fruit retention were (32.25, 30.55 and 34.57%) and (33.23, 31.71 and 35.81%) for the two studied seasons, respectively.

The increase in the fruit set percentage when pollination at either morning or afternoon may be due to that the pollen grain can easily germinate and elongate to penetrate the stigma and style of female flower resulting in better fertilization and fruit set. The moderate temperature is conjunction with more humidity in such period. Whereas, the reduction of fruit set when pollination carried out at noon may be attributed to drought of stigma and fiasco of pollen grain germination and fertilization occurred. The fastest germination and pollen tube elongation in the styles of female flowers occurred at 25-28°C. Most of pollen tube reached the base of the style within 6 hours, while at 15°C pollen tubes do not reach the base of the style even after 8 hours at these temperature (Reuveni, 1986). The highest percentage of germination and maximum rate of pollen tube elongation occurred at 30°C, however, no germination occurred at 10°C (Al-Helal *et al.*, 1988). Efficient pollination depends on the ovule longevity and growth speed of the pollen tube which is highly susceptible to low temperatures (Zaid and de Wet, 2002).

Similar findings were reported by Ream & Furr (1969), Khalifa *et al.* (1983), Moustafa *et al.* (1986) and Salama (2006) who found that the high fruit set of Sewy and Zaghloul date palms were detected when pollination was carried out at before sunset (3-4 pm), whereas the lowest values were recorded when pollination carried out in mid day (11-12 am).

Moreover, data showed that bunch weight took similar tendency and significantly increased as fruit

retention percentage increased. Pollination at afternoon gave the heaviest bunch weight on contrary, lightest bunch weight recorded when pollination carried out at noon.

The obtained bunch weight could be arranged in descending order as follow (13.17, 11.20 and 9.57 kg) and (12.45, 10.47 and 9.03 kg) in response pollination at afternoon, morning and noon, during the two studied seasons, respectively. The increment percentage of bunch weight pollination at the afternoon and morning compared to pollination at noon were (37.62 and 17.03%) and (37.87 and 15.95%) during the two studied seasons, respectively.

Table(2): Effect of daytime pollination and female inflorescence burst waves on fruit set (%) and bunch weight (kg) of Zaghloul date palm in 2006 and 2007 seasons.

Treatments B→ A↓	2006				2007			
	Early wave	Middle wave	Late wave	means	Early wave	Middle wave	Late wave	means
	Initial fruit set %							
Morning	67.43	68.45	57.64	64.50	62.60	63.50	56.28	60.79
Noon	54.13	59.24	51.56	54.98	51.87	55.64	49.78	52.43
Afternoon	65.84	66.50	57.60	63.32	61.99	62.53	54.78	59.77
Means (B)	62.47	64.73	55.60		58.82	60.56	53.61	
LSD5% for:								
Daytime (A)	1.73				1.30			
Waves (B)	2.15				1.60			
Timex waves	3.74				2.75			
	Fruit retention %							
Morning	31.26	36.44	29.05	32.25	31.86	37.60	30.24	33.23
Noon	30.89	32.75	28.01	30.55	31.70	33.56	29.88	31.71
Afternoon	32.28	37.62	33.80	34.57	33.72	38.84	34.86	35.81
Means (B)	31.48	35.60	30.29		32.43	36.67	31.66	
LSD5% for:								
Daytime (A)	1.36				1.43			
Waves (B)	1.62				1.62			
Timex waves	2.81				2.78			
	Bunch weight kg							
Morning	10.60	13.00	10.00	11.20	9.92	12.10	9.40	10.47
Noon	9.40	11.20	8.10	9.57	8.74	10.52	7.82	9.03
Afternoon	11.80	14.50	13.20	13.17	11.08	13.80	12.46	12.45
Means (B)	10.60	12.90	10.43		9.91	12.14	9.89	
LSD5% for:								
Daytime (A)	0.87				0.45			
Waves (B)	0.70				0.68			
Timex waves	1.21				1.17			

This findings were in accordance with those published by Brown *et al.* (1969); Brown & Perkins (1969); Vis *et al.* (1969) and Brown (1983). They found that low yield at any season was attributed to daily maximum temperature being too low to achieve good pollen germination and fruit set. Also in this connection Vis *et al.* (1971); Asif *et al.* (1983) and Reuveni (1986), reported that low temperature during the pollination seasons appear to be associated with poor fruit set.

Nevertheless the effect of daytime pollination, data present in prementioned table indicate that the fruit set and fruit retention percentages were significantly affected by various inflorescence waves. The middle inflorescence wave was higher in their fruit set and fruit retention percentages in comparison to other two inflorescence waves. On the contrary, the fruit set and fruit retention percentage of late inflorescence was lower.

The fruit set percentages were (62.47, 64.73 and 55.60%) and (58.82, 60.56 and 53.61%) for early, middle and late inflorescence waves during the two studied seasons, respectively.

The increment percentage of fruit set for middle inflorescence wave over the late one was attained (16.42 and 12.96%) during the two studied seasons, respectively. Such results could be attributed to environmental condition and stigma respectivety were favourable to pollen grain germination, consequently fruit set increased. In addition, the high fruit set for middle inflorescence wave could be due to such inflorescence bursted from axils of 10-12 months old leaves which is characterized with high accumulation of carbohydrates creating favourable condition to increasing the flower bud burst and fruit set. On the other hand, the late inflorescence wave bursted from axils of <14 months old leaves which is characterized with less photosynthesis activity, induce less accumulation of carbohydrates and flower burst and fruit set (Mahmoud, 2005).

Moreover, the low fruit set for the early inflorescence wave could be explained by the non-maturity of their flowers, usually caused by low summation of heat.

Similarly, the least retained fruit at harvest was observed for the latest inflorescence waves. Such ultimate fruit retention significantly increased for early and middle inflorescence waves. The recorded fruit retention were (31.48, 35.60 and 30.29%) and (32.43, 36.67 and 31.66%) for early, middle and late inflorescence waves, during the two studied seasons, respectively. The increment percentage of fruit retention for middle inflorescence wave compared to late waves was (17.53 and 15.82%) during the two

studied seasons, respectively. Also, data clearly indicated that bunch weight took similar trend and increased significantly as percentage of fruit retention increased during the two investigated seasons. So, high fruit set on the inflorescence and better fruit retention resulted in heavy bunch weight could be obtained at harvest. The obtained bunch weight was (10.60, 12.90 and 10.43 kg) and (9.91, 12.14 and 9.89 kg) for the early, middle and late inflorescence waves during the two studied seasons, respectively.

In addition, Table (2) reveal that palm cropping responed significantly to the interaction between the daytime pollination and inflorescence waves. In this respect, the middle wave pollinated at afternoon produced the highest fruit retention percentage (37.62 and 38.84%) and consequently heaviest bunch weight (14.50 and 13.80 kg) during the two studied seasons, respectively. On the other hand, the minimum values of fruit retention (28.01 and 29.88%) and bunch weight (8.10 and 7.82 kg) were obtained on latest wave pollinated at noon, respectively.

These finding could be attributed to increase the initial fruit set percentage due to pollination at afternoon. In addition the improving such percentage for the middle waves.

Fruit quality:

As regard to the effect of daytime pollination, the data in Table (3) showed that the time of day had no significant effect of weight and dimension of fruits. The recorded of fruit weight was (15.92, 15.89 and 15.54 g) and (14.75, 14.80 and 14.50 g) for pollination at morning, noon and afternoon during the two studied seasons, respectively. But, pollination at noon significantly increased the pulp ratio compared to pollination at morning or afternoon. The estimated pulp percentage attained (88.96, 89.22 and 88.67%) and (88.13, 88.14 and 87.65%) due to pollination at morning, noon and afternoon, during the two studied seasons, respectively.

Regardless of daytime pollination effects, data indicate that the middle inflorescence wave gave the heaviest fruit weight compared to either the early or the late inflorescence waves. The recorded fruit weight were (15.50, 16.27 and 15.57 g) and (14.46, 15.19 and 14.50 g) for early, middle and late waves, during the two studied seasons, respectively. The increment percentage in fruit weight for middle inflorescence wave compared to latest one were (4.49 and 5.49%) during the two studied seasons, respectively.

Table (3): Effect of daytime pollination and female inflorescence burst waves on some physical properties Zaghloul dates in 2006 and 2007 seasons.

Treatments B→ A↓	2006				2007			
	Early wave	Middle wave	Late wave	means	Early wave	Middle wave	Late wave	means
	Fruit weight (g)							
Morning	15.48	16.70	15.58	15.92	14.58	15.57	14.40	14.85
Noon	15.52	16.22	15.92	15.89	14.36	15.20	14.85	14.80
Afternoon	15.50	15.90	15.22	15.54	14.44	14.80	14.26	14.50
Means (B)	15.50	16.27	15.57		14.46	15.19	14.50	
LSD5% for:								
Daytime (A)	N.S.				N.S.			
Waves (B)	0.67				0.61			
Time x waves	1.16				1.06			
	Fruit length (cm)							
Morning	4.48	4.54	4.44	4.49	4.32	4.50	4.32	4.38
Noon	4.44	4.38	4.30	4.37	4.22	4.24	4.16	4.21
Afternoon	4.26	4.40	4.42	4.36	4.16	4.34	4.26	4.25
Means (B)	4.39	4.44	4.39		4.23	4.36	4.25	
LSD5%for :								
Daytime (A)	N.S.				N.S.			
Waves (B)	N.S.				N.S.			
Time x waves	N.S.				N.S.			
	Fruit diameter (cm)							
Morning	2.16	2.26	2.18	2.20	2.10	2.18	2.09	2.12
Noon	2.24	2.24	2.20	2.23	2.16	2.17	2.12	2.15
Afternoon	2.16	2.18	2.18	2.17	2.11	2.11	2.00	2.07
Means (B)	2.19	2.23	2.19		2.12	2.15	2.07	
LSD5% for:								
Daytime (A)	N.S.				N.S.			
Waves (B)	N.S.				N.S.			
Time x waves	N.S.				N.S.			
	Pulp ratio (%)							
Morning	89.34	88.80	88.74	88.96	88.28	88.16	87.97	88.13
Noon	89.74	88.78	89.15	89.22	88.56	87.67	88.17	88.14
Afternoon	88.44	88.70	88.87	88.67	87.51	87.73	87.72	87.65
Means (B)	89.17	88.76	88.92		88.12	87.86	87.95	
LSD5% for:								
Daytime (A)	0.31				0.41			
Waves (B)	N.S.				N.S.			
Time x waves	0.91				0.88			

The interaction between the two studied factors, Table (3) indicated that pollination at morning induce significantly increase in fruit weight compared to pollination at either noon or afternoon. The greatest increase in fruit weight (16.70 and 15.57 g) was found when the middle inflorescence wave pollinated at morning, during the two studied seasons, respectively. On the contrary, the late wave pollinated at afternoon gave the lightest fruit weight (15.22 g and 14.26 g), respectively.

Moreover, data presented in Table (4) showed that pollination at either morning or afternoon as well as middle inflorescence wave were accompanied with improving the quality of dates in terms of raising total soluble solid and sugar contents and in decrement total acidity percentage. The recorded total soluble solids values were (33.38, 31.48 and 33.35%) and (30.41, 29.33 and 30.78%) for pollination at morning, noon and afternoon, during the two studied seasons, respectively. The corresponding total sugar values were (25.0, 24.02 and 24.96%) and (22.73, 21.77 and 22.85%), respectively.

Whereas, the total soluble solids for early, middle and late inflorescence waves were (32.68, 33.07 and 32.46%) and (30.32, 30.50 and 29.70%) during the two studied seasons, respectively. The corresponding total sugar values were (24.74, 24.87 and 24.37%) and (22.50, 22.60 and 22.25%), respectively.

Moreover, all combination of middle inflorescence wave pollinated at morning or afternoon gave the highest dates soluble solids and sugar contents comparing with other treatments.

These data are in accordance with those obtained by Moustafa *et al.* (1986) and Salama (2006) who found that the high fruit quality were recorded when pollination afternoon, whereas, the lowest values were detected when pollinated in the mid day.

On account of the previously mentioned findings, it is concluded that choosing the middle inflorescence wave, as well as, pollination of Zaghloul date palm at morning or afternoon was best to obtain a considerable yield with best fruit quality.

Table (4): Effect of daytime pollination and female inflorescence burst waves on some chemical properties Zaghloul dates in 2006 and 2007 seasons.

	2006				2007			
Treatments B→ A↓	Early wave	Middle wave	Late wave	means	Early wave	Middle wave	Late wave	means
	T.S.S. %							
Morning	33.18	33.66	33.30	33.38	30.38	30.73	30.11	30.41
Noon	31.02	31.60	31.82	31.48	29.64	29.51	28.85	29.33
Afternoon	33.84	33.96	32.26	33.35	30.95	31.26	30.13	30.78
Means (B)	32.68	33.07	32.46		30.32	30.50	29.70	
LSD5% for:								
Daytime (A)	0.94				0.81			
Waves (B)	0.56				0.51			
Time x waves	1.66				1.42			
	Total sugars %							
Morning	24.80	25.22	24.98	25.00	22.71	22.88	22.60	22.73
Noon	24.17	24.03	23.86	24.02	21.86	21.86	21.60	21.77
Afternoon	25.26	25.36	24.26	24.96	22.93	23.06	22.56	22.85
Means (B)	24.74	24.87	24.37		22.50	22.60	22.25	
LSD5% for:								
Daytime (A)	0.65				0.97			
Waves (B)	0.45				0.66			
Time x waves	0.77				1.14			
	Reducing sugar %							
Morning	18.17	18.92	18.36	18.48	17.64	18.32	17.61	17.86
Noon	18.00	17.80	17.88	17.89	17.36	17.21	17.16	17.24
Afternoon	19.03	19.11	18.05	18.73	18.22	18.42	17.28	17.97
Means (B)	18.40	18.61	18.10		17.74	17.98	17.35	
LSD5% for:								
Daytime (A)	0.52				0.46			
Waves (B)	0.42				0.41			
Time x waves	0.73				0.71			
	Acidity %							
Morning	0.15	0.16	0.16	0.16	0.14	0.15	0.15	0.15
Noon	0.20	0.21	0.21	0.20	0.17	0.17	0.19	0.17
Afternoon	0.14	0.16	0.21	0.17	0.14	0.15	0.16	0.15
Means (B)	0.16	0.18	0.19		0.15	0.16	0.16	
LSD5% for:								
Daytime (A)	0.023				0.020			
Waves (B)	0.016				0.015			
Time x waves	0.027				0.022			

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تأثير اختلاف موجات خروج السباطات ووقت التلقيح اليومى على العقد وخصائص ثمار نخيل البلح الزغلول تحت ظروف أسيوط

رأفت أحمد على مصطفى ، مختار ممدوح شعبان

قسم البساتين – كلية الزراعة – جامعة أسيوط

أجريت هذه الدراسة خلال موسمى 2006 ، 2007 لدراسة تأثير التوقيت اليومى للتلقيح وموعد خروج النورات المؤنثة على العقد وخصائص ثمار نخيل البلح الزغلول تحت ظروف أسيوط حيث تم إجراء التلقيح خلال ثلاثة مواعيد هى 8-9 صباحا ، 12-1 ظهرا و 3 4 عصرا . كذلك قسمت مواعيد التزهير إلى الموجه المبكرة والوسطى والمتأخرة .

ويمكن تلخيص النتائج فيما يلى :

- سبب التلقيح فى الفترة من 12-1 ظهرا إلى نقص معنوى فى نسبة العقد الأولى ونسبة الثمار المتبقية وبالتالى حدث نقص فى وزن السباطة مقارنة بإجراء التلقيح صباحا (8-9) أو عصرا من (3-4) .

- أعطت موجة تفتح الأغاريض الوسطى أعلى نسبة فى عقد الثمار والثمار المتبقية ووزن السباطة مقارنة بموجتى تفتح الازهار المبكرة أو المتأخرة .

أظهرت نتائج التفاعل بين موعد التلقيح وتفتح الأغاريض أن الموجه الوسطى لتفتح الاغاريض والتلقيح عصرا أعطت أعلى نسبة للثمار المتبقية ووزن السباطة مقارنة بالمعاملات الأخرى . بينما سجلت أقل قيم لنسبة الثمار المتبقية ووزن السباطة لموجة تفتح الأغاريض المتأخرة والتلقيح ظهرا (12-1 ظهرا) .

- ارتبط التلقيح صباحا أو عصرا بموجة تفتح الأغاريض الوسطى بتحسين واضح لخصائص الثمار الطبيعية والكيميائية حيث يؤدى ذلك إلى زيادة وزن الثمرة ونسبة المواد الصلبة الذائبة والسكريات ونقص الحموضة الكلية مقارنة بالمعاملات الأخرى.

من نتائج هذه الدراسة يمكن التوصية بأهمية اختيار الموجه المتوسطة من تفتح الأغاريض الزهرية المؤنثة وكذلك التلقيح خلال فترتى الصباح أو العصر وذلك للحصول على محصول عالى ذو خصائص ثمرية جيدة من نخيل البلح الزغلول تحت ظروف أسيوط المناخية .