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**EFFECT OF MALE VIGOUR AS WELL AS DATE AND DAY  
TIME OF POLLINATION ON YIELD AND FRUIT QUALITY  
OF SEWY DATE PALMS GROWN UNDER EL- FARAFRAH  
OASIS CONDITIONS  
I- PRODUCTIVITY AND SOME PHYSICAL PROPERTIES OF  
THE FRUITS.**

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**ABSTRACT**

This study was carried out during 2006 and 2007 seasons to elucidate various effects of male vigour, date and day time of hand pollination on yield, bunch weight and physical quality of Sewy date fruits, The experiment included three factors, the first factor consisted of three treatments of male vigour namely high vigour, medium, and low vigour males, the second factor involved five treatments from dates of pollination after spathe cracking namely two, four, six, eight and ten days after spathe cracking and the third factor consisted of three treatments from day time of pollination i.e. early morning ( 6.30- 7.30 am ); afternoon (12- 1.0 pm) and before sunset ( 4.30 – 5.30 pm).

Male vigour had no obvious effect on the studied characters. The optimum time during which female flowers of Sewy date palms remain receptive to pollination was four days after spathe cracking. Hand pollination of female Sewy date palms beyond six to ten days after spathe cracking caused a great decline in palms production. The best day times for pollination of Sewy date palms were before sunset followed by the time of afternoon.

For promoting yield and physical quality of fruits of Sewy date palms grown under El-Farafrah conditions, New Valley

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**Governorate, palms should be manually pollinated with pollen grains obtained from Sewy males regardless of male vigour at the second or the fourth day of spathe splitting at sunset or afternoon.**

## **INTRODUCTION**

Sewy date palm is one of the most important cv. of semi dry dates grown in Egypt especially at El Farafrah Oasis, New Valley Governorate.

Artificial pollination is considered the only way for commercial date production. In most date palm growing countries, seedlings males are used for pollination. These seedling males are variable in their growth vigour, spathe characteristics and pollen quality (Nasr, *et al.*, 1986 , Hussien, *et al.*, 1986 and Ibrahim and Sinbel, 1991)

Determination of length time or selecting the best time during which the female flowers of different date palm cvs remain receptive to fertilization is very important to date growers. Early pollination after flowers opening is very beneficial for obtaining female flowers which are very receptive to fertilization. Pollinating the palms after five days of spathe cracking is considered the maximum length of receptivity to obtain appropriate yield of good fruit quality.( Abdalla, 1996; Soliman, 1999; Marzouk *et al.*, 2002c; and Abdalla *et al.*, 2002).

Pollens from different date palm males vary in shape, size, viability, germination and pollen tube length. Therefore, pollen grains from different male date palms may affect yield and fruit quality, a phenomenon known "Metaxenia" in some date palms. In another date palm cvs , the vigour had a slight effect on palm production ( El-Salhy *et al.*, 1997 ; Rahemi 1998 ; Khalifa , 1999; Helail and El- Kholey 2000 ; Abd El-Hamid, 2000; Marzouk *et al.*, 2002 and 2002b; Soliman and El- Kosary 2002; El- Kosary and Soliman 2003; Mohammed *et al.*, 2004b and Al- Hamoudi *et al.*, 2006).

Selecting the suitable day time for pollination is very effective in enhancing the efficiency of pollination and fertilization, yield and physical quality of fruits in different date palm cvs. Germination of pollen grains depends on temperature and relative humidity during day time. Delaying day time from early morning to afternoon was

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accompanied with improving germination of pollen grains (Brown *et al.*, 1969; Soliman *et al.*, 1976; Khosh- Khui *et al.*, 1979 and Moustafa *et al.*, 1986).

The first part of this study was conducted to assess the period of time ( date of pollination) at which the female flowers of Sewy date palm remain receptive to fertilization and the best time for pollination of Sewy date palms. Also, selecting the suitable pollinator and the proper day time of pollination after female spathe cracking which may result in appropriate production quantitatively and qualitatively.

### **MATERIALS AND METHODS**

This study was divided into two separate parts. The first part which presented herein is dealing with the effect of some pollination treatments on yield and physical characters of Sewy date palms. The experiment was conducted in an orchard of date palm located at El-Farafrah Oasis, New Valley Governorate during two consecutive seasons of 2006 and 2007 on one hundred and thirty five 14 years old propagated by offshoots Sewy date palms ( as semi dry date palm cv.) . The selected palms were uniform in vigour, healthy, good physical conditions, free of insects, damage and diseases and grown in sandy soil. They were planted at 7x 7 meters apart. The number of female spathes per each palm was adjusted to ten spathes by removing excess earliest, latest and small bunches, and the leaf bunch ratio was maintained at 7 :1 according to Sayed , (2002).

Generally, hand pollination of all selected palms was achieved by inserting ten male strands into the centre of the female bunch according to Soliman and El- Kosary, (2002) using different sources of pollen grains (from high vigour, medium vigour and low vigour males) throughout different dates after spathe cracking during various times through the day. To prevent contamination of pollens, every bunch was bagged after inserting the male strands by paper bags which was tied at the ends using a piece of cotton for aeration. The bags were shaken lightly to ensure pollen distribution and were removed after four weeks.

All selected Sewy date palms received the same and common horticultural practices that are usually applied in the orchard.

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The experiment included three factors ( A & B & C). The first factor ( A) consisted of three treatments of male vigour namely ; a<sub>1</sub>] high vigour ( had spathes with higher weight and dimensions longer strands, great number of flowers per strand as well as higher amount of pollens per spathe; a<sub>2</sub>] medium vigour ( had medium values of characters of spathes and amount of pollens per spathe) and a<sub>3</sub>] low males ( had lower values of characters of spathes and small amount of pollens per spathe ).

The second factor (B) involved five treatments from dates of pollination after spathe cracking namely; b<sub>1</sub>) two, b<sub>2</sub>) four, b<sub>3</sub>) six, b<sub>4</sub>) eight and b<sub>5</sub>) ten days. The third factor (C) consisted of three treatments from day time pollination i.e., c<sub>1</sub>) early morning (6.3- 7.30 am); c<sub>2</sub>), afternoon (12-1.0 pm) and c<sub>3</sub>) before sunset (4.30-5.30 pm).

Therefore, the experiment included 45 different pollination treatments ( 3 male vigor treatments X 5 dates of pollination after spathe cracking X 3 day time pollination treatments )

Each treatment was represented by three Sewy date palms (each one as replicate).

The experiment was set up in split split plot arrangement of completely randomized block design. Male vigour, dates of pollination and day time of pollination stood up for main, sub- plot and sub- sub – plots, respectively.

Data of temperature (C<sup>o</sup>) and relative humidity (%) obtained from El- Farafrah Meteorological Station during the pollination periods of the study are given in Table 1..

All fruit bunches ( ten bunches / palm) were harvested at late Rutab stage ( 1<sup>st</sup> week of Sept.). Bunch weight (kg.) was recorded. Yield per palm (kg.) was estimated by multiplying number of bunches by average bunch weight. Twenty- five fruits from each bunch were picked at random (i.e. 250 fruits/palm) for the determination of fruit weight (g.) and pulp/ seed ratio.

The obtained data were tabulated and subjected to the proper statistical analysis of variance using New L.S.D. test for recognizing the significant differences among the various treatment means according to the method outlined by Gomez and Gomez (1984).

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**Table 1 : Temperature (C°) and relative humidity (RH%) at El-Farafrah region during pollination periods of " Sewy " date palms in 2006 and 2007 season.**

Month		Early morning 6:30 – 7:30 am				Afternoon 12- 1 pm				Before sunset 4:30 – 5:30 pm			
		Temperature. °C		Relative humidity (%)		Temperature. °C		Relative humidity (%)		Temperature. °C		Relative humidity (%)	
		2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
13	Mar.	11.2	19.3	28	30	21.2	20.7	11	10	12.3	14.2	12	18
14	Mar.	10.8	17.4	27	29	19.8	21.1	10	9	13.5	13.1	18	17
15	Mar.	9.8	15	25	30	21.1	23.8	12	8	14.1	13.2	17	17
16	Mar.	12.7	13.3	24	32	22.3	22.3	11	11	14.8	12.8	17	18
17	Mar.	13.5	10.2	23	31	24.1	20.4	12	12	13.4	13.9	18	19
18	Mar.	11.2	11.4	27	30	21.3	21.8	13	10	12.8	14.8	15	16
19	Mar.	9.4	18.1	28	28	23.7	22.4	14	13	11.5	13.2	14	14
20	Mar.	8.5	16.5	30	27	22.1	20.3	12	11	8.9	11.7	16	15
21	Mar.	13.1	15.3	31	26	20.3	12.5	11	13	14.1	12.5	19	18
22	Mar.	12.1	13.8	34	27	21.5	15.8	10	14	13.5	12.9	18	19
23	Mar.	11.5	12.1	30	26	22.5	21.7	13	12	15.1	11.8	17	17
24	Mar.	8.4	14.5	35	27	23.1	23.2	12	11	17.8	13.5	16	14
25	Mar.	7.9	17.2	35	27	21.4	20.5	11	10	18.9	14.0	19	15
26	Mar.	6.8	18.2	34	28	20.1	22.1	13	13	16.4	13.6	18	13
27	Mar.	10.3	17.5	33	34	20.8	24.2	14	12	18.9	14.4	14	14
28	Mar.	4.5	11.5	32	31	20.1	21.8	12	11	11.5	13.6	15	16
29	Mar.	10	14.2	28	30	20	22.5	12	11	13.1	13.3	16	9
30	Mar.	12	15	23	28	23	23.7	11	12	12.3	14.5	18	19
31	Mar.	11.2	16.3	24	29	24.2	24.8	13	13	11.9	15.2	14	11
1	April	10.1	18.4	28	33	21.3	22.4	10	14	13.4	13.4	15	12
2	April	9.4	20	27	31	24.3	23.5	11	15	14.1	15.3	13	13
3	April	14	18.5	22	30	23.4	24.1	13	14	12.3	14.8	11	14
4	April	14.2	19	30	34	24.3	24.3	12	11	12.1	14.3	12	15
5	April	13	17.8	29	36	23.5	23.6	10	12	15.4	13.5	14	11
6	April	11	18.6	28	34	24.4	24	11	13	14.1	16.8	12	18
7	April	10.2	17.5	31	38	23.1	22	13	14	13.4	16.1	11	16
8	April	13	19.7	29	37	22.4	23.3	14	10	15.2	16.2	13	16
9	April	14.2	18.2	32	38	23.2	25	11	12	15.9	17.1	14	13

Source: Meteorological Dept., Meteorological Station at El Farafrah  
(2006- 2007) New Valley Governorate.

## RESULTS AND DISCUSSION

### Yield and bunch weight:

Data in Tables 2 , 3, 4 and 5 clearly show that varying male vigour of Sewy date palms had a slight and insignificant effect on yield and bunch weight of palms. The slight effect of date palm male vigour on yield and bunch weight was reported by Helail and El-Kholey (2000) on Hallawy date palms.

Pollination during the period of time at which female flowers of Sewy date palms remain receptive to fertilization had an announced effect on yield and bunch weight. A gradual decline in yield and bunch weight was observed with delaying date of hand pollination from the second to the tenth day after spathe cracking. However, reduction in yield was significant when pollination was conducted beyond the sixth to the tenth day after spathe opening. Yield per palm and bunch weight were similar from statistical point of view, if pollination took place either at the second or the fourth day after female spathe cracking. The maximum yield per palm and bunch weight of Sewy date palms was recorded when hand pollination was carried out at the second day after spathe cracking. However, carrying out pollination at the tenth day after spathe opening gave the minimum yield. These results were true for the two seasons. These findings might be attributed to the delay of pollen tubes to the ovules, consequently poor and failure of fruit setting as a result of delaying pollination and the reduction of flowers receptive to fertilization.

These results are in partial agreement with those obtained by Abdalla (1996) on Sewy date palms and Mohammed *et al.*, (2004b) on Dhakki date palms.

A progressive and significant promotion on yield and bunch weight was attained with delaying day time of pollination from early morning to before sunset. The maximum yield and bunch weight were obtained when Sewy date palms were pollinated before sunset. Carrying out hand pollination at early morning gave the lowest values. An intermediate values of yield and bunch weight were recorded on palms pollinated at afternoon.

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**Table 2: Effect of male vigour as well as date and day time of hand pollination on the yield per palm (kg.) of Sewy date palms during 2006 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathes cracking)</b>							
b <sub>1</sub> Two days	183.7	182.7	181.3	182.6			
b <sub>2</sub> Four days	181.7	180.3	179.3	180.4			
b <sub>3</sub> Six days	158.7	157.0	155.8	157.2			
b <sub>4</sub> Eight days	106.7	105.3	103.8	105.3			
b <sub>5</sub> Ten days	50.3	49.0	48.0	49.1			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	128.2	126.6	125.5	126.8			
C <sub>2</sub> Afternoon	135.2	134.2	133.2	134.2			
C <sub>3</sub> Before sunset	145.2	143.9	142.3	143.8			
b <sub>1</sub> C <sub>1</sub>	176.0	175.0	174.0	175.0			
b <sub>1</sub> C <sub>2</sub>	182.0	181.0	180.0	181.0			
b <sub>1</sub> C <sub>3</sub>	193.0	192.0	190.0	191.7			
b <sub>2</sub> C <sub>1</sub>	175.0	174.0	173.0	174.0			
b <sub>2</sub> C <sub>2</sub>	180.0	179.0	178.0	179.0			
b <sub>2</sub> C <sub>3</sub>	190.0	188.0	187.0	188.3			
b <sub>3</sub> C <sub>1</sub>	150.0	148.0	147.0	148.3			
b <sub>3</sub> C <sub>2</sub>	156.0	155.0	154.0	155.0			
b <sub>3</sub> C <sub>3</sub>	170.0	168.5	166.5	168.3			
b <sub>4</sub> C <sub>1</sub>	100.0	98.0	96.5	98.2			
b <sub>4</sub> C <sub>2</sub>	107.0	106.0	105.0	106.0			
b <sub>4</sub> C <sub>3</sub>	113.0	112.0	110.0	111.7			
b <sub>5</sub> C <sub>1</sub>	40.0	38.0	37.0	42.3			
b <sub>5</sub> C <sub>2</sub>	51.0	50.0	49.0	50.0			
b <sub>5</sub> C <sub>3</sub>	60.0	59.0	58.0	59.0			
Mean (A)	136.2	134.9	133.7				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	7.2	5.3	12.5	9.2	11.9	20.5

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**Table 3: Effect of male vigour as well as date and day time of hand pollination on the yield per palm (kg.) of Sewy date palms during 2007 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
Pollination date (B) ( after spathes cracking)							
b <sub>1</sub> Two days	146.7	145.9	145.5	146.0			
b <sub>2</sub> Four days	145.3	144.1	143.8	144.4			
b <sub>3</sub> Six days	126.9	126.0	125.0	126.0			
b <sub>4</sub> Eight days	85.3	84.0	83.5	84.3			
b <sub>5</sub> Ten days	40.4	39.2	38.8	39.5			
Day time of pollination (C)							
C <sub>1</sub> Early morning	102.9	101.1	100.6	101.5			
C <sub>2</sub> Afternoon	107.9	107.3	106.7	107.3			
C <sub>3</sub> Before sunset	116.0	115.2	114.7	115.3			
b <sub>1</sub> C <sub>1</sub>	141.0	140.0	139.0	140.0			
b <sub>1</sub> C <sub>2</sub>	145.0	144.8	144.6	144.8			
b <sub>1</sub> C <sub>3</sub>	154.0	153.0	153.0	153.3			
b <sub>2</sub> C <sub>1</sub>	140.0	139.2	139.0	139.4			
b <sub>2</sub> C <sub>2</sub>	144.0	143.0	142.5	143.2			
b <sub>2</sub> C <sub>3</sub>	152.0	150.0	150.0	150.7			
b <sub>3</sub> C <sub>1</sub>	120.0	118.0	117.5	118.5			
b <sub>3</sub> C <sub>2</sub>	124.8	124.0	122.5	123.8			
b <sub>3</sub> C <sub>3</sub>	136.0	136.0	135.0	135.7			
b <sub>4</sub> C <sub>1</sub>	81.0	78.4	77.5	79.0			
b <sub>4</sub> C <sub>2</sub>	85.0	84.5	84.0	84.5			
b <sub>4</sub> C <sub>3</sub>	90.0	89.2	89.0	89.4			
b <sub>5</sub> C <sub>1</sub>	32.5	30.0	30.0	30.8			
b <sub>5</sub> C <sub>2</sub>	40.8	40.0	40.0	40.3			
b <sub>5</sub> C <sub>3</sub>	48.0	47.7	46.5	47.4			
Mean (A)	108.9	107.8	107.3				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	3.0	2.1	5.2	3.6	4.7	8.1



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**Table 4: Effect of male vigour as well as date and day time of hand pollination on average bunch weight (kg.) of Sewy date palms during 2006 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathes cracking)</b>							
b <sub>1</sub> Two days	18.37	18.27	18.13	18.26			
b <sub>2</sub> Four days	18.17	18.04	17.94	18.05			
b <sub>3</sub> Six days	15.88	15.74	15.61	15.74			
b <sub>4</sub> Eight days	10.68	10.54	10.41	10.54			
b <sub>5</sub> Ten days	5.05	4.92	4.82	4.93			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	13.05	12.67	12.57	12.76			
C <sub>2</sub> Afternoon	13.53	13.43	13.33	13.43			
C <sub>3</sub> Before sunset	14.53	14.41	14.25	14.40			
b <sub>1</sub> C <sub>1</sub>	17.60	17.50	17.40	17.50			
b <sub>1</sub> C <sub>2</sub>	18.20	18.10	18.00	18.10			
b <sub>1</sub> C <sub>3</sub>	19.31	19.21	19.00	19.17			
b <sub>2</sub> C <sub>1</sub>	17.51	17.41	17.30	17.41			
b <sub>2</sub> C <sub>2</sub>	18.00	17.90	17.80	17.90			
b <sub>2</sub> C <sub>3</sub>	19.00	18.81	18.71	18.84			
b <sub>3</sub> C <sub>1</sub>	15.00	14.81	14.72	14.84			
b <sub>3</sub> C <sub>2</sub>	15.62	15.51	15.40	15.51			
b <sub>3</sub> C <sub>3</sub>	17.01	16.91	16.70	16.87			
b <sub>4</sub> C <sub>1</sub>	10.02	9.83	9.70	9.85			
b <sub>4</sub> C <sub>2</sub>	10.71	10.60	10.52	10.61			
b <sub>4</sub> C <sub>3</sub>	11.31	11.20	11.01	11.17			
b <sub>5</sub> C <sub>1</sub>	4.01	3.80	3.72	3.84			
b <sub>5</sub> C <sub>2</sub>	5.12	5.02	4.93	5.02			
b <sub>5</sub> C <sub>3</sub>	6.03	5.03	5.82	5.93			
Mean (A)	13.63	13.50	13.38				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.96	0.60	1.66	1.04	1.34	2.32

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**Table 5: Effect of male vigour as well as date and day time of hand pollination on average bunch weight (kg.) of Sewy date palms during 2007 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
Pollination date (B) ( after spathes cracking)							
b <sub>1</sub> Two days	14.67	14.59	14.55	14.60			
b <sub>2</sub> Four days	14.53	14.41	14.38	14.44			
b <sub>3</sub> Six days	12.69	12.60	12.50	12.60			
b <sub>4</sub> Eight days	8.53	8.40	8.35	8.43			
b <sub>5</sub> Ten days	4.04	3.91	3.88	3.94			
Day time of pollination (C)							
C <sub>1</sub> Early morning	10.29	10.11	10.06	10.15			
C <sub>2</sub> Afternoon	10.79	10.72	10.67	10.73			
C <sub>3</sub> Before sunset	11.61	11.51	11.47	11.53			
b <sub>1</sub> C <sub>1</sub>	14.08	14.00	13.90	13.99			
b <sub>1</sub> C <sub>2</sub>	14.50	14.48	14.46	14.48			
b <sub>1</sub> C <sub>3</sub>	15.44	15.30	15.30	15.35			
b <sub>2</sub> C <sub>1</sub>	14.00	13.42	13.90	13.94			
b <sub>2</sub> C <sub>2</sub>	14.40	14.30	14.25	14.32			
b <sub>2</sub> C <sub>3</sub>	15.20	15.00	15.00	15.07			
b <sub>3</sub> C <sub>1</sub>	12.00	11.80	11.75	11.85			
b <sub>3</sub> C <sub>2</sub>	12.48	12.40	12.25	12.38			
b <sub>3</sub> C <sub>3</sub>	13.60	13.60	13.50	13.57			
b <sub>4</sub> C <sub>1</sub>	8.10	7.84	7.75	7.90			
b <sub>4</sub> C <sub>2</sub>	8.50	8.45	8.40	8.45			
b <sub>4</sub> C <sub>3</sub>	9.00	8.92	8.90	8.94			
b <sub>5</sub> C <sub>1</sub>	3.25	3.00	3.00	3.08			
b <sub>5</sub> C <sub>2</sub>	4.08	4.00	4.00	4.03			
b <sub>5</sub> C <sub>3</sub>	4.80	4.74	4.65	4.73			
Mean (A)	10.89	10.78	10.73				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.92	0.51	1.59	0.88	1.14	1.98

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Selecting vigour males for pollinating of Sewy date palms at the second day of spathe cracking before sunset was found to be profitable for maximizing yield and bunch weight of Sewy date palms grown under El-Farafrah environmental conditions. Under such promising pollination treatment each palm produced 193 and 154 kg in both seasons, respectively. These results were true in both seasons.

The observed effect of day time of pollination on yield and bunch weight might be attributed to the increase in fruit set when hand pollination was carried out before sunset as a result of the availability of environmental conditions at this time (March and April) of the days at which there was decline in temperature accompanied with optimum and adequate relative humidity. Thus, the pollen tube can easily germinate and elongate to penetrate the stigma and style of the female flowers. Also, pollen germination is closely related with both environmental conditions and stigma receptivity (Brown *et al.*, 1969).

Similar results were reported by Moustafa *et al.*, (1986) on Sewy date palms.

### **Fruit weight and pulp / seed ratios:**

It is evident from the data in Tables 6 , 7 , 8 and 9 that varying male vigour failed to show significant effect on the two physical characters of fruits. These results are in harmony with those obtained by Helail and El- Kholey (2000) on Khadrawy dates and Al- Hamoudi *et al.*, (2006) on Barhi dates.

In general, there was gradual promotion on the two investigated physical characters with delaying date of pollination after spathe opening from two to ten days. The maximum values were recorded on palms pollinated at ten days after spathe splitting. Hand pollination at the second day of spathe cracking gave the minimum values. Similar results were observed in both seasons. Such results might be due to the effect of delaying pollination after spathe cracking on reducing fruit setting and improving organic and mineral nutrients for the retaining fruits. These results are in harmony with those obtained by Soliman (1999) on Samany dates , Marzouk *et al.*, (2002c) on Zaghoul and Samany dates and Abdalla *et al.*, (2002) on Sewy dates.

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**Table 6: Effect of male vigour as well as date and day time of hand pollination on average fruit weight (g.) of Sewy date palms during 2006 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathes cracking)</b>							
b <sub>1</sub> Two days	12.20	12.24	12.30	12.25			
b <sub>2</sub> Four days	12.25	12.30	12.36	12.30			
b <sub>3</sub> Six days	12.57	12.62	12.67	12.62			
b <sub>4</sub> Eight days	13.15	13.19	13.24	13.19			
b <sub>5</sub> Ten days	13.71	13.75	13.83	13.76			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	12.96	13.01	13.07	13.01			
C <sub>2</sub> Afternoon	12.76	12.81	12.87	12.18			
C <sub>3</sub> Before sunset	12.60	12.65	12.70	12.65			
b <sub>1</sub> C <sub>1</sub>	12.40	12.45	12.50	12.45			
b <sub>1</sub> C <sub>2</sub>	12.20	12.24	12.30	12.25			
b <sub>1</sub> C <sub>3</sub>	12.00	12.04	12.10	12.05			
b <sub>2</sub> C <sub>1</sub>	12.45	12.50	12.56	12.50			
b <sub>2</sub> C <sub>2</sub>	12.24	12.30	12.35	12.30			
b <sub>2</sub> C <sub>3</sub>	12.06	12.11	12.16	12.11			
b <sub>3</sub> C <sub>1</sub>	12.71	12.75	12.80	12.75			
b <sub>3</sub> C <sub>2</sub>	12.60	12.66	12.70	12.65			
b <sub>3</sub> C <sub>3</sub>	12.41	12.45	12.50	12.45			
b <sub>4</sub> C <sub>1</sub>	13.30	13.34	13.40	13.35			
b <sub>4</sub> C <sub>2</sub>	13.10	13.14	13.20	13.15			
b <sub>4</sub> C <sub>3</sub>	13.05	13.10	13.12	13.09			
b <sub>5</sub> C <sub>1</sub>	13.96	14.00	14.10	14.02			
b <sub>5</sub> C <sub>2</sub>	13.66	13.70	13.80	13.72			
b <sub>5</sub> C <sub>3</sub>	13.50	13.55	13.60	13.55			
Mean (A)	12.77	12.82	12.88				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.21	0.14	0.36	0.24	0.31	1.20

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**Table 7: Effect of male vigour as well as date and day time of hand pollination on average fruit weight (g.) of Sewy date palms during 2007 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathes cracking)</b>							
b <sub>1</sub> Two days	13.41	13.45	13.49	13.45			
b <sub>2</sub> Four days	13.48	13.50	13.52	13.50			
b <sub>3</sub> Six days	13.83	13.87	13.90	13.87			
b <sub>4</sub> Eight days	14.74	14.49	14.50	14.49			
b <sub>5</sub> Ten days	15.08	15.11	15.13	15.11			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	14.26	14.29	14.31	14.29			
C <sub>2</sub> Afternoon	14.03	14.06	14.08	14.06			
C <sub>3</sub> Before sunset	13.87	13.90	13.92	13.90			
b <sub>1</sub> C <sub>1</sub>	13.64	13.68	13.70	13.67			
b <sub>1</sub> C <sub>2</sub>	13.40	13.43	13.46	13.43			
b <sub>1</sub> C <sub>3</sub>	13.20	13.25	13.30	13.25			
b <sub>2</sub> C <sub>1</sub>	13.70	13.72	13.74	13.72			
b <sub>2</sub> C <sub>2</sub>	13.46	13.50	13.51	13.49			
b <sub>2</sub> C <sub>3</sub>	13.27	13.30	13.31	13.29			
b <sub>3</sub> C <sub>1</sub>	13.98	14.00	14.05	14.01			
b <sub>3</sub> C <sub>2</sub>	13.86	13.90	13.92	13.87			
b <sub>3</sub> C <sub>3</sub>	13.65	13.70	13.72	13.69			
b <sub>4</sub> C <sub>1</sub>	14.63	14.65	14.66	14.65			
b <sub>4</sub> C <sub>2</sub>	14.41	14.42	14.44	14.42			
b <sub>4</sub> C <sub>3</sub>	14.36	14.39	14.40	14.38			
b <sub>5</sub> C <sub>1</sub>	15.36	15.40	15.41	15.39			
b <sub>5</sub> C <sub>2</sub>	15.03	15.06	15.09	15.03			
b <sub>5</sub> C <sub>3</sub>	14.85	14.88	14.90	14.88			
Mean (A)	14.05	14.08	14.10				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.06	0.08	0.10	0.14	0.18	0.31

**Table 8: Effect of male vigour as well as date and day time of hand pollination on pulp/ seed in the fruits of Sewy date palms during 2006 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathe cracking)</b>							
b <sub>1</sub> Two days	4.05	4.15	4.17	4.12			
b <sub>2</sub> Four days	4.34	4.38	4.44	4.39			
b <sub>3</sub> Six days	4.95	5.08	5.15	5.06			
b <sub>4</sub> Eight days	5.87	5.98	6.04	5.96			
b <sub>5</sub> Ten days	6.31	6.40	6.45	6.39			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	5.66	5.77	5.82	5.75			
C <sub>2</sub> Afternoon	4.99	5.06	5.09	5.05			
C <sub>3</sub> Before sunset	4.66	4.76	4.84	4.75			
b <sub>1</sub> C <sub>1</sub>	4.26	4.41	4.43	4.37			
b <sub>1</sub> C <sub>2</sub>	4.00	4.08	4.08	4.05			
b <sub>1</sub> C <sub>3</sub>	3.88	3.95	4.00	3.94			
b <sub>2</sub> C <sub>1</sub>	4.75	4.81	4.88	5.81			
b <sub>2</sub> C <sub>2</sub>	4.26	4.26	4.32	4.28			
b <sub>2</sub> C <sub>3</sub>	4.00	4.08	4.13	4.07			
b <sub>3</sub> C <sub>1</sub>	5.25	5.37	5.45	5.36			
b <sub>3</sub> C <sub>2</sub>	4.88	4.99	5.06	4.98			
b <sub>3</sub> C <sub>3</sub>	4.71	4.88	4.95	4.85			
b <sub>4</sub> C <sub>1</sub>	6.69	6.94	7.00	6.88			
b <sub>4</sub> C <sub>2</sub>	5.67	5.67	5.67	5.67			
b <sub>4</sub> C <sub>3</sub>	5.25	5.33	5.45	5.34			
b <sub>5</sub> C <sub>1</sub>	7.33	7.33	7.33	7.33			
b <sub>5</sub> C <sub>2</sub>	6.14	6.30	6.35	6.26			
b <sub>5</sub> C <sub>3</sub>	5.45	5.58	5.67	5.57			
Mean (A)	5.10	5.20	5.25				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.30	0.55	0.52	0.95	1.23	2.13

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**Table 9: Effect of male vigour as well as date and day time of hand pollination on pulp/ seed in the fruits of Sewy date palms during 2007 season.**

Date (B) and day time of pollination (C) treatment	Male vigour (A)						
	a <sub>1</sub> High vigour	a <sub>2</sub> Medium vigour	a <sub>3</sub> Low vigour	Mean B, C & BC			
<b>Pollination date (B) ( after spathes cracking)</b>							
b <sub>1</sub> Two days	4.19	4.25	4.28	4.24			
b <sub>2</sub> Four days	4.46	4.51	4.56	4.51			
b <sub>3</sub> Six days	5.09	5.13	5.17	5.13			
b <sub>4</sub> Eight days	6.36	6.48	6.57	6.47			
b <sub>5</sub> Ten days	6.54	6.61	6.67	6.61			
<b>Day time of pollination (C)</b>							
C <sub>1</sub> Early morning	5.98	6.06	6.13	6.06			
C <sub>2</sub> Afternoon	5.16	5.24	5.28	5.23			
C <sub>3</sub> Before sunset	4.85	4.89	4.94	4.89			
b <sub>1</sub> C <sub>1</sub>	4.49	4.56	4.62	4.56			
b <sub>1</sub> C <sub>2</sub>	4.08	4.13	4.13	4.11			
b <sub>1</sub> C <sub>3</sub>	4.00	4.05	4.10	4.05			
b <sub>2</sub> C <sub>1</sub>	4.88	4.99	5.10	4.99			
b <sub>2</sub> C <sub>2</sub>	4.32	4.41	4.43	4.39			
b <sub>2</sub> C <sub>3</sub>	4.18	4.13	4.15	4.15			
b <sub>3</sub> C <sub>1</sub>	5.49	5.49	5.54	5.51			
b <sub>3</sub> C <sub>2</sub>	4.99	5.06	5.10	5.05			
b <sub>3</sub> C <sub>3</sub>	4.78	4.85	4.88	4.84			
b <sub>4</sub> C <sub>1</sub>	7.33	7.47	7.55	7.45			
b <sub>4</sub> C <sub>2</sub>	6.14	6.30	6.41	6.28			
b <sub>4</sub> C <sub>3</sub>	5.62	5.67	5.76	5.68			
b <sub>5</sub> C <sub>1</sub>	7.70	7.77	7.85	7.77			
b <sub>5</sub> C <sub>2</sub>	6.25	6.30	6.35	6.30			
b <sub>5</sub> C <sub>3</sub>	5.67	5.76	5.80	5.74			
Mean (A)	5.33	5.40	5.45				
New L.S.D. at 5 %	A	B	C	AB	AC	BC	ABC
	NS	0.12	0.17	0.21	0.29	0.38	0.66

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However, the best results were obtained when pollination was carried out at early morning. Carrying out pollination before sunset gave unsatisfactory promotion on fruit quality. Such trend was observed in 2006 and 2007 seasons. Using pollen grains from weak males and carrying out pollination at ten days after spathe cracking early morning maximized such two characters.

These findings regarding the effect of day time of pollination on physical characters of the dates are in harmony with those obtained by Moustafa *et al.*, (1986) on Sewy dates.

As a conclusion, pollinating Sewy date palms grown under El-Farafrah conditions with pollen grains obtained from Sewy males at the second or the fourth day of spathe splitting at the day time of sunset or afternoon gave the best results as regard yield and physical quality of the fruits.

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### تأثير قوة ذكر النخيل وموعد التلقيح وفترة خالالي اليوم الواحد المناسبة على كمية المحصول وجودة الثمار في نخيل البلح السيوي النامي تحت ظروف واحدة القرافرة I. الإنتاجية وبعض الخصائص الطبيعية للثمار

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مركز البحوث الزراعية - الجيزة- المنيا - مصر

أجريت هذه التجربة خلال موسمي ٢٠٠٦ ، ٢٠٠٧ للتعرف على التأثيرات المختلفة لقوة ذكر النخيل وموعد التلقيح وفترة النهار المناسبة على كمية محصول النخلة ومتوسط وزن السويطة والخصائص الطبيعية للثمار. ولقد اشتملت التجربة على ثلاث عوامل ، تكون العامل الأول من ثلاث معاملات من قوة ذكر النخيل هي ( ذكور نخيل قوية، ذكور نخيل متوسط القوة، ذكور نخيل ضعيفة) أما العامل الثاني فقد تكون من خمس معاملات من مواعيد التلقيح بعد اشقاق الاغريض المؤنثة هي ( يومان ، أربعة ، ستة ، ثمانية ثم عشرة ايام) أما العامل الثالث فقد تكون من ثلاثة معاملات من موعد التلقيح خلال اليوم الواحد هي التلقيح في الصباح الباكر ( من ٦،٣٠ الى ٧،٣٠ صباحا )، بعد الظهر ( من ١٢ الى ١ ظهرا) وقبل غروب الشمس من ( ٤،٣٠ الى ٥،٣٠ مساءً).

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أوضحت النتائج أن قوة ذكر النخيل ليس لها تأثيرات واضحة على الصفات تحت الدراسة وكانت أفضل فترة من الوقت لتلقيح الأزهار المؤنثة في نخيل البلح السيوى قبلية للاخصاب هي اثنين أو أربعة أيام بعد تشقاق الاغريض المؤنثة وكان هناك نقص ملحوظ في كمية محصول النخلة عن التلقيح ما بين ستة وثمانية أيام بعد تشقاق الاغريض المؤنثة وكانت أفضل فترة لتلقيح نخيل البلح السيوى خلال اليوم الواحد هي التلقيح قبل غروب الشمس وقبل الظهر.

لأجل تحسين الانتاجية والخصائص الطبيعية لثمار نخيل البلح السيوى النامى تحت ظروف واحة الفرافرة بمحافظة الوادى الجديد فإنه يفضل تلقيح النخيل بحبوب لقاح من نخيل نفس الصنف بغض النظر عن قوة الذكر وأن يتم التلقيح فى اليوم الثانى لتشقاق الاغريض المؤنثة ويتم هذا قبل غروب الشمس أو بعد الظهر.