

Effect of Some Pollination Treatments on Fruiting of Sewy Date Palms

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Abstract: During 2017 and 2018 seasons, Sewy date palms were hand pollinated with five fresh per strand; powdered pollens at 2.0g, powdered pollens enriched with 0.5 to 4.0 g Royal Jelly with or without 0.5 g boric acid per each female spathe. The merit was examining of the effect of these ten pollination treatments on fruit retention %, yield, bunch weight fruit weight and dimensions, seed and flesh weights%, T.S.S.%, total, reducing and non-reducing sugars %, pH, total acidity %, total soluble tannins and total fibre % in the fruits. Carrying out hand pollination using powdered pollens enriched with 0.5 to 4.0 g Royal Jelly with or without 0.5 g boric acid had an obvious promotion on the percentage of fruit retention, yield, bunch weight as well as physical and chemical characteristics of the fruits relative to conducting hand pollination using five fresh strands or powdered pollens at 2.0 g / spathe alone. The promotion was materially associated with increasing levels of Royal Jelly added to powdered pollens from 0.5 to 4.0 g / spathe as well as the addition of 0.5 g boric acid to the mixture of powdered pollens and Royal Jelly. Increasing levels of Royal Jelly applied with powdered pollens from 2.0 to 4.0 g / spathe had no material promotion on all the investigated parameters. Carrying out hand pollination using a mixture of 2.0 g powdered pollens + 2.0 g Royal Jelly + 0.5 g boric acid / spathe was responsible for promoting yield and fruit quality of Sewy date palms grown under New Valley conditions.

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Keywords: fresh strands, powdered pollens, Royal Jelly, boric acid, yield, fruit quality, Sewy date palms.

1. Introduction

Any efforts directed towards enhancing the yield and fruit quality of Sewy date palms in our country will result in a great promotion in our national income. Using natural materials such Royal Jelly and boron policy occupies an eminent position.

Royal Jelly secreted from the heads of queen bees contains higher amounts of proteins, fats, sugars, minerals, vitamins, hormones, amino acids and antioxidants (Hyel, 1951) and Nation and Robinson(1971).

Boron is responsible for enhancing pollens germination, pollination, fertilization, fruit setting, cell division, water and nutrient uptake, building and translocation of sugars and the tolerance of fruit crops to various disorders (Devlin and Withdam, 1963 and Marschner, 2012).

Previous studies showed that using Royal Jelly (Al- Wasfy, 2013; Gad El- Kareem and Abada, 2014; Ahmed and Habasy- Randa, 2014; Abdelaziz et al., 2015; Abd El- Rady, 2015; Wassel et al., 2015 and Abd El- Aziz- Fatma, El-Zahraa, 2018) and boron Ahmed et al., 2013; Mohamed and Mohamed, 2013; Omar et al., 2014; Refaai, 2014; Abdelbaky 2015; Sayed- Ola 2014; Mostafa, 2015 and Rizk, 2017). Was very effective in improving fruit setting, yield, and fruit quality in different fruit crops.

The merit of this study was examining the effect of different pollination treatments on yield and fruit quality of Sewy date palms.

2. Material and Methods

This study was conducted during 2017 and 2018 seasons in a private date palm orchard situated at Moot city, El –Farafra district, New Valley Governorate on 25 years old Sewy date palms (Semi-dry date palm cv.) These palms produced through conventional propagation by offshoots as well as characterized by regular bearing. The selected palms are uniform in vigour healthy, good physical conditions, free from insects, diseases and damages. They planted at 6 x 6 meters apart (116 palms/ feddan). The selected palms were irrigated with well water through surface irrigation system. The texture of the soil is sandy clay.

The objective of the study was examining the effect of some pollination treatments on yield as well as some physical and chemical characteristic of the fruits of Sewy date palms grown under New Valley conditions.

Physical and chemical properties of the experimental soil at 0.0- 90 cm depth are presented in Table (1) according to the procedures of Evenhuis and Dewaard (1980).

All the selected Sewy date palms received program of fertilization consists of 10 kg plant compost (2.5 % N), 5.0 kg ammonium sulphate, (20.6 % N) 1.5 kg triple calcium superphosphate (37.5 % P₂O₅) and 1.5 kg potassium sulphate (48% K₂O) per each palm. Plant compost was added once at the middle of Jan. Ammonium sulphate was splitted into three equal batches and added at the first week of Mar., May and July.

Table (1): Analysis of the tested soil

Characters	Values
Particle size distribution	
Clay %	16
Silt %	2.5
Sand %	81.5
Texture	Sandy Clay
pH (1 : 2.5 extract)	8.80
E.C. (1 : 2.5 extract) mmhos / 1 cm / 25°C	0.75
Organic matter %	14
Total CaCO ₃ %	2.92
Available macronutrients (ppm)	
N	22.0
P	3.3
K	80.0
Ca	71.0
Mg	5.0
EDTA extractable available micronutrients (ppm)	
Zn	2.1
Fe	1.8
Mn	0.9
Cu	0.7

Phosphate fertilizer was splitted into two equal batches. The first was added at the middle of January and the second one was applied just after fruit setting (last week of April). Potassium sulphate was applied twice before pollination (last week of Feb.) and just after fruity setting (last week of April). Other horticultural practices such as irrigation, pruning, hoeing and post management were carried out as usual.

This experiment included the following ten pollination treatments arranged as follows:

1. Hand pollinations using five fresh strands / spathe alone.
2. Hand pollination using powdered pollens at 2.0 g / spathe alone.
3. Hand pollination using powdered pollens at 2.0 g mixed with 0.5 g Royal Jelly / spathe.
4. Hand pollination using powdered pollens at 2.0 g mixed with 1.0 g Royal Jelly / spathe.
5. Hand pollination using powdered pollens at 2.0 g mixed with 2.0 g Royal Jelly / spathe.
6. Hand pollination using powdered pollens at 2.0 g mixed with 4.0 g Royal Jelly / spathe.

7. Hand pollination using powdered pollens at 2.0 g mixed with 0.5 g Royal Jelly plus 0.5 g boric acid / spathe.

8. Hand pollination using powdered pollens at 2.0 g mixed with 1.0 g Royal Jelly plus 0.5 g boric acid/ spathe.

9. Hand pollination using powdered pollens at 200 g mixed with 2.0 g Royal Jelly plus 0.5 g boric acid / spathe.

10. Hand pollination using powdered pollens at 2.0 g mixed with 4.0 g Royal jelly plus 0.5 g boric acid /spathe.

Each treatment was replicated three times, one Sewy palm date per each. Therefore, thirty uniform in vigour Sewy date palms were selected for achieving of this study.

Table (2): Chemical Analysis of Royal Jelly (Townsend and Lucas, 1966).

Constituents	Values mg/ 100 g F.W.
Water	65.3
Dry matter	34.7
Portents	48.2
Carbohydrate	37.8
Lipids	10.4
Ash	2.0
Sugar	23.0
Glucose	4.0
Fructose	4.0
Sucrose	5.0
K	220
Mg	105
Ca	112
Fe	50
P	118
S	44
Mn	32
Si	5
Vitamins B ₁	0.4
Vitamins B ₂	0.3
Vitamins B ₅	0.4
Vitamins B ₆	0.3
Vitamins B ₈	0.3
Vitamins B ₉	0.4
Vitamins B ₁₂	0.3
A	0.4
C	0.9
D	0.5
K	0.4
E	0.3
Essential amino acids	1100

Hand pollination was achieved by inserting five fresh male strands or powdered pollens grains either applied alone or in combined with Royal Jelly at 0.5 to 4.0 g / spathe or boric acid at 0.5 g / spathe into the center of one female spathe according to using the same source of pollens (Sewy date palm males)

to avoid residues of metaxenia (according to **Musa 1981**). according to **Moreira and Gurgel (1944)**. Pollination was carried out throughout two days after female spathes cracking at the day time of afternoon according to **Hussein et al., (1987)**. To prevent contamination of the investigated pollens every bunch was bagged after pollination by white paper bags which were tied at the ends using a piece of cotton for aeration. The bags were shaken lightly to ensure pollens distribution and they were removed after one month (**Musa, 1981**). Number of bunches per palm was adjusted to ten bunches and leaf bunch ratio was maintained at 8:1. (**Hussein et al., 1987**). Chemical analysis of Royal jelly was listed in Table (2) (According to (**Townsend and Lucas, 1966**)).

Randomized complete block design (RCBD) was followed in which the present study comprised from ten pollination treatments and each treatment was replicated three times, one Sewy date palms per each.

The number of fruits in the tagged spathes (two spathes / palm) was counted every week to determine the initial number of fruits per spathe. Total number of setted fruits was calculated. Total number of retained fruits for each of the tagged spathes was counted before harvesting. Percentage of fruit retention was estimated by dividing total number of fruits retained by total number of setting fruits and multiplying the product by 100.

Harvesting was took place after rutabe stage (according to **Chandler, 1987**) at the last week of September. Average bunch weight (kg.) was recorded. Yield/ palm (kg.) was estimated by multiplying number of bunches/ palm by average bunch weight. Fifty fruits from all bunches/ palm were picked at random for determination of the following physical and chemical characteristics of the fruits.

- 1- Fruit weight (g.).
- 2- Fruit dimensions (height and diameter in cm.) by using vernier caliper.
- 3- Percentages of flesh and seed weights.
- 4- Percentage of total soluble solids by using hand refractometer.
- 5- Percentages of total and reducing sugars were determined according to **Lane and Eynon (1965)** volumetric method that outlined in **A.O.A.C. (2000)**. Non – reducing sugars was estimated by substrating reducing Sugars from total sugars.
- 6- Percentage of total acidity was determined by titration against 0.1 N sodium hydroxide using phenolphthalein as an indicator (**A.O.A.C., 2000**). Total acidity was determined as g malic acid / 100 g pulp.
- 7- pH of the pulp was determined by using pH meter.

8- Percentage of total soluble tannins was determined by using the Indigo Carmen indicator (**Balaa, 1981**). Titration was conducted by using 0.1 N potassium permanganate solutions and percentage was calculated using 1 ml potassium permanganate.

9- Percentage of total fibres was determined by boiling 1.0 g fruit dry weight in acetic acid at 10: 1 for four hours then filtration was conducted. Percentage of crude fibre was estimated by dividing weight of residue by weight of titration sample and multiplying the product x 100 (**A.O.A.C., 2000**).

All the obtained data during the course of this study were collected, tabulated and statistically analyzed. The differences between treatment means were compared using new L.S.D. test at 5% according to **Snedecor and Cochran (1967)**; **Mead et al., (1993)** and **Rangaswamy, (1995)**.

3. Results

1- The percentage of fruit retention

Data in Table (3) show the effect of some pollination treatments on the percentage of fruit retention of Sewy date palms during 2017 and 2018 seasons.

It is clear from the obtained data that carrying out hand pollination of Sewy date palms with a mixture of powdered pollen grains and Royal Jelly at 0.5 to 4.0g / spathe alone or in combined with 0.5 g boric acid significantly improved the percentage of fruit retention of Sewy date palms relative to pollination with fresh strands or powdered pollens alone. There was a gradual promotion with increasing concentrations of Royal Jelly from 0.5 to 4.0g and when applied with powdered pollens. Meaningless promotion on the percentage of fruit retention was observed with increasing concentrations of Royal Jelly applied with powdered pollens from 2.0 to 4.0 g either applied a / or in combined maximum values (26.0 & 26.6%) of fruit retention was recorded on the palms that hand pollinated with powdered palms enriched with 4.0 g Royal Jelly and 0.5 g boric acid during both seasons, respectively the palms that pollinated with five strands / spathe, alone gave the lowest values (19.6 & 20.0 %) during both seasons, respectively. Carrying out pollination with powdered pollens at 2.0 g / spathe was significantly superior than using five fresh strands / spathe in this connections. These results were true during both seasons.

2- The yield / palm

Data in Table (3) show that the yield / palm was significantly improved by hand pollination with powdered pollens enriched with Royal Jelly at 0.5 to 4.0g without or with boric acid at 0.5 g / female spathe relative to hand pollination using fresh strands

or powdered pollens alone. The promotion on the yield was in proportional to the increase in levels of Royal Jelly added with powdered pollens from 0.5 to 4.0 g / spathe. Using boric acid at 0.5g besides powdered pollens and Royal Jelly was significantly superior than using powdered pollens plus Royal Jelly alone in enhancing the yield. Increasing levels of Royal Jelly in powdered pollens from 2.0 to 4.0 g spathe failed to show significant promotion on the yield. Carrying out hand pollination using powdered pollens at 2.0 g Royal Jelly plus 0.5 g boric acid per spathe gave the best results from economical point of view. Under such promised treatment, yield / palm reached 157.0 & 164.0 kg during both seasons, respectively. The lowest values of yield (115.0 & 118.0 kg) during both seasons, respectively were recorded on the palms that hand pollinated with five fresh strands / spathe. Pollination with 2.0 g powdered pollens significantly surpassed the pollination using 5 fresh strands / spathe in improving the yield./ The yield of the palms that hand pollinated with powdered pollens reached 121.0 & 124.0 kg during 2017 & 2018 seasons. The percentage of increment on the yield due to pollination with powdered pollens at 2.0 g + 2.0 g Royal Jelly + 2.0 g boric acid over the pollination with fresh strands/ spathe reached 36.5 and 39.0 % during both seasons, respectively. The percentage of increment on the yield of the palms that pollinated with powdered pollens + 2.0 g Royal Jelly + 0.5 g boric acid / spathe over the palms that pollinated with powdered pollens alone reached 29.8 and 32.3 during 2017 & 2018 seasons, respectively. These results were true during both seasons.

3- Average bunch weight

Data in Table (3) show the effect of some pollination treatments on average bunch weight of Sewy date palms during 2017 and 2018 seasons.

It is noticed from the obtained data that varying pollination treatments in most cases caused significant differences on average bunch weight. Hand pollination with powdered pollens enriched with 0.5 to 4.0 g Royal Jelly with or without 0.5 g boric acid/ spathe had significant promotion on average bunch weight relative to pollination using five fresh strands or powdered pollens at 2.0 g / spathe alone. Pollination using powdered pollens at 2.0 g / spathe was significantly superior than hand pollination using five strands / spathe in enhancing average bunch weight. Increasing levels of Royal Jelly in powdered pollens from 0.5 to 4.0 g per spathe caused a gradual promotion on the average bunch weight without significant differences among

the higher two levels of Royal Jelly Mixing 0.5 g boric acid to powdered pollens enriched with 0.5 g to 4.0 g Royal Jelly significantly succeeded in maximizing average bunch weight compared to pollination using a mixture of powdered pollens enriched with Royal Jelly alone. The maximum weight of bunch was recorded on the palms that pollinated with powdered pollens at 2.0 g and enriched with 4.0 g Royal Jelly and 0.5 g boric acid per spathe. Average bunch weight in the previous striked treatment reached 15.8 and 16.5 kg during both seasons, respectively. These results were true during both seasons.

4- Some physical and chemical characteristics of the fruits

Data in Tables (3 to 5) show the effect of some pollination treatments on fruit weight, height and diameter, percentages of seeds and flesh, T.S.S. %, total, reducing and non reducing sugars, pH, total acidity %, fibre % and total soluble tannins % of the fruits of the fruits of Sewy date palms during 2017 and 2018 seasons.

It is evident from the obtained data that hand pollination using powdered pollens at 2.0 g enriched with 0.5 to 4.0 g Royal Jelly or 05 g boric acid/ spathe significantly was responsible for improving fruit quality in terms of increasing weight, height and diameter of fruit, flesh, T.S.S.%, total, reducing and non- reducing sugars % and decreasing seed weight %, pH, total acidity %, total soluble tannins % and total fibre compared with hand pollination with five fresh strands or powdered pollens alone. The promotion on fruit quality was related to the increase in Royal Jelly levels in powdered pollens from 0.5 to 4.0 g / spathe. No significant promotion on fruit quality was observed with increasing levels of Royal Jelly in powdered pollens from 2.0 to 4.0 g / spathe. A significant promotion on fruit quality was observed with adding 0.5 g boric acid in powdered pollens enriched with Royal Jelly at 0.5 to 4.0 g / spathe relative to Pollination with powdered pollens enriched with Royal Jelly alone pollination with powdered pollens was significantly favourable than pollination with five fresh strands/ spathe in improving fruit quality. The best results with regard to fruit quality from economical point of view were obtained due to hand pollination with a mixture of powdered pollens at 2.0 g enriched with 2.0 g Royal Jelly and 0.5 g boric acid / spathe. Unfavourable effects on fruit quality were observed on the palms that pollinated with five fresh strands / spathe. These results were true during both seasons.

Table (3): Effect of some pollination treatments on the percentage of fruit retention, yield, bunch weight and fruit weight of Sewy date palms during 2017 and 2018 seasons.

Pollination treatments	Fruit retention %		Yield per palm (kg.)		Av. Bunch weight (kg.)		Av. Fruit weight (g.)	
	2017	2018	2017	2018	2017	2018	2017	2018
Pollination with 5 fresh strands / spathe	19.6	20.0	115.0	118.0	11.5	11.8	14.7	14.9
Pollination with powdered least at 2 g/ spathe	20.3	20.7	121.0	124.0	12.1	12.4	15.0	15.2
Pollination with powdered + 0.5 g Royal Jelly	21.0	21.5	127.0	130.0	12.7	13.0	15.4	15.5
Pollination with powdered + 1.0 g Royal Jelly	2.7	22.1	132.0	137.0	13.2	13.7	15.8	15.8
Pollination with powdered + 2.0 g Royal Jelly	22.8	23.3	139.0	142.0	13.9	14.2	16.2	16.3
Pollination with powdered + 4.0 g Royal Jelly	23.0	23.4	140.0	143.0	14.0	14.3	16.3	16.4
Pollination with powdered + 0.5 g Royal Jelly + 0.5 g B	23.8	24.2	145.0	149.0	14.5	14.9	16.6	16.8
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	25.0	25.4	152.0	158.0	15.2	15.8	17.0	17.2
Pollination with powdered + 2.0 g Royal Jelly + 0.5 g B	25.9	26.5	157.0	164.0	15.7	16.4	17.4	17.6
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	26.0	26.6	158.0	165.0	15.8	16.5	17.5	17.7
New L.S.D. 5%	0.5	0.6	4.1	3.9	0.5	0.6	0.3	0.2

Table (4): Effect of some pollination treatments on some physical fruit characteristics of Sewy date palms during 2017 and 2018 seasons.

Pollination treatments	Fruit height (g.)		Fruit diameter		Fruit seed weight %		Fruit flesh weight %	
	2017	2018	2017	2018	2017	2018	2017	2018
Pollination with 5 fresh strands / spathe	3.11	3.11	2.05	2.08	15.9	15.7	84.1	84.3
Pollination with powdered least at 2 g/ spathe	3.26	3.27	2.20	2.23	15.5	15.3	84.5	84.7
Pollination with powdered + 0.5 g Royal Jelly	3.40	3.41	2.35	2.38	15.0	14.8	85.0	85.2
Pollination with powdered + 1.0 g Royal Jelly	3.31	3.52	2.48	2.51	14.5	14.2	85.5	85.8
Pollination with powdered + 2.0 g Royal Jelly	3.61	3.63	2.61	2.62	14.0	13.7	86.0	86.3
Pollination with powdered + 4.0 g Royal Jelly	3.62	3.64	2.62	2.64	13.9	13.6	86.1	86.4
Pollination with powdered + 0.5 g Royal Jelly + 0.5 g B	3.72	3.77	2.75	2.80	13.5	13.1	86.5	86.9
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	3.82	3.90	2.89	2.94	13.0	12.6	87.0	87.4
Pollination with powdered + 2.0 g Royal Jelly + 0.5 g B	3.94	4.05	3.03	3.07	12.5	12.0	87.5	88.0
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	4.04	4.20	3.16	3.21	12.0	11.5	88.0	88.5
New L.S.D. 5%	0.03	0.012	0.12	0.12	0.4	0.4	0.2	0.3

Table (5): Effect of some pollination treatments on the percentages of T.S.S., total, reducing and non-reducing sugars % in the fruits of Sewy date palms during 2017 and 2018 seasons.

Pollination treatments	T.S.S. %		Total sugars %		Reducing sugars %		No. of reducing sugars %	
	2017	2018	2017	2018	2017	2018	2017	2018
Pollination with 5 fresh strands / spathe	40.1	39.9	33.9	34.0	19.9	19.2	14.0	14.8
Pollination with powdered least at 2 g/ spathe	40.7	40.9	34.4	34.6	20.3	19.5	14.1	15.1
Pollination with powdered + 0.5 g Royal Jelly	41.5	41.7	35.0	35.2	20.7	19.8	14.3	15.4
Pollination with powdered + 1.0 g Royal Jelly	42.2	42.5	35.5	35.8	21.2	20.1	14.3	15.7
Pollination with powdered + 2.0 g Royal Jelly	42.8	43.0	36.1	36.3	21.7	20.4	14.4	15.9
Pollination with powdered + 4.0 g Royal Jelly	42.9	43.1	36.2	36.4	21.5	20.5	14.4	15.9
Pollination with powdered + 0.5 g Royal Jelly + 0.5 g B	44.1	44.2	37.0	37.2	22.5	21.0	14.5	16.1
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	45.2	46.0	37.4	37.7	23.0	21.4	14.4	16.3
Pollination with powdered + 2.0 g Royal Jelly + 0.5 g B	46.3	47.0	38.0	38.2	33.2	21.8	14.8	16.4
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	46.9	47.5	38.4	38.6	23.5	22.1	14.9	16.5
New L.S.D. 5%	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2

Table (6): Effect of some pollination treatments on pH, total acidity %, total soluble tannins and total fibre % of the fruits of Sewy date palms during 2017 and 2018 seasons.

Pollination treatments	pH.		Total acidities %		Total soluble tannins %		Total fibre %	
	2017	2018	2017	2018	2017	2018	2017	2018
Pollination with 5 fresh strands / spathe	6.9	7.0	0.394	0.401	0.39	0.41	2.11	2.15
Pollination with powdered least at 2 g/ spathe	6.2	6.8	0.373	0.372	0.37	0.37	2.00	2.00
Pollination with powdered + 0.5 g Royal Jelly	6.0	6.6	0.353	0.352	0.35	0.34	1.88	1.87
Pollination with powdered + 1.0 g Royal Jelly	5.8	6.4	0.333	0.331	0.33	0.31	1.71	1.69
Pollination with powdered + 2.0 g Royal Jelly	5.6	6.2	0.314	0.313	0.30	0.29	1.60	1.58
Pollination with powdered + 4.0 g Royal Jelly	5.5	6.0	0.314	0.312	0.29	0.28	1.59	1.57
Pollination with powdered + 0.5 g Royal Jelly + 0.5 g B	5.3	5.8	0.297	0.295	0.26	0.24	2.41	1.39
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	5.2	5.6	0.277	0.275	0.23	0.21	1.30	1.29
Pollination with powdered + 2.0 g Royal Jelly + 0.5 g B	4.9	5.4	0.257	0.255	0.20	0.18	1.18	1.18
Pollination with powdered + 1.0 g Royal Jelly + 0.5 g B	4.7	5.2	0.240	0.238	0.17	0.16	1.06	1.05
New L.S.D. 5%	0.2	0.2	0.014	0.015	0.02	0.02	0.11	0.09

4. Discussion

1-Effect of Royal Jelly:

The previous positive effect of Royal Jelly on fruit retention and yield of Sewy date palms might be attributed to its higher content of proteins, lipids, glucose, fruits, sucrose, most nutrients, Si, vitamins B, A, C, D, K, E and essential amino acids (Townsend and Lucas, 1966). These nutrients are responsible for enhancing cell division, plant pigments hormone, vitamins and most antioxidants (Nijjar, 1985).

The promoting effect of Royal Jelly on yield and fruit quality of Sewy date palms was confirmed by the results of Al- Wasfy (2013) on Sakkoti date palms, Ahmed and Habasy- Randa (2014) on Washington Navel orange trees, Abdelaziz *et al.*, (2015) and Abd El- Rady (2015) on Ewaise mango trees and Abd El- Aziz – Fatma El- Zahraa (2018) on Zebda mango trees.

2- Effect of boron:

The beneficial effects of boron on stimulating germination of pollen grains which is reflected on enhancing the efficiency of pollination and fertilizations and the resultant was promoting fruit retention, enhancing translocation and biosynthesis of sugars, water and nutrient uptake, cell division, root development and reducing the different disorders (Chandler, 1987).

These results are in agreement with those obtained by Ahmed *et al.*, (2013) on Zaghoul date palms, Desouky *et al.*, (2007) on Barhee date palms Harhash and Abdel- Naser (2010) on Khalas date palms, Abdelbaky (2015); and Sayed – Ola (2014).

5. Conclusion

The best results with regard to yield and fruit quality of Sewy date palms grown under New valley conditions were obtained due to hand pollination with a mixture of 2.0 g powdered pollens enriched with 2.0 g Royal Jelly + 0.5 g boric acid.

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