

Effect of Different Sources of Pollen Grains on Some Physical and Chemical Fruit Characters of Barhy Date Palm Cultivar

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Abstract

This investigation was conducted during 2017 and 2018 seasons on 10-years-old trees of date palm (*Phoenix dactylifera* L.) Barhy date palm cultivar grown in a loamy sand soil at a El-Wahat Bahariya, 10 x 10 m away from each other and watered by drip irrigation system to compare the differences in their growth, fruit physical and chemical characteristics. The selected trees devoted for this study were strong, healthy, grown under the same air conditions and received the same agricultural practices usually done for date palm; pollen grains samples were taken from male date palms of four locations; i.e., (M1- Ghanamy; M2- Wahat Bahariya; M3- Demiat and M4-Rashied) while they germinated on scabrous solution to detected pollen grain viability by using grain germination.

The results of this study have shown that means of fruit set (%) and fruit physical parameters of Barhy cultivar expressed as Pollen grains germination (%); pollen grains weight (g)/spathe; fruit set (%); number of spathes/palm; fruit weight (g); flesh weight (g); seed weight (g); fruit length (cm); fruit diameter (cm); fruit shape index; flesh (%) ; seed (%) ; TSS (%) ; acidity (%) ; TSS/acidity were significantly improved by the various used in the two seasons. All parameters under study the exhibited highest significant values except Acidity. Barhy palms pollinated with (Ghanamy) pollen grains exhibited statistically the heaviest fruits as compared to any pollen grains sources under study

Hence, it can be recommended to Barhy palms pollinated with (Ghanamy) pollen grains induced the highest statistical values grown in sand loamy soil, (Ghanamy; Wahat Bahariya; Demiat; Rashied depending on every variables during the growing season to get the best results for fruit physical and chemical quality of the resulted date palm.

Keywords: Date palm (*Phoenix dactylifera* L.) cvs. Bahry, pollen grains, fruit physical, fruit chemical.

Introduction

Date palm (*Phoenix dactylifera* L.) One of the essential fruit trees that all palm farmers in the world are interested in because of their high economic and nutritional importance. Egypt occupies the first place globally in production, so attention is paid to pollination and fertilization, which leads to an increase for crop. Placing paper bags over the female inflorescence at the time of pollination increased fruit set, especially when the weather was cold early in the season. (Zaid and de Wet, 1999). Abdel-Hamid (2000) studied the effect of 6 males (Maghal1, Maghal2, Maghal3, Zaghloul, Samany and Hayany) as different pollen sources for Zaghloul cv. He showed that different pollen sources (Maghal1, Zaghloul and Hayany males) had highly metaxinic effects including high fruit set of Zaghloul cv. Warrge (2003) showed that the percentage of viable pollen was very high, where the germinated fresh pollen was low and lacking for the dry ones. Fruit set was 100% for all pollen groups. Hence, the stain technique seems to be the best way to evaluate pollen viability of date palm. Melegy (1993) studied the effect of different pollen grain sources: Giza, Kerdasa and Aswan on fruit set of Barhee seedling and Samani cultivar. He found that the highest fruit set percentage was obtained from Giza pollen source on Barhee seedling and Kerdasa pollen grains on Samani cv., in the first season, while, in the second season Aswan pollen source showed the

best final fruit set on Barhee seedling and Samani cv.. Sarrwy et al., (2014) determined the influence of different pollen grains sources from different regions of date palms on Siwi cultivar. Final obtained showed clearly the superiority of pollinizers selected from Rashid and Noubaria than other pollinizer sources since it gave the highest fruit set. Retention, bunch weight and yield/palm in both seasons. Hafez et al., (2014) found that some males are high potent as compared to others which contribute to increase in fruit set and yield. Khalifa et al., (1980) indicated that Hayany pollens increased Amhat rutab fruit length followed by Sewi, Samani and Amhat pollens. Abou-Hassan et al., (1983) studied the effect of pollens from Khadari, Sakhi and Nabut-Seif males on fruiting of Khadari females. They found that Nabut-Seif pollen increased fruit length. Fruit diameter, on the other hand, increased slightly when pollinated with Sakhi pollen. El-Kosary and Soliman (2003) found that pollination of both cultivars Samani and Zaghloul with pollen from Aswan induced the highest fruit dimensions. Khalifa et al., (1980) showed that Amhat fruits produced by Hayany pollens contained a high amount of total sugars than fruits produced by Amhat pollens. There was also an increase in sugars content when Siwi and Samani pollens were used. Also, Rahemi (1998) studied the effect of pollen sources on fruit characteristics of Shahani date. Pollen source date not significantly affect total soluble solids content. The cultivars Mazafati was a good pollen source for pollination of Shahani date palms.

Soliman (1999) found that Kerdasa pollen grains gave the highest T.S.S content compared with Aswan pollen grains in the first and second seasons. **Muhammed *et al.*, (2017)**, the results indicated that males were significantly differed from one to another in all these fruit quality characters. **Ricardo *et al.*, (2017)** study of the effect of different pollinators of Medjool, Zahidi, Khadrawy and Diglet on the yield and quality characteristics of date palm cultivars Medjool showing results superior to Zahidi in quality characteristics.

These consideration led to build the present investigation to study the response of pollen grains viability, fruit set percentage and some physical fruit characteristics as well as some chemical fruit properties of Barhy date palm cultivar to the effect of different sources of pollen grains under study.

Materials and Methods

The present investigation was carried out during two successive seasons (2017 and 2018) at Bahariya Oasis district, Egypt. Female Barhy date palm of healthy, nearly homogenous in growth as well as fruiting ability were selected and 10 x 10 m away from each other and watered by drip irrigation system to comparison to the differences in their fruit physical and chemical properties. The selected Barhy date palm was subjected to all Horticultural practices applied to the date palm in this region except those ones under study.

Chemical and physical properties of the soil analysis were done according to the procedures of **Jackson (1973)** as shown in Table (1).

Table 1. Physical and chemical analysis of the experimental soil.

Particle size distribution (%)				S.P.	E.C. (dS/m)	pH	Cations (meq/L)				
Coarse sand %	Silt %	Clay %	Textural class				Ca ⁺⁺	Mg ⁺⁺	Na ⁺	K ⁺	
97.50	1.50	1.00	Sand	24.00	1.88	7.98	6.00	3.00	11.40	0.40	
Available				Anions (Meq/L)							
P	K	Fe	Zn	Mn	Cu	SAR	HCO ₃ ⁻	CO ₃ ⁻	Cl ⁻	SO ₄ ⁻	
29.07	48.89	13.28	0.63	4.07	1.09	5.4	6.00	0.00	7.60	7.20	

Data and Measurements:

1- Pollen grain viability:

The total number of sample pollen grains and viable pollen in the sample were counted according to **Singh *et al.*, (1961)** and the percentage of pollen grain viability was calculated by using the following equation:

Percentage of viability =

$$\frac{\text{Viable pollen grain}}{\text{Total number of pollen grain (sample)}} \times 100$$

2-Fruit set percentage: Calculated according to the following equation:

$$\text{Fruit set \%} = \frac{\text{Total No. of setted fruits/bunch}}{\text{Total No. of calyxes on the strands/bunch}}$$

3 Fruit physical properties

Thirty fruits were randomly taken, at harvest time, as a sample for each palm during both seasons of study. Fruits samples were divided into three groups; each of 10 fruits treated as a replicate to determine the following characteristics:

3-1. Fruit weight (g).

It was calculated by weighing each of 10 fruits as a replicate. The average fruit weight, in grams, was tabulated.

3-2. Flesh weight (g).

It was calculated by weighing each of 10 fruits, as a replicate, after removing seeds. The average fruit weight, in grams, was tabulated.

3-3. Seed weight (g).

It was estimated by the differences between fruit weight and flesh fruit weight, and the average seed weight (in grams) was tabulated.

3-4. Fruit weight/seed weight ratio.

It was calculated by dividing the average of fruit weight on the average of seed weight and tabulated.

3-5. Fruit dimensions.

Fruit length and diameter were measured using individual fruits of each replicate (10 fruits) by using vernier caliper. In addition, fruit length (L) on fruit diameter (D) was calculated as L/D ratio for each palm tree.

4. Fruit chemical properties.

4-1. Total soluble solids (T.S.S. %).

It was determined in fruit juice using Carl Zeiss Refractometer as described in **A.O.A.C. (1995)**.

4-2. Fruit acidity percentage

It was determined as described and the titratable acidity was calculated as malic acid determined in fruit juice according to **A.O.A.C. (2005)**.

4-3. Total sugars content.

It was determined according to **Dubois *et al.*, (1966)** in the methanol extract using the phenol sulfuric acid method; and the concentration was calculated as g/100 g fresh weight.

Statistical analysis:

Data were then tabulated and the morphological ones are subjected to analysis of variance using the computer program of **SAS Institute (2009)**, that followed by Duncan's New Multiple Range t-Test (**Steel and Torrie, 1980**) for means separation.

Results and Discussions

1- Pollen grains characteristics:

1. a. Pollen grains germinations percentage:

In this regard, the effect of different investigated pollen grains sources under study on percentage of pollen grains germination of Barhy date palm, data in Table (2) revealed clearly that, the highest values of pollen grains germination %. However, Barhy palms pollinated with both (Ghanamy pollen grains) from one hand and (Rashied pollen grains) from another were exhibited statistically, the highest values of pollen grains germination %. However, Barhy palms pollinated with (Ghanamy pollen grains) was relatively more effective than those Barhy palm pollinated with (Rashied pollen grains) but differences did not reach level of significance between them. Such trend was true during both 2017 and 2018 seasons of study. On the other hand, Barhy date palm pollinated with both (Wahat Bahariya) and (Demiati) pollen grains sources ranked statistically the second which were significantly the inferior as exhibited the least

values of pollen grains germination % during the two seasons of study.

1.b. Pollen grains weight (gm):

Regarding the pollen grains weight/spathe, data obtained during both 2017 and 2018 seasons in Table (2) revealed obviously that, the response to the effect of four investigated pollen grains sources (Ghanamy, Wahat Bahariya, Demiati and Rashied) followed a firmer trend. Since, the highest and greatest weight was resulted by the Barhy date palm pollinated with (Ghanamy pollen grains) which was significantly the superior followed statistically in a descending order by those Barhy date palm pollinated with (Demiati) and (Wahat Bahariya) pollen grains sources during both (2017) and (2018) seasons of study, respectively. Moreover, the opposite trend was detected with Barhy date palm pollinated with (Rashied pollen grains sources) was ranked statistically the inferior as induced the least values of pollen grains weight in the two seasons of study. In addition to that, Barhy date palm pollinated with (Wahat Bahariya pollen grains) in the first season and (Demiati pollen grains) in the second one were in between the aforesaid discussed treatments.

Table 2. Pollen grains germination (%) and pollen grains weight (g)/ spathe of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters Location	Pollen grains germination (%)		Pollen grains weight (g) /spathe	
		1 st season	2 nd season	1 st season	2 nd season
M1	Ghanamy	92.11A	92.61A	25.75A	27.80A
M2	Wahat Bahariya	89.39B	90.70B	20.61C	24.72B
M3	Demiati	89.79B	90.20B	23.70B	23.70C
M4	Rashied	90.60AB	91.91AB	18.56D	20.61D

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

2- Fruiting and productivity:

2.a. Fruit set (%):

Concerning the effect of different investigated pollen grains sources under study on fruit set percentage of Barhy date palm, data obtained and tabulated in Table (3) displayed clearly that, the Barhy date palm pollinated with (Ghanamy pollen grains) exhibited statistically the greatest values of fruit set % during the two seasons of study. Meanwhile, Barhy date palm pollinated with either (Wahat Bahariya) or (Demiati) pollen grains sources ranked significantly second to the abovementioned superior one and the response was completely absent from the standpoint of statistic between them in both 2017 and 2018 seasons of study. Moreover, the Barhy date palm pollinated with (Rashied pollen grains) was statistically the inferior as induced significantly the lowest values of fruit set percentages during both experimental seasons of study.

Obtained results are partially in harmony with the findings of Khalifa *et al.*, (1980), Helail and El-Kholey (2000), Moustafa-Eman (2006), Hafez *et al.*, (2014) and Sarrwy *et al.*, (2014). They stated that, fruit set percentage of (Amhat, Halawy, Khadrawy and Zaghleoul date palm cultivars) was affected by different pollen grain sources used.

2.b. Number of spathes/palm:

Referring the influence of various sources of pollen grains locations on number of spathes per palm of Barhy cultivar, obtained results represented in Table (3) indicated obviously that, the highest values of number of spathes per palm was significantly exhibited by Barhy palm pollinated with Ghanamy pollen grains. However, the opposite trend was exhibited by those Barhy palm pollinated with Wahat Bahariya in the first season and Rashied pollen grains sources in the second one (Rashied pollen grains sources) were induced statistically the lowest value of number of spathes per palm of Barhy cv. during 2017 and 2018 of experimental seasons of study. On the other hand, obtained data showed clearly that Barhy palm pollinated with both Demiati and Rashied pollen grains sources in the first season (2017) from one hand and Barhy palm pollinated with both Wahat Bahariya and Demiati pollen grains sources in the second one (2018) from another were intermediate as compared to the abovementioned two extents and the response were statistically the same i.e., the response were completely absent from the stand point of statistics between them in both seasons of study.

Table 3. Fruit set (%) and number of spathes/palm of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters Location	Fruit set (%)		Number of spathes /palm	
		1st season	2nd season	1st season	2nd season
M1	Ghanamy	87.01A	88.62A	18.00A	19.00A
M2	Wahat Bahariya	84.85B	85.99B	13.00C	16.00B
M3	Demiat	84.42B	86.22B	16.00B	17.00B
M4	Rashied	83.59C	84.18C	15.00B	14.00C

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

3- Fruit quality of Barhy date.

3-A. Fruit physical properties.

3.a.1. Fruit (date) weight (gms):

Regarding the effect of different investigated sources pollen grains in this study on fruit weight, data tabulated in Table (4) displayed clearly that, Barhy palms pollinated with (Ghanamy) pollen grains exhibited statistically the heaviest fruits as compared to any pollen grains sources under study, followed statistically by those palms pollinated with (Wahat Bahariya) pollen grains. Meanwhile, palms pollinated with both (Demiat and Rashied) pollen grains produced significantly the least value of fruit (date) weights and similar effect in this respect from statistical of standpoint. Such trends were true during both 2016 and 2017 seasons of experimental study.

3.a.2. Flesh (pulp) weight (gms):

Concerning the effect of various investigated sources (locations) of pollen grains under study on flesh (pulp) weight of Barhy dates cultivar, data obtained and represented in Table (4) indicated obviously that, the same abovementioned trend with fruit (date) weight was found. In other words, Barhy palms pollinated with (Ghanamy) pollen grains induced the highest statistical values in their pulp

weight than the other three studied sources then, followed by palms pollinated with (Wahat Bahariya) pollen grains. On the other hand, palms pollinated with both (Demiat and Rashied) pollen grains produced fruits (dates) had the lowest significantly flesh (pulp) weight and equality effect in their pulp weight from the statistical standpoint. Such trends were detected throughout the first and second seasons of this investigation.

3.a.3. Seed weight (gms):

With respect the seed weight (grams) of Barhy palm cultivar in response to the different sources (locations) of pollen grains i.e., (Ghanamy, Wahat Bahariya, Demiat & Rashied) during both 2017 and 2018 seasons of study, obtained data tabulated in Table (4) showed clearly that, Barhy palms cv., pollinated with (Ghanamy) pollen grains exhibited significantly the heaviest and the highest values of seed weight in the two seasons of study. On the other hand, Barhy palms pollinated with the other three sources of pollen grains i.e., (Wahat Bahariya, Demiat and Rashied) followed statistically the abovementioned treatment respectively, with non-significant differences between them. This trend was true during both 2017 and 2018 seasons of experimental study.

Table 4. Some fruit quality measurements (fruit, flesh and seed weight "gm") of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters Location	Fruit weight (g)		Flesh weight (g)		Seed weight (g)	
		1 st season	2 nd season	1 st season	2 nd season	1 st season	2 nd season
M1	Ghanamy	25.77A	26.27B	22.45A	22.91A	3.32A	3.36A
M2	Wahat Bahariya	24.50B	25.08B	21.41B	22.08B	3.10B	3.00B
M3	Demiat	24.15C	24.49C	21.11BC	21.53C	3.04B	2.96B
M4	Rashied	23.92C	24.32C	20.91C	21.38C	3.01B	2.94B

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

3.a.4. Fruit (date) length (cm.):

Referring an influence of different investigated sources (locations) of palms pollinizers (pollen grains) on the length of fruits (dates), obtained results tabulated in Table (5) revealed that, Barhy palms pollinated with (Ghanamy) pollen grains induced significantly a positive effect on fruit (date) length as compared to any other investigated palm pollinizers sources used. However, Barhy palms pollinated with (Ghanamy) pollen grains exhibited the longest fruits and the highest values of date length in the two seasons of study. Moreover, fruits (dates) of Barhy

palms pollinated with the other studied pollen grains sources i.e., (Wahat Bahariya, Demiat and Rashied) ranked statistically the second one and had lower values of fruit (date) length and the effect is an equal from the statistical standpoint between the abovementioned three pollen grains sources during both the first and second seasons of study.

3.a.5. Fruit (date) diameter (cm.):

With regard to the effect of various pollen grains sources on fruit (date) diameter of Barhy palms, data in Table (5) obtained in between four investigated

pollen grains sources under study when Barhy palms pollinated with these during both seasons of study. Furthermore, Barhy palms of fruit (date) diameter followed descendingly by those palms pollinated with (Wahat Bahariya) pollen grains. On the other hand, Barhy palms pollinated with both (Demiati and Rashied) pollen grains ranked statistically the third and fourth ones, respectively while resulted significantly in the lower values of fruit (date) diameter. Such trends were true during both 2017 and 2018 seasons of study.

3.a.6. Fruit shape index (fruit length/diameter ratio):

As for the fruit (date) shape index of Barhy palms as affected by the investigated four sources of pollen grains i.e., (Ghanamy, Wahat Bahariya, Demiati and

Rashied), data represented in Table (5) showed obviously that, the response was completely absent from the standpoint of statistic whereas, Barhy palms pollinated with all studied pollen grains sources induced fruits (dates) similar values in their shape index in both seasons of study except with Barhy palms pollinated with Rashied pollen grains in the second season only. In other words, fruit shape index of Barhy palms pollinated with all investigated pollen grains sources were statistically the same during the two experimental seasons of investigated except with Barhy palms pollinated with Rashied pollen grains which tended to be relatively more effective than the three other pollinizers sources however, the differences was significant such trend was true in the second seasons only.

Table 5. Some fruit quality measurements of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters Location	Fruit length (cm)		Fruit diameter (cm)		Fruit shape index	
		1 st season	2 nd season	1 st season	2 nd season	1 st season	2 nd season
M1	Ghanamy	3.65A	3.70A	2.56A	2.83A	1.43A	1.31B
M2	Wahat Bahariya	3.25B	3.20B	2.31B	2.47B	1.41A	1.30B
M3	Demiati	3.15B	3.12B	2.22C	2.34C	1.42A	1.34AB
M4	Rashied	3.10B	3.04B	2.13D	2.20D	1.46A	1.38A

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

3.a.7. Flesh (pulp) percentage:

With respect to the Barhy cv. of flesh (pulp) date % in response to the effect of various pollen grains pollen grains sources, data represented in Table (6) shows that, the highest values and the richest fruits in their flesh (pulp) percentage were statistically with those Barhy palms pollinated with the three following pollen grains sources (Wahat Bahariya, Demiati and Rashied), in spite of differences did not reach level of significance as compared to each other. The opposite trend was observed with Barhy palms pollinated with (Ghanamy) pollen grains which were the inferior as exhibited significantly the lowest value of fruit flesh percentage. These trends were detected during the two experimental seasons of study.

3.a.8. Seed weight (%):

Referring the effect of different pollen grains sources on seed weight percentage of Barhy palm dates, data tabulated in Table (6) and declared obviously that, (Ghanamy) pollen grains exhibited generally the greatest value of seed weight percentage

during the two seasons of study. However, Barhy palm dates pollinated with (Ghanamy) pollen grains tended to be relatively more effective than the three other studied pollinizers, whereas difference was significant. On the other hand, Barhy palms pollinated with the three other pollen grains i.e., (Wahat Bahariya, Demiati and Rashied) ranked statistical the second which induced the lowest values of seed weight percentage and response was completely absent from the standpoint of statistic. In other words, the differences between the three pollen grains sources were statistically the same as compared each other. Such trends were during both 2017 and 2018 seasons of study.

All obtained results regarding the response of abovementioned physical fruit properties to the investigated treatments of different pollen grains sources were supported by *Khalifa et al., (1980), Abou-Hassan et al., (1983), Melgy (1993), Zeid and de Wet (1999), Abdel-Hamid (2000), El-Kosary and Soliman (2003) and Ricardo et al., (2017).*

Table 6. Some fruit quality measurements (Flesh and seed “%”) of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters Location	Flesh (%)		Seed (%)	
		1 st season	2 nd season	1 st season	2 nd season
M1	Ghanamy	87.12B	87.21B	12.88A	12.79A
M2	Wahat Bahariya	87.37AB	88.04A	12.63AB	11.96B
M3	Demiati	87.43A	87.89A	12.57B	12.11B
M4	Rashied	87.40A	87.91A	12.60AB	12.09B

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

3.B. Fruit chemical properties:

3.B.1. Total soluble solids percentage (TSS %):

Considering the total soluble solids content of Barhy palms fruits (dates) in response to the effect of the different pollen grains sources, it is quite evident from data in Table (7) that, a firm trend was obviously detected. However, the highest value of TSS content was obviously recorded by the Barhy palms pollinated with (Ghanamy) pollen grains. Moreover, Barhy palms pollinated with (Wahat Bahariya) pollen grains descendingly ranked second, whereas differences were significant between them during the first and second seasons of this investigation. On the other hand, the poorest fruits (dates) in their TSS content were closely related to Barhy palms pollinated with both (Demiat and Rashied) pollen grains from the standpoints of statistics. Such trends were detected throughout the two experimental seasons of study.

3.B.2. Total acidity (%):

As for the response of total acidity content of Barhy fruits (dates) to the effect of four investigated pollen grains sources during both seasons of study, data obtained in Table (7) revealed that, total acidity content of Barhy palms fruits (dates) pollinated with any pollen grains sources were statistically the same. In other words, total acidity content of Barhy fruits (dates) did not show any significant response to pollinated with pollen grains of four investigated

pollen grains sources (Ghanamy, Wahat Bahariya, Demiat and Rashied) and these sources failed to induce any significant effect on total acidity content. Such trend was true during both seasons of study.

3.B.3. TSS/acidity ratio:

As for the TSS/acidity ratio of Barhy date palm as affected by the investigated four sources of pollen grains i.e., (Ghanamy, Wahat Bahariya, Demiat and Rashied), data results in Table (10) cleared obviously that, the response was completely absent from the standpoint of statistic whereas, Barhy palms pollinated with all studied pollen grains sources induced fruits (dates) similar values in their TSS/acidity ratio in both seasons of study. On the other hand, TSS/acidity ratio get the same trend for TSS of Barhy date palm pollinated with all investigated pollen grains sources were statistically the same during the two experimental seasons of investigated, the differences was significant such trend was true in the second seasons only.

The present results with respect to the response of some chemical fruit characteristics to all investigated treatments of various sources of pollen grains under study are in general harmony with those previously mentioned by **Khalifa *et al.*, (1980), Rahemi (1998), Soliman (1999), Moustafa-Eman (2006) and Mumammed *et al.*, (2017).**

Table 10. Some fruit chemical characteristics of Barhy date palm cv. as affected by four males date palm during 2017 and 2018 seasons.

Males	Parameters	TSS (%)		Acidity (%)		TSS/acidity	
		1 st season	2 nd season	1 st season	2 nd season	1 st season	2 nd season
M1	Ghanamy	34.80A	35.32A	0.028A	0.033A	1242.9A	1070.3A
M2	Wahat Bahariya	33.33B	33.73B	0.031A	0.032A	1075.2B	1054.1B
M3	Demiat	32.81BC	32.88C	0.031A	0.033A	1058.4C	996.4C
M4	Rashied	32.47C	32.61C	0.031A	0.031A	1047.4D	1051.9B

Means of each column followed by the same letter/s during every season are not significantly differ at 5% level.

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تأثير حبوب اللقاح من مناطق مختلفة على بعض الخصائص الطبيعية والكيميائية لصنف نخيل البلح البرحي
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هذه الدراسة أجريت في عامي 2017 و 2018 على نخيل البلح صنفى البرحي والمجدول عمر 10 نوات، وتنمو في تربة رملية طميية في الواحات البحرية، ومنزوعة على مسافات 10×10 م بين كل نبات والأخر، وتروي بنظام الري بالتنقيط للمقارنة بين الاختلاف في النمو والخصائص الطبيعية والكيمائية، وقد تم اختيار الأشجار لكلا الصنفين بعناية لهذه الدراسة من حيث قوة النمو والخلو من الأمراض ونامية تحت هذه الظروف المناخية، وتجرى عليها جميع العمليات الزراعية المعتادة، وقد تم تلقيح أشجار النخيل من عدة مناطق مختلفة (حبوب لقاح غنيمي، الواحات البحرية، دمياط وراشيد). أوضحت نتائج هذا البحث أن متوسطات جميع متوسطات قياسات النسبة المئوية لعقد الثمار والصفات الطبيعية للثمار (وزن الثمرة، وزن اللب (لحم) الثمرة، (جم) طول الثمرة، وقطر الثمرة (سم))، قد تحسنت معنوياً استجابة لجميع مناطق حبوب اللقاح المختلفة لكلا الصنفين،