

## effect of pollen cultivar and spraying Glutamic acid on some physical properties of date palm c.v Ashressi

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### Abstract

A field experiment was carried out at the Mandali palm plant affiliated to the Department of Horticulture / Ministry of Agriculture located in Balad Ruz district / Mandali district, east of Baquba, Diyala governorate center, during the 2022 growing season, to find out the effect of pollen cultivar and spraying with the amino acid glutamic acid on some growth and yield characteristics of date palm *Phoenix dactylifera*. L, ashraasi cultivar, the experiment included 9 treatments that resulted from the overlap of two factors. Spraying with 200 mg L<sup>-1</sup> 2G glutamine acid was sprayed one day before The pollen variety had a significant effect on most of the .pollination and before and after fruit setting physical traits, as the mixed pollen variety (stal acidDakl + stal acid yellow) excelled in recording the best results for the trait: fruit weight 14.16, fruit size 0.74 gm, total yield amount 83.35 kg, bunch weight 10.54 kg. Glutamic had a significant effect on most of the physical traits, as spraying with a concentration of 200 mg.l<sup>-1</sup> was superior in recording the best results for the trait: fruit weight 80.09 gm, fruit volume 80.09 cm<sup>3</sup>, total yield amount 49.08 kg, and cluster weight 9.58 kg. The pollen and spraying with Glutamic acid significantly affected most of the chemical and physical characteristics, as the two-way interaction treatment between spraying at a concentration of 200 mg.L<sup>-1</sup> and the mixed pollen cultivar (Al-FahalDakel + Stal acid Yellow) excelled in recording the best results for the characteristic of fruit size 0.84 cm<sup>3</sup>, total yield quantity 61.83 kg, the weight of the bunch is 11.48 kg.

**Keywords:** imagine dates, pollen variety, glutamine acid

### Introduction

The date palm (*Phoenix dactylifera*.L) belongs to the palm family (Arecaceae) and to the order Palmae. Among the most important genera of this family are date palms, oil palms and coconut palms. Iraq is one of the oldest palm cultivation sites in the world, with more than 600 varieties grown in it. God Almighty endowed him with many virtues, as it is a source of goodness and blessing and was mentioned in 22 verses in the Holy Qur'an (1) Date palms are widely cultivated for their use for nutritional purposes as well as for their medicinal effects on a variety of diseases. Date fruits are rich in alkaloids, protein, carbohydrates, fatty acids (linoleic, lauric, palmitic, and citric acid), carotenoids, vitamins, polyphenolic compounds, flavonoids, Besides different types of nutrients such as potassium, calcium, magnesium, and phosphorous (2), the date palm is a rich source of cellulosic fiber due to its wide availability and large production of by-products suitable for fiber extraction. It is also rich in sugar and also contains a large amount of phenolic compounds. And antioxidants, date fruits can be used to produce an alternative sweetener, as eating it by humans leads to giving a lower blood sugar than sucrose (3,4), and the number of date palm trees in Iraq is 17,492,121 palm trees, while the total The total production is 676,111 tons, with an average production per palm tree of 68 kg. tree), (5)

The dioecious tamarind palm produces male and female flowers on different trees. Female palm trees produce fruit, while male palms do not. Pollination occurs when the male flowers produce pollen, which is then applied to the female flowers (6). After the pollen is laid on the female pollen, the development of the pollen tube begins, (7), the female ovule cells allow the pollen tube to stretch along the style, fertilize the ovule and form the seed (8,9) When electing stal acids, one must rely on the characteristics of the stal acid variety, such as the dates of flowering, which must be compatible with the flowering of females, the

size and number of pollen, the vitality and abundance of pollen grains, and the sexual compatibility between the male and female varieties (10).

.Amino acids have multiple physiological roles within the plant. They are the basic units for building protein in cells, and their function is to form nucleotides of nucleic acids and protein (11). They are essential materials for building and manufacturing many organic compounds such as hormones, enzymes, and vitamins (12). And it has an important role, especially in stimulating cell growth, as it acts as neutralizing substances that help maintain an appropriate pH value within the cell, as it contains both acid and base groups and it removes ammonia from the cell, this function is associated with the formation of amides, so it protects the plant from Ammonia toxicity. It can also be a source of carbon and energy as well as protecting the plant from pathogens (13), that glutamic acid is one of the essential amino acids that play an important role in plant growth and development, as it is one of the vital catalysts that reduce damage Stress caused by low temperatures by stimulating biosynthetic pathways leading to cells responsible for immobilization (Sim et al., 2022), which is a proteinogenic amino acid, a transporter of nitrogen and ammonia, and works to increase photosynthesis, enzymes and metabolites associated with nitrogen metabolism, and it also It significantly increases the amino acid and starch contents of the plant, and glutamic histidine provides a dynamic balance of nitrogen and carbon (Han et al., 2022).

The study aimed to determine the effect of the pollen variety and its source on the settling percentage and to know the effect of spraying amino acids on some physical characteristics of date palm.

#### MATERIALS AND METHODS

A field experiment was carried out at the Mandali palm plant affiliated to the Department of Horticulture / Ministry of Agriculture located in Balad Rose district / Mandali district, east of Baquba, Diyala governorate center, during the 2022 growing season, to find out the effect of the pollen variety and spraying with the amino acid glutamic acid on some growth and yield characteristics of date palm *Phoenix dactylifera*. L cultivar Ashrasi, 18 years old, propagated by vegetative propagation by offshoots, which are irrigated by waterwheels, as 27 palm trees were selected as homogeneous as possible in their growth and free from insect and disease infections, to conduct treatments on them, identification marks were placed on them and they were divided into three sectors, in each sector 9 palm trees, an analysis was carried out Some physical and chemical characteristics of the soil of the orchard before the implementation of the experiment in the laboratory (Wahaj Al-Nakhil Al-Ahly), as samples were taken at a depth of 0-60 cm. And a mixture of (Dukl + Yellow) 4/5/2022. Eight stalks were selected for each palm tree. The process of setting the stalk before woodening was completed. The process of harvesting the fruits began from 10/15/2022 until 10/31/2022. Fruit samples were taken at the date stage for special analysis. by studying it.

A factorial experiment was carried out using the randomized complete block design (RCBD), as the experiment included 9 treatments resulting from the interaction of two factors, the first (R.C.B.D) included the first factor, the vaccine class Dukl V1, yellow V2, mixture (Dukl + yellow) V3, the second factor: spraying the amino acid Glutamic spraying with water only, G0, spraying with 100 mg L-G11, spraying with 200 mg L-1 2G. Glutamic acid was sprayed before flowering. The date of the first spraying was on 4/6/2022, the second on 4/20/2022, and the third on 5/19/2022.

The physical characteristics of the fruits

##### 1-Weight of the fruit (gm)

25fruits were taken at the time of harvest and randomly from each fruit bark, where they were weighed, and the average weight of each fruit was extracted from them.

##### 2-Fruit size (cm<sup>3</sup>)

I followed the displaced water method, as a known volume of water was placed in a graduated cylinder. After that, 25 fruits taken randomly were placed in that cylinder, and the volume was calculated by finding the difference between the water level in the two cases (Al-Dahab, 2010).

##### 3-Weight of the bunch (kg).

Calculated by dividing the amount of the total yield by the number of shoots in each palm tree.

##### 4-Amount of total yield (kg).

The total yield of each palm tree was calculated by taking the weight at each harvesting process (by taking the weight when harvesting the shoots immediately after cutting them) using a field balance and then extracting the average weight of the total yield for each treatment separately.

**Results:**

1-Weight of the fruit (gm).

From the results presented in Table 2, it is noted that the mixture pollen source (Al-FahalDakl + Al-Fahl Yellow) was significantly superior in value to 14.16 and 14.17 gm, while the weight of the fruit in the pollen source Al-FahalDakl was 10.42 g. L<sup>-1</sup> was significantly superior to 80.09 gm over the comparison treatment, which amounted to 76.23 gm.

The results of the same table show that the bilateral interaction between the pollen sources and spraying with Glutomic acid had a significant effect on the fruit weight, as the treatment of spraying with a concentration of 100 mg L<sup>-1</sup> with the pollen source, Stal acid Yellow, and the mixture (Stal acidDakl + Stal acid Yellow) was significantly superior to the rest of the source and spraying treatments. With Glutomic acid and without spraying, it reached 14.96 and 15.13 g. The treatment without spraying with pollen source Al-Fahal, the lowest weight of the fruit was 9.42 g.

**Table 1. Effect of pollen source and Glutomic acid averages and the interaction between them on fruit weight (g) of date palm trees as source of Acharis pollen.**

Glutomic acid averages Mg L <sup>-1</sup>	Mixture (the stal acid is dukl + the stal acid is yellow)	The stal acid is yello	The stal acid is dukl	source of pollen
				Glutomic acid mg L <sup>-1</sup>
A 12.21	ab 13.76	ab 13.45	c 9.42	0
A 13.19	a 15.13	a 14.96	c 9.48	100
A 13.35	ab 13.58	ab 14.10	b 12.37	200
	A 14.16	A 14.17	B 10.42	source of pollen averages

\*Averages that share the same letter for each of the sources of difference do not differ significantly according to Duncan's multiple range test at the probability level of 0.05.

**2-The size of the fruit (cm<sup>3</sup>).**

The results presented in Table 3 indicate that there is a significant effect between pollen sources, as the mixture pollen source (Al-Fahal Dakl + Al-Fahl Yellow) exceeded by 0.74 g, while the fruit size in the pollen source Al-FahalDakal and Al-Fahal Yellow reached 0.65 and 0.66 cm<sup>3</sup>, and the results of the same table indicated that The treatment of spraying with Glutomic acid at a concentration of 200 mg L<sup>-1</sup> was significantly superior by 80.09 gm over the control treatment, which amounted to 0.66 cm<sup>3</sup>.

The results of the same table show that the bilateral interaction between the pollen sources and spraying with Glutomic acid had a significant effect on the fruit size, as the treatment of spraying with a concentration of 200 mg L<sup>-1</sup> with the mixed pollen source (Al-FahalDakel + Stal acid Yellow) was significantly superior to the rest of the treatments of sources and spraying with Glutomic acid Without spraying, it reached 0.84 cm<sup>3</sup>, and the spraying treatment was recorded at a concentration of 200 mg L<sup>-1</sup> with pollen source. The lowest fruit size was 0.63 cm<sup>3</sup>.

**Table.2. Effect of pollen source and Glutomic acid averages and the interaction between them on fruit size (cm<sup>3</sup>) of date palm trees as the source of Acharis pollen.**

Glutomic acid averages Mg L <sup>-1</sup>	Mixture (the stal aci is dukl + the stal acid (yellow)	The stal aci Yellow	The stal acid is dukl	source of pollen
				Glutomic acid mg L <sup>-1</sup>
B 0.66	b 0.68	b 0.64	b 0.66	0
B 0.68	b 0.71	b 0.64	b 0.70	100
A 0.71	a 0.84	b 0.67	b 0.63	200
	A 0.74	B 0.66	B 0.65	source of pollen averages

\*Averages that share the same letter for each of the sources of difference do not differ significantly according to Duncan's multiple range test at the probability level of 0.05.

**3-Weight of the bunch (kg).**

The results presented in Table 4 indicated that there was a significant effect between pollen sources, as the mixture pollen source (Al-FahalDakel + Stal acid Yellow) was superior by 10.54 kg. At a concentration of 200 mg L<sup>-1</sup>, it had a significant superiority of 9.58 kg over the control treatment, which was 8.03 kg.

The results of the same table show that the two-way interaction between the pollen sources and spraying with Glutomic acid had a significant effect on the weight of the bunch, as the treatment of spraying with a concentration of 200 mg L<sup>-1</sup> with the mixed pollen source (Al-FahalDakl + Stal acid Yellow) was significantly superior to the rest of the source treatments and spraying with Glutomic acid. Without spraying, it reached 11.48 kg. The treatment without spraying with the source of pollen, the stal acid, recorded the least weight of the bunch, which was 6.05 kg.

**Table 3 Effect of pollen source and Glutomic acid averages and the interaction between them on the bark weight (kg) of date palm trees as the source of acacia pollen.**

Glutomic acid averages Mg L <sup>-1</sup>	Mixture (the stal acid is dukl + the stal acid is yellow)	The stal acid is yellow	The stal acid is dukl	source of pollen Glutomic acid mg L <sup>-1</sup>
C 8.03	c 9.37	8.66d	6.05f	0
B 8.99	10.77b	9.70c	6.49f	100
A 9.58	11.48a	9.47c	7.79e	200
	A 10.54	B 9.28	C 6.78	source of pollen averages

\*Averages that share the same letter for each of the sources of difference do not differ significantly according to Duncan's multiple range test at the probability level of 0.05.

**4- The quantity of the total yield (kg)**

It is noted from the results presented in Table 5 that there is a significant effect between pollen sources, as the mixture pollen source (Al-FahalDakel + Stal acid Yellow) was superior by 83.35 kg, while the total yield in the pollen source Al-FahalDakel was 31.23 kg. At a concentration of 200 mg L<sup>-1</sup> it had a significant superiority of 49.08 kg over the control treatment, which was 37.99 kg.

The results of the same table show that the bilateral interaction between the pollen sources and spraying with Glutomic acid had a significant effect on the total yield, as the treatment of spraying with a concentration of 200 mg L<sup>-1</sup> with the mixed pollen source (Al-FahalDakl + Stal acid Yellow) was significantly superior to the rest of the treatments of sources and spraying with Glutomic acid Without spraying, it reached 61.83 kg. The treatment without spraying with the pollen source, Al-Fahal, recorded the lowest percentage of fruit ripening, which reached 26.10 kg.

**Table 4. The effect of pollen source and Glutomic acid averages and the interaction between them on the amount of total yield (kg) of date palm trees as the source of acacia pollen.**

Glutomic acid averages Mg L <sup>-1</sup>	Mixture (the stal acid is dukl + (stal acid is yello	The stal acid yellow	The stal acid is dukl	source of pollen Glutomic acid mg L <sup>-1</sup>
C37.99	52.38b	35.50d	26.10e	0
B43.61	54.53b	43.98c	32.31d	100
A 49.08	61.83a	50.11b	35.30d	200
	A56.25	B43.20	C31.23	source of pollen averages

Averages that share the same letter for each of the sources of difference do not differ significantly according \* .to Duncan's multiple range test at the probability level of 0.05

### Discussion

The results showed that the source of pollen had a significant effect on most of the physical characteristics, as the source of mixed pollen (stallion Dakl + stallion yellow) excelled in recording the best results for the characteristics of fruit weight, fruit size, total yield quantity, and cluster weight. The reason for this increase may be attributed to Pollen vitality as the highest percentage of pollen germination obtained from the mixture (stallion Dakl + stallion yellow). In pollen quality, percentage of germination, and growth of pollen tube, so pollen source has a significant effect on physical traits (16, 17).

The results showed that spraying with glutamic acid had a significant effect on most of the physical traits, as spraying with a concentration of 200 mg.L<sup>-1</sup> was superior in recording the best results in terms of fruit weight, fruit size, total yield quantity, and cluster weight. The reason for this increase may be attributed to the action of glutamic acid. In increasing cell division and thus increasing the size and weight of the fruit. It may be attributed to the effect of the amino acid in stimulating the endogenous hormones or the initial initiators that eventually help in improving the quality and quantity of the yield and thus the possibility of increasing the weight of the cluster and the quantity of the yield. Or it may be attributed to the use of amino acids in high concentrations. Suitable for scavenging free radicals, which helps prevent cell and tissue damage, as mentioned by (18, 19).

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