Iraqi Journal of Agricultural Sciences –2026:57(1):45-54
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/gek6pm55

INFLUENCE OF ORGANIC FERTILIZER AND POLLINATIONS TREATMENTS ON LEAVES CHEMICAL CONCETRATION AND YIELD OF" BARHI" DATE PALM

Mohammed A. Shakir *[1] M. R. Abood [2]
Department of Hort. and Landscape- College of Agricultural Engine. Science - University of Baghdad. Baghdad, Iraq

ABSTRACT

This study was aimed to investigate the response of "Barhi" cultivar trees to sheep manure, pollinator's and number of pollinations. This experiment was carried out during 2022 and 2023 seasons at one of "Barhi" palm orchards propagated by tissue culture, grown in Al-Dawwar date palm station affiliated to Ministry of Agriculture. ten-year-old Barhi cultivar. Factors of experiment included addition of three levels of sheep manure, 0 (M_0), 20 (M_1) and 40 kg,tree^{-1} (M_2), as well as two pollinators cultivar, Ghanami Akhdar (P_1), and local cultivar (P_2), while pollinations number were three times; once (N_1), Two pollinations (N_2) (2 days after first pollination) and pollination three times (N_3) (3 days after first and 3 days after second). 54 date palm trees were utilized in factorial experiment; treatments were replicated three times in RCBD. The results showed that manure (40 kg.tree^{-1}) (M_2) was significantly effective in leaf potassium concentration 1.488 and 1.531 %, leaf chlorophyll concentration 1.568 and 1.723 mg,100g^{-1} , fresh weight 9.42 and 12.36 kg and tree yield 47.10 and 61.80 kg for both seasons respectively. Pollinators did not significantly effect on leaf potassium and chlorophyll concentration while local cultivar pollinator (P_2). significantly increased bunch weight 7.82 and 10.59 kg and highest fruit yield weight 39.11 and 52.95 kg for both seasons respectively.Results also showed that pollinations number did not significantly effect on leaf potassium and chlorophyll concentration while pollination three times (N_3) gave highest bunch weight 7.91 and 11.31 kg .

Keywords: bunches yield, chlorophyll, date palm, pollination treatments, potassium, sheep manures
***Part of Ph.D. Dissertation of the 1st author.**

Received: 12/11/2023, Accepted: 11/2/2024, Published: 26/1/2026

INTRODUCTION

Barhi dates are considered soft dates. As for Barhi dates, their fruits are characterized by sweetness of disaccharides (sucrose), in addition to a very small amount of monosaccharide's (glucose + fructose). As for sweetness of Barhi dates, it is due to predominance of taste of reduced sugars (monosaccharide's) glucose and fructose. As for date stage, its sweetness comes from reduced sugars with an increase in their concentration, which gives it another delicious taste. High quality and high economic return, noting that there is an increasing demand for its cultivation and that the process of caring for this variety in terms of breeding, improvement, fertilization, thinning and irrigation has given very distinct results in terms of friut size, its weight and its sweetness. Green to orange, it tolerates salinity to a certain extent and drought and is moderately tolerant to frost. Recently, red Barhi appeared in Iraq and has same characteristics except for red color and began to spread widely and rapidly in Iraqi

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

governorates (Al-Aqidi 2014; Kareem and Al-Dahan. 2020). One of oldest fruit trees known to man is date palm, which is an important tree spread in arid and semi-arid regions. date palm belongs to Arecaceae family and to Palme order, which includes 200 genera and approximately 4,000 species. It's economically most important genera are four genera, including Phoenix genus, to which twelve species belong, most important from an economic and nutritional standpoint being dactylifera species (Ibrahim,2014; Kareem, and Al-Dahan. 2020). Fertilization is one of important agricultural operations carried out on fruit trees to improve their nutritional status, and this reflects positively on growth and yield. Organic fertilization is one of practices used to reduce use of chemical fertilizers and reduce their harm on human health and environment. Organic fertilizers are either animal or plant wastes, as they are able to supply the plant with nutrients from a natural source and reduce dependence on chemical fertilizers, as well as helping plant accelerate biological and physiological processes by increasing growth and productivity. Recently, importance of using organic fertilization on fruit trees has emerged because they contain some organic and amino acids and other important nutrients for plant growth. They are also characterized by their abundance, low cost, easy to use, and low pollution of environment and agricultural products. They also contribute in improving soil physical, chemical, and biological properties (Al-Hadethi etal .2020; Muktamar etal.,2017). Many experiments were carried out aiming to increase concentration of chlorophyll and elements as a result of adding organic fertilizers. In study conducted by Taha and Abood , (2018), they added organic fertilizer, amino acids, and seaweed extract to date palm tree of Barhi cultivar at concentrations of 1 and 2 kg tree, they found a significant increase in concentration of potassium and chlorophyll in leaves fertilized at 2 kg compared to no addition. In an experiment conducted in one of palm orchards, ten-year-old Khastawi cultivars were grown at Al-Rabi' palm station; it included study effect of Nano-fertilizers and methods of adding them, Jubeir and Ahmed, (2019) found that Nano-seaweed extract treatment had a significant effect on increasing average fruit weight and yield of one palm compared to control treatment. Pollen grains ability to germinate and grow is main indicator for determining quality of varieties, and vitality of pollen grains varies depending on the variety and climatic conditions, as life of a pollen grain is short when stored at moderate temperatures, high relative humidity, and high light intensity, while under conditions of low humidity. With low light intensity and sub-freezing temperatures, lifespan of pollen grains reaches a few years .Pollen is a good food substance because it contains many nutrient, chemical compounds, and some other components, such as hormones. Plant hormones are known as organic substances that are naturally formed in higher plants, and they control growth and some other physiological functions in multiple places other than places of their synthesis. These Hormones are effective in small concentrations and include (auxins, cytokinins, gibberellins and ethylene) (Torres etal.,2021). Results of research conducted in places where palm trees are grown in various parts of world vary, as yield characteristics were affected by difference pollen source and by number of pollination times. Some researchers also explained that female palm flowers of a certain variety are not affected when pollinated with different male varieties in these fruits characteristics, while Other researchers have confirmed presence of an effect of different types of pollen on a specific variety on

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

physical and chemical yield characteristics (Torres etal., 2021 ; Zargari etal.,2023).When they studied effect of local and external pollinators, found that they were denoted by Pollinizer 1, Pollinizer 2) for local pollinators and (Pollinzer3, Pollinizer 4, Pollinizer 5) for external pollinators on " Khalas" date palm. A significant effect of pollination treatments on fruit set and fall was found, as Pollinizer 1 recorded highest fruit set and lowest fruit drop compared to Pollinizer 5, which gave the lowest fruit set and highest percentage of fruit drop, Pollinizer 1 treatment also recorded highest bunch weight compared to Pollinizer 5 treatment, which produced lowest weight. In a study carried out by Ahmed et al., (2021) on " Barhi" date palm grown in newly reclaimed sandy lands, to study date and method of pollination in yield and fruit quality, through two pollination dates: (at same spathe cracking day and two days after spathe cracking). They found that pollination on same day gave highest rate of total and reducing sugars and highest rate of fruit TSS, especially when interfering with traditional manual pollination. This study was aimed to evaluate effect of some pollinators and addition of sheep manure on quantitative and qualitative fruit yield of "Barhi" date palm.

MATERIALS AND METHODS

To know response of "Barhi" date palm trees to sheep manure, pollinator's cultivar and number of pollinations this experiment was carried out during 2022 and 2023 seasons in one of "Barhi" palm orchards propagated by tissue culture, grown in Al-Dawwar date palm station affiliated to Ministry of Agriculture. ten-year-old Barhi cultivar, as 54 were chosen. Factors of study included addition of three levels of sheep manure, 0 (M_0), 20 (M_1) and 40 kg tree^{-1} (M_2), as well as two pollinators cultivar, Ghanami Akhdar (P_1), and local cultivar (P_2), while pollinations number was three times; once (N_1), Two pollinations (N_2) (2 days after first pollination) and pollination three times (N_3) (3 days after first and 3 days after second). 54 date palm trees were utilized in factorial experiment; with in Randomized Complete Block design using three replicates . After statistical analysis of study's data, means were compared using the (L.S.D.) at 0.05 level of significance according to Elsahookie and Wuhaib, (1990). The study traits included potassium Content in fronds, according Chapman and Pratt, 1978. Potassium was estimate chromatic by using spectrophotometer by (Estefan etal., 2013), Leaves chlorophyll contents (mg.100g^{-1} f.w.) according to Mackinny, (1941) Bunch weight (kg): average bunch weight of each palm tree was calculated by fully weighing each bunch, Date palm yield (kg), total soluble solids T.S.S in dates.

RESULTS AND DISCUSSIONS

Effect of Organic Fertilizer and Pollinations Treatments on leaf Potassium and Chlorophyll concentration in date palm:

Data concerning effect of treatments on leaf potassium and chlorophyll concentration are listed in Tables (1 , 2). The data shows that, organic fertilizer was significantly effect in leaf potassium and chlorophyll concentration especially at 40 kg tree^{-1} (M_2) excelled in leaf potassium concentration 1.488 and 1.531 % and leaf chlorophyll concentration 1.568 and 1.723 mg 100g^{-1} fresh weight for both seasons respectively while lower values of these leaves content was in M_0 treatment. Pollinator's cultivar and number of pollination time did not significantly effect on leaf potassium and chlorophyll concentration. Interactions between organic fertilizer application and pollinators significantly affected especially when interaction treatment (P_2M_2) gave 1.492 and 1.543 % as leaf potassium concentration for both seasons respectively. Also interaction treatment (P_2M_2) gave 1.581 mg.100g^{-1} fresh weight as leaf chlorophyll concentration in

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

first season while interaction treatment (P_1M_2) gave 1.753 mg $100g^{-1}$ fresh weight as leaf chlorophyll concentration in second season. The interaction between sheep manure treatment and pollination number especially interaction treatment (N_3M_2) gave highest leaf potassium content of 1.493 and 1.551% for both seasons respectively, whereas interaction treatment (N_1M_2) gave 1.593 mg $100g^{-1}$ fresh weight as leaf chlorophyll concentration in first season while interaction treatment (N_3M_2) gave 1.823 mg $100g^{-1}$ fresh weight as leaf chlorophyll concentration in second season. Interactions between number of pollination and pollinators did not significantly effect on leaf potassium and chlorophyll concentration. Triple interactions between study factors had a significant effect on these leaves concentration.

Table 1. Effect of Organic Fertilizer and Pollinations Treatments and their interaction on leaf Potassium concentration (%) in date palm trees (2022 and 2023).

Pollinator cultivar (P)	Pollination numbers (N)	2022 Organic Manure (M) M_0	M_1	M_2	P × N	2023 Organic Manure (M) M_0	M_1	M_2	P × N
P_1	N_1	1.320	1.395	1.472	1.396	1.341	1.418	1.498	1.419
	N_2	1.312	1.390	1.490	1.397	1.350	1.434	1.522	1.435
	N_3	1.333	1.402	1.487	1.407	1.339	1.452	1.540	1.444
P_2	N_1	1.306	1.391	1.496	1.398	1.317	1.426	1.536	1.426
	N_2	1.318	1.398	1.482	1.399	1.324	1.416	1.530	1.423
	N_3	1.319	1.410	1.499	1.409	1.333	1.440	1.562	1.445
LSD 5%			0.037		N.S		0.088		N.S
	P × M				P		P × M		P
P_1		1.322	1.396	1.483	1.400	1.343	1.435	1.520	1.433
P_2		1.314	1.400	1.492	1.402	1.325	1.427	1.543	1.432
LSD 5%			0.021		N.S		0.051		N.S
	N × M				N		N × M		N
N_1		1.313	1.393	1.484	1.397	1.329	1.422	1.517	1.423
N_2		1.315	1.394	1.486	1.398	1.337	1.425	1.526	1.429
N_3		1.326	1.406	1.493	1.408	1.336	1.446	1.551	1.444
LSD 5%			0.026		N.S		0.062		N.S
M		1.318	1.398	1.488		1.334	1.431	1.531	
LSD 5%			0.015				0.036		

These outcomes could be as a resulted from adding sheep manure, which modifies properties of soil by improving its aeration and water retention capacity, thereby facilitating spread and growth of roots. It also plays a role in increasing availability of nutrients, which increases their absorption and is reflected in concentration of these nutrients in leaves (Jubeir, and Ahmed. 2019). These results are consistent with what found by (Jubeir, and Ahmed. 2019 ; Latif and Abood.2023) on fruit transplants; who found that adding organic fertilizers increases soil nutrients availability and thus increases the concentrations of potassium and chlorophyll in leaves.

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

Table 2. Effect of Organic Fertilizer and Pollinations Treatments and their interaction on leaf chlorophyll concentration (mg.100g^{-1} fresh weight) in date palm trees (2022 and 2023).

Pollinator cultivar (P)	Pollination numbers (N)	2022 Organic Manure (M)			P × N	2023 Organic Manure (M)			P × N
		M_0	M_1	M_2		M_0	M_1	M_2	
P_1	N_1	0.917	1.349	1.651	1.306	1.046	1.416	1.820	1.427
	N_2	0.956	1.315	1.559	1.277	1.111	1.523	1.632	1.422
	N_3	0.850	1.374	1.456	1.227	1.062	1.483	1.806	1.450
P_2	N_1	0.939	1.361	1.535	1.278	1.066	1.462	1.592	1.373
	N_2	0.976	1.373	1.567	1.305	1.087	1.547	1.646	1.427
	N_3	1.046	1.386	1.642	1.358	1.148	1.521	1.840	1.503
LSD 5%			0.277		N.S		0.360		N.S
P × M					P		P × M		P
P_1		0.908	1.346	1.555	1.270	1.073	1.474	1.753	1.433
P_2		0.987	1.373	1.581	1.314	1.100	1.510	1.693	1.434
LSD 5%			0.160		N.S		0.208		N.S
N × M					N		N × M		N
N_1		0.928	1.355	1.593	1.292	1.056	1.439	1.706	1.400
N_2		0.966	1.344	1.563	1.291	1.099	1.535	1.639	1.424
N_3		0.948	1.380	1.549	1.292	1.105	1.502	1.823	1.477
LSD 5%			0.195		N.S		0.255		N.S
M		0.947	1.360	1.568		1.087	1.492	1.723	
LSD 5%			0.113				0.147		

Effect of Organic Fertilizer and Pollinations Treatments on bunch weight and yield in date palm trees:

Data concerning effect of treatments on bunch weight and yield are listed in Tables (3 , 4). Data shows that, organic fertilizer was significantly effect on bunch weight and yield especially at 40 kg tree^{-1} (M_2) excelled in bunch weight 9.42 and 12.36 kg and tree yield 47.10 and 61.80 kg for both seasons respectively while lower values of these properties were in M_0 treatment. Tables (3 , 4) also shows that local cultivar pollinator (P_2), significantly increased bunch weight 7.82 and 10.59 kg and highest fruit yield weight 39.11 and 52.95 kg for both seasons respectively while lower values of these traits were in P_1 pollinator. Data cleared that, number of pollination especially pollination three times (3 days after first and 3 days after second) (N_3), showed significant superiority in bunch weight 7.91 and 11.31 kg and gave highest fruit yield weight 39.55 and 56.55 kg for both seasons respectively while pollination one times (N_1) was lowest values of these traits. Interactions between organic fertilizer (sheep manure) application and pollinators significantly affected especially when interaction treatment (P_2M_2) gave 10.20 and 12.66 kg bunch weight and gave 51.00 and 63.32 kg tree yield for both seasons respectively. The interaction between sheep manure treatment and pollination number especially interaction treatment (N_3M_2) gave highest bunch weight 9.93 and 13.50 kg and highest tree yield 49.65 and 67.50 kg for both seasons respectively. Interactions between pollinators and number of pollination significantly affected on bunch weight and fruit yield weight especially interaction treatment (P_2N_3) 8.29 and 11.46 kg bunch weight gave 41.43 and 57.32 kg tree yield for both seasons respectively. Triple interactions between study factors had a significant effect on these studied properties.

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

Table 3. Effect of Organic Fertilizer and Pollinations Treatments and their interaction on bunch weight (kg) in date palm trees (2022 and 2023).

Pollinator cultivar (P)	Pollination numbers (N)	2022				2023			
		Organic Manure (M)			P × N	Organic Manure (M)			P × N
		M_0	M_1	M_2		M_0	M_1	M_2	
P_1	N_1	5.91	6.15	7.80	6.62	7.50	9.00	10.82	9.11
	N_2	6.06	6.28	8.94	7.09	7.93	9.98	12.35	10.09
	N_3	6.23	7.19	9.18	7.53	8.11	12.36	13.00	11.16
P_2	N_1	5.77	6.61	9.72	7.37	7.64	10.22	11.16	9.67
	N_2	6.24	7.00	10.20	7.81	7.91	11.16	12.83	10.63
	N_3	6.35	7.83	10.68	8.29	8.37	12.02	14.00	11.46
LSD 5%			1.32		0.76		1.20		0.69
		P × M			P		P × M		P
P_1		6.07	6.54	8.64	7.08	7.85	10.45	12.06	10.12
P_2		6.12	7.15	10.20	7.82	7.97	11.13	12.66	10.59
LSD 5%			0.76		0.44		0.69		0.40
		N × M			N		N × M		N
N_1		5.84	6.38	8.76	6.99	7.57	9.61	10.99	9.39
N_2		6.15	6.64	9.57	7.45	7.92	10.57	12.59	10.36
N_3		6.29	7.51	9.93	7.91	8.24	12.19	13.50	11.31
LSD 5%			0.93		0.54		0.85		0.49
M		6.09	6.84	9.42		7.91	10.79	12.36	
LSD 5%			0.54				0.49		

Table 4. Effect of Organic Fertilizer and Pollinations Treatments and their interaction on tree yield (kg) in date palm trees (2022 and 2023).

Pollinator cultivar (P)	Pollination numbers (N)	2022				2023			
		Organic Manure (M)			P × N	Organic Manure (M)			P × N
		M_0	M_1	M_2		M_0	M_1	M_2	
P_1	N_1	29.55	30.75	39.00	33.10	37.50	45.00	54.10	45.53
	N_2	30.30	31.40	44.70	35.47	39.65	49.90	61.75	50.43
	N_3	31.15	35.95	45.90	37.67	40.55	61.80	65.00	55.78
P_2	N_1	28.85	33.05	48.60	36.83	38.20	51.10	55.80	48.37
	N_2	31.20	35.00	51.00	39.07	39.55	55.80	64.15	53.17
	N_3	31.75	39.15	53.40	41.43	41.85	60.10	70.00	57.32
LSD 5%			5.58		3.22		4.75		2.75
		P × M			P		P × M		P
P_1		30.33	32.70	43.20	35.41	39.23	52.23	60.28	50.58
P_2		30.60	35.73	51.00	39.11	39.87	55.67	63.32	52.95
LSD 5%			3.22		1.86		2.75		1.59
		N × M			N		N × M		N
N_1		29.20	31.90	43.80	34.97	37.85	48.05	54.95	46.95
N_2		30.75	33.20	47.85	37.27	39.60	52.85	62.95	51.80
N_3		31.45	37.55	49.65	39.55	41.20	60.95	67.50	56.55
LSD 5%			3.95		2.28		3.37		1.95
M		30.47	34.22	47.10		39.55	53.95	61.80	
LSD 5%			2.28				1.95		

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

Effect of Organic Fertilizer and Pollinations Treatments on fruit TSS:

Data concerning effect of treatments on fruit TSS listed in Table (5). Data shows that, organic fertilizer was significantly effect on fruit TSS especially at 40 kg tree^{-1} (M_2) 72.59 and 73.16 % for both seasons respectively while lower values of TSS were in M_0 treatment. Table (5) also shows that local cultivar pollinator (P_2), significantly increased fruit TSS 71.77 % for first season only, while results did not differ significantly for second season of experiment. Data cleared that, number of pollination especially pollination three times (3 days after first and 3 days after second) (N_3), showed significant superiority in fruit TSS 71.87 and 72.64 % for both seasons respectively while pollination one times (N_1) was lowest values of fruit TSS. Interactions between organic fertilizer application and pollinators significantly affected especially when interaction treatment (P_2M_2) gave 72.60 and 73.20 % fruit TSS for both seasons respectively. The interaction between sheep manure treatment and pollination number especially interaction treatment (N_3M_2) gave highest fruit TSS 72.70 and 73.31 % for both seasons respectively. Interactions between pollinators and number of pollination significantly affected on fruit TSS especially interaction treatment (P_2N_3) 72.05 and 72.66 % for both seasons respectively. Triple interactions between study factors had a significant effect on fruit TSS.

Table 5. Effect of Organic Fertilizer and Pollinations Treatments and their interaction on fruit TSS (%) in date palm trees (2022 and 2023).

Pollinator cultivar (P)	Pollination numbers (N)	2022				2023			
		Organic Manure (M)			P × N	Organic Manure (M)			P × N
		M_0	M_1	M_2		M_0	M_1	M_2	
P_1	N_1	70.72	71.32	72.40	71.48	71.65	72.39	72.98	72.34
	N_2	70.88	71.14	73.00	71.67	71.29	72.46	73.19	72.31
	N_3	71.12	71.57	72.36	71.68	71.98	72.70	73.20	72.63
P_2	N_1	70.86	71.44	72.62	71.64	71.53	72.51	72.90	72.31
	N_2	71.16	71.60	72.14	71.63	71.97	71.94	73.27	72.39
	N_3	71.30	71.81	73.04	72.05	71.66	72.90	73.42	72.66
LSD 5%			0.33		0.19		0.32		0.18
		P × M			P		P × M		P
P_1		70.91	71.34	72.59	71.61	71.64	72.52	73.12	72.43
P_2		71.11	71.62	72.60	71.77	71.72	72.45	73.20	72.46
LSD 5%			0.19		0.11		0.18		N.S
		N × M			N		N × M		N
N_1		70.79	71.38	72.51	71.56	71.59	72.45	72.94	72.33
N_2		71.02	71.37	72.57	71.65	71.63	72.20	73.23	72.35
N_3		71.21	71.69	72.70	71.87	71.82	72.80	73.31	72.64
LSD 5%			0.23		0.13		0.23		0.13
M		71.01	71.48	72.59		71.68	72.48	73.16	
LSD 5%			0.13				0.13		

CONCLUSION

It was noted from results of Tables (3-5) that there was an increases in indicators that related to characteristics of the trees' quantitative and qualitative yields for two experiment years. The reason for this increases are due to role of added organic residues in increasing nutrients in soil solution, which increased their absorption (Table 1). Which leads to an increases in cell expansion and division, an

increase in size and area of leaves, and an increase in leaves chlorophyll content (Table 2), which means an increases in amount of sugars manufactured in leaves and their transfer to fruits, thus improving characteristics of the trees' yield in terms of yield per tree and fruit weights and sizes and TSS percentage, as well as role of these nutrients dissolved in soil solution and available for absorption in formation of compounds and some components of basic processes of photosynthesis and respiration, as well as their contribution in construction and increases in activity of a large number of enzymes, which is reflected in increases in yield characteristics and its components (Zamzami, etal.,2023). These results are consistent with what foundry (Alghanim, etal., 2023 , Joody, 2019) they found a significant increases in yield quantitative and qualitative characteristics of their trees when adding or spraying with organic fertilizers.

ACKNOWLEDGEMENT

I extend my deepest gratitude and appreciation to my esteemed professor, Dr. Mu'ayyad Rajab Aboud, for his guidance, support, and invaluable academic direction. I am also pleased to express my thanks and appreciation to the Head of the Horticulture Department, Professor Dr. Wafaa Ali Hussein, and all the faculty and staff of the Horticulture and Landscape Engineering Department, especially Professor Dr. Ahmed Talib Judi, Professor Dr. Nazik Haqqi, Dr. Osama, Professor Dr. Iman Jaber Abdul Rasoul, and Assistant Professor Dr. Mustafa Ayada Adai.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DECLARATION OF FUND

The authors declare that they have not received a fund.

REFERENCES

- Ahmed, A.A; M.A.F. Badran and S. H. Gaber. 2021. Impact of different times and methods of pollination on fruit set and productivity of Barhi date palm. Assiut J. Agric. Sci., 52 (5):104-112. DOI 10.21608/ajas.2022.112044.1073
- Al-Aqidi, H. Kh. 2014. Iraqi dates - famous types of dates - agricultural information about palm trees. Iraqi Forum for Elites and Competencies.pp:
- Alghanim, Faten S. R; M. E. A. Al-Hadethi and A. Yaviç. 2023. Response of apple trees performance to moringa extract, humic acid, and liquid organic fertilizers (Vit-Org). J. of Plant Production, Mansoura Univ., 14 (6):313 – 317. DOI: 10.21608/jpp.2023.213580.1244
- Al-Hadethi, M. E.A; F.H. Taha and S. M. Abbood. 2020. Effect of compost prepared from plant residues on olive transplants growth. International Journal of Agricultural and Statistical Sciences. 16 (1): 1385-1389.
- Jubeir, Sh. M and W. A. Ahmed. 2019. Effect of amino acids addition and spraying with glutathione and kaolin in growth apricot transplants. IOP Conference Series: Earth and Environmental Science. 1262(4): 042025. DOI: 10.1088/1755-1315/1262/4/042025
- Chapman, H, D. and P. E, Pratt. 1978. Methods of Analysis for Soils, Plants, and Waters. First Edition. Univ. of Calif., Div. Agric. Sci., Priced Pub: 4034.pp.
- Estefan, G; R.Sommer and J.Ryan. 2013. Methods of soil, plants and water analysis, ICARDA, International for Agriculture Research in the dry areas, third edition. pp:
- Elsahookie, M. M and K. M, Wuhaib. 1990. Design and Analysis of experiments. First Edition. Dar al hekma.Univ. Of Bagh. pp.488.

- Ibrahim, A.O. 2014. Date palm. Agriculture, service, technical care, and manufacturing. Isa Cultural Center, Bahrain.pp:
- Jubeir, Sh. M and W. A. Ahmed. 2019. Effect of Nano fertilizers and application methods on vegetative growth and yield of date palm. Iraqi Journal of Agricultural Sciences.50 (1):267-274.
- Joody, A. T. 2019. Effect of NPK and organic fertilizers on increasing medicinally active components and limiting heavy metal uptake in pomegranate trees. J. Pharm. Sci. & Res. 11(7): 2770-2773.
- Kareem, A.A.A and M.R.A, Al-Dahan. 2020. Influence of some factor on somatic embryos induction and germination of date palm Barhi C.V by using cell suspension culture technique. Plant Archives. 20(Supplement 1): 1666-1670.
- Latif, M. T. A and M. R, Abood.2023. Response of three citrus rootstocks to organic and biological fertilizers. Bionatura. 2(8):1-9.
  DOI : 10.21931/rb/css/2023.08.02.100
- Mackinny, G. 1941. Absorption of light by chlorophyll solutions. J. Biol. Chem., 140(2) 315-322.
- Muktamar, Z., S. Sudjatmiko, F. Fahrurrozi, N. Setyowati, and M. Chozin, .2017. Soil chemical improvement under application of liquid organic fertilizer in closed agriculture system. International Journal of Agricultural Technology, 13(7.2): 1715-1727.
- Torres, R.; R Krueger , J.P.; García-Vázquez, R.; Villa-Angulo, C.; Villa-Angulo, N.; Ortiz-Uribe, J.A.; Sol-Uribe, and L Samaniego-Sandoval,. 2021. Date Palm Pollen: Features, Production, Extraction and Pollination Methods.Agronomy . 11, 504.
  DOI: 10.3390/agronomy11030504
- Zamzami, A; W; Rev. Puri I. A; Angga Jawi, U Herlinda Putri and W Desy Cahya. 2023. The effectiveness of organic fertilizers of chicken, cow and sheep manure against the growth of cabbage, caisim, chicory plants vegetatively. Proceeding International Conference on Religion, Science and Education. 2: 591-596.
- Zargari, H; A. Talaie; Y.D, Shukri and V. Abdossi. 2023. Effect of pollen source on fruit set, yield, and physical properties of tissue culture-derived and offshoot-derived date palm, cv. ‘Barhi’ and ‘Piarom’. International Journal of Horticultural Science and Technology. 10(4):445-462.

Iraqi Journal of Agricultural Sciences –2026:57(1):1-18
P-ISSN: 0075- 0530/ E-ISSN: 2410-0862
DOI:

تأثير السماد العضوي و معاملات التلقيح في تركيز الاوراق الكيميائي و حاصل نخيل التمر البرحي

محمد عبد الحميد شاكر *[1] مؤيد رجب عبود [2]

باحث أستاذ

قسم البستنة وهندسة الحدائق, كلية علوم الهندسة الزراعية, جامعة بغداد, بغداد, العراق.

المستخلص

لمعرفة استجابة نخيل التمر صنف البرحي للتسميد بمخلفات الأغنام وصنف اللقاح وعدد مرات التلقيح اجريت هذه التجربة في موسمي النمو 2022 و2023 في أحد بساتين النخيل صنف برحي المكثر نسيجياً المزروع في محطة نخيل الدوار التابعة لوزارة الزراعة/دائرة البستنة, على اشجار النخيل صنف برحي وبعمر 10 سنوات. تضمنت عوامل الدراسة إضافة ثلاثة مستويات مخلفات أغنام وهي من دون اضافة (M_0) واضافة 20 كغم نخلة$^{-1}$ (M_1) واضافة 40 كغم نخلة$^{-1}$ (M_2)، فضلا عن صنفين من اللقاح هما الصنف الغنامي الأخضر (P_1)، والصنف المحلي (P_2)، وعدد مرات التلقيح وهي التلقيح لمرة واحدة (N_1) والتلقيح مرتان (بعد 2 يومين من التلقيح الأول) (N_2) والتلقيح ثلاث مرات (بعد 3 ايام من الاول وبعد 3 أيام من الثاني) (N_3) . تم استعمال 54 شجرة نخيل في التجربة العاملية بتصميم RCBD بثلاثة مكررات. أظهرت نتائج الدراسة ان اضافة مخلفات الأغنام لاسيما المستوى 40 كغم نخلة$^{-1}$ (M_2) اثر معنوياً واعطى اعلى تركيز للأوراق من البوتاسيوم بلغ 1.488 و1.531% واعلى تركيز للأوراق من الكلوروفيل بلغ 1.568 و1.723 ملغم 100غم وزن طري واعلى وزن للعذق بلغ 9.42 و 12.36 كغم واعلى حاصل للنخلة بلغ 47.10 و61.80 كغم للموسمين بالتتابع. لم تؤثر الملقحات معنوياً في تركيز الأوراق من البوتاسيوم والكلوروفيل لكن اللقاح المحلي (P_2) اثر معنوياً في وزن العذق بلغ 7.82 و10.59 كغم وحاصل النخلة بلغ 39.11 و52,95 كغم للموسمين بالتتابع. اشارت النتائج ايضاً ان عدد مرات التلقيح لم تؤثر معنوياً في تركيز الأوراق من البوتاسيوم والكلوروفيل بينما اثر التلقيح ثلاث مرات (N_3) معنوياً في وزن العذق بلغ 7.91 و11.31 كغم.

كلمات مفتاحية: حاصل العذوق، الكلوروفيل، نخيل التمر، معاملات التلقيح، البوتاسيوم، مخلفات الأغنام.

*** البحث مستل من اطروحة دكتوراه للباحث الأول**