Effect of pyotrcine and water stress on the flowering traits of two cultivars of static plant

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Abstract

The experiment was conducted in lathhouse of the Department of Plant Production Technologies/Al-Musayyib Technical College for autumn season of 2023 and the spring season of 2024 to study the response of two cultivars of static plant to the anti-transpirant agent Limonium Sinuatum. The experiment was conducted as a factorial experiment according to Randomized Complete Blocks Design (R.C.B.D),. It consists of three factors. The first factor is the cultivars and two levels: C1 (the white cultivar (Forever Silver) and C2 pink (Seeker Rose Shades). The second factor is the anti-transpiration factor pyotrcine with three levels: B0 (control treatment), B1 (spraying at a concentration of 150 mg L-1) and B2. (Spraying at a concentration of 300 mg L-1) Spraying began a month after cultivation in pots, at the rate of one spray every 30 days until flowering time. The third factor was water stress at four levels: S0 (irragation to 100% of field capacity), S1, (Irrigation to 75% of field capacity) S2 (Irrigation to 50% of field capacity), S3 (Irrigation to 25% of field capacity).The results of this study can be summarized as follows:The white cultivar was significantly excelled and gave the highest averages in the characteristics of stem diameter (mm), number of stem branches (branch plant - 1), flower stem length (cm), number of flower stems (plant stem - 1), number of inflorescences (plant inflorescence. -1), inflorescence diameter (mm),The results showed the pyrocine spray treatment (300 mg L-1) significantly excelled by giving it the highest average for all the studied traits represented by: stem diameter (45.9mm), number of flower stems (5.80 plant stems-1 , flower stem length (47.2 cm).), the number of inflorescences per plant (27.8 inflorescences plant-1), the diameter of the flower inflorescence (27.8 mm),The bi-interaction between the white cultivar and the water stress level (75% of field capacity) was superior in traits of stem diameter (mm), number of branches, number of inflorescences, flower inflorescence diameter, and number of flower stems.The triple intervention treatment (white cultivar , water stress level 75% of field capacity, and 300 mg L-1 spray of pyotrosine) significantly excelled and gave the highest averages for the traits of (stem diameter, flower stem length, number of Flower stems, number of inflorescences, and diameter of inflorescence.

Keywords: pyotrcine , water stress, static plant, Forever Silver ,Seeker Rose Shades

Introduction

Roses are a language that can be read in all the alphabets of the world, and no translation is required for anyone who tastes, feels, or understands them. They are a special language that stems from human feelings and sensations. When they speak to you, they attract you to them with the power of their sweet scent, charming shapes, and bright colors. Roses are considered to belong to the family Plumbaginaceae and the genus

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Limonium, and its scientific name is Limonium. Sinuatum L., a winter annual or perennial herbaceous plant, depending on the species and the environment in which it grows. Its original habitat is the Mediterranean basin, southern Palestine, Spain, North Africa, and the Canary Islands[8] It usually grows in sandy lands and tolerates salinity, so it is suitable for cultivation on seashores. It also tolerates cultivation in dry conditions [9] . Numerous amines are considered growth hormones that are produced in small quantities in specific places in the plant and then transported to other places to show their effect in regulating various growth processes[15] . They include a group of compounds that contain two or more amine groups, including putrescine and these. Amines have a regulatory relationship with various growth and development processes in plants, such as cell division, differentiation, and early flowering of plants [16.[

Stress is defined as any factor, whether environmental or biological, that is not appropriate for the growth of an organism and has the ability to cause damage to the vital activities of this organism [19]. One of the most prominent environmental stresses affecting plant growth is water stress, which occurs due to a lack of water available to the plant or The inability of the plant to absorb water, even if water is available, or the inability to absorb water naturally from the root environment due to the force affecting the holding of water molecules, which is the most lethal factor for the plant and has several types, such as Drought stress, Freezing stress, Flooding stress, and Flooding stress. Water deficit and salt stress [18].It was found that the static plant is one of the pioneering plants in converting salty soils to less salty soils, in addition to its tolerance for cultivation in soils with high levels of salinity. This is what was obtained from a previous study of two cultivars of static (QisYellow) (Good uniformity) [3], so it was It is necessary to study the suitability of other cultivars for cultivation in conditions of water stress, and given the lack of previous studies in Iraq, and to increase the benefit from it for cultivation in arid places in addition to saline areas, and to maximize the economic value and the environment, this study was found, which aims to:

-1Evaluation of the tolerance of two types of static to water stress conditions and its effects on vegetative and flowering growth.

-2Study of the response of sedges grown under water stress conditions to treatment with the anti-transpiration agent pyotrcine.

-3Determine the best cultivar to withstand water stress conditions.

Materials and methods

The experiment was conducted in lathhous of the Department of Plant Production Technologies / College of Technology - Al-Musayyab / Al-Furat Al-Awsat Technical University for autumn season of 2023 and the spring season of 2024, to study the effect of growth factors and water stress on the growth and flowering of two cultivars of static plant . The experiment included studying the effect of three factors, the first factor is the two cultivars: The white cultivar , Forever Silver, and the pink cultivar , Seeker Rose shades, are symbolized by (1 C, C2), and the second factor included the biological growth regulator pyotrcine, at three levels: (spraying with water (control treatment), spraying at a concentration of 150 mg L-1, spraying at a concentration of 300 mg L-1, symbolized by the symbol (P0, P1, P2). Spray solutions were prepared by dissolving the calculated weights (150-300 mg L-1) of the growth regulator

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pyotrcine in a liter of distilled water, each separately from the above two concentrations, with the addition of some drops of Liquid soap: To reduce surface tension and increase the absorption process, the process of spraying the plants with pyotrcine began thirty days after planting the seedlings in the pots and three times until the beginning of flowering [7] Spraying operations were conducted using a hand sprinkler in the early morning until the plants were completely wet, taking into account that the plants should be watered the day before the spraying operation to increase the efficiency of the plants in absorbing the sprayed material [5[

As for the third factor, it is water stress, which included four levels (S0 irrigation to 100% of field capacity, S1 irrigation to 75% of field capacity, S2 irrigation to 50% of field capacity, S3 irrigation to 25% of field capacity. The experiment was conducted as a factorial experiment (3 × 4 × 2) according to the Randomized Complete Blocks Design (R.C.B.D), with three replicates, each replicate containing 24 treatments, so the number of experimental units is (72), and with 7 plants for each experimental unit, the number of plants is (504), The means were compared according to the least significant difference (L.S.D) test under the 5% probability level [6] The data were analyzed using the Genstat program.

Studied traits

:1Flower stem length (cm(

The length of the Flower stem was measured from the surface of the potting soil to the bottom of the base of the main (first) floral inflorescence using a metric tape measure for each experimental unit, then the average was calculated for each treatment.

:2Flower stem diameter (mm(

At a height of 3 cm from the surface of the potting soil, the diameter of the flower stem was measured using an electronic foot (micro Vernier), and the average was calculated for each experimental unit for each treatment.

:3Number of flower stems (stem plant -1(

it calculated the number of flower stems formed and then calculated the average for each treatment.

:4Number of inflorescences (inflorescence plant -1(

The number of inflorescences opened from the plants of the experimental unit was calculated, then the average was calculated for each treatment.

:5Inflorescence diameter (mm(

The electronic foot (micro Vernier) was used to calculate the inflorescence diameter of four flower stems for each plant in the experimental unit, then the average was calculated for each treatment.

Results and discussion

Flower stem length (cm(

The results of Table (1) indicate that there are significant differences between the levels of the studied factors in influencing the average flower stem length(cm). The white cultivar was significantly excelled and gave the highest average of 44.81 cm compared to the pink cultivar , which gave the lowest average of 39.44 cm. As for the effect of water stress treatment (75% of the field capacity) was significantly excelled and gave the highest average of 46.17 cm. There was no significant difference between it and the treatment (100% of the field capacity), while the treatment (25% of the field capacity) gave the lowest average of 36.83 cm. The treatment of spraying pyotrcine at a concentration of 300 mg L-1 was significantly excelled and gave the highest average of 45.90 cm compared to the treatment without spraying pyotrcine,

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which gave the lowest average of 38.60 cm. As for the bi-interaction between the cultivars and water stress, the treatment (white cultivar + 75% of field capacity) excelled.) significantly and gave the highest average of 49.56 cm, while the treatment (pink cultivar + 25% of field capacity) gave the lowest average of 35.11 cm. As for the bi-interaction between the cultivars and pyotrcine, the treatment (white cultivar + 300 mg L-1) was significantly excelled and gave the highest average amounting to 48.80 cm compared to the treatment (pink cultivar + without spraying), the lowest average amounting to 36.79 cm. As for the bi-interaction between water stress and pyotrcine, the treatment (75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 51.00 cm, compared to the treatment (25% of field capacity + without spraying), which gave the lowest average of 34.50 cm. As for the triple interaction between cultivars, water stress, and pyotrcine spray, the treatment (white cultivar + 75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 55.00 cm, compared to the treatment (pink cultivar + 25% of field capacity). + Not spraying) which gave the lowest average of 32.30 cm.

Table 1. Effect of the two types of static , water stress, and pyotrcine and their interactions on flower stem length (cm(

averages	Pyotrcine mg L^{-1}			Water stress	cultivars
	300	150	0		
49.44	53.3	53.3	41.7	%100	White
49.56	55.0	48.7	45.0	%75	
41.67	46.3	40.0	38.7	%50	
38.56	40.3	38.7	36.7	%25	
41.89	46.3	40.7	38.7	%100	Pink
42.78	47.0	41.7	39.7	%75	
38.00	40.3	37.7	36.0	%50	
35.11	38.7	34.3	32.3	%25	
2.264	3.922			$LSD_{0.05}$	
cultivars*Pyotrcine					
44.81	48.8	45.2	40.5	White	
39.44	43.1	38.6	36.7	Pink	
1.132	1.961			LSD	
Water stress *Pyotrcine					
45.67	49.8	47.0	40.2	%100	
46.17	51.0	45.2	42.3	%75	
39.83	43.3	38.8	37.3	%50	
36.83	39.5	36.5	34.5	%25	
1.601	2.773			LSD	
	45.9	41.9	38.6	Pyotrcine averages	
	1.387			LSD	

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Flower stem diameter (mm(

The results of Table (2) indicate that there are significant differences between the levels of the studied factors in influencing the average diameter of the main stem, mm. The white cultivar was significantly excelled and gave the highest average of 4.71 mm compared to the pink cultivar , which gave the lowest average of 4.50 mm. As for the effect of stress In water, the treatment (75% of the field capacity) was significantly excelled and gave the highest average of 4.94 mm, and there was no significant difference between it and the treatment (100% of the field capacity), while the treatment (25% of the field capacity) gave the lowest average of 4.22 mm. The treatment of spraying pyotrcine at a concentration of 300 mg L-1 was significantly excelled and gave the highest average of 4.81 mm compared to the treatment without spraying pyotrcine, which gave the lowest average of 4.43 mm.

As for the bi-interaction between cultivars and water stress, the treatment (white cultivar + 75% of field capacity) was significantly excelled and gave the highest average amounting to 5.18 mm, while the treatment (white cultivar + 25% of field capacity) gave the lowest average amounting to 4.16 mm. As for the bi-interaction between the cultivars and pyotrcine, the treatment (white cultivar + 300 g. L-1) was significantly excelled and gave the highest average of 4.94 mm compared to the treatment (pink cultivar + without spraying). The lowest average was 4.39 mm. the bi-interaction between water stress and pyotrcine, the treatment (75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 5.20 mm compared to the treatment (25% of field capacity + without spraying), which gave the lowest average of 4.08 mm.

As for the triple interaction between cultivars, water stress, and pyotrcine spray, the treatment (white cultivar + 75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 5.53 mm compared to the treatment (white cultivar + 25% of field capacity + without spraying) which gave an average of 4.03 mm.

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Table 2. Effect of the two types of static , water stress, and pyotrcine and their interactions on the diameter of the flower stem (mm(

averages	Pyotrcine mg L^{-1}			Water stress	cultivars
	300	150	0		
5.18	5.40	5.40	4.73	%100	White
5.18	5.53	5.13	4.87	%75	
4.34	4.50	4.30	4.23	%50	
4.16	4.33	4.10	4.03	%25	
4.52	4.73	4.40	4.43	%100	Pink
4.71	4.87	4.63	4.63	%75	
4.50	4.67	4.47	4.37	%50	
4.28	4.43	4.27	4.13	%25	
0.135	0.235			$LSD_{0.05}$	
cultivars*Pyotrcine					
4.71	4.94	4.73	4.47	White	
4.50	4.68	4.44	4.39	Pink	
0.068	0.117			LSD	
Water stress*Pyotrcine					
4.85	5.07	4.90	4.58	%100	
4.94	5.20	4.88	4.75	%75	
4.42	4.58	4.38	4.30	%50	
4.22	4.38	4.18	4.08	%25	
0.096	0.166			LSD	
	4.81	4.59	4.43	Pyotrcine averages	
	0.083			LSD	

Number of flower stems (stem plant -1(

The results of Table (3) indicate that there are significant differences between the levels of the studied factors in influencing the average number of flower stems per plant. The white cultivar was significantly excelled and gave the highest average of 3.68 flower stems per plant compared to the pink cultivar , which gave the lowest average of 3.20 flower stems. Plant-1, where for the effect of water stress, the treatment (75% of field capacity) was significantly excelled and gave the highest average of 3.68 flower stems plant-1, and there is no significant difference between it and the treatment (100% of field capacity), while the treatment gave (25 % of field capacity (minimum average was 3.11 flower stems per plant-1. The treatment of spraying pyotrcine at a concentration of 300 mg L-1 was significantly excelled and gave the highest average of 3.73 flower stems per plant-1 compared to the treatment without spraying pyotrcine, which gave the lowest average of 3.14 flower stems . plant-1.

As for the bi-interaction between cultivars and water stress, the treatment (white cultivar + 75% of field capacity) was significantly excelled and gave the highest average of 4.09 flower stems per plant-1, while the treatment

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(pink cultivar + 25% of field capacity) gave the lowest average of 2.99 stems. plant-1. As for the bi-interaction between the cultivars and pyotrcine, the treatment (white cultivar + 300 mg L-1) was significantly excelled and gave the highest average of 4.03 flower stems per plant-1 compared to the treatment (pink cultivar + without spraying). The lowest average was 2.96 flower stems . plant-1. As for the bi-interaction between water stress and pyotrcine, the treatment (75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 4.03 flower stems . plant-1 compared to the treatment (25% of field capacity + without spraying), which gave the lowest average. It reached 2.85 flower stems plant - 1.

As for the triple interaction between cultivars, water stress, and pyotrcine spray, the treatment (white cultivar + 75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 4.57 flower stems . plant-1 compared to the treatment (pink cultivar + 25% of Field capacity + without spraying), which gave the lowest average of 2.67 flower stems . plant-1.

Table 3. Effect of the two types of static , water stress, and pyotrcine and their interactions on the number of flower stems (stem plant -1(

averages	Pyotrcine mg L-1			Water stress	cultivars
	300	150	0		
4.07	4.37	4.37	3.47	%100	White
4.09	4.57	3.87	3.63	%75	
3.41	3.73	3.33	3.17	%50	
3.22	3.43	3.20	3.03	%25	
3.26	3.47	3.27	3.03	%100	Pink
3.33	3.50	3.37	3.13	%75	
3.22	3.47	3.20	3.00	%50	
2.99	3.27	3.03	2.67	%25	
0.060	0.104			$LSD_{0.05}$	
cultivars*Pyotrcine					
3.68	4.03	3.69	3.33	White	
3.20	3.43	3.22	2.96	Pink	
0.030	0.052			LSD	
Water stress * Pyotrcine					
3.66	3.92	3.82	3.25	%100	
3.68	4.03	3.62	3.38	%75	
3.32	3.60	3.27	3.08	%50	
3.11	3.35	3.12	2.85	%25	
0.043	0.074			LSD	
	3.73	3.45	3.14	Pyotrcine averages	
	0.037			LSD	

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Number of flower inflorescences (inflorescence plant - 1(

The results of Table (4) indicate that there are significant differences between the levels of the studied factors in influencing the average number of flower inflorescences per plant. The white cultivar was significantly excelled and gave the highest average of 26.94 inflorescences . plant -1compared to the pink cultivar , which gave the lowest average of 24.76 plant inflorescences. -1, As for the effect of water stress, the treatment (75% of field capacity) was significantly excelled and gave the highest average of 27.15 plant inflorescences-1, and there is no significant difference between it and the treatment (100% of field capacity), while the treatment gave (25% of field capacity). Field) the lowest average was 23.82 inflorescences per plant. The treatment of spraying pyotrcine at a concentration of 300 mg L-1 was significantly excelled and gave the highest average of 28.30 inflorescences . plant-1 compared to the treatment without spraying pyotrcine, which gave the lowest average of 22.80 inflorescences . plant-1. As for the bi-interaction between the cultivars and water stress, the treatment (white cultivar +) excelled. 75% of the field capacity) significantly and gave the highest average of 28.21 plant inflorescences-1, while the treatment (pink cultivar + 25% of the field capacity) gave the lowest average of 22.89 plant inflorescences-1.

As for the bi-interaction between the cultivars and pyotrcine, the treatment (white cultivar + 300 mg L-1) was significantly excelled and gave the highest average of 29.50 plant inflorescences - 1 compared to the treatment (pink cultivar + without spraying). The lowest average was 22.10 plant inflorescences - 1. As for the bi-interaction between water stress and pyotrcine, the treatment (75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 29.5 plant inflorescences-1 compared to the treatment (25% of field capacity + without spraying), which gave the lowest. Average of 21.6 inflorescences . plant-1.As for the triple interaction between the cultivars, water stress, and pyotrcine spray, the treatment (white cultivar + 75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 31.4 inflorescences -1 compared to the treatment (pink cultivar + 25% of field capacity + without spraying) which gave the lowest average of 20.5 inflorescences . plant-1

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Table 4. Effect of the two types of static , water stress, and pyotrcine and their interactions on the number of inflorescences (inflorescence plant-1(

averages	Pyotrcine mg L-1			Water stress	cultivars
	300	150	0		
28.11	30.8	30.8	22.8	%100	White
28.21	31.4	28.5	24.8	%75	
26.69	29.3	27.1	23.7	%50	
24.76	26.4	25.2	22.6	%25	
25.91	29.4	26.0	22.3	%100	Pink
26.09	27.6	26.4	24.3	%75	
24.14	27.0	23.9	21.5	%50	
22.89	24.9	23.3	20.5	%25	
0.404	0.700			$LSD_{0.05}$	
cultivars*Pyotrcine					
26.94	29.5	27.9	23.5	White	
24.76	27.2	24.9	22.1	Pink	
0.202	0.350			LSD	
Water stress*Pyotrcine					
27.01	30.1	28.4	22.5	% 100	
27.15	29.5	27.5	24.5	%75	
25.42	28.1	25.5	22.6	%50	
23.82	25.6	24.3	21.6	%25	
0.286	0.495			LSD	
	28.3	26.4	22.8	averages	
	0.247			LSD	

Diameter of flower inflorescence (mm(

The results of Table (5) indicate that there are significant differences between the levels of the studied factors in influencing the average diameter of the flower inflorescence, mm. The white cultivar was significantly excelled and gave the highest average of 26.44 mm compared to the pink cultivar , which gave the lowest average of 24.21 mm. As for the effect of stress In water, the treatment (75% of the field capacity) was significantly excelled and gave the highest average of 26.65 mm, and there was no significant difference between it and the treatment (100% of the field capacity), while the treatment (25% of the field capacity) gave the lowest average of 23.32 mm. The treatment of spraying pyotrcine at a concentration of 300 mg L-1 was significantly excelled and gave the highest average of 27.80 mm compared to the treatment without adding pyotrcine, which gave the lowest average of 22.20 mm.

As for the bi-interaction between cultivars and water stress, the treatment (white cultivar + 75% of field capacity) was significantly excelled and gave the highest average amounting to 27.71 mm, while the treatment (pink cultivar + 25% of field capacity) gave the lowest average amounting to 22.39 mm.

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As for the bi-interaction between the cultivars and pyotrcine, the treatment (white cultivar + 300 mg L-1) was significantly excelled and gave the highest average of 29.00 mm compared to the treatment (pink cultivar + without spraying). The lowest average was 21.50 mm. As for the bi-interaction between water stress and pyotrcine, the treatment (100% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 29.60 mm compared to the treatment (25% of field capacity + without spraying), which gave the lowest average of 21.10 mm.

As for the triple interaction between cultivars, water stress, and the addition of pyotrcine, the treatment (white cultivar + 75% of field capacity + 300 mg L-1) was significantly excelled and gave the highest average of 30.90 mm compared to the treatment (pink cultivar + 25% of field capacity + without spraying) which gave the lowest average of 20.00 mm.

Table 5. Effect of the two types of static , water stress, and pyotrcine and their interactions on the diameter of the flower inflorescence (mm(

averages	Pyotrcine mg L-1			Water stress	cultivars
	300	150	0		
27.61	30.3	30.3	22.3	%100	White
27.71	30.9	28.0	24.3	%75	
26.19	28.8	26.6	23.2	%50	
24.26	25.9	24.7	22.1	%25	
25.20	29.0	25.5	21.1	%100	Pink
25.59	27.1	25.9	23.8	%75	
23.64	26.5	23.4	21.0	%50	
22.39	24.4	22.8	20.0	%25	
0.659	1.142			$LSD_{0.05}$	
cultivars*Pyotrcine					
26.44	29.0	27.4	23.0	White	
24.21	26.7	24.4	21.5	Pink	
0.330	0.571			LSD	
Water stress * البيوترسن					
26.41	29.6	27.9	21.7	100%	
26.65	29.0	27.0	24.0	75%	
24.92	27.6	25.0	22.1	50%	
23.32	25.1	23.8	21.1	25%	
0.466	0.807			LSD	
	27.8	25.9	22.2	Pyotrcine averages	
	0.404			LSD	

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Discussion

The results of the clear influence of cultivars on floral characteristics were shown in Tables (1-5). This is due to genetic differences and their interaction with environmental factors that determined the changes and affected these traits. It is also due to the nature of the growth of the cultivar . The pink cultivar is distinguished by having a larger vegetative system and the spread of the root system, which helps this. It helps absorb larger amounts of nutrients from the soil, and by increasing the leaf area, the processes of carbon synthesis and respiration increase, and then the metabolic products that lead to the formation of flower buds increase. Tables of flower characteristics have shown the positive effect of spraying with the growth regulator represented by pyotrcine at concentrations of 150 and 300 mg.L -1 in the number of plant flowers, in addition to improving the characteristics of floral growth . which are (flower stem length, Flower stem diameter, number of Flower stems, number of floral inflorescences, floral inflorescence diameter, fresh weight of floral inflorescences, dry weight of floral inflorescences , flowering age), and it could be that the sum of the effects of pyrotericin on vegetative growth traits accumulated in increasing the rates of floral growth traits[11,18]Perhaps the reason for this is due to the effect of pyrotericin in increasing the cell content of compounds. Amino acids and their accumulation, which leads the cell to manufacture alkaloid compounds and store them inside the vacuoles, or the increased production of primary metabolic compounds is accompanied by an increase in the production of secondary metabolic compounds, including alkaloids that work as part of the immune system in the plant cell, especially their effectiveness as antimicrobial agents[2,19]protects flowers from fungal and bacterial infections, which often cause a reduction in the duration of flowering. The increase in the number of flowers may be due to the fact that these compounds are involved in a wide range of biological processes that include plant development, differentiation, flowering, and embryo growth, or the increase may be due to From the effect of these compounds on growth by improving vegetative growth and thus giving the best flower growth results [1]. These compounds can also work to stimulate growth by increasing the amount of internal stimulants such as auxins, gibberellins, and cytokinins simultaneously with reducing the amount of The effectiveness of inhibitors such as ABA thus stimulates growth and flowering, and this demonstrates that butyricin increases the internal content of growth regulators, especially growth promoters such as indole acetic acid [10,19] . This result is consistent with [4] when spraying freesia plants with pyotrcine led to a significant increase in flower growth characteristics, and it agrees with [12] when spraying cladiolus plants gave positive results in increasing the diameter of the flower and the duration of flowering. It also agrees with the results of [20] that spraying the gerbera plant with pyotrcine gave the best results, as the number of flowers, the diameter of the flower, and the length of the flower stand increased. The results indicate the plant's ability to withstand water stress, as it gave excellent vegetative, flower, and root growth results. At high levels of stress (50%-25% of field capacity), this is due to the fact that some plants, including the Static plant, are controlled by several genes with different effects that help them in the adaptive mechanism of responding to water stress,

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including morphological changes or changes in physiological and chemical processes. This is because water stress affects carbon metabolism in one way or another by closing stomata or directly by reducing the ability and efficiency of carbon metabolism in the leaves, which causes a decrease in the average leaf area, which is one of the most prominent mechanisms that the plant resorts to cope with conditions of water shortage, as it reduces the amount of water. Lost through transpiration, especially when using substances that combat this phenomenon, such as growth regulators [16.[

Conclusions

In light of the results obtained in this study, we conclude the following:

-1All studied traits showed the same behavior in both cultivars of Static plant

Forever Silver and Seeker Rose Shades were influenced by study factors, as the response was similar but different in magnitude.

-2Spraying with pyotrcine at a level of 300 mg L-1 on the shoots showed superiority in reducing the harmful effects resulting from water stress and thus increasing the plant's ability to resist environmental conditions, as it gave the best study indicators in measurements of flowering traits.

-3Water stress levels had a negative effect on floweringtraits. The intensity of the effect increased with increasing stress levels, in addition to the negative increase in proline, which enables us to conclude that it can be used as indicators of the extent of water stress. Withstands two types of static to water stress

-4The interaction between the effect of cultivars and anti-transpiration achieved a significant effect to reduce the harmful effects of water stress.

-5The white Static cultivar , Forever Silver, showed greater ability than the pink cultivar , Seeker Rose Shades, to withstand conditions of water stress, as it achieved the best results compared to the cultivar.

References

.1 Abo-Elhasan, J. A. ; A.T. Mohamed;M.A. Darwish and Mahgoub M. H. . 2018. Effect of paclobutrazol and growing media on some vegetative growth, flowering a nd total carbohydrates of Callistemon citrinus Plant. Middle East Journal of Agriculture.3(7); 2077-4605.

.2 Abu Zeid, Al-Shahat Nasr. 2006. Physiology and chemistry of alkaloids in medicinal plants and their pharmacological and therapeutic importance. Dar Al-Kutub Al-Ilmiyyah for Publishing and Distribution. Arab Republic of Egypt: p. 494.

.3 Al-Azzawi, Mays Ahmed Kazem (2023). The effect of spraying seaweed extract and salinity of the cultivation medium on the growth of two species of Limonium sinuatum. Master's thesis. Al-Musayyib Technical College, Al-Furat Al-Awsat University, Republic of Iraq.

.4 Al-Khafaji, Safaa Muhammad Saleh Ali and Sami Karim Muhammad Amin Al-Chalabi. 2016. The effect of soaking corms with Epibrassinolide and spraying with CPPU on the yield of the Freesia plant, Goldenmieody cultivar . Al-Furat Journal of Agricultural Sciences, 8(2): 107-100.

.5 Al-Sahhaf, Fadel Hussein (1989). Applied plant nutrition, House of Wisdom for Publishing, Translation and Distribution, University of Baghdad, Republic of Iraq.

.6 Al-Sahuki, Medhat, Wahib, Karima Muhammad (1990). Applications in designing and analyzing experiments. Dar Al-Hekma for Printing and Publishing. Ministry of Higher Education and Scientific Research, College of Agriculture, University of Baghdad, Republic of Iraq.

ISSN 2072-3857

.7 Amin, A.A.; Gharib, F.A.; Abouzeina, H.F. and Dawood, M.G.(2013). Role of Indole-3-Acetic acid or. and Putrescine in Improving Productivity of Chickpea (Cicer arientinum L.)Plants .Pak. J. Biol. Sci., 16: 1894-1903.

.8 Buira, A.; Aedo, C.; Medina, L.(2017). Spatial patterns of the Iberian and Balearic endemic vascular flora.

.9 Caperta, A. D., Rois, A. S., Teixeira, G., Garcia-Caparros, P. & Flowers, T. J.(2020).Secretory structures in plants: Lessons from the Plumbaginaceae on their origin, evolution and roles in stress tolerance. Plant Cell Environ. 43, 2912–2931.

.10 Igarashi, K and K. Kashiwagi,.(2006). Polyamine modulon in Escherichia coli: genes involved in the stimulation of cell growth by polyamines. The Journal of Biochemistry, (Tokyo), 139:11–16

.11 Kakkar, R. K. ; P. K. Nagar; P. S. Ahuja; and Rai, V.K. 2000. Polyamines and plant morphogenesis. Boil.Plant, 43:1-11.

.12 Khattab, M.; A. Shehata; E. Abou El - Saadate and Al-Hasni. K. .2016. Effect of Glycine, Methionine and Tryptophan on the Vegetative Growth, Flowering and Corms Production of Gladiolus Plant.. Alexandria Csience Exchange Journal ,37(4) :647– 659

.13 Kumar, P . and P. Dwivedi. 2018. Putrescine and Glomus mycorrhiza moderate cadmium actuated stress reactions in Zea mays L. by means of extraordinary reference to sugar and protein. Vegetos, 31(3):74-77.

.14 Kumar, P. ; .A. Siddique. ; V. Thakur and Singh, M. .2019. Effect of putrescine and glomus on total reducing sugar in cadmium treated sorghum crop. Journal of Pharmacognosy and Phytochemistry; 8(2): 313-316 .

.15 Mahgoub , M.H. ; N.G. Abd – El Aziz and Mazhar , M.A.(2011) . Response of Dahlia pinnata L. plant foliar spray with putrescine and thiamine on growth , flowering and photosynthetic pigments . Journal of Agriculture and Environmental Sciences, 10 (5) : 769-775.

.16 Martin-tanguy, J.(2001). Metabolism and functions of polyamines in plants: recent development (new approaches). Plant Growth Regul., 34: 135-148.

.17 Prasad, P.V.V. , S.A. staggenborg and Z. Ristic .(2008). Impacets of Drought and /Or Heat stress on physiological , Developmental , Growth , and Yield Processes of Crop Plants .ASA , CSSA , SSSA , 677 S.segoe Rd , Modison , Wl 53711, USA.

.18 Rahman, I.M.D.; Begum, Z.A., Hasegawa, H. (2016) .Water Stress. InTech. Pub., Croatia.

.19 Ravin, P.H. ;Evert , R.F. and Eichhorn , S.E.(2013). Raven Biology of Plants. Freeman. Com.,USA. 900P. 103: 315-321 .

.20 Saeed, A. A. J. M.; M. D. Abdulhadi and Salih, S. M. . 2019 . Response of Gerbera Gerbera jamesonii cv. 'Great Smoky Mountains' to Foliar Application of Putrescine, Spermidine and Salicylic Acid .College of Agriculture . University of Diyala. Iraq

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