

How to Cite:

Al-Yasari, J. W. M., Al-Asadi, Q. th. y., Al-Silawi, N. N., & Safi, M. (2022). The role of spraying with urea- phosphate and cytokinin on some morphological properties of two cultivars of maize (*Zea mays* L.). *International Journal of Health Sciences*, 6(S4), 11290–11296. <https://doi.org/10.53730/ijhs.v6nS4.10998>

The role of spraying with urea-phosphate and cytokinin on some morphological properties of two cultivars of maize (*Zea mays* L.)

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Abstract---Field experiment was conducted in Karbala province during the spring season of 2018-2019. The experiment was arranged as split plot within RCBD with three replications. Urea- phosphate (UP) was applied at 0, 1 and 2ml L⁻¹ cytokines at 0.5 and 1 ml L⁻¹ sprayed on two cultivars of corn namely: Baghdad and fager. Results revealed that Baghdad cultivar was superior giving the highest values of all studied traits lie, plant light, leaves no, leaf area, stem diameter and fresh weight. the corresponding values were 171.9 cm ,13.6 leaves, 370.2cm², 21.93 mm and 3.49 kg respectively. Whereas fager cultivar gave 159.1 cm ,12.13 leaves ,286.2 cm² ,18.15 mm and 3.27 kg Cytokines at 1 ml L⁻¹ gave highest values of plant height, stem diameter and fresh wt. giving 181.3 cm ,21.98 mm and 3.80 kg respectively whereas Urea – Phosphate at 2 mL⁻¹ gave highest value of leaves number .and leaf area giving 13.50 leaves and 378.9 cm². the effect on some traits where Baghdad cultivar sprayed with 1ml L⁻¹ gave highest values of plant height, leaves no, stem diameter and fresh weight lie. 194.7 cm, 14.33 leave, 24.43 mm and 3.93 kg respectively. whereas the same cultivar sprayed with 2 ml L⁻¹ U P gave highest leaf area (422.0 cm²).

Keywords---urea-phosphate, cytokinin, fager, Baghdad, *Zea mays* L.

Introduction

Maize (*Zea mays* L.) is one of the field crops belonging to panacea family while Carnes in the third order after wheat and rice in terms of cultivated owes and the global productivity (Poehlman, 1983) . the importance of this crop comes from its nutritional value for both human and animals there it contains oil ranging from 4 to 10 % and from length production and acclimation to the environmental conditions (AL-Zuhairi,2005). foliar application of fertilizer is highly efficient than soil application 20 times (Mangle and Kirby ,2001). In addition, foliar fertilization decreases pollution caged by soil fertilization where the first method is applied with tow amount of fertilizer, nitrogen is playing a principal roles in plants, life cycle (Munoz-Huerta, et al, 2013). Phosphorus as well is considered one of the macronutrient while lad problem in its absorption by plant and its availability in the soil (Baton, et al, 2012). it plays important vole especially in seed germination (Mangle and Kirby, 1987). plant growth regulations have important voles in the growth and the production of plants especially cytokines' while have physiological effects on the plant growth and the productivity's (Al-khafagi,2014). there is a lack of information about the interaction effect between foliar fertilization, cytokines and the cultivar of corn plant. therefore, an experiment was conducted to assess the influence of Urea- phosphates and cytokines on some traits of two cultivars of maize plant.

Materials and Methods

An experiment was conducted in Karbala province dining the spring season of 2018 – 2019 to study the effect of Urea phosphate and cytokinin on the growth traits of corn plant. Physical and chemicals properties were as follow soil texture: clay, EC 3.12, PH 7.3, N 125 mg kg⁻¹ , P 19.5 mgkg⁻¹ and K 217mgkg⁻¹ . the experiment was arranged as split plot within randomized complete block design (R C B D) with three replications. five treatments were applied 0, 1 and 2 ml L⁻¹ of Urea phosphates', 0.5 and 1 ml.L⁻¹ cytokinin sprayed on two cultivars of maize namely twice the fager . the spray was added twice the first one was the at the elongation stage and the second one was at the flowering stage. the area of the experimental unit was 9 m² (3*3m) lie. 30 experimental units giving area equals 270 m². seeds were sown in rows. 75 cm apart in a seed 25 cm apart. four seeds were plaid in each seed bed thinned in to on seedling after. the emergence. Nitrogen, Phosphorus and potassium were added as recommended in the location (AL mosawy, 2010). the experiment was terminated and five plants were randomly taken from the middle lines of each experimental Unit. the Following characteristics were rewarded:

1. Plant height: it was measured by measurement ribbon from the soil surface till the end of the leaves (Hucl and Baker , 1989) .
2. Number of leaves per plant all leaves of 5 plants were rewarded and then average was calculated
3. leaf area (cm²). Leaf area of the same plants was measured according to the equation developed by (AL-Sahouki and chiad, 2013). as Follow Leaf area= (Leaf Length)² *0.75.
4. Stem diameter: it was measured using the Vernier highest than the see and node for 5 plants the average was calculated (AL-Sahouki, 1990).

5. Fresh weight of plant, five plants were weighed and the average was obtained statistical analysis. data were statistically analyzed using the analysis of variance. means were compared using the least significant difference (L S D) at 0.05 probability level, (Steel and Torrie , 1981).

Results

The effect of Urea-phosphate and cytokinin on plants height of two cultivars of corn is shown in table 1. Data revealed a significant effect of cultivars, treatments and their interaction on this trait. Baghdad cultivar gave highest value (171.9 cm) of plant height whereas fager cultivar gave 159.1 cm. cytokinin at 1 ml L⁻¹ gave highest value (181.3 cm) compared with the control treatment which gave 141.0 cm, the percentage inurement was 28.6 %. the interaction between cultivars and treatment showed a marked effect. where Baghdad cultivar treated with 1ml L⁻¹ cytokinin gave 194.7 Cm compound giving 139.0 cm.

Table (1) Effect of Urea phosphate and cytokinin on plant height (Cm)

The treatment	Cultivars		The average
	Fager	Baghdad	
Control	139.0	143.0	141.0
1 ml L ⁻¹ UP	156.7	168.3	162.5
2 ml L ⁻¹ UP	171.0	179.3	175.2
0.5 ml L ⁻¹ cytokinin	161.0	174.3	167.7
1 ml L ⁻¹ cytokinin	168.7	194.7	181.3
LSD 0.05 Interaction	10.2		LSD 0.05 6.7
The average	159.1	171.9	
LSD 0.05 Cultivars	10.9		

Table 2 show a that cultivars and treatments appeared a significant effect On the number of leaves. Baghdad cultivar gave highest number of leaves 13.60 leaves per plant meanwhile fager cultivar gave 12.13 leaves. the percentage increase was 12.12% Urea-phosphate at 2 ml L⁻¹ showed highest value 13.50 leaves compared with the control which gave 11.67 leaves. No significant C was found due to the interaction between cultivars and treatment.

Table (2) Effect of Urea phosphate and cytokinin on number of leaves (leaf plant⁻¹)

The treatment	Cultivars		The average
	Fager	Baghdad	
Control	11.33	12.00	11.67
1 ml L ⁻¹ UP	12.33	13.33	12.83
2 ml L ⁻¹ UP	13.00	14.00	13.50
0.5 ml L ⁻¹ cytokinin	11.68	14.32	13.00
1 ml L ⁻¹ cytokinin	12.33	14.33	13.33
LSD 0.05 Interaction	Ns		LSD 0.05 0.97
The average	12.13	13.60	

LSD 0.05 Cultivars	1.43	
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All studied traits had a excellent influence on the leaf area (Table 3). Baghdad cultivar gave the highest leaf area 370.8 cm² compared with fager cultivar 286.2 cm² giving 29.56% increment. Urea phosphate at 2mlL⁻¹ gave highest leaf area 378.9 cm² compared with the control which gave 268.8 cm² with on increment of 43.63%. The interaction between cultivars and treatment showed a marked in fluency on the leaf area where Baghdad cultivars treated with 2 mlL⁻¹ Urea phosphate gave highest leaf area 422.0 cm² compared with fager cultivar treated with 1ml L⁻¹ Urea phosphate giving 251.0 cm².

Table (3) Effect of Urea phosphate and cytokinin on leaf area (cm²)

The treatment	Cultivars		The average
	Fager	Baghdad	
Control	273.9	253.7	263.8
1 ml L ⁻¹ UP	251.0	357.4	304.2
2 ml L ⁻¹ UP	335.8	422.0	378.9
0.5 ml L ⁻¹ cytokinin	246.7	409.6	328.1
1 ml L ⁻¹ cytokinin	323.6	411.2	367.4
LSD 0.05 Interaction	62.8		LSD 0.05 38.7
The average	286.2	370.8	
LSD 0.05 Cultivars	73.1		

The effect of cultivars treatment and their interaction on stem diameter is shown in table Baghdad cultivar gave highest value of stem diameter reached 21.93mm compared with fager cultivar which gave 18.15mm, the increment was 20.8%. cytokinin at 1 ml L⁻¹ gave 21.98mm diameter compared with the control treatment giving 17.23mm diameter 27.57% increase on the other hand no significant influence was obtained from the interaction between cultivar and treatments.

Table (4) Effect of Urea phosphate and cytokinin on stem diameter (mm)

The treatment	Cultivars		The average
	Fager	Baghdad	
Control	15.60	18.87	17.23
1 ml L ⁻¹ UP	17.19	21.49	19.34
2 ml L ⁻¹ UP	20.28	23.48	21.88
0.5 ml L ⁻¹ cytokinin	18.12	21.36	19.74
1 ml L ⁻¹ cytokinin	19.54	24.43	21.98
LSD 0.05 Interaction	Ns		LSD 0.05 1.96
The average	18.15	21.93	
LSD 0.05 Cultivars	3.40		

The fresh weigh of corn plants (Table 5). corn plant c.v. Baghdad excelled and gave highest fresh weight 3.49 kg compared with fager cultivar 3.27 kg. Cytokinin at 1 ml L⁻¹ gave highest fresh weight 3.80 kg companied with the control treatment 2.67 kg. the increase per cent was 42.32 %. No effect was found due to the interaction between cultivars and treatments.

Table (5) Effect of Urea phosphate and cytokinin on wet weight (kg plant⁻¹)

The treatment	Cultivars		The average
	Fager	Baghdad	
Control	2.48	2.87	2.67
1 ml L ⁻¹ UP	3.43	3.50	3.47
2 ml L ⁻¹ UP	3.70	3.87	3.78
0.5 ml L ⁻¹ cytokinin	3.07	3.27	3.17
1 ml L ⁻¹ cytokinin	3.67	3.93	3.80
LSD 0.05 Interaction	Ns		LSD 0.05 0.23
The average	3.27	3.49	
LSD 0.05 Cultivars	0.04		

Discussion

Results of presented in tables 1,2,3,4 and 5 indicated that corn plant cv. Baghdad was superior compared with fager cv. The reason could be due to the difference of genotypes (De Araujo, et al, 2013). Cytokinin at 1mlL⁻¹ significantly affected plant height stem diameter and fresh weight. This could be due to the role of cytokinin in promoting cell divisions and elongation (Varma and Varma ,2010). Urea phosphate at 2ml L⁻¹ merited leaves number and leaf area. The reason is attributed role of nitrogen which inters in the synthesis of proteins, enzymes, amino asides and chlorophyll (AL sahaf,1989), this result is in avoidance with that obtained by (klanshal and Sadik, 2010) . The interaction between the cultivar and treatments significantly affected plant height and leaf area where Baghdad cultivar treated with 1ml L⁻¹ Cytokinin Compared with fager cultivar without foliar application. This could be attributed to the role of Cytokinin in the increase in plants growth, nutrients absorption, efficiency of photo synthesis leading to increase the fresh weight of corn plant, this was in the same trend with that found by (ALsubaiwe and ALmohammedi , 2018) . Urea phosphate treatment at 2ml L⁻¹ gave highest no. of levers and leaf area compared with other treatments. the reason is due to the role of N and P in the physiology of plant the same result were found by (AL Hakeem, 2011).

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