Eco. Env. & Cons. 26 (1) : 2020; pp. (55-60)
Copyright@ EM International
ISSN 0971–765X

Effect of Levels of Chemical Fertilizer and Gibberellic Acid in the Growth and Flowering of Tulip

Alaa Hashem Y. Altaee* and Mohammed D. Alsawaf

Department of Horticulture and Landscape Design, College of Agriculture and Forestry, Mosul. University, Iraq.

(Received 10 August, 2019; accepted 15 October, 2019)

ABSTRACT

This study was conducted in the wooden canopy of the Department of Horticulture/College of Agriculture and Forestry/University of Mosul for the season 2017 -2018 on the plaster of the tulip. *Tulipahybrida* L Crystal beauty The study included the addition of three concentrations of nitrogen fertilizer (0, 2 and 4 g / pot) and three concentrations of potassium fertilizers (0, 2 and 4 g/pot) and three concentrations of gibberellic acid: 0, 200 and 400 mg. L^{-1} by immersing the bulbs for 24 hours before planting, the study was carried out by designing the complete random sections with three replicates and three bulbs for the single repeater.

Key words : *Chemical Fertilizer, Nitrogen, Urea, GA3, Fertilizer Fertilizer.*

Intoduction

The Tulip is attributed to the Liliacea family of its native Turkey. The tulip is real, a pendulum surrounded by the bases of the meridian leaves, which are covered by white-colored scallop leaves, bearing flowers on a long stand (Hay and Beckett, 1978 and Rees, 1985, 2000). They are very important in landscaping within flower basins and galaxies. They are grown around ponds and used as identification plants. They are also planted in rock gardens in internal coordination and are used as flowering flowers (Naglaa *et al.,* 2012; Khader, 2001; Abu Dahab, 1992; Abu Zeid, 2002; and Baali, 1967). Fertilizing is an important and necessary factor affecting the growth, development and production of many plants. The most important elements are nitrogen, which is one of the essential elements needed by the plant (AL-Taey *et al.,* 2017; AL-Taey *et al.,* 2019). In an experiment conducted on Tulipahybrida, to increase in plant height, number of leaves, and syphilis diameter was found to be the lowest period for flowering when using chemical fertilizer NPK 15:15:15 at concentration (80 g/m^2) (42.31 cm) and (3.70 leaves/plant) (4.41 mm) (108.25) days respectively while the lowest values were (41.97 cm) and (3.40 leaves/plants) (4.01 mm) (111.83 days) for comparison plants. Sewedan and others (2012) reported that spraying Gladiolus hybrid with ammonium nitrate at 6 g/plant with diphenylamine daventi amine 150PPM resulted in an increase in plant height, leafy area and flowering time at plant (123.57 cm) (398.69/(17.5 days) respectively, while the lowest (69.53 cm) (211.34 cm^2) concentration (7.5 days) was found in comparison plants. Kashif *et al.* (2014) reported that the effect of adding the major and minor elements and adding NPK to Dahlia hybrid L.) at concentration (Chelated Mix micro - nutrients + 15: 32: 7) reduced the flowering time by (92.3 days) while the survival ratio Har was (19.3 days) and the diameter of the flower was (8.06 cm), while Qatar was Alchormp (3.43 cm) and reached fresh weight of flowers (3.54 g / flower).

Phytohormones are considered the most impor-

***Corresponding author's email:** Dr_alaaaltaee@yahoo.com
[1]Assistant Professor's

tant endogenous substances for modulating physiological and molecular responses, a critical requirement for plant survival as sessile organisms, Phytohormones act either attheir site of synthesis or elsewhere in plants following their transport (AL-Taey and Saadoon, 2012; AL-Taey, 2017)

Materials and Methods

This study was conducted in the wooden canopy of the Department of Horticulture and Landscape Design/College of Agriculture and Forestry/University of Mosul for the period from 1/11/2017 until 15/6/2018 on the *Tulipahybrida* plant L. Crystal beauty, plants were planted in plastic pots 20 cm diameter containing soil composed of garden soil: 2: 1 river sand, and then distributed plants randomly according to the experiment plan. In the implementation of this study, the design of (RCBD) segments was followed by three factors and the SAS (1996) program was used to analyze the data and compare the averages according to the Duncan Multiplicity test below the 5% probability level (Daoud and Abd Elias, 1990) Nitrogen fertilization has been added using urea containing 46% N with three levels: 0, 2 and 4 g/pot. and Potassium fertilization was added using H_2SO_4 containing 50% K_2O and three levels: 0, 2 and 4 g / pot. The fertilization process was carried out on four dates: the first date after eight weeks of planting, the second treatment after four weeks of the first treatment, and the third and the fourth after four and eight weeks of the second treatment. Fertilizer was added to the soil. 3: Gibberellic acid: The bulbs with a diameter of 2-2.5 cm were treated before planting with the acid Aljbrlik used three concentrations: 0, 200, 400 mg. After it was prepared in the form of aqueous solution, by dissolving it with droplets of ethyl alcohol until full dissolving and then adding a liter of distilled water, as well as the treatment of the comparison, where the bulbs were immersed in distilled water only for 24 hours before planting. The number of leaves/plant: Plant height (cm): Diameter of syphilis (cm): The duration of the flower's survival on the plant (day)

First dried in a hot airoven at 80 °C for two days and then powdered with a mortar and pestle. The ash was equilibrated with 2 M Hcl and supernatant analysed for Cu, Ni, Zn, Cd, Cr and Pb by atomic absorption spectrophotometer by model variant AA975.

Results and Discussion

The results shown in Table 1 that the addition of nitrogen fertilizer by 4 g/pot resulted in a significant increase in plant height (41.89) cm, which differed significantly from the comparison treatment (39.45) cm. Potassium fertilizer had no significant effect in increasing plant height. The treatment with the acid algebraic caused a significant increase in the height of the plant at (43.00) cm at the concentration of 400 mg. L^{-1}, which differed significantly from the comparison treatment at 37.54 cm, respectively. The effect of the interaction between nitrogen and potassium fertilization was significant. The highest yield of the plant at the treatment was 4 g/t of nitrogen fertilizer mixed with 4 g / pot of potassic fertilizer at 43.09 cm which differed significantly from most treatments. As for the interaction between nitrogen fertilizer and GA3, the highest plant height was obtained with 2 g/t of nitrogen fertilizer with 400 mg. Liter of GA3 (43.44 cm) compared with the comparison treatment (35.48) cm. As for the interaction between the fungicide and GA3, the highest plant height was 2 g / pot of potash fertilizer with 400 mg/L^{-1} of GA3 (43.27 cm) while the comparison treatment was (37.02) cm. In the three overlaps, the highest plant height at the treatment was obtained with 2 g/t of nitrogen fertilizer mixed with 2 and 4 g/pot of potassium fertilizer and 400 mg. L^{-1} from GA3 with plant height (44.00) cm, which differed substantially from the comparison treatment (33.16) cm. This may be due to the plant content of the nutrients and structure of the plant and its content of NPK elements as there is an effect of nitrogen in some of the biological processes that occur in the areas of the Mars and enter the nitrogen also in the synthesis of proteins and nucleic acids, which lead to increased growth (Butt, 2005), as well as The importance of the element of nitrogen in the growth of the plant, which is involved in the synthesis of amino acids, including the amino acid Tryptophan, which is the origin of acetic acid and anodic (IAA) within the plant necessary for the division of cells and their extension, which ultimately increases the length of the plant may be due to the role of potash Om in the physiological processes such as construction photosynthesis and respiration and to encourage the production of pigments and promote cell division.

The results of Table 2 indicate that the addition of nitrogen and potassium fertilizer separately did not

have any significant effect on the increase in the number of leaves forming on the plant. The GA3 treatment gave treatment with a concentration of 400 mg. L^{-1} of GA3 has the highest number of leaves forming (4.01) leaves/plants which significantly exceeded the comparison treatment (3.51) leaves / plants. Biodegradation data between nitrogen and potassium fertilization and the interaction between nitrogen fertilization and GA3 showed no significant effect on the obtained values, whereas the results of the interaction between the fungus fertilizer and GA3 showed significant effect. GA3 with a concentration of 400 mg/L^{-1}, as well as 4-g/4-g potassium fertilizer mixed with GA3 at a concentration of 200 mg/L^{-1}, significantly higher (4.38 and 4.27) leaf/ plant respectively compared to the 3.05 / Plant. As

Table 1. Effect of Nitrogen and Potassium Fertilizer Levels and Gibbrolic Acid and its Interactions in Plant Height Rate (cm) of *Tulipahybrida*.

Nitrogen fertilization g.pot	Potassium fertilization g.pot	GA_3mg.L^{-1} 0	200	400	N*P	N	P
0	0	16.33 f	91.41 bc	75.43 ab	61.39 c		
	2	66.36 e	66.41 bc	33.43 ab	55.40 c		
	4	63.36 e	50.37 d	50.40 cd	21.38 d		
2	0	75.36 e	55.41 bc	33.42 abc	21.40 c		
	2	15.38 de	08.42 abc	00.44 a	41.41 bc		
	4	08.36 e	58.43 ab	00.44 a	22.41 bc		
4	0	15.41 bc	83.42 abc	50.43 ab	49.42 ab		
	2	75.36 e	00.41 bc	50.42 abc	08.40 c		
	4	55.42 abc	66.43 ab	08.43 abc	09.43 a		
N *GA_3	0	48.35 d	36.40 b	52.42 a		45.39 b	
	2	99.36 c	40.42 a	44.43 a		94.40 ab	
	4	15.40 b	50.42 a	02.43 a		41.89a	
P* GA_3	0	02.37 c	09.42 ab	16.43 a			77.40 a
	2	19.37 c	58.41 b	27.43 a			68.40 a
	4	42.38 c	58.41 b	52.42 ab			84.40 a
GA_3		54.37 c	75.41 b	00.43 a			

Table 2. Effect of Nitrogen and Potassium Fertilization Levels and Gibbrolic Acid and its Interactions in the Average Number of Leaves of *Tulipahybrida*.

Nitrogen fertilization g.pot	Potassium fertilization g.pot	GA_3mg.L-1 0	200	400	N*P	N	P
0	0	83.2 c	00.4 abc	00.4 abc	61.3 a		
	2	16.4 abc	91.3 abc	50.3 abc	86.3 a		
	4	83.3 abc	50.4 ab	87.3 abc	06.4 a		
2	0	16.3 bc	37.3 abc	33.4 abc	62.3 a		
	2	00.4 abc	75.3 abc	33.4 abc	02.4 a		
	4	16.3 bc	12.4 abc	16.4 abc	81.3 a		
4	0	16.3 bc	62.3 abc	83.4 a	87.3 a		
	2	00.4 abc	00.4 abc	50.3 abc	83.3 a		
	4	33.3 abc	25.4 abc	62.3 abc	73.3 a		
N *GA_3	0	3.60 a	13.4 a	79.3 a		84.3 a	
	2	44.3 a	75.3 a	27.4 a		82.3 a	
	4	50.3 a	95.3 a	98.3 a		81.3 a	
P* GA_3	0	05.3 c	66.3 bc	38.4 a			70.3 a
	2	05.4 ab	88.3 ab	77.3 abc			90.3a
	4	44.3 bc	29.4 a	88.3 ab			87.3 a
GA_3		51.3 b	94.3 a	01.4 a			

for the interaction between the three factors, the fertilized plants were treated with nitrogen fertilizer by 4 g / s mixed with the treatment without potassium fertilizer and GA3 with a concentration of 400 mg. (-4.83) paper / plant. This value did not differ significantly on some treatments, but differed significantly from the comparison treatment. The lowest values were recorded for the number of leaves and reached (2.83) sheets / plants. May be attributed to the fact that fertilizer contains major nutrients such as nitrogen, phosphorus and potassium, which stimulate the growth of the plant and its evolution through its impact on the process of physiological processes such as photosynthesis and thus positively affect the characteristics of vegetative growth (Lateef *et al.,* 2018 and Noori *et al.,* 2018).

Table 3 indicates that there is no significant difference between the values recorded for the syphilis diameter of each other when treated with both nitrogen and potash fertilizers alone. It was found that the treatment with GA3 had a significant effect. The highest values of syphilis diameter (9.03 mm) were recorded when treated with GA3 at a concentration of 200 mg/L^{-1} which differed significantly with the comparison treatment (8.17 mm) Nitrogen and Potassium The largest significant values were recorded for plants treated with nitrogen fertilizer by 2 g/pot with 2 g/pot of Potassium fertilizer and 2 g/sec of nitrogen fertilizer with 4 g/pot of Potassium fertilizer at 10.05 and 9.79 mm for both treatments Respectively. While the value of this value and reached below morally at the treatment of the comparison at (7.20) mm. The combined interference data between nitrogen fertilizer and GA3 is shown to increase the diameter of syphilis when both nitrogen and GA3 are used in different levels and concentrations compared with the comparison treatment. The interaction between the Potassium Fertilizer and GA3 showed that the highest significant values were recorded for plants treated with Potassium Fertilizer by 4 g / t with GA3 at a concentration of 200 mg/L^{-1} at (10.91) mm, while this value was significantly below (7.05)) Mm when treated without poaceous compost with 200 mg.L^{-1} of GA3. Interference data showed that the highest morphological values of the syphilis diameter were treated without nitrogen fertilizer with 4 g/pot of potassium fertilizer and were mixed with 200 mg/L of GA3 (12.63 mm), while this value was below (4.21) mm at treatment without nitrogen fertilizer with 2 g / pot of potash fertilizer and non-treatment with GA3.

This may be due to potassium content, which plays a role in the transmission of the photosynthesis process to the active parts of the plant and in the activation of enzymes and the process of breathing and carbon representation (Taiz and Zeiger, 2006), increasing the paper area, which in turn affects the

Table 3. Effect of Nitrogen and Potassium Fertilizer Levels and Gebric Acid and its Interactions in the Rate of Syphilis (mm) Diameter of the Tulipahybrida Plant.

Nitrogen fertilization g.pot	Potassium fertilization g.pot	GA_3mg.L^{-1} 0	200	400	N*P	N	P
0	0	11.9 abc	68.5 de	81.6 cde	20.7 b		
	2	21.4 e	39.9 abc	43.9 abc	67.7 ab		
	4	16.7 cde	63.12 a	30.8 bcd	36.9 ab		
2	0	00.8 bcd	17.8 bcd	28.9 abc	48.8 ab		
	2	37.11 ab	56.8 bcd	22.10 abc	05.10 a		
	4	82.8 bcd	68.11 ab	87.8 bcd	79.9 a		
4	0	27.9 abc	31.7 cde	88.9 abc	82.8 ab		
	2	48.7 cde	41.9 abcd	66.8 bcd	51.8 ab		
	4	11.8 bcd	44.8 cd	69.8 bcd	41.8 ab		
N *GA_3	0	82.6 b	23.9 a	18.8 ab		07.8 a	
	2	39.9 a	47.9 a	45.9 a		44.9 a	
	4	28.8 ab	38.8 ab	07.9 a		58.8 a	
P* GA_3	0	79.8 bc	05.7 c	65.8 bc			16.8 a
	2	67.7 bc	12.9 Ã b	43.9 ab			74.8 a
	4	03.8 bc	91.10 a	62.8 bc			18.9 a
GA_3		17.8 b	9.03 a	90.8 ab			

diameter of the syphilis. This is consistent with what happened (Sewedan, 2012) on the cleavage.

Table 4 indicates that the treatment of both nitrogen and potash fertilizers did not have any significant effect on the duration of flowering on the plant. The treatment with GA3 has a significant effect, noting that the treatment at a concentration of 400 and 200 mg / l. -1 recorded the longest flowering period on the plant, which was 10.48 and 10.22 days respectively compared to the treatment of comparison, which amounted to (9.42) days. The results of the two-way interaction between nitrogen and potash fertilizer showed that plants not treated with nitrogen fertilizer with 2 g / potasse fertilizer recorded the longest flower duration on the plant at (11.09) days compared to (8.98) days when treated with nitrogen fertilizer by 2 g / Interdependent with treatment without potaceous compost. As for the interaction between nitrogen fertilizer and GA3, it is observed that the plants treated with nitrogen fertilizer by 4 g/s were mixed with 400 mg. L^{-1} of GA3 had the longest survival time (11.32) days compared to (8.10) days when treated with nitrogen fertilizer By 2 g/t with non-treatment with GA3.

While the results of the double interaction between the fungus fertilizer and GA3 acid showed that the longest duration of flowering on the plant was recorded for plants treated with Potassium fertilizer by 4 g/pot with 400 mg/L of GA3 (10.98) days which differed significantly with the comparison treatment (8.87) days. The results of the triangular interference between the factors studied indicate that plants treated with nitrogenic fertilizer by 2 g / pot with 2 g / pot of potash fertilizer and 200 mg / l -1 of GA3 recorded the longest flowering period (12.10) days. The value was reached below (6.43) days when treated with nitrogen fertilizer by 2 g / pot with treatment without GA and GA3. He explained the role of Gaberlin in delaying aging of cells by its role in reducing the breakdown of proteins in cells. It also delays the onset of protease activity, which is associated with the development of the aging of petals. It was noted that there is a significant reduction in the activity of this enzyme Eason (2002). This may be due to the role of amino acids when used in appropriate concentrations as they act as a disinfectant for harmful substances, which helps to prevent cell and tissue breakdowns and delayed flowering aging (Naglaa and Kandeel, 2012). This corresponds to Sewedan (2012) on the Cadillus plant.

References

Abu Dahab and Abu Dahab Mohammed, 1992. Production of Ornamental Plants and the First Printing, Dar Al-Marikh Publishing, Saudi Arabia.

Abu Zeid and Al-Shahat Nasr, 2002. *Planting and Produc-*

Table 4. Effect of Nitrogen and Potassium Fertilizer Levels and Gibbrolic Acid and its Interaction in Flowering Time on Plant (Day) of Tulipahybrida.

Nitrogen fertilization g.pot	Potassium fertilization g.pot	GA_3 mg.L^{-1} 0	200	400	N*P	N	P
0	0	10.9 ef	10.9 ef	10.9 ef	10.9 cd		
	2	76.10 abcde	43.11 abc	10.11 abcd	09.11 a		
	4	53.9 def	10.9 ef	10.10 bcde	57.9 cd		
2	0	43.6 g	76.10 abcde	76.9 cdef	98.8 d		
	2	26.8 f	10.12 a	10.10 bcde	15.10 bc		
	4	60.9 cdef	10.9 ef	10.11 abcd	93.9 bcd		
4	0	10.11 abcd	10.10 bcde	10.11 abcd	76.10 ab		
	2	43.10 abcde	26.9 def	10.11 abcd	26.10 abc		
	4	60.9 cdef	10.11 abcd	76.11 ab	87.10 ab		
N *GA_3	0	79.9 b	87.9 b	10.10 b		92.9 a	
	2	100.8 c	65.10 ab	32.10 b		69.9 a	
	4	37.10 b	05.10 b	32.11 a		61.10 a	
P* GA_3	0	87.8 c	98.9 bc	98.9 bc			61.9 a
	2	81.9 bc	93.10 ab	76.10 ab			50.10 a
	4	57.9 bc	76.9 bc	98.10 a			10.10 a
GA_3		**42.9 b**	**22.10 a**	**48.10 a**			

ing Flowers and Ornamental Plants, First Edition, Arab Publishing House, Cairo, Egypt.

Al-Saad and Kifaya Ghazi Saeed, 2010. *Effect of dates of cultivation, gerbilic acid, licorice root extract in growth, flowers, cormatus and creams for two varieties of Gladiolus grandiflorus*. PhD thesis, College of Agriculture and Forestry, University of Mosul, Iraq.

Al-Taey, D.K.A., Al-Janabi, A.H. and Rachid, A.M. 2019. Role of Additive in Mitigation of the Negative Effects of Saline Water on Cabbage (*Brassica oleracea* var. Capitata L. *Plant Archives.* 19(1) : 78-85.

Al-Taey, D.K.A. 2017. Mitigation of Salt Stress by Organic Matter and GA3 on Growth and Peroxidase Activity in Pepper (*Capsicum annum* L.). *Advances in Natural and Applied Sciences*. 11(10): 1-11

Al-Taey, D.K.A. and Saadoon, A.H. 2012. Effect of treatment of kinetin to reduce the salinity damage by drainage water irrigation on the growth and nitrate accumulation in the leaves of spinach. *Spenaciaoleracea* L. *Euphrates Journal of Agriculture Science.* 4(4) : 11–24

AL-Taey, D.K.A., Al-Janabi, A.S.H. and Rachid, A.M. 2017. Effect of water salinity, Organic and minerals fertilization on growth and some nutrients elements in cabbage *Brassica oleracea* varapitate. *Babylon Journal of Pure and Applied Science*. 25(6): 232-248

Application on growth, flowering, bulb productivity and chemicals compositionof Iris tingit –ANAcv. Wadge Wood Arab Univ. *J. Agric. Sci. Ain Shams Univ. Cairo.* 9 (2) : 803-824.

Baali, Sadiq Abdul Ghani 1967. Gardens .Local Administration Press.Baghdad.

Biram, Sulaiman Biram, 2013. Effect of Levels of Chemical Fertilizer NPK on the Growth and Flowering of Two Tinnitus Cultivars Tulipagesneriana. *Diyala Journal of Agricultural Sciences.* 5 (2) : 321-318.

Butt, S. J. 2005. Effect of N. P.K on Some flower Quality and Corm yield characteristics of Gladiolus. *J. Agric.* 2 (3): 212–214.

cultivars of gladiolus (*Gladiolus grandflorus*) under Rawalakat condition i. *Asian J. Plant. Sc.* 1:560-562.

Daoud, Khaled Mohammed and Zaki Abdel-Elias. 1990. *Methods for Agricultural Research Statistics.* Higher Education Press - University of Mosul.

Eason, J.R. 2002. *Sandersonia aurantiaca*: an evalution of posthervest pulsing Solution to gladiolus (*Gladiolus grandflorus*) under Rawalakat condition. *Asian J. Plant. Sci*

Hay, R. and Backett, K.A. 1978. Reoders Digest Encyclopedia of Garden plant and flowers (2nd X ed.). *The Reader,s Digest Association Linnited.* 25 Barkeley Square London.

Hopkins, W.G. and Hüner, N.P.A. 2004. Introduction to plant physiology. (3rd ed.). *Johon Journal of Chemical and Biochemical Sciences.* (ljcbs) 5 : 6-10.

Kashif and Muhammad, 2014. Efficacy of macro and micro – nutrients as foliar maximise cut flower quality. *New Zealand J. of Crop and Hortic. Sci.* 30 : 273 –279.

Khader and Mahmoud, 2001. *Decoration Plants*. Directorate of Books and Publications University, Faculty of Agriculture Publications of the University of Aleppo.

Lateef, Mohammed Abdul Aziz, Noori, Ali Mohammed, Al-Qadi, Raghad and Mahdi Hadi Muhsin. 2018. The role of nitrogen and boron fertilizers on growth and yield in pomegranate (*Punica granatum* L.). *Plant Archives.* 18 : 1957-1960.

Naglaa, S.A.T. and Kandeel, A.M. 2012. Effect of fertilization level and GA3

Naglaa, M., Khattab, M., EL-Shennawy, O. and Mustafa, M. 2012. *Effect of Nitrogen and Plants* 4 (3): 267-274.

Noori, Ali Mohammed, Lateef, Mohammed Abdul Aziz and Mahdi Hadi Muhsin 2018. Effect of phosphorus and gibberellic acid on growth and yield of grape (*Vitisvinifera* L.). *Res. on Crops.* 19 (4): 643-648 Publisher, Amsterdam. Netherlands.

Ress, A.R. 1985. Iris in Handbook of flowering. Halvey, A.H.(eds.) CRC press. *Boca Raton. Florida.* 282-287.

SAS. 1996. Statistical Analysis System, Release 7, SAS. Institute. Inc. Cary. Scientific

Sewedan Eman, 2012. Effect of Nitrogen and Diphenylamine ON Gladiolus hybrid Some antioxidants on tuberose production. *Alex. J. Agric. Res.* 56 : 49-63. USA. Wiley and Sone, Inc. U. S. A.

Tais, Lincoln and Eduardo Zieger, 2006. Effect of foliar Application and some Growth Regulators on Growth of Croton plants. *Hort Science.* September 1990 Vol 25 No 1101.