International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 1s, 2025
https://www.theaspd.com/ijes.php

Effect of spraying with some organic and chemical fertilizers on the vegetative and floral growth of Tulip plants variety White Prince

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Summary: This study was conducted in wooden canopy The Follower and to the Department of Horticulture and Landscape Architecture / College of Agriculture and Forestry / University of Mosul with the aim of studying the effect of some liquid organic fertilizers and chemical fertilizers NPK in the vegetative and flowering growth characteristics of Tulip White Prince. It included The study added three levels of organic fertilizers: (Foli Artal) and (Fevist) and (Humi Max) and chemical fertilizer NPK is 0, 1, 2 ml liter sprayed on Leaves, the first spraying was carried out when the plant reached a height of 10 poison, the second one is a month after the spray. First. The experiment was designed using a randomized complete block design. RCBD with three repeaters and 5 bulbs per repeater One. It was noted that spraying plants with high levels of fertilizer (Foli Artal) at a concentration of 2 ml L may exceed morally It caused a significant increase in all vegetative and floral characteristics of the plant, including plant height (31.11cm) and paper area (387.56 cm^2) and number of leaves (4.55) (leaf) and flower stalk length (27.68 cm) and the percentage of chlorophyll pigment (51.50) and the fresh weight of the flower stalk and the flower (10.70 cm) and the diameter of the flower stand (0.84 cm) and the diameter of the flower (7.12 cm) and the flowering age (12.03) Day and duration of flowers remaining on the plant (16.45) days and the required period To bloom (95.35) Day.

INTRODUCTION

Tulipa belongs to the Liliaceae family and is native to Türkiye. It is called the turban flower because it consists of several layers of petals. colorful, these flowers were introduced to Europe 400 years ago and spread throughout the country, and received special attention in their cultivation in the Netherlands, where they became a symbol and a major source of income. she has, it produces one billion flowers annually and exports them to all countries. the world. The genus Tulipa includes approximately120 species, some are annual, others are perennial or winter. (Khader, 2001). Tulips are found wild in northern Iraq in abundance, extending from Zakho to Haji Omran and Sulaymaniyah Governorate (Sultan and others,1992). tulip bulb Real, it is a disc-shaped stem surrounded by succulent, fused leaf bases, covered from the outside by scaly, green leaves. brown, Flowers are carried on a stand. long (Ress,1985 and the Al-Kateb, 2000). The flowers are beautiful in shape and come in many colors, including white, yellow, blue, dark purple, and purple-yellow, white, yellowish, and light purple. They are very important in garden arrangement in basins and containers. flowers, it is planted around ponds and is used in this case as a plant.to set, it is also grown in rock gardens and in pots used for interior design and is used as cut flowers. Naglaa and Kandeel, 2012 and Khader, 2001Abu Dahab, 1992 And Abu Zaid, 2002). Found everyone Altaee and Saeed (2020) While studying the growth and flowering of two species of tulips, upstar and the one The effect of spraying with organic fertilizer untrigrin at a concentration of (4) ml L^1 It caused a significant increase in plant height, number of leaves, leaf area, percentage of nitrogen, phosphorus and potassium, and also recorded a significant increase in chlorophyll percentage compared to the control treatment. In a study conducted by Ajeel (2018) On tulips Classify *Tulip Upstar* through addition Three levels of Fertilizers Organic and chemical fertilizers are 0, 1 and 2 ml/L Spray on the leaves and it was noted that spraying at high levels of organic fertilizer Foli Artal may outperform morally It caused a significant increase in terms of vegetative characteristics, including plant height (16.36 cm) and paper area (587.9poison^2) and the number of leaves (5.5Leaf/plant) and flower stalk length (6.32 cm/plant) and the percentage of chlorophyll pigment (53.61) The fresh weight of the flower stalk and the flower (12.80) and the diameter of

the flower holder (0.810) and the diameter of the flower (9,010) and the flowering age (14,633) Day and duration of flowers remaining on the plant (18,566) and the required period For flowers (84.35)

MATERIALS AND METHODS

This study was conducted in wooden canopy Department of Horticulture and Landscape Architecture / Faculty of Agriculture and Forestry / University Mosul, During the period from 11/1/2023 to 1/6/2024 on tulips Class (*White Prince* The flowery one White Color to know the effect of spraying with different levels of different organic fertilizers on the characteristics of vegetative growth and syphilis. The study included three types of organic fertilizers, which are:(Foli Artal) (Fevist) - (Humi Max) and NPK chemical fertilizer as well as treatment Comparison. Imported bulbs from origin Dutch, and measure the weight and diameter of each onion, Bulbs of uniform sizes with a diameter of 2-2.5 in plastic pots with a radius (30 poison) which consists of 4sand:1 itemmembership:1 beach sand and in each pot 5 bulbs according to the complete random sectors system and planted at a depth of8 cm On 11/1/2023), after Treat her with fungicide to protect it. Fertilize the plants in January and for three months to the fourth month. April, Random samples were taken and analyzed in the laboratory Central in Faculty of Agriculture and Forestry. The degree of soil reaction was estimated (PH) according to Black (1965) method and soil texture Using Hydrometer method as mentioned Klute (1986) and electrical conductivity (EC) according to the method of Richards (1954). The organic matter was estimated by the oxidation method according to the method of Walkly and Black. Mentioned in Allison (1965). And The circumstances were Conducting the experiment in terms of temperature and relative humidity (1) during the period of conducting Search as in Table (1).

Table (1): Maximum and minimum temperatures and relative humidity of the wooden canopy of the Horticulture and Landscape Engineering Department for the year 2023-2024.

The most famous Year 2023-2024	Average temperature		Relative humidity %
	Great	youngest	
December	22.5	8.6	55 %
January	17.5	7.4	67 %
February	19.3	9.8	62 %
March	24.2	10.2	50 %
April	30.8	14.7	39 %
May	37.4	20.3	33 %

(1) General Authority of Meteorology and Seismic Balance / Meteorology Department Mosul.

Table (2) Some characteristics Physics and the chemistry of the soil used in the study [(2)].

Soil separations (%)			Tissue Texture	pH Soil PH	electrical conduction EC ds/m	Organic matter (%)
sand	Green	clay	Lumia sand	7.2	4.0	3.70
63.3	17.45	19.25				
Ready-made nutritional content						
N%		P ppm		K ppm		
0. 23		2.14		20		

(2) The analyses were conducted in the laboratory Central/ Faculty of Agriculture and Forestry.

Attributes Studied:

Growth characteristics:

Percentage of emergence (%): Plant height (cm): Number Leaves: leaf area:

Characteristics of flower growth:

Flower stand length (cm): Flower stand diameter (cm) : Time required for flowering (day): Fresh weight of flower stalk and flower (g): Duration of flowers on a plant (day): Duration of stay in the vase Day: Flower diameter (cm):

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RESULTS AND DISCUSSION

Vegetative growth characteristics:

Percentage of emergence %-: The percentage of eruption was taken at two dates as shown in the table (3) The first appointment is 45 days after planting and the second appointment is 60 days after planting. For plant species Tulips *Tulip* White Prince, which showed that the emergence rate after 45 days reached60.87%, while it reached 100% after 60 days of planting. The variety began to emerge after 30 days of Agriculture

Table (3) Shows the percentage For the emergence of plants Tulip variety White Prince.

Tulip plant	After 45 days	After 60 days
Tulip White Prince	60.87%	100%

Plant height:-It appears from the table results (4) By adding fertilizer Foli Artal at a concentration of 2 ml/L has resulted in obtaining greater Plant height when it reaches (31.11) cm, which differed significantly from the control plants, which reached a height of (13.26) And about fertilization transactions Other. That Increase in Plant height may be due to the plant's content of nutrients and structural elements. (Al-Dulaimi, 2005) And its content of elements NPK: Nitrogen has an effect on some vital processes that occur in the meristematic regions. Nitrogen also enters into the composition of proteins and nucleic acids, which leads to increased growth. (Butt,2005).

Number Leaves: - It is clear from the data results of Table (4) that adding fertilizer Foli Artal at a concentration of 2 ml/L resulted in obtaining the highest value in the number of leaves, which reached (4.55) leaf/plant which differed significantly from the control plants which amounted to (2.06) Leaf/plant as well as the moral superiority of this fertilizer On the rest of the fertilizers The other. The increase in some vegetative growth characteristics, including the number of leaves, is attributed to the content of the fertilizer. Foli Artal Of the major nutritional elements such as nitrogen, phosphorus and potassium, which work to stimulate plant growth and development through their effect on the course of physiological processes such as photosynthesis, and thus are positively reflected in the characteristics of vegetative growth (Hegab et al., 2005), and the reason may be attributed to impact Zinc is an element in the process of photosynthesis, respiration, and energy production, in addition to this element entering into the composition of nucleic acids necessary for the process of cell division (Abu Dahi and Al-Younis, 1988, and Al-Sahaf, 1989), which works to encourage the formation of leaf buds.

Table (4) Effect of different concentrations of organic and chemical fertilizers on the rate of growth Plant, and the number Leaves, The leaf area of the tulip plant (White Prince).

T	Transactions	Plant height (cm)	Number Leaves	leaf area (cm2)
1	**Comparison treatment**	13.26 D	2.06 C	104.56 C
2	**2 ml/L Foli Artal**	31.11 A	4.55 A	387.56 A
3	**1 ml/L Foli Artal**	26.59 A	3.49 B	297.98 A B
4	**2 ml/L Fevist**	21.70 B	3.05 B C	197.88 B C
5	**1 ml/L Fevist**	15.71 C D	2.71 B C	153.78 C
6	**2 ml/L NPK**	20.80 B C	3.38 B	196.56 B C
7	**1 ml/L NPK**	17.01 C D	3.05 B C	156.69 C
8	**2 ml/L Humi Max**	21.30 B	3.08 B C	173.87 C
9	**1 ml/L Humi Max**	20.53 B C	2.69 B C	155.73 C

leaf area: from by looking at the data in Table (4), we find that spraying with the nutrient solution Foli Artal led to a significant increase in leaf area at a concentration of 2 ml/L, where The area reached Paper (387.56) cm2 which is more than morally On the rest of the other types of fertilizers and the comparison treatment that amounted to (104.56) cm^2. The effect of the balanced nutrient solution is due to the effect of nitrogen in increasing the leaf area and its role in the growth of the plant in general, which affects the increase in the number and size of leaf cells and increases the formation of chlorophyll, thus increasing the effectiveness of the leaves in the process of photosynthesis, which is reflected in the vegetative growth. (Mohammad et al.,

2014), but impact Potassium element returns to turn The catalytic role of potassium in controlling enzymes and the industrial role of phosphorus for the products of photosynthesis in the formation of proteins and carbohydrates, which was reflected Positively To increase the leaf area in the activation and division of cells (Butt, 2005).

chlorophyll: -The data in the table indicate that:5) The results showed that the fertilizer levels had a significant effect on the chlorophyll pigment. It is noted that the use of a high level of Foli Artal fertilizer at a concentration of 2 ml/liter might It led to an increase in the content of chlorophyll pigment in the leaves, which amounted to51.50 in When it reached its lowest value 26.02 In transaction Comparison. The reason for the increased concentration of chlorophyll pigment in the leaves is due to the role of nitrogen in the synthesis of...Porphyrin, which enters into the formation of chlorophyll, and this was confirmed by (Muhammad, 1988a, and Ahmed and Al-Mukhtar, 1987). It is likely that the reason for this, according to what was mentioned by Abu Dahi and Al-Younis (1988), is the effect of phosphorus in forming a good root system, and thus the absorption of nutrients increases, which may be accompanied by an increase in the production of chlorophyll and thus an increase in the concentration of this pigment in the plant.

Table (5) Effect of different concentrations of organic and chemical fertilizers on %For chlorophyll, And Flower stand length, Fresh weight of flower stalk and flower of the tulip plant (White Prince)

T	Transactions	% chlorophyll	Flower stand length (poison)	Fresh weight of flower stalk and flower (g)
1	**Comparison treatment**	26.02 B	10.44 D	6.93 C
2	**2 ml/L Foli Artal**	51.50 A	27.68 A	10.70 A
3	**1 ml/L Foli Artal**	42.39 A B	21.44 B	9.730 A B
4	**2 ml/L Fevist**	36.00 A B	17.54 B C	8.58 B C
5	**1 ml/L Fevist**	31.70 B	15.99 C D	8.46 B C
6	**2 ml/L NPK**	36.61 A B	15.00 C	8.46 B C
7	**1 ml/L NPK**	33.62 A B	13.66 CD	7.83 B C
8	**2 ml/L Humi Max**	35.71 A B	17.66 B C	9.13 A B
9	**1 ml/L Humi Max**	32.81 A B	16.18 C	8.62 B C

Floral characteristics:- Flower stand length:-Regarding the length of the flower stand, we note from the table (5) The 2 ml/L Foli Artal spray treatment significantly outperformed the other treatments and recorded:(27.68 poison)It also outperformed the comparison treatment, which recorded the lowest values, which amounted to (10.44 cm) This result is consistent with the results found by:(Ahmed and Khan ,2013 and Al-Abdali, 2011).The reason can be attributed to the role of the nitrogen and phosphorus content of the fertilizer in stimulating the production of auxins and increasing the activity of gibberellins in plant tissues, which encourages the process of cell division, cell elongation, expansion and increase in size. (Butt,2005).

Fresh weight of flower stalk and the flower: Statistical analysis of the data in Table (5) proved that the increase in the fresh weight of the flower stalk and the flower is due to spraying with a solution. Foli Artal at a concentration of 2 ml per liter, as this weight amounted to 10.70g compared to6.93 Sad to deal with comparison, this may be due to the nitrogen content of the solution, which is involved in vital processes within plant cells, protein formation, and increased efficiency of photosynthesis by increasing leaf area. (Piram, 2013).

Flower stand diameter:-It is clear from the results of Table (6) that the high concentration of Foli Artal gave the highest diameter of the flower stalk, which reached (0.84) poison and which It outperformed the rest of the other treatments, while the lowest value was for the comparison plants, which amounted to (0.59) poison. Phosphate fertilizer concentrations were effective, especially high levels, in increasing the diameter of the flower stalk. This may be attributed to the fact that treatment with phosphorus led to an increase in vegetative growth and its branches, which helped in absorption. Greater Amount of water and nutrients, in addition to its role in increasing the production of amino and nucleic acids, which has a positive impact on the

manufacture of carbohydrates and their transfer from the leaves to the flower branches, thus creating a state of balance in rate C/N has a clear effect on flower differentiation and increasing their dry weight. (Hartmann and others, 2002).

Flower diameter: -The data shown in Table (6) indicate that nitrogen fertilizer had impact Moral in the characteristic of flower diameter if fertilization led Foli Artal at concentrations of 2 ml/L to register greater Moral values of flower diameter if it reached (7.12) cm compared to untreated plants which obtained the lowest values. (4.88) poison. The reason for the increase in flower diameter may be attributed to the provision of plants with the necessary elements for growth contained in the fertilizer. Foli Artal, as it leads to improving vegetative and root growth, and thus increasing the amount of carbohydrates accumulated in plant tissues, which in turn pushes plants to flower growth. Good. (Piram, 2013)

Time required for flowering (day): Data from Table (6) indicate that fertilizer Foli Artal at a high concentration of 2 ml/L, it gave the shortest flowering period, reaching (95.35) days, while the highest value was for comparison plants, reaching (120.12) days. From this, it can be said that there are significant differences for plants that were treated with fertilizer. Foli Artal Compared to other treatments and the control treatment, the flower buds appeared sooner than in untreated plants. This may be due to differences in genetic characteristics between the varieties.

Table (6) Effect of different concentrations of organic and chemical fertilizers on the Flower stand diameter, Flower diameter, Time required for flowering (day) for the tulip plant is (White Prince)

T	Transactions	Flower stand diameter (poison)	Flower diameter (poison)	Time required for flowering (day)
1	**Comparison treatment**	0.59 D	4.88 C	120.12 A
2	**2 ml/L Foli Artal**	0.84 A	7.12 A	9535 AH
3	**1 ml/L Foli Artal**	0.75 B	6.02 A B	10010 d
4	**2 ml/L Fevist**	0.72 B C	6.03 A B C	101.78 c d
5	**1 ml/L Fevist**	0.69 C	6.11 A B	105.10 b c
6	**2 ml/L NPK**	0.66 C	5.44 A B C	107.70 b c
7	**1 ml/L NPK**	0.68 C	5.22 B C	110.80 father
8	**2 ml/L Humi Max**	0.68 C	6.46 A B C	111.93 father
9	**1 ml/L Humi Max**	0.66 C	5.96 A B C	112.60 a b

Duration of stay in the vase :- From the data in Table (7), we note that spraying with a solution Foli Artal At a concentration of 2 ml/liter, it led to a significant increase in the flowering age of the flowers, which reached (12.03) days, while the lowest value was for the control plants (3.60) days. From this, it is also clear that there are significant differences for the plants that were treated with fertilizer. Foli Artal Compared with other treatments and comparison treatment. The reason for this is due to the leaf content of nutritional elements, which in turn is reflected in the inflorescence content of the nutritional substance consumed by the inflorescence when picked (Al-Saad, 2003), which is reflected in extending the flower life, and perhaps the increase of its elements in the plant tissues, including nitrogen, is effective in increasing the arrival of absorbed and water-soluble materials to the leaf and its structural role for some elements in reducing the rate of plant tissue respiration, which increases the weight of the inflorescence (Al-Abdeli et al., 2004), and thus reduces moisture loss and perhaps reduces ethylene emission from it (Al-Rubaie, 2003), so the flower life increases and the aging stage is delayed.

Table (7) Effect of different concentrations of organic and chemical fertilizers Duration of stay in the vase ،Duration of flowers on the plant tulip variety *(White Prince*))

T	Transactions		Duration of stay in the vase (day)	Duration of flowers on the plant (day)
1	**Comparison treatment**		3.60 F	6.96 F
2	**2 ml/L**	**Foli Artal**	12.03 A	16.45 A
3	**1 ml/L**	**Foli Artal**	10.10 B C	14.40 A B
4	**2 ml/L**	**Fevist**	10.36 B	13.43 B C
5	**1 ml/L**	**Fevist**	8.36 C D	11.73 C D
6	**2 ml/L**	**NPK**	7.30 D E	10.76 D E
7	**1 ml/L**	**NPK**	5.23 E F	8.83 E F
8	**2 ml/L**	**Humi Max**	5.43 E F	11.63 D
9	**1 ml/L**	**Humi Max**	5.23 E F	10.60 D E

Duration of stay flower on Plant: -When looking at the table (7) It is clear to us that the superiority of high concentration of Foli Artal 2 ml/liter during the period of flowers remaining on the plant for a period of (16.45) days compared to (6.96) Days in comparison transaction and through the table also We find significant differences for plants treated with fertilizer. Foli Artal Compared to other transactions and treatment Comparison. This may be attributed to the role played by amino acids when used in appropriate concentrations, as they act as a remover of harmful substances, which helps prevent the breakdown of cells and tissues and delays the aging of flowers. (Naglaa and others,2012).

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