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RESPONSE OF SEEDLINGS OF TWO GRAPE CULTIVARS TO DIFFERENT LEVELS OF NITROGEN FERTILIZERS

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Abstract:

This experiment was carried out in the nursery of the Department of Horticulture and Landscaping at the College of Agriculture and Forestry / University of Mosul / Iraq during the 2020 growing season to study the effect of different levels of nitrogen fertilization, on the growth of seedlings of two grape cultivars. In the implementation of the experiment, a split-R.C.B.D was followed for the factorial experiments with two factors, where four concentrations of nitrogen (0, 1.5, 3.0, and 4.5) Nitrogen mg. seedlings $^{-1}$seedling using urea as a source of nitrogen (46%N). Two grape cultivars were used, are Des Al-Anz and Jafka 4X2 to become 8 treated with three replications and with (5) seedlings in the experimental unit per replicate. The results showed significant superiority of urea fertilizer in the characteristics (height of the main stem (cm), main stem diameter (cm), leaves number, area of one leaves (cm2). The cultivar Des Ans showed significant superiority in the studied parameter main stem diameter (cm), and JAFKA cultivar was significant superiority in area of one leaves (cm2).

Keywords: grape, cultivars, urea, nitrogen, fertilizer.

INTRODUCTION

The grape plant (*Vitis vinifera* L.) belongs to the Vitaceae family and is one of the most productive plants.agricultural crops around the world. Cultivated grapes (Vitis vinifera L. subsp. vinifera).It has economic significance (Ruel and Walker, 2006). Grape plant deciduous This plant has spread genetic varieties in the world. These varieties can produce such height the value of processed products such as grape juice, jelly, table grapes, and nutritional supplements (Zhang et al, 2009). The rare blueberry of Europe and Central Asia (V. vinifera subsp. sylvestris), which It is believed to be the living ancestor of modern grape cultivars (This et al., 2006). Grapes are plants of the subtropical, warm temperate, and cold temperate regions due to the spread of their cultivation between latitudes (20-50) degrees north of the equator and (20-40) degrees south of the equator (Hidalgo1980). Many researchers believe that the origin of grapes is from Central Asia, as there are so far wild forests, including them growing in mountainous areas near the slopes of rivers, while others assert that its origin is from the Mediterranean basin and that the Sumerians had prosperous agriculture since 4000 BC. (Al-Saeedi, 2000). The economic importance of grapes in Iraq is demonstrated by the long period of consumption of fresh grapes, which begins From the beginning of June to the end of November (Hassan and Samman, 1989) in addition to being ranked first among fruit trees in terms of production and cultivated area (O.A.F, 2007) From a medical point of view, grapes are a substance Food is used as a stimulant for brain cells and heart muscles, a quantitative tonic, and reduces stomach and liver diseases the intestines and the urinary tract (Jamal al-Din, 2010). Foliar application is the process of spraying nutrient solutions on the plant's vegetative complex, and spraying mineral nutrients allows plants to absorb them faster from the soil through the roots, and it is a complementary process to ground fertilization, especially in soils that are basic interaction, which leads with high soil basicity to the loss of many of the soil additives As a result of volatilization and its lack of readiness by sedimentation or stabilization, which is a preferred method because it consumes small amounts of fertilizer, and foliar spraying today is one of the ways to increase production in sustainable agriculture and in most orchids it has a positive effect on vegetative growth and fruit production and has distinct evidence, as it preserves water Soil from pollution is more effective and economically feasible in improving plant growth (Marschner and Marschner, 2012, Hamayun; et al., 2011). The addition of nutrients by foliar spray is useful for improving growth and production by reducing the obstacles that limit the availability of nutrients in the soil (Al-Nuaimi, 2000).The preparation of nutrients for plants is an essential factor, especially in the early stages of growth, as their role is structural, physiological, chemical, or biological, and a number of these elements are found in all important biological molecules such as carbohydrates, protein, chlorophyll and nucleic acids (Mengel et al., 2001).Urea is one of the most suitable forms of nitrogen for foliar application due to its rapid absorption, transmission, non-polarity, low toxicity, high solubility, as well as its high nitrogen content (46%) (Bondada et al., 2001).It is a highly

mobile element within the plant and moves from inactive tissues to active tissues. Nitrogen helps to form large-sized leaves rich in chlorophyll. Nitrogen deficiency can be easily observed when the leaves of the plant are small in areas with a light green to yellowish color, and the branches are weak and short (Narrator, 1982). Excessive uses of nitrogen fertilizers affect groundwater and phosphates in surface waters, and the efficiency of nitrogen fertilizer use is about 20-50% and 10-25% for phosphate fertilizers, knowing that food production must be more efficient than ever (Shaviv, 2000, Chinnamuthu and Boopathi, 2009). Razek et al. (2011) Fertilization of grapevines, cultivar Crimson, seedless at 5 years of age, with three levels of nitrogen and M. All levels gave a significant increase in nitrogen content and leaf area with increasing levels, and the best level was 48 kg N ha^{-1}. Hammond et al. (2013) found that the effect of level 4 gm seedling-1 of NP fertilizer in grape seedlings of Kamali cultivar was the best among the levels (6,4,2,0) gm $seedling^{-1}$ in the first year when added in four batches, and in the second season the level was 12 gm $seedling^{-1}$ is the best among the levels (14,12,10,8,0) gm $seedling^{-1}$, as it gave a significant increase in plant height, number of leaves, leaf area and dry weight of the vegetative total. alameer (2017) also confirmed that spraying the vines of Summer Royal cultivar with Total Grow mineral nutrient solution containing N gave the concentration of 3 ml L^{-1} a significant increase in the leaf area of the vine amounting to 58.63 and 71.16 dm2, the length of the stalks 134.3 and 240.6 cm, and the diameter of the stalks 7.37 And 10.78 mm and dry weight of leaves and for the two seasons of research.

MATERIAL AND METHODS

This experiment was carried out in the nursery of the Department of Horticulture and Landscaping at the College of Agriculture and Forestry / University of Mosul / Iraq for the 2020 growing season to study the effect of different levels of nitrogen fertilization, on the growth of seedlings of two grape cultivars. Follow the steps outlined in the split-R.C.B.D. general design section. A grape cultivar and Jafka 4X2 cultivar were used, welcoming 8 treatments, with three replicates, and with (5) seedlings in the experimental unit per replicate. Nitrogen fertilization was carried out by spraying on the vegetative height and in two batches, the first batch on April 4 and the second on May 5. All horticultural service operations were carried out in the growing season in growing season from watering and bushes in a homogeneous manner, its seedlings and seedlings, and measuring seedlings (cm) by measuring a tape from the surface of the soil to The plant and seedlings, the main plant and seedlings of seedlings (mm) where the diameter is at a height of 5 cm above the growth area from the eye and the use of the electronic foot (Vernier) and for all seedlings as well as the number of leaves in all seedlings in the first week of June for each experimental unit and the area of one leaf were calculated (cm 2) and the leaf area of the seedling, as well as the percentage of N in the petioles of the leaves.

RESULT AND DISCUSSION:

Table (1) shows the superiority of urea with a concentration of 4.5 mg. $seedlings^{-1}$ significantly over the comparison treatment and the other in the characteristic of the main stem height, and it did not show any differences between the cultivars, and for the interaction between the experimental treatments it was found that the interaction 4.5 mg. $seedlings^{-1}$ and the cultivar JAFKA were significant over all other treatments.

Table (1) Response of of nitrogen fertilization and cultivar on the height of the main stem (cm) of seedlings of two grape cultivars

Urea mg. seedlings $^{-1}$	concentration				C. v Average
	Control	1.5	3	4.5	
Des Al-Anz	37.33 d	40.00 bcd	47.67 a	43.33 abc	42.08 a
JAFKA	34.67 d	39.00 cd	45.00 ab	47.67 a	41.00 a
Average Urea	36.00 b	39.50 b	46.33 a	44.33 a	

The results indicate in Table No. (2) for the main stem diameter characteristic that level 3 mg. $seedlings^{-1}$ of urea was significantly superior to the comparison, and the Des Al-Anz variety was significantly superior to the JAFKA variety, and the interaction 3 mg. $seedlings^{-1}$ of urea with the variety Des Al-Anz was significantly superior to all other concentrations.

Table (2) Response of nitrogen fertilization and cultivar on the main stem diameter (cm) of seedlings of two grape cultivars

Urea mg. seedlings $^{-1}$	concentration				C. v Average
	Control	1.5	3	4.5	
Des Al-Anz	3.63 de	4.07 bc	4.63 a	4.17 bc	4.12 a
JAFKA	3.37 e	3.87 cd	4.27 b	3.97 bcd	3.87 b
Average Urea	3.50 c	3.97 b	4.45 a	4.07 b	

Table (3) shows the superiority of urea with a concentration of 3 mg. seedlings $^{-1}$ significantly over the comparison treatment and the other in the characteristic of the leave number, and it did not show any differences between the cultivars, and for the interaction between the experimental treatments it was found that the interaction 3 mg. seedlings $^{-1}$ and the cultivar Des Al-Anz were significant over all other treatments.

Table (3) Response of nitrogen fertilization and cultivar on the leave number of seedlings of two grape cultivars

Urea mg. seedlings $^{-1}$	concentration				C. v Average
	Control	1.5	3	4.5	
Des Al-Anz	31.33 c	35.00 bc	41.00 a	38.33 ab	36.42 a
JAFKA	30.67 c	34.33 bc	37.67 ab	36.33 b	34.75 a
Average Urea	31.00 c	34.67 b	39.33 a	37.33 ab	

The results indicate in Table No. (4) For the area of one leaves (cm2**)** that level 3 mg. seedlings $^{-1}$ of urea was significantly superior to the comparison, and the JAFKA variety was significantly superior to the Des Al-Anz variety, and the interaction 3 mg. seedlings $^{-1}$ of urea with the variety JAFKA was significantly superior to all other concentrations

Table (4) Response of nitrogen fertilization and cultivar on the area of one leaves (cm2) two grape cultivars

Urea mg. seedlings $^{-1}$	concentration				C. v Average
	Control	1.5	3	4.5	
Des Al-Anz	21.00 e	23.33 cd	26.00 ab	24.00 bc	23.58 b
JAFKA	21.33 de	24.00 bc	28.00 a	26.00 ab	24.83 a
Average Urea	21.17 c	23.67 b	27.00 a	25.00 b	

Table (5) shows the superiority of urea with a concentration of 3 mg. seedlings $^{-1}$ significantly over the comparison treatment and the other in the characteristic of the percentage of N in the petioles of the leaves, and it did not show any differences between the cultivars, and for the interaction between the experimental treatments it was found that the interaction 3 mg. seedlings $^{-1}$ and the cultivar Des Al-Anz were significant over all other treatments.

Table (5) Response of nitrogen fertilization and cultivar on the area of one leaves (cm2) of seedlings of two grape cultivars

Urea mg. seedlings $^{-1}$					C. v Average
	Control	1.5	3	4.5	
Des Al-Anz	0.82 b	1.01 ab	1.20 a	1.06 a	1.02 a
JAFKA	0.84 b	1.03 ab	1.07 a	1.08 a	1.00 a
Average Urea	0.08 b	1.02 a	1.13 a	1.07 a	

Table (6) shows that no significant defers between urea level in leaves area parameters , and it did not show any differences between the cultivars, and for the interaction between the experimental treatments it was found that no significant defers between all treatments

Table (6) Response of nitrogen fertilization and cultivar on the leaves area of seedlings of two grape cultivars

Urea mg. seedlings $^{-1}$	Control	1.5	3	4.5	C. v Average
Des Al-Anz	657.0 a	816.7 a	684.3 a	587.3 a	515.5 a
JAFKA	652.7 a	824.3 a	679.5 a	577.4 a	513.9 a
Average Urea	654.8 a	820.5 a	681.9 a	582.4 a	

DISCUSSION:

The reason for the significant defers superiority obtained from the treatment with nitrogen may be attributed the reason may be due to the good and direct nutrition of the leaves with nitrogen, which and they have a significant role in activating the vital activities of the process of respiration and photosynthesis (Al-Sahhaf, 1989).

As nitrogen works to impede the aging of leaves and their ability to build proteins and RNA, as well as destroying them (Weerachai and Duaug, 1988). The effectiveness of photosynthesis as well as other processes led to an optimal vegetative growth that required the absorption of other nutrients to replace the state of nutritional balance as a result of increasing vegetative growth and increasing leaf area, which contributed to improving the processes of physiological intentions and giving better growth (Al-Tamimi, 1998). The increase in plant height, leaf area and number of leaves is also attributed to the important role of nitrogen in many vital processes that occur in the plant, such as the formation of amino acids, proteins and enzymes, which encourage cell divisions and elongation of cells, so the rate of plant height, leaf area and number of leaves increases. (Kandil, 2002).

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