Sys Rev Pharm 2020;11(9):632-635
A multifaceted review journal in the field of pharmacy

Effect of Phosphorus Interferon on Some Physiological and Growth of Barley (Hordeum Vulgare L.)

Warqa'a Muhammed Shariff Al-Sheikh

Department of Basic Science, Faculty of Dentistry, Al-Qadisyah University, Iraq
Email: greatsteps727@gmail.com

ABSTRACT

The experiment was carried out with 1 kg pots of capacity, using measured silty sandy soil to grow barley type (IPA 99) in plastic pots. A material triple super phosphate (P2O5 61%) was used , where the pots were fertilized with the following sizes (P 0): The pots were only given spraying with water, (P 20): was done Fertilize the soil with Phosphorus at a rate of 10 mg p kg-1soil, (P 40): fertilize this group with 40 mg p kg-1soil of Phosphorus, (P 80): fertilize the group of pots at a rate of 80 mg p kg-1soil of Phosphorus. Where a group of barley seeds was planted randomly on top of 10 seeds, and then they were reduced to potted plants 1. After germination, the plants were cut after 15 days of germination after measuring the plant height, the average leaf area of cm2 A of the plant and the vegetative growth of the leaves.The results of statistical analysis showed significant difference (LSD) at a probability level of 0.05.were found significantly effect in increasement in the pots that I fertilized with 30 mg p kg-1soil Phosphorus in the plant height by a percentage 10.95±1.05, significantly effect in increasement in Chlorophyll level of barley about 0.487±0.042and significantly increasement in The leaf area of the plant, Root length, Vegetative part weight 5.913±0.631,5.56±1,65,0.538±0.02 .This indicates that the addition of Phosphorus has an effect on plant growth.

Keywords: **Barley, Phosphorus, Chlorophyll, Root, Growth**

Correspondence:
Warqa'a Muhammed Shariff Al-Sheikh
Department of Basic Science, Faculty of Dentistry, Al-Qadisyah University, Iraq
Email: greatsteps727@gmail.com

INTRODUCTION

Prepare the barley crop Strategic grains After wheat, rice and maize, the area in which this crop is grown in the world is estimated (70 million hectares, with a productivity of 60) million tons. And in Iraq, this crop comes after wheat in terms of) Cultivated area and production (Gabr, 2014). Canada, Germany, Russia, France and Spain are the leaders in the production of this crop.And its export, and it is resistant to difficult growing conditions in arid and semi-arid regions of cold, drought and basement (Sadeq et al., 2014), salinity, is resistant to bushes and a competitor to weeds, due to its rapid growth and faster maturation than wheat. Phosphorus is considered one of the main nutrients necessary for plant growth because of (Kribel et al., 2020) its great effect in many processes Physiology in plants, it is included in the formation of energy-rich compounds and enzymatic accompaniments without which the plant cannot It performs its vital functions, decomposes carbohydrates resulting from (Ehmann et al., 2017) (Bastida et al., 2019) the process of photosynthesis and aids in plant cell division It stimulates the growth and development of roots, early maturation of fruits and the formation of seeds, so its readiness in the soil in sufficient quantities during the growth phase is important in the growth and production of agricultural crops.. It stimulates many enzymatic reactions in plants, and has an important role in the leaf, especially with regard to guard cells (IPI, 2001) due to its responsibility for cell swelling and thus it controls the mechanism of opening and closing the stomata.

MATERIALS AND METHOD

The experiment was carried out with 1 kg pots of capacity, using measured silty sandy soil to grow barley type (IPA 99) in plastic pots. Model soils were measured knowing their physical and chemical properties and according to (Table 1). A material Phosphorus sulfate(K2O 35%) was used , where the pots were fertilized with the following sizes (K 0): The pots were only given spraying with water, (P 20): was done Fertilize the soil with Phosphorus at a rate of 20 mg p kg-1soil, (P 40): fertilize this group with 40 mg p kg-1soil of Phosphorus, (P80): fertilize the group of pots at a rate of 80 mg p kg-1soil of Phosphorus. Where a group of barley seeds was planted randomly on top of 10 seeds, and then they were reduced to potted plants [1]. After germination, the plants were cut after 15 days of germination after measuring the plant height, the average leaf area of cm2 A of the plant and the vegetative growth of the leaves.

Plant height measurement

The height of the plant was measured by a graduated scale, as it was measured from the germination area connected to the root to the top of the plant.

Chlorophyll level measurement

Fresh samples of barley leaves were washed with distilled water to dry in the room (temperature 20 ° C), and analyzed to determine the chlorophyll content by (UV-VIS Spectrophotometer)(shimadzu) to measure the absorption, 0.5 g was taken from finely weighed barley plant and homogenized in slurry with the addition of quartz sand 5 - 10 ml of 80% acetone as the solvent for the extraction, the samples were transferred into test tubes to determine the spectrophotometry. The chlorophyll counter d was analyzed by measuring the absorbance at 662 and 644 nm, respectively, and calculating the total chlorophyll by :Total chlorophyll(mg\g)=C1×V×R/Mx1000) (Havlíková et al., 2014)

Measure the leafy area of the plant

The leaf area of the plant was calculated on the basis of the source (Gunn et al., 1999) Leaf area = leaf length * maximum width * 0.95 for all plant leaves.

Measure root length (cm) and Vegetative part weight (g)

It was measured using a measuring ruler graduated from the base of the vegetative part (the area where the stem is connected to the root) until the end Root. Vegetative part

weight Measure by a (Analytical Balance) (AS 220/x) (RADWAG) (POLAND) type sensor scale after cutting it from the root beginning and measuring the weight of the vegetative part.

Table 1. Total of soil analysis**.** For physical properties and soil composition**.**

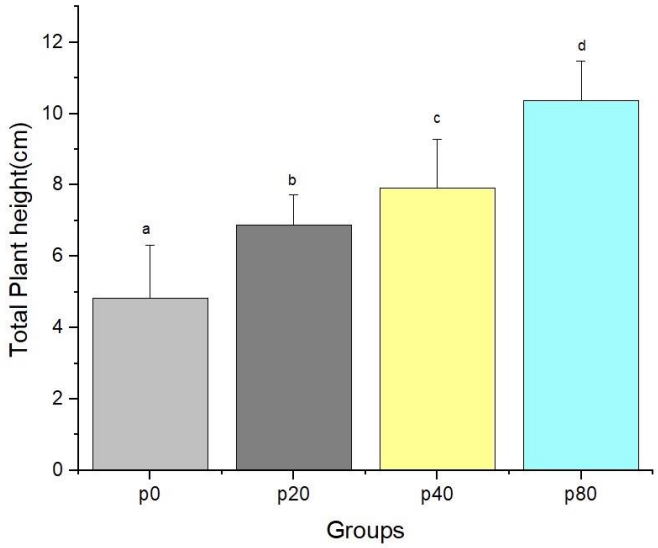
Soil analysis:		
Parameter	Total Measurement	Units
Ph	7.91	
EC	11.020	µS/cm
TDS	7714	mg/l
Soil texture: loamy sand		
Clay	5%	
Sand	85%	
Silt	10%	

RESULT

Plant height

The height of the plant was measured and compared significantly as in (Figure.1), where it was found that the quantity of (P80) was significantly more than that of the control group, and when compared with the group (P20),(P40) it was found that the amount of increased significantly.

Figure 1. The effect of Phosphorus on plant height of the barley. The means values are ±S.D. ($p < 0.05$).



The leafy area of the plant

Adifference in the paper area was observed in the group (P 80) as in (Table.2) and in comparison, with the control group, but no significant significant change was observed for the group (P 20, P40).

Table 2. The effect of Phosphorus on the leaf area of the barley plant.The means values are ±S.D. ($p < 0.05$).

The leaf area of the plant) $cm^{2)}$		
Groups	Means	SD ±
P0	2.85	0.346
P20	3.362	1.300
P40	3.763	0.640
P80	5.913	0.631

Chlorophyll level

The increase in Phosphorus group P80 in the vegetative part of chlorophyll was significantly higher than the rest of the groups as in (Table.3).

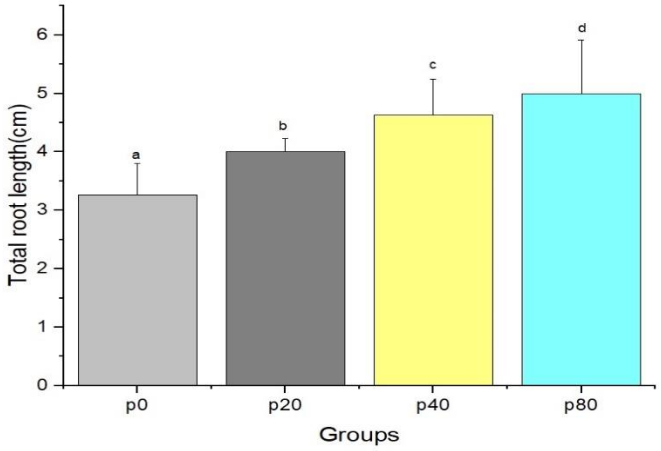
Table 3. The effect of Phosphorus on the Chlorophyll level of the barley plant.The means values are ±S.D. ($p < 0.05$).

Groups	Total Chlorophyll level (mg/g) ±S.D.
P0	0.196±0.032
P20	0.255±0.035
P40	0.274±0.047
P80	0.487±0.042

Total Root length and Vegetative part weight

In comparison between the group (P80) and the control group, a significant increase was found, as well as there is a significant difference for the (P20) (P40) groupS over the control group as in (Figure.2).

Figure 2. The effect of Phosphorus on the root length of the barley plant.The means values are ±S.D. ($p < 0.05$).



Also, Total increase in the Vegetative part weight of group k30 was found, which gave a difference over the control group and the groups k10, k20 as in (Table.4).

Table 4. The effect of Phosphorus on the Vegetative part weight of the barley plant.The means values are ±S.D. ($p < 0.05$).

Groups	Total Vegetative part weight(g) ± S.D.
P0	0.518 ±0.011
P20	0.519±0.022
P40	0.523±0.032
P80	0.538±0.02

DISCUSSION

The plant absorbs phosphate in greater quantities than it absorbs any other element, and it is considered the predominant cation in the plant, and most plants absorb more amounts of phosphate than they actually need to grow and give a good crop. (Livak & Schmittgen, 2001)The excess absorption of phosphate is called luxury consumption and phosphate does not enter the plant's chemical composition Like other elements, it is present as an inorganic salt, except that it also exists as a phosphate salt of organic acids. According to this, a significant increase in plant height in group (k30) This is his support and mention (El-Sheshtawy et al., 2019) The addition of phosphate levels and phosphorous levels led to a significant increase in root weight estimated.and Well in levels the leafy area of the plant (Barrow, 2017) phosphate is associated with the movement of water, nutrients and carbohydrates in plant tissue. It's involved with enzyme activation within the plant, which affects protein, starch and adenosine triphosphate (ATP) production. The production of ATP can regulate the rate of photosynthesis. phosphate also helps regulate the opening and closing of the stomata, (Singh & Handa, 1995) which regulates the exchange of water vapor, oxygen and carbon dioxide. If K is deficient or not supplied in adequate amounts, it stunts plant growth and reduces yield .Adding the amount of phosphate in proportion has an effect on root length, dry weight of the root mass, (Vysotskaya et al., 2016) dry weight of shoots (Zvobgo et al., 2018),. This indicates that the addition of phosphate has an effect on plant growth.

CONCLUSION

It was proved that adding phosphorous in an amount of (80 mg p kg-1soil of Phosphorus) gives positive results for

the barley yield in terms of chlorophyll, plant height and leaf area. This amount is recommended for barley growth and germination

REFERENCES

1. Barrow, N. J. (2017). The effects of pH on phosphate uptake from the soil. *Plant and Soil*, *410*(1–2), 401–410.
2. Bastida, F., Jehmlich, N., Martínez-Navarro, J., Bayona, V., García, C., & Moreno, J. L. (2019). The effects of struvite and sewage sludge on plant yield and the microbial community of a semiarid Mediterranean soil. *Geoderma*, *337*, 1051–1057.
3. Ehmann, A., Bach, I.-M., Laopeamthong, S., Bilbao, J., & Lewandowski, I. (2017). Can phosphate salts recovered from manure replace conventional phosphate fertilizer? *Agriculture*, *7*(1), 1.
4. El-Sheshtawy, A. A., Hager, M. A., & Shawer, S. S. (2019). Effect of bio-fertilizer, Phosphorus source and humic substances on yield, yield components and nutrients uptake by barley plant. *J. Biol. Chem. Environ. Sci*, *14*, 279–300.
5. Gabr, D. G. (2014). Seed morphology and seed coat anatomy of some species of Apocynaceae and Asclepiadaceae. *Annals of Agricultural Sciences*, *59*(2), 229–238.
6. Gunn, S., Farrar, J. F., Collis, B. E., & Nason, M. (1999). Specific leaf area in barley: individual leaves versus whole plants. *The New Phytologist*, *143*(1), 45–51.
7. Havlíková, L., Šatínský, D., Opletal, L., & Solich, P. (2014). A fast determination of chlorophylls in barley grass juice powder using HPLC fused-core column technology and HPTLC. *Food Analytical Methods*, *7*(3), 629–635.
8. Kribel, S., Qostal, S., Ouazzani Touhami, A., Selmaoui, K., Chliyeh, M., Benkirane, R., & Achbani, E. H. (2020). Effects of Trichoderma on growth and yield of wheat and barley and its survival ability on roots and amended rock phosphate growing substrates. *Current Research in Environmental & Applied Mycology (Journal of Fungal Biology)*, *10*(1), 400–416.
9. Livak, K. J., & Schmittgen, T. D. (2001). Analysis of relative gene expression data using real-time quantitative PCR and the 2− ΔΔCT method. *Methods*, *25*(4), 402–408.
10. Sadeq, M. A., Pathak, M. R., Salih, A. A., Abido, M., & Abahussain, A. (2014). Highly efficient in vitro regeneration method of endangered medicinal plant Heliotropium kotschyi (Ramram) in the kingdom of Bahrain. *American Journal of Plant Sciences*, *2014*.
11. Singh, A., & Handa, S. S. (1995). Hepatoprotective activity of Apium graveolens and Hygrophila auriculata against paracetamol and thioacetamide intoxication in rats. *Journal of Ethnopharmacology*, *49*(3), 119–126.
12. Vysotskaya, L. B., Trekozova, A. W., & Kudoyarova, G. R. (2016). Effect of phosphorus starvation on hormone content and growth of barley plants. *Acta Physiologiae Plantarum*, *38*(5), 108.
13. Zvobgo, G., LwalabaWaLwalaba, J., Sagonda, T., Mapodzeke, J. M., Muhammad, N., Shamsi, I. H., & Zhang, G. (2018). Phosphate alleviates arsenate toxicity by altering expression of phosphate transporters in the tolerant barley genotypes. *Ecotoxicology and Environmental Safety*, *147*, 832–839.