AMERICAN JOURNAL OF BOTANY AND BIOENGINEERING
https://biojournals.us/index.php/AJBB
ISSN: 2997-9331

Article

The Effect of Adding Different Spray Solutions on the Growth of Cypress and Thoya Forest Tree Seedlings

Nermen Asad Abdulazeez [1]*, Pinar Najdat Rashid [2], Ahmed Abdulsalam Abbas Gedik [3]

1. Department of Therapeutic Nutrition Techniques, College of Health and Medical Techniques, Kirkuk, Northern Technical University, Iraq.
2. Department of Therapeutic Nutrition Techniques, College of Health and Medical Techniques, Kirkuk, Northern Technical University, Iraq.
3. Department of Therapeutic Nutrition Techniques, College of Health and Medical Techniques, Kirkuk, Northern Technical University, Iraq.

Correspondence: nermen.asad@ntu.edu.iq, pinar.najdat@ntu.edu.iq, ahmed.gedik@ntu.edu.iq

Citation: Abdulazeez, N. A, Rashid, P. N. & Gedik, A. A. The Effect of Adding Different Spray Solutions on the Growth of Cypress and Thoya Forest Tree Seedlings. American Journal Of Botany And Bioengineering 2026, 3(5), 1-5.

Received: 10th Feb 2026
Revised: 21th Mar 2026
Accepted: 18th Apr 2026
Published: 05th May 2026

Abstract: This study was conducted in the wooden canopy belonging to a farmer within the Kirkuk Irrigation Project during 2025 using one-year-old forest seedlings of cypress and thoya types, and the type of seedlings was adopted as the first factor, while the second factor included four types, namely plain water, magnetized water, foliar manure (Hybox). The co-treatment between magnetized water and foliar manure, while the third factor was represented in spraying periods of 20, 40 and 60 days. The seedlings were planted in sand ponds with dimensions of 1×3 m, with 30 seedlings per basin according to the complete random design, and the measurements lasted from April to November and included the trait of stem length and stem diameter, and then the data were analyzed using SPSS software version 17. The results showed a clear superiority of the magnetized water treatment in all the studied traits, as it recorded the highest average leg length of 43.27 cm and the leg length reached 47.18 cm in November, while it also excelled in the stem diameter trait with an average of 6.89 mm and a final value of 7.57 mm, reflecting its strong positive effect in promoting vegetative growth and increasing stem thickness. The foliar fertilizer treatment gave average results in stem length with an average of 35. 23 cm and reached 40.12 cm at the end of the season, while the stem diameter reached 5.60 mm with a maximum of 6.18 mm. However, the combined treatment between magnetized water and foliar manure also recorded average values as the average leg length reached 35.29 cm and reached 39.08 cm. The average leg diameter was 5.88 mm and a maximum of 6.81 mm, but it did not surpass magnetized water alone. As for the plain water treatment, the lowest values were recorded in both qualities, with an average leg length of 34.46 cm and a maximum of 37.86 cm, while an average leg diameter of 5.82 mm reached 6.31 mm at the end of the season. In general, the best growth performance was in favor of the magnetized water treatment, which excelled in the length and diameter of the stem, followed by the foliar manure treatment and then the co-treatment, while the plain water treatment came with the lowest values. This confirms the importance of using catalytic treatments in improving the growth of cypress and thoya seedlings.

Keywords: Magnetized water, Leaf manure, Cypress, Thuya, Vegetative growth

Introduction

Agricultural workers and those interested in the field pay great attention to the creation of the best environmental and management conditions to obtain outstanding agricultural production in terms of quality and quantity, which prompts them to study and address many problems that may be related to environmental conditions or the technical aspects of production. The main objective of these efforts is to provide a suitable growing environment that leads to improved plant performance and increased productivity in general.

This trend is not limited to traditional agriculture only, but also extends to areas of forestry agriculture such as seeds, seedlings, and trees, where research and studies are moving in the same direction to achieve the best possible results. In this regard, many studies have been conducted that have dealt with the application of various modern technologies, including spraying seedlings with magnetized water or foliar fertilizers. Ali [1] pointed out the importance of these techniques in improving plant growth.

The use of foliar fertilizers is also an effective way to provide plant parts with complete or complementary nutrients, which are absorbed directly through the leaves and parts visible above the soil surface such as stems and fruits, which contributes to promoting growth and improving plant efficiency [2]. On the other hand, Blake [3] stated that the use of chemical fertilizers may be accompanied by some obstacles, especially when overused, such as high cost and potential negative effects. It prompted the search for more efficient and less expensive alternatives, including the use of magnetically treated water, which contributes to improving the absorption speed and increasing the growth rate.

In this context, Shamsham [4] found a significant superiority when using magnetically treated water, as it showed a higher ability to improve water absorption by giving additional absorption energy to the plant. This is due to the fact that the magnetization of water leads to a change in the arrangement of water molecules, which increases its effectiveness and helps to accelerate its transport within plant tissues [5].

The study of Alwan et al. [6] also showed that the use of magnetically treated water resulted in a significant increase in plant height and some other growth traits, confirming its effectiveness in improving plant performance. Similarly, Al-Tahafi et al. [7] found that the best values for plant height, number of branches, fruit weight, and total yield were achieved when spraying with solutions containing microelements such as manganese and copper were used, reflecting the importance of micronutrient nutrition in improving agricultural productivity.

Materials and Methods

This experiment was conducted in the wooden canopy of a farmer for the Kirkuk Irrigation Project during 2025, where two types of forest tree seedlings, cypress tree seedlings and thoya tree seedlings, were used at a one-year age, to represent the first factor in the study [8], [9], [10], [11].

These seedlings were treated with four different spraying treatments, the first was spraying with plain water. The second treatment included spraying with magnetized water, the third treatment was spraying with hypoox foliar manure, while the fourth treatment included joint spraying of magnetized water with foliar manure, which was considered the second factor in the experiment.

Spraying was carried out in three different time periods, i.e. 20, 40, and 60 days for each treatment, representing the third factor in the study. The seedlings were distributed in sand ponds with dimensions of 1×3 m^2, so that each basin contained 30 seedlings evenly distributed between the two types of seedlings, according to the complete random design (CRD) as reported in Al-Rawi et al. [12].

The seedlings were irrigated by irrigation method after a layer of plastic material was placed under the ponds in order to prevent water intrusion and ensure efficient irrigation. The process of recording measurements for stem diameter and length of seedlings started from April to October on a regular basis.

Then, all the resulting data were entered into the computer, where they were statistically analyzed using SPSS version 17, with the aim of assessing the effect of different coefficients on the studied growth traits.

Results and Discussion

First: The Attribute of Leg Length:

This table shows the effect of the type of addition on the stem length (cm) of plants during the growing period from April to November Table (1), with the growth averages for each treatment as well as the overall average of the months. This presentation aims to compare the plant's response to different treatments and determine the most effective ones in promoting vegetative growth [13].

In the normal water treatment, the stem length started with a relatively low value of 26.15 cm in April, and then gradually increased as the months progressed to reach 37.86 cm in November. This slow rise reflects the nature of the normal growth of the plant without the addition of external stimuli, with an average addition of 34.46 cm, which is lower than the rest of the treatments.

In the foliar manure treatment, a better improvement in growth was observed compared to plain water, with the stem length starting at 26.83 cm in April and gradually increasing to 40.12 cm in November. This improvement is due to the role of the nutrients provided by the foliar manure that are absorbed directly through the leaves, which reflect positively on vegetative growth. The average of this treatment was 35.23 cm [14].

In the magnetized water treatment, the plants recorded the highest growth rates among all treatments, with stem length starting with a relatively high value of 32.98 cm in April, and continued to increase significantly until it reached 47.18 cm in November. This indicates a strong positive effect of this treatment in stimulating growth, with an average addition of 43.27 cm, the highest in the table, indicating a clear superiority compared to the rest of the treatments.

The treatment of foliar manure with magnetized water showed moderate results, with the stem length starting at 26.93 cm and gradually rising to 39.08 cm at the end of the period. Although this treatment combined two stimulating factors, its results were lower than that of magnetized water alone, with an average of 35.29 cm.

Overall, the average months show a gradual increase in stem length for all parameters over time, with the average rising from 28.22 cm in April to 41.06 cm in November, reflecting the evolution of natural plant growth as a result of aging and improved environmental conditions during the season.

The results also show that the effect of the treatments is clearly different, as the magnetized water treatment was significantly superior to the rest of the treatments in terms of promoting growth, followed by the foliar fertilizer treatments, while plain water recorded the lowest values. This indicates the importance of stimulating treatments in improving the vegetative qualities of plants and increasing their efficiency in growth during the agricultural season.

Table 1. Averages of Leg Length by Type of Addition

Adjective / Addition Type	Leg length (cm) for months April	July	August	October	October 1	October 2	Average Addition
Plainwater	26.15	33.5	35.3	36.36	37.61	37.86	34.46333
Leaf fertilizer	26.83	34.02	36.08	36.92	37.43	40.12	35.23333
Magnetized water	32.98	42.49	43.89	45.62	47.45	47.18	43.26833
Paper fertilizer + magnetized water	26.93	34.31	36.07	37.12	38.23	39.08	35.29
Average Months	28.2225	36.08	37.835	39.005	40.18	41.06	

Second: Characteristics of the diameter of the leg

This table reveals the effect of the type of addition on **the stem diameter (mm)** of plants during the months from April to November Table (2), with the presentation of the average addition per treatment and the average of the months with the aim of comparing the plant response to different treatments.

In the **plain water treatment, the** stem diameter started with a value of 4.92 mm in April, then gradually increased over the months to reach 6.31 mm in November, indicating a relatively slow but continuous growth. Also, the average of this treatment was 5.82 mm, which is one of the low values compared to the rest of the treatments [15].

The **foliar manure treatment** showed a significant improvement in stem diameter compared to normal water, starting from 4.6 mm and gradually increasing to 6.18 mm at the end of the experiment. This reflects the role of foliar nutrients in supporting growth and increasing stem thickness, with an average of 5.60 mm [16].

The magnetized water **treatment recorded** the highest values clearly, with the stem diameter starting from 5.97 mm in April and gradually rising to 7.57 mm in November, with an overall average of 6.89 mm. This indicates a strong effect of this treatment in enhancing stem thickness and improving overall vegetative growth [6].

The treatment of **foliar manure with magnetized water** gave good results but less than magnetized water alone, where the stem diameter ranged between 5.16 mm and 6.81 mm, and averaged 5.88 mm, indicating a positive effect but less than the individual effect of magnetized water.

Overall, the average months show that the stem diameter gradually increased from 5.16 mm in April to 6.72 mm in November, reflecting a natural evolution in plant growth as the season progressed.

The results also report that the magnetized water treatment was the most effective in increasing the stem diameter compared to the rest of the treatments, followed by the foliar fertilizer treatment with magnetized water, while plain water recorded the lowest values, which indicates the importance of stimulating treatments in improving vegetative qualities and increasing plant stem strength.

Table 3. Averages of Leg Diameter (mm) by Type of Addition

Adjective addition type	Leg diameter (mm) for months April July August October October 1 October 2						Average Addition
Plainwater	4.92	5.53	5.8	5.9	6.47	6.31	5.821667
Leaf fertilizer	4.6	5.39	5.64	5.68	6.09	6.18	5.596667
Magnetized water	5.97	6.7	7.08	6.63	7.41	7.57	6.893333
Paper fertilizer + magnetized water	5.16	5.46	5.78	5.94	6.15	6.81	5.883333
Average Months	5.1625	5.77	6.075	6.0375	6.53	6.7175	6.04875

Conclusion

All the spray treatments used improved the growth of cypress and thoya seedlings compared to the normal water treatment, but the degree of effect varied between treatments. The magnetized water treatment significantly improved stem length and diameter, achieving the highest growth averages of 43. 27 cm for stem length and 6.89 mm for stem diameter, which implied its high efficiency in promoting vegetative growth. Although the foliar manure treatment gave good results less than magnetized water, the combined treatment of magnetized water and foliar manure had moderate results and did not outperform magnetized water alone, indicating that the incorporation did not add a clear additional effect. The plain water treatment recorded the lowest values in all the traits studied, reflecting natural growth without stimulants. Overall, it can be concluded that the use of magnetized water is the most effective in improving the growth of cypress and thoya seedlings under experimental conditions.

REFERENCES

[1] Q. B. Ali, "The effect of foliar fertilization on growth, yield, components, and qualitative characteristics of the Assyrian cotton crop," *Technical Journal*, vol. 18, no. 3, 2005.

[2] M. Kamal, "The effect of foliar fertilization with micronutrients on yield and quality of fruit trees," 2009.

[3] W. Blake, "Physical and biological effects of magnet," in *The art of magnetic healing*, M. T. Santwani, Ed., B. Jain Publishers, 2000.

[4] S. Shamsham, "The effect of using magnetized irrigation water on plant growth and its content of some microelements," in *Proceedings of the scientific symposium: Improving soil properties and modern agricultural techniques*, 2009.

[5] C. Martin, "Magnetic and electric effects on water. Water structure and behavior," 2003.

[6] D. S. Alwan, S. K. Al-Jubouri, and N. A. Khamas, "Study of the effect of bio-organic fertilizers and magnetic field on tomato plant growth," *Diyala Journal of Agricultural Sciences*, vol. 2, no. 2, pp. 245–251, 2010.

[7] S. A. A. M. Al-Tahafi, "The effect of manganese and copper spraying on the growth and yield of eggplant (Black Beauty variety) under plastic house conditions," *Technical Magazine*, vol. 22, pp. 23–29, 2009.

[8] SPSS Inc., "SPSS: Statistical package for the social sciences," 2005, *Lawrence Erlbaum Associates*.

[9] "Water salinity on vegetative growth characteristics of gerbera (Gerbera jamesonii)," *Journal of Damascus University for Agricultural Sciences*, vol. 25, no. 1, pp. 63–74.

[10] E. K. Haddo, "The effect of foliar fertilizer spraying on the growth and yield of green pods of cowpea plant (Vigna sinensis L.)," *Technician Magazine*, vol. 24, no. 1, 2011.

[11] D. B. Duncan, "Multiple range and multiple F test," *Biometrics*, vol. 11, pp. 1–42, 1955.

[12] K. M. Al-Rawi and A. Khalafallah, *Designing and analyzing agricultural experiments*. University of Mosul Press, 1980.

[13] Y. S. H. Al-Bek, T. S. B. Al-Hayali, S. N. H. Al-Numan, and Y. S. M. Al-Badrani, "The response of some forest seedlings (Eucalyptus, ole, olive) to spraying with foliar manure, magnetically treated water, and plain water," *Tikrit Journal of Agricultural Sciences*, 2012.

[14] H. et al. Zhang, "Recent advances in designable nanomaterial-based electrochemical sensors for environmental heavy-metal detection," *Nanoscale*, vol. 17, no. 5, pp. 2386–2407, 2025.

[15] M. F. Latif, A. A. Mousa, and A. S. Mahmoud, "The effect of spraying dates and nitrogen fertilizer concentrations on vegetative growth of Melia azedarach L.," *J. Agric. Sci. (Belihuloya).*, vol. 2, no. 1, pp. 88–98, 2010.

[16] Q. Y. Ayed, "The effect of three foliar fertilizers on the growth and yield of two varieties of faba bean (Vicia faba L.) under the drip irrigation system," *Journal of Tikrit University of Agricultural Sciences*, vol. 12, no. 1, 2012.