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Influence of Magnetism on the Development of the Bean Plant in Two Environments

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Abstract:- Magnetic fields were applied, through 35NE neodymium magnets coupled to pieces of metallic material, on bean seeds in different soils, such as the common without fertilization and the sandy also without any addition of fertilizer; in small sample spaces. It was observed that the seedlings of the experimental groups had a higher growth. If this effect is statistically proven a demonstrative formula of the relationship between variables can be created and guide future crops.

Keywords:- *Growth. Magnetism, magnetism. Seedling. Soil. Rate.*

I. INTRODUCTION

This work is – if it is a pilot test from which other projects, larger and with the appropriate specifications of the parameters involved, can be developed with the purpose of increasing national or international agricultural production, if the positive effect on seedling growth of some cultivars is statistically proven.

A possible relationship between seedling growth rate and magnetic field distance and intensity could be determined in the future if this effect is experimentally confirmed and statistically relevant.

A specific formula could be determined after the experiments. Suggested variables are as follows:

D1 = distance from seed to electrode with magnetic field B1
D2 = distance from seed to electrode with magnetic field B2
B1 = intensity of the electromagnetic field of the electrode 1
B2 = magnetic field intensity of electrode 2
Tx = average growth rate, in percentage

The reason that magnetic fields may influence plant growth has not yet been elucidated. Further tests, with significant sample space, are necessary to prove or refute this hypothesis.

One hypothesis is that there will be an increase in glucose formation on the soil in which seedlings grow, especially in the region hypothetically with a smaller magnetic field.

Theoretically, the light concentrated by the magnifying glass does not only provide energy in joules, which would not only favor the enthalpy of some chemical reactions, but also provide electromagnetic waves absorbable by molecules with equal frequencies. These waves stored for a short time are retransmitted, with their associated energy, to molecules present in H2O and CO2. As a result, glucose is formed and its concentration increases [1].

In an experiment It was verified a greater growth of the roots in the stimulated plant, which facilitated the absorption of calcium, essential for the growth of plant tissue, and iron, which contributed to the phenomenon of photosynthesis of legumes [2].

The differences in growth observed after 30 days of experimenting (the plant that had not been "magnetized" was about 13 cm, while the other was 18 cm) would have been caused by the "influence of the magnetic field produced by the magnets, which facilitated the absorption of nutrients. The polarity of the field accelerates the ingress of calcium and iron, the main food for the bean plant."

Another benefit attributed to biomagnetism is water saving, resulting from decreased consumption of stimulated plants.

The reason, according to Mahecha, is the behavior of proteins in the cell membrane of the plant. "When stimulated magnetically, they are organized in parallel, compacting and stiffening the cell membrane, and thus avoiding the process of evapotranspiration, (loss of water by the "sweat" of the plant); these plants should therefore be less watered."

In fact, the agreement with the researchers demonstrated that magnetically treated seeds consume up to 75% less water. "In this way, the plant produces more energy for itself, because it does not lose it in its sweating process, then taking advantage of this energy to stimulate its metabolism and grow more," said Adriana Blandón. [2] .

II. MATERIALS AND METODOS

In each experimental group of experiments 1 and 2, type 1 bean seeds were placed between the metal bars coupled to neodymium magnets, Only seeds were placed in the control groups of both experiments.

No fertilization was performed. Irrigation was not regular.

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III. RESULTS AND DISCUSSION

➢ *Experiment 1*

Plants of the control group; yellowish leaves and wilted leaves. 1 withered – if completely before the appearance of the 3 leaves. 02 plants of the experimental group showed good development, with the growth of all leaves. A third plant showed good development at the cauliar level.

01 plant of the experimental group showed higher growth and development than the plants of the other groups. Initially 02 seeds germinated in group 01 and 06 in group 02.

➢ *Experiment 02*

Development of leaves of group 1 higher between the second and fourth weeks and the death of leaves of group 2 in this period. Development of group 2 leaves, and death of group 1 leaves, between the fourth week and December 30, 2021.

Fig 01: plants of the experimental group (with sand as substrate; on the left) and of the control group (on the right) of experiment 02
Source: own authorship

Another hypothesis that could explain the cause of the increased growth rate of plants submitted to magnetic fields is the increase in nutrient absorption.

There was the presence of spots suggestive of infection in leaves of both groups.

The cause of death of the plants was undetermined.

IV. DISCUSSION

It is possible that the irregularity in irrigation contributed to the death of seedlings; however, the degree of influence of the amount of water and periodicity of irrigation also need to be determined experimentally.

Leaf growth was also higher in some plants of the experimental groups when compared to the plants of the control groups. Further analyses with similar experiments need to be performed to determine whether magnetic fields influence seedling cauliar growth or also the increase in root and fruit development.

Another hypothesis that could explain the cause of the increase in the growth rate of plants submitted to magnetic fields is the increase in nutrient absorption [2]. However, to prove this hypothesis it would be necessary to chemically analyze the soil in the vicinity of the plants before and during the experiment.

V. CONCLUSION

There was an increase in the growth of carioca type 01 bean seedlings in the vicinity of static magnetic fields.

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