

## RESEARCH ON EGGPLANT SEEDLINGS FERTILIZED WITH MACRO AND MICROELEMENTS

### CERCETĂRI ASUPRA RĂSADURILOR DE PĂTLĂGELE VINETE FERTILIZATE CU MACRO ȘI MICROELEMENTE

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**Abstract.** Ensuring an appropriate level of nutrients is very important for obtaining a quality seedling. This study presents some effects on some technical indices in eggplant seedlings that were determined by foliar treatments with different combinations of macro and microelements. The applied treatments consisted in different combinations of Ca, Cu, Mg, in the presence of other macro and micro elements. Foliar treatments with a complex combination of nutrients leads to obtaining a more vigorous eggplant seedling.

**Key words:** foliar fertilization, fertilizers combinations, seedling vigor

**Rezumat.** Asigurarea unui nivel corespunzător de nutrienți este foarte importantă pentru obținerea unui răsad de calitate. Cercetările întreprinse au evidențiat unele efecte pe care le determină diferite tratamente foliare în combinații de macro și microelemente asupra unor indici tehnici la răsadul de pătlăgele vinete. S-au folosit diferite combinații de Ca, Cu, Mg, în prezența altor macro și microelemente. Aplicarea tratamentelor foliare cu combinații complexe de elemente nutritive conduc la obținerea unui răsad de pătlăgele vinete mai viguros.

**Cuvinte cheie:** fertilizare foliară, combinații de fertilizanți, vigoarea răsadurilor

## INTRODUCTION

It is necessary to ensure some nutrients, which are not entirely found in the growth substrate used, in order to obtain a vigorous and healthy seedling. Among the macroelements that must be provided in sufficient quantity for the normal development of plants, can be mentioned N, P, K, Ca and Mg, and among microelements, Cu, Fe, Zn, Mn, Mo, S, B (Zamfirescu, 1977). For the additional fertilization applied to eggplant seedlings, can be used foliar fertilizers with N, P, K or fertilizer mixtures (Voican and Lăcătuș, 1998).

Nutrients from foliar fertilizers are more easily assimilated and metabolized by the plant than those from fertilizers applied at the soil level (Fageria *et. al.*, 2009). The composition of foliar fertilizers can include different macro and

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microelements necessary for plant development (Cioroianu *et. al.*, 2000). Eggplant plants are higher consumers of nitrogen and potassium, in general, than other species of the *Solanaceae* family, and they react well to both organic and chemical fertilization (Munteanu, 2003).

## MATERIAL AND METHOD

Foliar treatments with certain combinations of macro and microelements were applied to eggplant seedlings, variety Luiza. The variants were placed in randomized blocks design in three replications. The composition of the fertilizers, used for the treatments, are presented in Table 1.

Table 1

Fertilizers used for treatments and their chemical composition

The name of the product	Chemical composition
Theocal	30% Ca. 35% organic matter
Theocopper	1.4% Cu; 12% N; 2.5% K; 3.5% organic matter
Microcat Magneziu	10% MgO; 8% N; 2.6% free amino acids; 7% organic acids
Folimax	10% N; 2 % MgO; 15% Ca; 0.05% B; 0.04% Cu; 0.05% Fe; 0.01% Mn; 0.001% Mo; 0.02% Zn

Table 2 shows the experimental variants, depending on the number of fertilizations and the products used. Variant 1 is Control (no treatments were applied on it).

Table 1

Experimental variants

Variant	Number of fertilizations	Product used
V1	-	-
V2	3	Theocal (0.2 g/1 L water)
V3	5	Theocal (0.2 g/1 L water)
V4	3	Theocopper (1 mL/1 L water)
V5	5	Theocopper (1 mL/1 L water)
V6	3	Theocal (0.2 g/1 L water)+ Theocopper (1 mL/1 L water)
V7	5	Theocal (0.2 g/1 L water)+ Theocopper (1 mL/1 L water)
V8	3	Theocal (0.2 g/1 L water) + Theocopper (1 mL/1 L water) + Microcat Magneziu (1.2 mL/1 L water)
V9	5	Theocal (0.2 g/1 L water) + Theocopper (1 mL/1 L water) + Microcat Magneziu (1.2 mL/1 L water)
V10	5	Folimax (2 mL/1 L water)

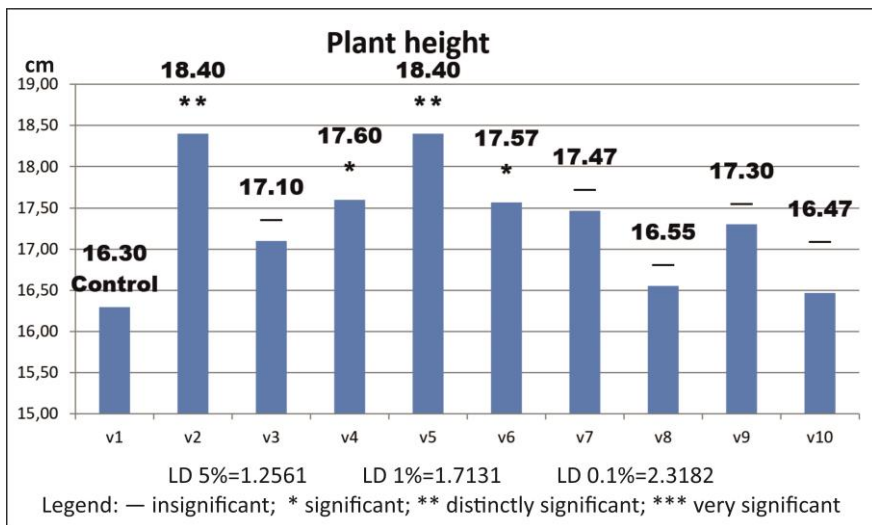
When the plants age reached 50 days, five plants of each variant were used for the following measurements which were recorded: the height of the plant, roots weight, the weight of the aerial part, leaf weight, the total weight of the plants, the leaf surface. The obtained data were statistically evaluated by ANOVA method.

## RESULTS AND DISCUSSIONS

The applied treatments determined significant differences on the eggplant seedlings. These led to obtaining a more vigorous and healthier seedling. The results are presented below, depending on the biometric indicators that were measured.

### Plant height

In some cases, the applied treatments determined significant increases in plant height. The results are presented in figure. 1.



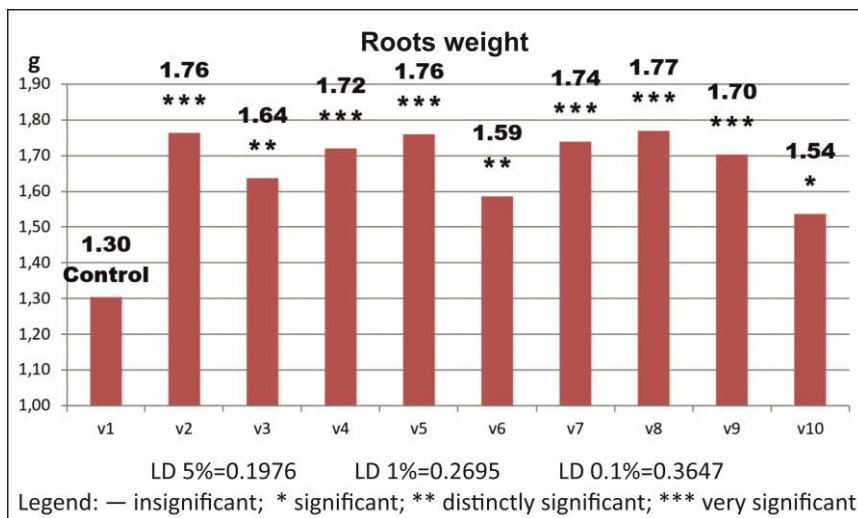
**Fig. 1.** Graphic representation of the height of eggplant seedlings

The treatments applied on the plants from variants V2 and V5 determined distinct significant differences of about 2 centimeters, but V4 and V6 determined significant differences. It should be mentioned that excessive height growth of the seedling is not desired (Munteanu, 2003), this making it difficult to plant the seedling. Seedling length does not necessarily indicate better seedling vigor. This must be correlated with other indices.

### Roots weight

All treatments applied with fertilizers determined significant increases in the weight of the roots. These differences and their significance are shown in figure 2. The treatments determined increases that varied between 0.24 and 0.47 g.

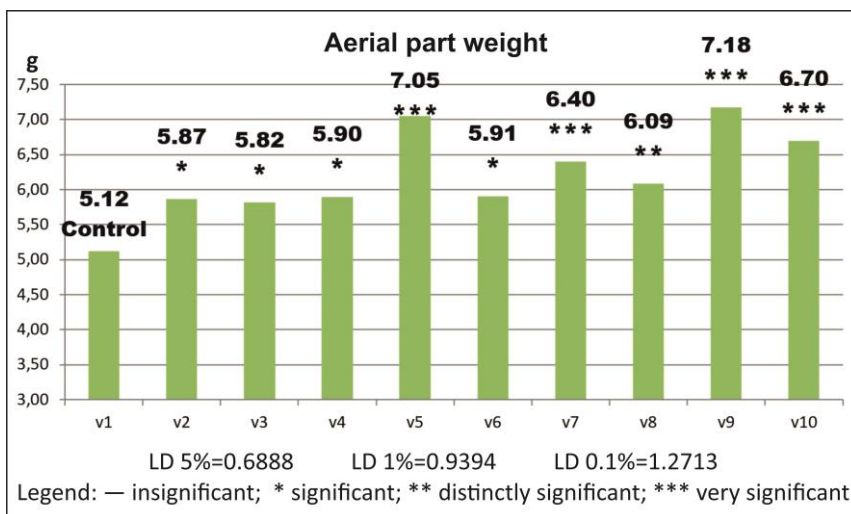
The treatment variants that determined the most important increases in root weight were V2, V4, V5, V7, V8 and V9.



**Fig. 2.** Graphic representation of the weight of the roots of eggplant seedlings

### Aerial part weight

The aerial part weight of the seedlings was also influenced by all the treatments used. The data are shown in figure 3. Very significant differences are provided by the variants V5, V7, V9 and V10. In the case of V5 and V9, the increases were approximately 2 g.



**Fig. 3.** Graphic representation of the aerial part weight of eggplant seedlings

### Leaf weight

The results of treatments with macro and microelements on the weight of the leaves of eggplant seedlings are presented in Fig. 4. Most of the treatments determined important increases, but variants V5 and V9 had very significant effects. The two variants increased the weight of the leaves by approximately 0.6 g.

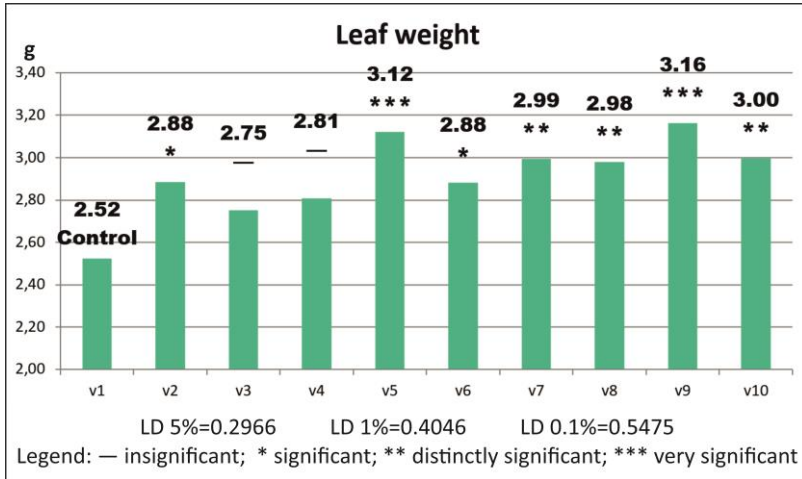


Fig. 4. Graphic representation of the leaf weight of eggplant seedlings

### Totally seedling weight

The treatments with fertilizers strongly influence the development of eggplant seedlings, their application having significant effects on the total weight. The strongest effects were noted in the case of the V5 and V9 variants, where the increases were around 2.4 g (fig. 5).

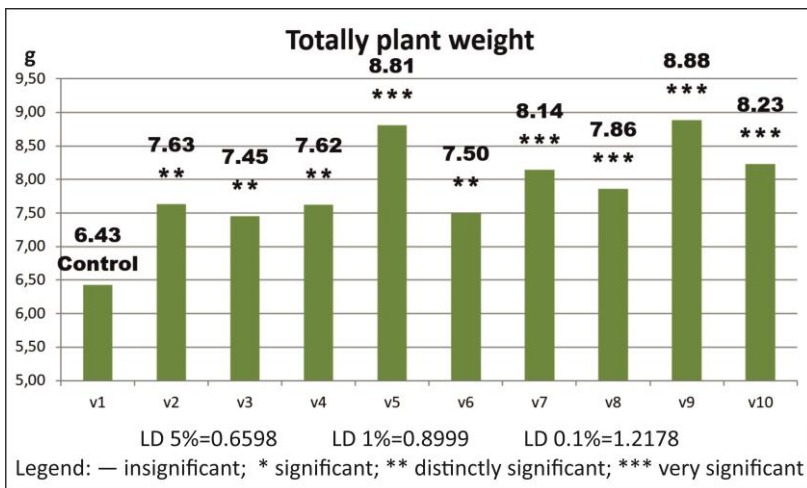


Fig. 5. Graphic representation of the totally seedling weight

### Leaf surface

The strongest effects on the leaf surface were determined by the treatments applied to V5 and V9, which determined very significant differences by comparison to control (fig. 6).

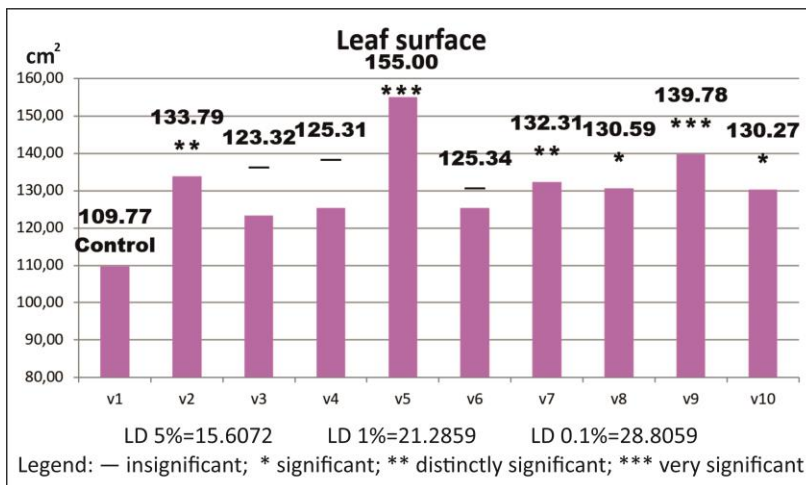


Fig. 6. Graphic representation of the leaf surface of eggplant seedlings

## CONCLUSIONS

1. The best effect was noted by V9 variant, treated with a combination of fertilizers: Theocal (0.2 g/1 L water) + Theocopper (1 mL/1 L water) + Microcat Magneziu (1.2 mL/1 L water).

2. The V5 variant results in lower nitrogen application than V9, so it is likely that the use of copper in foliar treatments will have a stronger effect when applied alone than when combined with calcium or magnesium.

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