

## INFLUENCE OF SOME BIOFERTILIZERS ON CUCUMBER PLANTS IN ORGANIC FARMING SYSTEM

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### INTRODUCTION

The main difference between the two agricultural alternatives (ecological and conventional) is probably in the conception about fertilization. The fact that the biological and biochemical "health" of the soil is pursued more and less the overcoming of some chemical indices of appreciation of the momentary qualities, gives value to the biological/ecological agriculture approaches, which in all its actions does nothing more than to resume the natural processes of formation of the soil. soil and eventually accelerate them in order to improve it (Munteanu *et al.*, 2008).

The unconventional agriculture systems appeared as a reaction to the excesses of conventional agriculture. The purpose of these systems is to stop the pollution and erosion of agricultural ecosystems, even their regeneration and obtaining "clean" (Measnicov, 1998) agricultural products, unpolluted, to maintain and improve the health of the population.

Organic farming is not only limited to the preparation and use of compost, but also integrates with other technical measures, namely (Davidescu, 1994):

- multiannual crop rotation with legumes;
- work the soil as far as the surface, without turning the furrow;
- the renouncement of chemical fertilizers obtained industrially and the use of highly soluble natural mineral forms;
- reducing or giving up chemical control of weeds, pests and plant diseases.

The main objectives of organic farming, as specified by the International Federation of Organic Agriculture Movements (IFOAM), are the following:

- to produce high quality food in sufficient quantities;
- to sustain (maintain) and increase soil fertility in the long term;
- to reduce all forms of pollution that may result from agricultural technology (Munteanu and Stoleru, 2012).

Organic vegetables should stimulate the activity of living organisms. The richer the soil is in

living organisms, the more fertile it is, and the plants will be more resistant to parasites.

The algae based products used as foliar fertilizers consist of green, brown or red dried algae, with a high content of organic substance and many microelements.

Biofertilizers obtained in Romania are very important sources of nitrogen. Based on the ability of soil bacteria to fix symbiotically, associatively or freely atmospheric nitrogen, and to make it available to plants together with phytohormones, this industry is non-polluting, and with beneficial effects in restoring soil biodiversity.

At the Research Center for Antibiotics in Iași, the technology of industrial production of *Azospirillum* and *Azotobacter* biopreparates was developed (Stoleru and Imre, 2007).

Cucumber is a demanding species for which the success of organic farming must be strictly followed a few principles:

- to return to the same plot in crop rotation, only after four-five years;
- to cultivate only varieties or hybrids resistant or tolerant to different diseases;
- to apply preventive treatments with copper products, when the conditions of the disease are favorable;
- when sowing or planting to comply with the recommended densities (lower densities) (Călin, 2010; Stoian, 2005).

The goal of our research is to evaluate the influence of some biofertilizers on the cucumber crop development and health status in ecological farming system.

### MATERIAL AND METHODS

Research on the efficacy of biological products and herbal extracts was performed under laboratory and field conditions (Table 1).

For the experiment the following materials were used:

- cucumber seeds from the "Mapamond" cultivar;
- fertilizers allowed in organic agriculture;
- distilled water;

- syringes for the preparation of fertilization solutions;
- the land chosen for the experiment;
- agriculture manual sprayer.

Table 1. The list of organic fertilizers use in experiment

Variant	The product	Active substance	Concentration (%)
V1	Funres	Extracts of <i>Mimosa tenuiflora</i> and citrus	0,25
V2	Blocks	Seaweed extract	0,25
V3	<i>Azospirillum lipoferum</i>	<i>A. lipoferum</i>	1
V4	<i>Azotobacter chroococcum</i>	<i>A. chroococcum</i>	1
V5	<i>Bacillus megaterium</i>	<i>B. megaterium</i>	1
V6	Rom-Agrobiofertil NP	Mix bacteria of <i>A. lipoferum</i> , <i>A. chroococcum</i> and <i>B. megaterium</i>	3
V7	Cropmax	The combination of microelements, amino acids, vitamins and polysaccharides	0,17
V8	Untrated	x	x

The land area for the experiment was 224 m<sup>2</sup>. The experimental design used was random complete blocks with four replicates. It was chosen that a variant should be 5 m long and 1,4 m width which means that its surface was 7 m<sup>2</sup>.

Two fertilizers treatments were performed in at a distance of eight days, in different phenophases, flowering and fruit setting.

For the preparation of the treatment solution a certain amount of substance was used from the fertilization product (Table 2).

A effect of the organic fertilizers treatments was assessed/evaluated by the attack frequency and intensity of the diseases.

Table 2. Fertilizers and water quality used in experiment

Variant	The product	Quantity of substance (mL)	Quantity of water (L)
V1	Funres	5	2
V2	Blocks	5	2
V3	<i>A. lipoferum</i>	14	2
V4	<i>A. chroococcum</i>	14	2
V5	<i>B. megaterium</i>	14	2
V6	Rom-Agrobiofertil NP	52	2
V7	Cropmax	3	2
V8	Untrated	x	x

## RESULTS AND DISCUSSIONS

*Pseudomonas lachrymans* (angular leaf spot) was identified on all cucumber plants of each variant, both those treated with fertilizers (V1-V7) and the control variant (V8), which led to a 100% attack frequency (Figure 1).

From figure 2 it can be observed that the intensity of the attack of *P. lachrymans* on cucumber plants was higher on the variant treated with Blocks (V2), with a percentage of 17% and on the control variant (V8), also with a percentage of 17%.

The least plants affected by the disease attack are found in the variant treated with *A. lipoferum* (V3), with a percentage of 12%, as can be seen from figure 2. It can be seen from figure 3 that the highest average number of plants and fruits can be found in the control variant (V8), with a number of 82 fruits to 51 plants.

The lowest average number of plants and fruits is found in the variant treated with *B. megaterium* (V5) with a number of 36 fruits to 23 plants, according to figure 3. It was observed that the highest ratio between the number of fruits and the number of plants was identified in the variant treated with Rom-Agrobiofertil NP (V6) and it is 66 fruits to 33 plants, namely 2:1.

The lowest ratio between the number of fruits and the number of plants could be seen in the variant treated with *A. lipoferum* and it is 62 fruits to 44 plants, namely 1,41:1 (Figure 4).

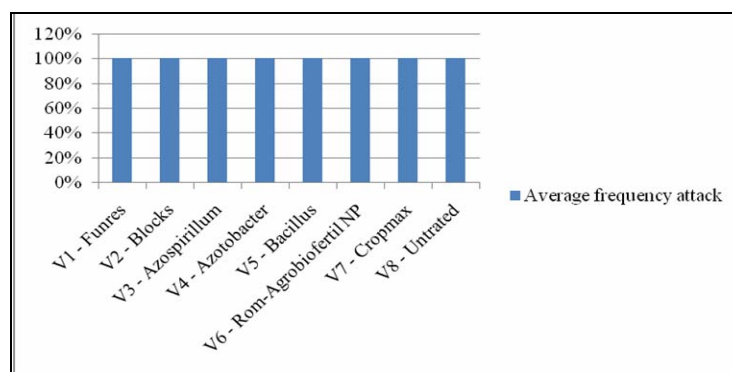


Fig. 1 The average frequency attack of *P. lachrymans* at cucumber plants

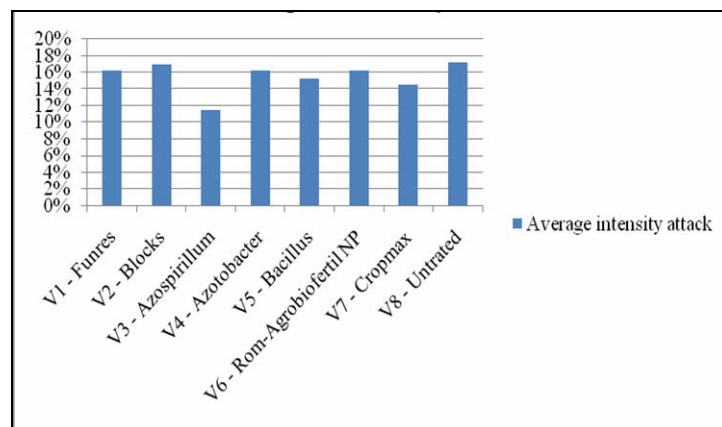


Fig. 2 The average intensity attack of *P. lachrymans*

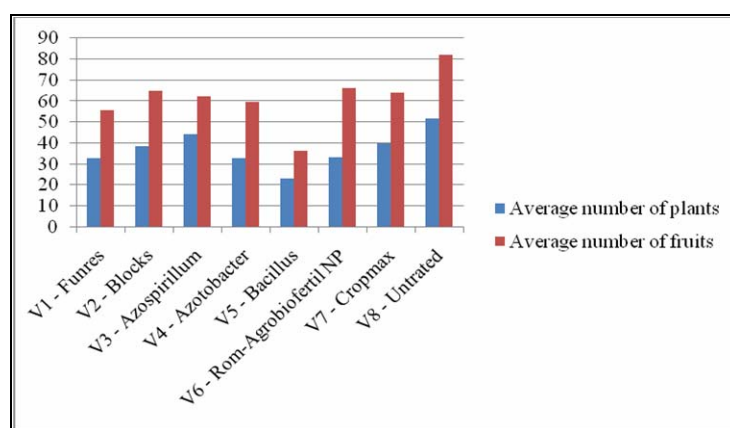


Fig. 3 The average number of plants and number of fruits

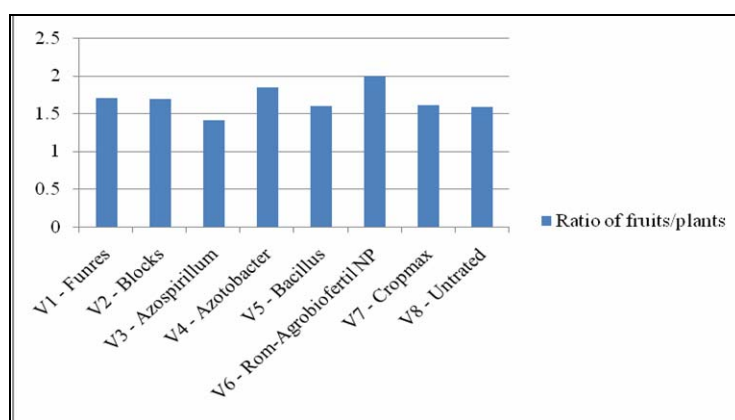


Fig. 4 The ratio between the number of fruits and the number of plants

## CONCLUSIONS

The most affected by the disease were the plants of the variant treated with Blocks (V2) and of the control variant (V8).

Treatment with *A. lipoferum* bacteria (V3 variant) has the best effect on cucumber plants, being

the least affected by the attack of *P. lachrymans* disease, the intensity of the attack being only 12%.

Although the highest average number of plants and number of fruits had it the control variant (V8), the ratio of fruits to plants was almost the lowest, only 1,59, exceeding only the variant treated with *A.*

*lipoferum* (V3), which had the lowest ratio of fruits to plants, only 1,41.

The treatment with Rom-Agrobiofertil NP, at V6 variant, helped the cucumber plants to form the most fruits at the plant, the ratio between them being 2.

#### ABSTRACT

The paper presents the experimental results of using some ecological fertilizers and their effect on the cucumber crop from an ecological/organic agricultural system.

Seven fertilizers were used: Funres, Blocks, *A. lipoferum*, *A. chroococcum*, *B. megaterium*, Rom-Agrobiofertil NP, Cropmax, by comparison with control (unrated). The least plants affected by the disease *P. lachrymans* attack are found in the variant treated with *A. lipoferum* (V3), with a percentage of 12%.

It was observed that the highest ratio between the number of fruits and the number of plants was identified in the variant treated with Rom-Agrobiofertil NP (V6) and it is 66 fruits to 33 plants, namely 2:1.

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