



## **Selection and characterization of entomopathogenic microorganisms (bacteria, fungi) beneficial to agricultural crops. Results on SCDA Suceava**

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### **Introduction**

The worldwide increases in both environmental damage and human population pressure have the consequence that global food production may soon become insufficient to feed all of the world's people. It is therefore essential that agricultural productivity be significantly increased within the next few decades. Entomopathogenic microorganisms are microorganism's living or lacontains tent cells. Entomopathogenic microorganisms increase the nutrients of host plants when applied to their seeds, plant surface or soil by colonizing the rhizosphere of the plant. Soil is replete with microscopic life forms including bacteria, fungi, actinomycetes, protozoa, and algae. Of these different microorganisms, bacteria are by far the most common (i.e., 95%). It has been known for some time that the soil hosts a large number of bacteria (often around 10<sup>8</sup> to 10<sup>9</sup> cells per gram of soil) and that the number of culturable bacterial cells in soil is generally only about 1% of the total number of cells present.

**Keywords:** organic agriculture, bacterial biopreparations, biofertilizers, bioinsecticides, biofungicides.

### **Scop, obiective**

This paper aims to explain the mechanisms of action of the entomopathogenic microorganisms, the processes by which they lead to ensuring sustainable production systems as diverse and balanced. At the same time, the paper also presents the role that bioinsecticides play in preventing the pollution of agricultural crops, but especially in obtaining much higher yields and with a better agri-food sequence than the chemically biofertilized crops.

**Material and Methods** In order to increase and maximize agricultural production (regardless of crop), farmers are forced to adapt to new technologies of the future, technologies that have the role of regenerating the agricultural ecosystem, greening the soil and ensuring high production. For each field, the specialists have developed a series of emerging technologies that have the role of facilitating the work of farmers, to reduce costs as much as possible and to give a high production by implementing and using mechanisms. Because in the agricultural field of Romania these new technologies (Entomopathogenic microorganisms) are very little encountered, as materials were identified technologies necessary for farmers, technologies that are already used in other countries. This paper did not use a series of working materials but only methods of using those new state-of-the-art technologies, namely entomopathogenic microorganisms that are used in agriculture. These microorganisms have been described as succinctly as possible so that farmers are aware of the importance of new technologies in their own crops, as well as the benefits of these technologies in reducing costs, pollution and high production, high profit with minimal investment.

### **Results**

In order to obtain a high agricultural production as well as to maximize the production per hectare, the specialists proposed a series of entomopathogenic microorganisms destined for the agricultural field, as follows: *Bacillus megaterium* confers a resistance to plants to environmental factors as well as to the attack of diseases and pests. The role of this bacterium is to spread. It can be used to produce and fix phosphorus and potassium in the soil. At the same time, the bacterium has the role of degrading the inorganic phosphorus in the soil, in organic phosphorus, soluble for plants but especially the decomposition of plant residues in and on the soil surface. *Azotobacter chroococcum* is a useful bacterium in agriculture, perhaps the most important bacterium because it has the ability to fix atmospheric nitrogen in the soil. At the soil level, the microorganism forms at the level of the root system of plants certain nodules in which it will store nitrogen. The conversion of atmospheric nitrogen into soluble nitrogen, ready for use by plants is a great advantage for farmers because they will no longer use chemical fertilizers. The application of live crops of *Azospirillum lipoferum* on the soil surface is an important advantage for farmers because it successfully fights some soil pests, eliminating pathogens, producing plant growth regulators (gibberellins, auxins, cytokinins, etc.) and increasing the amounts of elements necessary for the growth and development of crop plants (nitrogen, phosphorus, potassium, calcium, copper, etc.).

### **Conclusions**

The combination of different crops with these bacteria as well as the bacteria between them, will lead to obtaining large parameters of agricultural crops, parameters imposed by farmers (plant growth, number of bacterial colonies in the soil, identification of beneficial bacteria in the soil, etc.). Thus, when farmers decide to approach a sustainable, ecological agriculture, they have at their disposal many kinds of living bacterial cultures such as *Azospirillum*, *Bacillus* or *Rhizobium*, which can be primary candidates for soil inoculation. Thus, the introduction of beneficial bacteria into the soil tends to be a non-invasive technology that causes less impact on the environment than chemical fertilization, which makes the farmer to practice sustainable agriculture as well as an advantage for it or a way to reduce costs. of production.