

## Biological agents in organic production in Serbia

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**P**rotection of maize and small grain seeds from diseases and insects with Plant Growth Promoting Rhizobacteria (PGPR) is in the concept of sustainable agriculture, integral and organic plant protection supported by the European Commission. The need for food and raw materials in the same time increases the agricultural areas and provoke the improvement of the technology of growing corn and small grains. Currently, the total available agricultural area in Serbia in 2020, 68% was sown with grain. Maize was grown on about 996,527ha, which is 29.4% more than the ten-year average. Compared to the average agricultural areas in the period 2011-2020, area under wheat production increased by 9.4%. Organic cereals production is organized on 2,306 ha in Serbia.

Protecting corn and small grain seeds (wheat, barley, millet, hay, triticale) from diseases and insects became a challenge for Serbian producers of seeds and mercantile crops because a large number of fungicides and insecticides, due to toxicity to birds, bees, fish, warm-blooded animals and adverse effects on the environment, have been removed from the list of permitted products. However, seeds infected with phytopathogenic fungi like *Fusarium*, *Rhizoctonia*, *Phytium* lose germination, and the larvae of *Agriotes* sp. bite the roots, which reduces crop density and yield.

PGPR of the genus *Bacillus*, synthesize antibiotics, lipoproteins that have antifungal activity, while some species produce endotoxins that have an insecticidal effect. Since strains of these bacteria are not pathogenic to humans and have a positive effect on the environment, they are recommended in the system of integrated plant protection. To solve the problem of protecting seeds from diseases and insects, we used indigenous strains of bacteria from the genus *Bacillus* as biological agents that can protect seeds in a completely natural way. Results of inhibition of fungal growth were from 35% to 45%. Results of field trials indicated a statistically significant increase in international journals.