



Fungi in focus: bioproducts for climate-resilient crops

Through the integration of entomopathogenic, antagonistic, and mycorrhizal fungi, the project is developing multifunctional biological solutions to enhance maize health, productivity, and resilience under climate change conditions.

Native Beneficial Fungi: Multifunctional Allies for Building Resilient and Sustainable Maize Production Systems

Initiative

This project evaluates the integration of native beneficial fungi from Colombia and Argentina as a multifunctional strategy to strengthen maize resilience to climate change. Beneficial fungi were selected for insect pest control, disease management, improved plant nutrition, and enhanced tolerance to water stress. In addition, their potential to promote soil health and carbon

stabilization is being explored. Results obtained under laboratory and greenhouse conditions demonstrate their capacity to improve crop health, productivity, and sustainability, while reducing dependence on agrochemicals and supporting the development of more resilient and environmentally friendly agricultural systems.

Integration of Beneficial Fungi for More Resilient, Productive, and Sustainable Maize Production

Tech solution

The proposed technological solution is based on the integration of beneficial fungi with complementary functions to address the main challenges affecting maize production. The project combines entomopathogenic fungi for the biological control of insect pests, antagonistic fungi for disease management, and arbuscular mycorrhizal fungi to improve plant nutrition and enhance tolerance to

water stress. This multifunctional strategy aims to reduce dependence on agrochemicals, strengthen soil health, and increase the resilience of production systems to climate change. In addition, the project explores the potential of these microorganisms to contribute to carbon stabilization in soils, promoting a more sustainable and environmentally friendly agriculture.



Colombia / Argentina / New Zealand / Nueva Zelanda

The results highlight the potential of beneficial fungi to control pests and diseases, improve drought tolerance, and strengthen the resilience and sustainability of maize cropping systems.



+5 %
Increase in productivity expected



-50 %
Reduction in the use of agrochemicals expected



+200
A total of 387 farmers, technical advisors, and other stakeholders associated with the maize sector have been trained.



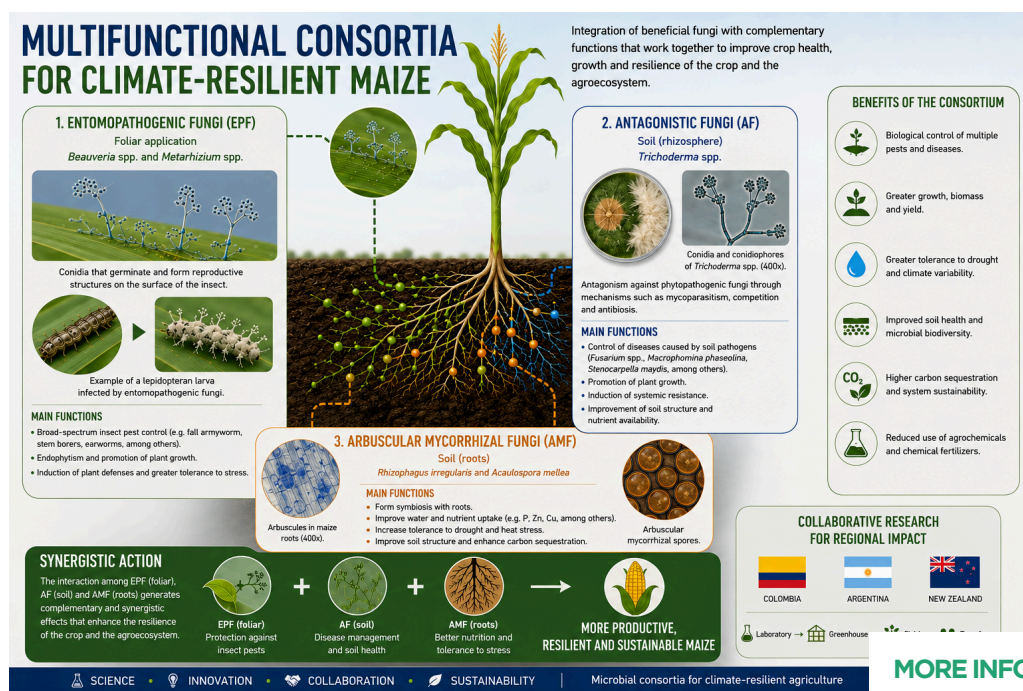
+10 %
Improvement in soil carbon stabilization expected



+10
Nine fungal isolates with biotechnological potential were characterized and prioritized as candidates for future development into bioproducts for maize production.



+3000
Farmers expected to be impacted through sustainable agricultural practices



Impacts and Results

Native beneficial fungi from Colombia and Argentina were selected and characterized for pest and disease management and the promotion of plant growth in maize. In Colombia, isolates Bv064 (*Beauveria bassiana*) and Mtcato12 (*Metarhizium robertsii*) showed high efficacy, while in Argentina the isolate Ma1 (*Metarhizium anisopliae*) stood out against *Spodoptera frugiperda*. The *Trichoderma* isolates Th406 and Th032 were highly effective against

Macrophomina, *Fusarium*, and *Stenocarpella*. In addition, a combination of arbuscular mycorrhizal fungi (AMF) was selected for its potential to improve plant growth and tolerance to water deficit. Integrated greenhouse trials showed that combining these fungi enhances plant responses to pests, diseases, and drought stress, highlighting their potential to strengthen the resilience and sustainability of maize production systems.

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