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Biological locust control moves closer to reality after successful Kazakhstan-China trials

10 June 2026 | News

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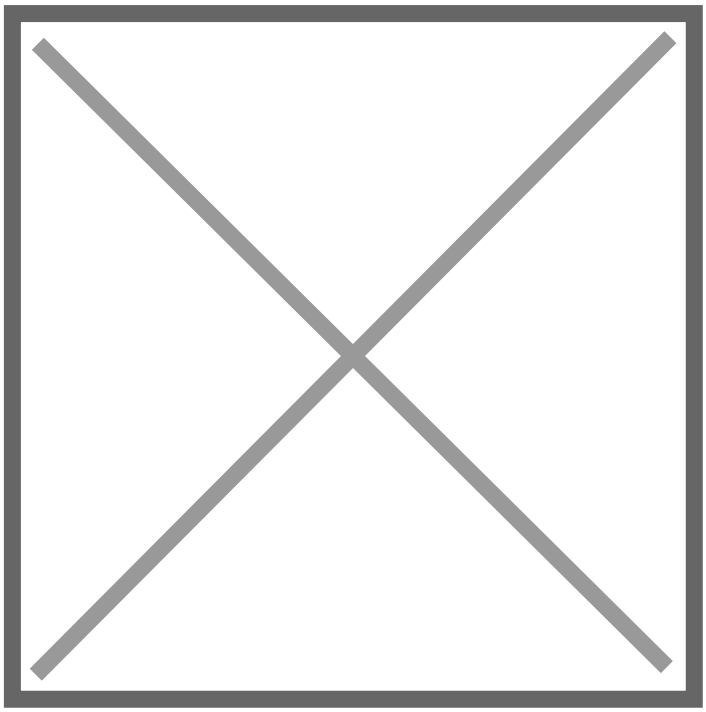

Scientists are preparing wider tests of a fungal-based solution aimed at protecting crops while minimizing environmental impact

Kazakhstan and China have taken a significant step toward more sustainable pest management after successfully completing field trials of a biological control agent that achieved complete mortality against one of Central Asiaâ??s most destructive agricultural pestsâ??the Moroccan locust.

The joint research initiative, conducted by scientists from Kazakhstan and China, tested a biopesticide based on the entomopathogenic fungus Metarhizium anisopliae, a naturally occurring microorganism capable of infecting and killing locust populations without the environmental drawbacks associated with conventional chemical pesticides.

According to Kazakhstanâ??s Ministry of Agriculture, the trials demonstrated strong efficacy under field conditions, reinforcing the potential of biological crop protection technologies as governments seek more environmentally responsible approaches to managing agricultural pests.

A New Tool in the Fight Against Locust Outbreaks

The research forms part of a broader international collaboration focused on developing biological solutions for locust control in transboundary breeding zones that stretch across Central Asia.

The project brought together specialists from the Zhazken Zhiembayev Kazakh Research Institute of Plant Protection and Quarantine and researchers from the Institute of Plant Protection of the Chinese Academy of Agricultural Sciences.

Field trials were conducted on pasturelands in Kazakhstanâ??s Turkestan Region, an area regularly affected by outbreaks of the Moroccan locust (Dociostaurus maroccanus), a migratory pest capable of causing severe damage to crops and grazing lands.

To evaluate the effectiveness of the fungal preparation, researchers placed treated locusts in controlled field cages and monitored mortality rates over several days.

The results were striking.

Initial signs of fungal infection appeared within three days of application. By the fifth day, mortality rates had reached between 70 per cent and 80 per cent, and by the ninth day, all locusts in the treated groups had died.

Reducing Dependence on Chemical Pesticides

The findings come as countries across Central Asia increasingly explore biological alternatives to chemical pest-control programs, which can carry ecological risks when deployed on a large scale.

Researchers said the fungal-based approach offers a promising pathway for reducing pesticide use while maintaining effective control over destructive locust populations.

Unlike conventional insecticides, biological control agents target pests through natural biological processes, potentially minimizing impacts on non-target species and surrounding ecosystems.

Kazakhstanâ??s Ministry of Agriculture said the successful trials underscore the growing role of biological crop protection technologies in sustainable agricultural systems and national food security strategies.

Regional Cooperation Gains Momentum

Locust infestations remain one of the most persistent agricultural threats across Central Asia, where migratory swarms can rapidly cross national borders and devastate crops, pasturelands, and rural livelihoods.

Recognizing the transboundary nature of the challenge, Kazakhstan has expanded cooperation with neighboring countries, including China, Russia, Uzbekistan, and Kyrgyzstan, to improve monitoring, forecasting, and response mechanisms.

Last year, Kazakhstan, Uzbekistan, and Kyrgyzstan agreed to strengthen regional coordination on locust management, reflecting increasing concern over pest outbreaks amid changing climatic conditions.

Next Phase: Scaling Across Climatic Zones

Following the successful field trials, researchers plan to conduct larger-scale evaluations across multiple climatic regions of Kazakhstan to assess the technology's performance under different environmental conditions.

The next stage will also focus on developing practical recommendations for integrating biological control methods into national locust surveillance and response systems.

If successful, the initiative could provide a scalable, lower-impact alternative to chemical spraying and contribute to broader efforts to build climate-resilient and environmentally sustainable agricultural systems across the region.

As governments and researchers search for new tools to safeguard food production, the Kazakhstan-China collaboration highlights how biotechnology and international cooperation are increasingly shaping the future of pest management.