EU-CHINA JOINT ACTION TO INCREASE THE DEVELOPMENT AND ADOPTION OF IPM TOOLS

Locations	China, Europe
Dates	01/12/2022 - 30/11/2026

Summary

The persistent threat of invasive agricultural pests and their chronic re-emergence underlines the importance of Integrated Pest Management (IPM) tools and their implementation. Pest management typically relies largely on chemical pesticides, increasing the risks to humans and wildlife. Despite European Union and Chinese policies promoting the use of IPM, widespread adoption by farmers is limited. This project will utilize existing knowledge and techniques to adapt and optimize future IPM tools and practices. The project will further develop high-potential IPM tools and design cost-effective, environmentally safe IPM packages for economically important crops. Together with partners, CABI will lead the development of a web-based IPM tool performance demonstrator. CABI will also make valuable contributions to the development and efficacy of IPM tools against fall armyworm and develop a biocontrol agent for common ragweed.

The problem

Annually, a high percentage of food crops are lost to plant pests and diseases. Global trade and climate change have contributed to a rise in the prevalence of invasive agricultural pests, diseases and weeds. This has resulted in the chronic re-emergence of specific pests and weeds such as fall armyworm, *Tuta absoluta*

and common ragweed, leading to chemical pesticides being used.

There are growing concerns over the effects of pesticides used in agriculture on the environment, non-target plants and animals, and human health. These concerns have prompted the development of environmentally safe and sustainable pest management strategies, particularly biologically-based IPM approaches including biological controls and agronomic practices.

Progress has been made in creating IPM tools in the past decade. However, despite European Union (EU) and Chinese policies prompting the use of IPM, widespread adoption by farmers has been slowed down by certain barriers. Many available non-chemical IPM tools (biocontrol research, pheromone-based approaches) have not been optimized so they lack reliability or effectiveness; they are sub-optimal when combined in IPM packages because they have not been developed via an integrated approach, or IPM tools are missing for particular key pests, especially new invasive pests or re-emerging pests such as fall armyworm and *Tuta absoluta.*

The EU and China share similar objectives of reducing chemical pesticides via the wider development and implementation of IPM, notably to protect the environment and human health. A joint EU-China approach will make agricultural products safer for domestic consumers while ensuring profitable trade among countries.

What we are doing

This project (ADOPT-IPM) aims to develop, optimize and implement IPM tools and packages. Ultimately, it will aim to reduce the dependence of farmers on conventional chemical pesticides in the EU, China, and associated countries that share similar problems with the same crops and pests.

ADOPT-IPM will focus on key crops (tomato, leafy vegetables, wheat and maize) that are economically important to countries and their farmers in the EU and China.

The main objectives of ADOPT-IPM are to:

- Optimize existing IPM tools and practices for key agricultural pests, diseases and weeds in the key crops
- Develop novel IPM tools considering farmers' and agricultural businesses' priorities, consumers' preferences, and legislation-related issues
- Assess and evaluate the IPM tools optimized or developed as part of the ADOPT-IPM project and create optimized IPM packages that can efficiently incorporate these tools
- Assess and demonstrate integrated tools through field trials, and measure the possibility of adopting IPM packages at farm level in the EU and China
- Disseminate knowledge to key stakeholders and promote the uptake of IPM tools

CABI will carry out the following research activities:

- Improve the efficacy of IPM tools against fall armyworm on maize via acute pest monitoring and improved timing of application and positioning where IPM tools can be effective
- Develop a novel push-pull system for the management of fall armyworm on maize in China
- Develop an integrated biological control approach against an invasive common ragweed in the EU
- Develop a web-based IPM tool performance demonstrator to enable users to design and evaluate their own IPM packages

Results so far

So far, CABI has designed the fieldwork protocol for the fall armyworm model calibration work and assessed fall armyworm distribution in China to optimize field site locations. Experimental designs on laboratory bioassays and semi-field cage tests to assess the feasibility and efficacy of a push-pull crop system against fall armyworm under controlled conditions have also been designed.

Field cage experiments have been conducted along an environmental gradient at six field sites in Central and south-eastern Europe to assess the efficacy of *O. communa* as a biocontrol agent against common ragweed. The results showed that *O. communa* built up high population densities inside the cages in central Slovenia, while population growth was limited at some sites in central and southern Hungary.

Wireframes of the IPM performance demonstrator have also been developed to illustrate user journey and examples of potential outputs from the IPM tool demonstrator.

ADOPT-IPM will likely contribute to the following expected outcomes:

- Reduce the use of pesticides for crops of importance to the EU, China, and associated countries in which dependency on chemical pest management is currently high
- Demonstrate the efficiency of IPM tools being optimized or developed by the project
- Increase on-farm use and implementation of IPM tools
- Develop IPM training courses and toolboxes for knowledge transfer to increase the uptake of integrated pest management practices
- Increase the awareness of IPM tools and packages through communication and dissemination activities

The project website can be found here.

Donors	European Union (EU)
Partners	A consortium of partners including:, Institut National De Recherche Pour L'Agricuture, Imperial College, London, Assimila, Agri New Tech (ANT), Aarhus University (AU), Arcadia International (Arcadia), Wageningen University (WU), Guizhou University (GU), Institute of Plant Protection, Chinese Academy of Agriculture Sciences (IPPCASS)
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