The next generation of pest control is here

A novel technology that makes it possible to produce affordable insect pheromones is allowing farmers to protect field crops against pests in a sustainable way. The technology has been developed under the auspices of the EU-funded PHERA (PHEromones for Row crop Application) project, which pulls together some of the leading players in biological pest control.

PHERA Technical Manager Irina Borodina, who adds: “With pheromones, we can actually intensify agricultural productivity without losing biodiversity.”

Pheromones are used to control pests by preventing them from mating (see Figure 1). Rather than eliminating pests, mating disruption seeks to keep the population of pests below acceptable levels. It’s a tried-and-tested method in speciality crops in vineyards, orchards and greenhouses. Using pheromones in agriculture at large, in the row crops that really make a difference in terms of food security, has been highly desired but so far unattainable due to their high cost.

Pheromones are complex molecules that traditionally have been constructed via chemical synthesis. It is a multi-step process that involves expensive inputs and hazardous wastes. What the PHERA project has achieved is to scale up a whole new technology based on yeast fermentation to produce pheromones at a cost that enables their use in row crops.

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“Our vision is to make pheromones a mainstream crop protection method,” BioPhero Chief Executive Officer Kvislun Ebbensgaard says. “We have developed a technology platform for industrial manufacturing of pheromones in record time, and that is a major step towards using them in row crops, bringing us very close to fulfilling our vision.”

The first pests targeted by the PHERA project include some of the world’s worst pests (fall armyworm, rice stemborers, cotton bollworm and diamondback moth) in some of the world’s most important food and feed crops (maize, rice, sorghum and soybean).

A paradigm shift in pest control

Pests destroy up to 40 per cent of global crop production and cost the global economy over $220 billion, according to the Food and Agriculture Organisation (FAO). Efficient plant protection is, therefore, key to food security. Traditionally, farmers have relied on pesticides to keep pests at bay, but growing concerns about their impact on human health and the environment.

Pheromones play an important role in IPM, where they can be used to either monitor pests, prevent outbreaks through mating disruption, or actively reduce their numbers through attract-and-kill that combines an attractant with an insecticide.

Pheromones are easy to apply

With the advances in precision fermentation, farmers can now use pheromones, either as stand-alone control solutions, as part of IPM programmes or in combination with pesticides to reduce overall chemical consumption or overcome resistance challenges.

However, advances in formulation technologies have been equally important. Pheromones have traditionally been applied manually as simple bait formulations or waxy strips to trap or monitor insects. Today, pheromones can be applied in row crops using conventional sprayers or drones. Pheromone formulations now come as sprays, oils, pastes, gels or granules with slow-release properties and optimised handling and storage attributes.

This work is driven by the application partners of the PHERA project: Noviafrica (Greece), Russel IPM (UK), SEDQ Healthy Crops (Spain) and ISCA Europe (France). These partners are now carrying out field trials in various geographies to evaluate fermented pheromone performance and their novel formulations for field application. They are supported by ongoing life cycle assessments of pheromone production and application carried out by PHERA partner Fraunhofer, Germany.

The PHERA project took off in 2020 on the back of a €6.4 million grant from the Bio-based Industries Joint Undertaking, a public-private partnership between the EU and the Bio-based Industries Consortium set up to advance competitive circular bio-based industries in Europe. The PHERA project is doing just that by developing a technological platform for the commercial production of affordable mating disruption products for safer and more environmentally pest control in agriculture.

Read more: 
https://www.phera.info/ 
https://biophero.com/