



PHERA: A Major Grant from BBI JU Aiming to Commercialize Sustainable Pest Control with Insect Pheromones

Russell IPM is delighted to be part of the PHERA consortium that has won a €6.4 million grant from the EU Horizon 2020 research and innovation programme, aimed at sustainable production and deployment of pheromone using fermentation processes. The grant from the Bio-Based Industries Joint Undertaking (BBI JU), a partnership between the EU and several of Europe's bio-based industries, will help Europe meet its goals for sustainable agriculture.

Using pheromone-based Mating Disruption (MD) to control pest populations is a safe, effective, and sustainable alternative to chemical pesticides. To date, MD uptake has been limited by the cost of pheromone production and has only been developed for high value crops and markets. Cost-effective pheromone production will enable the extension of this technology to staple crops and markets around the world to the benefit of farmers and consumers. Since the project started in March 2020, sufficient quantities of good quality pheromone have already been produced for field trials.

Russell IPM is due to start Mating Disruption trials in 2021 against rice yellow stem borer, *Scirpophaga incertulas*, in rice crops. Rice is the most important crop in the world, eaten daily by nearly half of the world's population. With increased intensification and a higher population to feed, use of pesticide on rice has increased by 400% per acre in some areas over the past 20 years, and pesticide residues in rice have risen accordingly. Yellow rice stem borer is one of the most serious pests of rice in Southeast Asia, so a safe and effective alternative to chemical pesticides for its control will bring immediate benefits to many. Field trials will follow against fall army worm, *Spodoptera frugiperda*, in maize and diamondback moth, *Plutella xylostella*, in cabbage.

"Russell IPM will bring state of the art technology for pheromone formulation and deployment to the project, including microencapsulation for longer-lasting release, biodegradable dispensers, as well as sprayable formulations that can be applied by drone."

Clare Sampson, Technical Director, Russell IPM





The Project:

Agricultural productivity needs to rise by 70% by 2050 to feed a fast-growing population. This challenge is made difficult by the onset of insect pesticide resistance, increased regulatory pressure on crop protection chemicals, and consumer-driven demand for clean nutritious and healthy products.

Pheromone insect controls, however, are safe, effective, affordable, and sustainable alternatives to toxic pesticides. Dispensing a pest insect's sex pheromones into the field disrupts their ability to attract or find mating partners, keeping the pest population numbers low and the crops safe. Crops protected with pheromones have less chemical residue and the natural biodiversity of fields and orchards is preserved.

The mating disruption strategy has been applied successfully for 20 years in specialty crops, such as fruits and berries, and holds enormous potential to expand into major row crops such as maize, rice, cotton, and soybeans. Producing insect pheromones through new fermentation innovations that use renewable raw materials is expected to greatly reduce costs and waste that is now associated with industrial scale pheromone synthesis.

*"Pheromones are the next generation of insect control because they work harmoniously with nature, without the environmental disturbance and pest resistance associated with traditional insecticides. "Bringing these pheromone innovations to row crops is overdue, and the PHERA grant will expedite these needed and sustainable technologies." **Jean Pierre Princen, President, ISCA Europe***

The project aims to scale up pheromone production and application technology and to drive commercialization into major row crops.

*"Mating disruption is a vitally important tool for the management of pest species of economic importance. Growth of this technology has been constrained by the high cost of pheromone active ingredients and difficulty in optimizing the specific formulations of pheromones required for success. BioPhero's breakthrough and novel idea allowing bio- synthesis of pheromone actives will be a paradigm shift in mating disruption technology, allowing affordable crop protection in a wider range of crop, including row crops. With our formulation technology we are excited to be part of this journey." **Dr. Shams Usmani, Head of Pheromone Solutions, Russell IPM***

The pheromones used in PHERA will be produced by fermentation using renewable raw materials. The project thereby directly supports BBI JU's strategic objectives by establishing



a new bio-based business for pheromone-based pest control in row crops, while helping to solve the major societal issue of achieving sustainable agricultural productivity growth.

“At BBI JU we are very proud to fund the PHERA project which aims to develop and commercialise bio-based insect pheromones for Crop protection. Sustainable crop protection is a key challenge that supports the contribution of BBI JU to the EU Green Deal and the need for agricultural productivity to significantly rise by 2050 while keeping biodiversity.” Philippe Mengal, Executive Director, BBI JU

The PHERA grant will be used directly towards two critical steps required for large scale implementation: Scaling up the production of pheromones to production in 100 cubic meter fermentation tanks, and conducting large-scale mating disruption field experiments in row-crops to prove the efficacy of the pheromone formulations offered by the pheromone application companies.

“Pheromone-based pest control is a solution that genuinely works for the greater good of the planet. But good solutions will only become market realities if they are supported by the right players and resources. PHERA and the consortium partners will work directly to address the two essential milestones of making pheromones affordable through large scale biological production and proving the field efficacy of the solutions when applied at large scale.” Kristian Ebbensgaard, CEO, BioPhero

The Consortium:

The PHERA consortium consists of companies specialized in pheromone application: Russell IPM (UK), SEDQ Healthy Crops (Spain), ISCA Europe (France) and Novagric (Greece), as well as in bio-based pheromone production: BioPhero (Denmark). The consortium is completed with scale-up expertise from BPF (Netherlands), and life-cycle assessment capabilities from Fraunhofer (Germany).



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