The Ecosyn Project

The European Network for SME Incecticide Innovation

This paper was originally presented at the Latin American Aerosol Federation (FLADA) World Aerosol Congress & 8th Latin American Congress, Buenos Aires, Argentina.

Ecosyn is a two-year project that was started in October 2013, supported by significant funding from the European Research Council. Its aim is to "develop (through molecular modeling) ecofriendly, cost-effective synergists to overcome insect resistance with the goal of using fewer insecticides to control insect pests with benefit for the environment (ground and water contamination as well as for beneficial insects)."

The aerosol insecticide market has potentially a great deal to gain from the development of the new synergists. Until now, Piperonyl Butoxide (PBO) has been traditionally the number one synergist used in Household Aerosol, Pest Control and Public Hygiene formulations throughout the world. The development of synergists similar to PBO with higher efficacy signifies safer formulations for the consumer and new products for the market.

The availability of innovative, ecofriendly synergists would also create opportunities for extensive applications in agriculture as resistance breakers.

The ultimate goal of the project is to produce ecofriendly synergists for use in formulations with insecticides and pesticides for agriculture, public health and pest control operator (PCO) aerosol applications.

Coordinated by the Italian chemical company Endura SpA and headed by Endura R&D Director, Valerio Borzatta, other members of the European consortium include AgrochemAccess (UK), Ankara Advanced Technologies Investment (Turkey), Babolna Bio (Hungary), Alan Dewar Crop Protection (UK), Università Cattolica del Sacro Cuore (Italy) and Bee Research Institute (Vyzkumny Ustav Vcelarsky, Czech Republic).

The Ecosyn project is part of the European 7th Framework Program for Research & Technological Development (7th FP) and falls under the Treaty of Lisbon. The main objectives of the 7th Framework Program are to:

- Increase R&D activites and intensity with the purpose of generating innovation;
- Stimulate collaboration among industry, universities and research centers;
- Improve the companies' internationalization capabili ties and competitiveness: most European companies are small to medium sized enterprises (SMEs) and this is a way to achieve critical mass;
- Develop proprietary technological know-how;
- Help invention to become innovation.

Regarding this last point, a general problem with innovation is the distinction between invention and innovation. Invention is related to human knowledge while innovation is knowledge that has found a market. However,

The Ecosyn Project kick-off meeting, October 2013

Cosimo Franco
CEO, Endura (Italy)

this simple concept is very difficult to put into practice. Most inventions fail to cross the fragile bridge from invention to innovation due to lack of market analysis, customer interest, financial analysis, etc. This matter seems clear to EU authorities and through this kind of consortium project, they will attempt to help SMEs to be more successful in turning invention into innovation.

Table 1. CRITERIA	SCORE
Scientific and/or Technological Excellence	From 0 to 5
Qulaity and Efficacy of its Implementation and Management	From 0 to 5
Potential Economical Impact and use of Project Results	From 0 to 5
	Max 15

The program reflected all aspects of EU research policy and had a budget of over €55.8 billion ($60.37 billion), of which over €3.9 billion ($4.22 billion) is devoted to SME innovation. It should be noted that SMEs in Europe contribute to two-thirds of the European gross domestic products (GDP), creating 75 million jobs.

The EU 7th FP evaluation criteria for project eligibility are shown in **Table 1.** All participants have to be actively involved in the project chain and a Consortium Agreement among the participants, reporting the property of intellectual

rights of the potential innovation, has to be signed on occasion of the grant agreement.

Table 2 shows the specific role of each participant in the Consortium.

The Ecosyn project consists of nine different work packages:

WP1: Production of esterases and recombined P450 enzymes

WP2: Novel synergists, characterization and interaction with enzymes

WP3: Synthesis of novel synergists

WP4: Laboratory bioassays

WP5: Glasshouse and field trials

WP6: Novel synergists selection for insect resistance

WP7: Development and validation

WP8: Dissemination of the results and knowledge

WP9: Project management

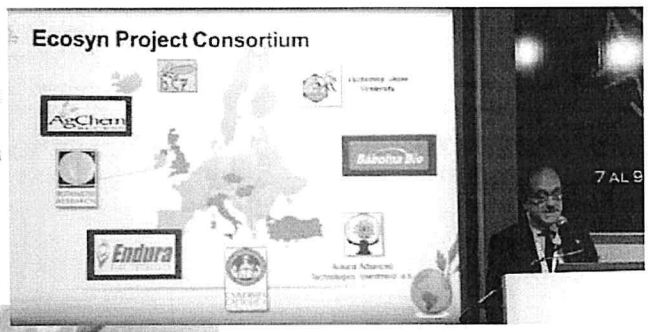
The project can be summarized as follows:

- Around 50 potential novel synergists have been synthesized
- More than 40 potential novel synergists have been tested in vitro
- Twelve potential novel synergists have been tested in vivo
- Five novel synergists appear to have an interesting and promising performance
- Field trials in the UK, Italy and Turkey were planned for 2015 and are underway

Ecosyn received positive feedback during the mid-project evaluation held in Brussels in October 2014. Program Coordinator Dr. Valerio Borzatta reported, "All members of the Consortium are strongly motivated to obtain the maximum results from the Ecosyn project in the spirit of reciprocal support and collaboration. Significant progress has been made in less than one year and field trials are now underway. We trust that these trials can demonstrate that the synergists are able to reduce the enviromental impact of insecticides while increasing the efficacy and using lower doses."

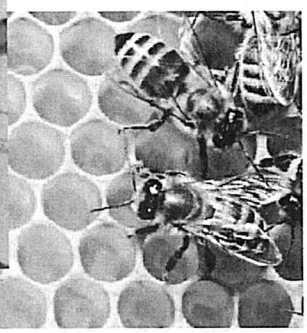
Table 2. COMPANY	ROLE
Endura *Project coordinator*	Manufacture, household trials, sales and Mkt of the novel synergist
Babolna	PCO trials and sales / Mkt of the novel synergist
Agchem	Agriculture sales / Mkt of the novel synergist
Dewar Crop Protection	Novel synergist crop trials
Ankara Advanced Tech.	Novel synergist crop trials
Vyzkumny Ustav	Novel synergist trials on beneficial (bees)
Cattolica University	Novel synergist lab trials
Rothamsted Research	Novel synergist molecular modelling and in vitro tests

A source from within the Food & Agriculture Organization of the United Nations (FAO) reported that, "Excessive use of pesticides also exposes farmers to serious health risks and has negative consequences for the environment and sometimes for crop yields. Consumers have grown increasingly concerned about pesticide residue in food. Rapid urbanization has resulted in the expansion of urban and peri-urban horticulture, where pesticide use is more evident and its overuse even less acceptable to the public."



Cosimo Franco, CEO Endura, presents the Ecosyn Project at the 8th Latin American Aerosol Congress held in Buenos Aires in October 2014.

Trial plots at Hatfield Heath (UK) are infested by pollen beetles such as these above.



Bees: beneficial insects at risk.

Another important factor being evaluated in the field trials is the impact of synergists on bees and other beneficial insects. In fact, the bee population in Europe has decreased in recent years due to various environmental and non-environmental factors, such as the possible indiscriminant over-use of insecticides. Therefore, the important objective of decreasing the doses of insecticides will be to contribute to minimizing their effect on beneficial insects such as bees. SPRAY

More information, visit ecosyn.eu.