

Participation of the Forest Research Institute, Poland in EU – Project – BIOCOTES – New biological control products for sustainable farming and forestry

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Since 1 December, 2013, the Department of Forest Protection, the Forest Research Institute, Warsaw, Poland, has been participating in the European Union project BIOCOTES: Biological control manufacturers in Europe develop novel biological control products to support the implementation of integrated pest management (IPM) in agriculture and forestry. The project is co-financed by the EU within 7th Framework Programme for Research and Technological Development (KBBE-2013.1.2-05).

In the nineties of the last century, in the EU member states, there were implemented new law regulations which considerably changed the principles concerning the placing of plant protection products on the market (Council Directive 91/414/EEC), among others through putting high demands on pesticide producers with reference to impact of their products on the health of humans and animals as well as on natural environment. This resulted in ever-increasing costs of plant protection product registration, and consequently led to elimination of certain products from the market, especially those produced by small- or medium-sized enterprises, by and large not unable to afford complicated and costly registration procedures. In 2009, there were adopted two legal acts, which have so far had the biggest influence on the extent and form of pesticide use:

– DIRECTIVE 2009/128/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides.

– REGULATION (EC) No 1107/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC.

Under these acts, since 1 January, 2014, authorized users of plant protection products have been obliged to apply the principles of integrated pest management, which comprise all available means of plant protection, with priority given to the application of biological methods including the use of plant pest natural enemies.

Consequently, during the last 20 years, there have been eliminated many biological pesticides from the EU market on the one hand, and on the other – the principles of integrated pest management have been implemented and biological formulations have been promoted. BIOCOTES represents the attempt to resolve this paradox, since the main goal of the project is to develop at its end (in November 2017) eleven new biological preparations for application in control of harmful organisms in European agriculture, horticulture and forestry. Only the preparations which showed high biological activity in earlier assessments carried out both under laboratory and field conditions have been included in the project. For the most part, the preparations to be further tested are based on viruses, bacteria, fungi and nematodes with high insecticidal activities which predispose these organisms to use in plant protection practice.

Within the framework of BIOCOTES, there will be tested virus and fungus plant protection products formu-

lated to reduce population numbers of insects causing damage in tomato and potato cultivation, such as: *Tuta absoluta*, *Tecia solanivora* and *Phthorimaea operculella*. Furthermore, there will be assessed efficacy of virus preparations in control of gypsy moth *Lymantria dispar* feeding on many species of deciduous trees both in forests and orchards. BIOCOMES research will allow determining and evaluating optimal conditions for the use of preparations formulated for reducing fungal infections in vegetable cultivation, in orchards as well as in forestry. Among others, there will be tested efficiency of bacteria used in cabbage seed treatment and for control of brown rot of stone fruits (*Bacillus subtilis*). Efficacy of preparations with fungi of the genus *Penicillium* as well as fungi applied for control of development of cereal powdery mildew will be assessed. One of the most important elements of BIOCOMES is research on applying fungi and bacteria for the protection of forest nurseries against damping-off affecting many tree species with the use microorganisms such as: *Trichoderma harzianum*, *Serratia plymuthica* and *Paenibacillus polymyxa*. Apart from viruses, bacteria and fungi, there will be tested entomopathogenic nematode efficiency in control of pine weevil *Hylobius abietis* – one of the most important pests in Europe causing considerable economic losses in afforested areas. At the same time, the project encompasses studies on possibilities of using parasitoids in control of cabbage moth *Mamestra brassicae* larvae and aphids in orchards.

All the project tasks are arranged in 14 Work Packages (WP), of which twelve are connected with meeting research objectives, and the remaining two concern project management and promotion.

The project consortium consists of 27 partners from 14 countries. Scientific units are represented by 14 partners with long-term experience in the use of plant protection products. Other 13 partners are the producers representing 3 leading in Europe companies producing bio-preparations as well as 10 European small- and medium- sized biological control enterprises. Hence, the consortium linking research objectives with practical application ensures to a high degree the project's success in enriching an assortment of biological pesticides applicable in integrated pest management.

The total budget of BIOCOMES is 12 million EURO, of which 75% comes from the European Union funds. Dr. Jürgen Köhl from Wageningen UR, the Netherlands, is the coordinator of the project.

The Forest Research Institute (FRI), Poland is one of BIOCOMES partners and participates in all the works included in WP 3: *Biological Control Agents (BCAs) for control of forest pests and diseases*, which comprises the following four tasks:

Task 3.1. Production of in vivo nucleopolyhedrovirus of gypsy moth *L. dispar* (LdMNPV):

- collection of different virus isolates,
- testing of LdMNPV isolates: bioassay of the isolates on *L. dispar*, selection of the most appropriate isolate for BCA,
- quality control of LdMNPV product: laboratory bioassays on insects and semi field trials for efficacy testing.

Task 3.2. Field testing LdMNPV for *Lymantria dispar* control on deciduous trees:

- field trials in stands of oak (*Quercus* spp.) or in groups of trees outside forests
- (mainly *Tilia cordata*) threatened by *Lymantria dispar*.
- molecular identification of wild and tested isolates of LdMNPV

Task 3.3 Entomopathogenic nematodes (EPNs) for pine weevil *Hylobius abietis* control in reforestation:

- small and large-scale field trials with nematode-treated and untreated stumps,
- laboratory assessment of the role and interactions of different factors (soil organic matter, nematode species) in field trials.

Task 3.4. Disease control in forest nurseries:

- greenhouse experiments on the potential of the antagonists (*Serratia plymuthica*, *Paenibacillus polymyxa* and *Trichoderma harzianum*) to control the relevant diseases (*Phytophthora plurivora*, *Fusarium oxysporum*, *Rhizoctonia solani*) of important tree species: beech, oak and Scots pine,
- the use of antagonists in nurseries with natural infestation by the pathogens.

Twelve employees of the Forest research Institute, Poland (9 scientists and 3 technicians) will realize the above tasks.

More information about the project is available at www.biocomes.eu