Develop of environmentally safety entomopathogens for the biological control in Georgia

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Description:

Bioinsecticides is biological control means based on the natural enemies (predators, microorganisms, nematodes). They are absolutely safe for men and environment and offer a desired integrated pest management (IPM) - compatible alternative to the broad-spectrum unselective, environmentally unacceptable chemical pesticides, which cause environmental pollution, change biodiversity, do much damage to ecology, influenced on Climate change and have a detrimental effect on the human health (Weizer, Briggss, 1970; Tanada, Kaya, 1993).

At present the biological control as a pest control technology is becoming more desirable. There is take important place in Biosecurity and in Food safety strategy. Biological formulations on basis of entomopathogenic fungi (EPF) and entomoparasitic nematodes (EPN), are as one of the effective means for the protected of agricultural crops and forest plants from the harmful insects and successfully were used in practices (Butt et al., 2001; Inglis et al., 2001; Glazer, Lewis, 2001).

Modernization of mass-production technology, use of the new specialized species of fungi and utilize cultivation process of EPN are the actual problems for modern IPM and biological control around the world including Republic of Georgia.

At present Georgia does not produce the microbial control means and needs its own production, as import from foreign countries deals with high costs. The development of local production industry gives the possibility to reduce the costs dealing with the import of the analogical bioinsecticedes, and use of chemical pesticides will reduce as well. This gives possibility to provide the preservation of biodiversity, environmental balance and ecological pure agricultural products which is very important social problem

Innovative Aspect and Main Advantages:

The develop mass-production technology and local produce industry for the bioformulation products is novelty for Georgia. A high action of biopesticides consists of the following effects:

- Control pests using safe biological method without chemical pollution of the environment

Will be highly superior on ecologically sensitive forests and agriculture ecosystem in the recreational and health-resort zones, on public properties, school grounds and city's; reduce the wood losses and CO_2 emission;

- Development of inexpensive mass-production technology of EPF and EPN; .Putting the new bioformulation to against harmful insects into agricultural practice is directed to save the environment from contamination and to lower the expenses required for pest control, which is of great important for farming.

Currently we are develop technology mass-production of entomopatogenic fungi EPF commercially available *Beauveria bassiana* (Fig.1, A) and cultivation of entomopathogenic nematodes EPN (*Steinernematidae*) on local inexpensive substrate in laboratory (Fig.1, B).

A (EPF) **B (** EPN)

Fig.1.Bioformulations of EPF and EPN

Main advantage of this mass-production technology is that local selective strains of EPFs *Beauveria bassiana* and local inexpensive substrate were used.

The objective of this study was to evaluate the conidia production of strain of *Beauveria bassiana* on millet growing media different water volumes (substrate: water 1:0.25; 1:0.5; 1:0.75 and 1:1). The results showed that there were significant differences in conidia production among at the water volume of cooking. Conidia production of *B. bassiana* was significantly higher 3.4 x10^7 /g millet at 1:1 water ration and spore viability achieve 90.3%. Although, higher (94.7%) spore viability was observed too in variants 1:0.25 (Burjanadze, 2009).

Also, using of silkworm (*Bombyx mori*) larvae, pupa and cocoon as a feeding media for EPNs cultivation is a novelty items, that during cultivation the number of obtained nematodes

per larva and pupa (400-450 thousand) are greatly exceeds then the number of obtained its on any other media (Kakulia et al., 2000**;** Kakulia et al 2001).

The experiment on cultivation of nematodes in the silkworm cocoon was within the scope of special interest. The suspension was injected into the side of the cocoon and the syringe reached the pupa. During this experiment series on cocoons a double portion of nematodes (≈500 IJ/ml) was injected. In order to prevent penetration of harmful microflora into the cocoon the site of injection was glued up with plaster. On the seventh day dissection of the cocoons as well as estimation of the degree of invasion was started. On the 7-8-9th days from the beginning of the experiment the invasion couldn't reach the required level as it was very weak, but on the 11th day approximately 500.000 nematodes were accumulated in each cocoon (nematodes were recounted after putting them through a sieve with a cell of 0, 25 ml and after washing them).

The main point of the invasion of the pupa inside the cocoon is that the cocoon is a convenient container which makes it possible to transport live invasive material for performing further experiments.

A further novelty, which needs further research, is the combination of EPF and EPNs with different biological agents (bacterial preparations) of regulates a number of insect pests. This might become new means for biological plant protection.

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