RESEARCH REGARDING COLORADO BEETLE CONTROL (*LEPTINOTARSA DECEMLINEATA* Say.) AT POTATOES CROPS THROUGH UNCONVENTIONAL METHODS, IN THE ARDS TURDA CLIMATIC CONDITIONS

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Abstract: *Colorado potato beetle (Leptinotarsa decemlineata) is and will remain the main pest of potato crops. It seeks to combat it, more so as enable transmission of the virus X (PVC) and could reach total causing damage, in an attack early harvest losses are possible in 50 to 80% while a later attack, they can reach up to 30%. În currently there are different methods based on biological products, various chemicals (pheromones) that causes certain behaviors (in this case aggregation) with efficiency superior, clean, reducing the quantities of toxic chemicals in the cultivation of potatoes, there is not resistance (as happens with insecticides), and thus do not affect consumer health tubers of potatoes. The paper presents results obtained at SCDA Turda during 2006-2008, regarding the biotechnical use of unconventional methods of control or limitation under ETD (Economic Thresholds for Pest) of the Colorado beetle (Leptinotarsa decemlineata Say.) from the potato crop. This method was tested based on the use of compositions attraction of mentioned pest, obtained at the Institute of Chemistry Cluj-Napoca, which were used as traps for beetle aggregation pheromone in Colorado; two variants were synthesized pheromone of aggregation, V1-PEG and V2 -ExFr. Adults to follow this pest abundance and frequency of attack (%) in each variant. Colorado beetle attack frequency (Leptinotarsa decemlineata) in the potato crop in terms of the ARDS Turda was 30-40%, and larval abundance of 20-30 larvae / plant. Between variants used, option 1-PEG was more effective than PEG-ExFr var.2, adult abundance during June 10 to September 10 was higher in version 1, a total of 209 adults captured than in version 2, only 57 adults during mentioned. Finally, in terms of the ARDS Turda, version 1-PEG was more effective than PEG-ExFr var.2. These aggregation pheromones are effective and can be introduced in the management of integrated control in potato.*

***Key words*:** *biotechnics method, aggregation pheromone of the Colorado beetle, population density, abundance of adult .*

INTRODUCTION

Trade in plant products between different countries contributed to the rapid spread of diseases, pests and other pests of crop plants. So no potato crop was not protected and it appears that a number of diseases and pests known to many of us only in the literature are reported in different potato producing areas (DONESCU, 2005; DONESCU et al., 2006). The diseases present in potato crops, foliar diseases in potato crops are dominant: hand (*Phythophthora infestans*) and alternarioza (*Alternaria porri* and *A.tenuis*), and the diseases of tubers dry rot caused by *Fusarium* species; were reported and attacks by: *Phythophthora erythoseptica,Pythium*spp.,*Rizoctoniasolani* (MORAR, 1999; BOŢOMAN ET AL., 2005; DONESCU, 2005).

The most *important pests of potatoes are: wire worms (Agriotes lineatus), white worms (Melolontha melolontha-* Carabus of May), Colorado potato beetle (*Leptinotarsa decemlineata*), aphids (*Myzus persicae* and *Macrosiphon solani*) Potato Cyst (*Ditylenchus dipsaci, D. destructor),* golden nematode of potatoes (*Heterodera rostochiensis*) wich is a quarantine pest (CHIRU ET AL., 2005; DONESCU, 2005; MORAR, 2003, 2005).

Colorado beetle (*Leptinotarsa decemlineata*) is and will remain the main pest of potato crops. It seeks to combat it, more so as enable transmission of the virus X (PVC), and could reach causing total damage, so if an attack early harvest losses are possible from 50 to 80% while a later attack, it can reach 30%. If before there was talk of losses only when more than 20-30% of green mass was affected, today are recorded losses and 10% green mass harmful destruction. This pest developed resistance to a wide range of insecticides, which amplification resulted in management studies, based on a better and more thorough understanding of the ecology pest. In present there are different methods based on biological products, various chemicals (pheromones) that determine some behaviors (in this case aggregation) with higher efficiency, cleaner, reducing the quantities of chemicals in the potatoes crops, resistance is not (as happens with insecticides), and thus do not affect consumer health tubers of potatoes.

Aspects of the biology of Colorado beetle (*Leptinotarsa decemlineata* Say.)

This pest attacks potato crops and the addition of tomatoes, eggplant; winters in the soil as an adult; beetles become active in spring; females lay eggs orange (between 200-1500) in groups leaves behind a period of 4 -5 weeks; larvae hatch from eggs after 4-9 days; larva stages lasts 2-3 weeks and then hiding in earth for transformation in pupa; I generation adults appear starting with the 3rd decade of June; July-August generation II; there are two- to three generations in each year; through the stages of insect from egg to adult in less than 21 days.

Pheromonal some information on the aggregation of the Colorado beetle (*Leptinotarsa decemlineata* Say.)

Aggregation pheromones (S) -3.7-dimethyl-2-oxo-6-octen-1,3-diol) that the pest was first reported in 2002 (Dickens ,J C, et al., 2002**)** (figure 1). This pheromone was obtained by asymmetric synthesis based on chemical reactions:
-epoxidarea Sharpless asymmetric-key reaction to it is synthesis;
-is used t-butyl hidroperoxidul izopropoxidul titanium diethyl tartrate in the presence of optically-active.

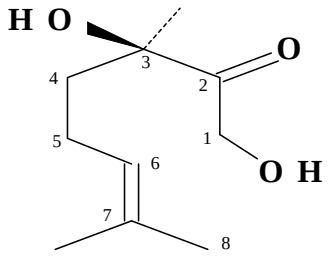

Figure 1 Aggregation pheromonal of the Colorado beetle (*Leptinotarsa decemlineata* Say.)

MATERIAL AND METHOD

Research on Agricultural Development Station Turda to watch the Colorado beetle (*Leptinotarsa decemlineata*), between 2006 to 2008, using pheromone traps (RO) Institute of Chemistry Cluj-Napoca, in two variants. Location of traps was performed on the surface of 1 ha of potatoes, at distances of 20 m in June-July period of years specified. To pursuing the development of both generations of this pest.

Observations were conducted from June and until you end the first decade of September, referring to the abundance of adult plants and the frequency of attack plants. Dynamic readings were made at 4-5 days to closely monitor adult emergence, both generations. The two options were:

-Variant 1-PEG: bait - 10 mg of geraniol epoxide, in a jar: alcoholic extract of leaves of potato EtOH diluted with 5 mg of 7-methyl-nonan-1-of,2 mg Linalool;

-Variant 2 - ExFr: bait contains: 5 mg (S) -1 in a jar: alcoholic extract of leaves of potato, dilution with 5 mg PEG-2-phenyl ethanol.

Bait was put on rubber stoppers.

RESULTS AND DISCUSSIONS

In terms of the Agricultural Research Development Station Turda the center-west of Transylvania, during that period, the Colorado beetle introduced two generations: the maximum flight of the first generation adults was recorded in the second decade of June, while the second generation was registered in the first decade of August, in both types of aggregation pheromone, including control variant, differing only in the number of adults registered pheromone traps used.

Thus aiming at adult abundance of Colorado potato beetle (*Leptinotarsa decemlineata*) in pheromone traps in version V1-PEG and V2 -ExFr compared with control variant, from June to September from 2006 to 2008, it was observed that the average number sign in adult V1-PEG variant was significantly higher compared with control variant and V2-ExFr, in late July and early August had registered the highest number of adults (30 adults) compared with control variant (15 adults) and of variant V2-ExFr (12 adults) (figure 2).

The same variants were performed on the frequency of observations and plants attacked by this pest, with the following results: a significant reduction in attack frequency was recorded in V1-PEG variant (10%) compared with control variant (40%); and V2-ExFr variant, the attack rate was 25% compared with control variant (40%) was noted, however, V1- PEG-variant, the most significant reduction was detected (figure 3).

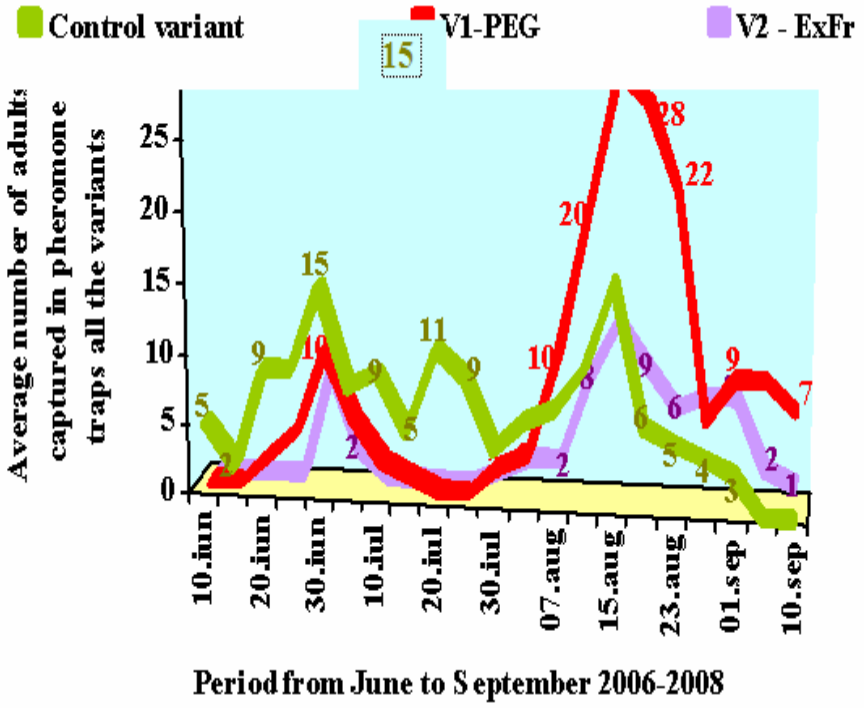

Figure 2 Abundance of adult Colorado beetle (*Leptinotarsa decemlineata* Say.*)* in pheromone traps, variant V1-PEG and V2 -ExFr compared with control variant, 2006-2008, ARDS Turda

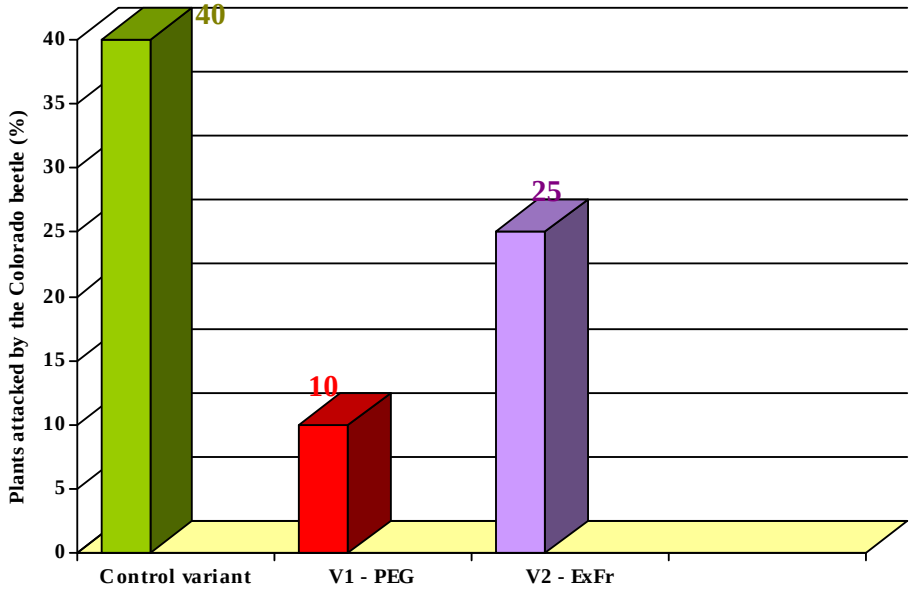

Figure 3 Frequency of plants attacked by the Colorado beetle (*Leptinotarsa decemlineata* Say.), 2006-2008, ARDS Turda

CONCLUSIONS

• The potato crop in 2006-2008, in Transylvania, it was reported attack wire worms (*Agriotes* spp) in a proportion up to 25%, with a density of 1-4 larvae per square meter.
• Then, it was reported the presence of vegetable garden pest (*Amathes c-nigrum*) with an attack rate of 6-10% and a density of 2-4 larvae per square meter.

• Present in this crop was the Colorado beetle (*Leptinotarsa decemlineata*) with a 30-40% attack and 20 to 30 larvae/plant.

• In Transylvania, said the pest has two generations, first registered in June II decade and the second generation in August I decade.

• ETD (Economic Thresholds for Pest) is 5 adulti/10 plants bloom or 20 larvae / pl., 5-8% frequency of attack.

• Adult abundance during June 10 to September 10 was higher in variant 1, (in total 209 adults captured) than in version 2, only 57 adults during mentioned.

• In terms of the ARDS Turda variant-1 PEG was more effective than var.2-ExFr (209adults vs.57).

• These chemicals causes certain behaviors (in this case aggregation), which entitles us to use them in a mass strategy against Colorado beetles.

• To reduce the population density of Colorado potato beetle (*Leptinotarsa decemlineata*) under the Economic Thresholds for Pest (ETD), provided from Transilvania, biotechnics can use this method, thus reducing chemical treatments necessary to control pest and thereby protecting wildlife is so useful.

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