

Chemical possibilities of *Cydalima perspectalis* Walk. (Lepidoptera: Crambidae) control

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Abstract *Cydalima perspectalis* Walk. is the most dangerous defoliator of box trees in Romania. The pest is new in our region, strong defoliation can have as effect drying of host plants, don't have much natural enemies and its spread in all country. From that reasons it is necessary to establish possibilities of control. From all complexes of plant protection measures, in case of strong defoliation, chemical control can have good effect to decrease the caterpillar level on host plants. We consider in our study different active ingredients of insecticides: deltametrin 250 g/kg (Decis 25 WG); lambda - cihalotrin 50 g/l (Karate Zeon); thiametoxam 25% (Actara 25 WG); tiacloprid 480 g/l (Calypso 480 SC) and imidacloprid 75 g/l + deltametrin 10 g/l (Confidor Energy).

Key words

Cydalima perspectalis, chemical control, *Buxus sempervirens*, Romania

In last years *C. perspectalis* have a very fast spreading in Europe because the pest found here very good climatic conditions to multiply. The pest have few synonyms: *Diaphania perspectalis* Walk., *Glyphodes perspectalis* Walk., *Palpita perspectalis* Walk., *Phakellura perspectalis* Walk.. Beginning with Germany in 2007 (Krüger, 2008), the pest extend the spread area year by year, being recorded for the first time in Switzerland (Billen, 2007), Holland (Muus *et al.*, 2009), England (Mitchell, 2009), France (Feldtrauer *et al.*, 2009), Austria (Rodeland, 2009), Liechtenstein (Slamka, 2010), Belgium (Casteels *et al.*, 2011), Italy (Biondi, 2010), Romania (Iamandei, 2010 and Szekely *et al.*, 2011), Hungary (Sáfián and Horváth, 2011), Czech Republic (Šumpich, 2011), Turkey (Hizal *et al.*, 2012), Slovenia (Seljak, 2012), Croatia (Matošević, 2013), Slovakia (Pastorális *et al.*, 2013), Denmark (Hobern, 2013), Spain (Pérez-Otero *et al.*, 2014), Montenegro and Serbia (Ostojić *et al.*, 2015), and in Greece (Strachinis *et al.*, 2015). The aim of our study is to test different insecticide active ingredients to control caterpillars of dangerous pest *C. perspectalis* and to appreciate the efficacy of them.

Material and Method

Our research was developed in year 2015 in a park from Timisoara (West Romania), close to Green Forest of the city (45°46'46.18"N; 21°16'14.30"E). For our purpose we chosen 5 different box trees placed one after another at short distance. Every tree had around 1.5 m in diameter and 1.3 m height (figure 2). The

infestation level with larvae at the moment of spraying was very high and the larval stage was L₂-L₃. To apply the insecticides we use a back-pack sprayer. The products take in consideration were: deltametrin 250 g/kg (Decis 25 WG, 0.003%); lambda - cihalotrin 50 g/l (Karate Zeon, 0.015%); thiametoxam 25% (Actara 25 WG, 0.01%); tiacloprid 480 g/l (Calypso 480 SC, 0.02%) and imidacloprid 75 g/l + deltametrin 10 g/l (Confidor Energy, 0.06%). To increase de efficacy of the products in all water solutions was included an adjuvant (Siltim, 0.1%). We mention that these products are not registered to be used in control of *C. perspectalis* pest. Evaluation of efficacy was done at 3, 7, 14 and 21 days after treatment. On every established box tree the samples of twigs (4 pieces from the base of box tree, 4 pieces from the middle and 4 pieces from the top) were analyzed by the point of view of death or live caterpillars. For statistical analysis of results was applied χ^2 test and to evaluate the efficacy of treatments was applied the Abbot formula.

Results and Discussions

In all period 612 caterpillars were observed (figure 2). Applying the χ^2 test for $\alpha = 5\%$, the value of χ^2 was 9.49. Analyzing of our results it can be observed that at 3 days after application and at 21 days after application products had significant differences between, and at 7 respectively at 14 days after application the insecticides had the same effect. At the beginning piretroids as deltametrin 250 g/kg (Decis 25 WG) and lambda - cihalotrin 50 g/l (Karate Zeon)

register the best effects on *C. perspectalis* caterpillars and in opposite to the end of observed period when tiacloprid 480 g/l (Calypso 480 SC) and imidacloprid

75 g/l + deltametrin 10 g/l (Confidor Energy) show best effect (figure 1).

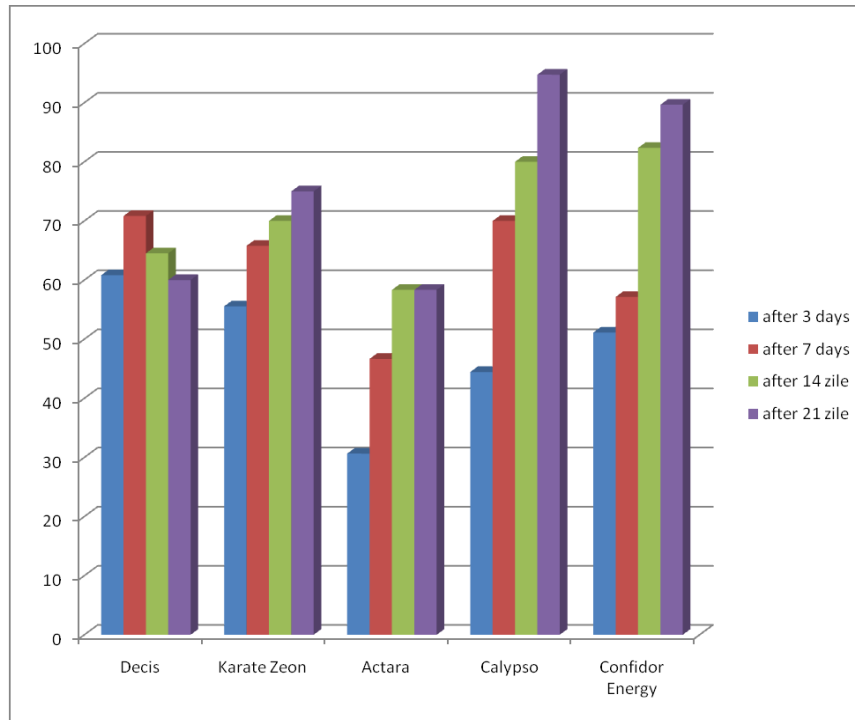


Fig.1. Efficacy of different insecticides on *C. perspectalis* caterpillars

Active ingredient deltametrin 250 g/kg (Decis 25 WG) have the maximum caterpillar control effect at 7 days after application, lambda - cihalotrin 50 g/l (Karate Zeon, 0.015%) at 21 days after application, thiametoxam 25% (Actara 25 WG, 0.01%) at 14 days after application, tiacloprid 480 g/l (Calypso 480 SC) and imidacloprid 75 g/l + deltametrin 10 g/l (Confidor Energy) at 21 days after application (figure 1).

In Timis county this pest could be found in majority of localities and the level of damages were generally low to middle (Fora and Posta, 2015). In our region adults can be found in flight in July and August and lasts 36 days (Fora *et al.*, 2016) and can be observed both color form of the adults (figure 2). The brown color form represents generally less than 10% form entire population.

In Europe in this moment cannot be registered natural enemies for *C. perspectalis* (Nacambo *et al.*, 2013), even birds neither attacked pest caterpillars

because they have a toxic alkaloids content from their host-plant (Leuthardt *et al.*, 2013). In Europe larval parasitism was less than 1% and represented by a single tachinid parasitoid, *Pseudoperichaeta nigrolineata* Walk. while no egg or pupal parasitoids were found (Nacambo, 2012).

Today, besides chemical control of caterpillars, a possibility to control *C. perspectalis* is *Bacillus thuringiensis* preparations (Korycinska and Eyre, 2011). Other promising investigations are with application of *Trichogramma* (Zimmermann *et al.*, 2009) and entomopathogenic nematodes (Choo *et al.*, 1991). Laboratory experiments have indicated the susceptibility of *C. perspectalis* larvae to baculovirus *Anagrapha falcifera* nucleopolyhedrovirus (AnfaNPV) as a new opportunity to control this pest (ROSE *et al.*, 2013). The possibilities of control the caterpillars of *C. perspectalis* are not so many in this moment that underlines the necessity to search them in future.



Fig.2. *C. perspectalis*: Larva (up left); Damage on host plant (up right); Adult – normal color (down left); Adult – brown color (down right).
(Photo: Fora Ciprian George)

Conclusions

Experimental results obtained in our products test let us to formulate next conclusions:

- all products show good effect on *C. perspectalis* caterpillars control;
- the best efficacy had tiaclorid 480 g/l (Calypso 480 SC) and lambda - cihalotrin 50 g/l (Karate Zeon);
- because the mechanisms of action of this products are different for practice can be recommended to mix them to increase the efficacy against pest caterpillars;
- to increase the efficacy of insecticides in case of box tree moth control using of adjuvant in water solution is mandatory.

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