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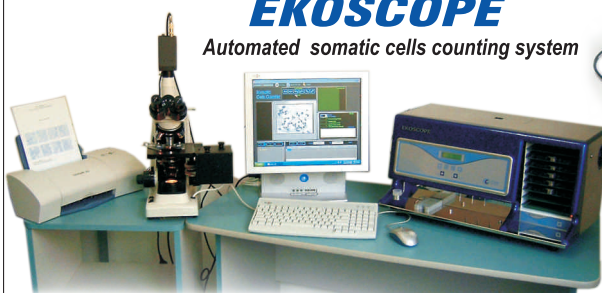
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Plant protection means against Oilseed rape pests

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Abstract. Oilseed rape, together with its industrial, biological and agricultural advantages, appears as a good host plant to a lot of harmful insects. They appear often as a calamity and lead to considerable damages. Thus, the aim of the present investigation is to approve the influence of some pest control chemicals against cabbage bugs -*Eurydema ornata* L. and pollen beetles - *Meligethes aeneus* F. We carried out the investigation in 2004/2005. Each of the chemicals was used in three different concentrations in order to determine the concentration dependency effect. The mortality rate was calculated by the Berim's formula. Based on the results it was established that Vaztak 10 EK in concentration 0.03% could be recommended as a preparation with multipurpose effects against pollen beetles - *Meligethes aeneus* F. and cabbage bugs – *Eurydema ornata* L.

Keywords: Vaztak 10 EK, Decis 2.5 EK, pollen beetle, cabbage bug, oil seed rape.

Introduction

During the period of vegetation oilseed rape is attacked by a lot of pests. The most important of them in Bulgaria are pollen beetles and cabbage bugs attacking leaves as well blossoms in bloom. Almost in all regions of the world where oilseed rape is cultivated problems exist with pests, attacking the crop during fluorescence (Hansen, 2003). A leading role in this respect is played by pollen beetles. In their works Cool et al. (1998) determine pollen beetles as an economically important pest. They found that the highest yield was received when spraying was done in the "green bud" stage at a density of 0.5-1.0 beetles per plant. Oilseed rape is a host plant of cruciferous bugs. The monitoring of the pests' number demands search of suitable means for pest control. (Alford et al., 2003). In Bulgaria Kontev (2001) reported about pest species of genus *Eurydema* on oilseed rape in butonization and flowering stage. In May 2003 oilseed rape has become a major area of interest because of its potential to be used for biofuel production, and then the European Commission published a Directive on the promotion of biofuels and other renewable sources in transport (Directive (EC) 30/2003).

According to this directive, 5.75% of the energy content of all petrol and diesel for transport purposes marketed in the EU Member States must consist of biofuels and other renewable fuels until 31.12. 2010. The EU produces about one third of world production of oilseed rape. The purpose of this work is to evaluate the economic effects of Vaztak 10 EK and Decis 2.5 EK preparations on pollen beetle and cabbage bug mortality.

Material and methods

In this investigation we used preparations with short quarantine terms such as Decis 2.5 EK and Vaztak 10 EK. Each preparation was used in three concentrations – 0.02%, 0.03% and 0.04% in

order to determine the concentration dependency effect. In the preparations under laboratory conditions 50 adult insects were put under observation on three occasions.

Oilseed rape leaves were put in sterile dishes and sprayed with the working concentration of the corresponding preparation. The readings were made on the 1st, 3rd and 5th day after treatment. The mortality was calculated through the Berim's formula (Derron, 2007; Hansen, 2003).

For easier assessment of the economic viability of insecticides K - coefficient of profitability was introduced, showing how many times a preparation is economically more viable than others. The trading price of insecticides was formed at a currency rate: 1 € = 1.95 lv.

The experimental data were analysed by ANOVA and the differences were compared by Least Significant Difference (LSD) test ($p < 0.05$), $n = 3$.

Results and discussion

The data concerning the effects of Decis 2.5 EK (Deltamethrin 25 g/l) and 10 Vaztak EK (Alfamestrin 100 g/l) preparations used in three concentrations against pollen beetles - *Meligethes aeneus* F. are presented in the current study (Table 1). It is evident that both insecticides with concentration of 0.04% on the 3rd and 5th day after starting treatment show high toxicity that is statistically unclear. Mortality at this concentration is the highest. The other variants have statistically proven differences. The toxicity is the lowest on the first day after treatment at a concentration of 0.02%. On the third day of treatment Vaztak 10 EK preparation used in dosage with 0.03 percent and 0.04 percent guarantee 100% mortality.

Decis 2.5 EK preparations in all concentrations show statistically proven toxicity difference with the exception of variations in concentrations of 0.02% and 0.03% on 5th day after treatment, in which case statistical processing demonstrated

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unconfirmed differences in toxicity. Maximum mortality was recorded at 0.04% concentrations of valsartan.

Table 2 shows the effects of Decis 2.5 EK (Deltamethrin 25 g/l) and 10 Vaztak EK (Alfametrin 100 g/l) preparations used in three concentrations against cabbage bugs. Cabbage bugs demonstrated less initial susceptibility to Decis 2.5 EK toxicity. When using the preparation in three concentrations there was straightforward relationship between the preparation concentration and mortality of bugs. Using Vaztak 10 EK in concentration 0.03% and 0.04% on the 3rd and 5th day after treatment. the toxicity was statistically unproven. and in all other options, some differences were shown.

The prices of insecticide in 1 litre concentrations - 0.02, 0.03 and 0.04 percent are presented in Table 3. The profitability ratio

shows that we can recommend Vaztak 10 EK with 0.03% dosage as a cost-effective preparation of combined action against the enemies of Oilseed rape. Mrowzynski et al. (1995) also recommended the preparation Vaztak 10 EK, as more effective for simultaneous combat against the enemies of Oilseed rape.

Only limited information is available in literature about damages on the yield of oilseed rape caused by pests. According to FAO (2007) the yield losses caused by oilseed rape pests vary from 4 to 12% According to data from Demont et al. (2004) the average loss in Germany was 8%. Statistical models were developed by Hurley et al. (2004) in which the losses reach 40 percent, as said by them, everything depending on the time and manner of conducting chemical pest control.

Table 1. Assessment of the effects of Vaztak 10 EK and Decis 2.5 EK preparations against pollen beetle.

Decis 2.5 EK				Vaztak 10 EK			
Concentration	Mean	Days	Mortality	Concentration	Mean	Days	Mortality
0.02%	30.56 ^c	1	22.67 ^h	0.02%	35.55 ^a	1	25.67 ^a
			33.33 ^e				39.67 ^c
			35.67 ^d				41.33 ^b
0.03%	34.56 ^b	3	28.33 ^g	0.03%	44.89 ^b	3	34.67 ^e
			36.67 ^c				50.00 ^a
			38.67 ^b				50.00 ^a
0.04%	40.56 ^a	5	30.67 ^f	0.04%	45.89 ^c	5	37.67 ^d
			45.33 ^a				50.00 ^a
			45.67 ^a				50.00 ^a

* Options with the same letters have unproved statistical difference (p <0.05)

Table 2. Assessment of the effects of Vaztak 10 EK and Decis 2.5 EK preparations against cabbage bugs

Decis 2.5 EK				Vaztak 10 EK			
Concentration	Mean	Days	Mortality	Concentration	Mean	Days	Mortality
0.02%	30.78 ^c	1	27.33 ^a	0.02%	42.33 ^c	1	36.34 ^e
			29.67 ^g				40.67 ^c
			35.33 ^e				50.00 ^a
0.03%	36.44 ^b	3	32.33 ^f	0.03%	42.33 ^c	3	39.34 ^d
			35.67 ^e				50.00 ^a
			41.33 ^b				50.00 ^a
0.04%	39.55 ^a	5	37.33 ^d	0.04%	48.78 ^a	5	46.33 ^b
			38.67 ^c				50.00 ^a
			42.67 ^a				50.00 ^a

* Options with the same letters have unproved statistical difference (p <0.05)

Table 3. Economic effectiveness of Vaztak 10 EK and Decis 2.5 EK of 0.02%, 0.03% and 0.04 %

Insecticides	Active matter	Concentration (%)	Cost per litre-(€)	K
Vaztak 10 EK	Alpha-cypermethrin	0.02	0.09	1.77
		0.03	0.14	
		0.04	0.18	
Decis 2.5 EK	Deltamethrin	0.02	0.16	
		0.03	0.25	
		0.04	0.32	

Conclusion

The actions of Decis 2.5 EK 10 and EK Vaztak are better against pollen beetles and less powerful against cabbage bugs. As an appropriate preparation with combined effect on both of the oilseed rape pests Vaztak 10 EK can be recommended with 0.03% dosage. At the current market prices of insecticides Vaztak 10 EK is economically more profitable than Decis 2.5 EK by 1.77 times.

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Todorov N and Mitev J, 1995. Effect of level of feeding during dry period, and body condition score on reproductive performance in dairy cows, IXth International Conference on Production Diseases in Farm Animals, Sept. 11 – 14, Berlin, Germany, p. 302 (Abstr.).

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