

Summary of four years research of cherry fruit fly control in the Czech Republic

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Abstract

The different preparations suitable for organic agriculture were tested against cherry fruit fly (*Rhagoletis cerasi* L.) on three localities in the Czech Republic and Slovak Republic (South Moravia, Bile Karpaty mountains and Middle Bohemia) over the years 2012-2015. Low efficacy was recorded in case of *Quassia amara* extract in dosage 3.5 kg of wood chips per hectare. It was only 38.6 %. Similarly *Beauveria bassiana* based product *Naturalis-L* reached efficacy 13.6-57.1 % during 2013 and 2014. The higher efficacy was observed in case of *Spruzit Flussig* (natural pyrethrins) on two locations during 2015. The efficacies were 66.7 and 88.1 %. In the same year two preparations on attract and kill method based were tested. *Spintor Fly* (*spinosad*) reached the highest efficacy 100 %, while the second preparation *NeemAzal T/S* with food bait reached efficacy only 27.4 %.

Keywords: cherry fruit fly, natural pyrethrins, *spinosad*, *Beauveria bassiana*

Introduction

The cherry fruit fly is the key pest in the cherry orchards. Under the organic agriculture rules it is still sometimes limitation. Probably the most effective precaution is to cover the whole orchards by nets which are impermeable for cherry fruit fly adults (Häseli & Daniel, 2009). On the other hand under the conditions of Czech Republic (lower buying power) this solution is not possible due to the high investment. Therefore different strategy has to be found.

Based on the available information we have decided to try different preparations against the cherry fruit fly.

Material and Methods

Trails were conducted as either small-plot or semi-field in commercial cherry orchards. Following formulated products were tested: *Naturalis-L* (a.i. *Beauveria bassiana*), *Spintor Fly* (a.i. *spinosad*) and *Spruzit-Flussig* (a.i. natural pyrethrins) and *VectoBac* (a.i. *Bacillus thuringiensis* spp. *israelensis*). *NeemAzal-T/S* (a.i. azadirachtin) together with food bait was also tested. In this case the food bait was prepared according to the Böckmann *et al.*, 2012. Last tested preparation was *quassia amara* extract which was prepared according to the Psota *et al.*, 2010. The trail overview is presented in Table 1.

Treatments were always done during the cherry fruit fly adult flight. The cherry fruit fly activity was monitored by yellow sticky traps. Evaluations were done always during the harvest according to the EPPO PP1/035(2) method. Based on acquired date the Abbott efficacy was calculated.

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Table 1: Trail details over the years 2012-2015.

Year	Location	Tested preparation	Dosage / Concentration	Water volume l/ha	Treatment n.	Trail type
2012	Valtovice (Czech Republic)	<i>Quassia amara</i> extract	Extract prepared from 3 and 4.5 kg wood chips used for 1 ha	600	4	small-plot
2013 - 2014	Bílé Karpaty (Slovak Republic)	Naturalis-L	2 l/ha	700	4	semi-filed
2014	Bílé Podolí (Czech Republic)	Naturalis-L	1.4 l/ha	700	5	semi-field
		VectoBac	1 kg/ha	700	5	
2015	Bílé Karpaty (Slovak Republic)	NeemAzal T/S + food bait	1%	700	4	Semi-field
		Spruzit-Flussig	0,1%	700	4	Semi-field
		Spintor-Fly	0,5 l/ha	20	4	Semi-field
2015	Bílé Podolí (Czech Republic)	NeemAzal T/S + food bait	1%	10	4	small-plot
		Spruzit-Flussig	0,1%	1000	4	semi-field
		Spintor Fly	0,5 l/ha	10	4	small-plot

Results

Unsatisfactory results were found during 2012-2014. Whereas high efficacy was recorded in case of Spintor Fly and Spruziti Flussig during 2015 (Table 2).

Table 2: Analysis of variance: Valtovice 2012 – F 3.6, p 0.07; Bílé Karpaty 2013 – F 14.2, p 0.000001; Bílé Karpaty 2014 – F 10.8, p 0.0001; Bílé Karpaty 2015 – F 1.24, p 0.000001; Bílé Podolí 2014 – F 9.54, p 0.006; Bílé Podolí 2015 – F 64.29, p 0.000001.

Location	Year	Variant	Damage %	Efficacy
Valtovice (Czech Rep.)	2012	<i>Quassia amara</i> 3 kg/ha	25.5 ^b	38.6
		<i>Quassia amara</i> 4,5 kg/ha	35.8 ^a	13.7
		control	41.5 ^a	
Bílé Karpaty (Slovak Rep.)	2013	Naturalis-L	3.0 ^b	57.1
		control	7.0 ^a	
	2014	Naturalis-L	23.4 ^a	14.5
		control	27.5 ^a	
	2015	Spruzit-Flussig	0.5 ^a	66.7
		NeemAzal T/S + food bait	1.5 ^a	
Spintor Fly		11.75 ^b		
	control	1.5 ^a		
Bílé Podolí (Czech Republic)	2014	Naturalis-L	23.8 ^a	13.6
		VectoBac	9.3 ^b	66.4
		control	27.5 ^a	
	2015	Spruzit-Flussig	2.5 ^a	88.1
		Spintor Fly	0 ^a	100
		NeemAzal T/S + food bait	15.3 ^b	27.4
	control	21 ^c		

Discussion

Since *Quassia amara* extract, Naturalis-L, VectoBac and NeemAzal T/S + food bait did not show satisfactory results. In case of Naturalis-L the low efficacy might be caused by unsuitable outdoor environmental conditions for *Beauveria bassiana*. High efficacy of azadirachtin was found in case of NeemAzal-T which is formulated without oil (Böckmann *et al.*, 2012). Therefore it seems NeemAzal T/S inappropriate formulation for cherry fruit fly control.

The failure of Spintor Fly on Bílé Karpaty location was probably caused by high water volume. Producer recommendation (Dow Agroscience) was 10 l/ha. Due to the lack of suitable application sprayer we have to use dosage 20 l/ha on this location. Generally the satisfactory results with Spintor Fly were already proved in North Italy during 2010 and 2011 (Tommasini & Caruso, 2012).

Based on results trials with natural pyrethrins product and Spintor Fly will continue in the season 2016.

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