

Study on pyrethroid resistance of *Brassicogethes aeneus* F. (Coleoptera: Nitidulidae) in Hungary

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Introduction

Pollen beetle (*Brassicogethes aeneus* F.) is one of the most serious pests of winter oilseed rape. Although it has been effectively controlled with pyrethroid insecticides for two decades, these insecticides have lost their efficacy. Their constant selective pressure has resulted in the occurrence and rapid spread of resistant pollen beetle populations (Slater et al., 2011, Thieme et al., 2008). The resistance of pollen beetles was first reported in 1999 in North-Eastern France (Zimmer & Nauen, 2011, Veromann & Toome, 2011), and until 2017, in the majority of European countries, pyrethroid resistant populations of pollen beetle dominate (>60% are resistant). The objective of this study was to investigate the susceptibility or pyrethroid resistance of pollen beetle in different locations of Hungary.

Materials and methods

Pollen beetles were collected by sweep netting during the spring of 2016 at Keszthely and Enying. Approximately 100 to 200 adults were collected from each location across the infested fields. The beetles were kept in aerated plastic containers, with some dry paper towel at the bottom and some oil seed rape leaves and inflorescences as food source, to keep the vigour of the beetles until the laboratory tests. In the laboratory, a standard method recommended by Insecticide Resistance Action Committee (IRAC method No. 011) was used. During the tests, 20% and 100% of the typical field application rate of 7.5 g lambda-cyhalothrin as active ingredient per hectare were used.

Results and discussion

Table 1: Results of the laboratory tests with beetles collected at Enying

Active ingredient	Concentration %	Replicates	Tested adults (pcs)	Dead	Moribund (M)	Number of reacting adults (D + M)	Mortality %
lambda-cyhalothrin	20%	1	28	8	17	25	89.29
lambda-cyhalothrin	20%	2	39	10	6	16	41.03
lambda-cyhalothrin	20%	3	35	11	8	19	54.29
lambda-cyhalothrin	100%	1	23	6	7	13	56.50
lambda-cyhalothrin	100%	2	33	11	19	30	90.90
lambda-cyhalothrin	100%	3	31	10	17	27	87.10
Untreated/control	0	1	30	0	0	0	0.00
Untreated/control	0	2	39	0	0	0	0.00
Untreated/control	0	3	35	0	0	0	0.00

Table 2: Results of the laboratory tests with beetles collected at Keszthely

Active ingredient	Concentration %	Replicates	Tested adults (pcs)	Dead (D)	Moribund (M)	Number of reacting adults (D + M)	Mortality %
lambda-cyhalothrin	20%	1	25	15	8	23	92,00
lambda-cyhalothrin	20%	2	26	13	9	22	84,62
lambda-cyhalothrin	20%	3	30	17	11	28	93,33
lambda-cyhalothrin	100%	1	34	28	6	34	100,00
lambda-cyhalothrin	100%	2	32	20	12	32	100,00
lambda-cyhalothrin	100%	3	35	24	11	35	100,00
Untreated/control	0	1	30	0	0	0	0,00
Untreated/control	0	2	36	0	0	0	0,00
Untreated/control	0	3	34	0	0	0	0,00

According to the evaluation and classification method of IRAC, the pollen beetle samples derived from Keszthely could be classified as susceptible (code 2), while the samples taken from Enying showed resistance (code 4).

Conclusions

Nowadays, constant monitoring of pollen beetle susceptibility to insecticides is essential for working out insecticide resistance management strategies, necessary for maintaining the effectiveness of chemical control.

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