

An evaluation on the effects of sowing date, variety and number of spraying on rapeseed pollen beetle control in Iran.

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Abstract

Meligethes aeneus (Col., Nitidulidae) is one of the main pests on canola in budding stage. Recently, the damage of this pest has been seen in some winter rapeseed fields which are located in the north provinces of Iran specially Mazandaran province. In IPM program of pollen beetles in order to select suitable method for controlling this pest in mountainous areas of Mazandaran province, a design split plot was conducted with 18 treatments in 3 replications. In order to investigate the effect of different planting dates (A₁: 22 September, A₂: 6 October and A₃: 22 October), different numbers of spraying (B₁: control, B₂: one spraying, B₃: two spraying) and different cultivars (C₁: Rigent* Cobra and C₂: Pf) for two years continuous. For spraying related treatments used Phosalone and the application period for treatment between two spraying was 10 days. The chosen time of spraying was when there were 10 pollen beetles on the main stems in 50 percent of plants in the plot. The morphological indexes and criteria such as plant height, 1000 seed weight, number of seed per pod and number of pod per plant studied. Finally, results of mean comparison based on Duncan's test showed that greatest yield obtained from (A₃B₃C₁) treatments.

Key words: Pollen beetle, spraying, *Meligethes aeneus* and canola

Introduction

Pollen beetles *Meligethes aeneus* is one of the most common pests on cruciferous crops throughout Europe. Both adults and larvae feed on pollen within buds and flowers, but can damage stamens, petals and ovaries of flowers, causing them to dry and fall leaving podless stalks (Williams, Free, 1978). The damage is greatest in the green and yellow bud stages of plant growth. When the buds on the main stem are damaged, more than half of the seed crop can be lost (Williams, Free, 1978; Nilsson, 1987; Williams, 2010). Also *M. aeneus* is one of the most important rapeseed pests in Iran mountainous areas and the farmer should have a special program for controlling it. The different decisions taken for decreasing this pest damage are chemical control, rotation, biological control and other methods for example use of blue plastic containers.

Methods and materials

In mountainous areas usually the winter rapeseed is planted like Zarpham and Okapi or some of the semi winter varieties as PF that have a long growth period. In accordance with late maturing these varieties (about 8-9 months) a high population of pollen beetles has been seen in budding stage

that if we have a high temperature in this time it can cause a economic losses for farmer. For integrated management of this pest, in autumn 2006, the design with 3 factors planting date(A), variety (B) and number of spraying (C) as main plot, subplot, sub-subplot respectively in the mentioned zone (South of the Mazandaran, Kiasar) was performed. Planting dates treatments had 3 levels; A1: early October - A2: mid October - A3: end of October. Spraying treatments had 3 levels; B1: no spraying - B2: Once sprayed - B3: Double-sprayed and variety treatments had 2 levels; C1: Zarfam – C2: PF. For spraying used Phosalone fungicide 3 L/Ha when there were 4 pollen beetles on buds. Size of plots was 3*4 m² with 30 cm between rows and 5 cm between plants on lines has been considered. Also between plots and blocks were 1 and 2 m respectively. Planting operations have been done by hand. Before planting, pre emergence herbicide (Treflan 2.5 L/Ha) use for all of treatments and immediately mixed with soil. The below table is the related information about this design. For survey effect of the mentioned treatments against pollen beetle, data from yield, number of pods, number of seeds in pod, one thousand seed weight and Plant height calculated and analyzed in randomize complete block design in 1% level with SAs 9.1 software.

Date	Description operations
10.5.2006,10.1.2006 and 10.17.2006	Irrigation
11.4.2006	Thinning
11.6.2006	Urea Fertilization (220 Kg/Ha)
11.14.2006	Pesticide (Citruban 1.2 L/Ha) On <i>Entomoscelis Adonidis</i>
11.23.2006 and 4.10.2007	Weeding
1.16.2007	Snowing For One Month
3.6.2007	Bait For Slugs
9.20.2006 and 11.14.2006	Spraying With Herbicide (Lonterol And Super Gallant)
4.10.2007	Spraying With Phosalone 3 L/Ha For One Time And Two Times Spraying Treatments
4.16.2007	Spraying With Phosalone 3 L/Ha For Two Times Spraying Treatment
6.5.2007 and 6.10.2007	Harvesting

Result:

The result of variation analysis showed that there is significant difference between some treatments in 1% level (table 1). Planting date: totally planting on time in every area especially in mentioned condition can be benefit for maximum utilization from environment, more growth, resistance to cold condition and also escape from pollen beetle damage. Although duration of budding stage that has a positive relation with temperature is very important. In our design in the late planting date population and damage of this pest duration budding stage was very high although this time also was short.

Number of spraying: the maximum yield was obtained from once and twice spraying compared with no spraying treatment. This rate was 480 kg/ha that is considerable. In according to lack of significant difference between once and twice spraying treatments, in this case just once spraying can be

sufficient for preventing pollen beetle economic damage. So determining the best time for spraying is needed.

Variety: In the same condition Zarfam variety has a more yield than PF variety because duration of Zarfam maturity stage is longer than PF. The other hand this problem cause coincidence plant sensitive stage with peek of pollen beetle population.

References:

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Trait	DF	Plant height(cm)		Number of pods		Number of seed in pod		One thousand seeds weight(gr)		Yield(kg/ha)	
		MS	F	MS	F	MS	F	MS	F	MS	F
Replication	2	277.694	117.883	328.444	7.0887	1.028	0.028	0.750	3.8571	50428.58	0.3879
Factor(A)	1	93.444	6.0179 ^{ns}	7056	152.28**	110.25	3 ^{ns}	0.111	0.111 ^{ns}	3015432	23.1946*
Error	2	15.528	-----	46.333	-----	36.750	-----	0.194	-----	130005.7	-----
Factor(B)	2	40.861	1.4957 ^{ns}	641.694	5.8774*	12.861	3.704 ^{ns}	0.083	0.2400 ^{ns}	980646	41.017**
AB	2	38.361	1.4042 ^{ns}	987.583	9.0454**	52.583	15.144**	0.028	0.0800 ^{ns}	1724073	72.112**
Error	8	27.319	-----	109.181	-----	3.472	-----	0.374	-----	23908.1	-----
C	1	1736.11	53.191**	7281.778	131.79**	20.250	6.6273*	5.444	49**	72630.2	1.632 ^{ns}
AC	1	49	1.5013 ^{ns}	747.111	13.522**	10.028	3.2818 ^{ns}	0.111	1 ^{ns}	193160.2	2.8277 ^{ns}
BC	2	10.028	0.3072 ^{ns}	1844.361	33.382**	6.083	1.9909 ^{ns}	0.861	7.750**	247217.2	3.6190 ^{ns}
ABC	2	2.083	0.0638 ^{ns}	2.694	0.0488 ^{ns}	6.694	2.1909 ^{ns}	0.694	6.250*	2252361	32.9722 ^{ns}
Error	12	32.639	-----	55.250	-----	3.056	-----	0.111	-----	68310.94	-----

Table 1: Analysis of variances for yield, number of pods , number of seeds in pod, one thousand seed weight, Plant height, Study on the effects of sowing date, variety and number of spraying on the control of pollen and blossom feeding beetles on rapeseed in Mazandaran province (Second year results)