Factsheet: Comparative efficacy of insecticidal seed treatments for flea beetle control in canola and evaluation of a novel mitigation strategy to reduce

Objective:

To demonstrate the relative efficacies of registered seed treatments to control flea beetle damage in seedling canola. Secondly, to evaluate deployment strategies for insecticidal seed treatments to contribute to mitigation strategies for water contamination by neonicotinoids.

Methodology:

This study was conducted at three contractor sites: East Central Research Foundation (Yorkton), Western Applied Research Corporation (Scott), and Irrigation Crop Diversification Corporation (Outlook). Plots were established at each site with treatments arranged in a four-replicate, randomized complete block design (RCB). Treatments included: 1) an untreated control, 2) fungicidal seed treatment (difenoconazole), 3) the thiamethoxam products, Helix Vibrance, and 4) Helix JumpStart, 5) the cyantraniliprole (diamide) seed treatment, Lumiderm, 6) the sulfoxaflor product, Visivio (mixed with thiamethoxam), a mixture of Lumidem and thiamethoxam, and the clothianidin product, Prosper.

Table 1. Demonstration treatment list of insecticidal seed treatments for the trial "Comparative Efficacy of Insecticidal Seed Treatments for Flea Beetle Control in Canola and Evaluation of a Novel Mitigation Strategy to Reduce Neonicotinoid Use" in Scott, SK in 2019

TRT	Product
1	Untreated = 6.72 gm
2	Fungicide treated
3	Helix + Vibrance = 7.25 gm
4	Helix + Jumpstart = 7.22 gm
5	Lumiderm
6	Visivio = 6.84 gm
7	Helix + Lumiderm = 7.47 gm
8	Prosper = 7.11 gm

Large plot trials were conducted on the AAFC Saskatoon and Llewelyn research farm sites. We evaluated targeted use of a neonicotinoid seed treatments by comparing flea beetle damage and harvest data among three treatments: 1) 60 m by 60 m plots seeded completely to commercial neonicotinoid-treated seed, 2) Plots of these dimensions seeded with a 9.45 m strip around the plot's inner periphery seeded to neonicotinoid-treated seed, the remainder was seeded with untreated seed, 3) as treatment 2 except that the border strip was 18.33 m Seed were Helix Vibrance-treated (thiamethoxam) for the Saskatoon site. Llewelyn site insecticide treatment plots were seeded with Prosper-treated (clothianidin)

Key Findings:

- All of the commercial seed treatments substantially reduce flea beetle feeding
- Despite relatively low population densities, damage to plants in small plots and fungicide treatments was about the action threshold (25% damage) and significant reductions in feeding damage were seen with all insecticidal treatments.
- The most effective of these were generally the combination of thiamethoxam and cyantraniliprole. Differences among insecticidal treatments were apparent at two sites: cyantraniliprole used alone was generally, if only numerically less effective than the neonicotinoids. Differences in the performance of thiamethoxam and clothianidin products were rarely significant. The addition of sulfoxaflor to thiamethoxam (Visivio) apparently had little benefit to damage control.

The full report is available at www.warc.ca. This work was funded through the Saskatchewan Ministry of Agriculture's Strategic Field Plan
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- the current action and economic thresholds have merit
- similarities in harvest data among treatments in both trials indicate the plasticity and how canola is capable of great compensation to foliar damage of response of spring *B. napus* canola to moderate levels of flea beetle damage. This result also suggests the tolerance of spring canola to foliar damage and supports the current nominal thresholds.
- Further work is required to determine the relative performance of these seed treatments under heavy pressure from *Phyllotreta* spp. flea beetles and assess the effects of border strips. The current study supports, given similarities in yields among strip treatments despite differences in feeding damage among treated and untreated plants, recommendations for reduced use of neonicotinoid seed treatments.

Table 2. Differences in mean flea beetle feeding damage among treatments at three Agri-ARM sites. Like-lettered treatments are not significantly different according to Tukey's Honestly Significant Difference (HSD) test (α = 0.05)

Site	Treatment	Mean feeding damage rating (% defoliation)	HSD designation (within-site)
Yorkton (ECRF)	Control	28.8	A
	Fungicide	25.9	AB
	Lumiderm	23.4	ABC
	Prosper	17.1	BCD
	Helix Vibrance	14.4	CDE
	Visivio	10.9	DE
	Helix JumpStart	7.2	DE
	Helix + Lumiderm	5.0	E
Outlook (ICDC)	Control	42.1	A
	Fungicide	33.6	B
	Lumiderm	14.5	C
	Visivio	13.1	C
	Prosper	12.8	C
	Helix JumpStart	10.3	C
	Helix Vibrance	9.9	C
	Helix + Lumiderm	8.6	C
Scott (WARC)	Control	24.0	A
	Fungicide	22.7	A
	Lumiderm	13.8	B
	Prosper	9.8	C
	Visivio	9.2	CD
	Helix + Lumiderm	7.3	CD
	Helix JumpStart	6.3	D
	Helix Vibrance	6.3	D

Table 3. Differences in mean flea beetle feeding damage among treatments at the AAFC Saskatoon site. Like-lettered treatments are not significantly different according to Tukey's Honestly Significant Difference (HSD) test (α = 0.05)

Treatment	Mean feeding damage rating (% defoliation)	HSD designation
30-ft strip	13.90	A
60-ft strip	10.82	AB
Complete use of seed treatment	9.24	B

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