Section II
Foliage & Seed-Feeding & Mining Insects

SEED TREATMENTS FOR FLEA BEETLE CONTROL IN CANOLA

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Plots were established at the University of Idaho Plant Science Farms at Moscow and Genesee, ID. Treated and untreated seed was planted at about 7 lb / acre using a six-row (7 in spacing), small-plot, cone seeder on 11 May at Moscow and 13 May at Genesee. Plots were 3.5 x 25 ft arranged in a randomized complete block design with each treatment replicated four times. The plots were cultivated and harrowed twice and fertilized (200 lb 30:0:0:6/acre) prior to planting. Seed treated with five rates of GAUCHO (imidacloprid), a Vitavax/Thiram (fungicide only) treatment, a Vitavax RS (Vitavax/Thiram/Lindane) standard and untreated seed were supplied by Gustafson Inc. In the case of the granular treatment of Furadan CR-10, the granules were mixed with the seed prior to planting. The foliar treatment of Sevin XLR was applied when flea beetle damage to cotyledons was first noted (20 May and 26 May for Moscow and Genesee, respectively) using a CO_2- pressurized backpack sprayer equipped with 80° fan nozzles on a 6-ft boom that delivered 10 gal/A at 20 psi. The Moscow plots were sprayed 25 June and 1 July with endosulfan (1 lb ai/acre) to control diamondback moth and cabbage aphids. The Genesee plots were sprayed 1 July with endosulfan (1 lb ai/acre) and an aerial application of methyl parathion (0.5 lb ai/acre) was applied 29 July to also control diamondback moth and aphids. Flea beetle damage ratings and counts of all plants in 6.6 ft of rows 2 and 5 were made 3 and 8 d following the foliar application of Sevin XLR. Flea beetle damage to cotyledons was scored using a 0-6 rating system Final stand counts were made following harvest on 24 September and 23 September for Moscow and Genesee, respectively.

At Moscow, all GAUCHO treatments provided significantly better ($P < 0.05$) protection from flea beetle damage than the Vitavax/Thiram, Sevin XLR and Furadan CR-10 treatments for the 3 and 8 d rating periods. However, the GAUCHO damage ratings were not statistically different ($P > 0.05$) than the Vitavax RS seed treatment (Table 1). It should also be noted that the Furadan CR-10 failed to prevent flea beetle damage. Plant stands were significantly ($P < 0.05$) lower for the high rates of GAUCHO seed treatment during the 8 d assessment, but no significant differences ($P > 0.05$) in plant stand were noted at the 3 d assessment and harvest. There were no significant differences ($P > 0.05$) in yield among the treatments. At Genesee, GAUCHO generally provided significantly ($P < 0.05$) better protection from flea beetle damage than the Vitavax/Thiram, Sevin XLR, Furadan CR-10 treatments (Table 2). Again the GAUCHO treatments, particularly the higher rates, provided similar levels of protection to that of the Vitavax RS standard. The low rates of GAUCHO were not as effective as the high rates in

providing protection, but all damage ratings were less than 2.0, which indicates minor damage. Again, the Furadan CR-10 did not significantly ($P > 0.05$) reduce flea beetle damage over that of the control. There were no significant differences ($P > 0.05$) in plant stands at 3d, 8d or harvest. There were significant differences ($P = 0.05$) in yield among the treatments, with the control treatment significantly lower than the Vitavax RS and all GAUCHO treatments (Table 2). Flea beetle pressure was moderate at both sites. Seedling emergence was somewhat irregular at both sites with new seedlings still emerging when the 8 d damage and stand assessment was made, particularly at the Genesee site. No phytotoxicity was noted for any treatments.

Table 1. Efficacy of selected seed treatments for control of cabbage flea beetle in Canola, Moscow, ID, 1993.

Treatment	Rate	Moscow Plots					
		Damage[a]		Plants/6.6 ft row			Yield
	(ml/cwt seed)	3d	8d	3d	8d	Harvest	(lbs/acre)
Vitavax RS	1022.00	0.5 b	1.5 d	89.8 a	93.0 a	47.0 a	2,543.8 a
Vitavax/Thiram (UBI 2390-3)	386.24	2.5 a	3.1 a	50.3 a	49.0 c	25.0 a	1,994.9 a
Vitavax/Thiram + Gaucho Fl	386.24 + 759	0.3 b	1.8 cd	73.5 a	72.3 abc	40.2 a	1,834.0 a
Vitavax/Thiram + Gaucho Fl	386.24 + 947	0.4 b	2.0 cd	53.8 a	52.8 bc	28.5 a	2,136.0 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1136	0.5 b	1.7 d	54.5 a	62.3 bc	29.0 a	1,971.0 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1325	0.3 b	1.6 d	40.3 a	46.5 c	32.3 a	1,950.5 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1515	0.4 b	1.7 d	51.0 a	50.5 c	26.5 a	2,157.6 a
Sevin XLR	0.50 lb ai/acre	2.3 a	2.7 ab	78.8 a	78.8 ab	43.0 a	2,083.3 a
Furadan CR-10	0.25 lb ai/acre	2.2 a	2.4 bc	71.5 a	73.8 abc	39.5 a	2,262.5 a
Control	—	2.4 a	2.8 ab	67.8 a	70.8 abc	31.0 a	2,032.2 a

Means in a column followed by the same letter are not significanly different at 5 % level (Protected LSD)

[a]0 = no damage, 1 = minor leaf abrasion and no shot holes, 2 = 1-3 shot holes and < 25% damage to cotyledon, 3 = 3-5 shot holes and 25% of cotyledon destroyed, 4 = 5-10 shot holes and 25 - 50% of cotyledon destroyed, 5 = > 50% cotyledon destroyed and 6 = cotyledon totally destroyed

Table 2. Efficacy of selected seed treatments for control of cabbage flea beetle in Canola, Genesee, ID, 1993.

Treatment	Rate	Damage[a]		Plants/6.6 ft row			Yield
	(ml/cwt seed)	3d	8d	3d	8d	Harvest	(lbs/acre)
Vitavax RS	1022.00	0.8 e	1.3 f	118.3 a	151.5 a	47.0 a	1804.2 a
Vitavax/Thiram (UBI 2390-3)	386.24	2.1 ab	2.6 a	114.5 a	128.5 a	42.5 a	1418.4 ab
Vitavax/Thiram + Gaucho Fl	386.24 + 759	1.2 cde	2.0 bc	132.5 a	139.0 a	59.3 a	1,538.5 a
Vitavax/Thiram + Gaucho Fl	386.24 + 947	1.0 de	1.9 bcd	101.2 a	116.0 a	52.0 a	1,640.3 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1136	1.0 de	1.7 cde	93.8 a	117.0 a	45.0 a	1,842.5 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1325	0.8 e	1.3 ef	95.3 a	130.8 a	39.5 a	1,785.9 a
Vitavax/Thiram + Gaucho Fl	386.24 + 1515	0.9 e	1.5 def	76.5 a	99.0 a	39.5 a	1,709.6 a
Sevin XLR	0.50 lb ai/acre	1.5 cd	2.3 ab	78.5 a	81.0 a	37.3 a	1,418.7 ab
Furadan CR-10	0.25 lb ai/acre	1.6 bc	2.3 ab	76.3 a	95.8 a	41.8 a	1,316.7 ab
Control	—	2.3 a	2.7 a	75.8 a	84.3 a	34.8 a	926.3 b

Means in a column followed by the same letter are not significanly different at 5 % level (Protected LSD)

[a]0 = no damage, 1 = minor leaf abrasion and no shot holes, 2 = 1-3 shot holes and < 25% damage to cotyledon, 3 = 3-5 shot holes and 25% of cotyledon destroyed, 4 = 5-10 shot holes and 25 - 50% of cotyledon destroyed, 5 = > 50% cotyledon destroyed and 6 = cotyledon totally destroyed