

CABBAGE: *Brassica oleracea* L. 'Bronco'

CONTROL OF LEPIDOPTERAN PESTS IN MINNESOTA CABBAGE, 2003

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Imported cabbageworm (ICW): *Pieris rapae* (L.)

Cabbage looper (CL): *Trichoplusia ni* (Hübner)

Diamondback moth (DBM): *Plutella xylostella* (L.)

'Gideon' was seeded 5 Jun at the University of Minnesota Agricultural Experiment Station at Rosemount, MN. Treatments were arranged in a RCB design with 4 replications. Plots consisted of 3 rows, 25 ft (7.6 m) long with 40 inch (1.02 m) row spacing. Each replicate was separated by a 5 ft (1.52 m) alley. Treatment applications were made with a CO₂ pressurized backpack sprayer using a 10 ft boom with 6 nozzles (XR-Teejet 8002 flat fan, with no screen). The sprayer was calibrated to deliver 20 gpa (187.04 l/ha) at 35 psi (242 kPa). Freeway surfactant was added to all treatments, at a rate of 8 fl oz/100 gal (0.625 ml/liter). Treatments were applied on 23 and 30 Jul and 6 Aug. Treatments were evaluated for CL, ICW and DBM larval infestation 31 Jul. All larval counts were taken from the middle row of each plot. Plots were harvested 21 Aug. In each treatment, 10 consecutive heads, with 4 wrapper leaves on each head, were harvested from the middle row and evaluated for feeding damage using Greene's rating scale (J. Econ. Entomol. 1969 62: 798-800), where: 1= no feeding damage; 2= minor feeding damage on the wrapper leaves (0-1% eaten) with no head damage; 3= moderate feeding damage on the wrapper leaves (2-5% eaten) with no head damage; 4= moderate feeding damage on the wrapper leaves (6-10% eaten) and minor feeding scars on the head; 5= moderate to heavy feeding on the wrapper leaves (11-30% eaten) and moderate feeding scars on the head; 6= greater than 30% of the wrapper leaves eaten and numerous feeding scars on the head. The number of larval contaminants within the 4 wrapper leaves and head were also noted.

Preliminary larval counts were taken 21 Jul. Preliminary counts revealed a total of 1.5 CL and 5.5 DBM per 10 heads. On 31 Jul, after 2 applications, treatment evaluations indicated that ICW was not present in the field (data not shown). For total CL densities none of the treatments were significantly different from the untreated check. There were no significant differences among treatments for total DBM compared with the untreated check except for Avaunt 30WG, both rates, and Mustang Max 0.8EC. No treatments provided for significantly lower head contaminants or a better marketability rating than the untreated check. Due to light infestations of all pests, even the untreated check would have a high percentage of marketable heads with an average marketability rating of 1.98 indicating only minor feeding on the wrapper leaves. No phytotoxicity was observed.

Treatment/formulation	Rate (lbs AI / ac)	31 Jul		21 Aug (Harvest)	
		Larval-pupal density (avg./10 heads)		Avg. larval contaminant/ 10 heads ³	Marketability rating ⁴
		Total CL ^{1,2}	Total DBM ¹		
SpinTor 2SC	0.067	0.00	2.00 b	0.00	1.38
Entrust 80WP	0.067	1.00	1.50 b	0.25	1.33
Capture 2EC	0.040	0.25	1.25 b	1.50	1.65
Warrior 1CS	0.025	0.50	1.75 b	2.75	1.58
Proclaim 5SG / Warrior 1CS / Warrior 1CS ⁵	0.015 / 0.025 / 0.025	1.50	1.50 b	0.75	1.55
Avaunt 30WG	0.045	1.25	3.75 ab	0.50	1.33
Avaunt 30WG	0.065	1.50	3.75 ab	1.75	1.78
Mustang Max 0.8EC	0.025	0.25	4.75 a	1.00	1.83
Untreated check	--	1.50	6.25 a	1.50	1.98
		NS		NS	NS

Means within columns followed by the same letter are not significantly different ($P=0.05$); Protected least significant difference test (LSD). NS = not significant ANOVA.

¹Total includes all larval instars and pupae.

²Total cabbage looper data were transformed using the square root transformation to obtain mean separations using LSD ($P=0.05$); untransformed means are presented.

³Larval contaminants include all larval instars and pupae of all three species (ICW, CL, and DBM) found within the head or 4 wrapper leaves.

⁴Greene's rating system; refer to text. Mean separation test run on rank transformed data; untransformed means are presented.

⁵Treatments are indicated in the order of application (i.e., Proclaim was 1st application) from 1st to 3rd application.

Part II. Materials Tested for Arthropod Management

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Avaunt 30WG, (Ideno(1.2-e)(1,3,4)oxadiazine-4a (3H)-carboxylic acid, 7-chloro-2,5-carbonyl)-methyl ester), indoxacarb, DuPont

Capture 2EC, (2-Methyl-1(1,1'-biphenyl)-3yl)methyl cis-3-(2-chloro-3,3,3-trifluoro propenyl)-2,2dimethyl cyclopropane carboxylate), bifenthrin, FMC

SpinTor 2SC, (2(((6-Deoxy-2,3,4-tri-O-methyl-a-L-mannopyronaosyl)oxy)-13-((5-(dimethylamino)tetrahydro-6-methyl-2H-pyran-2-yl)oxy)-9-ethyl

2,3,2a,5a,5b,6,9,10,11,12,13,14,16a,16b-tetradecahydro-14-methyl-1H-as-indaceno(3,2,-d)oxacyclododecin-7,15-dione), spinosad, Dow AgroSciences

Warrior 1CS, (3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2dimethylcyclopropanecar-boxylate (S),(S)-cis-Z isomers, lambdacyhalothrin, Syngenta

Entrust 80WP, spinosad, Dow AgroSciences

Proclaim 5SG, (Epi-methylamino-4''-deoxy-avermectin B,hydrochloride and a maximum 20% 4''-epi-methylamino 4''-deoxyavermectin B benzoate), emamectin benzoate, Syngenta

Mustang Max 0.8EC, Zetacypermetherin, FMC

Freeway, Silicon-polyether copolymer, alcohol ethoxylates, propylene glycol and dimethylpolysiloxane, Loveland Industries Inc.