

Section VI
Vectors of Plant Pathogens

MANAGEMENT OF POTATO VIRUSES AND VECTORS

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This experiment was conducted at the University of Idaho, Kimberly Research and Extension Center. The experiment consisted of 16 treatments (see Table 1 for rates and application methods for each treatment) and one control replicated four times in a randomized complete block design. Individual treatment plots were four rows (36 inch row spacing) wide by 25 ft long with 5 ft alleyways separating the plots.

Green peach aphids (GPA) were mass reared in growth chambers on Chinese cabbage plants. Aphids became viruliferous after feeding on an infected *Potato virus Y* (PVY^o) tobacco plant. Aphids were then released into the center two rows of each individual test plot on June 24. PLRV-infected GPA in ground cherry, *Physalis floridana* leaf strips were also released into each plot as stated above. Potato aphids (PA) from naturally occurring populations and GPA were counted by non-destructively sampling five plants in the center two rows of each plot for a total of 20 plants per treatment. Aphid counts were taken at weekly intervals for ten weeks from June 18 – Aug 19. Insecticides were sprayed on July 08 and on July 29. ELISA tests were conducted on 5 randomly selected plants /plot (middle two rows) after plant emergence to determine initial virus inoculum. ELISA tests were also conducted on 5 randomly selected plants /plot (middle two rows) before and after each application. All tubers from the middle two rows of each plot were harvested to estimate yields per treatment. Thirty randomly selected tubers per plot (120/ treatment) were collected and stored for three months and then planted. Emerging plants will be ELISA tested in January for PVY and PLRV-infection to determine final infection rates per treatment.

The number of aphids is presented as average per plot (5 plants per plot). Data were analyzed using analysis of variance using Proc GLM (generalized linear model). The treatment means were separated using Fisher's LSD ($\alpha = 0.05$). Statistical analyses were performed in SAS (SAS version 9.1, SAS institute, Cary, NC). Results are presented in the tables below.

Table 1. Treatment list.			
		Amount of Pesticide /Acre	Application Method
1	Untreated Control		
2	Admire Pro	8.7 oz	IFAP
3	Belay	18.0 oz	IFAP
4	Platinum	8.0 oz	IFAP
5	Admire Pro	8.7 oz	IFAP
	Temik 15G	320.0 oz	
6	Movento 240 SC	4.0 oz	Foliar
	NIS	0.25% V/V	
7	Movento 240 SC	4.0 oz	Foliar
	Provado 1.6	3.8 oz	
	NIS	0.25% V/V	
8	Movento 240 SC	4.0 oz	Foliar
	Baythroid XL	2.8 oz	
	NIS	0.25% V/V	
9	Movento 240 SC	4.0 oz	Foliar
	Provado 1.6	3.0 oz	
	Baythroid XL	2.0 oz	
	NIS	0.25% V/V	
10	Movento 240 SC	4.0 oz	Foliar
	Ammonium Sulfate	2.0 oz	
	NIS	0.25% V/V	
11	Movento 240 SC	4.0 oz	Foliar
	NIS	0.25% V/V	
12	Fulfill	5.5 oz	Foliar
13	Monitor	32.0 oz	Foliar
14	Vydate	135.0 oz	IFAP
15	Agricultural Mineral Oil	4 % V/V	Foliar
16	Warrior	2.56 oz	Foliar
17	Assail	4.0 oz	Foliar

Table 2. Effect of various insecticides on Green Peach Aphid

	Treatment	18-Jun	24-Jun	2-Jul	8-Jul	15-Jul	21-Jul	29-Jul	30-Jul	5-Aug	12-Aug	19-Aug
1	Untreated Control	0.0a	0.0a	0.0b	0.0b	1.0a	0.5b	2.8ab	1.8b	5.0abc	2.0a	0.3bc
2	Admire Pro	0.0a	0.0a	0.5ab	0.0b	0.0c	0.0b	2.0bc	N/A	0.0d	0.0b	0.0c
3	Belay	0.0a	0.0a	0.0b	0.0b	0.0c	0.0b	0.0c	N/A	0.0d	0.0b	0.3bc
4	Platinum	0.0a	0.0a	0.0b	0.0b	0.0c	0.0b	0.0c	N/A	0.3bc	0.0b	0.3bc
5	Admire Pro	0.0a	0.0a	0.3b	0.0b	0.0c	0.0b	0.0c	N/A	0.0d	0.0b	0.0c
	Temik 15G											
6	Movento 240 SC	0.0a	0.0a	0.0b	0.0b	0.3c	0.0b	0.8bc	0.0b	0.3bc	0.5b	1.3a
	NIS											
7	Movento 240 SC	0.0a	0.0a	0.3b	0.0b	0.0c	0.0b	0.0c	0.3b	1.0c	0.3b	0.3bc
	Provado 1.6											
	NIS											
8	Movento 240 SC	0.0a	0.0a	0.0b	0.0b	0.0c	0.0b	0.3c	4.0a	1.0c	0.3b	1.0ab
	Baythroid XL											
	NIS											
9	Movento 240 SC	0.0a	0.0a	0.0b	0.0b	0.0c	0.0b	1.0bc	0.0b	3.0cd	0.0b	0.3bc
	Provado 1.6											
	Baythroid XL											
	NIS											
10	Movento 240 SC	0.0a	0.0a	0.0b	0.0b	0.0c	0.0b	0.5bc	0.3b	0.3d	0.0b	0.3bc
	Ammonium Sulfate											
	NIS											
11	Movento 240 SC	0.0a	0.0a	0.5ab	0.0b	0.8ab	0.3b	1.8bc	1.5b	2.0cd	0.3b	0.0c
	NIS											
12	Fulfill	0.0a	0.0a	0.3b	0.0b	0.0c	0.0b	0.5bc	1.0b	2.8cd	0.0b	0.5abc
13	Monitor	0.0a	0.0a	0.0b	0.0b	0.0c	3.5a	1.0bc	0.5b	0.0d	0.0b	0.0c
14	Vydate	0.0a	0.0a	0.0b	0.0b	0.0c	2.0ab	2.8ab	N/A	6.0ab	0.3b	0.5abc
	Agricult. Mineral Oil											
15	Mineral Oil	0.0a	0.0a	1.5a	0.0b	0.0c	1.8ab	1.3bc	N/A	6.3a	0.5b	0.5abc
16	Warrior	0.0a	0.0a	0.8ab	0.3a	0.5abc	0.5b	4.3a	N/A	2.8cd	0.3b	0.3bc
17	Assail	0.0a	0.0a	0.3b	0.0b	0.0c	0.3b	0.8bc	N/A	1.5d	0.5b	0.5abc

*Counts are presented as average green peach aphids per plot (5 plants per plot). Treatment means were separated using Fisher's LSD in SAS (9.1). Treatment means with the same letters are not significantly different from each other ($\alpha = 0.05$).

Table 3. The effect of various insecticides on PVY and PLRV infection									
		Initial		After spray 1		After spray 2		Cumulative	
		PVY %	PLRV %	PVY %	PLRV %	PVY %	PLRV %	PVY %	PLRV %
1	Untreated Control	0	0	0	0	0	5	0	5
2	Admire Pro	5	0	0	0	0	0	5	0
3	Belay	0	0	0	0	0	0	0	0
4	Platinum	0	0	5	0	0	0	5	0
5	Admire Pro	0	0	0	0	0	5	0	5
	Temik 15G								
6	Movento 240 SC	0	0	0	0	0	0	0	0
	NIS								
7	Movento 240 SC	0	0	0	0	0	0	0	0
	Provado 1.6								
	NIS								
8	Movento 240 SC	0	0	5	0	0	5	5	5
	Baythroid XL								
	NIS								
9	Movento 240 SC	0	0	0	0	0	0	0	0
	Provado 1.6								
	Baythroid XL								
	NIS								
10	Movento 240 SC	0	0	5	0	0	0	5	0
	Ammonium Sulfate								
	NIS								
11	Movento 240 SC	0	0	0	0	0	5	0	5
	NIS								
12	Fulfill	0	0	0	0	0	0	0	0
13	Monitor	0	0	0	0	0	0	0	0
14	Vydate	0	0	0	0	0	5	0	5
15	Agricultural Mineral Oil	0	0	10	0	0	15	10	15
16	Warrior	0	0	0	0	0	0	0	0
17	Assail	5	0	0	0	0	5	5	5

*Numbers represent PVY and PLRV-infections rates obtained at three different sampling periods. 5 Plants were sampled for each plot and four such plots for each replication. 5% infection represents that one single plant (1/20) was infected with either PVY or PLRV.