

Watermelon (*Citrullus lanatus*'Fiesta')
Squash vein yellowing virus

P.D. Roberts, P.A Stansly, B. Kostyk
and R. Sytsma
University of Florida, IFAS
Southwest Florida REC
Immokalee, FL 34142

Evaluation of products to manage watermelon vine decline (WVD) caused by Squash vein yellowing virus in Florida, fall 2007.

Watermelon seedlings were transplanted on 18 Sep into Immokalee fine sand at the Southwest Florida Research and Education Center, Immokalee, FL. Treatments were arranged in a randomized complete block design with four replications. Each plot consisted of 10 plants spaced 36 in. apart within a 27 ft row with 10 ft between each plot and 12 ft between each row. Guidelines established by the University of Florida/IFAS were followed for land preparation, fertility, irrigation, weed management and insect control. Sprays were applied with a CO₂-pressurized backpack sprayer at 40 psi with a single hollow-cone nozzle at 24 gal/A. Adult whiteflies were counted weekly from 05-Oct to 13-Dec by randomly selecting three plants in each plot and examining a series of three leaves on each plant. Plants were evaluated for disease severity (percentage of plant tissue affected) and also the type of WVD-associated symptoms such as yellowing, wilting, and tissue death, at 7 to 14 day intervals. The disease rating scale was 0 through 5 where plants 0= healthy; 1= foliage exhibiting yellowing; 2= yellowing of foliage and wilting; 3= yellowing, wilting, and necrosis (death) exhibited on one or more runners; 4= most of the plant affected by all the symptoms of vine decline including more than 50% of plant dead; 5= plant dead. Disease incidence, or the number of plants exhibiting symptoms of vine decline regardless of severity, was determined. Fruit were harvested on 17 Dec and the number and weight per plot recorded. The fruit were dissected and interior symptoms of vine decline on fruit were taken using a disease rating based upon a 0 to 5 scale where 0= no fruit symptoms, 1= slight necrosis of rind only, 2= rind necrosis and slightly discolored flesh, 3= extensive rind necrosis and discolored flesh; 4= extensive rind necrosis and necrosis of flesh; 5 = fruit completely rotten including discoloration and rotted flesh. Mean rating and total fruit weight were statistically evaluated. The yield and disease ratings were subject to one-way ANOVA and significant differences between means were separated using Tukey Multiple Comparison. Average monthly high and low temperatures (°F) were 94 and 69 in Sep, 97 and 68 in Oct, 88 and 44 in Nov and 86 and 42 in Dec. Rainfall totals for Sep, Oct, Nov and Dec were 4.7, 3.4, 0.09 in., and 0.4 respectively.

The untreated plants had the highest percentage of symptomatic plants for the first two rating. Only treatment 9 was not significantly different from the untreated on 11 Nov for incidence. Treatments with reduced severity ratings compared to the untreated at every date were treatments 2 and 4 containing an intensive insecticidal rotational program. There was no significant treatment effect in adult whitefly counts per leaf over the entire period of 05-Oct to 13-Dec.

Treatment/Rate (Dates of application)	Disease Incidence ^z		Disease Severity (0-5 scale)		
	2 Nov	11 Nov	11 Nov	28 Nov	10 Dec
1 Untreated control.....	35 a	63 a	1.43 a	3.15 a	4.13 ab
2 Admire Pro 4.6FL 10.5 oz/A at planting.. Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	3 c	20 bcd	0.35 bc	2.53 bc	2.98 c
3 Actigard 50WG 0.25 oz/A (1, 2, 3...12)...	5 bc	33 bc	0.33 bc	2.25 bc	3.23 bc
4 Actigard 50WG 0.25 oz/A (1,2,3...12).. Admire Pro 4.6FL 10.5 oz/A at planting Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	2.5 c	2.5 d	0.03 c	2.33 bc	3.13 c
5 <i>Metarhizium anisopliae</i> strain F52 (11% a.i.; Tick-Ex EC) 29 oz/A (1,2,3...12)...	10 bc	33 bc	0.55 b	2.48 cb	3.33 bc
6 Bmj WP (3 ×10 ¹⁰ spores/g <i>Bacillus mycoides</i>) 1 oz/A (1,2,3...12).....	15 bc	30 bcd	0.43 bc	2.60 b	4.78 a
7 QRD 416 2 qt/A (1,2,3...12).....	8 bc	18 bcd	0.53 b	2.53 bc	3.75 bc
8 Prev-Am 0.4% v:v (1,2,3...12).....	18 b	13 cd	0.18 bc	2.60 b	3.90 abc
9 JMS Stylet Oil 0.50 % (1,2,3...12)..... Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	18 b	45 ab	1.13 a	3.08 a	3.78 bc
10 Actigard 50WG 0.25 oz/A (1,2,3...12).. JMS Stylet Oil 0.50 % (1,2,3...12)	10 bc	18 bcd	0.33 bc	2.18 c	3.65 bc

^zFor Disease ratings for 11/28/07 and 12/10/07 incidence readings were 100% of plants.

^y1=24 Sep, 2 =1 Oct, 3 =8 Oct , 4 =15 Oct, 5 =22 Oct, 6 =29 Oct, 7 =5 Nov, 8 =12 Nov, 9 =19 Nov, 10 =26 Nov, 11 =3 Dec, 12 = 10 Dec

^x Means followed by the same letter are not significantly different, Tukey's P<002.

	Treatment/Rate (Dates of application)	Mean Fruit no. per plot ^z	Fruit weight in lb per plot	Fruit Rating 0-5 scale
1	Untreated control.....	12	153.8	2.1 bcd
2	Admire Pro 4.6FL 10.5 oz/A at planting.. Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	17.8	213.3	1.5 d
3	Actigard 50WG 0.25 oz/A (1, 2, 3...12)...	15.3	179.0	1.9 bcd
4	Actigard 50WG 0.25 oz/A (1,2,3...12).. Admire Pro 4.6FL 10.5 oz/A at planting Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	14.8	178.0	3.5 a
5	<i>Metarhizium anisopliae</i> strain F52 (11% a.i.; Tick-Ex EC) 29 oz/A (1,2,3...12)...	14.3	168.5	2.3 bcd
6	Bmj WP (3×10^{10} spores/g <i>Bacillus mycooides</i>) 1 oz/A (1,2,3...12).....	18.5	199.3	2.7 abc
7	QRD 416 2 qt/A (1,2,3...12).....	17.0	174.8	1.8 cd
8	Prev-Am 0.4% v:v (1,2,3...12).....	14.8	160.8	2.9 ab
9	JMS Stylet Oil 0.50 % (1,2,3...12)..... Fulfill 50WG 8 oz/A (1, 2) ^y Thionex 3EC 0.67 qt/100 gal (3, 4, 9, 12) Oberon 2SC 8.5 oz/A (5, 6) Knack 11WG 10 fl oz/A (10)	15.3	174.3	2.5 bcd
10	Actigard 50WG 0.25 oz/A (1,2,3...12).. JMS Stylet Oil 0.50 % (1,2,3...12)	14.5	187.0	2.7 abc

^zColumns without letters are not significantly different ($P=0.05$). Numbers followed by the same letter are not significantly different Tukey's studentized range $P < 0.0001$

	Treatment	Adult Whitefly/leaf
1	Control	0.95
2	Admire plus insecticides	0.40
3	Actigard alone	0.64
4	Actigard plus Admire and insecticides	0.28
5	Metarhizium	0.71
6	BMJ	0.66
7	QRD 416	0.53
8	Prevam	0.60
9	Oil plus insecticides	0.65
10	Actigard plus oil	0.56

Columns without letters are not significantly different