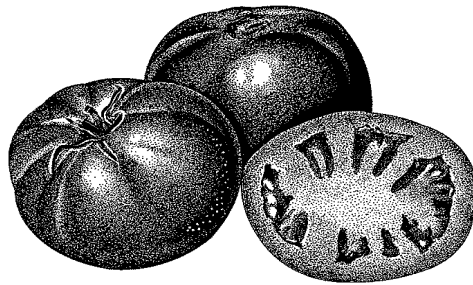


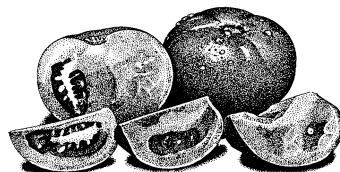
# PROCESSING TOMATOES

IN  
SAN JOAQUIN  
&  
CONTRA COSTA  
COUNTIES



## 1999 Weed, Disease & Insect Control Trials

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## **1999 WEED, DISEASE AND INSECT CONTROL RESEARCH PROGRESS REPORT**

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### Acknowledgements

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### **CAUTION**

This report is a summary of processing tomato weed and disease control studies conducted in San Joaquin and Contra Costa Counties. **IT SHOULD NOT, IN ANY WAY, BE INTERPRETED AS A RECOMMENDATION OF THE UNIVERSITY OF CALIFORNIA.**

Chemical or common names of herbicides, fungicides, and insecticides are used in this report instead of the more common trade names of these materials. No endorsement of products mentioned or criticism of similar products is intended.

The rates of herbicides and fungicides in this report are always expressed as active ingredient (a.i.) of the material per treated acre, unless otherwise indicated.

<u>Trade Name</u>	<u>Common or Chemical Name</u>	<u>Manufacturer</u>
Devrinol (2 E)	napropamide	United Phosphorus Limited
Shadeout (25 DF)	rimsulfuron	DuPont Chemical Co.
Tillam (6 E)	pebulate	Zeneca Ag. Products
Aim (40 DF)	carfentrazone	FMC Corporation
Dual Magnum (7.64 E)	metolachlor	Novartis
Treflan (5 E)	trifluralin	Dow-Elanco
Permit/GWN-3060 (75 WG)	halosulfuron	Monsanto Chemical Co./Gowan Chemical Co.
Kocide 101 (77 WP)	copper hydroxide	Griffin Corp.
Kocide 2000 (53.8 DF)	copper hydroxide	Griffin Corp.
Dithane/Manzate 200 (75 DF)	mancozeb	Rohm & Haas Co./DuPont
Platinum	neonicotinoid	Novartis
Admire	imadicloprid	Bayer Ag. Chem
AG 600 WBC	diazinon	Novartis

In 1999, five weed control studies were conducted on processing tomatoes in San Joaquin and Contra Costa Counties, evaluating seven herbicide materials and/or combination treatments for preemergence and postemergence weed control efficacy and crop safety. The first trial was a combination preemergence, postemergence and layby incorporated weed trial in direct seeded tomatoes concentrating on Shadeout (rimsulfuron), Permit/GWN 3060 (halosulfuron), Aim (carfentrazone) and Devrinol (napropamide) in the preemergence phase, Shadeout rates plus X-77 used sequentially postemergence and Dual Magnum (metolachlor) layby incorporated after the tomatoes had been thinned. A second preemergence trial, where treatments were soil incorporated with a Performer rotovator prior to tomato transplanting, evaluated Shadeout plus Devrinol, Permit/GWN-3060, Dual Magnum and Aim. Two of the postemergence trials evaluated two rates of Shadeout at different crop and weed growth stages with different spreader/adjuvants added to the Shadeout to determine weed control efficacy and possible crop injury. Adjuvants investigated were Herbimax, Hasten, Cohort DC, Activator 90, Silwet L-77, Quad 7 and Crop Oil Concentrate. The final postemergence weed trial looked at two sequential applications of four rates of Permit/GWN 3060 plus X-77 and a single rate of two applications of Shadeout plus X-77 for control of yellow nutsedge (3 to 5 true leaf stage of growth) on transplanted tomatoes that were 8 to 10 inches tall at the time of initial treatment.

One disease management trial, for control of Bacterial Speck, was established in Contra Costa County. Three bactericides or fungicides alone or in combination treatments were evaluated at different spray timings oriented to the growth stage of the tomato crop. Disease pressure was extremely low.

A trial to evaluate three candidate insecticides for the control of garden symphylan/centipede (*Scutigera immaculata*) in transplanted tomatoes was established near Tracy in San Joaquin County using soil drench treatments.

Detailed descriptions of each trial follow, along with yield and crop maturity data, where taken. Additionally, the weed control trials have weed control and crop phytotoxicity/crop vigor ratings, the disease trial has a disease severity rating, and the insect control trial has plant population and symphylan/plant counts pre and post treatment. More work on weed, disease and insect problems is planned for the 2000 processing tomato season.

# **PROCESSING TOMATO WEED MANAGEMENT TRIALS**

A Preemergence, Postemergence and Layby Incorporated Weed Control Trial in Direct-seeded Processing Tomatoes. Robert J. Mullen, Janet Caprile, Chuck Cancilla and Vanessa Sanchez.

A combination preemergence, postemergence and layby incorporated weed control trial in direct-seeded processing tomatoes was established at Vaquero Farms near Byron, CA, on April 23, 1999. The preemergence treatments of Shadeout (rimsulfuron), Devrinol (napropamide), Permit/GWN-3060 (halosulfuron) and Aim (carfentrazone) were applied with a handheld CO<sub>2</sub> backpack sprayer in 30 gal/Acre water using 8002 nozzles at 40 psi over the tomato beds, which had been seeded to **Campbell 179** four days earlier. Three quarters of an inch of water were sprinkler applied to the beds, incorporating the herbicides, the day following treatment. The soil at the trial site was a Brentwood clay. Initial weed control and crop vigor ratings were taken on May 13. Shadeout provided excellent control of hairy and black nightshade, as well as common groundsel, followed by the Permit/GWN-3060 treatment. At a later rating date for the preemergence treatments on May 28 only the Shadeout treatment was providing good weed control. Crop safety was good to excellent with all preemergence treatments.

Postemergence treatments were made on May13, 1999 using Shadeout plus X77 as a single treatment or two sequential applications at the same or different rates. Weed control and crop safety ratings were taken on 5/21/99 and again on 5/28/99. The single rate treatment of Shadeout at the high rate provided excellent control of black and hairy nightshade and common groundsel while the sequential treatments, particularly at the low rate, gave a little less control of black and hairy nightshade. Again all treatments showed very good crop safety with a very slight temporary crop growth slowdown at the sequential high rate treatment.

Layby power incorporated treatments of Dual Magnum (metolachlor) were made on June 8, 1999, and evaluated on June 24, and again on July.1. Dual Magnum provided excellent control of black and hairy nightshade and common groundsel with excellent crop safety. The trial was harvested on August 30, 1999 and all treatments outyielded the untreated control, most of them significantly higher in yield.

**1999 Processing Tomato Preemergence, Postemergence And Layby Weed Control  
Vaquero Farms – Byron, California**

Treatment	Rate oz or lb/Acre a.i.	Application Timing	Weed Control <sup>1</sup>						Crop Vigor <sup>1</sup>		Yield <sup>2</sup> (Tons/Acre)
			Black Nightshade		Hairy Nightshade		Common Groundsel				
			5/13	5/28	5/13	5/28	5/13	5/28	5/13	5/28	
Shadeout (25DF) + (Shadeout + X-77)	0.50 oz + (0.50 oz + ½%)	Pre + Post	8.6	9.0	9.3	9.6	10.0	10.0	9.1	8.7	30.4
Shadeout + Dual Magnum (7.64E)	0.50 oz + 1.27 lb	Pre + Layby	8.9 8.3 <u>6/24</u> <u>7/1</u> 9.4 9.8	8.3 7.1 <u>7/1</u> <u>7/1</u> 9.8 10.0	9.4 8.8 <u>6/24</u> <u>7/1</u> 10.0 10.0	8.8 7.1 <u>7/1</u> <u>7/1</u> 10.0 10.0	9.9 10.0 <u>6/24</u> <u>7/1</u> 10.0 10.0	10.0 10.0 <u>7/1</u> <u>7/1</u> 10.0 10.0	9.1 9.4 <u>6/24</u> <u>7/1</u> 9.5 9.3	9.4 9.3 <u>7/1</u> <u>7/1</u> 9.3 9.3	28.4
Devrinol (2E) + Dual Magnum	2.00 + 1.27 lb	Pre + Layby	3.0 2.4 <u>6/24</u> <u>7/1</u> 9.5 9.9	2.4 7.1 <u>7/1</u> <u>7/1</u> 9.9 10.0	3.3 3.0 <u>6/24</u> <u>7/1</u> 10.0 10.0	3.0 7.1 <u>7/1</u> <u>7/1</u> 10.0 10.0	9.0 7.3 <u>6/24</u> <u>7/1</u> 10.0 10.0	7.3 9.5 <u>7/1</u> <u>7/1</u> 10.0 9.3	9.1 9.5 <u>6/24</u> <u>7/1</u> 9.0 9.3	9.5 9.3 <u>7/1</u> <u>7/1</u> 9.3 9.3	20.1
Permit (75WG)	1.33 oz	Pre	7.6 6.1	6.1 8.6	8.6 7.5	7.5 9.8	9.8 10.0	9.8 10.0	8.5 8.7	8.7 27.6	27.6
Aim (40DF)	0.10 lb	Pre	3.9 2.3	2.3 4.5	4.5 2.5	2.5 8.0	8.0 5.0	8.0 5.0	9.1 9.4	9.4 19.3	19.3
Untreated Control	---	---	0.0 0.0 <u>6/24</u> <u>7/1</u> 0.0 0.0	0.0 0.0 <u>7/1</u> <u>7/1</u> 0.0 0.0	0.0 0.0 <u>6/24</u> <u>7/1</u> 0.0 0.0	0.0 0.0 <u>7/1</u> <u>7/1</u> 0.0 0.0	0.0 0.0 <u>6/24</u> <u>7/1</u> 0.0 0.0	0.0 0.0 <u>7/1</u> <u>7/1</u> 0.0 0.0	9.4 9.5 <u>6/24</u> <u>7/1</u> 8.8 9.1	9.5 9.1 <u>7/1</u> <u>7/1</u> 9.1 9.1	(see below)
									<u>Crop Phyto</u>		
Shadeout + X-77	0.25 oz + 0.25 oz + (½%)	Post	<u>5/21</u> <u>5/28</u> 6.4 7.8	<u>5/21</u> <u>5/28</u> 7.1 8.3	<u>5/21</u> <u>5/28</u> 7.1 8.3	<u>5/21</u> <u>5/28</u> 7.1 8.3	<u>5/21</u> <u>5/28</u> 7.1 9.9	<u>5/21</u> <u>5/28</u> 7.1 9.9	<u>5/21</u> <u>5/28</u> 0.9 1.0	<u>5/21</u> <u>5/28</u> 1.0 1.0	36.4
Shadeout + X-77	0.25 oz + 0.50 oz + (½%)	Post	6.4 8.9	8.9 7.3	7.3 9.4	9.4 7.3	10.0 7.3	10.0 7.3	1.0 1.1	1.1 34.3	34.3
Shadeout + X-77	0.50 oz + 0.50 oz + (½%)	Post	7.9 9.0	9.0 8.4	8.4 9.4	9.4 8.4	10.0 8.4	10.0 8.4	1.5 1.6	1.6 36.2	36.2
Untreated Control	---	---	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.5 0.5	0.5 14.3	14.3

LSD @ 5%: 7.3

CV = 18.4%

<sup>1</sup> Average of four replications: Weed Control – 0 = no weed control; 10 = complete weed control

Crop Vigor – 0 = crop dead; 10 = crop growing vigorously

Crop Phyto – 0 = no crop injury; 10 = crop dead

<sup>2</sup> Average of four replications

A Processing Tomato Pre-Transplant Incorporated Weed Control Trial. Robert J. Mullen, Michelle Rego, Chuck Cancilla and Jasmine Noriega.

A pre-transplant incorporated weed control trial in processing tomatoes, evaluating five herbicides for weed control efficacy and crop safety, was established at K & H Farms, southeast of Tracy, CA on April 30, 1999. All treatments were applied to the soil surface of the beds using a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. The treatments were then soil incorporated 2 inches deep using a tractor pulled Performer rotary tiller. The soil type of the trial field was a Sorrento silty clay and the field variety was **H-9663**. The field was transplanted two days after herbicide treatment and incorporation; furrow irrigation was not applied until May 9, 1999. There were four replications of each treatment in a randomized complete block design.

Weed control efficacy and crop vigor ratings were made on May 26, 1999. Best control of the black and hairy nightshade and yellow nutsedge present occurred with a combination treatment of Shadeout (rimsulfuron) plus Devrinol (napropamide) and a treatment of Dual Magnum (metolachlor) alone. Permit/GWN 30-0 (halosulfuron) gave very good control of yellow nutsedge and good, but not excellent, control of the two nightshade species, particularly black nightshade. All treatments were very safe to the crop and the trial was harvested on August 17, 1999. All treatments were equal to or better than the untreated check relative to yield, with the combination treatment of Shadeout plus Devrinol providing a significantly higher yield.

**1999 Processing Tomato Pre-Transplant Incorporated Weed Control  
K & H Farms – Tracy, California**

Treatment	Rate oz or lb/Acre a.i.	Weed Control <sup>1</sup>		Crop <sup>1</sup> Vigor	Yield <sup>2</sup> (Tons/Acre)
		Black and Hairy Nightshade	Yellow Nutsedge		
Dual Magnum (7.64E)	1.27 lb	8.9	8.5	9.3	38.0
Shadeout (25DF) + Devrinol (2E)	0.50 oz + 2.00 lb	8.9	8.5	9.5	42.2
GWN-3060 (75WG)	0.50 oz	7.8	8.4	9.2	36.5
Aim (40DF)	0.10 lb	6.5	6.3	9.3	35.9
Untreated Control	---	1.5	1.5	9.4	36.0
				LSD@ 5%: 4.5	
				CV = 7.8%	

<sup>1</sup> Average of four replications:

Weed Control – 0 = no weed control; 10 = complete weed control

Crop Vigor – 0 = crop dead; 10 = crop growing vigorously

<sup>2</sup> Average of four replications

A Processing Tomato Postemergence Weed Control Trial. Robert J. Mullen, Janet Caprile, Ben Fouche, Chuck Cancilla and Michelle Rego.

A postemergence weed control trial in direct-seeded processing tomatoes, evaluating two rates of Shadeout (rimsulfuron) combined with 6 different adjuvants/surfactants for weed control efficacy and crop safety, was established at Vaquero Farms near Byron, CA, on April 9, 1999. All treatments were applied over the second true leaf tomatoes, cotyledon to second true leaf black nightshade and 3 to 4 true leaf yellow nutsedge using a handheld CO<sub>2</sub> backpack sprayer. There were four replications of each treatment in a randomized complete block design. The spray volume was 30 gal/Acre water using 8002 nozzles at 40 psi. The soil type at the trial site was a Brentwood clay and the field was irrigated using a combination of sprinkler and furrow irrigation. The variety of tomatoes planted in the trial site field was **Halley 3155**. The six adjuvants/surfactants each evaluated with Shadeout were Activator 90 (non-ionic surfactant), Silwet L-77 (silicone non-ionic surfactant), Herbimax (petroleum oil/emulsifier crop oil concentrate), Hasten (modified seed oil), Cohort DC (60% dry non-ionic surfactant and 40%urea) and Quad 7 (an ammonium nitrate-based adjuvant). Two rates of Shadeout without any adjuvant added also were evaluated.

Weed control efficacy and crop vigor ratings were taken on April 15, 1999 and again on April 22, 1999. At the later rating date, crop chlorosis evaluation was made along with crop stand counts and the number of nightshade per square foot. Due to the larger size, in general, of the nightshade in the trial at time of treatment, control of black nightshade long term was most effective with the high rate of Shadeout plus Activator 90, followed by the high rate of Shadeout plus Hasten, the high rate of Shadeout plus Quad 7 and the low rate of Shadeout plus Herbimax. All treatments only gave temporary chlorosis and/or partial burn to the yellow nutsedge present. As far as tomato crop leaf chlorosis is concerned, (based on a 1 to 7 scale with 1 = yellow green and 7 = dark green), Shadeout at the low rate plus Hasten and the two rates of Shadeout with no surfactant showed the least yellowing at the April 15 rating date, but by the April 22 rating date temporary chlorosis had all but disappeared with all treatments. In terms of nightshade population per square foot on April 22, the biggest reduction occurred with the high rate of Shadeout plus Hasten, followed by the high rate of Shadeout plus Activator 90 and the low rate of Shadeout plus Herbimax. The trial was harvested on August 2, 1999, and most of the treatments out-yielded the untreated control led by the high rate of Shadeout plus Hasten and both rates of Shadeout plus Herbimax. Both rates of Shadeout plus either Quad 7 or Cohort DC resulted in lower yields than the untreated control possibly indicating some crop injury (long term) when Shadeout was used with either of these adjuvants.

**1999 Processing Tomato Postemergence Weed Control  
Vaquero Farms - Byron, California**

Treatment	Rate oz/Acre a.i.	Yield (Tons/Acre)	Weed Control <sup>1</sup>				Tomato <sup>2</sup> Chlorosis		Crop Vigor <sup>1</sup>		Crop <sup>3</sup> Stand Count (Avg Rep)	# Nightshade <sup>3</sup> per square foot (Avg Rep)
			Black Nightshade		Yellow Nutsedge		4/15	4/22	4/15	4/22	4/15	4/22
Shadeout (25DF) + Herbimax	0.25 + 1%	49.8	8.1	7.1	4.8	3.0	4.3	5.8	8.0	8.5	58.5	4.5
Shadeout + Hasten	0.25 + ¼%	46.0	7.4	6.3	4.8	3.0	5.5	6.0	8.5	8.9	65.0	5.7
Shadeout + Cohort DC	0.25 + ¼%	40.2	7.9	6.1	4.8	3.5	4.8	6.0	8.1	8.8	62.5	5.5
Shadeout + Silwet L-77	0.25 + 1/8%	44.4	8.0	6.5	4.8	3.8	4.8	5.8	8.3	8.8	62.3	6.4
Shadeout + Activator 90	0.25 + ¼%	42.7	6.9	5.3	4.8	3.3	4.8	5.5	8.5	8.9	66.0	7.7
Shadeout + Quad 7	0.25 + ½%	39.2	7.3	6.3	5.0	3.5	4.8	6.0	8.5	8.8	73.3	6.5
Shadeout + Herbimax	0.50 + 1%	49.7	7.9	6.5	5.0	3.9	4.3	5.8	8.4	8.9	62.8	5.8
Shadeout + Hasten	0.50 + ¼%	50.8	8.4	7.8	4.8	3.8	4.8	5.8	8.4	8.6	61.0	4.2
Shadeout + Cohort DC	0.50 + ¼%	39.5	8.0	6.4	5.0	3.5	4.5	5.5	8.3	8.8	60.8	6.1
Shadeout + Silwet L-77	0.50 + 1/8%	45.5	8.1	6.9	5.5	3.8	5.0	6.0	8.4	8.8	70.3	6.1
Shadeout + Activator 90	0.50 + ¼%	45.1	8.3	7.9	5.0	4.1	4.5	5.0	7.9	8.3	62.0	4.3
Shadeout + Quad 7	0.50 + ½%	37.3	8.0	7.1	5.3	4.0	4.5	5.8	8.1	8.9	68.0	5.2
Shadeout	0.25	46.5	6.8	5.9	4.5	3.0	5.8	6.0	8.0	8.8	64.8	6.6
Shadeout	0.50	44.9	6.8	5.9	4.8	3.8	5.8	6.0	7.8	8.8	62.0	5.5
Untreated Control	---	42.5	0.5	1.0	0.5	1.5	5.8	6.0	8.0	8.8	59.8	15.4

LSD @ 5%: 7.9

CV = 12.5%

<sup>1</sup> Average of four replications: Weed Control – 0 = no weed control; 10 = complete weed control  
Crop Vigor – 0 = crop dead; 10 = crop growing vigorously

<sup>2</sup> Average of four replications: 1 to 7 scale = measure of leaf chlorosis  
1 = yellow green; 7 = dark green

<sup>3</sup> Average of four replications

A Postemergence Weed Control Trial in Direct-seeded Processing Tomatoes. Robert J. Mullen, Scott Whiteley, Chuck Rivara and Chuck Cancilla.

A postemergence weed control trial in direct-seeded processing tomatoes, evaluating six different adjuvant/surfactants each with two different rates of Shadeout (rimsulfuron) at two different crop growth stages, was established at Steve Pellegrini Farms east of Tracy, CA on June 11, 1999. All treatments were applied over the crop and weeds with a handheld CO<sub>2</sub> backpack sprayer using 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. There were four replications of each treatment in a randomized complete block design. Weeds present at time of initial treatment included cotyledon to first true leaf black and hairy nightshade and cotyledon to first true leaf common purslane. The soil type at the trial site field was a Sorrento clay loam and the tomato variety in the field was **H-8892**. The six adjuvants/surfactants each evaluated with Shadeout were Activator 90 (non-ionic surfactant), Silwet L-77 (silicone non-ionic surfactant), Herbimax (petroleum oil/emulsifier crop oil concentrate), Hasten (modified seed oil), Cohort DC (60% dry non-ionic surfactant and 40% urea) and Crop Oil Concentrate (paraffin-based petroleum oil/poly fatty acid esters). Those treatments made at the first true leaf growth stage of the crop were evaluated for weed control efficacy and crop vigor on June 17, 1999, and again on June 24<sup>th</sup>. Excellent black and hairy nightshade and common purslane control occurred with all treatments, led by the high rate of Shadeout plus Activator 90. Tomato leaf chlorosis ratings (based on a 1 to 7 scale with 1 = yellow-green and 7 = dark green) were also taken and the greatest degree of crop yellowing occurred with the high rate of Shadeout plus Activator 90, followed by the high rate of Shadeout plus Silwet L-77 and the low rate of Shadeout plus Silwet L-77. Crop vigor was also reduced with the high rate of Shadeout plus Activator 90 or Silwet L-77. The low rate of Shadeout plus Hasten showed the least crop chlorosis and the best crop vigor. Based on nightshade counts per square foot of bed, the high rate of Shadeout plus Activator 90 or Silwet L-77 had also greatly reduced the nightshade population by June 24<sup>th</sup>. Three sequential treatments involving different rates of Shadeout plus Crop Oil Concentrate (COC) were treated for the second time on June 18<sup>th</sup>, as well as all the remaining Shadeout/adjuvant mixtures, receiving the second of two rates, at the second true leaf stage of crop growth. All treatments were evaluated on June 24, 1999. Best control of all weeds present occurred with all the sequential treatments of Shadeout plus COC, led by the two high rate sequential treatment – 0.50 oz/Acre a.i. + 0.50 oz/Acre a.i. + (1/2%) COC. Weed control of nightshade, particularly black nightshade, was down where either high or low rates of Shadeout plus any of the candidate adjuvants were used at the second true leaf stage. Simply put, the weeds were too big at the second true leaf of crop growth. The best result occurred with Shadeout at the high rate plus Activator 90. Similar to the earlier set of treatments, applied at first true leaf of the crop, the high rate of Shadeout plus Activator 90 or Silwet L-77 caused the most crop chlorosis. Crop vigor was most reduced with sequential treatment of high rates of Shadeout plus COC. Looking at nightshade counts per square foot of bed on the second true crop leaf treatments, nightshade populations were reduced in general but not to the degree that occurred when treatments were applied at first true leaf of the crop. The best treatment, across the board, were the two sequential Shadeout treatments made at first true leaf with the second application following a week later at second true leaf – 0.50 Oz/Acre a.i. + 0.50 oz/Acre a.i. + (1/2%) COC, followed by 0.25 oz/Acre a.i. + 0.50 oz/Acre a.i. + (1/2%) COC.

**1999 Processing Tomato Postemergence Weed Control  
Steve Pellegrini Farms – Tracy, California**

Treatment	Rate oz/Ac a.i.	Crop Growth Stage	Weed Control <sup>1</sup>						Tomato <sup>2</sup>		Crop <sup>1</sup>		Crop <sup>3</sup>		(Avg/Rep) <sup>3</sup>	
			Black Nightshade		Hairy Nightshade		Common Purslane		Chlorosis		Vigor		Stand Count		Nightshade per sq foot	
			6/17	6/24	6/17	6/24	6/17	6/24	6/17	6/24	6/17	6/24	6/17	6/24	6/17	6/24
Shadeout (25DF) + Herbimax	0.25 + 1%	1 <sup>st</sup> true leaf	8.4	8.3	9.8	9.8	9.4	10.0	5.0	5.3	8.6	8.8	42.5	57.0	9.2	6.8
Shadeout + Hasten	0.25 + ¼%	“	8.1	8.3	9.5	9.3	9.4	10.0	5.5	5.5	9.0	8.9	50.3	60.0	9.8	7.1
Shadeout + Cohort DC	0.25 + ¼%	“	8.4	8.4	9.6	9.3	9.4	10.0	4.5	4.5	8.6	8.6	43.8	56.5	8.8	7.4
Shadeout + Silwet L-77	0.25 + 1/8%	“	8.3	8.8	9.7	9.5	9.5	10.0	3.8	4.0	8.4	7.5	42.5	54.0	7.6	5.3
Shadeout + Activator 90	0.25 + ¼%	“	8.3	8.8	9.6	9.4	9.5	10.0	4.5	4.3	8.4	8.1	47.0	54.8	7.3	6.7
Shadeout + Herbimax	0.50 + 1%	“	8.3	8.9	10.0	9.9	9.6	10.0	5.0	4.8	8.4	8.5	36.3	40.8	6.4	3.9
Shadeout + Hasten	0.50 + ¼%	“	8.4	9.0	9.9	9.8	9.5	10.0	4.5	4.8	8.8	8.6	41.5	50.3	7.5	4.8
Shadeout + Cohort DC	0.50 + ¼%	“	8.4	9.0	9.9	9.9	9.4	10.0	4.0	4.0	8.1	8.4	42.8	53.3	6.4	3.8
Shadeout + Silwet L-77	0.50 + 1/8%	“	8.4	9.1	9.9	9.9	9.5	10.0	3.5	4.0	7.8	6.9	39.3	48.3	7.6	3.6
Shadeout + Activator 90	0.50 + ¼%	“	8.6	9.3	10.0	10.0	9.9	10.0	3.3	4.4	7.4	8.3	46.5	59.0	6.6	3.1
Shadeout + Crop Oil Conc.	0.25 + 0.25 + (½%)	1 <sup>st</sup> & 2 <sup>nd</sup> true leaf	8.4	9.3	9.9	9.8	9.5	10.0	4.8	4.3	9.1	8.9	40.5	51.0	8.3	4.1
Shadeout + Crop Oil Conc.	0.25 + 0.50 + (½%)	“	8.5	9.6	9.9	10.0	9.6	10.0	4.3	4.0	9.0	8.5	54.5	64.0	6.7	2.4
Shadeout + Herbimax	0.25 + 1%	2 <sup>nd</sup> true leaf		6.8		7.8		9.0		4.5		8.6		59.0		14.1
Shadeout + Hasten	0.25 + ¼%	“		6.8		7.8		9.0		5.3		8.9		68.0		15.3
Shadeout + Cohort DC	0.25 + ¼%	“		6.6		7.8		9.1		4.3		9.0		59.5		13.8
Shadeout + Silwet L-77	0.25 + 1/8%	“		7.0		8.4		9.0		4.0		8.8		46.8		14.0
Shadeout + Activator 90	0.25 + ¼%	“		6.9		8.3		9.0		3.8		8.5		60.8		15.3
Shadeout + Herbimax	0.50 + 1%	“		7.0		8.3		9.4		4.0		8.6		64.0		12.5
Shadeout + Hasten	0.50 + ¼%	“		6.9		8.1		9.1		5.0		9.1		60.0		15.8
Shadeout + Cohort DC	0.50 + ¼%	“		6.9		8.4		9.1		4.0		8.6		60.3		14.9
Shadeout + Silwet L-77	0.50 + ¼%	“		7.3		8.6		9.3		3.5		8.1		55.3		11.4
Shadeout + Activator 90	0.50 + 1/8%	“		7.8		9.1		9.4		3.8		8.4		50.8		13.0
Shadeout + Crop Oil Conc.	0.50 + 0.50 + (½%)	1 <sup>st</sup> & 2 <sup>nd</sup> true leaf	8.8	9.6	10.0	10.0	9.8	10.0	4.0	4.0	8.5	7.0	50.0	61.8	7.0	1.5
Untreated Control	---	---	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.5	9.3	9.3	44.8	58.5	25.8	30.0

<sup>1</sup> Average of four replications: Weed Control – 0 = no weed control; 10 = complete weed control  
Crop Vigor – 0 = crop dead; 10 = crop growing vigorously

<sup>2</sup> Average of four replications: 1 to 7 scale = measure of leaf chlorosis  
1 = yellow green; 7 = dark green

<sup>3</sup> Average of four replications

A Postemergence Yellow Nutsedge Control Trial in Transplanted Processing Tomatoes. Robert J. Mullen, Michelle Rego, Chuck Cancilla and Jasmine Noriega.

A postemergence trial, evaluating two herbicides for the control of yellow nutsedge in transplanted processing tomatoes, was established at George Perry and Sons Farms in French Camp, CA, on May 28, 1999. Sequential applications, four weeks apart, using Permit/GWN-3060 (halosulfuron) plus X-77 and Shadeout (rimsulfuron) plus X-77, were begun when the transplanted tomatoes were 8 to 10 inches tall and the yellow nutsedge had 3 to 6 true leaves. Four rates of Permit and one rate of Shadeout were studied. The plot was a randomized complete block design with four replications. All treatments were made over the tomato crop and yellow nutsedge using a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. The soil type of the field trial site was a Dinuba fine sandy loam and the field variety was **H-9663**. The trial was rated for weed control efficacy and crop vigor on June 11, 1999 and again on July 8, 1999. The highest rate of Permit/GWN-3060, at 0.65 lb/Acre a.i. plus ¼% X-77, gave the best nutsedge control/suppression, followed by the 0.047 lb/Acre a.i. rate and the 0.032 lb/Acre a.i. rates, respectively. The low rate of Permit plus X-77 and the one rate of Shadeout plus X-77 gave moderate control/suppression of yellow nutsedge. All treatments appeared very safe to the crop, but when the trial was harvested on August 23, 1999, the high rate treatment of Permit plus X-77 provided less yield than the untreated control. Permit at 0.047 lb/Acre a.i. or 0.032 lb/Acre a.i. plus X-77 produced yields greater than the untreated control and, if registered eventually on tomatoes, could probably be a potential use rate.

**1999 Processing Tomato Postemergence Yellow Nutsedge Management Trial  
George Perry & Sons – Lathrop, California**

Treatment	Rate lb/Acre a.i.	No of Applications	Weed Control <sup>1</sup>		CropVigor <sup>1</sup>		Yield <sup>2</sup> (Tons/Acre)
			Yellow Nutsedge 6/11	7/8	6/11	7/8	
Permit (75WG) + X -77	0.023 + ¼%	2	7.0	7.3	9.4	9.4	35.0
Permit + X -77	0.032 + ¼%	2	8.0	8.0	9.3	9.3	36.7
Permit + X – 77	0.047 + ¼%	2	8.5	8.3	9.1	9.3	34.3
Permit + X -77	0.065 + ¼%	2	8.8	8.9	9.1	9.0	26.6
Shadeout (25DF) + X -77	0.065 + ¼%	2	6.5	7.3	9.3	9.3	32.0
Untreated Control	---	---	1.0	0.0	9.5	9.4	32.6

LSD @5%: N.S.

CV = 25.9%

<sup>1</sup>Average of four replications:

Weed Control – 0 = no weed control; 10 = complete weed control

Crop Vigor – 0 = crop dead; 10 = crop growing vigorously

<sup>2</sup>Average of four replications

# **PROCESSING TOMATO**

## **DISEASE CONTROL TRIAL**

A BACTERIAL SPECK DISEASE CONTROL TRIAL IN PROCESSING TOMATOES. Robert J. Mullen, Janet Caprile, Michelle Rego, Chuck Cancilla, Chuck Rivara and Vanessa Sanchez

A Bacterial Speck control trial in direct-seeded processing tomatoes, evaluating bactericides or fungicides alone or in combination treatments at different tomato growth stages, was established at Vaquero Farms near Brentwood, CA on May 4, 1999. The trial field had been seeded to the variety, **H-9492**, and the soil type of the field was a Brentwood clay. Rainfall and subsequent sprinkler irrigation were used to bring the crop up and, after crop thinning, furrow irrigation was used for the remainder of the season. Treatments were initiated at the first sign of disease symptoms, when the crop was at the first to second true leaf stage of growth. Other applications, alone or as sequential treatments, were made at the 3-4 true leaf stage, 5-6 true leaf stage and 2 weeks after first flower development. The trial was a randomized complete block design with four replications. Candidate bactericides and/or fungicides were applied as foliar applications using a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/A water. The treatment dates were May 4, May 7, May 14 and May 28, 1999. Disease pressure was extremely light and the disease severity ratings reflect this. Basically, no real disease control efficacy conclusions can be gleaned from any of the treatments. Yields were taken on August 9, 1999 and there was no significant difference between any of the treatments and the untreated control.

**1999 Processing Tomato Bacterial Speck Control Trail  
Vaquero Farms –Brentwood, California**

Treatment	Rate lb/Acre a.i.	Spray <sup>3</sup> Timing	Disease Severity Rating <sup>1</sup>					Yield <sup>2</sup> (Tons/Acre)
			5/7	5/13	5/21	5/28	6/4	
Kocide 101 (77DF) + Dithane (75DF)	2 lb + 2 lb	A	0.5	0.3	0.0	0.3	0.3	27.4
Kocide 101 + Dithane	2 lb + 2 lb	B	0.8	0.5	0.1	0.5	0.1	26.5
Kocide 101 + Dithane	2 lb + 2 lb	C	1.3	0.6	0.3	0.1	0.1	---
Kocide 101 + Dithane	2 lb + 2 lb	D	1.3	1.0	0.5	0.6	0.0	---
Kocide 101 + Dithane	2 lb + 2 lb	A + B	0.8	0.1	0.0	0.1	0.1	28.1
Kocide 101 + Dithane	2 lb + 2 lb	C + D	1.1	0.8	0.4	0.1	0.0	---
Kocide 101 + Dithane	2 lb + 2 lb	A + B + C+D	0.8	0.4	0.1	0.0	0.0	---
Kocide 101	2 lb	A + B	0.3	0.4	0.0	0.3	0.0	25.7
Manzate (75 DF) + Kocide 2000 (53.8DF)	2 lb + 2 lb	A + B + C + D	1.0	0.5	0.0	0.0	0.0	29.1
GX 614001 + Kocide 2000	1.5 qts + 2 lb	A + B + C + D	0.5	0.4	0.0	0.0	0.0	25.8
GX 614002 + Kocide 2000	1.5 qts +2 lb	A + B + C + D	0.6	0.4	0.1	0.0	0.0	27.9
Untreated Control	---	---	1.5	0.9	0.5	0.8	0.9	29.1

LSD @ 5%: N.S.  
CV = 14.0%

<sup>1</sup> Average of four replications

Disease Severity Scale – 1 to 10 scale based on % diseased leaf area:

0 = 0	4 = 35.0	8 = 90.0
1 = 2.5	5 = 50.0	9 = 97.5
2 = 10.0	6 = 65.0	10 = 100.0
3 = 21.0	7 = 79.0	

<sup>2</sup> Average of four replications

<sup>3</sup> Spray Timing:

A = 1-2 true leaf stage  
B = 3-4 true leaf stage  
C = 5-6 true leaf stage  
D = 2 weeks after first flower

# **PROCESSING TOMATO**

## **INSECT CONTROL TRIAL**

## Control Of Garden Centipedes, *Scutigerella immaculata* in Processing Tomatoes

**Grower/Cooperators:** Hal and Keith Robertson Farms, Tracy, CA

**Researchers:** R. Mullen, C. Fouche, C. Rivara & D. Brunmeier

**Test Crop:** Tomatoes, Processing – Field Transplant Variety: H-9663  
30” rows, with 12” spacing between double rows of plants.  
Plot size .002 acre, one row wide by 20 plants in each bed.  
Field was furrow irrigated.

**Materials in Trial:**

Products	Active ingredient	Timing	Formulation	G a.i./100 ml
1. Platinum	neonicotinoid	At Transplanting	2SC	0.75
2. Platinum	neonicotinoid	At Transplanting	2SC	1.04
3. Admire	imidacloprid	At Transplanting	2SC	2.80
4. AG600 WBC	diazinon	At Transplanting	AG600	34.40
8.Untreated	water	At Transplanting	-----	-----

**Application:**

Each material was dissolved in water with 250 ml of solution applied to the soil immediately after transplanting. The solution was applied to the base of the plant and allowed to penetrate the soil profile to a level just below the plug.

**Application Date:**

All materials were applied on June 3, 1999.

**Evaluations:**

Stand counts were taken by visually rating the number of plants alive out of the total of 20 in the plots. Stand vigor was evaluated based on the growth and vigor of the plants outside of the affected area. Counts of symphylids per plant was highly variable and only used in the precount evaluation.

**Results:**

The Diazinon AG600 was the only material to provide protection from garden centipedes in this trial. The Diazinon provided protection for the 48 days the plants were observed.

**Conclusions:**

Platinum and Admire at these rates were not effective materials for controlling damage by symphylans. Diazinon applied at the time of transplanting provided commercially acceptable control in an area where the pest pressure was high.

**Tomato Symphylid Trial – 1999**  
**Tracy, CA**

Trt.		June 3 – existing plant population presample				June 17 14 days after trt.		July 1 28 days after trt.		July 21 48 days after trt.	
		Stand Count	Stand Vigor	# Symphylid per plot	# Symphylid per plant	Stand Count	Stand Vigor	Stand Count	Stand Vigor	Stand Count	Grams per plant
1.	Platinum 0.75 g	11 b	3.9 bc	11.5 ab	2.6 ab	20 a	4.8 a	14 ab	4.3 a	14 ab	153 a
2.	Platinum 1.04 g	9 ab	3.1 abc	14 ab	2.8 ab	20 a	4.5 a	13 a	3.8 a	13 a	129 a
3.	Admire 2FS 2.8 g a.i.	5.8 a	2.1 a	19.5 b	4.1 b	20 a	5.3 ab	16 ab	5.6 ab	16 ab	270 a
4.	Diazinon AG600	11.5 b	4.8 c	4.8 a	1.1 a	20 a	7.8 b	19 b	9 b	19 b	579 b
5.	Untreated Control	8.4 ab	2.4 ab	11.3 ab	2.5 ab	19 a	4.7 a	15 ab	4.3 a	15 ab	142 a

Means within a column followed by the same letter(s) are not significantly different (DMRT,P = 0.05)

Stand Count is out of twenty plants

Stand vigor is visual rating: 1 = low vigor, 10 = high vigor

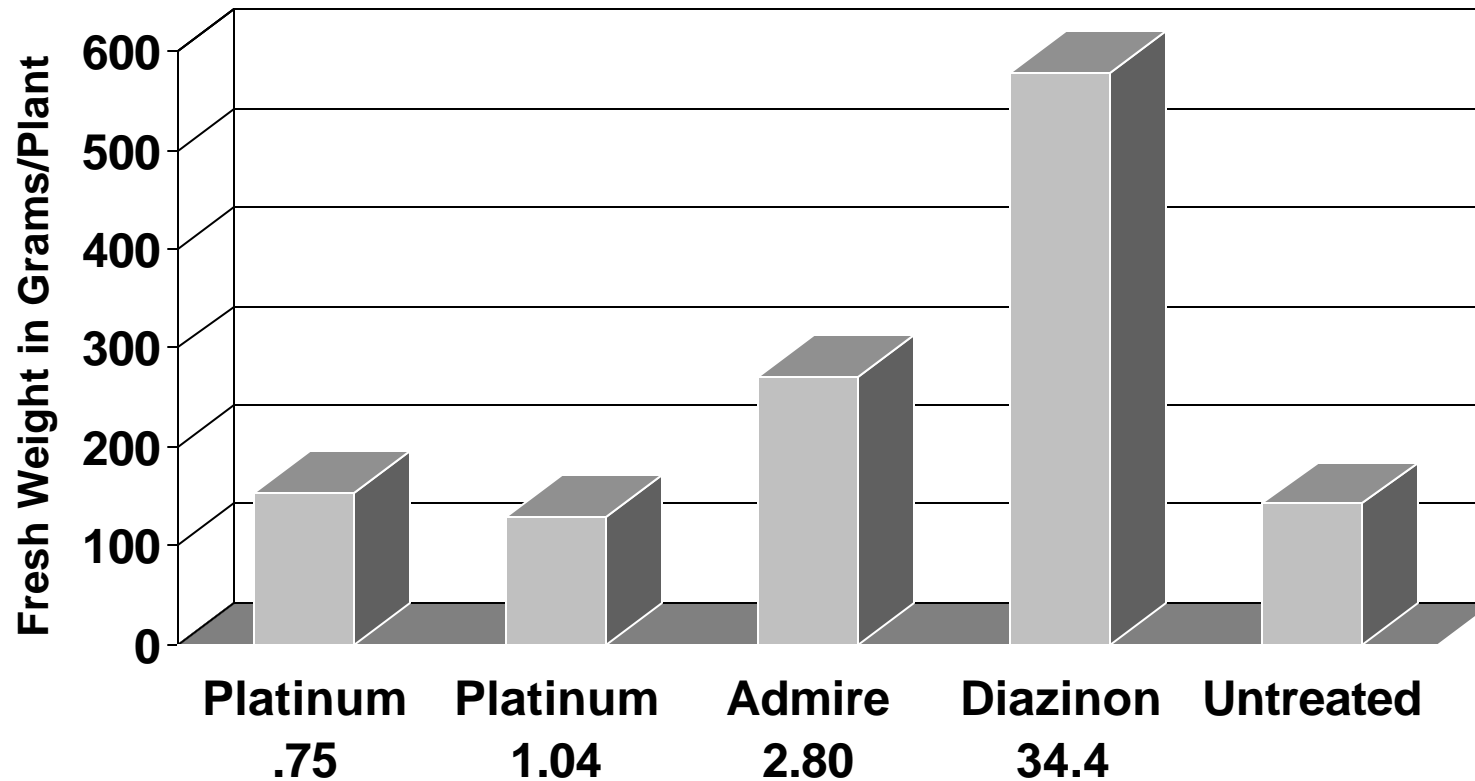
Yield = mean fresh weight in grams of whole plants



# Tomato Symphylan Trial - Tracy, CA 1999

## 48 Days After Treatment - 20 Plants/Plot

Treatments in gai/100m



This is a report of work in progress only. The chemicals and uses contained in this publication are experimental data and should not be considered as recommendations for use.

Until the products and their uses given in this report appear on a registered pesticide label or other legal, supplementary direction for use, it is illegal to use the chemicals as described.

### **WARNING ON THE USE OF CHEMICALS**

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in their original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Recommendations are based on the best information currently available, and treatments based on them should not leave residues exceeding the tolerance established for any particular chemical. Confine chemicals to the area being treated. **THE GROWER IS LEGALLY RESPONSIBLE** for residues on his crops as well as for problems caused by drift from his property to other properties or crops.

Consult your County Agricultural Commissioner for correct methods of disposing of leftover spray material and empty containers. Never burn pesticide containers.

### **PHYTOTOXICITY**

Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high or when overcast conditions occur. Injury may also result from excessive amounts or the wrong formulation or mixing incompatible materials. Inert ingredients such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

**No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.**

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