

ASPARAGUS

Variety Evaluation & Pest Management
in San Joaquin County



2001 Research Progress Report

University of California Cooperative Extension
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Stockton, California 95205-6243

**2001 ASPARAGUS VARIETY EVALUATION
AND PEST MANAGEMENT TRIALS**

RESEARCH PROGRESS REPORT

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The asparagus variety evaluation and pest management research program in San Joaquin County is conducted with the cooperation and management assistance of the following growers and managers: Bill Zech, Tony Piazza and Alan Carlisle, Bill and Chip Salmon, Mark Bacchetti and John Bacchetti, Marc and Paul Marchini and Skip Foppiano, as well as the California Asparagus Commission. It is their fine cooperation, financial and in-kind support and patience that benefits all asparagus growers in San Joaquin County and elsewhere. Great appreciation and many thanks are extended to these individuals for their contributions and interest.

CAUTION

This publication is a research progress report of asparagus cultivar evaluation trials and pest management studies conducted in San Joaquin County during 2001. This report presents results of asparagus weed and disease management trials conducted with local grower cooperators. They should not, in any way, be interpreted as a recommendation of the University of California. Chemical or common names of pesticides are used in this report instead of the more common trade names of those products. No endorsement of products mentioned or criticism of similar products is intended. The rates of pesticides in this report are always expressed as active ingredients (A.I.) of the material per treated acre, unless otherwise indicated.

<u>Trade Name</u>	<u>Common or Chemical Name</u>	<u>Manufacturer</u>
Lorsban (15G)	chlorpyrifos	Dow AgroSciences
Diazinon (AG600)	diazinon	Syngenta Crop Protection
Mocap (20G)	ethoprop	Aventis
Admire (2F)	imidacloprid	Bayer AgChemicals
Platinum (25C)	(thiamethoxam)	Syngenta Crop Protection
Devrinol (2E)	napropamide	Zeneca Ag Products
Goal (2XL)	oxyfluorfen	Dow AgroSciences
Karmex (80DF)	diuron	DuPont Ag Products
Lorox (50DF)	linuron	DuPont Ag Products
Milestone (80DF)	azafendin	DuPont Ag Products
Sandea (75WG)	halosulfuron	Monsanto/Gowan Chemical Co.
Prowl (3.3E)	pendimethalin	BASF Corporation
Sencor (75DF)	metribuzin	Bayer Ag Chemicals
Valor (50WP)	flumioxazin	Valent U.S.A. Corporation
Visor (2E)	thiazopyr	Dow AgroSciences
Cabrio (20.7 WDG)	BASF-500	BASF Corporation
Dithane (75DF)	mancozeb	Dow AgroSciences
Flint (50WG)	trifloxystrobin	Syngenta
Folicur (3.6F)	tebuconazole	Bayer Ag Chemicals
Quadris (2.08SC)	azoxystrobin	Zeneca Ag Products
Rally (40WP)	myclobutanil	Dow AgroSciences
Thiolux (80DF)	micronized sulfur	Syngenta Crop Protection
Tilt (3.6E)	propiconazole	Syngenta Crop Protection

CULTIVAR EVALUATION TRIALS

International Asparagus Cultivar Evaluation Trial II (Augusta-Bixler Farms) - The trial, in its sixth year of harvest, was cut 30 times over 70 days. The trial has 17 replicated lines with another 17 selections in a single replication observation block. Variety selections from Dr. Mikeal Roose's asparagus breeding program at UC Riverside, along with lines from 7 foreign countries (Italy, France, Germany, Spain, Holland, New Zealand and Taiwan) and varieties from Rutgers University in New Jersey, are being compared to three selected "standard" cultivars - UC157F₁, Jersey Giant and Gin Lim. Additionally, four private breeder lines from California Asparagus Seed and Transplant (Brian Benson) - Apollo, Atlas, Grande and Purple Passion - are also being evaluated. Production of a number of the lines was very good considering the late start of the harvest season due to cold weather and below-normal temperatures limiting production for a considerable time once cutting had begun. Depressed market prices also caused a number of growers to end harvest prematurely. The highest yielding line in the replicated block of the International trial was crown-planted UC157F₁, at 5,239 Lbs./Acre, followed by seedling-planted UCR7 (4,030 Lbs./Acre), UC157F₁ (3,816 Lbs./Acre), Atlas (3,765 Lbs./Acre), UCR5 (3,713 Lbs./Acre), UCR8 (2,980 Lbs./Acre) and

Grande (2,966 Lbs./Acre). It should be noted that UC157F₁ is reported twice for yield because 17 replicated lines were established in 1995 using 10-12 week old seedling transplants, while the site for the 18th line, which was unavailable, was filled by using UC157F₁ again as one-year-old crowns. Best spear quality was attained by UC157F₁ (seedling or crown planted), UCR5, UCR7, Atlas, Gin Lim, UCR8, Grande and ASP-1. Largest spear size occurred with Purple Passion, followed by Andreas, UCR8, Grande and Dariana. See **Table 1** for complete replicated trial results.

In the 17-line observation trial block (all planted with 10-12 week old seedlings), with one line - UCR115 - repeated to fill out the 18 plots, harvest occurred 30 times over 70 days. Best yield was achieved by UCR115 at 4,160 Lbs./Acre, followed by Eros (3,347 Lbs./Acre), Tainan #2 (2,673 Lbs./Acre), Ven Lim (2,626 Lbs./Acre), Jersey Knight (2,321 Lbs./Acre), UCR88 (2,195 Lbs./Acre) and Golia (2,060 Lbs./Acre). Yields in the observation block were down considerably from 2000, possibly due to water seepage from a canal about 80 feet from the trial causing some disease damage to the crowns. Best spear quality occurred with UCR115, Tainan #2, Eros, DA911 and Golia. Golia had the largest spear size, followed by UCR84, 89P58 and Cipres. Complete observation trial results are presented in **Table 2**.

UC Asparagus Cultivar Evaluation Trial (Victoria Island Farms) This trial, planted with one-year-old crowns in 1998, was harvested 30 times over 70 days. Drip irrigation is being used to supply the majority of the moisture needs of the trial field while also serving as a system to deliver fertilizer to the plant stand. The trial contains 12 replicated varieties with another 13 cultivars in single replication observation plots. Some stand loss in a couple of the slower growing varieties occurred during 1998 from excessive early filling of the planted trenches with soil. As in 2000, excellent production in a number of replicated and observation varieties occurred during the 2001 harvest season. The highest yielding line in the replicated trial was UCR115 at 7,398 Lbs./Acre, followed by Atlas (6,026 Lbs./Acre), UC157F₁ (5,880 Lbs./Acre), UCR65 (5,847 Lbs./Acre), UCR112 (5,032 Lbs./Acre), Grande (4,968 Lbs./Acre) and UCR87 (4,822 Lbs./Acre). Best spear quality was attained by UC157F₁, UCR115, UCR82, Atlas, Grande, UCR62, UCR65 and UCR112. Largest spear size occurred with Atlas, followed by UCR87, Grande, Apollo and UCR65. The large spear size demonstrated in this field is a function of plant spacing, fertilization and the use of drip irrigation, and this could pose a potential marketing problem with the current consumer market desiring smaller spear sizes. Complete replicated trial data is given in **Table 3**.

In the 13 line observation block, greatest yield was attained by Cipres at 7,205 Lbs./Acre, followed by PLA 2232 (6,560 Lbs./Acre), UCR69 (6,385 Lbs./Acre), UCR122 (6,300 Lbs./Acre), UCR107 (5,560 Lbs./Acre) and UCR66 (5,490 Lbs./Acre). Best spear quality was shown by UCR122, UCR69, UCR66, PLA 2332, DA 909, PLA 2232 and UCR107. Largest spear size was provided by UCR122, Cipres, PLA 2232, UCR107, and UCR96. The problem with large average spear size with many of these lines due to drip irrigation and plant spacing needs to be considered, along with plant fertilization. Reduction in all 3 areas may bring spear size to more marketable levels. Complete observation trial data is provided in **Table 4**.

UC Asparagus Cultivar Evaluation Trial (Foppiano Farms) This trial, planted with one-year-old crowns in 1997, was harvested 30 times over a period of 66 days. The field was flooded late, to recharge the soil profile with moisture, since minimal rainfall occurred during December 2000 and January 2001. Water had just been drained off when substantial rain fell in February. This, coupled with very cool weather, caused a delay in the start of harvest as well as considerable crown damage due to garden symphylan/centipede feeding and saturated soil conditions contributing to Phytophthora crown rot. This is the second season in a row that these conditions prevailed resulting in low yields for most trial cultivars. The highest yield in the replicated block, containing 7 lines, occurred with RF110 x M138 (UCR4) at 3,032 Lbs./Acre, followed by F597 x M138 (UCR5) at 2,910 Lbs./Acre and F189 x HS185 (UCR10) at 2,544 Lbs./Acre. Best spear quality occurred with UCR5, UC157F₁, and UCR4. Largest spear size was attained by UCR10, UCR8 and UCR5. Complete replicated trial data is contained in **Table 5.**

In the 7 line observation trial block, suffering from the aforementioned saturated soil, symphylan and cool weather problems, highest yield was produced by F145 x A1 at 3,546 Lbs./Acre, followed by RF110 x A1 (2,736 Lbs./Acre) and F141 x A1 (1,995 Lbs./Acre). Best spear quality occurred with F145 x A1. Largest spear size was attained by F212 x H1, RF110 x A1 and F141 x A1. Complete observation trial data is shown in **Table 6.**

Due to the considerable damage that has occurred in the trial from disease and insect pressure, no further work will be conducted next year.

OTHER CULTIVAR EVALUATION TRIALS

Two trials, evaluating advanced lines from Dr. Mikeal Roose's breeding program at UC Riverside and Dr. Steve Garrison's asparagus variety development program at Rutgers University in New Jersey plus lines from California Asparagus Seed and Transplant, showed promise in 2000 but have been lost due to a heavy infestation of European asparagus aphid killing off most of the stand in both trials.

A new cultivar evaluation trial will be established in a new location in 2002. Crowns are currently being grown by California Vegetable Specialties (Rich Collins) at a nursery site near Turlock, California. This trial will contain new and very promising lines from UC Riverside, Rutgers University, and California Asparagus Seed and Transplant. The intended trial will include 19 replicated lines (8 from UC Riverside, 5 from Rutgers University and 5 from California Asparagus Seed and Transplant, plus UC157F₁ as a standard line). The observation block will contain 29 lines from UC Riverside and 8 lines from Rutgers University.

Table 1. 2001 INTERNATIONAL ASPARAGUS CULTIVAR EVALUATION TRIAL
 Augusta Bixler Farms – Union Island, California
 Replicated Trial – 30 harvests, 70 days

Cultivar	Yield Lbs/Acre ¹	Spear No./Acre ¹	Average Spear Size (g) ¹
UC 157 (crowns)	5,239	75,794	31.4
UCR 7	4,030	57,717	31.7
UC 157	3,816	61,129	28.3
Atlas	3,765	54,595	31.3
UCR 5	3,713	57,717	29.2
UCR 8	2,980	39,712	34.1
Grande	2,966	39,712	33.9
Val Prima	2,233	36,518	27.8
Gin Lim	2,203	35,937	27.8
Purple Passion	2,193	23,958	41.6
Apollo	2,163	32,380	30.3
ASP-1	2,161	37,171	26.4
Dariana	2,138	28,895	33.6
Taramea	1,891	35,937	23.9
Jersey Giant	1,754	32,597	24.4
Tie Lim	1,452	21,199	31.1
Andreas	958	12,705	34.2
Jersey Gem	801	13,141	27.7
LSD @ 5%:	1,194	19,771	
C.V. =	32.6%	36.0%	

¹ Average of four replications

Table 2. 2001 INTERNATIONAL ASPARAGUS CULTIVAR EVALUATION TRIAL
 Augusta Bixler Farms – Union Island, California
 Observation Trial – 30 harvests, 70 days

Cultivar	Yield Lbs/Acre ¹	Spear No./Acre ¹	Average Spear Size (g) ¹
UCR 115 ²	4,160	70,277	26.9
Eros	3,347	49,078	31.0
Tainan #2	2,673	50,239	24.2
Ven Lim	2,626	35,719	33.4
Jersey Knight	2,321	37,171	28.3
UCR 88	2,195	31,944	31.2
Golia	2,060	23,522	39.8
DA 911	1,919	28,750	30.3
89P72	1,905	26,136	33.1
UCR 65	1,793	24,974	32.6
UCR 84	1,760	21,490	37.2
UCR 60	1,758	34,848	22.9
UCR 62	1,739	27,878	28.3
Huchels L	1,649	27,007	27.7
Argo	1,247	21,199	26.7
89P58	1,215	14,810	37.2
Cipres	984	13,068	34.2

¹ Average of four replications

² Average of two replications

Table 3. 2001 ASPARAGUS CULTIVAR EVALUATION TRIAL
 Victoria Island Farms – West Of Stockton, California
 Replicated Trial (30 harvests – 70 days)

Cultivar	Spear Weight ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
UCR115	7,398	90,012	37.3
Atlas	6,026	61,786	44.3
UC157F ₁	5,880	75,794	35.2
UCR65	5,847	65,514	40.5
UCR112	5,032	57,952	39.4
Grande	4,968	52,795	42.7
UCR87	4,822	49,484	44.2
UCR88	4,212	48,369	39.5
Apollo	3,597	38,437	42.5
UCR82	3,589	44,013	37.0
UCR60	3,337	39,657	38.2
UCR62	2,825	35,301	36.3
LSD @ 5%:	1,299	14,140	
CV =	18.8%	17.9%	

¹ Average of four replications

Table 4. 2001 ASPARAGUS CULTIVAR EVALUATION TRIAL
 Victoria Island Farms – West Of Stockton, California
 Observation Trial (30 harvests – 70 days)

Cultivar	Spear Weight ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
Cipres	7,205	70,393	46.5
PLA-2232	6,560	69,348	42.9
UCR69	6,385	93,044	31.2
UCR122	6,300	55,757	51.3
UCR107	5,560	60,636	41.6
UCR66	5,490	64,120	38.9
UCR79	4,980	70,741	32.0
UCR109*	4,500*	42,834*	47.7
UCR64	4,013	50,181	36.3
UCR96	3,859	42,166	41.5
DA909	3,167	42,515	33.8
PLA-2332	3,072	47,393	29.4
PLA-H34IA*	1,743*	21,780*	36.3

¹ Average of only one replication

* 12 ft of planted row of each variety, due to shortage of crowns at planting time

Table 5. 2001 ASPARAGUS CULTIVAR EVALUATION TRIAL
Foppiano Farms – King Island
Replicated Trial (30 harvests – 66 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
RF110 x M138 (UCR4)	3,032	73,181	18.8
F597 x M138 (UCR5)	2,910	64,730	20.4
F189 x HS185 (UCR10)	2,544	46,871	24.6
F189 x HS104 (UCR8)	1,934	40,337	21.8
UC157 _{F1}	1,899	47,742	18.1
F608 x M138 (UCR6)	1,856	47,306	17.8
F609 x M138 (UCR7)	1,838	49,049	17.0
LSD @ 5%:	775	13,835	
CV =	22.8%	17.7%	

¹ Average of four replications

Table 6. 2001 ASPARAGUS CULTIVAR EVALUATION TRIAL
Foppiano Farms - King Island
Observation Trial (30 harvests - 66 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
F145 x A1	3,546	82,764	19.4
RF110 x A1	2,736	58,370	21.3
F141 x A1	1,995	44,431	20.4
F212 x H1	1,533	29,621	23.5
F181 x A1	1,498	33,977	20.0
F137 x L1	1,255	32,234	17.7
F109 x L1	845	20,909	18.3

¹ Average of only one replication

Pest Management Research Trials

A preemergence weed control trial in newly planted one-year-old asparagus crowns.

Robert Mullen.

A preemergence weed control trial in newly planted one-year-old asparagus crowns, evaluating eight herbicides and/or combination treatments, was established on January 4, 2001 at Marchini Farms on Fabian Tract northwest of Tracy, California. All treatments were applied with a handheld CO₂ backpack sprayer in a spray volume of 30 gallons water per acre. Soil incorporation of the surface-applied herbicides evaluated was accomplished by winter rainfall and grower-applied furrow irrigation. The soil type at the trial site was a Roberts muck/Burns clay loam mix. Plot design was a randomized complete block. The field was planted to UC157F₁ crowns in mid-December 2000. The trial was evaluated for weed control efficacy and crop fern vigor on February 28, 2001 and again on March 28, 2001. All treatments gave excellent control of the major weed species present: shepherdspurse, burning nettle and common groundsel. Materials evaluated included Visor (thiazopyr) alone and in combination with Goal (oxyfluorfen), Sandea (halosulfuron) alone, Milestone (azafenadin) alone, Valor (flumioxazin) alone, the combination treatments of Karmex (diuron) plus Devrinol (napropamide), Karmex plus Prowl (pendimethalin) and Prowl alone. Crop safety was very good with most treatments except for some temporary suppression of fern growth with Valor and the combination treatment of Visor plus Goal. Valor was evaluated using an old protocol and the use rate should have been 1/3 to 1/2 of the rate tested. Had this been done the suppression of growth may not have occurred. Goal, even at low rates, has consistently shown some crop growth suppression in previous trial work.

2001 ASPARAGUS PREEMERGENCE WEED CONTROL
 (Newly planted one-year-old crowns)
 Marchini Farms – West Fabian Tract near Tracy, California

Treatment	Rate Lb/Ac.	Weed Control ¹							
		Shepherdspurse		Burning Nettle		Common Groundsel		Crop Fern Vigor ¹	
		2/28	3/28	2/28	3/28	2/28	3/28	2/28	3/28
Visor (2E)	1.00	10.0	10.0	10.0	10.0	10.0	10.0	8.4	8.8
Visor + Goal (2XL)	1.00 + 0.25	10.0	10.0	10.0	10.0	10.0	10.0	7.3	7.6
Sandea (75WG)	0.083	10.0	10.0	10.0	10.0	10.0	10.0	8.6	8.8
Milestone (80DF)	0.50	10.0	10.0	10.0	10.0	10.0	10.0	8.6	9.0
Valor (50WDG)	0.375	10.0	10.0	10.0	10.0	10.0	10.0	6.4	8.1
Prowl (3.3E)	4.00	10.0	10.0	10.0	10.0	10.0	8.9	8.6	9.1
Prowl + Karmex (80DF)	4.00 + 2.00	10.0	10.0	10.0	10.0	10.0	9.0	8.6	9.3
Karmex + Devrinol (50WP)	2.00 + 4.00	10.0	10.0	10.0	10.0	10.0	10.0	8.8	9.3
Untreated Control	----	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.9

¹ Average of four replications
 Weed Control – 0 = no weed control; 10 = complete weed control
 Crop Fern Vigor – 0 = crop dead; 10 = crop growing vigorously

Notes:

1. Visor and Visor plus Goal did not control a limited population of volunteer sunflower.
2. Prowl was only partially effective on volunteer sunflower and missed a little common lambsquarter.
3. Prowl plus Karmex was only partially effective on volunteer sunflower.
4. Karmex plus Devrinol also missed some volunteer sunflower, as well as some annual sowthistle and common lambsquarter.
5. Untreated Control contained volunteer sunflower, common lambsquarter, annual sowthistle, red maids, Poa annua, and the weed species rated in the above table.

A postemergence weed control trial in newly planted one-year-old asparagus crowns.

Robert Mullen

A postemergence weed control trial in newly planted one-year-old asparagus crowns, evaluating three herbicides, was established on March 1, 2001 at Marchini Farms on Fabian Tract northwest of Tracy, California. All treatments were applied with a handheld CO₂ backpack sprayer in a spray volume of 30 gallons water per acre. The soil type at the trial site was a Roberts muck/Burns clay loam mix. The plot design was a randomized complete block. The field had been planted in mid-December 2000 with one-year-old UC157F₁ asparagus crowns. Weeds present at the time of treatment included 3 to 6 inch rosette shepherdspurse, 2 to 6 inch tall burning nettle, 2 to 5 inch tall common groundsel, 2 to 4 inch rosette redmaids and limited weed populations of 2 to 4 inch tall volunteer sunflower, cotyledon to first true leaf common lambsquarter and 1 to 2 inch tall Poa annua. The asparagus crop fern was 12 to 14 inches tall and spray applications were made directly over the crop fern and weeds. The trial was rated for weed control efficacy and asparagus fern phytotoxicity on March 15, 2001. Best weed control of all the weed species rated occurred with Sencor (metribuzin). Lorox (linuron) alone or with crop oil concentrate (COC) added gave excellent control of shepherdspurse, burning nettle and redmaids but only partial control of common groundsel. Sandea plus crop oil concentrate, at both rates tested, was weak on all the weed species rated. Crop fern safety was excellent with all treatments.

2001 ASPARAGUS POSTEMERGENCE WEED CONTROL
 (Newly planted one-year-old crowns)
 Marchini Farms – West Fabian Tract near Tracy, California

Treatment	Rate Lb/Ac.	Weed Control ¹				Crop ¹ Fern Phyto
		Shepherdspurse	Burning Nettle	Common Groundsel	Redmaids	
Sencor (75DF)	1.00	10.0	9.6	10.0	10.0	0.8
Lorox (50DF)	1.00	10.0	9.3	6.2	10.0	0.6
Lorox + COC	1.00 + ½%	10.0	9.6	7.7	10.0	0.8
Sandea (75WG) + COC ²	0.032 + ½%	5.3	2.5	2.7	2.8	0.6
Sandea + COC	0.047 + ½%	6.0	3.3	3.0	3.0	0.9
Untreated Control	----	0.0	0.0	0.0	0.0	0.6

¹ Average of four replications

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

Crop Fern Phyto – 0 = no crop damage; 10 = crop dead

² COC = crop oil concentrate

Notes:

6. Lorox and Lorox + COC missing a limited population of Poa annua, as well as some volunteer sunflower.
7. Sandea + COC, at both rates tested, missing a limited population of common henbit.
8. Sencor also is missing a limited population of Poa annua
9. Untreated control contains Poa annua and common henbit as well as the weeds rated in table above.

Postemergence yellow nutsedge management in post-cutting season established asparagus.

Robert Mullen & Scott Whiteley

A postemergence nutsedge management trial in post-cutting season fern stage established asparagus, evaluating several rates of Sandea (halosulfuron) plus X-77 spreader and liquid ammonium sulfate (AMS), was established at Marca Bella Farms on Fabian Tract, northwest of Tracy, California, July 25, 2000. A second treatment of selected rates occurred on August 15, 2000. All treatments were made as directed sprays to the base of the crop fern but over the emerged yellow nutsedge using a handheld CO₂ backpack sprayer in a spray volume of 40 gallons per acre. The soil type at the trial site was a Sacramento clay/Piper sandy loam mix and the field variety was UC 157F₁. The trial plot design was a randomized complete block. Yellow nutsedge, at the time of initial treatment, was at the 3 to 7 true leaf stage of growth. Weed control efficacy and crop fern phytotoxicity ratings were made August 10, 2000 and again on September 12, 2000. All treatments gave good to very good suppression (78 to 91 percent) of yellow nutsedge with two applications of comparable rates giving slightly better activity than a single application. Crop fern safety was excellent with all treatments.

In 2001, visual ratings of the 2000 treatments were made to document yellow nutsedge suppression and two applications of the highest rate, (0.047 Lb./Acre) plus ½% X-77 and 2.5% liquid ammonium sulfate (AMS) applied in 2000, had resulted in suppression rating of 7.3 on a scale of 1 to 10, with a 10 being complete suppression. Two applications for the lower rate (0.032 Lb./Acre) in 2000 gave yellow nutsedge suppression rating of 6.5 in 2001. Yield data on the trial was taken for the entire harvest season (35 harvests over 84 days). The trial site had not had a previous history of asparagus and the yields were exceptionally high. All treatments, led by the 2 applications of Sandea at the lower rate (0.032 Lb./Acre), out-produced the untreated control, but not significantly. The vigor of the asparagus crop was excellent.

A rust control trial in established asparagus. Robert Mullen, Scott Whiteley, Michelle Goff and Charles Cancilla.

A trial to control rust (*Puccinia asparagi*) in established fern stage asparagus, evaluating eight candidate fungicides, was established at Victoria Island Farms west of Stockton, California on September 10, 2000. The asparagus fern at initial treatment was 60 to 72 inches high and rust infection was light. All treatments were applied over the crop fern using a handheld CO₂ backpack sprayer in a spray volume of 50 gallons per acre. The soil type at the trial site was an Egbert muck and the field variety was UC 157F₁. Plot design was a randomized complete block. After the initial spray application on September 10, 2000, additional treatment occurred on September 22, 2000 and October 6, 2000. Disease severity ratings of the crop fern were made on 9/21/00, 10/6/00 and 10/20/00. Best suppression of the disease occurred with Folicur (tebuconazole) and Cabrio (BASF 500), followed closely by Rally (myclobutanil) and Tilt (propiconazole). The only ineffective fungicides in the trial were Dithane (mancozeb) and Thiolux (micronized sulfur).

In 2001, the previous year's rust management trial was harvested for the entire season. Highest yields, relative to the untreated control, occurred with Rally (myclobutanil) at 4,394 Lbs./Acre, followed by Flint (trifloxystrobin) at 4,203 Lbs./Acre, Quadris (azoxystrobin) at 4,143 Lbs./Acre and Cabrio (BASF 500) at 4,035 Lbs./Acre. The yields in the trial were not significantly different and variability in crop stand between treatments should alert the reader to view the yield figures with a degree of caution relative to any conclusion that any one product provided better yield than another product or the untreated control.

2000/2001 ASPARAGUS RUST DISEASE CONTROL
Victoria Island Farms - Victoria Island, California
Established Beds

Treatment	Rate lb./Acre a.i.	2000 Asparagus Fern Rust ¹ Disease Severity Rating			2001 Asparagus Rust Trial Yield (Lbs/Ac.) <i>31 harvests – 72 days</i>
		9/21	10/6	10/20	
Rally (40WP)	0.125	2.6	2.4	2.3	4,394
Folicur (3.6F)	0.150	2.8	2.2	2.1	3,188
Quadris (2.08SC)	0.200	2.9	3.1	3.3	4,143
Flint (50WG)	0.078	2.9	3.0	2.9	4,203
Tilt (3.6E)	0.100	2.8	2.4	2.4	3,338
Dithane (75DF)	1.500	4.9	5.0	5.1	3,610
Thiolux (80DF)	8.000	4.8	4.9	5.0	3,795
Cabrio (20.7WDG)	0.150	2.4	2.0	2.1	4,035
Untreated Control	---	5.3	5.4	6.3	3,780

¹ Average of four replications and the following disease severity rating scale:

LSD @ 5%: ns
CV = 21.6%

Disease severity rating - Barratt/Horsfall System

Rating Scale	Grade	% Plant Infected	% Plant Healthy	Grade	% Plant Infected	% Plant Healthy	Grade	% Plant Infected	% Plant Healthy
	0	0	100	4	12 to 25	75 to 88	8	88 to 94	6 to 12
	1	0 to 3	97 to 100	5	25 to 50	50 to 75	9	94 to 97	3 to 6
	2	3 to 6	94 to 97	6	50 to 75	25 to 50	10	97 to 100	0 to 3
	3	6 to 12	88 to 94	7	75 to 88	12 to 25	11	100	0

A garden symphylan control trial in newly planted one-year-old asparagus crowns.

Benny Fouche, Robert Mullen and Scott Whiteley

A trial, seeking to control garden symphylan (*Scutigera immaculata*) in newly planted one-year-old asparagus crowns, was established November 27, 2000 at Marca Bella Farms on Fabian Tract northwest of Tracy, California. Since the loss of Dyfonate (fonofos) a few years ago, problems with garden symphylan causing asparagus crown damage and plant stand loss have been on the increase. The current registered material, Lorsban (chlorpyrifos), is partially effective in controlling garden centipede but is labeled in such a way (180 day preharvest interval) that it cannot be used on established asparagus when it is really needed – during the normally wet late fall and early winter months when garden centipede is most active and can cause serious crop damage and loss of spear production.

Consequently the trial was initiated, with funding support from the California Asparagus Commission, to further evaluate Lorsban, along with some other candidate materials – Mocap (ethoprop) 20G, Diazinon (diazinon) AG600, Admire (imidacloprid) 2F and Platinum (thiamethoxam) 25C, for control of garden symphylan. Lorsban and Mocap were applied as granular materials over the newly planted asparagus crowns and then the crowns were immediately covered in the open trenches with 3 to 4 inches of soil. Diazinon AG600, Admire and Platinum were applied with a handheld CO₂ backpack sprayer in a spray volume of 30 gallons water per acre before the crowns had been covered in the open trenches with 3 to 4 inches of soil. The trial design was a complete randomized block and there were six replications of each treatment. Twice the normal number of crowns was planted so that crowns could be dug, without hurting the grower's crop stand, and evaluated for the presence of garden symphylan strikes. The soil type at the trial site was a Burns clay loam.

Crop stand counts and crop fern vigor ratings were taken on March 21, 2001 and again on June 26, 2001. Both the number of plants and the crop fern vigor had decreased somewhat from the first rating date. Five crowns from each treatment in each replication were dug, washed and scored for symphylan strikes, as well as weighed. The symphylan strike data showed there was minimal symphylan activity and this is probably the result of a relatively cold and dry winter. Crown weights were generally greater than those in the untreated control but probably not significantly more. The trial will be somewhat redesigned in 2001/2002 with the probable addition of another material, fipronil, and possibly others.

2001 ASPARAGUS GARDEN SYMPHYLAN CONTROL
 Marca Bella Farms – Fabian Tract near Tracy, California

Treatment	Rate Product/Acre	Crop Stand ¹ Count/Rep		Crop Fern ¹ Vigor		# Symphylan ¹ Strikes/Crown per rep	Ave. Wt (g) ¹ per crown/rep (5 crown sample/plot)
		3/21	6/26	3/21	6/26		
Untreated Control	-----	53.0	41.5	8.2	7.8	3.7	71.7
Lorsban (15G)	10 Lb	51.7	43.5	8.5	7.8	3.9	100.1
Diazinon (AG600)	102 Fl. oz.	53.3	45.0	8.5	7.5	3.9	83.0
Mocap (20G)	1.1 Lb/500 ft.	50.7	42.3	8.4	7.7	4.9	79.4
Admire (2F)	24 Fl. oz	53.8	44.5	8.6	8.2	4.7	77.2
Platinum (25C)	11 Fl. oz.	53.5	43.8	8.3	7.9	5.7	78.4

¹ Average of 6 replications

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.

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