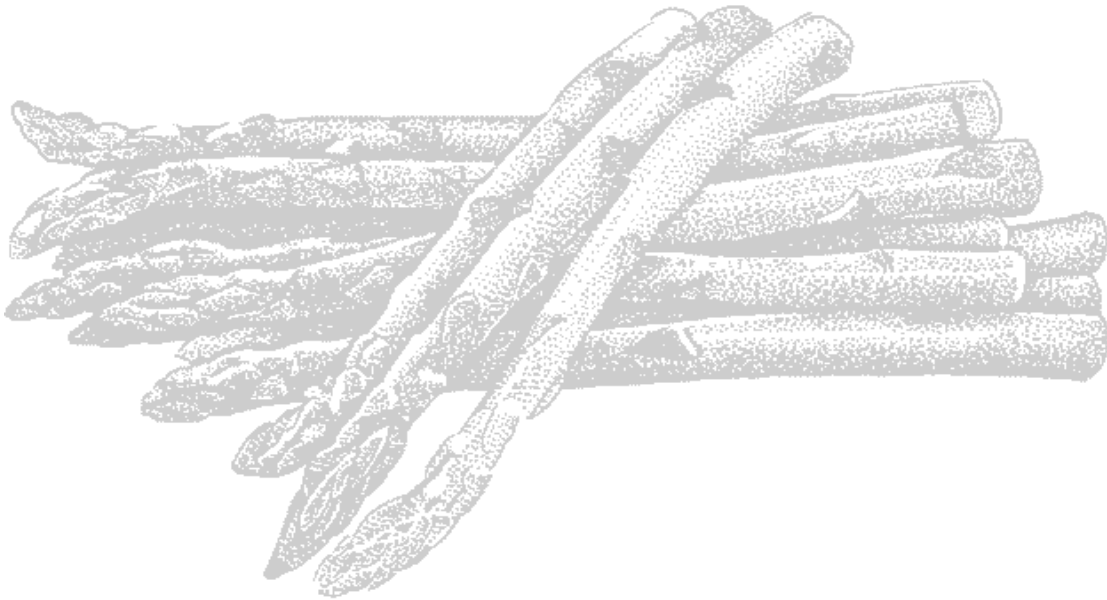


ASPARAGUS



Variety Evaluation & Pest Management
in San Joaquin County

2000 Research Progress Report

University of California Cooperative Extension
420 South Wilson Way
Stockton, California 95205-6243

**2000 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, Ed Zuckerman 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 contribution 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 2000. 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 fungicides and herbicides 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 fungicides and herbicides 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>
Aim (40DF)	carfentrazone	FMC Corporation
Authority (75DF)	sulfentrazone	FMC Corporation
Devrinol (2E)	napropamide	Zeneca Ag Products
Goal (2XL)+0	oxyfluorfen	Rohm & Haas Co.
Karmex (80DF)	diuron	DuPont Ag Products
Lorox (50DF)	linuron	DuPont Ag Products
Milestone (80DF)	azafendin	DuPont Ag Products
Permit/GWN-3060 (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	Rohm & Haas Co.
BASF 500 (20.7 WDG)	BASF-500	BASF Corporation
Dithane (75DF)	mancozeb	Rohm & Haas Co.
Flint (50WG)	CGA-279202	Novartis
Folicur (3.6F)	tebuconazole	Bayer Ag Chemicals
Quadris (2.08SC)	azoxystrobin	Zeneca Ag Products
Rally (40WP)	myclobutanil	Rohm & Haas Co.
Thiloux (80DF)	micronized sulfur	Novartis
Tilt (3.6E)	propiconazole	Novartis

CULTIVAR EVALUATION TRIALS

International Asparagus Cultivar Evaluation Trial II (Augusta-Bixler Farms) - The trial, in its fifth year of harvest, was cut 30 times over 73 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 - UC157_{F1}, 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 high amount of rainfall that fell over the area in just a few weeks after the start of the cutting season. Prolonged wet soil conditions reduced yields for a number of producers in the San Joaquin-Sacramento Delta this past season. The highest yielding line in the replicated block was crown planted UC157_{F1}, at 5,001 Lbs./Acre, followed by seedling planted UC157_{F1} (4,188 Lbs./Acre), UCR5 (3,938 Lbs./Acre), UCR7 (3,714 Lbs./Acre), Dariana (3,578 Lbs./Acre), Atlas (3,450 Lbs./Acre), Gin Lim (3,200 Lbs./Acre) and UCR8 (3,183 Lbs./Acre). It should be noted that figures for UC157_{F1} are reported twice because 17 replicated lines were established in 1995 using 10-12 week old seedling transplants. An eighteenth line had very low seed germination in the nursery and so UC157_{F1} one-year-old crowns were used as a replacement line to fill out the replicated block. Best spear quality

was attained by UC157F₁ (seedling or crown planted), UCR8, UCR5, Atlas, Gin Lim, ASP1 and UCR7. Largest spear size was attained by Purple Passion, followed by UCR8, Dariana, Atlas and Grande. See [Table 1](#) for complete replicated trial results.

In the 17-line observation trial block, with one line (UCR115) repeated to fill out the 18 plots, all lines were planted in 1995 as 10-12 week old seedling transplants. The observation lines were also cut 30 times over 73 days. Best yield was achieved by Golia at 4,266 Lbs./Acre, followed by Eros (3,296 Lbs./Acre), DA911 (3,229 Lbs./Acre), UCR62 (3,200 Lbs./Acre), Ven Lim (3,125 Lbs./Acre) and UCR115 (2,990 Lbs./Acre). Best spear quality occurred with UCR115, DA911, Golia, Tainan #2, Eros and 89P72. UCR84 had the largest spear size, followed by Eros, DA911, Ven Lim, Golia 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 29 times over 73 days. Drip irrigation is being used to supply the moisture and fertilizer needs of the asparagus field in which the trial is located. The trial contains 12 replicated varieties and another 13 lines in a single replication observation block. Some stand loss in a couple of the slower growing varieties occurred during 1998 from excessive early filling of the planted trenches with soil. Excellent production, with a number of lines in the replicated trial, occurred this past season led by Atlas at 8,193 Lbs./Acre, followed by UC157F₁, (6,199 Lbs./Acre), Grande (5,851 Lbs./Acre), UCR115 (5,760 Lbs./Acre), UCR65 (5,196 Lbs./Acre) and UCR112 (4,684 Lbs./Acre). Best spear quality occurred with UC157F₁, UCR115, Atlas, UCR65, UCR112 and Grande. Largest spear size occurred with Atlas, followed by Grande, Apollo, UCR87, UCR112, UCR65 and UCR82. Complete replicated trial data is given in [Table 3](#).

In the 12 line observation block, highest yield came from Cipres at 8,677 Lbs./Acre, followed by UCR69 (8,203 Lbs./Acre), UCR109 - a limited plant stand (6,505 Lbs./Acre), UCR122 (6,165 Lbs./Acre), PLA-2232 (5,988 Lbs./Acre) and UCR96 (4,722 Lbs./Acre). Best spear quality occurred with UCR69, UCR122, UCR96, UCR64 and PLA-2232. Varieties with the largest spear size included Cipres, UCR122, PLA-H34IA - limited plant stand, PLA-2232, UCR107 and UCR109. Complete observation trial data is presented in [Table 4](#).

UC Asparagus Cultivar Evaluation Trial (Foppiano Farms) - This trial, planted with one-year-old crowns in 1997, was harvested 27 times over a period of 60 days. The field was flooded late, to re-charge the soil profile with moisture, since little rainfall occurred during December 1999 and January 2000. Water had just been drained off when the heavy rainfall of late February and early March occurred. This caused a delay in the start of harvest as well as considerable crown damage due to garden symphyllan/centipede feeding and saturated soil conditions contributing to crown rot. Yields were relatively low due to these aforementioned problems. In the 7 variety replicated block, the highest production occurred with F597 x M138 (UCR5) at 2,689 Lbs./Acre, followed by RF110 x M138 (2,526 Lbs./Acre), UC157F₁, (2,115 Lbs./Acre) and F609 x M138 (UCR7) at 2,039 Lbs./Acre. Best spear quality was achieved by UC157F₁, F597 x M138 (UCR5), RF110 x M138 and F609 x M138 (UCR7). Largest spear size, given the reduced stand and vigor of the trial area, was attained by F189 x

HS185, followed by UC157_{F1} and F597 x M138 (UCR5). Complete data for the replicated trial is given in Table 5.

The observation block contained 7 lines with F145A1 producing the highest yield at 2,688 Lbs./Acre, followed by RF110A1 and F212H1. Spear quality was only marginally good with all lines perhaps due to the stress caused by insect and disease damage. RF110A1 gave the largest spear size, followed by F212H1, F145A1 and F181A1. Data for the observation trial are provided in Table 6.

Due to the considerable damage that occurred to the trial from disease and insect pressure, and the resultant lack of recovery during the past summer fern season, the trial will probably be discontinued for harvest in 2001.

OTHER CULTIVAR EVALUATION TRIALS

A newer asparagus cultivar evaluation trail, featuring advanced M256 hybrids and All Male hybrids from Dr. Mikeal Roose's breeding program at UC Riverside, was established with one-year-old crowns in the southwest section of Victoria Island Farms on March 16, 1999. The trial was not cut this past spring and only visual observations were made as to vigor and spear quality. The plot contains nine replicated M256 hybrids and seven replicated All Male hybrids. Additionally, eight All Male hybrids are in a single replication observation block. Based on visual observations, lines in the replicated M256 hybrid block that show good yield and/or quality potential include F82-2 x M256, RF135 x M256, F172 x M256 and F184 x M256. Of the replicated All Male hybrids, best yield and/or quality potential appears in RF110 x L1, F181 x L1 and F600 x L1. The spears of F181 x C458, F600 x C452 and F600 x L1 appear to have a reddish tinge; this was also true of the All Male observational line F600 x C453. The top yield/quality potential lines in the All Male observational block were F82-2 x C453, RF110 x C458, F177 x L1, F181 x C452 and F600 x C453. It is intended to harvest the entire trial for an 8 week period in 2001.

Adjacent to this trial is a larger companion plot established by Drs. Garrison and Chen of Rutgers University in New Jersey. Their trial contains 10 replicated lines that include commercial lines from the Rutgers program, UC157_{F1} and Ida Lea from the University of California, and Apollo, Atlas and Grande from California Asparagus Seed and Transplant (Brian Benson). There are another 23 advanced lines, replicated two times, planted with one-year-old crowns. There are also two replications of 22 more advanced selections established with 10-12 week old seedlings. Rutgers University researchers will oversee initial harvest of the trial in 2001 and the author of this publication will make visual observations of the Rutgers material.

Table 1. 2000 INTERNATIONAL ASPARAGUS CULTIVAR EVALUATION TRIAL
 AUGUSTA-BIXLER FARMS on UNION ISLAND
 Replicated Trial
 (30 harvests – 73 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ No./Acre	Average Spear ¹ Size (g.)
UC157F ₁ (crown planted)	5,001	83,054	27.3
UC157F ₁	4,188	76,666	24.8
UCR5	3,938	67,082	26.6
UCR7	3,714	64,178	26.3
Dariana	3,578	54,305	29.9
Atlas	3,450	54,595	28.7
Gin Lim	3,200	65,340	22.2
UCR8	3,183	47,916	30.2
Grande	2,988	47,916	28.3
Taramea	2,869	62,436	20.9
Val Prima	2,648	49,078	24.5
Tie Lim	2,561	43,850	26.5
Jersey Giant	2,503	51,110	22.2
ASP-1	2,268	45,883	22.4
Apollo	2,251	39,494	25.9
Jersey Gem	1,769	32,234	24.9
Purple Passion	1,620	19,747	37.2
Andreas	1,220	20,038	27.6
LSD @ 5%:	1,376	25,701	
CV =	33.0%	35.3%	

¹Average of four replications

Table 2. 2000 INTERNATIONAL ASPARAGUS CULTIVAR EVALUATION TRIAL
AUGUSTA-BIXLER FARMS on UNION ISLAND
Observation Trial
(30 harvests – 73 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ No./Acre	Average Spear ¹ Size (g.)
Golia	4,266	68,534	28.3
Eros	3,296	49,368	30.3
DA 911	3,229	51,691	28.4
UCR 62	3,200	55,757	26.1
Ven Lim	3,125	49,949	28.4
UCR 115 ²	2,990	55,176	24.6
89P72	2,956	50,239	26.7
Tainan #2	2,828	63,017	20.4
Jersey Knight	2,683	48,206	25.3
UCR 60	2,419	51,110	21.5
Argo	2,303	41,237	25.4
Cipres	2,161	35,429	27.7
UCR 65	1,937	34,267	25.7
89P58	1,812	33,977	24.2
UCR 84	1,792	26,426	30.8
Huchels L	1,362	27,007	22.9
UCR 88	767	13,939	25.0

¹Average of only one replication

²Average of two replications

Table 3. 2000 ASPARAGUS CULTIVAR EVALUATION TRIAL
 VICTORIA ISLAND FARMS – VICTORIA ISLAND
 Replicated Trial
 (29 harvests – 73 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g.)
Atlas	8,193	87,573	42.5
UC157F ₁	6,199	99,840	28.2
Grande	5,851	67,187	39.5
UCR115	5,760	93,741	27.9
UCR65	5,196	74,749	31.6
UCR112	4,684	65,619	32.4
UCR88	4,143	60,984	30.8
UCR87	3,805	49,658	34.8
Apollo	3,551	42,793	37.7
UCR60	3,527	53,074	30.2
UCR82	3,290	47,846	31.2
UCR62	2,875	45,302	28.8
LSD @ 5%:	1,668	22,930	
CV =	24.4%	24.3%	

¹ Average of four replications

Note: Subsurface drip is the irrigation method used in this trial location.

Table 4. 2000 ASPARAGUS CULTIVAR EVALUATION TRIAL
 VICTORIA ISLAND FARMS – VICTORIA ISLAND
 Observation Trial
 (29 harvests – 73 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
Cipres	8,677	89,908	43.8
UCR69	8,203	129,983	28.7
UCR109*	6,505	98,736	29.9
UCR122	6,165	80,150	34.9
PLA-2232	5,948	86,772	31.1
UCR96	4,722	76,317	28.1
UCR107	4,335	65,863	29.9
UCR64	4,035	70,741	25.9
PLA-2332	3,781	77,014	22.3
DA-909	3,530	60,984	26.3
UCR66	3,460	62,378	25.2
UCR79	3,384	67,954	22.6
PLA-H34IA*	2,541	35,574	32.4

¹ Average of only one replication

* Indicates cultivar with limited plant stand; yields should be viewed with caution

Note: Subsurface drip is the irrigation method used in this trial location.

Table 5. 2000 ASPARAGUS CULTIVAR EVALUATION TRIAL
FOPPIANO FARMS – KING ISLAND
Replicated Trial
(27 harvests – 60 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
F597 x M138 (UCR5)	2,689	57,586	21.2
RF110 x M138	2,526	60,217	19.0
UC157F ₁	2,115	45,128	21.3
F609 x M138 (UCR7)	2,039	59,346	15.6
F189 x HS104 (UCR8)	1,982	44,431	20.3
F608 x M138	1,924	53,248	16.4
F189 x HS185	1,870	36,346	23.4
LSD @ 5%:	810	23,736	
CV =	25.2%	31.4%	

¹ Average of four replications

Table 6. 2000 ASPARAGUS CULTIVAR EVALUATION TRIAL
FOPPIANO FARMS - KING ISLAND
Observation Trial
(27 harvests - 60 days)

Cultivar	Yield ¹ (Lbs./Acre)	Spears ¹ (No./Acre)	Average Spear ¹ Weight (g)
F145A1	2,688	60,984	20.0
RF110A1	2,100	40,424	23.6
F212H1	1,567	31,363	22.7
F137L1	1,469	40,424	16.5
F141A1	1,417	35,893	17.9
F181A1	1,406	32,409	19.7
F109L1	727	19,515	16.9

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 ten herbicides and/or combination treatments, was established on January 20, 2000 at Marca Bella Farms north of Tracy, California. All treatments were applied with a handheld CO₂ backpack sprayer in a spray volume of 30 gallons per acre. Soil incorporation of the herbicides evaluated was accomplished by a combination of winter rainfall and grower-applied furrow irrigation. The soil type at the trial site was a Sacramento clay loam. Plot design was a randomized complete block. The field was planted to UC 157F₁ crowns during December 1999. The trial was evaluated for weed control efficacy and crop fern vigor on March 15, 2000 and again on April 5, 2000. Best weed control of the mixture of annual sowthistle, stinging nettle, shepherdspurse, annual bluegrass, panicled willow herb, common chickweed, redmaids and volunteer tomatoes occurred with Valor (flumioxazin) alone, the combination treatment of Karmex (diuron) plus Prowl (pendimethalin), Permit/GWN-3060 (halosulfuron) alone and Milestone (azafenadin) alone. Crop safety appeared good with most treatments except for some temporary suppression of fern growth with Valor, the combination treatment of Visor (thiazopyr) plus Goal (oxyfluorfen), and Goal alone. In areas of the field around the trial, fern growth was also suppressed/slow growing so perhaps a soil texture/fertility problem existed. Prior work with most of these herbicides on high organic soils has shown little fern growth suppression with the exception of higher rates of Goal.

**2000 Asparagus Preemergence Weed Control
(Newly Planted Crown Beds)
Marca Bella Farms - Tracy, California**

Treatment	Rate lb./Acre a.i.	Weed Control ¹																Crop Fern ¹ Vigor	
		Annual sowthistle		Stinging nettle		Shepherd's purse		Annual bluegrass		Panicked willow herb		Common chickweed		Redmaids		Volunteer tomatoes		3/15	4/5
		3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5	3/15	4/5
Aim (40DF)	0.20	7.4	6.6	9.4	9.5	9.8	10.0	5.3	6.5	7.3	5.0	6.4	5.0	9.6	9.5	7.0	5.5	8.3	9.1
Authority (75DF)	1.00	10.0	9.8	10.0	9.9	10.0	10.0	10.0	10.0	10.0	10.0	9.3	8.8	10.0	10.0	10.0	10.0	8.1	9.0
Visor (75DF)	1.00	9.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.8	7.5	10.0	10.0	10.0	10.0	10.0	10.0	7.9	8.3
Goal (2XL)	0.25	10.0	10.0	10.0	10.0	10.0	9.8	10.0	9.1	9.4	9.5	9.1	8.9	10.0	10.0	9.5	9.8	6.3	8.5
Visor + Goal	1.00 + 0.25	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.4	9.8	10.0	10.0	10.0	10.0	10.0	6.4	7.9
Permit (75WG)	0.083	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.8	10.0	10.0	10.0	10.0	2.9	1.5	7.8	8.0
Milestone (80DF)	0.50	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.6	9.9	10.0	10.0	10.0	10.0	8.5	8.9
Valor (50WP)	0.375	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.8	7.6
Prowl (3.3E)	4.00	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.9	10.0	10.0	10.0	9.8	10.0	9.5	8.0	8.6
Karmex (80DF) + Prowl	2.00 + 4.00	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.5	8.4
Karmex + Devrinol (2E)	2.00 + 2.00	10.0	10.0	9.5	9.6	10.0	10.0	10.0	10.0	9.8	9.8	10.0	10.0	10.0	10.0	10.0	9.5	8.8	9.0
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	0.0	0.0	0.0	0.0	8.9	8.8

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

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 23, 2000 at Marca Bella Farms north of Tracy, California. All treatments were applied with a handheld CO₂ backpack sprayer in a spray volume of 30 gallons per acre. The soil type at the trial site was a Sacramento clay loam and the plot design was a randomized complete block. The field had been planted in December 1999 with one-year-old UC 157F₁ asparagus crowns. Weeds present at the time of treatment included 5 to 12 inch tall stinging nettle, 3 to 5 inch rosette shepherdspurse, 2 to 3 inch tall annual bluegrass, 2 to 5 inch tall paniced willow herb, 3 to 5 inch tall annual sowthistle, and 3 to 4 inch rosette redmaids. The crop fern was 12 to 30 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 April 5, 2000. Best control of all the weed species present, except annual bluegrass, occurred with Sencor (metribuzin), followed by Lorox (linuron) plus Crop Oil Concentrate (COC). Rates of Permit/GWN-3060 (halosulfuron) plus crop oil concentrate and liquid ammonium sulfate (AMS) only gave partial control of most weed species. A period of high winds for over a week precluded treating the trial earlier when weeds were considerably smaller.

**2000 Asparagus Postemergence Weed Control
(Newly Planted Crowns)
Marca Bella Farms - Tracy, California**

Treatment	Rate lb./Acre a.i.	Weed Control ¹						Crop ¹ Fern Phyto
		Stinging nettle	Shepherd's purse	Annual bluegrass	Panicled willow herb	Annual sowthistle	Redmaids	
Sencor (75DF)	1.00	9.4	10.0	5.3	7.6	8.0	9.9	0.8
Lorox (50DF)	1.00	7.5	9.0	3.8	5.5	6.5	9.3	0.5
Lorox + COC	1.00 + ½%	8.5	10.0	4.8	6.0	7.8	10.0	0.7
Permit (75WDG) + AMS* + COC	0.047 + 3% + ½%	6.3	7.3	4.5	3.8	5.5	7.4	0.8
Permit + AMS + COC	0.032 + 3% + ½%	5.6	6.3	4.5	3.3	4.5	5.0	0.8
Permit + COC	0.032 + ½%	5.8	6.0	4.1	3.0	4.8	5.0	0.6
Untreated Control	---	0.0	0.0	0.0	0.0	0.0	0.0	0.7

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

* AMS = 33.1% ammonium sulfate in Embrace Plus - 3% v/v

Notes: Sencor - missed some common groundsel but controlled a light population of common chickweed and black nightshade.

Lorox - missed some common groundsel but controlled a light population of common chickweed and black nightshade.

Lorox + COC - gave partial control of common groundsel while controlling a light population of common chickweed and black nightshade.

Permit - all treatments were weak on common groundsel and only gave partial control of common chickweed and black nightshade.

Postemergence nutsedge management in post-cutting season established asparagus.

Robert Mullen

A postemergence nutsedge management trial in post-cutting season fern stage established asparagus, evaluating several rates of Permit/GWN-3060 (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. Plot design was a randomized complete block. Yellow nutsedge present at the initial treatment date was at the 3 to 7 true leaf stage of growth. Weed control efficacy and crop fern phytotoxicity ratings were taken on August 10, 2000 and again on September 12, 2000. All treatments of Permit/GWN-3060 gave good to very good control/suppression of yellow nutsedge with 2 applications of comparable rates giving the best activity, although a single application of the high rate gave equally good results. Crop fern safety was excellent with all treatments. It should also be noted that all applications were made within 5 to 7 days following a furrow irrigation of the fields.

**2000 Asparagus Postemergence Weed Control
(Established Beds - Fern Stage)
Marca Bella Farms - Tracy, California**

Treatment	Rate lb./Acre a.i.	No. of Spray Applications	Weed Control ¹		Crop ¹	Fern Phyto
			Yellow Nutsedge 8/10	9/12		
GWN- 3060 (75WDG) + X-77 + AMS*	0.032 + ¼% + 2.5%	1	7.8	8.1	0.6	0.7
GWN- 3060 + X-77 + AMS	0.032 + ¼% + 2.5%	2	7.9	8.8	0.6	0.6
GWN- 3060 + X-77 + AMS	0.047 + ¼% + 2.5%	1	8.3	8.3	0.6	0.6
GWN- 3060 + X-77 + AMS	0.047 + ¼% + 2.5%	2	8.3	9.1	0.6	0.6
GWN- 3060 + X-77 + AMS	0.064 + ¼% + 2.5%	1	8.7	8.9	0.7	0.7
Untreated Control	---	---	1.0	0.8	0.5	0.7

¹ Average of four replications:

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

Crop Phyto - 0 = no crop damage; 10 = crop dead

* AMS = 33.1% ammonium sulfate in Embrace Plus - 2.5% v/v

A rust control trial in established asparagus. Robert Mullen

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 BASF 500, followed closely by Rally (myclobutanil) and Tilt (propiconazole). The only ineffective fungicides in the trial were Dithane (mancozeb) and Thiolux (micronized sulfur).

**2000 Asparagus Rust Disease Control
Victoria Island Farms - Victoria Island, California
Established Beds**

Treatment	Rate lb./Acre a.i.	Asparagus Fern Rust ¹ Disease Severity Rating		
		9/21	10/6	10/20
Rally (40WP)	0.125	2.6	2.4	2.3
Folicur (3.6F)	0.150	2.8	2.2	2.1
Quadris (2.08SC)	0.200	2.9	3.1	3.3
Flint (50WG)	0.078	2.9	3.0	2.9
Tilt (3.6E)	0.100	2.8	2.4	2.4
Dithane (75DF)	1.500	4.9	5.0	5.1
Thiolux (80DF)	8.000	4.8	4.9	5.0
BASF 500 (20.7WDG)	0.150	2.4	2.0	2.1
Untreated Control	---	5.3	5.4	6.3

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

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

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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