

ASPARAGUS

Variety Evaluation & Pest Management
in San Joaquin County



2004 Research Progress Report

University of California Cooperative Extension
420 South Wilson Way
Stockton, California 95205-6243
Telephone (209) 468-2085

**2004 ASPARAGUS VARIETY EVALUATION
AND PEST MANAGEMENT TRIALS**

RESEARCH PROGRESS REPORT

Bob Mullen, Farm Advisor Emeritus
University of California Cooperative Extension San Joaquin County

Jan Mickler, Farm Advisor
University of California Cooperative Extension Stanislaus County

Benny Fouché, Farm Advisor
University of California Cooperative Extension San Joaquin County

Cooperating Authors:

Dr. Mikeal Roose, Department of Botany and Plant Sciences, UC Riverside
Neil Stone, Staff Research Associate, UC Riverside
Scott Whiteley, Extension Technician, UCCE San Joaquin County
Don Colbert, Field Research Assistant, UCCE San Joaquin County
Randall Wittie, Field Research Assistant, UCCE San Joaquin County
Dawn Brunmeier, Staff Research Associate, UCCE Stanislaus County
Brian Benson, President, California Asparagus Seed & Transplant
Dr. Steve Garrison, Department of Vegetable Crops, Rutgers University

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: Graydon Nichols, Bill Zech, Tony Piazza and Alan Carlisle, Ed Zuckerman and Ken Jochimsen, 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 2004. This report presents results of asparagus weed management trials and early observations of an asparagus Fusarium management project 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>
Devrinol (2E)	napropamide	Zeneca Ag Products
Karmex (80DF)	diuron	DuPont Ag Products
Lorox (50DF)	linuron	DuPont Ag Products
Matrix (25DF)	rimsulfuron	Dupont Ag Products
Prism (0.94E)	clethodim	Valent U.S.A. Corporation
Prowl (3.8CS)	pendimethalin	BASF Corporation
Raptor (1AS)	Imazamox	BASF Corporation
Roundup Ultra (5L)	glyphosate	Monsanto Chemical Co.
Sandea (75WG)	halosulfuron	Gowan Chemical Co.
Sencor (75DF)	metribuzin	Bayer Ag Chemicals
Solicam (80DF)	norflurazon	Syngenta Crop Protection
Spartan (75DF)	sulfentrazone	FMC Corporation
Valor (50WP)	flumioxazin	Valent U.S.A. Corporation
Scholar (50WP)	fludioxonil	Syngenta Crop Protection

CULTIVAR EVALUATION TRIALS

UC Asparagus Cultivar Evaluation Trial (Victoria Island Farms) – This trial, planted with one-year-old crowns in 1998, was harvested 30 times over a 69-day period. Drip irrigation is being used to supply the majority of the moisture requirements of the trial field as well as serving as a fertilizer delivery system to the plant stand. The trial contains 12 replicated cultivars with another 13 lines in single replication observation plots. Cultivars in the trial are from Dr. Mikeal Roose’s breeding program at UC Riverside, Brian Benson’s private breeding program near Davis, California, and Dr. Marc Darbonne’s private breeding enterprise in France. Some stand loss in a couple of the slower growing varieties occurred, during the 1998 trial establishment season, from excessive early filling of the planted trenches with soil, causing smothering of some crowns. As in the four previous cutting seasons, excellent production in a number of replicated and observation cultivars occurred during the 2004 harvest season. Yields were down 14% on average in the replicated trial, from 2003, due to a generally cooler harvest season in 2004, but spear quality was good. The highest yielding line in the replicated trial was UCR 115 at 8,262 Lbs/Acre, followed by UCR 65 (6,942 Lbs/Acre), Atlas (6,475 Lbs/Acre), UC 157F1 (5,698 Lbs/Acre), Grande (5,555 Lbs/Acre) and UCR 112 (4,700 Lbs/Acre). Best spear quality was attained by UCR 115, followed by UCR 65, UCR 112, UCR 87, UCR 60 and UC 157F₁. Largest spear size (9 inch spear in grams/spear) on average occurred with UCR 88, followed by UCR 87, Atlas, UCR 65, Grande and Apollo. There was very little difference between cultivars this year with regard to spear size. There has been concern in the past that plant spacing (12 inches between crowns down the bed row in this trial), fertilization and drip irrigation might result in spear sizes too large for the current market demand by produce buyers and consumers. Complete replicated trial data is given in **Table 1**.

In the 13-line observation cultivar block, greatest yield was achieved by Cipres at 7,351 Lbs/Acre, followed by UCR 122 (7,199) Lbs/Acre, PLA 2232 (6,002 Lbs/Acre), UCR 79 (5,807 Lbs/Acre), UCR 69 (5,727 Lbs/Acre), UCR 96 (5,342 Lbs/Acre) and UCR 107 (5,194 Lbs/Acre). Yields on average were about the same in the observation block, compared to 2003. Best spear quality occurred with UCR 79 and UCR 107, followed by UCR 122, PLA-2232, UCR 69, Cipres and UCR 66. Spear size, in general, was larger in 2004 than 2003 in the observation lines. Largest spear size was demonstrated by UCR 109, followed by PLA-H341A, Cipres, UCR 107, UCR 96, PLA 2232 and UCR 122. The reader is cautioned that data in the observation block is only from one replication of each cultivar. Complete observation trial data is shown in **Table 2**.

UC Asparagus Cultivar Evaluation Trial (Zuckerman-Heritage Farms).

This trial was established in 2002 with one-year-old crowns on McDonald Island. The crowns were provided by California Vegetable Specialties (Rich Collins) and some provided by Ed Zuckerman and Ken Jochimsen from the growers' own crown nursery. The trial contains 12 replicated varieties and another 29 observation lines in single or two replication plots. Advanced cultivars from Dr. Mikeal Roose's breeding program at UC Riverside, Dr. Steve Garrison's breeding program at Rutgers University in New Jersey and the private asparagus variety development program from Brian Benson at California Asparagus Seed and Transplant near Davis, California make up the trial. The trial was harvested for 30 days in 2003 and a number of lines looked very good in terms of production and spear quality. This past season the trial was to be harvested for a full 10 weeks but problems with garden centipede, perhaps made worse by the use of drip irrigation during the cutting season, caused the grower to terminate harvest in the trial field after 50 days. The field was aired out and then treated in an effort to control the centipede and reduce crop loss for the future. Despite the reduced cutting schedule, yields were fair to good in the replicated trial, led by UC157F₁ at 3,047 Lbs/Acre, NJ 953 (2,984 Lbs/Acre), Grande (2,921 Lbs/Acre), UCR 115 (2,879 Lbs/Acre), NJ 977 (2,804 Lbs/Acre) and F586 x M256 (2,705 Lbs/Acre). Largest spear size occurred with Grande, Purple Passion, F586 x M256, Atlas and F141 x M256. Best spear quality was attained by UC 115, followed by F141 x M256, UC 157F₁, F586 x M256 and Grande. Complete replicated trial data is presented in **Table 3**.

In the 29-cultivar observation trial, much better yields were obtained probably because the lines were at the rear of the trial where there was less damage from garden centipede. Yields were led by F177 x M256 at 5,262 Lbs/Acre, FCE5 x M256 (5,250 Lbs/Acre), NJ 1021 (5,097 Lbs/Acre), FCE1 x M256 (4,916 Lbs/Acre), FCE3 x M256 (4,823 Lbs/Acre), NJ 1028 (4,595 Lbs/Acre) and F82-2 x M256 (4,318 Lbs/Acre). Largest spear size was obtained by F133 x M256, FCE7 x M256, NJ 937, NJ 956, FCE5 x M256 and F172 x M256. Best spear quality was led by FCE1 x M256 and FCE5 x M256, followed by F82-2 x M256, FCE3 x M256, F177 x M256, FCE7 x M256, and F137 x MCE4. Complete observation trial data is contained in **Table 4**.

One of the constant problems observed in local asparagus stand establishment is the use of one-year-old crowns from grower nurseries in the San Joaquin-Sacramento Delta area. Most of these nurseries are located in fields with a recent history of asparagus culture and consequently have high inoculum levels of *Fusarium* crown and root rot (*Fusarium oxysporum*, f.sp. *asparagi* and *Fusarium moniliforme*). Because the disease is the most serious pathogen affecting asparagus production worldwide, growers are encouraged to put their own crown nursery plantings in soils without a crop history of asparagus and to fumigate the nursery site ensuring good, clean, healthy crowns for planting in new production beds. The final planting sites for new production beds ideally should also be in ground without an asparagus crop history to reduce chances of asparagus infection from *Fusarium*.

When the asparagus cultivar evaluation trial was established at Zuckerman-Heritage Farms in 2002, a separate mini-trial was also planted comparing crowns of four UC cultivars (UC 157F₁, UCR 115, F141 x M256 and F586 x M256) from different nursery sites – one a grower nursery in the Delta with previous asparagus crop history and the other a non-asparagus crop history nursery site that was on fumigated ground in Delhi, California. Initial growth of the crowns at the Zuckerman-Heritage Farms trial was superior for all four varieties from the Delhi nursery over the same four varieties from the grower nursery site in the Delta. Yields of these plots were taken for 30 days during the 2003 season and all four of the varieties from the Delhi fumigated nursery site outyielded the same four varieties from the Delta Nursery site, where *Fusarium* had been present. A 50-day harvest occurred in this experiment in 2004 and generally the same yield trends occurred as had been the case of 2003, except that one variety (F586 x M256) from the Delta nursery site actually produced significantly better than the same line from the Delhi nursery site. The differences in yield from the other three lines also was also reduced comparing 2003 and 2004. This may suggest only a temporary benefit occurred from the Delhi nursery site crowns on fumigated, non-asparagus history ground and/or that the trial site at Zuckerman-Heritage Farms may also have a level of soil-borne *Fusarium* inoculum that adversely affected yields in the trial. It still would be recommended to locate nursery sites for asparagus seedling or crowns on soils with no asparagus crop history and to fumigate the sites. The other suggestion would be to establish the final production beds on ground without a history of asparagus as well. In this way, clean crowns or seedlings would be going into relatively disease free soil for final planting. Data on this year's trial harvest results are shown in **Table 5**.

Table 1. 2004 ASPARAGUS CULTIVAR EVALUATION TRIAL *
Victoria Island Farms; Victoria Island

(30 harvests — 69 days)

Replicated Varieties

Cultivar	Yield ¹ Lbs/Acre	No. Spears ¹ per Acre	Average ¹ Spear Wt. (g.)	Spear Quality ² Rating
UCR 115	8,262	153,244	24.5	2.20
UCR 65	6,942	113,082	27.9	2.05
Atlas	6,475	105,502	27.9	1.95
UC 157F ₁	5,698	109,005	23.7	1.98
Grande	5,555	93,741	26.9	1.83
UCR 112	4,799	82,503	26.4	2.05
UCR 60	4,495	81,475	25.0	2.00
UCR 88	4,254	67,605	28.6	1.88
UCR 87	3,917	62,657	28.4	2.00
UCR 82	3,702	64,120	26.2	1.93
Apollo	3,676	63,005	26.5	1.65
UCR 62	2,147	38,263	25.5	1.70
LSD @ 5%:	2,081	28,286		
C.V. =	29.0%	22.8%		

¹ Average of four replications

² Average of 30 harvests:

Rating Scale very good = 2.50

good = 2.25

fair to good = 2.00

fair = 1.75

fair to poor = 1.50

poor = 1.25

very poor = 1.00

* Trial was planted with one-year-old crowns in 1998 and is drip irrigated

Table 2. 2004 ASPARAGUS CULTIVAR EVALUATION TRIAL *
Victoria Island Farms; Victoria Island

(30 harvests — 69 days)
Observation Varieties

Cultivar	Yield ¹ Lbs/Acre	No. Spears ¹ per Acre	Average ¹ Spear Wt. (g.)	Spear Quality ² Rating
Cipres	7,351	110,817	30.1	2.00
UCR 122	7,199	120,574	27.1	2.10
PLA-2232	6,002	100,362	27.2	2.10
UCR 79	5,807	105,241	25.1	2.20
UCR 69	5,727	113,953	22.8	2.00
UCR 96	5,342	83,984	28.9	1.90
UCR 107	5,194	80,847	29.2	2.20
UCR 109	4,238	43,908	43.8	1.90
UCR 66	3,837	71,787	24.3	2.00
UCR 64	3,185	57,151	25.3	1.80
DA 909	3,020	70,393	19.5	1.80
PLA-H341A	1,395	17,424	36.3	1.50
PLA-2332	642	13,591	21.4	1.70

¹ Average of only one replication

² Average of 30 harvests:

Rating Scale very good = 2.50
good = 2.25
fair to good = 2.00
fair = 1.75
fair to poor = 1.50
poor = 1.25
very poor = 1.00

* Trial was planted with one-year-old crowns in 1998 and is drip irrigated

Table 3. 2004 ASPARAGUS CULTIVAR EVALUATION TRIAL *
Zuckerman – Heritage Farms; McDonald Island

(22 harvests--50 days)
Replicated Varieties

Cultivar	Yield ¹ Lbs/Acre	No. Spears ¹ per Acre	Average ¹ Spear Wt. (g.)	Spear Quality ²
UC 157F ₁	3,047	42,863	32.3	2.06
NJ 953	2,984	51,836	26.1	1.67
Grande	2,921	34,674	38.2	1.91
UCR 115	2,879	43,299	30.2	2.26
NJ 977	2,804	45,128	28.2	1.82
F586 x M256	2,705	33,890	36.2	2.00
Apollo	2,338	35,458	29.9	1.79
Atlas	2,318	30,231	34.8	1.72
F141 x M256	2,276	31,189	33.1	2.13
Jersey Supreme	2,022	34,325	26.7	1.48
Purple Passion	1,741	20,735	38.1	1.71
Dulce Verde	596	8,364	32.4	1.66
LSD @ 5%:	833	11,265		
C.V. =	24.2%	22.8%		

¹ Average of four replications

² Average of 22 harvests:

Rating Scale very good = 2.50
good = 2.25
fair to good = 2.00
fair = 1.75
fair to poor = 1.50
poor = 1.25
very poor = 1.00

* Trial was planted with one-year-old crowns in 2002 and is drip irrigated

Table 4. 2004 ASPARAGUS CULTIVAR EVALUATION TRIAL *
Zuckerman – Heritage Farms; McDonald Island

(22 harvests--50 days)
Observation Lines

Cultivar	Yield ¹ Lbs/Acre	No. Spears ¹ per Acre	Average ¹ Spear Wt. (g.)	Spear Quality ³
F177 x M256	5,262	77,363	30.9	2.29
FCE5 x M256	5,250	73,878	32.3	2.48
NJ 1021	5,097	78,060	29.6	2.00
FCE1 x M256	4,916	77,711	28.7	2.55
FCE3 x M256	4,823	71,787	30.5	2.31
NJ 1018	4,595	79,105	26.4	2.02
F82-2 x M256	4,318	64,817	30.2	2.38
FCE7 x M256	4,221	57,151	33.5	2.29
NJ 956	4,113 ²	57,151 ²	32.7 ²	1.89
NJ 982	3,888	68,302	25.8	1.88
F172 x M256	3,779 ²	53,492 ²	32.1 ²	1.89
NJ 978	3,747	58,893	28.9	1.79
F177 x MCE2	3,448	60,636	25.8	1.93
F133 x M256	3,379	35,545	43.2	1.83
F137 x MCE4	3,379 ²	56,977 ²	26.9 ²	2.19
FCE1 x M120	3,223 ²	47,742 ²	30.6 ²	2.10
NJ 990	3,099	55,060	25.6	1.55
NJ 937	2,977	40,772	33.1	1.86
F177 x MCE1	2,828	58,545	21.9	1.90
NJ 976	2,697	40,772	30.0	1.76
FCE2 x HMJ	2,333 ²	33,803 ²	31.3 ²	1.71
F133 x HMJ	2,261	36,939	27.8	1.64
FCE1 x A1	2,175 ²	36,765 ²	26.8 ²	2.01
NJ 963	2,011	37,287	24.5	1.31

¹ Average of only one replication

² Average of 2 replications

³ Average of 22 harvests

Rating Scale – very good = 2.50; good = 2.25; fair to good = 2.00; fair = 1.75;
fair to poor = 1.50; poor = 1.25; very poor = 1.00

*Trial was planted with one-year-old crowns in 2002 and is drip irrigated

Table 5.

2004 ASPARAGUS CULTIVAR EVALUATION TRIAL *
Zuckerman – Heritage Farms; McDonald Island

(22 harvests--50 days)

SELECTED CULTIVAR COMPARISON OF CROWNS FROM TWO DIFFERENT NURSERIES

Cultivar	Yield Lbs/Acre	No. Spears per Acre	Average Spear Wt. (g.)	Spear Quality ⁴ Rating
UC 157F ₁ (Delhi) ¹	1,630	28,750	25.7	1.92
UC 157F ₁ (McDonald Island) ²	1,381	20,386	30.8	1.83
UCR 115 (Delhi) ³	5,366	65,514	37.2	2.19
UCR 115 (McDonald Island) ³	4,958	73,878	30.5	2.45
F141 x M256 (Delhi) ³	4,025	54,363	33.6	2.00
F141 x M256 (McDonald Island) ³	3,953	55,060	32.6	2.21
F586 x M256 (Delhi) ³	2,934	43,908	30.3	1.88
F586 x M256 (McDonald Island) ³	4,204	50,530	37.8	2.19

¹ Average of two replications

² Average of four replications

³ Average of only one replication

⁴ Average of 22 harvests

*Trial was planted with one-year-old crowns in 2002 and is drip irrigated

Pest Management Research Trials

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

Robert Mullen, Scott Whiteley and Don Colbert

A preemergence weed control trial in newly planted one-year-old asparagus crowns, evaluating seven herbicides and/or combination treatments, was established on March 24, 2004, at Victoria Island Farms on Victoria Island, west of Stockton, California. All treatments were applied after the asparagus crowns were planted (3/12/04) and covered with 3 to 4 inches of soil. A handheld CO₂ backpack sprayer was used with a spray volume of 30 gallons water per acre, 8002 nozzles and Roundup Ultra (glyphosate) added to each treatment at a rate of 1.00 Lb/Acre A.I. to remove any emerged weeds. Soil incorporation of the soil surface-applied herbicides was accomplished by winter/spring rainfall. The soil type at the trial site was an Egbert muck. Plot design was a randomized complete block. The field was planted to the asparagus cultivar UC 157F₁. The trial was evaluated for weed control efficacy and crop fern vigor on May 4, 2004. Best control of the major weeds present at time of rating – yellow nutsedge, barnyardgrass, redroot pigweed and wild radish – occurred with the combination treatment of Solicam (norflurazon) plus Karmex (diuron), followed by the combination treatment of Karmex plus Devrinol (napropamide), Valor (flumioxazin) at the high rate, and the combination treatment of Prowl (pendimethalin) plus Karmex. The low rate of Valor alone, Spartan (sulfentrazone) alone, and Matrix (rimsulfuron) alone gave excellent control of barnyardgrass, redroot pigweed and wild radish but was weak on yellow nutsedge. Only the combination treatment of Solicam plus Karmex gave commercial control of yellow nutsedge. All treatments were very safe to the crop with the exception of some temporary growth suppression in the Matrix treatment. Additional notes on weed control by the various treatments on populations of minor weed populations are given below the following table.

2004 ASPARAGUS PREEMERGENCE WEED CONTROL
(Newly Planted One-Year-Old Crowns)
Victoria Island Farms; Victoria Island, California

Treatment	Rate Lb/Ac. A.I.	Weed Control ¹				Crop ¹ Fern Vigor
		Yellow Nutsedge	Barnyardgrass	Redroot Pigweed	Wild Radish	
Valor (51WDG)	0.125	3.5	10.0	10.0	10.0	8.9
Valor	0.250	4.8	9.0	10.0	10.0	8.5
Prowl (3.8CS)	4.00	3.8	9.8	10.0	10.0	9.4
Prowl + Karmex (80DF)	4.00 + 2.00	4.5	10.0	10.0	10.0	9.4
Karmex + Devrinol (50DF)	2.00 + 2.00	5.3	10.0	10.0	10.0	8.8
Solicam (80DF) + Karmex	2.00 + 2.00	7.0	10.0	10.0	10.0	8.8
Matrix (25DF)	0.062	4.0	8.8	10.0	10.0	7.8
Spartan (75DF)	1.00	3.9	9.5	10.0	9.0	9.1
Untreated Control	-----	1.5	2.5	0.0	0.0	8.8

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

Notes:

Valor at the low rate is missing small amount of prickly lettuce, common purslane and Italian ryegrass

Valor at the high rate is missing small amount of Italian ryegrass

Prowl alone is missing small amount of common sowthistle and Italian ryegrass

The combination of Prowl + Karmex is missing small amount of common sowthistle and Italian ryegrass

The combination of Karmex + Devrinol is missing small amount of common sowthistle

The combination of Solicam + Karmex is missing small amount of Italian ryegrass

Matrix is missing small amount of Italian ryegrass

Spartan is missing small amount of Italian ryegrass

Untreated control contains common sowthistle, common purslane, Italian ryegrass, shepherdspurse and swamp smartweed

A postemergence weed management trial in newly planted one-year-old asparagus crowns. Robert Mullen, Don Colbert, Scott Whiteley

A postemergence weed management trial in newly planted one-year-old asparagus crowns, evaluating six herbicides and/or combination treatments, was established May 4, 2004, at Victoria Island Farms on Victoria Island west of Stockton, California. All treatments were applied over the crop fern and emerged weeds with a handheld CO₂ backpack sprayer using 8002 nozzles and a spray volume of 30 gallons water per acre. The soil type at the trial site was an Egbert muck and the field variety was UC 157F₁. The plot design was a randomized complete block. The field was planted March 15, 2004 with one-year-old asparagus crowns that were then covered with three to four inches of soil shortly after planting. Weeds present at the time of herbicide treatment were 4 to 6 true leaf yellow nutsedge and 3 to 4 inch tall barnyardgrass. Minor populations of 3 to 4 inch tall Italian ryegrass, 2 to 3 inch rosette redroot pigweed, 6 to 8 inch tall swamp smartweed, 2 to 3 inch rosette prickly lettuce and annual sowthistle, 2 to 4 inch rosette shepherdspurse, 2 to 4 inch tall common groundsel and 1 to 3 inch rosette common purslane were also present. There were also isolated plants of hairy crabgrass, Mexican tea and Johnsongrass. The crop fern was 12 to 18 inches tall. The trial was evaluated for weed control efficacy and crop fern phytotoxicity on May 13, 2004. Best control of the two major weed species present came with the combination treatment of Matrix (rimsulfuron) plus Sandea (halosulfuron) plus Crop Oil Concentrate. Raptor (imazimox) plus AMS (liquid ammonium sulfate) and the combination treatment of Lorox (linuron) plus Prism (clethodim) plus Crop Oil Concentrate gave very good control of barnyardgrass but only gave partial burn of yellow nutsedge. All treatments were quite safe to the crop with only a slight bit of temporary fern chlorosis occurring with the combination treatment of Matrix plus Sandea plus Crop Oil Concentrate. Notes on the activity of the herbicide treatments on the previously mentioned minor population weeds are given after the table below.

2004 ASPARAGUS POSTEMERGENCE WEED CONTROL
 (Newly Planted One-Year-Old Crowns)
 Victoria Island Farms; Victoria Island, California

Treatment	Rate Lb./Ac. A.I.	Weed Control ¹		Crop ¹ Fern Phyto
		Yellow Nutsedge	Barnyardgrass	
Sencor (75DF)	1.00	2.0	2.3	0.6
Raptor (1AS) + AMS* + X-77	0.31 + 4.50 + ¼%	4.5	8.5	0.6
Lorox (50DF)	1.00	3.5	3.0	0.6
Lorox + Prism (0.94E) + COC	1.00 + 0.188 + ½%	4.3	9.0	0.8
Matrix (25DF) + Sanda (75WG) + COC	0.031 + 0.032 + ½%	6.8	8.8	1.2
Untreated Control	-----	1.0	0.0	0.5

¹ Average of four replications: Weed Control – 0 = no weed control; 10 = complete weed control
 Crop Fern Phyto – 0 = no crop injury; 10 = crop dead

* AMS = liquid ammonium sulfate

** COC = Crop Oil Concentrate

Notes:

Sencor showed good activity on limited population of swamp smartweed, shepherdspurse, and redroot pigweed; ineffective on Italian ryegrass.

Raptor + AMS + X-77 showed good activity on redroot pigweed and Italian ryegrass and gave partial control of common purslane and common sowthistle.

Lorox alone missing Italian ryegrass and Johnsongrass; partial to good control on common groundsel; good activity on common sowthistle and prickly lettuce.

Lorox + Prism + COC showed good activity on prickly lettuce, Italian ryegrass and common sowthistle with partial control of swamp smartweed

Matrix + Sandea + COC showed good activity on Italian ryegrass, common sowthistle, shepherdspurse, redroot pigweed and prickly lettuce.

Untreated Control contains Italian ryegrass; hairy crabgrass, Johnsongrass, common sowthistle, prickly lettuce, swamp smartweed, common groundsel, shepherdspurse and a few plants of Mexican Tea.

Fusarium control trials in newly planted one-year-old asparagus crowns.

Jan Mickler, Robert Mullen, Scott Whiteley, Dawn Brunmeier, Don Colbert, and Randall Wittie

A three-year project, funded by the IR-4 minor crop registration program, was initiated in 2004 at Victoria Island Farms west of Stockton, California. Scholar (fludioxonil) a fungicide, is being evaluated as a crown dip or as an in-furrow spray treatment at planting on one-year-old asparagus crowns for the control of Fusarium crown and root rot (Fusarium oxysporum, f.s.p. asparagi and Fusarium moniliforme).

Two sources of crowns were used – the Bob Whitaker Farms nursery on fumigated sedimentary soil with no previous history of asparagus production and the Victoria Island Farm nursery on a fumigated muck (high organic) soil with an asparagus production history. Prior to trial establishment, crowns from both nurseries were evaluated for Fusarium incidence and severity. The crowns were surface-disinfested for five minutes in a 10% sodium hypochlorite solution, and rinsed in deionized water three times for five minutes each. After air drying for 15 minutes, three rootlets were severed just below the crown and five segments, ranging from 9 – 15 mm in length were cut in sequence beginning at the point most proximal to the crown. The segments were plated on PDA and incubated at room temperature. Incidence and severity were measured seven days later. Initial results showed that Victoria Island crowns had about three times greater incidence and severity of Fusarium than those from Whitaker Farms, demonstrating the value of fumigation and selection of a crown nursery site with no previous asparagus crop history.

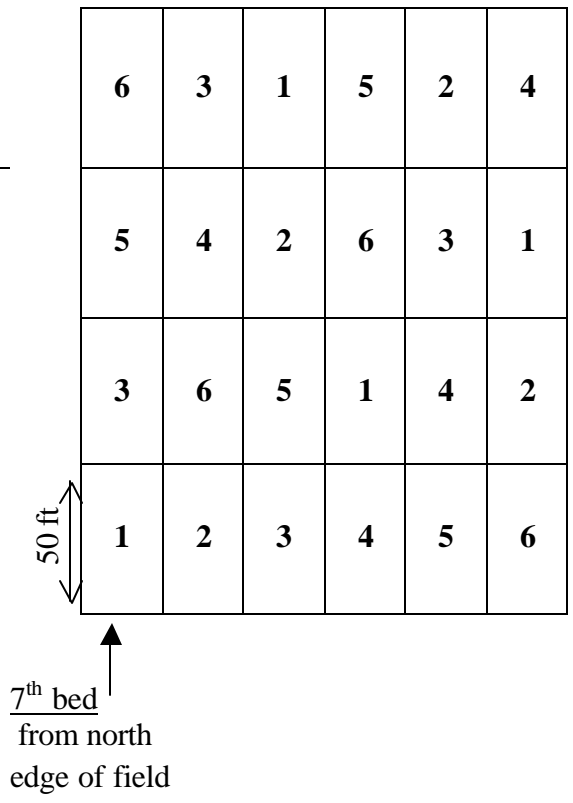
Two trials, evaluating crowns from each nursery source, were established on March 9, 2004. Crowns were dipped for a two-minute soak at different rates of fungicide in 100 gallons water and then planted. The in-furrow at-planting sprays utilized a handheld CO₂ backpack sprayer with a spray volume of 100 gallons water per acre. Untreated one-year-old crowns were planted before the in-furrow sprays were made. All treatments were then covered with three to four inches of soil. The field received irrigation from winter rainfall and a sub-surface drip irrigation system. The soil at the trial sites was an Egbert muck and the asparagus variety was UC 157F₁. Asparagus fern vigor ratings were taken during the spring and were somewhat variable depending on which crown nursery trial was evaluated. In the spring of 2005, selected crowns from each treatment in each trial will be dug up, cleaned, plated and scored for Fusarium incidence and severity.

**2004 Asparagus Fusarium Control Trial
Victoria Island Farms – Victoria Island, California**

<u>Variety</u>	UC157F ₁	<u>Experiment No.</u>	1-04
<u>Growth Stage</u>	Newly Planted One-Year-Old Crowns	<u>Cooperators:</u>	Victoria Island Farms (Graydon Nichols, Bill Zech and Tony Piazza)
<u>Type of Application:</u>	Pre-plant	<u>Experimenters:</u>	Jan Mickler, Bob Mullen, Scott Whiteley, Don Colbert, Randall Wittie and Dawn Brunmeier
<u>Planting Date:</u>	3/9/04	<u>Trial Location:</u>	0.2 mile south of Highway 4 and approximately 1.0 mile west of Victoria Island Packing Shed and Office
<u>Soil Type:</u>	Egbert Muck		
<u>Soil Moisture:</u>	Intermediate		
<u>Irrigation Method:</u>	Drip and Rainfall		
<u>Plot Size:</u>	2.5 ft x 50 ft		
<u>Replications:</u>	4		
<u>Treatment Date:</u>	3/9/04		
<u>Spray Volume:</u>	100 GPA		
<u>Crown Nursery Source:</u>	Bob Whitaker Farms		
<u>Application Methods:</u>	Handheld CO ₂ backpack sprayer and two-minute crown soak dip		

Treatments	Rate lbs/Ac A.I.	Application Method
1. Untreated Control	-----	-----
2. Scholar (50WP)	0.125	Crown Dip
3. Scholar	0.250	Crown Dip
4. Scholar	0.500	Crown Dip
5. Scholar	0.250	In-Furrow Spray @ planting
6. Scholar	0.500	In-Furrow Spray @ planting

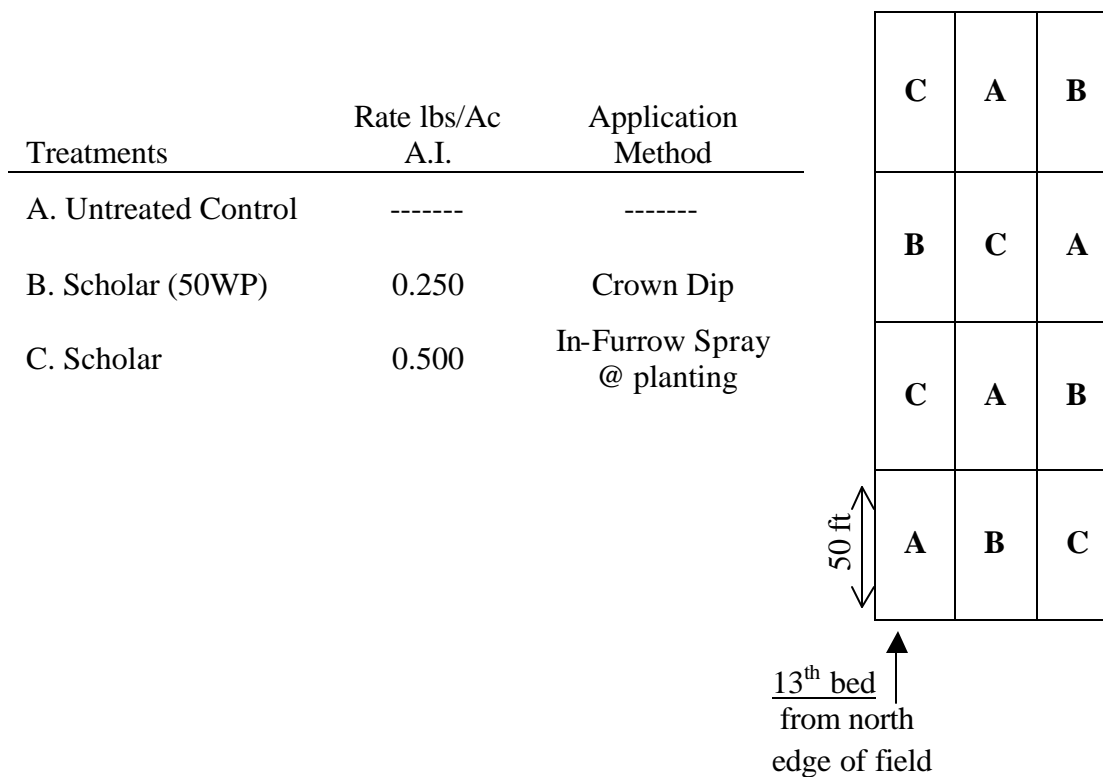
PLOT PLAN: N ←



**2004 Asparagus Fusarium Control Trial
Victoria Island Farms – Victoria Island, California**

<u>Variety</u>	UC 157F ₁	<u>Experiment No.</u>	2-04
<u>Growth Stage</u>	Newly Planted One-Year-Old Crowns	<u>Cooperators:</u>	Victoria Island Farms (Graydon Nichols, Bill Zech, Tony Piazza and Alan Carlisle)
<u>Type of Application:</u>	Pre-plant	<u>Experimenters:</u>	Jan Mickler, Bob Mullen, Scott Whiteley, Don Colbert, and Randall Wittie
<u>Planting Date:</u>	3/9/04	<u>Trial Location:</u>	0.2 mile south of Highway 4 and approximately ½ mile west of Victoria Island Packing Shed and Office
<u>Soil Type:</u>	Egbert Muck		
<u>Soil Moisture:</u>	Intermediate		
<u>Irrigation Method:</u>	Drip and rainfall		
<u>Plot Size:</u>	2.5 ft x 50 ft		
<u>Replications:</u>	4		
<u>Treatment Date:</u>	3/9/04		
<u>Spray Volume:</u>	100 GPA		
<u>Crown Nursery Source:</u>	Victoria Island Farms		
<u>Application Methods:</u>	Handheld CO ₂ backpack sprayer and two-minute crown soak dip		

PLOT PLAN: **N** ←



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.

University of California Cooperative Extension
420 South Wilson Way, Stockton, California 95205-6243 Telephone (209) 468-2085

The University of California prohibits discrimination against or harassment of any person on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, Vietnam-era veteran or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized).

University Policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 1111 Franklin, 6th Floor, Oakland, CA 94607-5200, (510) 987-0096.

Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California and San Joaquin County Cooperating