ASPARAGUS

Variety Evaluation and
Weed Management Trials
in San Joaquin County

2009 RESEARCH PROGRESS REPORT

University of California Cooperative Extension
2101 East Earhart Avenue Suite 200
Stockton, California 95206-3924
Telephone (209) 953-6100

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION SAN JOAQUIN COUNTY ASPARAGUS RESEARCH PROGRESS REPORT, 2009

Principal Investigator:	Brenna Aegerter, Farm Advisor, UCCE San Joaquin County
Cooperating Personnel:	Bob Mullen, Scott Whiteley and Michelle Kong, UCCE San Joaquin County
Collaborators:	Mikeal Roose and Neil Stone, UC Riverside
	Brian Benson, California Asparagus Seed & Transplants, Inc.
	Peter Falloon, Aspara Pacific Ltd., New Zealand
	Chee-Kok Chin and Steve Garrison, Rutgers University
	Don and Jim Brock, Brock Seed Company

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UCCE ASPARAGUS CULTIVAR EVALUATION TRIAL

This trial was established with one-year-old crowns in March of 2007 at Klein Family Farms, on Rindge Tract near Stockton, California. Asparagus lines included were from the breeding programs of UC Riverside, Rutgers University, California Asparagus Seed and Transplants, Aspara Pacific Ltd. and Brock Seed Company. The trial contains forty-four lines in total; sixteen in replicated blocks of green asparagus varieties, and twenty-nine in the observational block of green varieties. There are an additional seven replicated purple lines in a specialty asparagus variety evaluation trial.

The crowns were grown at a fumigated nursery site with loamy sand soil near Manteca. At planting, the one-year-old crowns were placed just over 8” apart within the row on 5.5 foot beds (center to center), for a plant population equivalent to 11,647 plants per acre. Stand

establishment was evaluated during the summer of 2007 and was good to excellent for all varieties. The soil type at the trial site on Rindge Tract is an Egbert Muck.

In 2009, the green variety trial was harvested 23 times over a 56-day period from March 25th to May 20th. In the replicated trial, the highest yielding varieties were FCE4 x M256 at 3,659 lbs/acre, followed by FCE2 x M256 (3,576 lbs/acre), NJ953 (3,531 lbs/acre), Grande (3,477 lbs/acre), and UC157 (3,459 lbs/acre; see Table 1 for all varieties). Lines with the largest spear size were Grande, Atlas, UC 157, Apollo and FCE1 x M256. In general, spear quality was fair to good; led by F132 x MCE4, FCE4 x M256, FCE1 x M256, FCE3 x M256 and De Paoli. Data on all varieties is presented in **Table 1**.

In the observational block of the trial each variety is evaluated only in a single row plot, and therefore data on these varieties should be viewed with much less confidence than the data from the replicated trial. In the observational block, the highest yielding lines were F172 x MCE4 (5,218 lbs/acre), F597 x MCE4 (4,941 lbs/acre), F181 x MCE4 (4,839 lbs/acre), F582 x MCE4 (4,711 lbs/acre), and FCE7 x M120 (4,618 lbs/acre). Varieties with the largest spear size were FCE7 x M120, F583 x MCE4, FCE7 x M256 and F172 x MCE4. Best spear quality was observed with F189 x MCE4, F181 x MCE4, F597 x MCE2, F172 x MCE4, F582 x MCE4 and F177 x MCE4. **Table 2** contains the data for all varieties in the green variety observational block.

Seven purple asparagus varieties are being evaluated in four replicate blocks. In 2009, they were harvested 23 times over a 56-day period from March 25th to May 20th. Most of the Rutgers varieties were the top-yielding, with NJ1092 leading the way at 3,783 lbs/acre, followed by NJ1062 (3,503 lbs/acre) and NJ1064 (3,498 lbs/acre). In general, spear quality was fair to poor; best spear quality was observed with Pacific Purple, Purple Passion and NJ1016. All the purple lines exhibited large spear size, with Purple Passion, NJ1016 and NJ1069 producing the largest spears. Data on all the purple lines is in **Table 3**.

Table 1. 2009 ASPARAGUS CULTIVAR EVALUATION TRIAL - Replicated Green Lines
Klein Family Farms – Rindge Tract
(23 harvests – 56 days)

Cultivar	Yield [1] lb/acre	No. spears [1] per acre	Average [1] spear wt. (g)	Spear quality [2]
FCE4xM256	3,659	59,995	27.7	3.94
FCE2xM256	3,576	59,180	27.4	3.35
NJ953	3,531	70,713	22.7	2.57
Grande	3,477	44,036	35.8	2.75
$UC157_{F1}$	3,459	51,724	30.4	3.22
F582xM256	2,957	53,821	24.9	3.27
NJ1031	2,923	50,909	26.1	2.73
Pacific 2000	2,864	65,704	19.8	2.93
FCE6xM256	2,860	56,035	23.2	3.06
FCE1xM256	2,821	45,899	27.9	3.79
FCE3xM256	2,816	55,219	23.2	3.57
De Paoli	2,779	51,025	24.7	3.51
Atlas	2,777	40,308	31.3	2.92
Apollo	2,630	42,405	28.2	2.82
NJ1019	2,570	48,113	24.3	3.08
F132xMCE4	1,834	43,453	19.2	4.02
C.V. =	30.9%	27.0%		

Means for yield and spear size not significantly different at 5% level

[1] Average of four replications
[2] Average of 23 harvests per replication

Spear Quality Rating Scale:	
very good =	6.00
good =	5.00
good/fair =	4.50
fair/good =	4.00
fair =	3.00
fair/poor =	2.50
poor/fair =	2.00
poor =	1.50

Table 2. 2009 ASPARAGUS CULTIVAR EVALUATION TRIAL - OBSERVATIONAL LINES
Klein Family Farms – Rindge Tract (23 harvests – 56 days)

Cultivar	Yield[1] lb/acre	No. spears[1] per acre	Average[1] spear wt. (g)	Spear quality[2]
F172xMCE4	5,218	82,479	28.7	3.98
F597xMCE4	4,941	87,605	25.6	3.87
F181xMCE4	4,839	80,149	27.4	4.11
F582xMCE4	4,711	79,683	26.8	3.91
FCE7xM120	4,618	63,840	32.8	3.45
F586xMCE1	4,515	78,751	26.0	3.39
NJ951	4,276	68,500	28.3	2.77
FCE5xM256	3,971	74,557	24.2	3.39
FCE4xA1	3,944	68,034	26.3	3.24
F608xMCE4	3,783	79,217	21.7	3.85
NJ956	3,718	68,500	24.6	3.09
F583xMCE4	3,598	50,792	32.2	3.52
3xPHY20	3,579	67,568	24.0	2.75
F582xA1	3,486	60,112	26.3	2.80
F177xMCE4	3,467	75,955	20.7	3.89
FCE7xM256	3,446	53,588	29.2	3.64
FCE3xA1	3,415	76,887	20.2	3.27
FCE1xA1	3,323	62,908	24.0	3.32
FCE6xA1	3,301	54,054	27.7	3.72
F132xMCE2	3,275	55,918	26.6	3.70
F189xMCE4	3,270	59,180	25.1	4.15
F609xMCE2	3,257	63,374	23.3	3.11
F608xMCE2	3,206	51,724	28.1	3.43
Early California	2,928	49,860	26.7	3.34
FCE5xA1	2,866	57,782	22.5	3.17
F597xMCE2	2,845	46,598	27.7	4.00
74x22	2,526	43,336	26.5	2.25
73x22	2,348	49,394	21.6	2.59
F600xA1	2,248	54,520	18.7	2.87

[1] Average of only one replication
[2] Average of 23 harvests/replication

Table 3. 2009 ASPARAGUS CULTIVAR EVALUATION TRIAL
Klein Family Farms – Rindge Tract

(23 harvests – 56 days)
Purple Replicated Lines

Cultivar	Yield[1] lb/acre		No. spears[1] per acre	Average[1] spear wt. (g)	Spear quality[2]
NJ1092	3,783	a	55,103	31.2	2.98
NJ1062	3,503	a b	50,559	31.5	2.20
NJ1064	3,498	a b	47,647	33.3	3.09
NJ1069	2,902	b c	33,900	38.9	2.31
Purple Passion	2,884	b c	32,386	40.4	3.10
NJ1016	2,742	c	31,803	39.1	2.64
Pacific Purple	2,408	c	30,871	35.4	3.48
LSD @ 0.05	695				
C.V. =	15.1%				

[1] Average of four replications
[2] Average of 23 harvests/replication

SPEAR QUALITY

Rating Scale:	
very good =	6.00
good =	5.00
good/fair =	4.50
fair/good =	4.00
fair =	3.00
fair/poor =	2.50
poor/fair =	2.00
poor =	1.50

A Pre-emergence Weed Control Trial in Newly Planted One-year-old Asparagus Crowns

A pre-emergence weed control trial in newly planted one-year-old asparagus crowns, evaluating four herbicides and/or combination treatments, was established on February 3, 2009 at Del Terra Farms (Mark and John Bacchetti and Kevin Robertson) on Fabian Tract, northwest of Tracy, California. All treatments were applied after the asparagus crowns were planted (19 December 2008) and covered with 3 to 5 inches of soil. A handheld CO_2 backpack sprayer was used with a spray volume of 50 gallons water per acre, 8004 nozzles and Roundup Ultra (glyphosate) at 1 lb/acre plus 0.5% v/v crop oil concentrate (COC) added to each treatment to remove any emerged weeds. Weeds present at the time of treatment included seedling to early second true leaf burning nettle, seedling to 2-inch rosette shepherd's-purse, 2- to 3-inch rosette lesser swinecress, and a small amount of seedling common lambsquarters. Soil incorporation of the surface-applied herbicides was accomplished by winter/spring rainfall. The soil type at the trial site was a Sacramento Clay loam. Plot design was a randomized complete block. The field was planted to the asparagus cultivar UC 157_{F1}. The trial was evaluated for weed control efficacy and crop fern vigor on February 24, 2009, March 6, 2009 and March 16, 2009. Best control of the major weeds present at the time of rating (burning nettle, shepherd's-purse, and lesser swinecress) occurred with Sencor (metribuzin) alone, Chateau (flumioxazin) alone at both rates tested, the combination treatments of Prowl H_2O (pendimethalin) plus Sencor, Prowl H_2O plus Chateau, Prowl H_2O plus Karmex (diuron) and Karmex alone. Prowl H_2O alone at both rates tested gave effective weed control as well. All treatments were safe to the young asparagus except Chateau. Alone or in combination treatment, Chateau caused a significant delay in crop fern growth. By the third rating date fern growth in the Chateau treatments had improved but was still behind other herbicide treatments and the untreated control. A final fourth crop fern vigor rating was done during the summer (July 10, 2009). All treatments exhibited good crop fern vigor. Only Chateau at the higher rate tested and a combination of Chateau plus Prowl H_2O lagged a little bit behind other herbicide treatment, but was visibly better than earlier in the season. Crop fern vigor in the untreated control was down considerably because of severe weed competition.

2009 ASPARAGUS PREEMERGENCE WEED CONTROL

(Newly planted one-year-old crowns)

Del Terra Farms (Mark and John Bacchetti, Kevin Robertson)

Fabian Tract off Finck Rd. near Tracy, CA

Weed Control Ratings

Treatments	Rate lb a.i./acre	Burning nettle			Shepherd's-purse			Lesser swinecress*			Fern Crop Vigor			
		2/24	3/6	3/16	2/24	3/6	3/16	2/24	3/6	3/16	2/24	3/6	3/16	7/10
Prowl H_2O (38.7%)	4.0	5.9	7.3	9.3	7.5	8.4	8.5	8.3	9.3	9.3	8.6	9.4	9.3	9.3
Prowl H_2O	8.0	6.6	8.1	9.4	7.3	8.8	9.0	8.3	10.0	9.6	8.3	9.0	8.6	8.6
Prowl H_2O+ Sencor (75DF)	4.0+1.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.4	8.9	9.1	9.3
Prowl H_2O + Sencor	8.0+1.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.4	8.6	8.6	8.6
Sencor	1.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.4	9.1	9.0	9.0
Chateau (51WDG)	0.188	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	4.3	5.5	7.1	8.9
Chateau	0.250	10.0	10.0	10.0	10.0	10.0	9.9	10.0	10.0	10.0	5.3	6.6	7.6	8.4
Chateau + Prowl H_2O	0.188+4.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	4.0	5.5	6.8	8.0
Chateau + Prowl H_2O	0.250+4.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	3.5	5.1	7.0	8.6
Karmex (80DF)	2.0	10.0	10.0	9.9	10.0	10.0	10.0	10.0	10.0	10.0	8.5	9.5	9.1	9.0
Karmex + Prowl H_2O	2.0+2.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.5	9.3	9.3
Untreated Control	–	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.5	0.0	8.3	9.1	8.8	5.8

*light stand of lesser swinecress

Numbers are the average of four replications.

Weed control rating scale: 0 = no weed control 10 = complete weed control

Crop vigor rating scale: 0 = crop dead, 10 = crop growing vigorously

A Postemergence Weed Control Trial in Newly Planted One-year-old Asparagus Crowns.

A postemergence weed management trial in newly planted one-year-old asparagus crowns, evaluating four herbicides and/or combination treatments was established February 27, 2009, at Del Terra Farms (Mark and John Bacchetti, Kevin Robertson) on Fabian Tract off Finck Road, northwest of Tracy, California. All treatments were applied over the young crop fern and emerged weeds with a handheld CO_2 backpack sprayer using 8004 nozzles and a spray volume of 50 gallons water per acre at 30 psi. The plot design was a randomized complete block and the field variety of asparagus was UC157F_1. The crowns were planted on December 19, 2008 and then covered with three to five inches of soil shortly after planting. Weeds present at the time of herbicide treatment were 2- to 4-inch rosette lesser swinecress, one to three true leaf burning nettle, 2- to 4-inch rosette shepherd's-purse, some seedling to three true leaf lambsquarters, a few 1- to 3-inch rosette annual sowthistle and a few one to three true leaf bur clover. The young asparagus was at early spear emergence to 4- to 6-inch tall fern.

The trial was evaluated for weed control efficacy and crop fern phytotoxicity on March 10 and March 16, 2009. Best control of the major weeds present occurred with Lorox (Linuron) alone, followed by the combination treatments of Sencor (metribuzin) plus Prism (clethodim) plus crop oil concentrate (COC), Lorox plus Sandea (halosulfuron) plus COC and Sencor alone. All treatments were quite safe to the crop. During summer (July 10, 2009), a crop fern vigor rating was taken with all treatments showing good crop fern vigor, except the control. The non-weeded control treatment showed poor crop fern vigor due to the intense weed competition. Notes on the activity of the herbicide treatments on minor population weeds are given after the table that follows.

Weed Control Ratings

Treatments	Rate lb a.i./acre	Shepherd's-purse		Burning nettle		Lambs-quarters		Lesser swinecress		Crop Fern Phyto		Crop Fern Vigor
		3/10	3/16	3/10	3/16	3/10	3/16	3/10	3/16	3/10	3/16	7/10
Lorox (50DF) + Prism (0.94E) + COC	1.00 + 0.188 + 0.5%	9.5	9.5	9.7	10.0	10.0	10.0	8.4	9.0	1.2	0.8	8.8
Sencor (75DF) + Prism (0.94E) + COC	1.00 + 0.188 + 0.5%	9.6	10.0	10.0	10.0	10.0	10.0	9.6	10.0	1.4	1.3	8.9
Lorox (50DF)+ Sandea (75WG) + COC	1.00 + 0.032 + 0.5%	9.5	10.0	9.8	10.0	10.0	10.0	9.4	10.0	1.2	0.6	8.8
Lorox (50DF)	1.00	9.8	10.0	9.9	10.0	10.0	10.0	9.0	9.8	1.1	0.8	8.4
Sencor (75DF)	1.00	9.6	10.0	9.4	10.0	9.8	10.0	9.5	10.0	1.4	1.3	8.8
Untreated Control	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	3.9

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 San Joaquin County
2101 East Earhart Avenue Suite 200, Stockton, California 95206-3924
Telephone (209) 953-6100

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