

# ASPARAGUS

Variety Evaluation Trials  
in San Joaquin County



## 2007 RESEARCH PROGRESS REPORT



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## **2007 ASPARAGUS VARIETY EVALUATION 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: Ed Zuckerman, Ken Jochimsen and George Biagi; Jeff Klein and Louis Casale and Bob Whitaker, as well as Cherie Watte and the California Asparagus Commission. It is their fine cooperation, financial and in-kind support and patience that benefit all asparagus growers in San Joaquin County and elsewhere. Great appreciation and many thanks are extended to these individuals for their contributions and interest.

This publication is a research progress report of asparagus cultivar evaluation trials conducted in San Joaquin County during 2007.

## CULTIVAR EVALUATION TRIALS

UC Asparagus Cultivar Evaluation Trial (Zuckerman-Heritage Farms) - This trial was planted in 2002 with one-year-old crowns on McDonald Island, west of Stockton, California. The crowns were provided by California Vegetable Specialties (Rich Collins) from their fumigated nursery site near Delhi, California, and some were attained from Zuckerman-Heritage Farms (Ed Zuckerman and Ken Jochimsen) at their crown nursery on McDonald Island. The trial contains 12 replicated lines and another 29 observation varieties in single or two-replication plots. Advanced cultivars from Dr. Mikeal Roose's breeding program at UC Riverside, Drs. Steve Garrison and Chee-Kok Chin's breeding programs at Rutgers University in New Jersey and the private asparagus variety development program from Brian Benson at California Seed and Transplant near Davis, California, make up the trial. This past winter and spring saw dry weather and cool to mild temperatures during the harvest season and the trial was cut 27 times over a 62-day period. The trial receives most of its moisture and fertility requirements from a buried drip irrigation system. Crop yield and quality was generally good for many of the cultivars in the replicated trial, led by UC 157F<sub>1</sub> at 5,638 Lbs./Acre and then followed by Grande (5,006 Lbs./Acre, F141 x M256 (4,728 Lbs./Acre), De Paoli (UCR 115) at 4,422 Lbs/Acre and Jersey Supreme (4,326 Lbs./Acre). Largest spear size was attained by Purple Passion, Grande, F586 x M256, F144 x M256 and Atlas. Best spear quality occurred with De Paoli, Purple Passion, F141 x M256, UC 157F<sub>1</sub>, and F586 x M256. Complete data from the replicated trial at Zuckerman-Heritage Farms is shown in **Table 1**.

In the 29-cultivar observation trial at Zuckerman-Heritage Farms, yields were very good for a number of varieties. The top yielding variety was NJ 937 (6,168 Lbs/Acre), followed by F177 x M256 (5,926 Lbs/Acre), FCE3 x M256 (5,221 Lbs/Acre), NJ 1021 (5,156 Lbs/Acre), FCE1 x M120 (5,150 Lbs/Acre), NJ 956 (4,861 Lbs/Acre), F133 x M256 (4,846 Lbs/Acre), F172 x M256 (4,748 Lbs/Acre), FCE2 x HMJ (4,669 Lbs/Acre) and FCE1 x M256 (4,315 Lbs/Acre). Largest spear size occurred with FCE2 x HMJ, FCE1 x A1, F133 x M256, F177 x M256, F172 x M256, and FCE7 x M256. Best spear quality was achieved by F82-2 x M256, FCE1 x M256, FCE3 x M256, F177 x MCE1, FCE1 x M120, F177 x M256 and F133 x M256. Complete observation trail data is contained in **Table 2**.

One of the persistent problems observed in local asparagus stand establishment is the use of one-year-old crowns from grower nurseries in the Sacramento-San Joaquin Delta area. Most of these nurseries are located in fields with a recent or long history of asparagus culture and consequently have high inoculum levels of *Fusarium* crown and root rot (*Fusarium oxysporum*, f.sp. *asparagi* and *Fusarium moniliforme*). Fumigation efforts on highly organic Delta soils used for many of these crown nurseries have met with mixed results because soil-applied fumigant materials tend to get tied up by the organic matter in the soils, rendering them partially ineffective. Because *Fusarium* is the most serious chronic pathogen affecting asparagus production worldwide, growers are encouraged to put their own crown nursery planting in soils without a crop history of asparagus and without a composition high in organic matter (in other words, away from the Delta). Fumigation of the nursery site also should be done on these preferable sedimentary soils to ensure good, clean, healthy crowns for planting in new production asparagus beds the following year. The final planting sites of

production beds should, ideally, also be in ground without an asparagus crop history to reduce the incidence of asparagus infection from *Fusarium* in succeeding years.

When the asparagus cultivar evaluation trail was established at Zuckerman-Heritage Farms in 2002, a separate mini-trial was also planted comparing crowns of four UC cultivars (UC 157F<sub>1</sub>, De Paoli, 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 site on mineral (sedimentary) soil that was fumigated, near 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 outyielded the same four varieties from the Delta nursery site, where *fusarium* had been present. During the past four full harvest seasons (2004, 2005, 2006 and 2007) there has been a trend in yield favoring the Delta site nursery crowns over the fumigated nursery crowns from the Delhi nursery site.

All of this may suggest there is some benefit that initially occurred from crowns grown in fumigated, non-asparagus crop history ground at the Delhi site for the majority of the selected lines evaluated. Over time with the variety trial located on non-fumigated high organic soil with the presence of *Fusarium* this advantage appears to have been nullified. It is still recommended that asparagus nursery sites for seedlings or crowns be located on sedimentary soils with no asparagus crop history and that those sites be fumigated. 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 planted into relatively disease-free soil. Data on this year's nursery comparison lines with respect to yield, spear numbers per acre, spear size and quality are shown in **Table 3**.

In the spring of 2006, an asparagus crown nursery was planted with Bob Whitaker on a Dinuba loamy sand soil south of Manteca, California. This crown nursery contained 16 lines from the University of California Riverside, Rutgers University, and the private asparagus breeding programs of Brian Benson (California Asparagus Seed and Transplant) and Peter Falloon (Aspara Pacific) in New Zealand. In addition, another 28 observation lines from the same seed sources were in the crown nursery. Additional crowns were provided from Brock Farms of another cultivar, Early California,, that has been put into the observation trial. A satellite trial of seven purple lines from Rutgers University, Brian Benson and Peter Falloon was also in the crown nursery for a replicated specialty crop trial. **Table 4** contains a listing of all crown nursery cultivars and their seed sources. The two new trials were established with Klein Family Farms (Jeff Klein and Louis Casale) March 10, 2007, on Rindge Tract.

Twenty-five crowns were planted in each replication of every cultivar in both trials. Stand survival counts were made on May 31, 2007 and again on August 21, 2007. Results for all cultivars were good to excellent in both trials. **Table 5** gives the crown counts for each counting date. A limited three to four-week harvest (7 to 10 cuttings) will be conducted on both trials in 2008.

**Table 1.** 2007 ASPARAGUS CULTIVAR EVALUATION TRIAL  
Zuckerman – Heritage Farms; McDonald Island

(27 harvests over 62 days)  
Replicated Varieties

Cultivar	Yield <sup>1</sup> Lbs/Acre	No. Spears <sup>1</sup> per Acre	Average <sup>1</sup> Spear Wt. (g.)	Spear Quality <sup>2</sup>
UC 157F <sub>1</sub>	5,638	116,218	22.0	3.28
Grande	5,006	86,423	26.3	2.67
F141 x M256	4,728	86,597	24.8	3.29
De Paoli (UCR 115)	4,422	90,431	22.2	3.57
Jersey Supreme	4,326	88,340	22.2	2.39 <sup>A</sup>
NJ 953	4,241	99,840	19.3	2.67
F586 x M256	4,227	73,007	26.3	2.87
Apollo	3,459	67,866	23.1	2.60 <sup>A</sup>
Atlas	3,315	60,686	24.8	2.72
Purple Passion	3,130	41,643	34.1	3.44 <sup>C</sup>
NJ 977	1,646	39,204	19.1	2.74 <sup>B</sup>
Average:	4,013	77,296	23.6	2.93
LSD @ 5%:	1,112	20,577		
C.V. =	19.2%	18.4%		

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

<sup>2</sup> Average of 27 harvests per replication, except as noted in Spear Quality column.....

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

<sup>A</sup> 26.5 harvests average per replication

<sup>B</sup> 25.3 harvests average per replication

<sup>C</sup> 24.5 harvests average per replication

**Table 2.** 2007 ASPARAGUS CULTIVAR EVALUATION TRIAL  
Zuckerman – Heritage Farms; McDonald Island

(27 harvests --62 days)  
Observation Lines

Cultivar	Yield <sup>1</sup> Lbs/Acre	No. Spears <sup>1</sup> per Acre	Average <sup>1</sup> Spear Wt. (g.)	Spear Quality <sup>3</sup>
NJ 937	6,168	120,226	23.3	2.56
F177 x M256 <sup>2</sup>	5,926	108,377	24.8	3.20
FCE3 x M256	5,221	103,673	22.9	3.40
NJ 1021	5,156	111,165	21.1	2.76
FCE1 x M120 <sup>2</sup>	5,150	105,415	22.2	3.21 <sup>A</sup>
NJ 956 <sup>2</sup>	4,861	115,347	19.1	2.82
F133 x M256	4,846	86,075	25.6	3.19
F172 x M256 <sup>2</sup>	4,748	87,817	24.5	2.94 <sup>A</sup>
FCE2 x HMJ <sup>2</sup>	4,669	77,885	27.2	2.46 <sup>B</sup>
FCE1 x M256	4,315	85,726	22.8	3.56
F137 x MCE4 <sup>2</sup>	4,117	85,726	21.8	3.10 <sup>A</sup>
FCE1 x A1 <sup>2</sup>	3,997	69,696	26.0	3.13
NJ 1018	3,940	97,574	18.3	2.37
FCE7 x M256	3,857	73,181	23.9	3.06
NJ 963	3,840	90,953	19.2	2.28
NJ 982	3,673	95,135	17.5	2.63
F133 x HMJ	3,089	68,651	20.4	2.26
F82-2 x M256	3,002	74,575	18.3	3.57
F177 x MCE2	2,981	67,954	19.9	2.60 <sup>C</sup>
NJ978	2,163	56,454	17.4	2.50 <sup>C</sup>
F177 x MCE1	1,534	45,999	15.1	3.40 <sup>D</sup>
NJ 976	1,282	33,803	17.2	2.69 <sup>E</sup>
NJ 990	1,038	32,409	14.5	2.71 <sup>E</sup>
Average	3,894	82,340	21.0	2.89

<sup>1</sup> Average of only one replication

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

<sup>3</sup> Average of 27 harvests, except as noted in  
Spear Quality column

<sup>A</sup> 26.5 harvests average per replication

<sup>B</sup> 25.5 harvests average per replication

<sup>C</sup> 26.0 harvests average per replication

<sup>D</sup> 25.0 harvests average per replication

<sup>E</sup> 24.0 harvests average per replication

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 3.**

2007 ASPARAGUS CULTIVAR EVALUATION TRIAL  
 Zuckerman – Heritage Farms; McDonald Island  
 (27 harvests - 62 days)

**SELECTED CULTIVAR COMPARISON OF CROWNS**  
**FROM TWO DIFFERENT NURSERIES**

Cultivar	Yield <sup>1</sup> Lbs/Acre	No. Spears <sup>1</sup> per Acre	Average <sup>1</sup> Spear Wt. (grams)	Spear <sup>4</sup> Quality
DePaoli (UCR 115) Delhi Nursery	4,483	84,332	24.1	3.26
DePaoli (UCR 115) McDonald Island	4,747	95,832	22.5	3.59
F141 x M256 Delhi	5,134	94,090	24.8	2.80
F141 x M256 McDonald Island	5,906	103,150	26.0	3.19
F586 x M256 Delhi	3,033	51,227	26.9	3.02
F586 x M256 McDonald Island	3,881	68,651	25.7	3.26
UC 157F <sub>1</sub> <sup>2</sup> Delhi	4,559	101,059	20.5	3.13
UC 157F <sub>1</sub> <sup>3</sup> McDonald Island	4,726	96,877	22.1	3.06

<sup>1</sup> Average of only one replication

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

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

<sup>4</sup> Average of 27 harvests of each replication

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 4.**

**2007 ASPARAGUS CULTIVAR EVALUATION TRIAL**

Cooperators: Klein Farms (Jeff Klein, Lou Casale) Rindge Tract

Experimenters: Brenna Aegerter, Benny Fouché, Bob Mullen and Scott Whiteley; UCCE San Joaquin County

		Breeder/Seed Source
REPLICATED PURPLE CULTIVARS	1. Pacific Purple	Peter Falloon, Aspara Pacific, New Zealand
	2. Purple Passion	Brian Benson, California Asparagus Seed & Transplants, California
	3. NJ 1069	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	4. NJ 1016	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	5. NJ 1062	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	6. NJ 1092	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	7. NJ 1064	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
REPLICATED GREEN CULTIVARS	8. Grande	Brian Benson, California Asparagus Seed & Transplants, California
	9. Apollo	Brian Benson, California Asparagus Seed & Transplants, California
	10. UC 157F <sub>1</sub>	Brian Benson, California Asparagus Seed & Transplants, California
	11. Atlas	Brian Benson, California Asparagus Seed & Transplants, California
	12. De Paoli (UCR 115)	Mike Roose/Neil Stone, UC/Stan Cutter, California
	13. NJ 1031	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	14. NJ 953	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	15. NJ 1019	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	16. Pacific 2000	Peter Falloon, Aspara Pacific, New Zealand
	17. FCE1 x M256	Mike Roose/Neil Stone, UC Riverside, California
	18. FCE2 x M256	Mike Roose/Neil Stone, UC Riverside, California
	19. FCE3 x M256	Mike Roose/Neil Stone, UC Riverside, California
	20. F582 x M256	Mike Roose/Neil Stone, UC Riverside, California
	21. FCE4 x M256	Mike Roose/Neil Stone, UC Riverside, California
	22. F132 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	23. FCE6 x M256	Mike Roose/Neil Stone, UC Riverside, California
OBSERVATION GREEN CULTIVARS	24. NJ 951	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	25. NJ 956	Chee-Kok Chin/Steve Garrison, Rutgers University, New Jersey
	26. 73 x 22	Peter Falloon, Aspara Pacific, New Zealand
	27. 74 x 22	Peter Falloon, Aspara Pacific, New Zealand
	28. 3 x Phy20	Peter Falloon, Aspara Pacific, New Zealand
	29. F172 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	30. FCE3 x A1	Mike Roose/Neil Stone, UC Riverside, California
	31. F181 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	32. F597 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	33. FCE7 x M120	Mike Roose/Neil Stone, UC Riverside, California
	34. F608 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	35. F582 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	36. FCE7 x M256	Mike Roose/Neil Stone, UC Riverside, California
	37. F597 x MCE2	Mike Roose/Neil Stone, UC Riverside, California
	38. F600 x A1	Mike Roose/Neil Stone, UC Riverside, California
	39. F189 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	40. FCE1 x A1	Mike Roose/Neil Stone, UC Riverside, California
	41. F582 x A1	Mike Roose/Neil Stone, UC Riverside, California
	42. FCE5 x A1	Mike Roose/Neil Stone, UC Riverside, California
	43. F609 x MCE2	Mike Roose/Neil Stone, UC Riverside, California
	44. FCE4 x A1	Mike Roose/Neil Stone, UC Riverside, California
	45. F177 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	46. F586 x MCE1	Mike Roose/Neil Stone, UC Riverside, California
	47. FCE6 x A1	Mike Roose/Neil Stone, UC Riverside, California
	48. F583 x MCE4	Mike Roose/Neil Stone, UC Riverside, California
	49. FCE5 x M256	Mike Roose/Neil Stone, UC Riverside, California
	50. F608 x MCE2	Mike Roose/Neil Stone, UC Riverside, California
	51. F132 x MCE2	Mike Roose/Neil Stone, UC Riverside, California
	52. Early California	Jim & Don Brock, Brock Farms, California



Table 5.

## 2007 ASPARAGUS CULTIVAR EVALUATION TRIAL

Klein Farms (Jeff Klein, Lou Casale) Rindge Tract

		Average Number Crowns per Replication*	
		5/31/07	8/21/07
REPLICATED (4 Reps) PURPLE CULTIVARS	1. Pacific Purple	22.0	21.8
	2. Purple Passion	22.3	21.8
	3. NJ 1069	23.3	23.8
	4. NJ 1016	23.5	23.3
	5. NJ 1062	23.3	23.3
	6. NJ 1092	23.3	24.0
	7. NJ 1064	23.5	23.3
REPLICATED GREEN CULTIVARS (4 Reps)	8. Grande	23.8	24.0
	9. Apollo	22.5	22.8
	10. UC 157F <sub>1</sub>	23.5	23.0
	11. Atlas	23.3	22.8
	12. De Paoli (UCR 115)	23.0	22.8
	13. NJ 1031	23.8	23.8
	14. NJ 953	24.3	24.5
	15. NJ 1019	24.8	24.5
	16. Pacific 2000	24.5	24.8
	17. FCE1 x M256	23.5	23.8
	18. FCE2 x M256	24.3	24.0
	19. FCE3 x M256	24.0	24.0
	20. F582 x M256	22.8	22.8
	21. FCE4 x M256	23.5	23.8
	22. F132 x MCE4	23.3	23.3
	23. FCE6 x M256	23.5	22.8
OBSERVATION GREEN CULTIVARS (1 Rep) *	24. NJ 951	25.0	25.0
	25. NJ 956	25.0	25.0
	26. 73 x 22	24.0	24.0
	27. 74 x 22	25.0	25.0
	28. 3 x Phy20	25.0	25.0
	29. F172 x MCE4	25.0	25.0
	30. FCE3 x A1	25.0	25.0
	31. F181 x MCE4	24.0	25.0
	32. F597 x MCE4	25.0	25.0
	33. FCE7 x M120	25.0	25.0
	34. F608 x MCE4	24.0	25.0
	35. F582 x MCE4	25.0	25.0
	36. FCE7 x M256	25.0	25.0
	37. F597 x MCE2	23.0	25.0
	38. F600 x A1	25.0	24.0
	39. F189 x MCE4	25.0	25.0
	40. F582 x A1	25.0	25.0
	41. F582 x A1	25.0	25.0
	42. FCE5 x A1	25.0	25.0
	43. F609 x MCE2	24.0	25.0
	44. FCE4 x A1	25.0	25.0
	45. F177 x MCE4	24.0	25.0
	46. F586 x MCE1	25.0	25.0
	47. FCE6 x A1	25.0	25.0
	48. F583 x MCE4	23.0	24.0
	49. FCE5 x M256	25.0	25.0
	50. F608 x MCE2	25.0	25.0
	51. F132 x MCE2	25.0	25.0
	52. Early California	25.0	25.0

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.

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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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