Sweetpotato Research Progress Report 2005

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Collaborators Trial 2005
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Location: Gallo Bear Creek Ranch. South of Hwy 140 & Howard Rds. Hilmar sand, slightly saline-alkali. Soil analysis results shown in Table 1. Blain Yagi, cooperator.

Varieties:

1. CA Beauregard GI from Dave Sousa.
2. B63 cuttings from bed G3
3. B14 G4
4. *– dropped –*
5. B63 G1
6. B14 G2
7. L99-35
8. NC 98-608 (Covington)
9. L01-29
10. Yagi Bros Japanese Yam
11. Costanero (G0 from FPS)

Plot layout.

1	2	3	11	10	9	8	7	6	5
7	9	1	6	11	8	2	10	3	5
5	7	6	8	3	11	10	1	9	2
1	2	3	5	6	7	8	9	10	x

70 plants per plot on 9" spacing, 2 rows wide
each plot one 80" bed, drip irrigated, ~ 30 ft long
Note that there is no #4 and only 3 reps of #11

Bedded: March 2, 2005. Sprayed with Botran
Bed evaluation: April 13, 2005
Transplanted: May 19, 2004 with new 2-row finger planter. Field moisture excellent, temps mild. Plants were cut previous day and stored in shade .
Hand transplant: none
Field evaluation: July 1, 2005. All lines growing well. Costanero very large vigorous plant with large leaves.
Harvest: Sept 28, 2005. Used 2-row digger and picked off the ground. Field graded.

Costanero foliage.

Results:

Table 1. Soil sample results, 2005 Collaborators Trial.

Sample		SP %	pH	EC dS/m	Ca (SP) meq/L	Mg (SP) meq/L	Na (SP) meq/L	Cl (SP) meq/L	NO3-N ppm	Olsen-P ppm	X-K ppm	Zn (Total) ppm	Mn (Total) ppm	Fe (Total) ppm	Cu (Total) ppm
Bear Creek Ranch	0-12"	26	7.1	2.06	11.4	4.6	5.1	2.8	18.3	60.3	117	22	107	48	10
		sand	H	H				L		H	M	VH	VH	VH	VH

SP = saturation percentage.
Micronutrient analysis results questionable. Values much higher than normal.

Figure 1. Hand picking plots.

Figure 2. Close up of Costanero root.

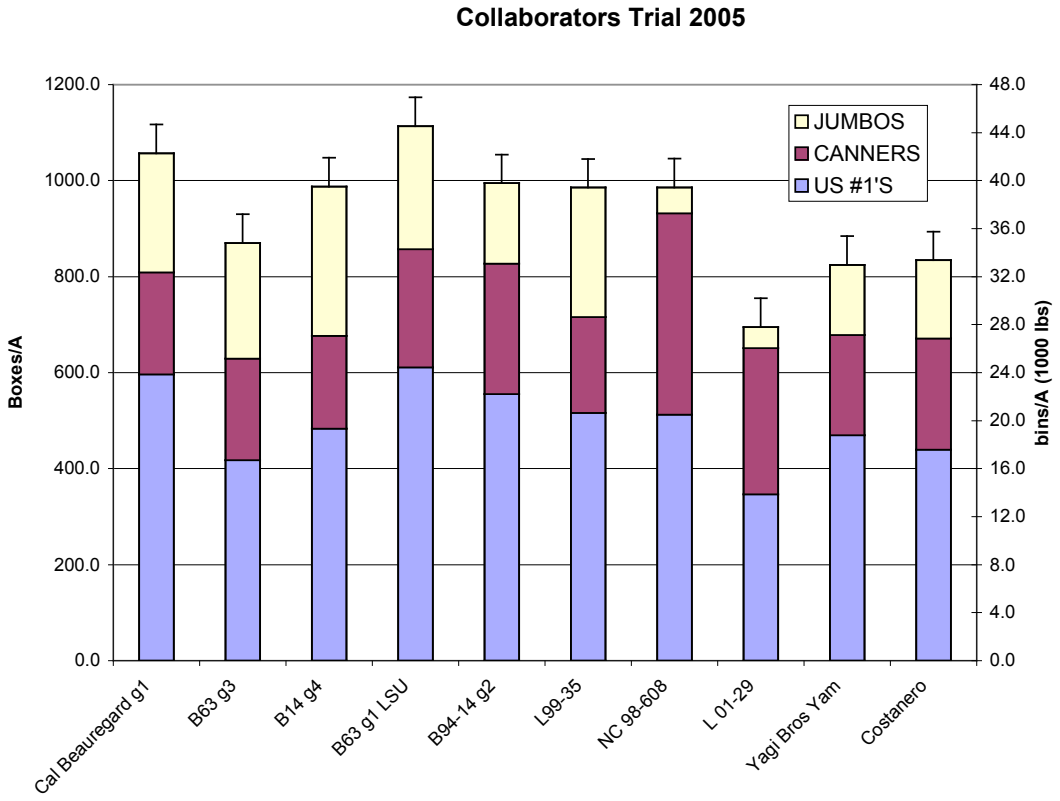

Figure 3. Yield results, Collaborators Trial 2005. See Table 3 for statistical analysis.

Table 2.
SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION

Date bedded: 3/2/05 Location: Yagi Bros Farms, Inc.

Date Evaluated: 4/13/05 Type of bed: hot bed w/ cotton gin trash

Evaluated by: S. Stoddard

Selection	Roots presprouted yes/no	Plant Production 1-5 (1)	Uniformity of Emergence 1-5 (2)	Earliness 1-3 (3)	Root Conditions 1-5 (4)	Remarks (5)
Cal Beauregard g1	G1 plants taken from growers hot bed					
B63 g3	no	2	1	1		poor production
B14 g4	no	3	3	2		okay
B63 g1 LSU	no	2	2	1		
B94-14 g2	no	4	3	2		best of the Bgards
L 99-35	no	1	1	1		purple lvs, weak
NC 98-608	no	4	4	2		good
L 01-29	no	5	5	3		very strong
Yagi Bros Yam	no	5	4	3		best producer
Costanero	no					from greenhouse

(1) Plant production rated from 1 – 5 based on observation during pulling season. A rating of 1 indicates low plant production, while 5 indicates good plant production.

(2) Uniformity of emergence rated from 1 - 5. One (1) indcates poor uniformity while 5 indicates the highest degree of uniformity of emergence.

(3) Earliness of plant production is rated form 1 – 3. One (1) indicated late emergence while 3 indicates early production.

(4) Root conditions six weeks after first pulling, rated 1 – 5. One (1) indicates complete rotting, while 5 indicates perfectly sound conditions.
Mostly not applicable as beds were disced shortly after transplanting.

(5) Notes on size of root, decay in beds, etc.

Table 3. Yield.

NATIONAL SWEETPOTATO COLLABORATORS SUMMARY OF DATA
2005

STATE AND LOCATION REPORTING: Livingston, CA
DATE TRANSPLANTED: May 19. DATE HARVESTED: 9/28/2005. No. GROWING DAYS: 132
DISTANCE BETEEN ROWS (in): 40. DISTANCE IN ROW (in): 9
PLOT SIZE: NO. OF ROWS: 2 LENGTH (ft): 25 NO. OF REPS: 4
IRRIGATION: pre irrigate + drip irrigation. 1.5 to 2 inches per week during summer, total 36".
FERTILIZER: 1 ton gyp, 3 tons compost, 500 lbs K2SO4 pre plant, CAN17 drip. About 180-60-375 NPK.

	-------	40 lb box/A		-------	1000 lb	%	%	% wt loss
SELECTION	US #1'S	CANNERS	JUMBOS	MKT YIELD	BINS/A	US #1'S	CULLS	84 days
1 Cal Beauregard g1	596.3	212.6	248.0	1056.9	42.3	56.5	1.5	4.9%
2 B63 g3	417.4	211.5	240.9	869.7	34.8	48.1	12.6	3.6%
3 B14 g4	483.1	193.6	310.9	987.6	39.5	48.8	2.0	4.1%
5 B63 g1 LSU	611.0	246.1	256.3	1113.4	44.5	55.0	0.5	3.3%
6 B94-14 g2	555.5	271.4	167.6	994.4	39.8	56.0	0.0	4.7%
7 L99-35	516.4	199.6	269.4	985.3	39.4	52.3	0.0	4.8%
8 NC 98-608	512.2	419.8	54.2	986.1	39.4	51.9	0.0	4.8%
9 L 01-29	346.3	305.2	43.4	694.9	27.8	50.1	0.0	5.4%
10 Yagi Bros Yam	469.8	208.5	146.0	824.3	33.0	56.9	0.0	xx
11 Costanero	439.3	232.3	162.4	833.9	33.4	52.5	0.0	6.4%
Average	494.7	250.0	189.9	934.7	37.4	52.8	1.7	4.7%
LSD 0.05	90.34	79.8	51.8	120.34	4.8	ns	xx	xx
CV, %	12.6	22	18.8	8.9	8.9	8.2	xx	xx

US #1's	Roots 2 to 3.5 inches in diameter, length 3 to 9 inches, well shaped and free of defects.
Canners	Roots 1 to 2 in diameter, 2 to 7 inches in length.
Jumbos	Roots that exceed the diameter and length requirements of above grades, but are marketable quality.
Mkt Yield	Total marketable yield is the sum of the above three categories. Bin weight = 1000 lbs.
% US #1's	Weight of US #1's divided by total marketable yield.
% Culls	Roots greater than 1" in diameter that are so misshapen or unattractive as to be unmarketable.
	xx Because of a lack of data, statistical analysis was not performed.
LSD 0.05	Least significant difference. Means separated by less than this amount are not significantly different (ns)
CV, %	Coefficient of variation, a measure of variability in the experiment.

Sweetpotato Collaborators Trial -- 2005

Merced County

This year's sweetpotato evaluation was with Blain Yagi, near Livingston, CA. Soil type was Hilmar sand, slightly saline-alkali. Ground was fumigated with Telone. Field pre-irrigated, and soil moisture was excellent at planting. Plants cut the previous day. All plants from hot bed except variety 11, which was greenhouse plants. Field sprayed once for armyworms. No other pest problems. Russet crack showing in Beauregard, but overall trial yield and quality very good.

Rep	Var	Variety Name	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniformity	Overall App	Comments
1	1	Cal Beauregard	Rose-	7, 9	3	7	7	1, 5, 6	5	6	chunky rose copper
2			copper	7	3	7	7	1, 5, 6	5	7	some fluting
1	2	B63 g3	rose	5, 7	3	7	6	2, 3, 6	5	5	some fluting, rough skin
2			copper	6, 7	3	6	6		5	6	YCR, slight cracking
1	3	B14 g4	copper	5	2.5	5	6	2, 3, 5	5	6	More Cu color, rough skin
2			rose Cu	5	3	5	7		6	7	good shape, YCR
	4		*dropped from trial.*								
1	5	B63 g1	rose Cu	7	3	9	7	2, 5	7	7	YCR. Slight rough skin on some
2			rose Cu	7	3	7	7		7	8	nice shape, slight fluting
1	6	B94-14 g2	Copper	7	3	7	5	2, 3, 5	5	7	some rough skin
2			Copper	5	3.5	7	6			6	some fluting
1	7	I 99-35	rose Cu	7	4	7	5	2, 3, 8	7	7	Good shape, smooth, some veins
2			rose Cu	7	4	9	7		7	7	lents obvious, good flesh color
			Dark green foliage with purple new growth, leaves slightly crinkled. Looks like Bienville.								
1	8	NC 98-608	Rose Cu	7	3	7	7	3, 5, 6	7+	8	good shape, slightly chunky
2			Rose Cu	9	3	9	9		8	8	slight fluting, very smooth
			All green foliage, compact growth habit, slight crinkle to leaves.								
1	9	L 01-29	purple	7	0	5	5	2, 5	7	7	good shape, color, texture
2			purple	8	white	6	7		8	7	later maturity? Skins easily
			All green foliage, smaller leaves, more upright bunch type growth.								
1	10	Yagi Bros Yam	purple	5	0	6	6	6, 7	5	5	Japanese yam (Koto Buki).
2											Blocky lumps, fluting
			Grower Japanese Yam to compare to L-01-29.								
1	11	Costanero	red	1	3	3	3	4, 6, 7	1	3	fluting, lumpy, misshapen
2			red purple	1	2	3	3		1		lents, heavy pimpling, dull color
			Very large, vigorous plant. All green foliage, upright growth habit with large leaves.								

Skin color:	Skin Texture:	Flesh Color:	Eyes:	Lenticles:
cream (Hanna)	1 = very rough	0 = white	1 = very deep	1 = very prominent
Tan	3 = moderately rough	1 = cream	3 = deep	3 = prominent
copper (Jewel)	5 = moderately smooth	2 = yellow	5 = moderate	5 = moderate
Rose (Beau)	7 = smooth	3 = orange	7 = shallow	7 = few
Purple (Garnet)	9 = very smooth	4 = deep orange	9 = very shallow	9 = none
		5 = very deep orange		

Shape:	Shape Uniformity:	Overall Appearance:
1 = round	1 = very poor	1 = very poor
2 = round-eliptical	3 = poor	3 = poor
3 = eliptic	5 = moderate	5 = moderate
4 = long eliptic	7 = good	7 = good
5 = ovoid	9 = excellent	9 = excellent
6 = blocky		
7 = irregular		
8 = asymmetric		

All ratings made on #1 roots.

Louisiana Advanced Line Trial - 2005 **Root Evaluation**

Merced County

An advanced line sweetpotato observation trial with varieties from Don LaBonte was conducted with Dave Souza of D&S Farms.
Ground was fumigated with Telone. Soil is Delhi sand, deep and uniform.
Planted on an 18" spacing down the row, drip irrigated. All plants received as cutting from LA, 6 to 20 per variety. Plant stand very good.
Plants cut June 8, received June 9, and transplanted June 10. Harvest Oct 13, 2005 using mechanical harvester.

Variety	# of plants	yield boxes (45 lbs)	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniformity	Overall App	Comments
02-21	14	4	Red	7	4	7	3	3, 4, 8	7	6	Lots jumbos, nice color, mostly smooth prominent lenticles w/sprouts. Too many sprouts, long.
	All green vigorous vine, pointy spade shape leaf.										
02-32	23	6	Rose Cu	6, 7	3	8	7	2, 3, 5	5	7	Few with cracks, lots of size variation Some w/rough skin, slight YCR, tails, string roots.
	Vine looks like Bienville, large, purple new growth crinkled leaf										
03-278	5	2	Purple	7	4	5	5	2, 5, 6	5	3	cracking, tails, string roots, sprouts lots of size variation
	vine all green, smaller leaves, leaf like crinkly Diane										
03-87	5	2.25	Cu	5	4	3	9	3, 5	5	1	deep extensive cracking, deep eyes, some veining, string roots
	Vine all green, large vine, large leaves, spade shape										
03-282	11	2	Rose	7	0	7	5	3, 6	5	5	Tails, sprouts, string roots, skin color variation end to end, some pimples, some veins, mostly jumbos
	vine all green, large vine, leaves like Diane, some flowers										
03-402	5	3	Red	5	3	4	7	3, 6	7	7	some skin cracking, nice color, eyes dark with scurf
	Vine all green, large leaves, spade shape										
03-358	10	4	Cu	6	3	5	7	2, 6, 8	3	3	lumpy, string roots, variable shape long
	Vine purple new growth, smooth spade shape leaf										

Variety	# of plants	yield boxes (45 lbs)	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniformity	Overall App	Comments
02-814		1	Purple	7	purple	6	9	5	7	5	deep fluting, some dark spots (scurf?) string roots
	Mixed with 02-814										
02-814 b		2	Red	9	4	7	4	2, 3	7	7	sprouts, lenticles prominent, too long
	Diane type leaf but darker green, some purple on new growth. Yellowing of older growth and some necrotic spots. Stem rot?										
03-268	11	2	Rose Cu	5	3	5	5	3	7	5	less red than 814 b, skin rough, string roots, pimpling, some lumps mostly small
	Vine all green, smaller vine, crinkle leaf, spade shape										
03-10	22	4	Cu	7	3	5	7	5, 6, 8	5	5	string roots, nice Cu color, mostly smooth
	Vine all green, vigorous, large, spade shape leaf.										

Skin color:	Skin Texture:	Flesh Color:	Eyes:	Lenticles:
cream (Hanna)	1 = very rough	0 = white	1 = very deep	1 = very prominent
Tan	3 = moderately rough	1 = cream	3 = deep	3 = prominent
copper (Jewel)	5 = moderately smooth	2 = yellow	5 = moderate	5 = moderate
Rose (Beau)	7 = smooth	3 = orange	7 = shallow	7 = few
Purple (Garnet)	9 = very smooth	4 = deep orange	9 = very shallow	9 = none
		5 = very deep orange		

Shape:	Shape Uniformity:	Overall Appearance:	**All ratings made on #1 roots.**
1 = round	1 = very poor	1 = very poor	
2 = round-eliptical	3 = poor	3 = poor	
3 = eliptic	5 = moderate	5 = moderate	
4 = long eliptic	7 = good	7 = good	
5 = ovoid	9 = excellent	9 = excellent	
6 = blocky			
7 = irregular			
8 = asymmetric			

Valor/Chateau Herbicide on Sweetpotatoes, 2005
Scott Stoddard
UCCE Merced & Madera Counties

Objective: evaluate pre-plant applications of Chateau (Valent, flumioxazin) for weed control and variety tolerance in commercial sweetpotatoes. Note: Chateau has Federal, but not state, label. No crop destruct required.

Location: One trial with Gabe Estrada on the Gallo Blue Heron Ranch, south of Hwy 140 and east of Burt Crane Road, soil type Hilmar loamy sand; second trial with Nathan Mininger at the Machado Ranch, south of 140 near Washington Rd, soil type Hilmar loamy sand.

Treatments:

1. UTC
2. Dacthal PPI at 6 lbs/A (standard)
3. Valor pre-plant (no incorporation) 1 oz/A
4. Valor pre-plant (no incorporation) 2 oz/A

Varieties:	(Estrada's)	(Mininger's)
a.	Diane	Diane
b.	Golden Sweet	O'Henry
c.	Beauregard	Beauregard

4			3			2			1		
2			4			1			3		
3			2			4			1		
1 a	b	c	2 a	b	c	3 a	b	c	4 a	b	c

Plots 3 beds (20 ft) by 40 ft long, replicated 4 times. 2 rows per bed. Same varieties planted down the row in each plot across reps.

Trial 1: Herbicides applied May 18, 2005 with backpack sprayer at 30 psi and 30 gpa equivalent using 8002 flat fan nozzles. Used 5 ft boom, so the entire top of the bed and part of the shoulders were covered, but not the furrow bottom. Transplanted May 19. Dacthal incorporated

with a rake. Valor only incorporated with water from the drip tape down the middle of the bed. No rain post application.

Trial 1 weed and crop ratings were conducted on June 14, June 20, and July 1. June 20 rating also hand weeded plots in plant row (did not hand weed under drip tape). Main weed red-root pigweed. Plots harvested October 10, 2005.

Trial 2: Herbicides applied June 3, 2005, with same back pack sprayer as location 1 and transplanted same day. Valor not incorporated. Watered-in only from drip tape. No rain post application. Weed and crop ratings were conducted on July 1, 8, and 27. Main weeds were redroot pigweed, Bermuda grass, and crabgrass. Plots harvested November 2, 2005.

SUMMARY

Valor (flumioxazin) is an herbicide from Valent that has recently received full federal labeling for use in sweetpotatoes. Valor does not have a label for use in sweetpotatoes in California, where it is also marketed under the trade name Chateau. In weed control trials in Louisiana and Mississippi, Valor has given excellent control of pigweeds. Pre-transplant applications were shown to have good crop tolerance.

Valor requires water incorporation, preferably from rain or sprinklers, to give good control. However, very few sweetpotato fields are sprinkler irrigated. Therefore, a trial was conducted in 2005 in California in two locations to determine if Valor could be an effective herbicide under our growing conditions using only water from the drip tape to activate the herbicide, and also to evaluate variety tolerance.

Both trial locations were located in Merced County on Hilmar sandy loam soils, slightly saline alkali. Soil sample results are shown in Table 1. Both locations were drip irrigated and had not received any herbicide prior to transplanting. The drip tape wetted a zone on top of the bed about 12" wide.

Weed control and crop phytotoxicity ratings for both trial locations are shown in Table 2. Ratings were restricted to the top of the bed where the Valor herbicides were water incorporated. At Trial 1 (Gabe Estrada), redroot pigweed and grasses were significantly reduced by all herbicide treatments as compared to the untreated control. By July 8, Dacthal and the 2 oz rate of Valor suppressed weeds better than the 1 oz rate of Valor. No significant differences were seen for nutsedge control, though the level found in any plot was very low. Weed pressure is illustrated in Figures 1 – 4.

Weed pressure at Trial 2 (Nathan Mininger) was less than Site 1, however all herbicide treatments significantly reduced weed pressure as compared to the untreated control (Table 2). There were slightly less weeds in the plots that received the high rate of Valor as compared to the low rate. At both locations, Dacthal pre-plant incorporated performed very well.

Some slight crop phytotoxicity was seen, in that the plants were slightly smaller in the Valor treatments. (Table 2) At Trial 1, Golden Sweet appeared to be more sensitive than the other varieties; at site 2 Diane seemed to be more sensitive and show more stunting. Statistical

analysis could not be performed on this data because of the large number of zeros (no observed phytotoxicity) observed in the plots. All plants outgrew the stunting and no phytotoxicity symptoms could be seen by mid-July at either location. Yield and root quality were unaffected (data not shown).

A major limitation of Valor in sweetpotato production in California is the requirement for water incorporation to activate the herbicide. While spring rains do occur after transplanting, they are highly erratic. Even though the density of weeds is usually greatest under the drip tape, in this trial there was still substantial weed growth in the plant row and shoulders of the beds in the Valor plots. Mechanical cultivation and hand hoeing would still be required.

Acknowledgements. Many thanks to Gabe Estrada with Angelakis Farms and Nathan Mininger for their cooperation, and Tom DeWitt for product.

Table 1. Soil sample results for the Valor trial locations, Hilmar loamy sand slightly saline-alkali.

Location	DESC	pH	EC	Ca (SP)	Mg (SP)	Na (SP)	Cl (SP)	HCO3 (SP)	NO3-N	Olsen-P	X-K	Zn (Total)	Mn (Total)	Fe (Total)	Cu (Total)
			dS/m	meq/L	meq/L	meq/L	meq/L	meq/L	ppm	ppm	ppm	ppm	ppm	ppm	ppm
1	Gabe E.	7.2	1.91	10.2	3.7	2.3	2.5	1.1	20.8	27.8	212	14	98	4310	5
2	Nathan M.	7.8	1.28	6.5	0.9	5.1	1.5	1.3	24.8	9.2	50	17	132	6380	5

Samples 0 - 12" taken during the summer from the top of the bed.

Table 2. Valor weed control and crop phytotoxicity ratings on sweetpotatoes. 0 = nothing, 10 = extremely bad.

Site 1: Gabe E.	14-Jun			20-Jun			1-Jul			crop phytotoxicity on July 1		
treatment	BL	grass	nutsedge	BL	grass	nutsedge	BL	grass	nutsedge	Diane	G. Sweet	Beauregard
UTC	4.00	1.75	1.50	7.00	1.50	1.75	8.50	2.50	2.00	0.00	0.00	0.00
Dacthal PPI 6 lbs/A	1.50	0.00	1.50	1.75	0.50	2.00	3.00	0.75	2.25	0.00	0.00	0.00
Valor 1 oz/A	2.25	0.00	1.50	2.50	0.75	2.00	3.50	1.00	2.75	1.75	2.25	1.50
Valor 2 oz/A	1.25	0.50	1.00	1.25	0.50	1.00	2.25	1.00	2.00	2.00	2.25	1.75
LSD 0.05	1.1	0.9	NS	1.5	NS	NS	1	1.3	NS	xx	xx	xx
CV, %	33.1	103	32.1	29.7	82.7	34.6	14.5	60	23.4			

Site 2: Nathan M.	1-Jul			8-Jul			27-Jul			crop phytotoxicity on July 8		
treatment	BL	grass	nutsedge	BL	grass	nutsedge	BL	grass	nutsedge	Diane	O'Henry	Beauregard
UTC	3.75	2.75	0.00	3.75	3.50	0.00	4.25	4.25	0.00	0.00	0.00	0.00
Dacthal PPI 6 lbs/A	1.25	1.50	0.00	1.50	1.75	0.00	1.25	1.00	0.00	0.00	0.00	0.00
Valor 1 oz/A	2.00	1.25	0.00	1.50	1.75	0.00	1.75	2.00	0.00	2.00	1.00	1.00
Valor 2 oz/A	0.75	0.75	0.00	1.00	1.75	0.00	1.00	2.00	0.00	2.75	1.50	1.75
LSD 0.05	1.6	1.4	xx	0.7	1.3	xx	0.9	1.1	xx	xx	xx	xx
CV, %	50.3	54.6		21.5	35.9		28.3	30.8				

LSD 0.05	Least significant difference at the 95% confidence level. Means within a column and location separated by less than this amount are not significantly different.
CV	Coefficient of variation, a measure of the variability in the experiment.
xx	statistical analysis could not be performed
BL	Broadleaf weeds, mainly redroot pigweed.

Ratings made from center of bed only.

Figure 1. Untreated control.

Figure 2. Dacthal 6 lbs/A pre-plant incorporated.

Figure 3. Chateau (Valor) at 1 oz/A pre-plant, not incorporated.

Figure 4. Chateau (Valor) at 2 oz/A pre-plant.

Roundup herbicide trial on sweetpotatoes, 2005

Scott Stoddard, Farm Advisor
UCCE Merced & Madera Counties

Objective: evaluate rates and tank-mix combinations of Roundup herbicide on weed control in sweetpotatoes.

Location: 2 trials, both with Nathan Mininger, north of 1st Avenue and east of Hwy 165 near Stevinson. Trial 1 main weed redroot pigweed; trial 2 main weed yellow nutsedge.

Treatments:

1. UTC
2. 0.4% (1 pint) Roundup UltraMax (glyphosate)
3. 0.8% (2 pints) Roundup UltraMax
4. 0.8% Roundup + 2% Scythe (pelargonic acid)
5. 0.4% Roundup + 1 oz/A Sandea (halosulfuron-methyl)
6. 1 oz/A Sandea + NIS (non-ionic surfactant)

All treatments applied as a post-directed spray down the middle of the beds about 6 weeks after transplanting. Used 30 gpa equivalent at 30 psi. Most weeds < 4 true leaves. Variety was Beauregard.

Trial 1: plots 1 bed x 30 feet long, 5 reps
Trial 2: plots 1 bed x 40 ft, 4 reps

Trial 1. sprayed June 4, 2005. Directed spray down middle of row at 30 gpa broadcast-spray acre equivalent. Field had been cultivated once. Actual spray volume less because spray band was about 18" wide. Weed and crop phytotoxicity ratings on June 10, June 20, July 1, 2005.

Trial 2. Sprayed June 14, nutgrass 3 – 9" tall. Field had been cultivated 2x. Weed and crop phytotoxicity ratings made June 20, July 1, and July 8.

Yield was not measured at either location.

Summary:

Two Roundup herbicide trials were conducted in 2005. In one location the main weeds were redroot pigweed; at the other site yellow nutsedge dominated. The addition of Sandea, a post-emergence nutsedge control herbicide, was included in the trial specifically because of the heavy nutsedge pressure at this location (Sandea has a Federal Label for use in sweetpotatoes in other areas of the U.S.) Weed control and crop phytotoxicity ratings were made on a subjective scale, with 0 indicating no weed growth or crop phytotoxicity, and 10 indicating extreme weed growth or crop death. Herbicides were directed in a band down the center of the bed using a wand attached to a back pack sprayer, but slight drift resulted in some herbicide getting on the tips of the vines. Statistical analysis was performed on the subjective plot ratings using analysis of variance procedures for a randomized block design; least significant differences were calculated using Fisher's Unprotected LSD at the 95% confidence level. Soil samples were taken at the onset of the trials for background information. Soil sample results are shown in Table 1.

Weed control and crop phytotoxicity ratings for both sites are shown in Tables 2 and 3. At site 1, redroot pigweed was significantly reduced in all treatments as compared to the untreated check plots, but the Sandea alone treatment was far less effective than the others. Initially, the Sandea treatment appeared to

provide some weed control (Table 3 June 20 evaluation). However, by the last evaluation date the weeds had recovered and were growing vigorously. All of the Roundup treatments did an excellent job of controlling weeds throughout the duration of the trial. There was no significant improvement in weed control by adding Scythe, Sandea, or increasing the rate to 2 pints (Figure 1).

Weed control at site 2, dominated by yellow nutsedge, was not nearly as good as site 1. While Roundup and Sandea significantly reduced sedge growth as compared to the untreated check (Table 3), the amount of control was marginal. Most likely this occurred because the nutsedge was sprayed too late.

Crop phytotoxicity increased as the rate of Roundup increased and was greatest in the treatments that contained Sandea herbicide. Phytotoxicity ratings declined as the crop matured (Figure 1) and were not visible by the end of the season.

Two years of research have shown that Roundup can be effectively used as a post-emergent, directed spray to the top of the beds in sweetpotatoes. One application at equivalent 1 – 2 pints/A can provide season long weed control without having to move the drip tape (Fig. 2). The actual amount applied will be less than 2 pints because the band application covers only about 15% of the bed. Roundup Ultra Max is registered for in-season use in sweetpotatoes in California. Crop risk can be minimized by taking certain precautions like using a hooded sprayer and applying when the weeds are small and the vines have not covered the beds.

Acknowledgements
Many thanks to Nathan Mininger for his help with this project.

Table 1. Roundup on sweetpotatoes, soil sample results 2005.

	ppm			meq/L					dS/m	%
	NO_3-N	PO_4-P	K	Ca	Mg	Na	Cl	pH	EC	SP
0 -12"	10.2	25.9	45.0	1.7	0.5	9.0	4.5	8.3	1.18	24
	L	H	L	L	L	L	L	H	L	sand

SP = saturation percentage, approximately 2x field capacity. Values < 30 indicate a sandy texture.
Ca, Mg, Na, and Cl levels are all low, but since Na dominates, the calculated SAR is almost 9 and indicates a sodic soil.
Samples taken in summer form 0 - 12" depth.

Table 2. Roundup herbicide trial in sweetpotatoes, results for site 1 on three evaluation dates.
Results are based on a subjective ratingscale, where 0 = no weeds or crop phytotoxicity, and 10 = all weeds or crop death.

	10-Jun-05		crop	6/20/05		crop	7/1/05		crop
treatment	BL	Grass	phytotoxicity	BL	Grass	phytotoxicity	BL	Grass	phytotoxicity
1 UTC	5.2	0.4	0.0	6.0	1.0	0.0	7.2	1.0	0.0
2 0.4% (1 pt) Roundup	0.4	0.0	1.4	1.6	0.2	1.4	1.6	0.4	0.4
3 0.8% (2 pts) Roundup	0.2	0.0	2.6	1.2	0.2	2.6	1.2	0.2	1.6
4 0.8% + 2% Scythe	0.0	0.4	3.8	1.2	1.0	4.0	1.6	1.0	3.0
5 0.4% Roundup + 1 oz Sandea	0.0	0.0	2.6	0.2	0.2	5.0	0.6	0.4	3.4
6 1 oz Sandea + NIS	2.6	0.8	3.0	3.8	1.2	5.4	5.4	1.6	3.0
Average	**1.4**	**0.3**	**2.2**	**2.3**	**0.6**	**3.1**	**2.9**	**0.8**	**1.9**
LSD 0.05	**1.2**	**NS**	**0.9**	**1.6**	**NS**	**1.3**	**1.46**	**NS**	**0.73**
CV, %	**66.7**		**29.2**	**53.1**		**31.0**	**37.8**		**29.0**

BL = broadleaf weeds, mainly redroot pigweed
LSD 0.05 = Least significant difference at the 95% confidence level.
CV, % = coefficient of variation.

Table 3. Roundup herbicide trial in sweetpotatoes, results for site 2 on three evaluation dates.
Results are based on a subjective ratingscale, where 0 = no weeds or crop phytotoxicity, and 10 = all weeds or crop death.

	20-Jun-05		crop	7/1/05		crop	7/8/05		crop
treatment	sedge	Grass	phytotoxicity	sedge	Grass	phytotoxicity	sedge	Grass	phytotoxicity
1 UTC	6.3	1.5	0.0	8.0	2.0	0.0	8.3	2.5	0.0
2 0.4% (1 pt) Roundup	2.5	1.0	1.5	4.5	0.5	0.8	4.5	1.8	0.0
3 0.8% (2 pts) Roundup	3.5	0.8	3.0	4.5	0.3	1.8	4.5	1.8	0.0
4 0.8% + 2% Scythe	3.0	0.5	4.0	3.5	0.5	1.8	4.5	1.0	0.3
5 0.4% Roundup + 1 oz Sandea	2.3	0.8	2.5	2.0	0.8	4.8	2.8	2.5	1.0
6 1 oz Sandea + NIS	2.3	0.3	3.5	1.8	1.5	5.3	1.8	1.0	2.0
Average	**3.3**	**0.8**	**2.4**	**4.0**	**0.9**	**2.4**	**4.4**	**1.8**	**0.5**
LSD 0.05	**2.20**	**NS**	**1.16**	**1.74**	**NS**	**1.14**	**2.01**	**NS**	**0.54**
CV, %	**43.7**		**31.8**	**28.5**		**31.9**	**30.5**		**66.7**

Sedge = yellow nutsedge, grass = bermuda.
LSD 0.05 = Least significant difference at the 95% confidence level. NS = not significant.
CV, % = coefficient of variation.

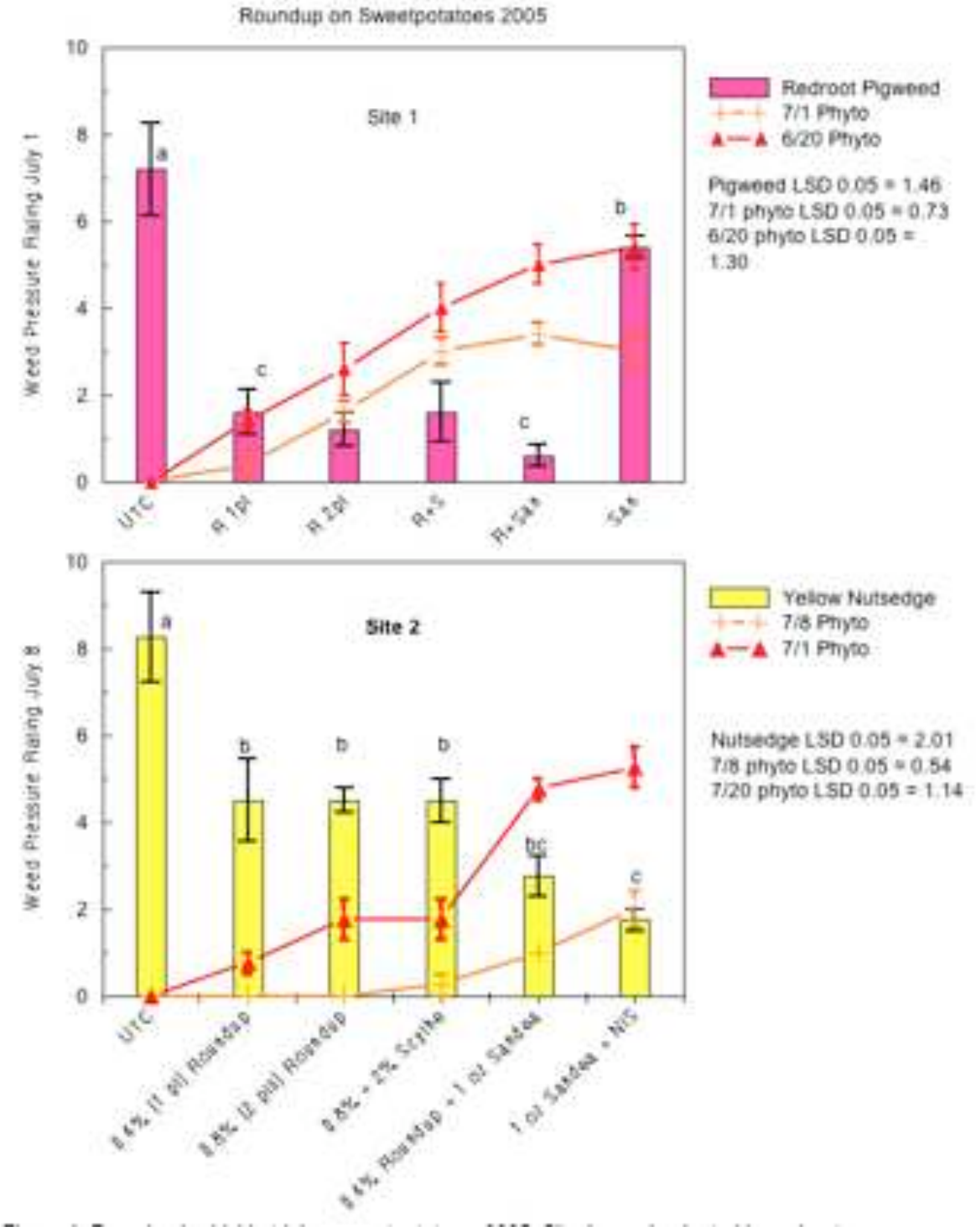

Figure 1. Roundup herbicide trial on sweetpotatoes, 2005. Site 1 was dominated by redroot pigweed, Site 2 was dominated by yellow nutsedge. Columns show weed pressure at the last evaluation date; red lines indicate crop phytotoxicity caused by the herbicides. Error bars are +/- one standard error. Columns with the same letter are not significant different at the 95% confidence level.

Figure 2. Pigweed growth in the untreated check plot (left) and Roundup 1 pint/A (right) one week after spraying. A band application was made down the middle of the bed directly on top of the drip tape. No cultivation was needed for the rest of the season in the Roundup plots.

Devrinol Chemigation Trial On Sweetpotatoes, 2005
Scott Stoddard, Farm Advisor
UCCE Merced & Madera Counties

Objective: evaluate different rates of Devrinol herbicide applied through the drip tape for weed control in sweetpotatoes.

Location: Trial with Bob Weimer at field located on NW corner of Dwight and Longview near Livingston. Sandy soil, test results shown in Table 2.

Treatments:

1. UTC
2. 2 lbs/A Devrinol (Napropamide)
3. 3 lbs/A Devrinol
4. 4 lbs/A Devrinol

Treatments injected over 4 application events (treatments show total amount applied for the season) to clean, recently cultivated beds.

1	2	3	4	2	1	4	3	4	3	0	2	4	3	2	1
Rep 1				Rep 2				Rep 3				Rep 4			

Plots 1 bed wide by 100 feet long

Plant date: mid May
Variety: Beauregard
Injection system installed June 16
Injections: June 29, July 8, July 13, July 27. August 1 KNO_3 only. Some lines beginning to plug from algae growth. Four lines replaced; chlorox injected twice in August for algae control.
Leaf and petiole samples taken July 27 (UTC and treatment 4 only) and August 12 all treatments.

Aug 4 plots oversprayed with Prism to control grass weeds.

Weed ratings: July 15 and July 27, 2005

Harvest: Oct 18, 2005. 25 ft from double row plot.

Results

Devrinol is registered as a pre-emergent herbicide for sweetpotatoes in California. Label guidelines suggest a broadcast application of 2 – 4 lbs/acre followed by shallow incorporation. In previous studies, I have found fairly good control of many weeds at the 4 lb rate. However, Devrinol is not commonly used by the industry. Some of the reasons for this include erratic control, and control that is not good enough to make the expense worthwhile. Efficacy is improved if the product can be water incorporated, thus, some growers have tried using the material through the drip system. The objective of this trial was to evaluate different rates of Devrinol on controlling weeds in a commercial sweetpotato field when applied through the drip tape.

Devrinol was injected once per week over a 4-week span beginning about 6 weeks after transplanting. Total application rates were 2, 3, or 4 lbs of product per acre. Rates were not adjusted to compensate for the band width of the wetted zone under the drip tape. The product was dissolved in water and injected into the drip system using a small piston pump. Because the drip system where the herbicide was applied was separated from the main system in the field, supplemental fertilizer was also required. Potassium nitrate was injected at the same time to provide varying rates of K_2O as listed on Table 1.

Towards the end of the summer, it became obvious that algae was plugging the untreated drip lines and limiting crop growth. These lines were replaced, and chlorox was injected into the other lines to prevent further plugging problems.

Weed control results are presented in Table 1 and Figure 1. Grassy weeds, which dominated at this location, were significantly reduced by all rates of Devrinol as compared to the untreated control plots. There was no significant difference in broadleaf weed control, however, broadleaf weed pressure was very low. No crop phytotoxicity nor plugging problems were encountered (plugging was worst in the control treatments that did not receive herbicide or fertilizer applications). Photos of the treatments are shown in Figure 2.

Yields are shown in Table 1 and Figure 3. Yields significantly increased with the addition of fertilizer, but there was no significant increase between the different rates applied. However, the leaf and petiole analysis did show that as K rate increased, so did the amount in the plant (Table 2). The yield response seen in this trial was probably more a response to water deficiencies in the control plots caused by drip tape plugging. Deficit irrigation had the largest impact on the number of jumbos produced.

The lack of difference between the different rates used in this trial indicates that they need to be adjusted for a band application. The wetted zone under a drip tape is typically 12 – 15" wide; thus, rates should be adjusted to about $1/6^{th}$ of a broadcast application, or 15%. Future studies should continue to investigate the best rate of Devrinol when used through the drip tape. This study shows that injecting Devrinol through the drip tape has potential to be an effective way to control weeds in sweetpotatoes.

Acknowledgements: Many thanks to Bob Weimer for his help with this trial.

Table 1. Weed and yield results, Devrinol chemigation trial 2005.

			Weed control						Yield, boxes/A				
				15-Jul			27-Jul						bins/A
plot	Devrinol treatment	K2O rate lbs/A	BL	Grass	Sedge	BL	Grass	Sedge	#1's	Jumbo	Med	TMY	TMY
1	UTC	0	1.25	3.75	0.00	1.75	5.25	0.00	491.1	123.6	141.4	756.1	32.9
2	2 lbs/A	75	1.25	1.50	0.00	1.00	2.00	0.00	540.5	352.3	156.1	1048.9	45.6
3	3 lbs/A	150	0.75	1.50	0.00	0.75	2.25	0.00	519.7	357.2	129.5	1006.4	43.8
4	4 lbs/A	300	0.25	1.25	0.25	1.25	1.50	0.25	610.6	260.4	165.9	1036.9	45.1
	Average		0.88	2.00	0.06	1.19	2.75	0.06	540.5	273.4	148.2	962.1	41.8
	LSD 0.05		NS	1.70	xx	NS	1.70	xx	NS	93.7	NS	204.7	8.2
	CV %			52.7		49.1	38.3		24.7	21.4	16	13.3	

LSD 0 Least significant difference at the 95% confidence level. Means within a column and location separated by less than this amount are not significantly different.
CV Coefficient of variation, a measure of the variability in the experiment.
xx statistical analysis could not be performed.
BL Broadleaf weeds, mainly redroot pigweed, lambsquarters, and nightshade.

Table 2. Soil and tissue analysis results, Devrinol chemigation trial 2005.

			Leaf and Petioles						0 - 12 Soil Test							
				27-Jul			12-Aug			EC	NO3-N	PO4-P	K	Ca	Mg	Na
plot	Devrinol treatment	K2O rate lbs/A	N %	P %	K %	N %	P %	K %	pH	dS/m	ppm	ppm	ppm	meq/L	meq/L	meq/L
1	UTC	0	3.4	0.32	2.65	3.39	0.34	2.33	6	1.05	16.9	28.2	100	4.6	1.4	1.5
2	2 lbs/A	75				3.28	0.34	2.79								
3	3 lbs/A	150				3.67	0.3	3.33								
4	4 lbs/A	300	3.5	0.34	3.8	3.85	0.3	3.45								

Tissue samples not replicated, but a composite of all reps.
Soil samples taken at beginning of experiment.

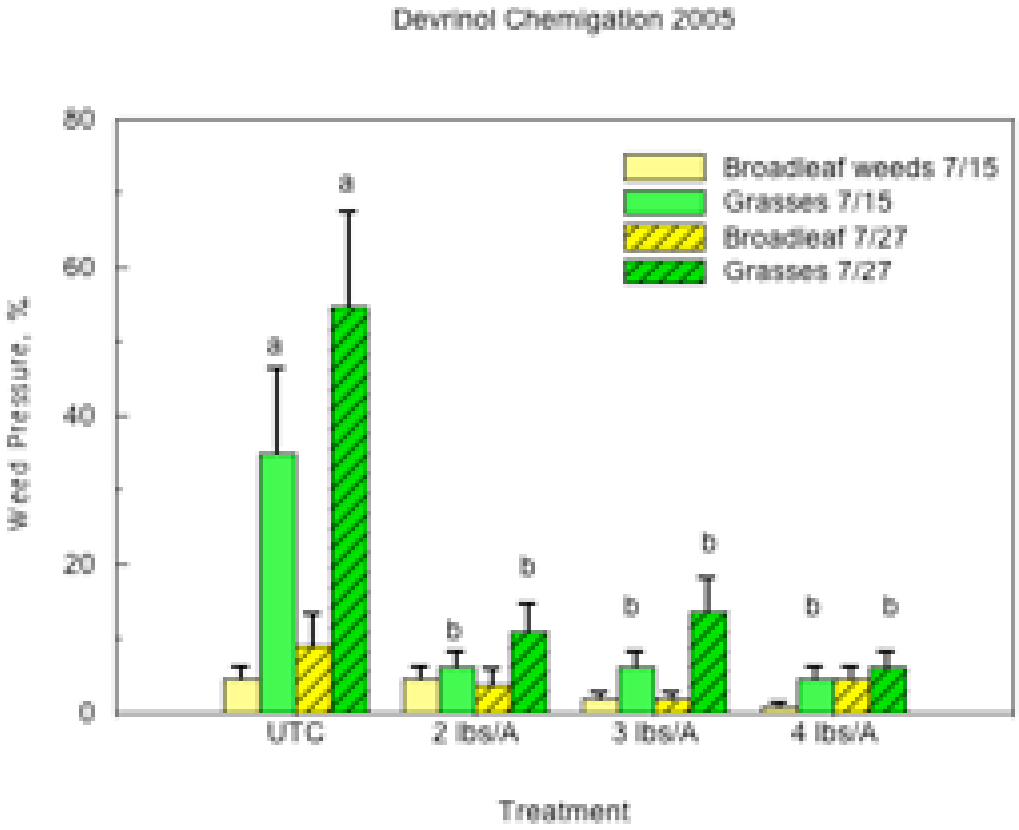

Figure 1. Weed control on two different dates as affected by rate of Devrinol herbicide applied through the drip tape in sweetpotatoes, 2005. All rates significantly reduced grassy weeds as compared to the untreated control (UTC), but there was no difference between the rates. There were few broadleaf weeds at this location, and no significant differences between the treatments for broadleaf weed control.

A **B**

C **D**

Figure 2. Weed growth in the Devrinol trial, 2005. A, untreated control; B, 2 lbs/A; C, 3 lbs/A; D, 4 lbs/A.

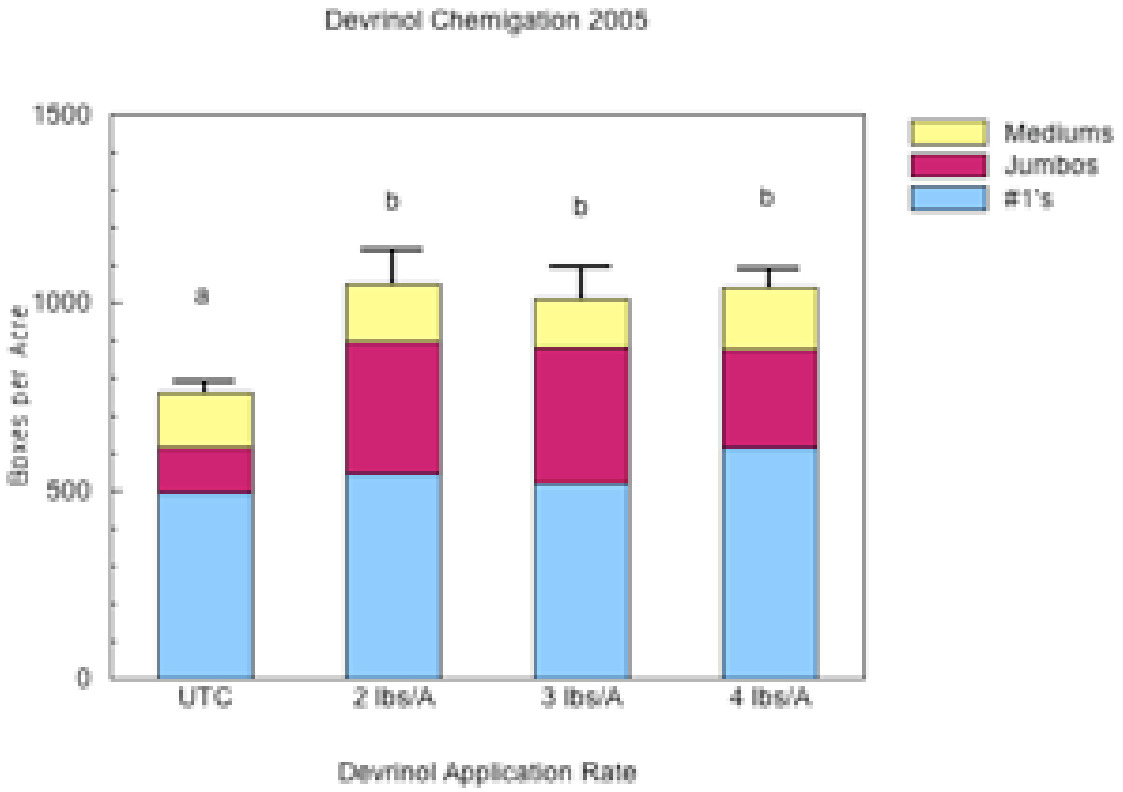

Figure 3. Sweetpotato yields. Height of each column is the total marketable yield. Yields followed by the same letter are not significantly different.

Sweetpotato Cost of Production Study 2005 (Summary)

Scott Stoddard, Farm Advisor, Rich DeMoura, UC Dept. of Economics

Sample costs to produce sweetpotatoes in the San Joaquin Valley were estimated from surveys of grower practices conducted during 2005. Costs encompass both transplant production from hot beds as well as field production. The practices described are based on production operations considered typical for the area and good agronomic practices, but may not apply to any particular farm. Timing and types of cultural practices vary among growers and from season to season.

This report is based on 75 acres of sweetpotatoes on rented ground, split into three separate 25-acre fields. The choice of field size and total acres are based on 2004 Merced County permit reporting data. Hotbeds are located on rented ground and are tarp fumigated. Fields are fumigated, drip irrigated, and planted on a 9" plant spacing and 40" row spacing. Transplant speed is 5 acres per 10-hour day; harvest speed is 40 bins per 10-hour day. Labor rates are $9.73 per hour for general labor and $11.82 per hour for machine operators; wages include payroll overhead of 39%. Based on an average yield of 32 bins per acre (706 boxes) marketable. The full report is available on the web.

	Sample Costs		My Costs	
	Per Acre	Per Box	Per Acre	Per Box
Hotbeds: land prep and fumigation	$ 42.00			
Hotbeds: open, gin trash, labor	$ 22.00			
Hotbeds: seed + labor	$ 195.00			
Hotbeds: plastic tunnels, irrigation	$ 19.00			
Hotbeds: maintenance and labor	$ 52.00			
Hotbeds: harvest plants	$ 217.00			
Hotbeds: cash overhead (rent, sanitation, ins)	$ 33.00			
Hotbeds: capital recovery (equipment)	$ 33.00			
TOTAL HOTBED COSTS	**$ 613.00**	**$ 0.87**		
field: land prep and soil amendments	$ 117.00			
field: fumigation, custom; disc and roll	$ 305.00			
field: cover crop (rye)	$ 33.00			
field: pre-plant land prep + manure	$ 72.00			
field: Custom: list and fertilize	$ 111.00			
field: transplant	$ 339.00			
field: irrigation system, fertilizer, labor	$ 267.00			
field: weeds: cultivate 3x, hand hoe 3x, herbicides	$ 359.00			
field: Misc. (worm spray, pickup)	$ 106.00			
TOTAL FIELD CULTURAL COSTS	**$ 1,709.00**	**$ 2.42**		
Harvest: remove drip tape	$ 56.00			
Harvest: mow and cut vines	$ 14.00			
Harvest: dig potatoes	$ 810.00			
Harvest: haul to storage	$ 117.00			
Harvest: water truck	$ 24.00			
TOTAL HARVEST COSTS	**$ 1,021.00**	**$ 1.45**		
Cash Overhead				
Interest	$ 103.00			
rent	$ 393.00			
office	$ 100.00			
sanitation rental	$ 16.00			
insurance and taxes	$ 113.00			
fuel, repairs, electric	$ 275.00			
Non-cash overhead				
storage, bins, laterals, tools, pumps, etc	$ 1,284.00			
TOTAL CASH & NON-CASH OVERHEAD	**$ 2,284.00**	**$ 3.24**		
TOTAL COSTS	**$ 5,627.00**	**$ 7.97**		
Shed Pack: 706 boxes @ $4	$ 2,824.00	$ 4.00		

Hotbeds: costs based on planting 62 field acres