Sweetpotato Research Progress Report 2011

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Sweetpotato Collaborators Trial -- 2011

Scott Stoddard, UCCE 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. Cool, wet spring.
Mild summer with reduced heat units, growth restricted from lack of water and saline soil conditions. Smaller than normal plot size (1 row).
No significant pest problems, but overall yields less than normal. Notes made 6 weeks after harvest.
NCSU entries and B14 arrived mid June and were planted in a different location (D&S Farms); same harvest date.

Rep	Var#	Variety Name	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniform	Overall App	Comments	notes on culls
1	1	California	Rose-Cu	5	3	9	5	3, 4, 7	5	6	Smooth skin	Shape
2		Beauregard	Rose-Cu	7	3	9	7		5	7		
1	2	B63	Rose-Cu	7	3	7	7	3,4,7	5	5	irregular shape,	shape
2			Rose	9	3	9	5		3	6	some interior mottling	
1	3	L-06-52	orange	9	3	9	7	3,4	7	7	color fading in storage	shape
2			orange Cu	9	4	9	9	3,8	7	8	good uniform flesh color	
1	4	Covington	Cu	9	3	7	5	3,6	7	8	Nice shape, color. Small uniform	
2			Rose-Cu	7	3	7	5	2,6,8	7	7	YCR very distinct	
1	5	Evangeline	Rose	7	4	9	7	3,8	7	7	smooth, good flesh color	Air
2			Rose Cu	7	4	9	5		7	7		cracking
1	6	L-05-111	Rose-Cu	6	4	7	7	3,5,7	3	5	Some RC; irregular shape	RC, veins
2			Cu	5	3	9	7		5	5	good skin color	shape
1	7	L-05-29	buff	7	1	7	5	4,5	7	5	Lents; color good	long, veins
2		"Bonita"	buff/tan	9	1	9	5	4,7	7	6	long, veins, obvious lents	off-shape
1	8	O'Henry	white/	5	1	5	5	3,7	3	3	long, irregular shape	cuts, shape
2			cream	5	1	5	5		3	3	dark spots	small
1	9	L-07-146	Red	5	3	9	5	2,5	5	5	faded color, long	cuts
2			dk Red	7	4	9	5	7,8	6	6	some staining, but good color	long
1	10	Diane	Rose-red	5	3	7	5	4	5	5	Long, good color	cuts
2			red	7	4	7	7		5	5		long
1	11	L-04-175	lt red	7	4	9	5	2,6	8	7	chunky, smooth skin, good flesh	almost none
2			lt red	9	4	9	5	5,6	9	9	attractive, deep orange flesh	
Note: the following entries were evaluated at a different location, transplant June 17, 12" spacing.												
1	13	NC04-032	Rose	5	3	7	3	2,3	5	5	skin little rough; more rosy than Bx	faded red
2												
1	14	NC05-198	Rose	7	4	9	5	2,5	5	6	same skin color as Bx, flesh darker	Black surface
2											RKN, RC, rotting	rots
1	15	NC07-847	buff	5	2	8	5	1,3,5	3	6	orange-yellow flesh, good skin	too much
2											color; sleight veins, variable shape	rot in Feb
1	16	B14	Rose-Cu	7	3	7	7	2,3	5	7	lots of jumbos	shape
1	xx	L-04-175	Purple	7	5	9	3	5,8	7	9	beautiful bin, no rot, good color	
2											retention. (175 second location)	

Skin color:
cream (Hanna)
Tan
copper (Jewel)
Rose (Beau)
Purple (Garnet)

Skin Texture:
1 = very rough
3 = moderately rough
5 = moderately smooth
7 = smooth
9 = very smooth

Flesh Color:
0 = white
1 = cream
2 = yellow
3 = orange
4 = deep orange
5 = very deep orange

Eyes:
1 = very deep
3 = deep
5 = moderate
7 = shallow
9 = very shallow

Lenticels:
1 = very prominent
3 = prominent
5 = moderate
7 = few
9 = none

Shape:
1 = round
2 = round-elliptical
3 = elliptic
4 = long elliptic
5 = ovoid
6 = blocky
7 = irregular
8 = asymmetric

Shape Uniformity:
1 = very poor
3 = poor
5 = moderate
7 = good
9 = excellent

Overall Appearance:
1 = very poor
3 = poor
5 = moderate
7 = good
9 = excellent

All ratings made on #1 roots.
YCR = yellow cortical ring
RC = Russet Crack
RKN = root knot nematode
Culls = main reason for culls

NATIONAL SWEETPOTATO COLLABORATORS SUMMARY OF DATA
2011

STATE AND LOCATION REPORTING: Livingston, CA
DATE TRANSPLANTED: 6/2/2011. DATE HARVESTED: 10/25/2011. No. GROWING DAYS: 145
DISTANCE BETEEN ROWS (in): 40. DISTANCE IN ROW (in): 9
PLOT SIZE: NO. OF ROWS: 1 LENGTH (ft): 35 NO. OF REPS: 4
IRRIGATION: pre irrigate + drip irrigation. 1.5 to 2 inches per week during summer, total 30".
FERTILIZER: 3 tons compost, 500 lbs K2SO4 pre plant, CAN17 drip. About 150-60-375 NPK.

			40 lb box/A					%	%
	SELECTION	CLASS	US #1'S	CANNERS	JUMBOS	MKT YIELD	BINS/A	US #1'S	CULLS
11	175 G0	red	492	244	176	912	32.1	53.4%	0.0%
5	Evangeline G1	yam	386	176	150	713	25.1	54.1%	21.5%
1	Cal Beauregard	yam	314	275	290	880	31.0	34.6%	7.3%
9	L-07-146	red	282	252	120	654	23.0	43.2%	20.0%
2	B63	yam	249	174	168	591	20.8	42.3%	12.1%
6	L-05-111	yam	233	292	105	630	22.2	38.5%	13.3%
7	Bonita	sweet	210	295	100	605	21.3	34.9%	4.1%
4	Covington	yam	187	323	7	517	18.2	34.6%	0.0%
3	L-06-52	yam	187	271	107	566	19.9	34.3%	0.8%
10	Diane	red	181	391	119	691	24.3	25.2%	7.6%
8	O'Henry	sweet	100	297	80	477	16.8	23.0%	9.0%
	Average		257	272	129	658	23.2	38.0%	8.7%
	LSD 0.05		88.1	103.9	101.8	173.3	7.6	12.3	13.1
	CV, %		23.8	26.4	54.5	18.2	18.2	18	83.8
Note: the following entries were evaluated at a different location, transplant June 17, 12" spacing.									
11b	175 G0	red	890	429	674	1993	70.2	44.5%	0.7%
13	NC04-032	yam	448	295	289	1032	36.3	43.2%	5.4%
14	NC05-198	yam	377	189	563	1129	39.7	33.8%	19.4%
16	B14 G2	yam	402	230	704	1336	47.0	29.7%	9.2%
15	NC07-847	sweet	310	238	610	1158	40.8	27.3%	3.4%
	Average		485	276	568	1330	46.8	35.7%	7.6%
	LSD 0.05		179.6	117.4	201.1	309.0	13.6	11.5	14.4
	CV, %		24.5	28.2	23.5	15.4		17.1	101

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 size requirements of above grades, but are marketable quality.
Mkt Yield	Total marketable yield is the sum of the above three categories.
bins/A	bins/A are estimated based on market box yield assuming 22 boxes (17.6 Bu) per bin.
% 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.
LSD 0.05	Least significant difference. Means separated by less than this amt are not significantly different (ns).
CV, %	Coefficient of variation, a measure of variability in the experiment.

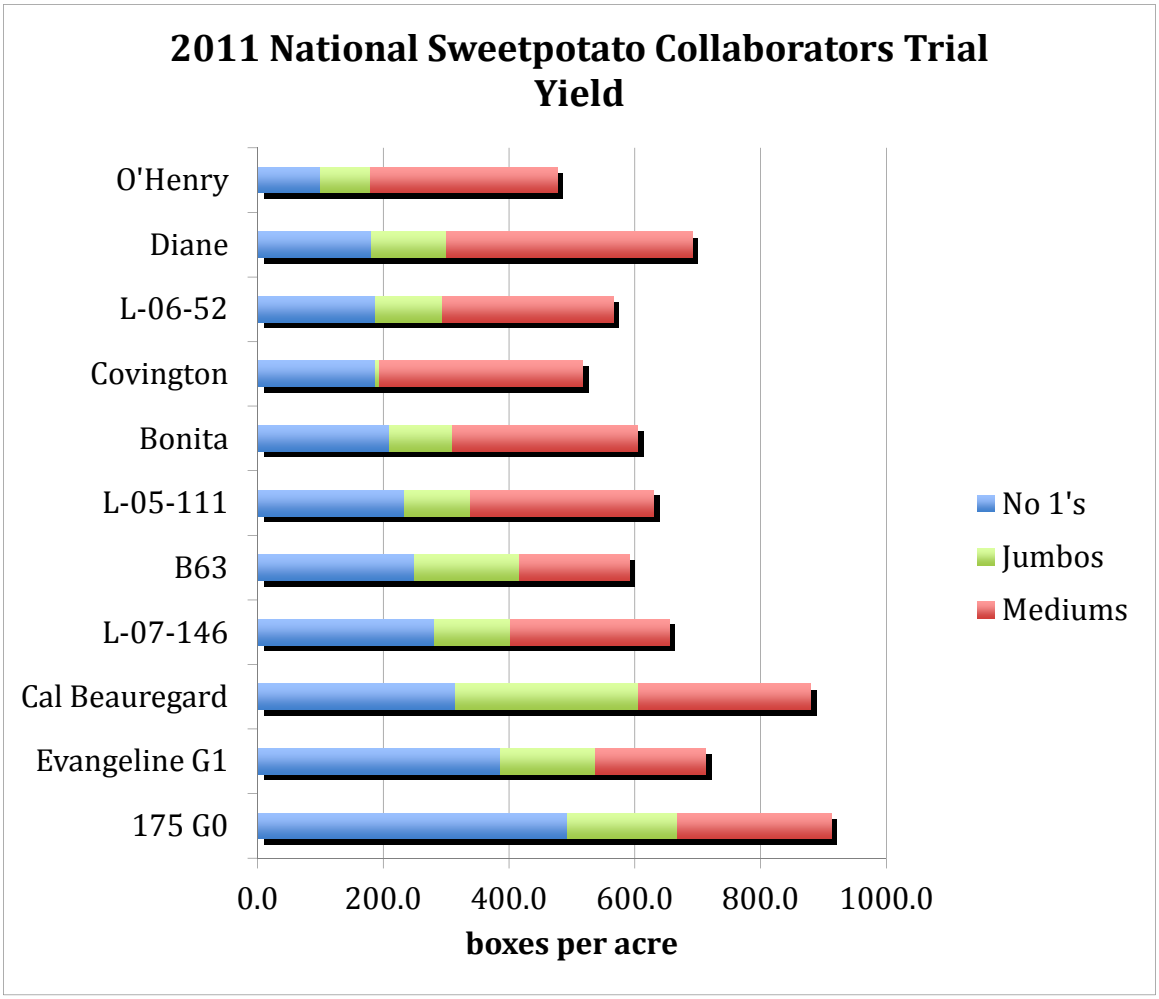

Figure 1. Bar graph showing yield results from Table 2 (above) for the NSCG Trial in the initial location (Yagi Farms).

SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION - NSPCG TRIAL

Date bedded: 2/23/11 Location: Yagi Bros Farms Livingston, CA

Date Evaluated: 4/1/11 Type of bed: hot bed

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)
1	Cal Beauregard	yes	3	3	3		
2	B63	yes	4	3	3		
3	L-06-52	yes	3	3	2	good	lots of purple
4	Covington	yes	4	3	2		short plants
5	Evangeline	yes	1	1	1	some rot	typical Evangeline
6	L-05-111	yes	3	3	2		uniform emergence
7	L-05-29 (Bonita)	yes	4	4	2	good	tall
8	O'Henry	yes	4	4	2		
9	L-07-146	yes	3	3	3		
#	Diane	yes	4	3	3		
#	L-04-175	no, used G0 greenhouse cuttings					
#	NCSU entries	not bedded, varieties sent as plant cuttings					
#	B14	plant cuttings from NCSU					

(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.

Sweetpotato ALT -- 2011

Scott Stoddard, UCCE Merced County

This year's sweetpotato ALT evaluation was with Dave Souza, near Atwater CA. Corner of Atwater Jordan and Sultana Rds.
Ground was fumigated with Telone. Field pre-irrigated, and soil moisture was excellent at planting. Cool, wet spring.
Transplanted May 27. harvested on Oct 18. 2011. Root evaluation on Feb 24. 2012.
Drip irrigation, 12' plant spacing. 1 row plots 35 - 40 ft long. Not all plots replicated, and no yield data collected.

Variety Name	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniform	Overall App	Harvest Comments	notes on culls	for 2012
L09-154	Purple	5	3	5	3		5	6	lenticles, bumpy	Feb sprouts	? (bedded)
L09-150	Purple	5	3	7	5	5,3	5	5	erratic color & shape, low yld		drop
L09-149	Purple	7	3	5	5	5,8	5	6	deep red, ok yld, good shape	lt orange flesh, lents	keep
L09-123	Purple	1	3	8	5	5,6	5	1	low yield, "hairy" - roots hold the dirt	very rough	drop
L09-109	Purple	3	purple	7	5	2,5	5	3	purple/purple, low yld	rough skin, veins	keep for fun
L08-95	Red	7	4	5	7	3,4	7	2	red. Looks nice.	long	keep
L08-25	dark red	5	3	5	7	3	7	4	red. Low yld, but nice color	rough skin, tea stain	drop
L08-22	dark red	7	4	7	7	3	7	4	red. Low yld.	pimples, long	drop
L08-124	Red	5	4	9	5	4,8	3	5	poor yld, shape, size	veins, rough skin	drop
L08-117	Red	7	3	9	5	2,5	6	8	looks good		keep
L07-190	pink red	5	4	7	5	3,5	7	5	faded red, good yld. Color?	rough skin, bumpy	keep
L07-106	Red	5	4	9	5	4,8	7	4	just okay.	07-102 better	keep
L06-52	orange Cu	9	3	7	7	5,8	9	9	big yield - 80+ bins/A, uniform shape		replicated trials
L05-111	rose Cu	8	4	9	7	2,5	5	8	yam, rose Cu skin looks nice		in NSPCG trial
Evangeline	rose Cu	3	5	9	3	3,8	8	7	good color, but cracking	pimples	dropped
Bonita	tan	9	1	5	5	3	7	7	very pink	some veins	in NSPCG trial
148	deep tan	5	4	9	7	5,6	7	6	just okay. Getting old and tired	RC	drop
NC07-364	dark red	5	4	9	3	7	3	3	latex; variable shape, lenticles		in NSPCG trial
NC05-257	dark red	7	4	7	3		5	5	fusarium surface rot, variable shape		? (bedded)
NC07-044	brown	3	4	9	5	2	7	3	veins, rough skin, dark, small		drop

SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION - ALT TRIAL

Date bedded: 3/4/11 Location: D&S, N. of Hwy 140

Date Evaluated: 4/19/11 Type of bed: cold bed
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)
Evangeline	yes	1	2	1	some rotting	poor production
Bonita	yes	5	4	3	good	tall
05-111	yes	4	4	2	-	uniform emergence
07-190	yes	3	2	2	good	poor production
06-52	yes	3	3	2		lots of purple
08-124	yes	1	2	2		only 1/2 of plants
08-117	yes	4	4	3		sl purple new growth
08-22	yes	4	4	3		purple veins
148	yes	3	3	2		getting tired
07-146	yes	4	3	2		
08-25	yes	1	4	1		small, late, uniform
08-95	yes	1	3	1		small late purple new growth

(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.

Some of the varieties grown in the ALT in 2011. Clockwise from upper left: L-08-95, L-08-117, L-07-190, NC-847, NC-032, , NC-198, L-04-175 G0.

Red Yam Evaluation Trial 2011

The red yam trial was an extension of the NSPCG Trial and the ALT to compare L-04-175 GO to Diane in separate fields. This was done to better determine the affect of virus testing had on 175. In 2009, 175 had been compared in multiple locations with only marginal success – many areas the roots were off-color (too brown) or bally. Furthermore, roots from all locations stored poorly. The roots used for this evaluation were heavily infected with SPFMV, however. Because this variety showed good potential prior to 2009, a hill selection was taken to Foundation Plant Services (UC Davis) in 2010 for virus cleaning. Plants were unavailable until 2011. Three locations were evaluated with replicated plots in commercial fields. Plots consisted of 50 plants made from runner cuttings from greenhouse plants (G0), placed into single rows and replicated 4 times. Location information is shown below.

	Blaine Yagi	Dave Souza	Dave Souza ALT2
Location			
Plant date			
Spacing			
Harvest date			
Days			
Comparison variety			

Results

L-04-175 G0 did very well in all three locations, out yielding Diane and Beauregard (Table 1 and Figure 1). It performed especially well at the D&S location off Arena Rd, with total production of almost 2400 boxes per acre (Table 1). However, this location also had significantly more jumbos than the other entries, and the No. 1 packout was less than 40%. Nonetheless, root quality was excellent, with good shape and skin color. After 4 months of storage, there were no significant losses due to rot from samples held in two locations. This variety responded very well to virus testing, and further evaluations are planned in 2012 with G0 and G1 seed.

Table 1. Yield summary for the red yam evaluation trial, D&S Farms, 2011.

	TMY	40 lb box/A			TMY	Market	No. 1's	Culls
	lbs/A	No. 1's	Meds	Jumbos	lb box/A	bins/A	#1%	cull%
148	53663	578	593	171	1342	47	42.8%	3.8%
175 G0	95489	903	482	1002	2387	84	38.3%	0.0%
Diane	79441	1105	485	396	1986	70	55.8%	0.3%
L07-106	63849	692	132	771	1596	56	43.4%	0.9%
L07-190	80369	846	459	704	2009	71	42.2%	0.0%
L08-117	57512	813	523	101	1438	51	55.8%	1.6%
175 vs Diane comparison t-test 0.05		**	ns	*	*	*	**	ns

Note: only 175 and Diane had enough reps to make statistical analyses; others shown for comparison.
***, * Significant at p = 0.01 and 0.05 respectively*

Figure 1. Total market yield (TMY) for L-04-175 compared to Beauregard (red bars) or Diane (tan bars) at two different locations.

Covington Plant Spacing Trial 2011
Scott Stoddard, Farm Advisor
UC Cooperative Extension Merced County

As part of the Specialty Crops Research Initiative (SCRI) with LSU, I investigated the impact of plant spacing on the growth and root development of the variety Covington under different plant spacings. Trial was designated as Site 1, and was conducted with Aaron Silva in a commercial field located northwest of Livingston on Hinton and Bloss. Sweetpotato variety "Covington" was planted at 9", 12", and 18" on May 12, 2011 using 2-row, 50 foot plots. Soil temperature and moisture sensors were established in one plot at 2", 6", and 12" within 2 days of transplanting.

At each location, destructive plant sampling to look at root development occurred at 30 days after transplanting. Soil samples were taken for fertility analysis and nematode determination; leaf and petiole samples were taken around 60 days after transplanting. Harvest was done with a standard 2-row harvester on November 4, 2011.

Results: There was no difference in the root counts at 30 days, which averaged only 2.6 potential storage roots for all plant spacings (Table 1). Soil and plant sampling results are shown in Tables 2 & 3. Soil K was low at sampling time, but levels within the plant in July were sufficient. Regression analysis on the impact of plant population on root size distribution is shown in Figure 1. Due to a high level of Scurf in all plots (average 58%), root size data were highly skewed, as most roots were culled regardless of size. Nonetheless, spacing had a significant impact on the total yield and size distribution. Best #1 yield occurred with the 9" spacing; best total marketable yield (TMY) was observed in the 18" spacing (a result of less Scurf in these plots more than spacing). Mediums declined and jumbos increased as plant spacing increased, as would be expected. The 9" spacing

had the highest number of #1's probably because of the amount of time this crop was in the field. Total root production was very high in this test (about 80,000 lbs/A), largely because of a high percentage of jumbo-sized roots. Given enough time, even Covington will produce jumbos.

This research will continue in 2012.

Table 1. Covington sweetpotato plant spacing trial 2011.
SCRI site #1, Hinton and Bloss, NW corner behind olives

		root count	Yield, boxes/A					TMY	
treatment	plants/A	30 days	#1's	Med	Jumbo	culls	total	boxes/A	culls, %
9 in	15553	2.8	213.7	72.0	503.8	1230.8	2020.3	789.5	60.8%
12 in	12617	2.3	120.0	45.9	578.6	1065.0	1809.5	744.5	58.4%
18 in	8173	2.9	90.3	48.4	750.0	1105.1	1993.8	888.7	54.9%
LSD 0.05	1538	ns	79.5	17.6	152.1	ns	ns	111.9	ns
CV, %	7.3	16.3	32.5	18.3	14.4	16.6	8.4	8.0	9.0

Variety: Covington Note: plots badly infected with Scurf; size data skewed.
Plant date: 5/12/11
Harvest: 11/4/11
days: 176

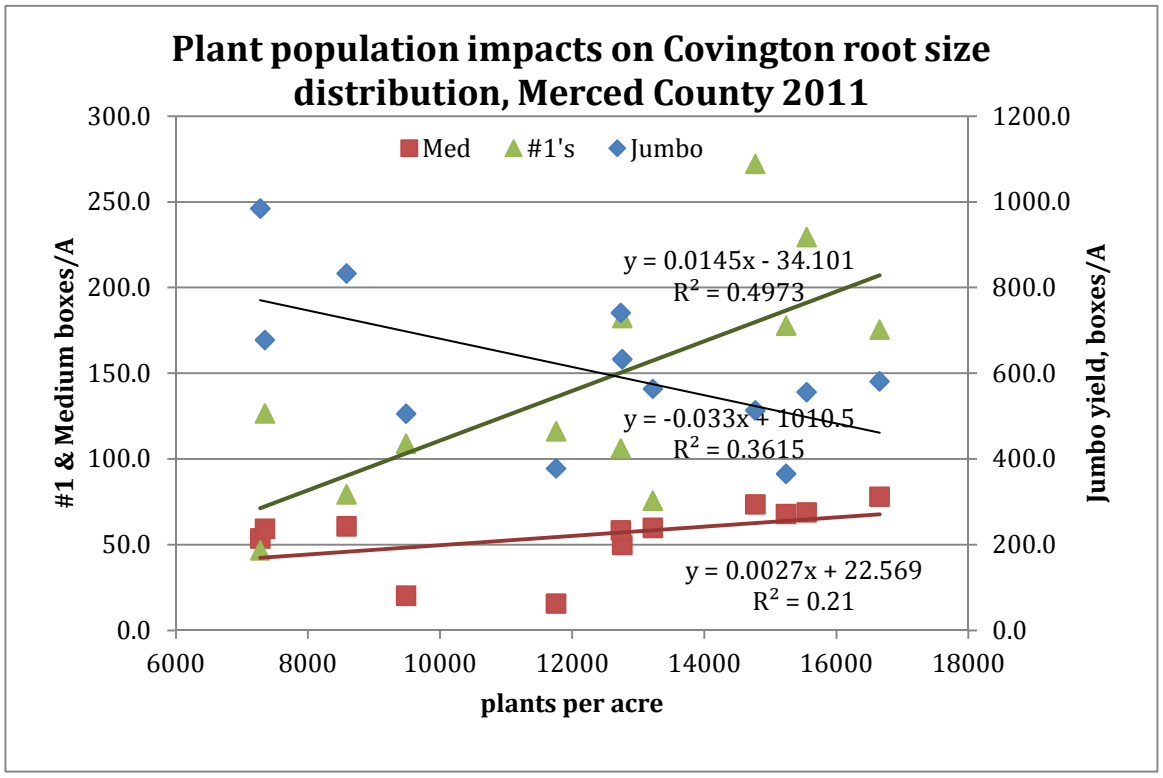

Figure 1. Relationship of sweetpotato root yield by size and number of plants per acre. A 12" spacing is about 13,000 plants per acre. As the number of plants per acre increases, jumbo-sized roots decrease, while #1's and mediums increase.

Dual Magnum Herbicide On Sweetpotatoes 2011
Scott Stoddard, UCCE Merced County

Location: Pepper and 2nd Ave, near McConnel State Park
Cooperator: Nathan Mininger.

Objective: Evaluate weed control (especially yellow nutsedge) and crop safety from different rates of Dual Magnum herbicide on sweetpotatoes. Dual Magnum received a Section 24(c) Special Local Need Label for control of yellow nutsedge in sweetpotatoes in 2010.

Treatments:

1 UTC
2 2/3 pint Dual Magnum
3 1.0 pint Dual Magnum
4 1.33 pints Dual Magnum/A
5 Devrinol, 4 lbs/A
6 Dacthal 8 lbs/A
7. Hand weeded check

Treatments applied 6/1/2011 before transplanting. Used backpack sprayer and 60 gpa equivalent with Tee Jet 8004 nozzles at 30 psi.
Incorporated by hand raking 2 – 3" deep before transplanting.
O'Henry variety transplanted June 3

Plots: 1 bed by 35 feet long with 4 reps
Weed control and harvest data from center of bed
Weed and crop ratings on June 16 and July 18, 2011
Harvest: 31-Oct-11

Results
This test plot was located in a commercial field with heavy yellow nutsedge (*Cyperus esculentus*) pressure that had been sprayed once with Roundup, then cultivated. Application of Dual Magnum (S-metolachlor), Devrinol (napropamide), and Dacthal (DCPA) were made to prepared beds using a backpack sprayer, then mechanically incorporated with a light raking to a depth of about 2 inches. The area was then transplanted and no further hand weeding or cultivation was performed until after the last rating on July 18 (except for treatment 7, which was kept weed-free with hand weeding. Weed and crop ratings are shown in Table 1. Ratings were made from each plot by evaluating the amount of yellow nutsedge, grasses, broadleaf weeds, and sweetpotato phytotoxicity on a subjective scale, where 0 = no weeds or crop phytotoxicity, and 10 would equal 100% weeds/crop death. Yellow nutsedge dominated the weed spectrum at this location, and at very high levels. All the herbicide treatments except Dacthal significantly reduced the number of weeds at this location; Dual Magnum provided better control of yellow nutsedge than Devrinol (Figure 1). In general, however, weed control was not good except in two bands near where the press wheels were located from the transplanters (Figure 2). Unlike last year, no significant crop phytotoxicity occurred. At harvest, the roots were separated by the harvest crew into #1's, mediums, and jumbos. No significant differences were observed in yield between the treatments, however, due to a loss of many plants in the test area to gophers, yield data were highly variable.

The variable weed control results seen in this trial (generally poor on top of the beds but very good in a narrow band near but not in the plant row as seen in Figure 2) suggest that incorporation of Dual Magnum is very important, and that banding may be a practical method to improve efficacy.

Table 1. Weed and crop phytotoxicity ratings, sweetpotato herbicide trial 2011.

		6/16/11 Weed ratings (0 - 10 scale)			7/18/11 Weed ratings		
plot	Treatment	nutsedge	BL other	Grass	nutsedge	BL other	Crop
1	UTC	5.50	2.75	0	6.50	0	0.51
2	2/3 pint dual magnum	2.25	1.00	0	3.50	0	0.69
3	1 pint	2.50	1.00	0	3.75	0	0.69
4	1 1/3 pint	2.25	1.00	0	3.50	0	0.63
5	Devrinol 4lbs A	3.50	1.25	0	4.25	0	0.58
6	Dacthal 8lbs A	4.25	1.00	0	6.50	0	0.46
	Mean	3.38	1.33	0.00	4.67	0.00	0.59
	LSD 0.05	1.69	0.69	---	ns	---	ns
	CV, %	33.2	34.4	---	40.6	---	23.3

LSD 0.05 = Least Significant Difference at the 95% confidence level.
ns = not significant.
CV, % = coefficient of variation.
BL = broadleaf weeds other than nutsedge.

Table 2. O'Henry sweetpotato root yields for each herbicide treatment, 2011.

		bins per acre					
Treatment	plot	No.1's	Mediums	Jumbo	TMY	% #1's	% Culls
UTC	1	18.3	7.0	2.4	27.7	65.4%	10.6%
2/3 pt Dual Mag	2	18.5	6.1	3.9	28.6	64.3%	13.8%
1 pt Dual Mag	3	19.9	5.5	5.1	30.5	65.0%	11.2%
1 1/3 pt Dual Mag	4	18.3	5.3	4.6	28.2	64.9%	13.9%
Devrinol 4 lbs A	5	15.1	6.3	2.3	23.7	63.8%	12.8%
Dacthal 8 lbs A	6	15.0	5.9	3.2	24.1	62.1%	15.2%
Weeded check	7	20.7	7.3	2.4	30.5	67.9%	18.8%
Mean		18.0	6.2	3.4	27.6	64.8%	13.8%
LSD 0.05		ns	ns	ns	ns	ns	ns
CV, %		22.1	20.3	43.7	18.3	6.4	31.7

LSD 0.05 = Least Significant Difference at the 95% confidence level.
ns = not significant.
CV, % = coefficient of variation.

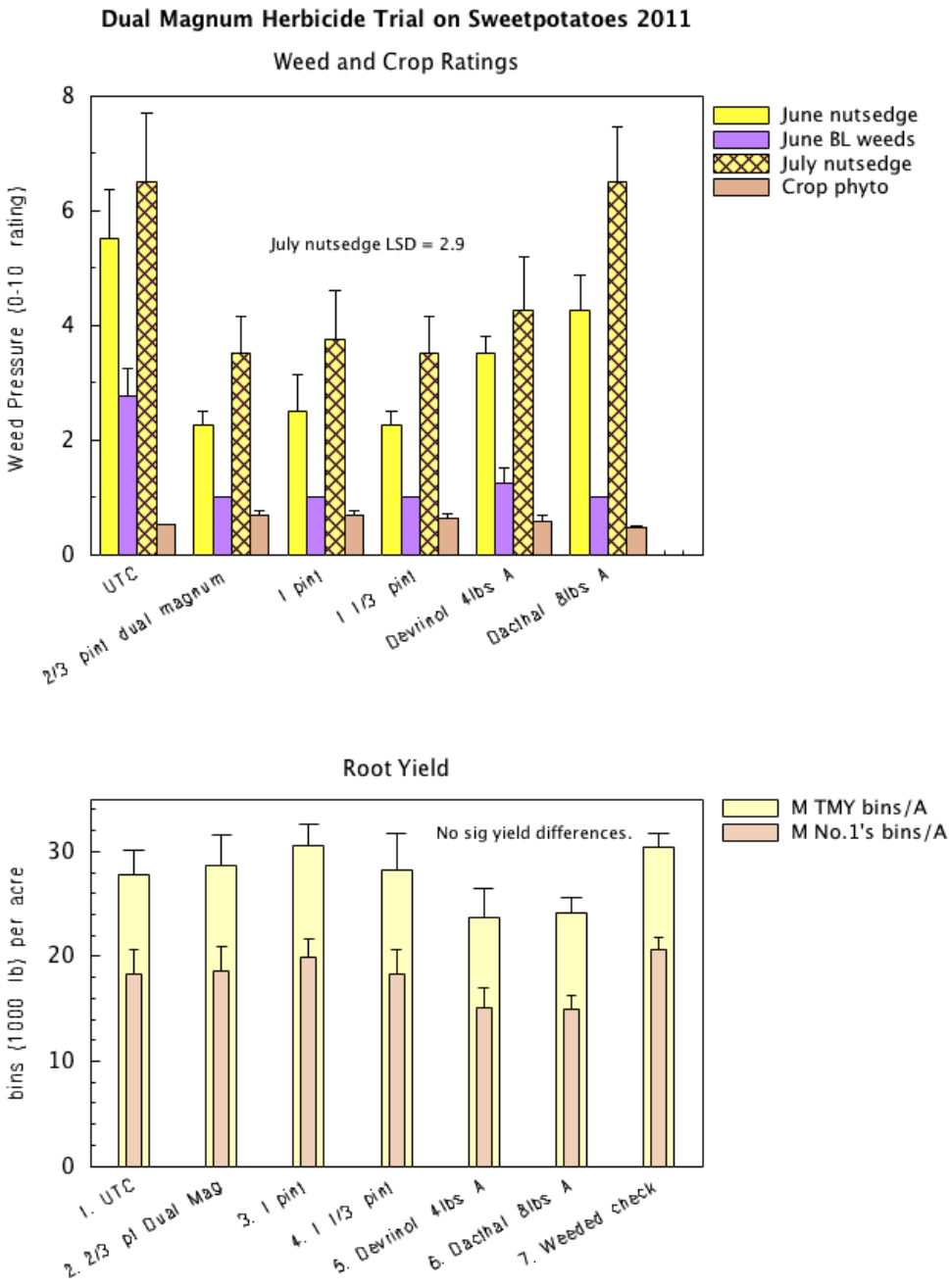

Figure 1. Dual Magnum herbicide significantly reduced the amount of all weeds in this test plot as compared to the untreated control, but was more effective on yellow nutsedge as compared to Devrinol and Dacthal (top). Higher rates of Dual Magnum had no significant effect on root yield (above).

1. UTC

2. 2/3 pt Dual Mag

3. 1.0 pt Dual Mag

4. 4/3 pt Dual Mag

5. Devrinol 4 lbs/A

6. Dacthal 8 lbs/A

Figure 2. June weed pressure was dominated by yellow nutsedge at this location. Efficacy was very good in two narrow bands on either side of the transplants in the Dual Magnum plots, regardless of rate.

METHYL BROMIDE ALTERNATIVES SHOW GOOD POTENTIAL FOR SWEETPOTATO HOTBEDS

C.S. Stoddard*, M.Davis[1], A. Ploeg[2], J. Stapleton[3]

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MeBr is currently allowed for sweetpotato production under a Critical Use Exemption (CUE) with the U.S. EPA, but this is scheduled to end in 2012 and effective alternatives are needed. 2011 marks the end of a four-year USDA-ARS sponsored project that evaluated fumigation, herbicide, and fungicide alternatives in commercial hotbed operations.

In 2011, fumigation and non-fumigant alternatives to MeBr were evaluated in commercial sweetpotato hotbeds at 6 locations near Livingston, CA. Fumigation alternatives were solarization, various rates of chloropicrin under TIF tarp, and metam sodium. These were compared to a non-fumigated control or a standard MeBr + Pic (53/47% at 350 lbs/A) under LDPE tarp. At each location, five different herbicide treatments were evaluated within each fumigation alternative treatment. Herbicides included Devrinol (napropamide), 4 lbs/A equivalent; two rates of Valor (flumioxizin), 1.0 and 1.5 oz/A equivalent; Dacthal (DCPA), 8 lbs/A equivalent; plus an untreated control. Herbicide plots were 100 ft^2 with 4 replications. Herbicide treatments were the same at each location, however, due to the demonstration nature of this project fumigation treatments varied by location and were not replicated. The fumigation treatments were large, typically 1000 feet long by 30 feet wide. Treatments were evaluated for nematodes (especially root knot), *Pythium*, weed pressure, crop phytoxicity, and plant production.

Fumigation and solarization activities were done by the grower or a custom applicator. Metam was shanked at 75 gpa on a 9" spacing and 18" deep. Various rates of Pic under TIF tarp (Raven Vapor Safe Totally Impermeable Film) were used 5 of the locations: 240, 250, 400, 450, and 650 lbs/A. Pic fumigation treatments utilized the services of TriCal Inc., and were applied in December 2010 or January 2011. Herbicides were applied about one week after bedding in March 2011, before weed or sweetpotato crop emergence using a CO_2 backpack sprayer, and water incorporated. In May 2011, plots were evaluated for weed pressure, nematodes, root rotting caused by *Pythium* fungi, and plant production.

As in previous years, nematodes were sampled by taking a 500 cc soil sample from each of the main plots in February before the beds were installed and again at plant harvest in May. No root knot nematodes (*Meloidogyne incognita)* or other plant parasitic nematodes were found at either sampling event (Table 1). Similar to nematodes, the soil analysis for potential root rotting pathogens showed no significant differences among treatments (Table 2). *Pythium* populations were extremely low in all plots.

In 2011, the only fumigant treatment that provided adequate weed suppression was MeBr. Even though Pic was applied at very high rates under totally impermeable film (TIF), weed suppression was negligible. However, most of the weeds, with the exception of yellow nutsedge, were effectively controlled with the herbicides evaluated at each location, regardless of fumigation treatment (Figure 1). Application of Devrinol or either rate of Valor significantly reduced the number of weeds as compared to not treating, with Valor having the greatest efficacy on the weeds present. Dacthal prevented most weed growth, but caused substantial crop injury and cannot be recommended for use in hotbeds even though it is a registered herbicide for sweetpotatoes. No crop phytotoxicity was seen as a result of the main plot fumigation treatments, and there were no differences in plant production between any of the treatments with the exception of Dacthal (Figure 2).

An economic analysis of the hand weeding cost for all years of this trial were estimated for the 18 different treatment combinations (6 fumigation x 3 herbicide treatments) and show that costs were lowered in all fumigation treatments with the addition of herbicides (Tables 3 and 4). Herbicides had greater cost reductions in the untreated, solar, and pic fumigation treatments. A more comprehensive cost analysis is shown in Table 5, and clearly indicate that Telone + Vapam treatment has been the most effective and economical alternative to MeBr. Much of the cost savings were a result of eliminating gin trash for this particular treatment, however, and not from weed control.

Unfortunately, the method of application for the Telone + metam fumigation treatment tested is not commercially available. Alternatives that are being used include metam applied with sprinklers, shanked metam with and without herbicides, herbicides only, and pic + Telone under tarp.

Four years of research data has indicated quite convincingly that MeBr is not necessary for sweetpotato hotbeds in California, and that weed control can be obtained by judicious use of fumigation alternatives such as Telone, metam, or the combination thereof, or no fumigants at all when herbicides are used. Because of the cost and limited availability of MeBr after 2011, adopting many of the alternatives tested in this project is also economically viable.

Acknowledgements. Many thanks to Paul Domecq, Matt Alvernaz, Bob Chad, Tom Dallas, Armajit Kandola, Nathan Mininger, and Brad Nightengale for their cooperation, without which this work would not have been possible. This research was supported by a grant from the USDA ARS Pacific Area Wide Methyl Bromide Alternatives project.

Table 1. Sweetpotato hotbed nematode(1) sampling results, February and May, 2011.

				February Sampling		May Sampling		
Site	Cooperator / location	Sample	Treatment	Root-knot J2 #per 100 g soil	saprophytic , # per 100 g soil		Root-knot J2 #per 100 g soil	saprophytic #per 100 g soil
1	**Matt Alvernaz**	STD	MeBr + Pic, 350 lbs/A	0	0	MB	0	4360
	NE corner of	TIF 1	Pic 650 lbs/A	0	225	Pic	0	2700
	Howard & Sunset							
2	**Bob Chad**	Solar 1	summer solarization	0	313	Solar	1	220
	S of Olive, W of	Solar 2		0	89			
	Dwight	UTC	untreated control	0	407	UTC	1	1120
		UTC 2		0	374			
3	**Tom Dallas**	STD	MeBr + Pic, 350 lbs/A	0	0	MB	0	460
	SE corner of	TIF cold	Pic 450 lbs/A	0	123	Pic cold	0	2840
	Lincoln & Magnolia	TIF hot	Pic 450 lbs/A	0	0	Pic Hot	0	1160
4	**Armajit Kandola**	STD	MeBr + Pic, 350 lbs/A	0	31	MB	0	2880
	NE corner of	TIF 1	Pic 400 lbs/A	0	129	Pic	1	513
	Lincoln and Atwate	UTC	untreated control	0	297	UTC	0	600
	Jordan							
5	**Nathan Mininger**	STD 1	MeBr + Pic, 350 lbs/A	0	79	Pic+MB	0	400
	SW of Hwy 140	STD 2		0	117			
	and Washington	TIF 1	Pic 250 lbs/A	0	295	Pic	0	3200
		TIF 2		0	588			
		UTC 1	untreated control	0	417			
		UTC 2		0	650	UTC	0	380
6	**Brad Nightengale**	STD 1	Metam K 50 gpa shan	0	179	Metam K	0	760
	S. of Westside	STD 2		0	613			
	between Lincoln ar	TIF 1	Pic 240 lbs/A	0	56	Pic	0	2320
	Robin	TIF 2		0	0	MB	0	220

1 Root knot nematodes, Meloidogyne spp.

Table 2. Sweetpotato hotbed Pythium counts, May 23 2011.

Site	Cooperator	sample* a	b	avg	adj	Pythium cfu/g dry soil
1	Alvernaz MeBr	1	5	3	75	83.3
1	Alvernaz Pic	1	0	0.5	12.5	13.9
2	Chad solar	0	0	0	0	0.0
2	Chad UTC	1	1	1	25	27.8
3	Dallas MeBr coldbed	6	7	6.5	162.5	180.6
3	Dallas MeBr hotbed	4	4	4	100	111.1
3	Dallas Pic-cold	7	7	7	175	194.4
3	Dallas Pic-hot	1	1	1	25	27.8
4	Kandola MeBr	0	0	0	0	0.0
4	Kandola Pic	0	2	1	25	27.8
4	Kandola UTC	0	1	0.5	12.5	13.9
5	Nathan Mininger MeBr	6	6	6	150	166.7
5	Nathan Mininger Pic	2	2	2	50	55.6
5	Nathan Mininger UTC	2	1	1.5	37.5	41.7
6	Nightengale MeBr	0	0	0	0	0.0
6	Nightengale Pic + Vapam	1	1	1	25	27.8
6	Nightengale Vapam	2	3	2.5	62.5	69.4

* colony forming units (cfu), from composite soil samples in each treatment.

Table 3. Sweetpotato slip production as affected by fumigation and herbicide treatments

Main Plot (fumigation)	split plot (herbicide)	# per 4 sq ft 2008	2009	2010	2011	Average	at 12" ft per acre*	$ 15.15 $/Acre**
1 UTC	UTC	254	241	145	174	203.5	32.1	$ 486.44
	Devrinol	220	276	148	187	207.8	31.5	$ 476.49
	Valor 1.5	232	194	168	181	193.8	33.7	$ 510.92
2 MeBr + Pic	UTC	140	267	150	241	199.5	32.8	$ 496.19
	Devrinol	137	287	162	253	209.8	31.2	$ 471.94
	Valor 1.5	142	262	158	248	202.5	32.3	$ 488.84
3 PicChlor 60	UTC	126	246	127		166.3	39.3	$ 595.13
	Devrinol	120	284	160		188.0	34.8	$ 526.54
	Valor 1.5	133	207	143		161.0	40.6	$ 614.85
4 Vapam + Telone	UTC	154	330	143		209.0	31.3	$ 473.64
	Devrinol	133	310	200		214.3	30.5	$ 461.85
	Valor 1.5	163	287	169		206.3	31.7	$ 479.76
5 Pic only	UTC	139	280	161	174	188.5	34.7	$ 525.15
	Devrinol	158	260	172	209	199.8	32.7	$ 495.57
	Valor 1.5	169	261	193	174	199.3	32.8	$ 496.81
6 Solar	UTC	112	302	147		187.0	34.9	$ 529.36
	Devrinol	107	269	156		177.3	36.8	$ 558.21
	Valor 1.5	113	242	141		165.3	39.5	$ 598.73
	Average	152.9	266.9	157.9	204.6	**193.3**	**33.8**	**$ 512.18**

** Distance in feet needed to transplant one field acre at 12" plant spacing and 40" row spacing.*

*** Cost per hotbed acre at the given cost per linear foot.*

Table 4. Sweetpotato hotbed 2-man hand weeding times as affected by fumigation and herbicide treatments, 2008 - 2010 yr summary .

Main Plot (fumigation)	split plot (herbicide)	seconds/2-men/100 sq ft 2008	2009	2010	2011	Average	$ 11.00 $/Acre*
1 UTC	UTC	186	81	168		145.0	$ 171.55
	Devrinol	102	42	70		71.3	$ 84.40
	Valor 1.5	33	21	25		26.3	$ 31.16
2 MeBr + Pic	UTC	22	24	60		35.3	$ 41.80
	Devrinol	21	13	16		16.7	$ 19.72
	Valor 1.5	15	9	14		12.7	$ 14.99
3 PicChlor 60	UTC	24	34	51		36.3	$ 42.99
	Devrinol	15	41	24		26.7	$ 31.55
	Valor 1.5	17	13	17		15.7	$ 18.54
4 Vapam + Telone	UTC	33	28	36		32.3	$ 38.25
	Devrinol	22	11	38		23.7	$ 28.00
	Valor 1.5	10	5	19		11.3	$ 13.41
5 Pic only	UTC	103	51	45		66.3	$ 78.48
	Devrinol	34	23	33		30.0	$ 35.49
	Valor 1.5	17	13	12		14.0	$ 16.56
6 Solar	UTC	213	67	108		129.3	$ 153.02
	Devrinol	57	50	42		49.7	$ 58.76
	Valor 1.5	29	21	19		23.0	$ 27.21
	Average	52.9	30.4	44.3			

** Hand weeding cost per hotbed acre at the given hourly wage.*
Hand weeding times not measured in 2011.

Dacthal injury included reduced stand, stunting, and discoloration.

Table 5. Estimated hotbed production costs as affected by fumigation and herbicide treatments (2012), sweetpotato PAW-MBA project.

Fungicide treatments did not have any effect (data not shown).

Main Plot (fumigation)	split plot (herbicide)	$/A Fumigant	$/A Application	$/A gin trash	gin trash handling	$/A herbicide	weed hoeing cost	$/A plant cost	sub-total	Total Cultural $/acre	Total Operating $/acre
1 UTC	UTC	$ -	$ -	$ 2,095	$ 489	$ -	$ 172	$ 486	**$ 3,242**	$ 21,357	$ 35,960
	Devrinol	$ -	$ -	$ 2,095	$ 489	$ 48	$ 84	$ 476	**$ 3,193**	$ 21,318	$ 35,920
	Valor 1.5	$ -	$ -	$ 2,095	$ 489	$ 26	$ 31	$ 511	**$ 3,152**	$ 21,243	$ 35,844
2 MeBr + Pic	UTC	$ 2,235	$ 1,565	$ 2,095	$ 489	$ -	$ 42	$ 496	**$ 6,922**	$ 25,028	$ 39,720
57/43, 350 lbs/A	Devrinol	$ 2,235	$ 1,565	$ 2,095	$ 489	$ 48	$ 20	$ 472	**$ 6,924**	$ 25,034	$ 39,726
	Valor 1.5	$ 2,235	$ 1,565	$ 2,095	$ 489	$ 26	$ 15	$ 489	**$ 6,914**	$ 25,007	$ 39,699
3 PicChlor 60	UTC	$ 987	$ 1,565	$ 2,095	$ 489	$ -	$ 43	$ 595	**$ 5,774**	$ 23,714	$ 38,375
45 gpa	Devrinol	$ 987	$ 1,565	$ 2,095	$ 489	$ 48	$ 32	$ 527	**$ 5,742**	$ 23,710	$ 38,371
	Valor 1.5	$ 987	$ 1,565	$ 2,095	$ 489	$ 26	$ 19	$ 615	**$ 5,795**	$ 23,782	$ 38,445
4 Vapam + Telone	UTC	$ 542	$ 90	$ -	$ -	$ -	$ 38	$ 474	**$ 1,144**	$ 19,344	$ 33,901
40 gpa + 12 gpa	Devrinol	$ 542	$ 90	$ -	$ -	$ 48	$ 28	$ 462	**$ 1,170**	$ 19,362	$ 33,919
	Valor 1.5	$ 542	$ 90	$ -	$ -	$ 26	$ 13	$ 480	**$ 1,151**	$ 19,318	$ 33,874
5 Pic only	UTC	$ 804	$ 1,565	$ 2,095	$ 489	$ -	$ 78	$ 525	**$ 5,557**	$ 23,633	$ 38,292
150 lbs/A	Devrinol	$ 804	$ 1,565	$ 2,095	$ 489	$ 48	$ 35	$ 496	**$ 5,532**	$ 23,638	$ 38,297
	Valor 1.5	$ 804	$ 1,565	$ 2,095	$ 489	$ 26	$ 17	$ 497	**$ 5,492**	$ 23,597	$ 38,256
6 Solar	UTC	$ -	$ 1,350	$ -	$ -	$ -	$ 153	$ 529	**$ 2,032**	$ 20,287	$ 34,915
	Devrinol	$ -	$ 1,350	$ -	$ -	$ 48	$ 59	$ 558	**$ 2,015**	$ 20,241	$ 34,869
	Valor 1.5	$ -	$ 1,350	$ -	$ -	$ 26	$ 27	$ 599	**$ 2,002**	$ 20,144	$ 34,770
Average		**$ 761**	**$ 1,023**	**$ 1,397**	**$ 326**	**$ 25**	**$ 50**	**$ 516**	**$ 4,097**	**$ 22,209**	**$ 36,842**

Fumigation costs are for the entire area.

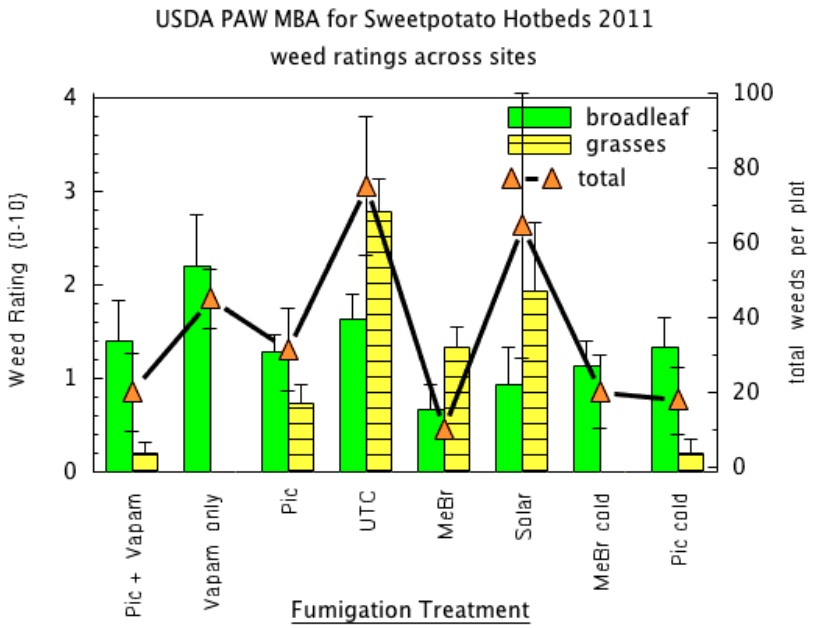
Gin trash: 24 tons per 2500 linear ft of bed, $90 per ton

Gin trash handling: open bed, apply, roll, irrigate, cover

herbicide costs = product + application. Devrinol $11/lb, Valor $110/lb.

Hoeing cost from Table 2.

Plant cost based on 2008 - 2010 average and $15.15 per linear foot.



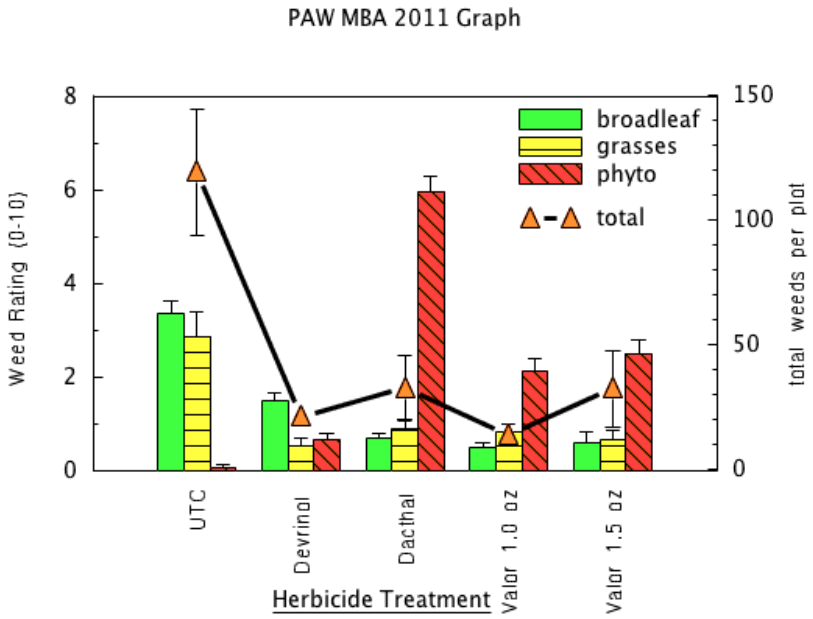


Figure 1. Average weed ratings (0 – 10 scale) in 2011 for each fumigation (top) and herbicide (bottom) treatment.

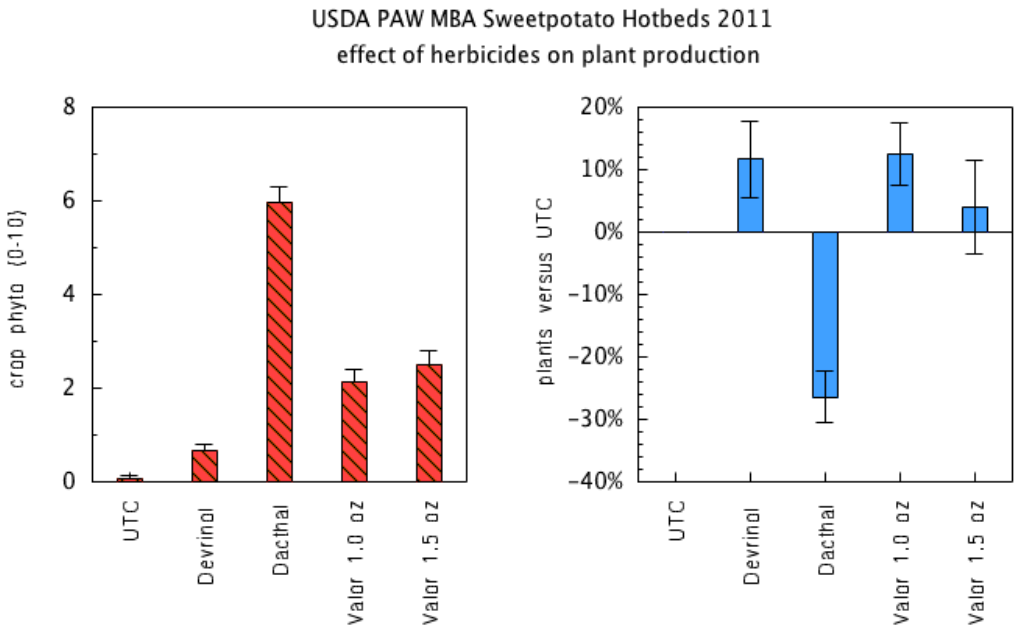


Figure 2. Though registered for field production, Dacthal caused an unacceptable amount of sweetpotato plant injury when used in the hotbeds (left). Injury was severe enough to cause significant reduction in stand (right).

Belay Insecticide Trial on Sweetpotatoes

Scott Stoddard, Farm Advisor
UCCE Merced County

Objective: Evaluate Belay (clothianidin) insecticide applied broadcast PPI for the control of western wiremorm spp on sweetpotato.

Location: Commercial field, between Peach and Magnolia on Howard, west side of road.

Cooperator: Randy Jantz (grower), Larry Beckstead (PCA), Tom Dirks (Valent)

Treatments:
1 Telone, 15 gpa
2 Sectagon K-54 (metam potassium), 45 gpa
3 Belay (clothanidin), 12 oz/A
4 UTC

Treatments applied April 22, 2011, and incorporated.
Belay applied in 50 gpa water.
All treatments received Mocap 15G at 26 lbs/A prior to planting

Plot size: Variable, put in with commercial equipment. Untreated was 32 ft x 60 ft. Not replicated.

Variety: O'Henry, transplanted May 20, 2011.

Harvest: Oct 19, 2011 using commercial harvesters.
Treatments were not replicated, but were large enough that multiple harvest samples were taken within each plot.

Results

Without replication, it is not possible to say whether there were any significant differences in yield between treatments, but results were very similar (Table 1). The Belay treated area had greater standard errors than the other treatments (Figure 1). All areas of the field received an over-the-top application of Mocap, and so there is no true untreated area in which to make a comparison. Culls were a result of misshapen roots and not wireworm damage.

Table 1. Sweetpotato yield and grade results for the Belay insecticide trial, 2011.

	bins/A (1000 lbs)					%	%
Treatment	#1's	Jumbo	Med	Culls	TMY	#1	Culls
1 Telone	22.4	9.1	8.0	5.1	39.5	56.7	11.4
2 K-pam	23.3	8.9	7.3	6.6	39.5	59.1	14.4
3 Belay	22.6	10.7	9.0	5.4	42.2	54.1	11.6
4 UTC	23.7	9.7	8.3	5.5	41.7	57.1	11.5
Average	23.0	9.6	8.2	5.7	40.7	56.8	12.2
Std Error:	see standard error bars on Figure 1.						

An AOV could not be performed because treatments were not replicated.
Multiple samples were taken within each treatment; standard errors calculated.

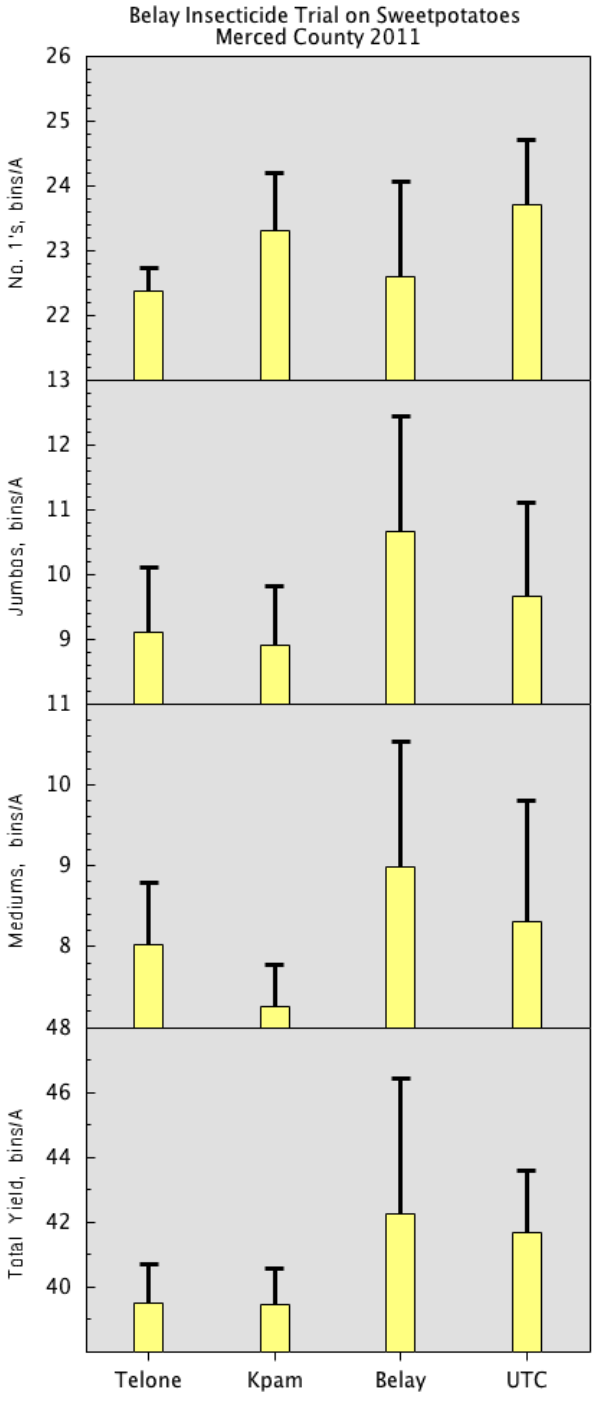


Figure 1. Sweetpotato Belay trial yield results and standard errors. Longer error bars indicate more variability in the data.

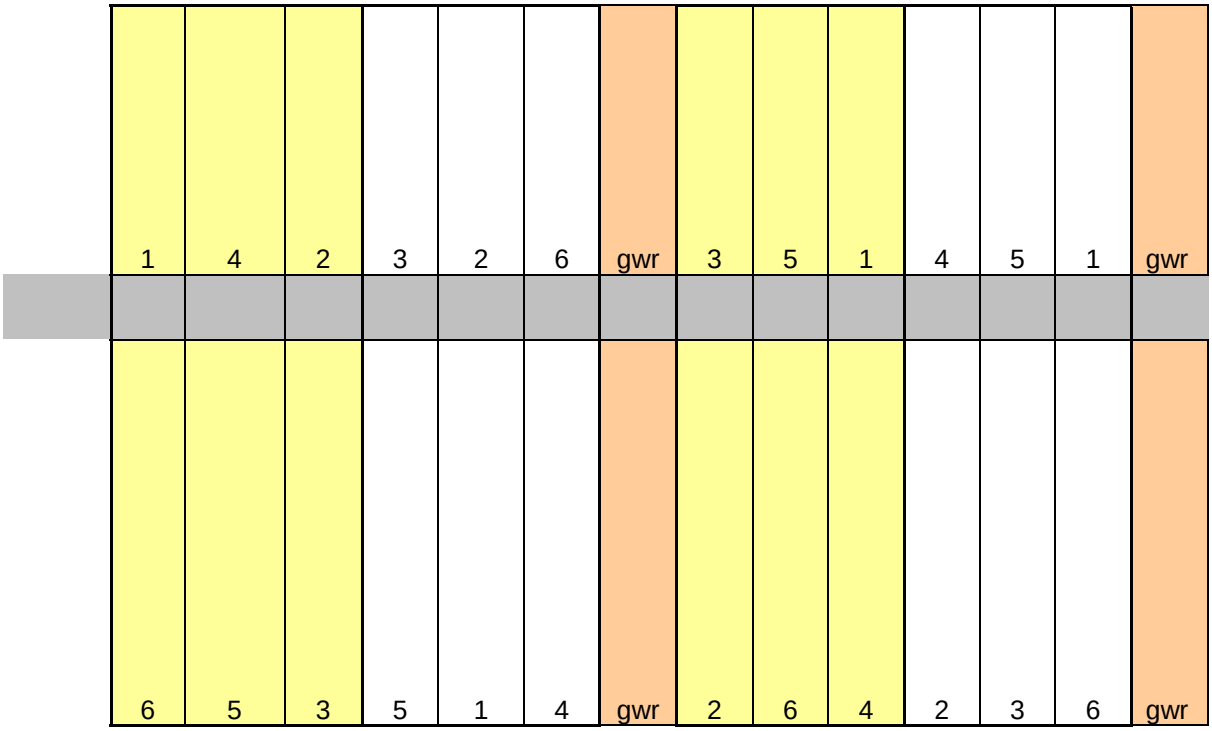
Sweetpotato Irrigation Trial 2011

Scott Stoddard, UCCE Merced County

Cooperator: Bob Weimer
Location: NW corner of Sultana and Longview Rds
Variety: Covington
Transplanted: 3-Jun-11
Harvest: 10-Nov-11 growing days: 160
Fertilizer: 5 injections, weekly, starting July 20. Total 150 lbs N/acre from CN17
Treatments: begin 7/7/2011 end: 10/14/2011

1	40%	All treatments full irrigation for the first month
2	60%	then %of Et x Kc
3	80%	
4	100%	Et from the Merced CIMIS station
5	120%	Kc values begin at 0.4, increase to 1.15, then down to 0.65
6	100% no Kc	
7	Grower*	

Plot layout:



A continuation of work started in 2010. The main reason for this trial was to determine the amount of water needed to produce sweetpotatoes with drip irrigation by imposing different deficit

irrigation treatments ranging from 40% to 120% of crop evaporation in 20% increments (40%, 60%, 80%, 100%, 120%). Crop evaporation was determined from the equation:

Etc = Eto x Kc

where Etc is the evapotranspiration of the crop, Eto is reference evaporation using the Merced CIMIS station, and Kc is the crop coefficient.

Additionally, a 100% of Eto with no Kc factor was also evaluated. Since Kc values for sweetpotatoes are not determined for California growing conditions, a generic crop coefficient curve was utilized, beginning at 0.4, peaking at 1.15, and then declining to 0.65 for the last month of the growing season (Figure 1).

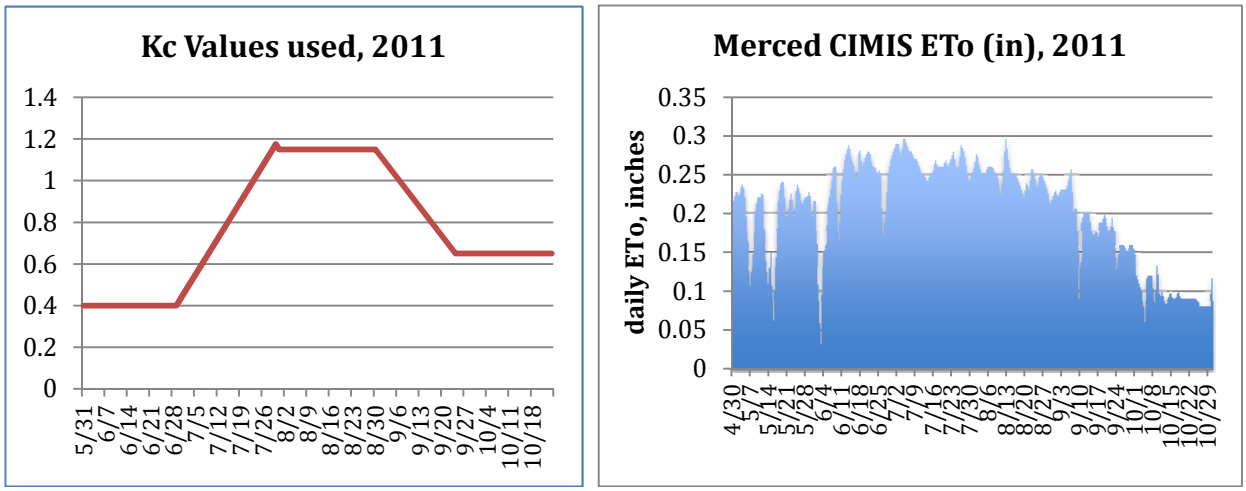


Figure 1. Kc values followed a general curve shown above, and were multiplies by the reference evapotranspiration (ETo, left) to calculate the amount of water to apply each week.

After transplanting, the crop was irrigated fully for the first month to establish the root system before imposing the irrigation treatments. Irrigation amounts were controlled through the use of battery operated timers attached to a 6-port irrigation manifold (Figure 2). Drip lines were then attached to the sub-mains coming off the manifold in a randomized block design with 4 replications. In-line water meters were used to determine flow rates for the individual treatments and adjust the time accordingly to apply the amount of water estimated for the following week. The timers, and therefore the amount of water, were adjusted weekly until the system was removed in late fall.

Moisture sensors were installed in one area of the plot (not replicated) under treatment #3 at depths of 2, 6, 12, and 24 inches. Unfortunately, the sensors and/or data loggers malfunctioned about 1 month after installation and many data points are missing or bad. Results are shown in Figure 2. Soil moisture in 2010 ranged from 0.25 – 0.10 m^3/m^3 during most of this trial except for the 2" depth. For a sandy soil, plant available water is between these vlues.

Weekly water application amounts are shown in Figure 4, and the total water applied in Figure 5. Application rates ranged from 13.6 to 31.8 acre-inches. The early July spike in water application

indicates leaking lines that were then fixed. The total applied water for both 100% treatments was very similar, 28.3 and 29.8 acre-inches respectively.

Yield results are shown in Table 1. In general, the more water that was applied, up to 100% of Etc, the better the yield. Deficit irrigation had the greatest impact on jumbos – the weight of jumbos in the 40% treatment was about one-third (5.4 bins) that of the 100% water application (14.4 bins). An economic analysis of the results is shown in Table 2. With the assumptions used ($16 #1 box, $5 packing charge, and 21 box/bin pack-out), the 100% ETo x Kc was the most profitable treatment by a large margin.

These results are very similar to 2010, and suggest that sweetpotatoes only require about 2.5 acre-ft of water (30 inches) for maximum production. Additional research is planned in 2012, with the addition of more soil moisture monitoring to observe if any of the treatments are moving water beyond the root zone.

Figure 2. Irrigation control manifold.

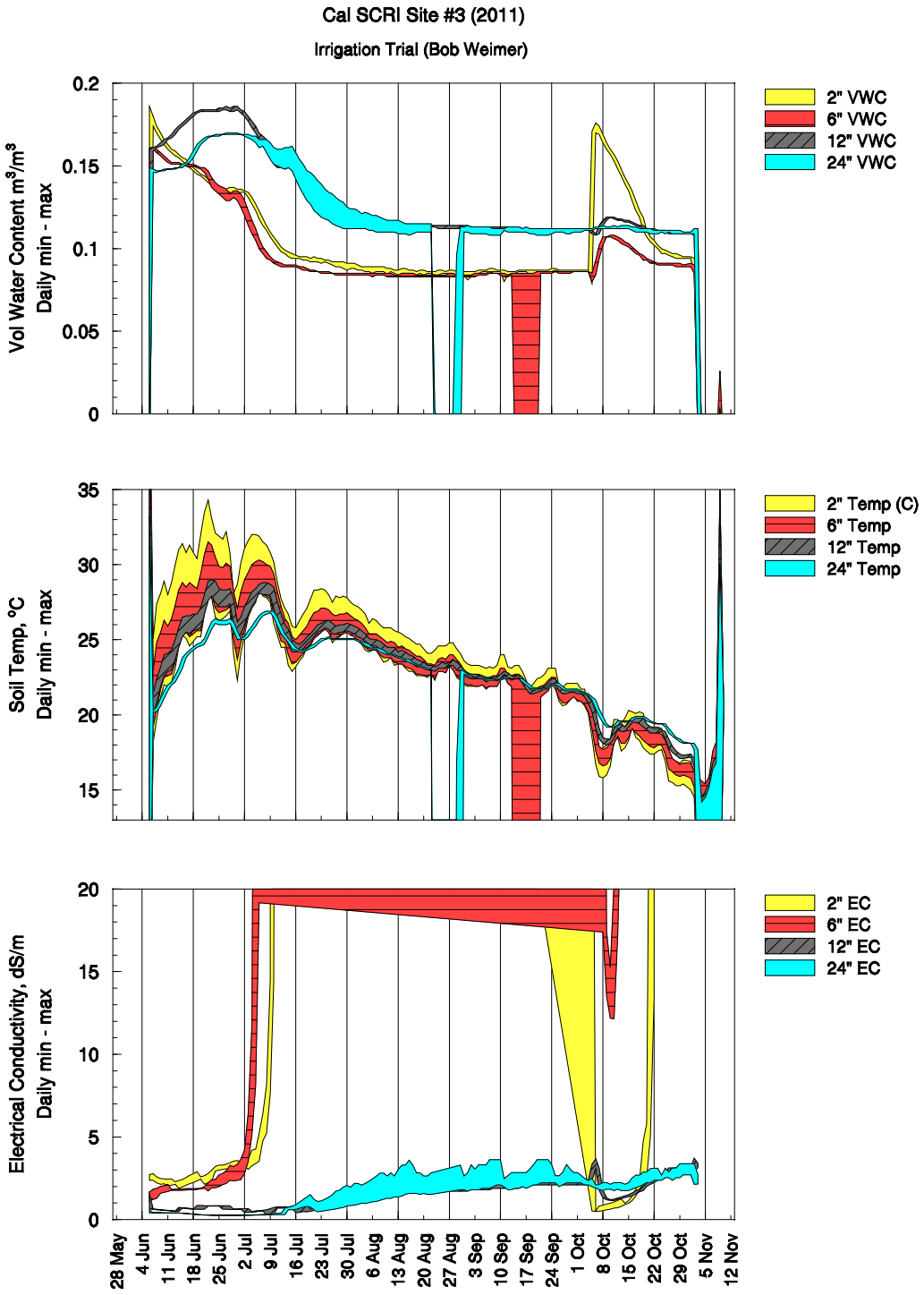


Figure 3. Sweetpotato irrigation trial 2011 soil moisture (top), temperature (middle), and pore electrical conductivity (bottom) at 4 different depths. All three charts show the daily minimum to maximum changes over the course of the season. Problems with the data loggers resulted in lost and erroneous data in August and September.

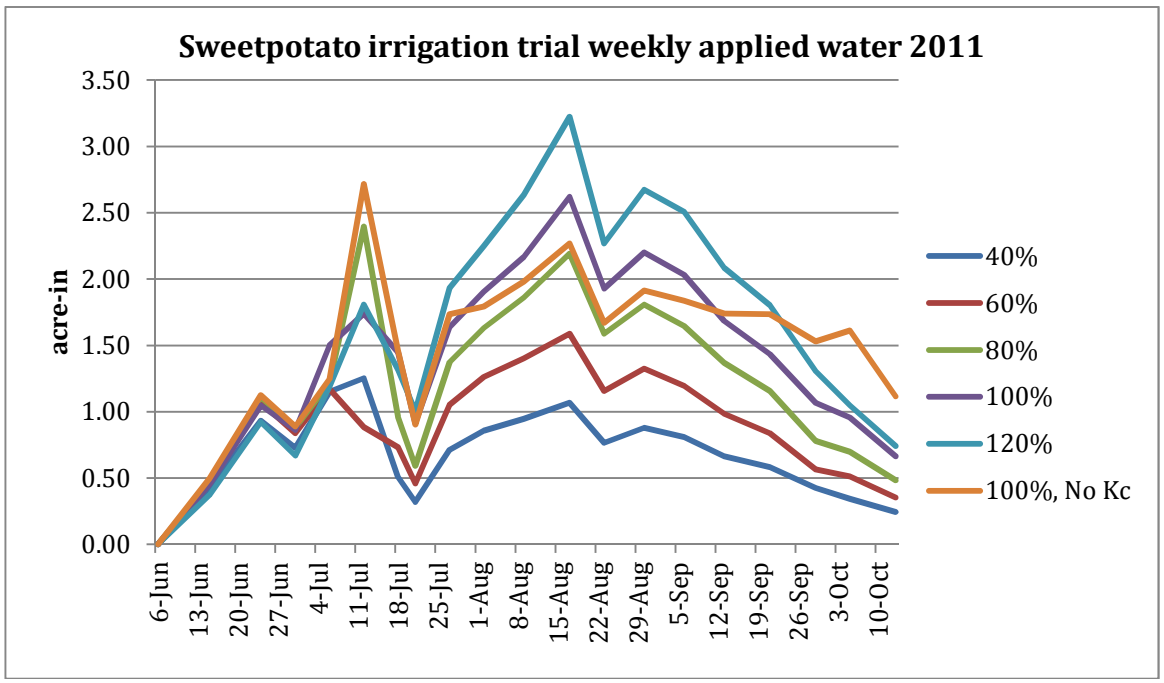


Figure 4. 2011 weekly irrigation water applied after starting irrigation deficit treatments. The spike in early July for some of the treatments shows a leak that developed that week.

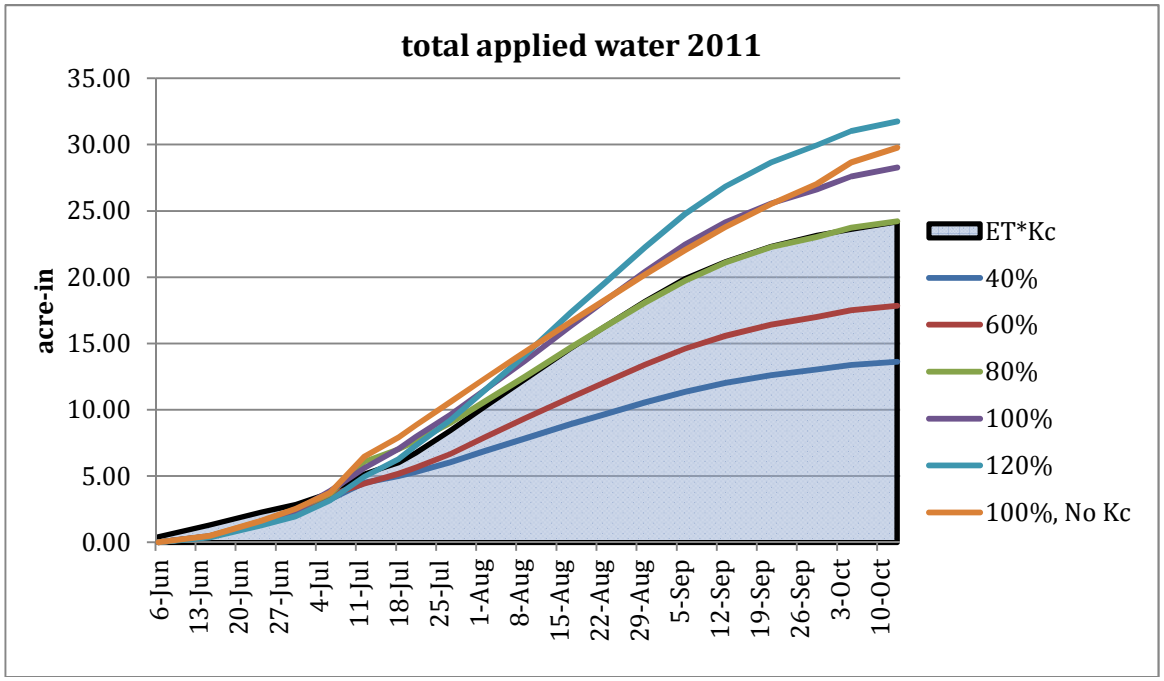


Figure 5. Total water application for the 2011 season for each of the irrigation treatments.

Table 1. Sweetpotato Irrigation Trial 2011yield results.

SCRI site #3 (Sultana and Longview)

Treatment	Actual applied A-in	bins/A (1000 lbs) #1's	Jumbos	Mediums	TMY	culls %	#1's %
40%	13.6	25.6	5.4	14.5	45.5	1.4%	56.3%
60%	17.9	35.8	7.4	14.0	57.3	1.9%	62.5%
80%	24.2	35.5	9.1	15.1	59.7	2.7%	59.5%
100%	28.3	37.8	14.4	17.4	69.5	3.1%	54.1%
120%	31.8	35.0	7.5	16.2	58.7	1.0%	59.6%
100% no Kc	29.8	34.5	10.9	16.0	61.4	1.6%	56.3%
Grower*	---	31.5	8.6	19.6	59.8	4.3%	52.7%
	LSD 0.05	4.7	4.8	ns	4.5	ns	ns
	CV, %	9.2	35.2	20.6	5.1	72.4	8.3

* Grower plots within treatment area, shown for comparison

LSD 0.05 = least significant difference at the 95% confidence level. Values less than this amount are not significantly different (ns).

CV % = coefficient of variation

Table 2. Sweetpotato irrigation trial economic analysis, 2011.

Treatment	Actual applied water A-in	boxes/acre $ 16.00 #1's	$ 7.00 Jumbos	$ 8.00 Mediums	$/A total
40%	13.6	5,903.22	228.25	913.25	7,044.72
60%	17.9	8,274.63	310.61	884.44	9,469.68
80%	24.2	8,198.32	380.71	954.08	9,533.11
100%	28.3	8,720.52	603.76	1,095.01	10,419.29
120%	31.8	8,089.24	314.04	1,018.56	9,421.85
100% no Kc	29.8	7,973.29	457.39	1,008.86	9,439.55
Grower*	---	7,285.65	360.53	1,237.93	8,884.12
21	boxes per bin	84%	pack-out		
$ 5.00	packing charge				

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