Sweetpotato Research Progress Report 2012

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Sweetpotato Collaborators Trial -- 2012

Scott Stoddard, UCCE Merced County

This year's sweetpotato evaluation was with Quail H Farms, near Livingston, CA. Soil type was Delhi sand, 0 - 3% slope.
The field was certified for organic, and therefore not fumigated with Telone. Soil moisture adequate at planting. Dry spring.
Summer with record heat and above average water demands. Growth restricted from mid-season water deficiency.
Significant root-knot nematode pressure; also lack of nitrogen. Overall yields less than normal.
B63 G1 sent from Don La Bonte and were transplanted one day later than the other entries. Notes made 2 weeks after harvest.

Rep	Var#	Variety Name	Skin Color	Skin Text	Flesh color	Eyes	Lents	Shape	Shape Uniform	Overall App	Comments	notes on culls
1	1	Bonita	buff/tan	7	1-2	5	7	3,5	7	7	some veins, slight pink, some RKN	veins, RKN
2			pink tan	9	1-2	7	7	5,2	9	8	some veins, some pink in skin	
1	6	NC07-847	tan/gold	7	2-3	7	5	2,6	7	7	blocky, good skin color, slight veins	few
2												
1	8	O'Henry	cream	8	2	8	5	5	4	5	dark lents, variable shape, RKN	RKN
2												
1	2	L-05-111	rose	5	3	7	5	3,6	6	6	rough skin some pimpling, shape	cuts, RKN
2												
1	3	L-07-146	red	5	4	4-5	7	5	6	6	lumpy, dull skin	too long
2												
1	4	NC-04-032	red rose	6	4	6	7	3	7	6	off color red, some pink, rough skin	RKN, shape
2												
1	5	NC05-198	rose	7	3	7	7	3	7	7	good uniform shape but small	RKN
2												
1	7	NC07-364	red	8	4	9	5	3,5	6	7	lents, scratched easily healed white	
2												
1	9	Covington	Cu/rose	5	3.5	7	3	5,6	6	6	YCR, grooving, lents	RKN
2												
1	10	B63	rose Cu	5	2.5	6	5	3,8	5	5	surface fusarium, rough skin	RKN
2												
1	11	B14	rose Cu	5	2.5	5	7	7	4	5	rough skin, irregular	RKN
2												
1	12	Cal Bx	rose	7	3	7	5	3,8	6	6	YCR, lumps, pimples	RKN
2												
1	13	LSU52	orange	7	3.5	7	6	3,7	6	7	small, irregular shape	shape, cuts
2			orange	9	3.5	9	7	5	9	9	slight veins & lents. Excellent	few
1	14	Diane	red	5	4	5	5	3,5	7	7	good color, consistent shape	RKN, cuts
2												
1	15	LSU 175 G0	maroon	8	4	8	7	2,5	7	8	chunky, skin little brown	RKN, grubs
1	16	LSU 175 G1	maroon	8	4	8	7	2,5	7	8	chunky	splits
2			purple	9	5	9	7	2,5	8	9	chunky, good skin color	

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
2012

STATE AND LOCATION REPORTING: Livingston, CA
DATE TRANSPLANTED: 5/24/2012. DATE HARVESTED: 10/5/2012. No. GROWING DAYS: 134
DISTANCE BETEEN ROWS (in): 40. DISTANCE IN ROW (in): 12
PLOT SIZE: NO. OF ROWS: 1 LENGTH (ft): 350 NO. OF REPS: 4
IRRIGATION: drip irrigation. 1.5 to 2 inches per week during summer, total 30".
FERTILIZER: 10 tons/A steer compost, foliar micros. About 70-150-400 N-P2O5-K2O.

			40 lb box/A					%	%
	SELECTION	CLASS	US #1'S	CANNERS	JUMBOS	MKT YIELD	BINS/A	US #1'S	CULLS
9	Covington	yam	533.9	122.9	32.8	689.6	24.3	77.4%	11.3%
15	LSU 175 G0	red	457.4	180.3	34.7	672.3	23.7	68.2%	3.6%
12	Cal Bx G1	yam	422.4	192.9	6.9	622.2	21.9	68.1%	11.9%
3	L07-146	red	405.8	191.4	93.3	690.4	24.3	59.3%	29.3%
7	NC07-364	red	402.7	180.4	3.7	586.8	20.7	68.1%	3.3%
6	NC07-847	sweet	391.8	95.5	133.5	620.8	21.9	62.5%	3.2%
14	Diane	red	358.6	185.0	7.3	550.9	19.4	65.3%	14.4%
2	L05-111	yam	357.8	157.7	14.8	530.3	18.7	67.5%	22.3%
5	NC05-198	yam	333.2	107.6	9.5	450.2	15.8	74.3%	18.8%
1	Bonita	sweet	307.1	121.1	16.0	444.1	15.6	69.6%	25.0%
16	LSU 175 G1	red	293.8	135.8	69.3	499.0	17.6	58.6%	12.2%
11 b	B14-G2	yam	266.7	130.3	13.5	410.6	14.5	64.9%	24.1%
10 b	B63-G1	yam	209.1	118.1	33.0	360.2	12.7	59.5%	29.8%
8	O'Henry	sweet	191.2	80.0	6.1	277.3	9.8	69.3%	34.6%
11	B14 - G4	yam	168.7	93.6	0.0	262.3	9.2	64.4%	37.4%
13	LSU52	yam	159.3	79.5	29.3	268.0	9.4	59.7%	15.4%
10	B63 - G4	yam	155.5	149.7	6.3	311.5	11.0	49.2%	31.8%
4	NC04-032	yam	147.2	81.9	0.0	229.0	8.1	63.3%	29.6%
	Average		309.0	133.5	28.3	470.9	16.6	65.0%	19.9%
	LSD 0.05		99.6	57.9	43.5	147.6	5.2	9.3%	11.7%
	CV, %		19.5	26.3	90.1	18.9		9.3	36.2

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.

SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION - NSPCG TRIAL

Date bedded: 2/28/12 Location: Quail H Farms
Livingston, CA
Date Evaluated: 4/9/12 Type of bed: cold bed, drip irrigated
Evaluated by: S. Stoddard Botran & Devrinol at bedding

	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	Bonita	no	4	2	3		
2	L05-111	no	4	3	2		good
3	L07-146	no	3	3	2		
4	NC04-032	no	3	4	2	good	small, but uniform
5	NC05-198	no	4	4	3		most plants
6	NC07-847	no	4	3	3		largest plants
7	NC07-364	no	3	4	2		
8	O'Henry	no	4	2	1		very small but lots
9	Covington	no	1	1	1	good	poor plant prod
#	B63	no	2	2	1		
#	B14	no	4	4	2		lots of plants
#	Cal Bx	no	2	2	1	okay	end of bed
#	LSU52	no	3	4	2	some rot	half good, half not
#	Diane	no	2	2	1	some rot	yellow, erratic
#	LSU 175 G0	not in bed					
#	LSU 175 G1	no	3	1	2	good	lots of small plants

(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.

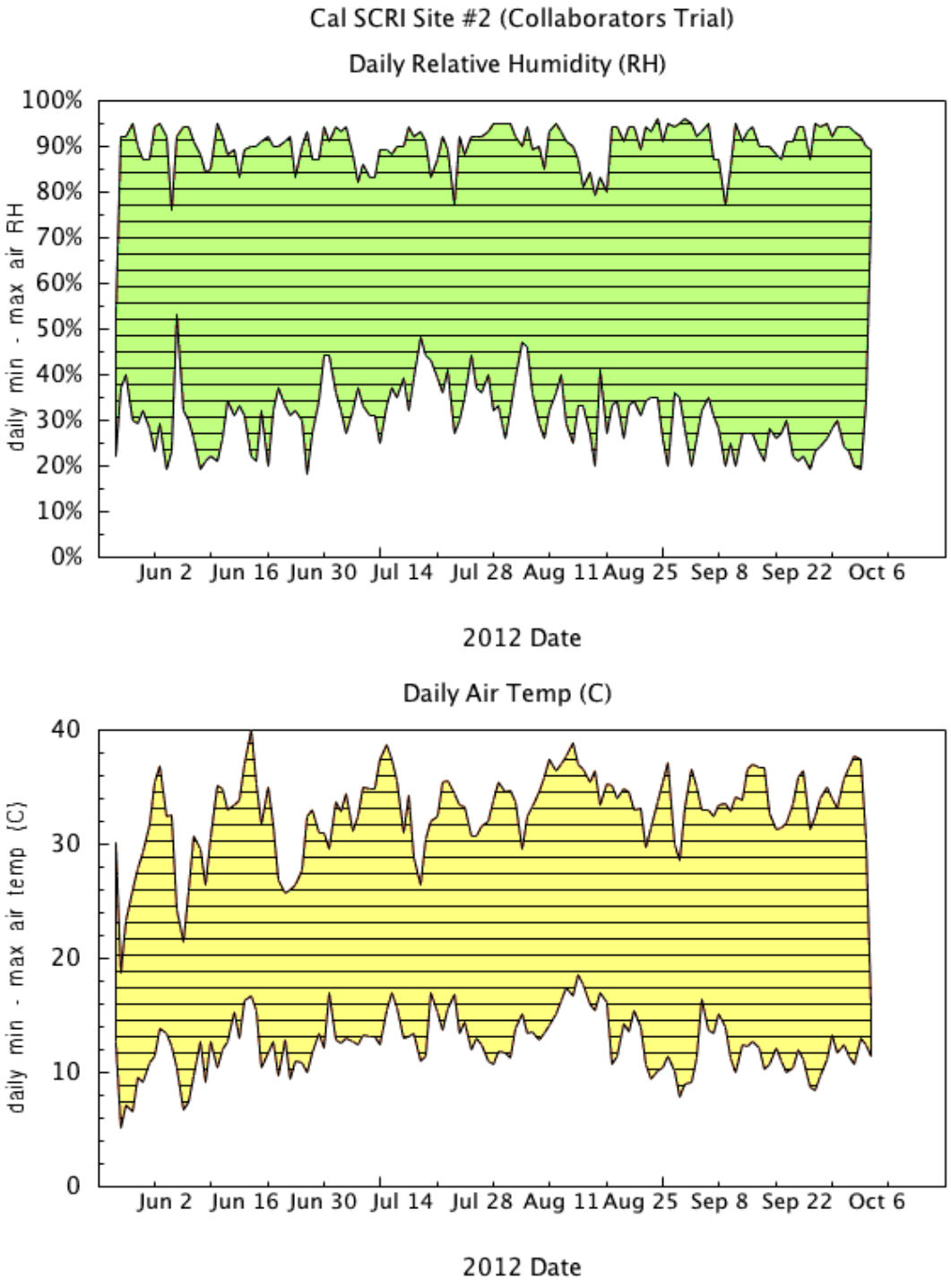


Figure 1. 2012 was the hottest summer on record for Merced, with 36 days over 95° F. Daily high temps remained well above 30° C (86° F) through harvest of this trial in mid October.

Sweetpotato ALT -- 2012

Scott Stoddard, UCCE Merced County

This year's sweetpotato ALT evaluation was with Dave Souza, near Atwater CA. SE corner of Central and Bell, east side of field.
Ground was fumigated with Telone. Field pre-irrigated, and soil moisture was excellent at planting. Dry winter and spring.
Transplanted May 25, harvested on Oct 17, 2012. Root evaluation on Nov 28, 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 2013
L09-154	dull red	3	4	9	5	3,5	5	3	RC, RKN, pimples, rough	cracks, RKN	drop
L09-149	Purple	7	3	9	5	2,3	7	7	YCR, small	shape	keep
L07-106	dull Red	6	4	9	6	7	3	4	veins, dull color, poor shape	RC banding	drop
L09-109	Purple	3	purple	5	3	7	3	3	purple/purple,pimples, lumpy, bands	low yld	keep for fun
L08-95	dull red	6	4	9	7	2,3	5	5	RC, rough, small	poor set	drop
L08-117	Red	7	4	9	5	3,4	6	7	good skin color, some pimples	RKN	?
L07-190	pink red	5	3	9	5	2,5	6	5	color off, not uniform, rough	shape	drop
L11-97	tan/pale Cu	4	2/3	6	5	3,8	7	3	rough skin, pimples. Yellow flecks in flesh	low yld	drop
L07-102	deep red	6	4	7	5	2,7	3	5	Veins, variable shape	veins, low yld	keep
L11-68	red/purple	8	1	9	3	3,8	7	8	Some pimples, lents prominent. White flesh, good shape		keep
L11-03	Red	8	4	9	5	2	7	9	Nice shape, color, skin. Good set		keep
L11-156	dull red	5	4	7	7	4	7	6	Long, dull color, some grooving		?
L10-01	red	5	3	7	3	2,3	5	4	Veins,lumps, lents, rough		drop
L11-05	red/purple	7	4	5	5	4	7	4	Long, dull color		drop
L10-08	Maroon	5	2/3/4	8	5	5,7,1	5	5	Mottling, YCR, shape bally		drop
175	maroon	8	4	9	7	2,5	7	7	chunky, some pimpling		keep
Covington	rose	8	3	5	7	3	8	8	good color, shape, skin		standard
NC07-847	gold/tan	7	2	5	5	3,6	8	8	flesh a hint of orange	shape	keep
NC05-257	dark red	7	3	9	5	3,8	8	9	Smooth, good shape, color, but developed pimples in storage.	Latex	keep

L-07-102

L-07-106

L-08-117

L-11-68


L-09-149


NC07-847


L-09-109


L-11-03

SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION - ALT TRIAL

Date bedded: 2/28/12 Location: D&S Farms, Cressey Ranch N. of Hwy 140

Date Evaluated: 4/18/12 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)
L-07-102	yes	5	5	3		best producer
L-09-149	yes	4	5	5		
L-09-154	yes	5	4	5		
L-08-95	yes	2	3	1		purple new growth
L-08-117	yes	4	3	2		
L-07-106	yes	4	4	2		
NC-05-257	yes	1	1	1		small, few
175 (G1)	yes	3	4	2		some rot
L-09-109	yes	5	4	3		good
L-07-190	yes	3	3	2		
NC-07-847	yes	4	3	2		
Covington	yes	3	3	2		poor, erratic, short

(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.

Red Yam Trial 2012

Scott Stoddard, Farm Advisor
UCCE Merced County

The red yam trial has been conducted for a few years to evaluate the more promising red skin lines from the ALT in replicated plots. Plot size is 2 rows (1 bed) x 50 feet, and replicated 4 times in a commercial field. In 2012, this was done with Dave Souza in a new seed field on the corner of Westside and Lincoln. The main emphasis this year was to evaluate L-04-175 both G0 and G1 roots compared to Diane, D&S Red Rose. Also included were L-117 (G4) and L-102 (G5), which had looked promising in the ALT in 2011. The plots were transplanted May 14 on 12" plant spacing and harvested October 2.

Additionally, L-04-175 was evaluated again in strip trials in 6 different fields. Typical size was 2 rows by 100 ft, though a couple of sites were replicated and also included 175 (G1) and a new yam type, LSU52.

Results:

Results for the 2012 replicated trial and the strip trial is shown in Tables 1 and 2. L-175 (G0) performed very well at most locations, being the highest yielder in the Red Yam trial and second highest in the Collaborators Trial. Average total market yield (No.1's, mediums, jumbos) was about 48 bins per acre. G1 seed had significant less yield, but there were far fewer test locations. Across all locations Number 1 size averaged 47%, but in some locations was as low as 22%. 175 grows fast and jumbos easily. This variety should probably be grown on 9 – 10" plant spacing with expected harvest of 90 – 110 days.

Figure 1 shows the results of the strip trials, and includes the new yam, LSU52. Table 3 includes data from the strip trials as well as a small trial to compare G0 to G6 root age. LSU52 appears to be much more virus tolerant than 175. Further testing of this variety, which has excellent disease resistance and attractive roots, is planned for 2013.

L-175 has been tested extensively in Merced County, in both replicated plots and strip trials. A summary of results from 2007 – 2011 are shown in Tables 4 – 5. This variety usually had significantly greater total yield than Diane, especially when virus-tested plants were used after 2009. Overall, G0 plants had highest No. 1's and total yield and lowest cull% (Table 6), but G1 and old 175 seed were very similar. While not shown in Table 6, color and shape were better with G1 seed as compared to old seed.

L-175 has the following characteristics:

- Yield potential comparable or greater than Diane.
- Chunky shape, with smooth, maroon colored skin and deep orange flesh. Unlike Diane, its shape becomes more bally as the seed ages (Table 7).
- Quick maturity, 90 – 110 days, and easily jumbos.
- Storage: no worse than Diane. Further evaluation of this needed.
- Plant beds: average production. Plants more slender than Diane.
- Leaves are lacier than Beauregard or Covington, slightly deeper green than Diane with a silvery cast to them (think wintergreen). Petioles and veins are purple.
- Good resistance to nematodes, Pox, and Fusarium. No observed russet crack, but responds strongly to virus testing with improved appearance and yield.

- Flesh color, texture, and taste are similar to Diane, slightly less stringy.

Table 1. Yield summary for the red yam evaluation trial, D&S Farms, 2012.

		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%
1	175 G0	74883	675	277	919	1872	65.9	36.2%	0.1%
2	L-117 (G4)	49960	373	330	545	1249	44.0	30.0%	0.0%
3	L-102 (G5)	66021	371	294	986	1651	58.1	22.5%	0.6%
4	Diane (G1)	52946	447	470	407	1324	46.6	33.8%	0.9%
5	Red Rose (G1)	60638	567	465	484	1516	53.4	37.0%	0.2%
6	175 G1	61147	333	199	997	1529	53.8	22.2%	0.5%
	Average	60933	461	339	723	1523	53.6	30.3%	0.4%
	LSD 0.05	9167	111	60	192	229	8.1	5.3	---
	CV, %	10	16	11.7	17.6	10		11.5	---

TMY	Total marketable yield is the sum of #1's, mediums, and jumbo 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 at the 95% confidence level.
CV, %	Coefficient of variation, a measure of variability in the experiment.

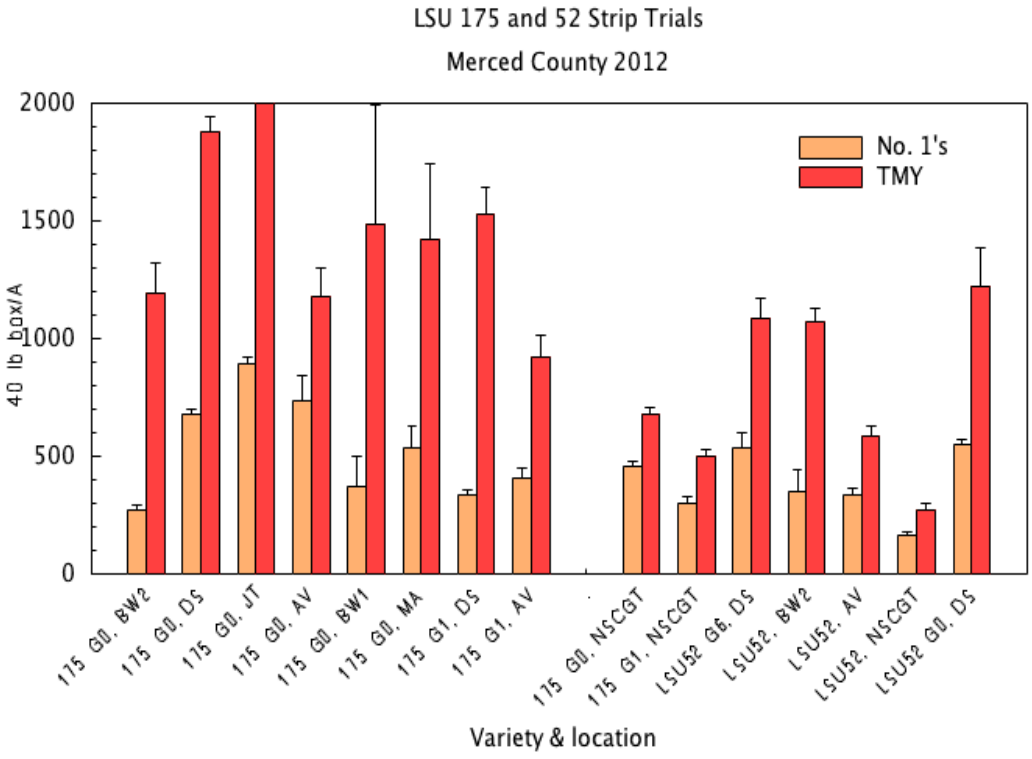


Figure 1. LSU 175 red yam and LSU52 yam strip trial results.

Table 2. Yield summary for L-04-175 trial locations, Merced County 2012.

Site #	Seed	Cooperator	Location	transplant	harvest	days	spacing	TMY lbs/A	40 lb box/A No. 1's	Meds	Jumbos	TMY lb box/A	Market bins/A	No. 1's #1%	Culls cull%
1	175 G0	AV	140 and Central Ave, organic Covington	22-May	3-Oct	134	12"	47054	736	213	228	1176	41.4	62%	6.4%
	175 G1							36718	406	115	397	918	32.3	45%	10.0%
						t-test 0.05		*0.06*	*	**	*	*0.06*		*	*
2	175 G0	JT	Dwight and Peach, SW corner	14-May	29-Oct	168	12"	82852	892	124	1055	2071	72.9	43%	0.2%
3	175 G0	MA	Westside and Washington	29-May	31-Oct	155	10"	56612	534	227	654	1415	49.8	41%	0.5%
4	175 G0	BW1	Sunset and Central, SE field	29-May	19-Nov	174	12"	59189	369	79	1032	1480	52.1	25%	5.4%
5	175 G0	BW2	Robin and Rose, SW corner, organic field	20-May	17-Oct	150	12"	47545	265	258	666	1189	41.8	22%	0.0%
6	175 G0	DS	SW corner of Westside and Lincoln	14-May	2-Oct	141	12"	74883	675	277	919	1872	65.9	36%	0.1%
	175 G1		Red Yam Trial					61147	333	199	997	1529	53.8	22%	0.5%
						t-test 0.05		*	*	*	ns	*	*	*	---
7	175 G0	QH	Hwy 140 and Sultana, NE corner	24-May	5-Oct	134	10"	26893	457	180	35	672	23.7	68%	3.6%
	175 G1		NSPCG Variety Trial					19958	294	136	69	499	17.6	59%	12.2%
		t-test 0.05						*	*	ns	ns	*	*	ns	*
AVG	**175 G0**		**Average across locations**			**151**		56432	**587**	**203**	**560**	**1351**	47.6	**47.2%**	**2.8%**
	175 G1							39275	**349**	**147**	**481**	**977**	34.4	**42.2%**	**7.7%**
						t-test 0.05		*	**	*	ns	*	*	ns	**

TMY Total marketable yield is the sum of #1's, mediums, and jumbo 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.

**, * Significant at p = 0.01 and 0.05 respectively. Ns = not significant.

Table 3. Yield summary for LSU52 trial locations, Merced County 2012.

Site #	Seed	Location	TMY lbs/A	40 lb box/A No. 1's	40 lb box/A Meds	40 lb box/A Jumbos	TMY lb box/A	Market bins/A	No. 1's #1%	Culls cull%
1	LSU52 G6	AV	23415.1	330.3	110.6	144.4	585.4	20.6	56.4%	30.9%
2	LSU52 G6	BW2	42747.1	347.1	295.5	426.1	1068.7	37.6	33.1%	11.7%
3	LSU G6	NSPCG	10720.8	159.3	79.5	29.3	268.0	9.4	59.7%	15.4%
4	LSU52 G0	DS	48837.5	544.1	276.3	400.6	1220.9	43.0	46.4%	0.1%
	LSU52 G6		43346.2	532.1	429.3	122.3	1083.7	38.1	49.4%	0.0%
	t-test		ns	ns	*	ns	ns	ns	ns	---

TMY — Total marketable yield is the sum of #1's, mediums, and jumbo 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.
***, * Significant at p = 0.01 and 0.05 respectively. Ns = not significant.*

Figure 2. Upper left: 175 interior flesh color is deep orange throughout; above: foliage is lacy with a hint of silver; left: Red Yam Trial entries, Diane in the front tote, 175 top left.

Table 4. L-04-175 yield summary (2007 - 11) from plots in the ALT, Collaborators Trial, or Red Yam Trial.

			-------	40 lb box/A	-------			%	%
	SELECTION	CLASS	US #1'S	CANNERS	JUMBOS	MKT YIELD	BINS/A	US #1'S	CULLS
2011									
	148	red	577.7	593.0	170.9	1341.6	47.2	42.8%	3.8%
	L07-106	red	692.5	132.4	771.3	1596.2	56.2	43.4%	0.9%
	L07-190	red	846.2	459.3	703.7	2009.2	70.7	42.2%	0.0%
	L08-117	red	813.1	523.4	101.3	1437.8	50.6	55.8%	1.6%
	175 G0	red	903.1	482.4	1001.7	2387.2	84.0	38.3%	0.0%
	Diane	red	1105.2	484.9	395.9	1986.0	69.9	55.8%	0.3%
	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.								
	**, * Significanly different at p = 0.01 and 0.05 respectively								
	B14 G2		402.2	230.4	703.7	1336.2	47.0	29.7%	9.2%
	175 G0		890.0	428.8	674.3	1993.1	70.2	44.5%	0.7%
	LSD 0.05		143.7	93.9	160.9	247.2	10.9	9.2	11.5
		D&S Farms							
	Diane		180.6	391.3	119.1	691.0	24.3	25.2%	7.6%
	175 G0		492.4	244.3	175.6	912.3	32.1	53.4%	0.0%
	LSD 0.05		70.5	83.1	81.4	138.6	6.1	9.8	10.5
		Collaborators Trial							
2010									
	No testing was conducted in this year while plants were meristemed.								
2009									
	L-04-175	red	568.2	123.2	505.4	1196.8	42.1	48.6	5.1
	L-04-148	red	523.2	290.3	362.1	1175.5	41.4	44.4	5.1
	173	red	576.7	235.5	255.2	1067.4	37.6	54.1	9.1
	Diane	red	494.9	181.4	479.1	1155.4	40.7	42.6	16.4
	LSD red yam		NS	123.1	NS	NS	NS	NS	7.2
2008									
	L-04-175 (Red)		349.6	118.2	469.5	937.3	33.0	37.7	2.5
	L-04-148 (Red)		472.6	295.4	147.3	915.3	32.2	52.0	18.1
	L-04-178 (Red)		335.3	198.8	314.5	848.5	29.9	39.0	28.0
	Diane (Red)		422.1	260.2	361.2	1043.5	36.7	40.6	13.3
	LSD red yam		ns	62.0	134.0	ns	ns	ns	8.3
2007									
*	L-04-175	red	392.8	143.7	374.6	911.0	32.1	43.1	1.0
*	L-04-148	red	546.2	89.1	160.0	795.4	28.0	68.7	0.0
*	L-04-178	red	398.8	124.6	265.0	788.4	27.8	50.6	4.5
	* not replicated								

Table 5. L-04-175 red-skin sweetpotato multi-site evaluation 2009

Scott Stoddard, UCCE Merced and Madera Counties

Cooperator	location	plant date	harvest date	growing days	rows	ft	TMY lbs/A	40 lb box/A No. 1's	Meds	Jumbos	TMY box/A	Market bins/A	No. 1's #1%	Culls cull%	Comments
A.V. Thomas	Rosa & 3rd Aves, in Stevinson	29-May	30-Oct	154	2	50	38,589	434.6	77.2	452.9	964.7	34.0	45.1	12.8	Veins, cuts, bally. Good color
Classic Yam	by shed, off Longview	29-May	30-Oct	154	1	100	36,222	357.8	162.9	384.9	905.5	31.9	39.5	9.7	Good shape. Cuts only
Jason Tucker	Weir and 140	30-May	30-Oct	153	1	135	51,898	606.6	256.3	434.6	1297.4	45.7	46.8	10.7	Cuts and rot. Color dull
Weimer Farms	lower Livingston field	29-May	30-Oct	154	1	100	37,517	424.5	140.3	373.1	937.9	33.0	45.3	8.8	Cuts, slightly rough, good color
Ben Alvernaz	Sunset and Howard	30-May	2-Nov	156	2	37.5	50,555	492.1	234.2	547.7	1273.9	44.8	38.6	6.3	Cuts, rot. Nice shape, color dull
Dave Souza	Atwater Jordan & Arena	29-May	20-Oct	144	2	100	43,105	710.9	131.8	235.0	1077.6	37.9	66.0	3.3	Cuts, shape. Good color.
Blaine Yagi	NSPCG trial, Bear Creek Ranch	28-May	28-Oct	153	2	109	55,439	568.2	128.2	505.4	1196.8	54.4	47.5	4.2	Cuts; good color
AVERAGE							**44,773**	**513.5**	**160.8**	**419.1**	**1093.4**	**40.2**	**45.9**	**8.0**	
Comparison lines:															
Dave Souza	D&S Red				1	190	47,609	419.1	225.3	547.0	1191.4	41.9	35%	5.4%	teardrop shape; bally
	L-04-148				1	177	38,872	611.9	261.3	99.6	972.8	34.2	68%	2.6%	
Blaine Yagi	Diane				2	103	45,129	434.6	77.2	452.9	964.7	34.0	45%	12.8%	long
	L-04-148				2	100	48,031	434.6	77.2	452.9	964.7	34.0	45%	12.8%	

Most locations 1 or 2 rows on 12" spacing. Total 100 plants.

Only Dave Souza and Blaine Yagi had other reds for comparison.

In general, 175 exhibited some negative characteristics in 3 locations (balliness, veins, rotting, and dull color) not seen in previous years.

Good interior flesh color in all locations. Good yields, but tendency to jumbo.

Additional testing needed with G0 plants. Disease and RKN, fry test evaluations needed.

Feb 16, 2010. Extensive rotting in two locations. Color fade.

Feb 17. Good baked color, skin and flesh, moist and smooth but not sweet. Similar to Beauregard.

Table 6. Yield summary for L-04-175 red yam, Merced County all locations 2007 - 2012.

Site #	Selection	40 lb box/A No. 1's	Meds	Jumbos	TMY box/A	Market bins/A	No. 1's #1%	Culls cull%	n
	L-04-175 old	490.5	151.1	428.3	1069.9	38.9	45.8%	6.4	10
	L-04 -175 G1	349.0	147.0	481.0	977.0	34.4	42.2%	7.7%	13
	L-04-175 G0	608.9	225.8	567.1	1402.7	49.4	47.0%	2.5%	24
	Diane (mix G) Standard	491.7	363.7	381.8	1237.3	43.6	35.6%	6.0%	9

Table 7. ANOVA for L:D ratio by location

175 G0	Red yam trial	2.93	A
175 G0	MA	2.85	A
175 G0	JT	2.43	B
175 G1	Red yam trial	2.22	B
175 G1	ALT	2.21	B

LSD = 0.305

ratio significantly different between G0 and G1

Table 8. Length (inches) and diameter (inches) ratios of sweetpotato roots for selected varieties, Merced County 2012.

	Covington		Bx		Bx		LSU152		Diane		Diane	
	L	D	L	D	L	D	L	D	L	D	L	D
Average	6.82	2.51	6.31	2.65	6.71	2.56	6.74	2.98	8.64	2.46	8.80	2.43
n	40	40	35	35	30	30	32	32	32	32	29	29
min	4	1.97	3.75	1.97	4.75	1.84	4.25	2.28	6	2.05	6.25	2.01
maximum	9	3.27	9	5.58	9.5	3.24	9.5	3.83	14.5	3.16	12.25	2.99
L:D Ratio	**2.72**		**2.38**		**2.62**		**2.27**		**3.52**		**3.61**	

Covington Plant Spacing Trial

Scott Stoddard, Farm Advisor
UCCE 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 SCRI Site 1, and was conducted with Aaron Silva in a commercial field located west of Atwater at the end of Orchard Park Rd. Sweetpotato variety "Covington" was planted at 9", 12", and 18" on May 10, 2012 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 (Figure 1).

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 September 7, 2012.

Results: Yields are shown in Table 1, and soil and nematode sampling results are shown in Tables 2 & 3. Spacing had a significant impact on the size distribution, but not total yield. Mediums declined and jumbos increased as plant spacing increased, as would be expected. Higher #1 yield occurred with the 9" spacing, and the differences between #1 yields were not significant, but #1% was significantly more with the 9" spacing treatment. Nematode counts were elevated for this location and may have been a factor in the overall yields.

Table 1. Covington sweetpotato plant spacing trial 2012.

SCRI site #1, end of Orchard Park, near Atwater H.S.

spacing		TMY	40 lb box/A				Market	No. 1's			Culls
treatment	plants/A	lbs/A	No. 1's	Meds	Jumbos	TMY	bins/A	#1%	Med %	Jumbo %	cull%
9 in	12296	30392	374.9	134.1	250.7	759.8	26.7	48.7%	17.6%	33.7%	3.2%
12 in	10256	26659	292.2	114.6	259.7	666.5	23.5	44.1%	17.1%	38.7%	2.7%
18 in	6541	29200	266.8	72.7	390.4	730.0	25.7	36.6%	10.0%	53.4%	2.4%
LSD 0.05	---	ns	ns	44.8	95.7	ns	ns	4.5	4.6	4.9	ns
CV, %		21	27.1	24.2	18.4	21	21	6.1	17.6	6.8	85

Variety: Covington, organic
Plant date: 5/10/12
Harvest: 9/7/12
days: 120

TMY = total marketable yield, #1's + Med + Jumbo
Market bins assume 22 boxes/bin
LSD = Least Significant Difference at the 95% confidence level.

Table 2. SCRI #1 location soil sample results

smple date:		8/21/12	
depth:		12"	
Mehlich 3 extraction:			
pH (1:1 water)		7.19	HIGH
Phosphorus	ppm	95.5	
Potassium	ppm	38.7	LOW
Calcium	ppm	598	
Magnesium	ppm	99	MED
Sodium	ppm	22	LOW
Sulfur	ppm	3.74	
Copper	ppm	2.62	HIGH
Zinc	ppm	7.43	HIGH
OM	%	0.54	LOW
Boron	ppm	0.34	OK
Al	ppm		
Soil	Texture:	sandy loam	

Table 3. Nematode results (Antoon Ploeg lab, UCR)

LABEL	DESCRIPTION	SAMPLE DATE	dilution	ROOT-KNOT COUNT	SAPROPHYTIC COUNT	TOTAL ROOT-KNOT PER 100 G SOIL	TOTAL SAPROPHYTIC PER 100 G SOIL
4	SCRI NSPCG, 0-12", NEMATODES	8/22/16	15	27	7	405	105
4	SCRI NSPCG, 0-12", NEMATODES	8/22/16	15	61	11	915	165
4	SCRI NSPCG, 0-12", NEMATODES	8/22/16	15	58	nd	870	---
					AVERAGE:	**660**	**135**

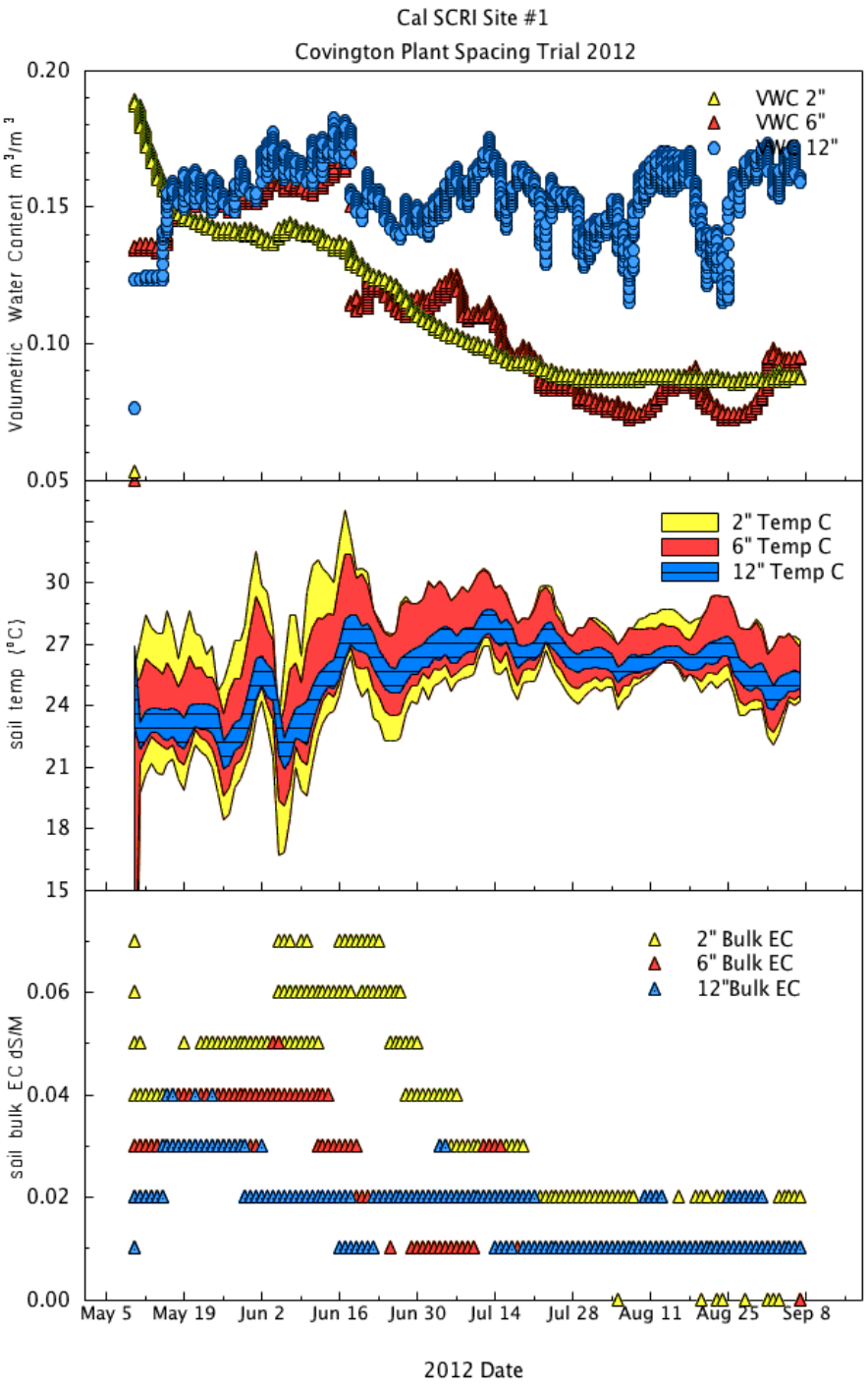


Figure 1. Soil volumetric water content and temperature at 2, 6, and 12 inches at the SCRI #1 location, near Atwater.

Sweetpotato Scurf Fungicide Trial 2012

Scott Stoddard, Farm Advisor
UCCE Merced County

Objective: evaluate control Scurf on Covington sweetpotatoes by various treatments, including cutting vs pulling of plants, root and plant dips, and different fungicides. Evaluate whether roots infected with "Leopard Scurf" symptoms can be transferred to new plants.

Background:
In 2009, the new sweetpotato cultivar "Covington" became the most widely grown yam type sweetpotato in California, displacing Beauregard. While Covington has many positive attributes such as improved nematode resistance and #1 packout, it also appears to be very susceptible to the Scurf fungus, *Monilchaetes infuscans*. Whether this susceptibility is a result of genetics, plant bed growth characteristics, or seed source has not been determined. Certainly its habit of growing short, which results in more pulling rather than cutting of plants, contributes to the problems that have been observed in the industry.

Additionally, in 2010 it was noted by many growers that sometimes the Scurf on Covington had a different appearance than typical, being lighter and occurring more in bands running the length of the root (Figure 1). This appearance is so atypical that some have suggested it is not caused by the Scurf organism at all, but rather may be a result of Boron deficiency.

It has been known for decades that an effective cultural method to control Scurf in planting stock is to cut plants in the hotbed above the soil line. Unfortunately, Covington grows so slow and short that most growers pull plants. Therefore, this trial was conducted to see if fungicides could be used on roots or plants to control Scurf on pulled plants. A small subset of treatments also used plants from roots with "Leopard Scurf" symptoms to see if this could be transferred to new plants in the field.

Methods:
Covington sweetpotato roots infected with Scurf were bedded at the end of a commercial hotbed 12-Mar-2012. Prior to covering with soil, roots were treated with Serenade Soil (**QST 713 strain of dried *Bacillus subtilis)***, Botran, or Mertect (thiabendazole) fungicides at 6 fl oz, 8 fl oz, and 3.2 fl oz per 2 gallons of water, respectively. Roots were immersed in the fungicide solutions for one minute to ensure complete coverage (Figures 2 & 3). Untreated roots were immersed in water only. "Leopard Scurf" roots were surface sterilized by immersing into a 2% Clorox solution before bedding, but were otherwise untreated until plants were pulled. Plants were irrigated and fertilized normally until ready for transplanting.

Plants were pulled on June 4, 2012, and a subset again treated with fungicides at the same rates. For comparison, some plants were also cut above the soil line from each root treatment, but were not treated with additional fungicides at transplanting. A total of 16 different treatment combinations were evaluated (Table 1). Plants were transplanted using conventional mechanical transplanters into a commercial field on the same day. Plot size was 12 plants x one row, with 4 replications. Plant stand counts were made 30 days after transplanting.

Harvest and disease evaluation of the sweetpotato occurred on Nov 1, 2012. Plants were dug with a 2-row chain digger that placed the roots back on the ground (Fig 4). Approximately 25 roots from the center of each plot were then evaluated for Scurf on a 0 – 4 scale, where 0 = no visible Scurf, 1 =

<25%, 2 = 25 - 50%, 3 = 50 - 75%, and 4 = >75% coverage (Fig 5). These values were then averaged to obtain Scurf incidence and severity scores for each plot. Harvest weights were also taken from one plot of each treatment, but were not replicated.

Results:

Plant stand counts at 30 days after transplanting were made to determine if the fungicide treatments had a negative impact on stand establishment. A significant reduction in plant stand was noted where cut plants were used, but otherwise there was no difference between fungicide products (Table 1 and Figure 6). Plants from cuttings had 30% higher mortality than plants that were pulled.

At harvest, significant differences were observed between treatments for both the incidence and severity of Scurf. Regardless of treatment, Scurf transmission was very high in this test, between 45 – 95%. Cut plants had significantly less Scurf than pulled plants (Table 1), but there was no difference in the timing of fungicide treatment (roots or plants). Both Serenade and Mertect significantly reduced Scurf severity on the roots from cut plants, but had no effect with pulled plants (Figure 7). There was no significant effect from the fungicides on the incidence (%) of Scurf (Fig 8), though Mertect and Serenade had lower amounts similar to the severity scores.

Leopard Scurf is not abiotic, as we were able to successfully transfer and increase the amount of this kind of Scurf. Indeed, plots from "Leopard Scurf" roots had the highest levels of incidence and severity. All post harvest testing on the roots have shown the pathogen to be *Monilchaetes infuscans,* the same organism responsible for standard Scurf.

Results from this test indicate that the most effective way to limit the transfer of Scurf from the hotbeds is to cut, rather than pull, plants. However, this also reduced stand establishment. The use of fungicides only moderately reduced the presence and severity of Scurf in this test.

Acknowledgements:

Many thanks to Bob Weimer, Weimer Farms, Mike Davis, UC Davis, and Roy Whitson, AgraQuest Inc., for their help and cooperation with this test.

Figure 1. "Leopard Scurf" example, bottom, compared to another root with typical Scurf symptoms.

Figure 2. Sweetpotato roots were treated with fungicides prior to bedding.

Figure 3. Treated sweetpotatoes prior to covering in the hotbed.

Figure 4. Selected plants were again dipped at hotbed harvest in June before transplanting.

Figure 5. Scurf evaluation at harvest.

Figure 6. Scurf rating scale. Each root in the foreground represents ratings 0, 1, 2, 3, 4 left to right.

Table 1. Scurf fungicide control trial on sweetpotatoes, 2012.

Plot	Treatment name (1)	30-day plant stand	Harvest Scurf score (2)	Incidence %	TMY bins/A	% No. 1's
1	Serenade Soil root dip only	7.5	1.40	77.4	44.7	59.8
2	Serenade Soil plant dip only	9.5	1.30	85.1	35.5	58.5
3	Serenade Soil root and plant dip	10.5	1.20	86.0	64.1	48.7
4	Botran root dip only	9.0	1.53	88.1	52.7	44.0
5	Botran plant dip only	9.5	1.75	95.0	59.6	53.5
6	Botran root and plant dip	9.5	0.95	66.3	42.1	54.6
7	Mertect root dip only	10.3	1.65	83.4	59.7	61.9
8	Mertect plant dip only	11.0	1.48	86.0	41.4	48.6
9	Mertect root and plant dip	9.0	1.60	94.1	33.7	58.5
10	UTC: water root dip, pull plants	11.0	1.23	79.0	57.7	63.0
11	UTC: water root dip, cut plants	6.0	0.85	59.4	48.1	46.4
12	UTC: Leopard scurf, pull plants	11.3	2.50	97.1	41.2	42.3
13	Botran treated roots, cut plants	5.3	1.08	71.8	35.4	40.4
14	Mertect treated roots, cut plants	7.0	0.45	44.8	56.3	29.7
15	Serenade treated roots, cut plants	7.3	0.58	50.5	59.1	28.9
16	Roots with "Leopard" Scurf, surface sterilized with Chlorox, pulled,plants treated with Botran	10.3	1.60	93.3	72.8	34.3
	Average	9.0	1.32	78.6	50.3	48.3
	LSD 0.05	2.8	0.55	16	---	---
	CV, %	21.8	29.1	14.3	---	---
Factorial Analyses						
	cut	6.4	0.74	56.6		
	pulled	9.9	1.51	85.9		
	t-test	0.001	0.001	0.001		
	Pulled Plants:					
	root dip	9.3	1.54	85.5		
	plant dip	10.0	1.51	88.7		
	both	9.7	1.25	82.1		
	UTC	11.1	1.86	88.1		
	LSD 0.05	ns	ns	ns		
	Product LSD with cut plants (3):	ns	0.40	ns		
	Product LSD with pulled plants:	ns	ns	ns		

(1) all dipped 1 minute, all pulled plants except where noted
2 disease ratings made on 0 (nothing) to 4 (> 75%) scale.
(3) See figures for means.
LSD = Least significant difference at the 95% confidence level. NS = not significant.
CV = Coefficient of variation.

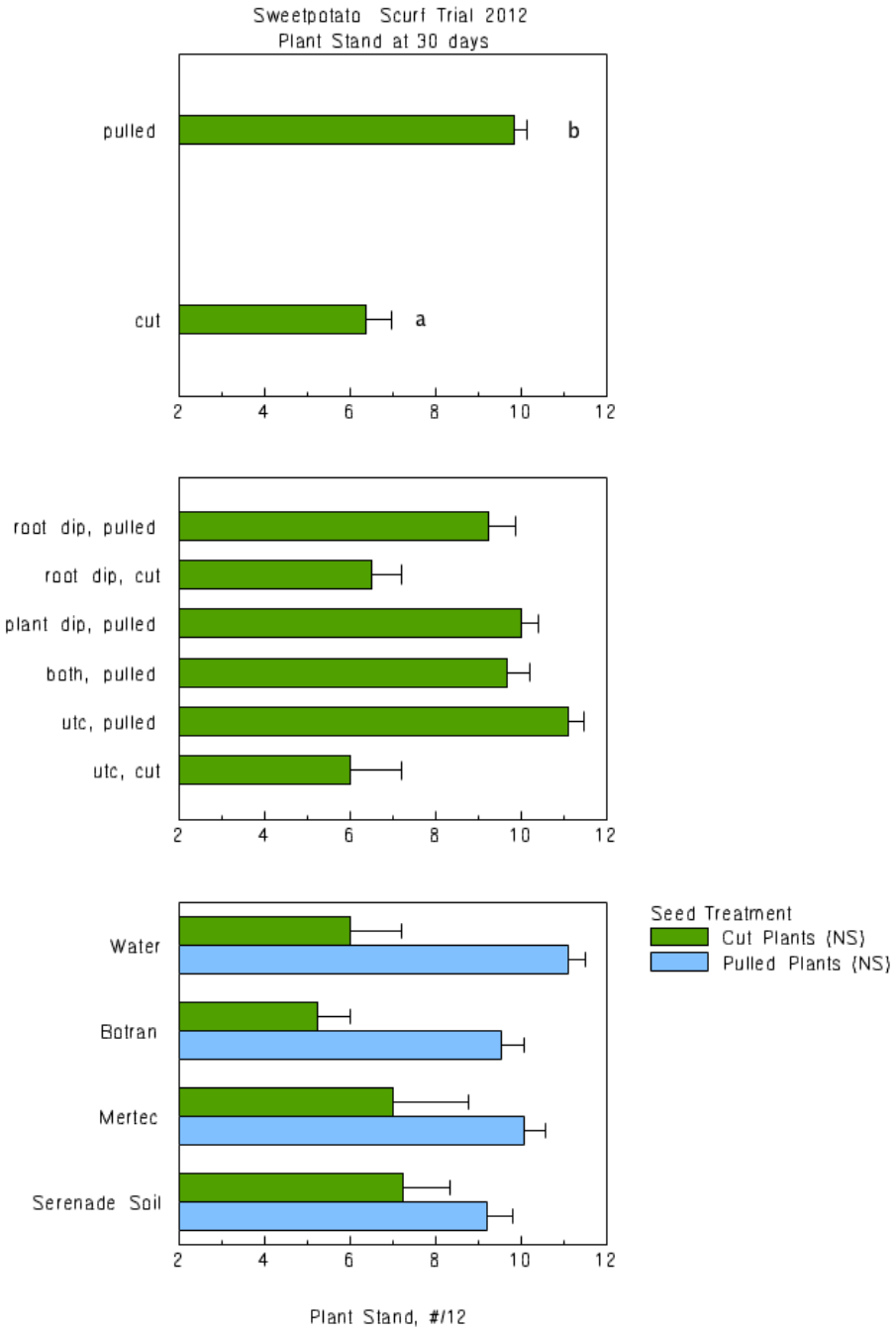


Figure 6. Plant stand at 30 days after transplanting. Data are the number of live plants from an initial 12-plant plot.

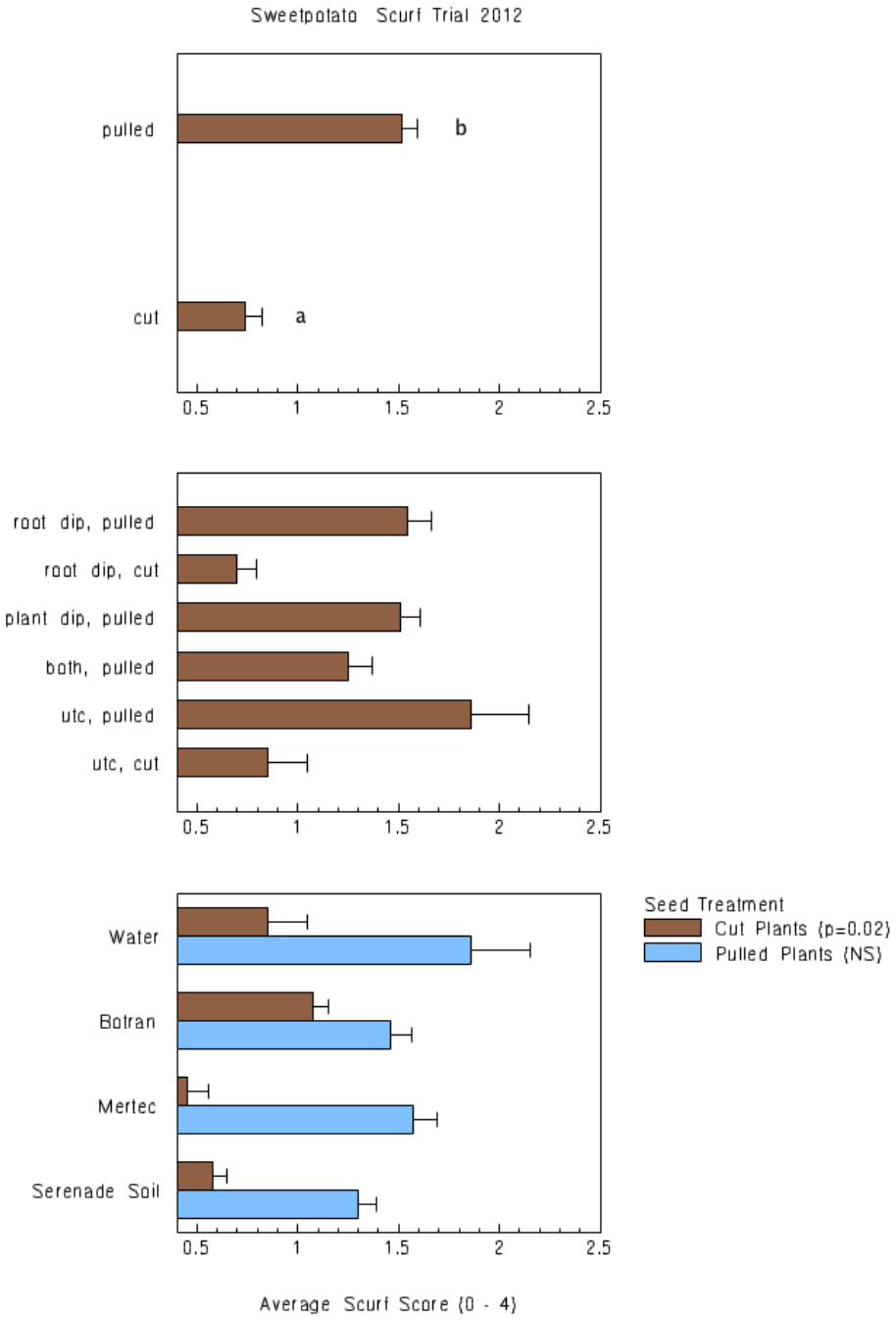


Figure 7. Sweetpotato roots were scored on the severity of Scurf using a 0 – 4 scale. Cutting plants, rather than pulling, significantly reduced Scurf, as did the fungicides Mertect and Serenade Soil on cut plants.

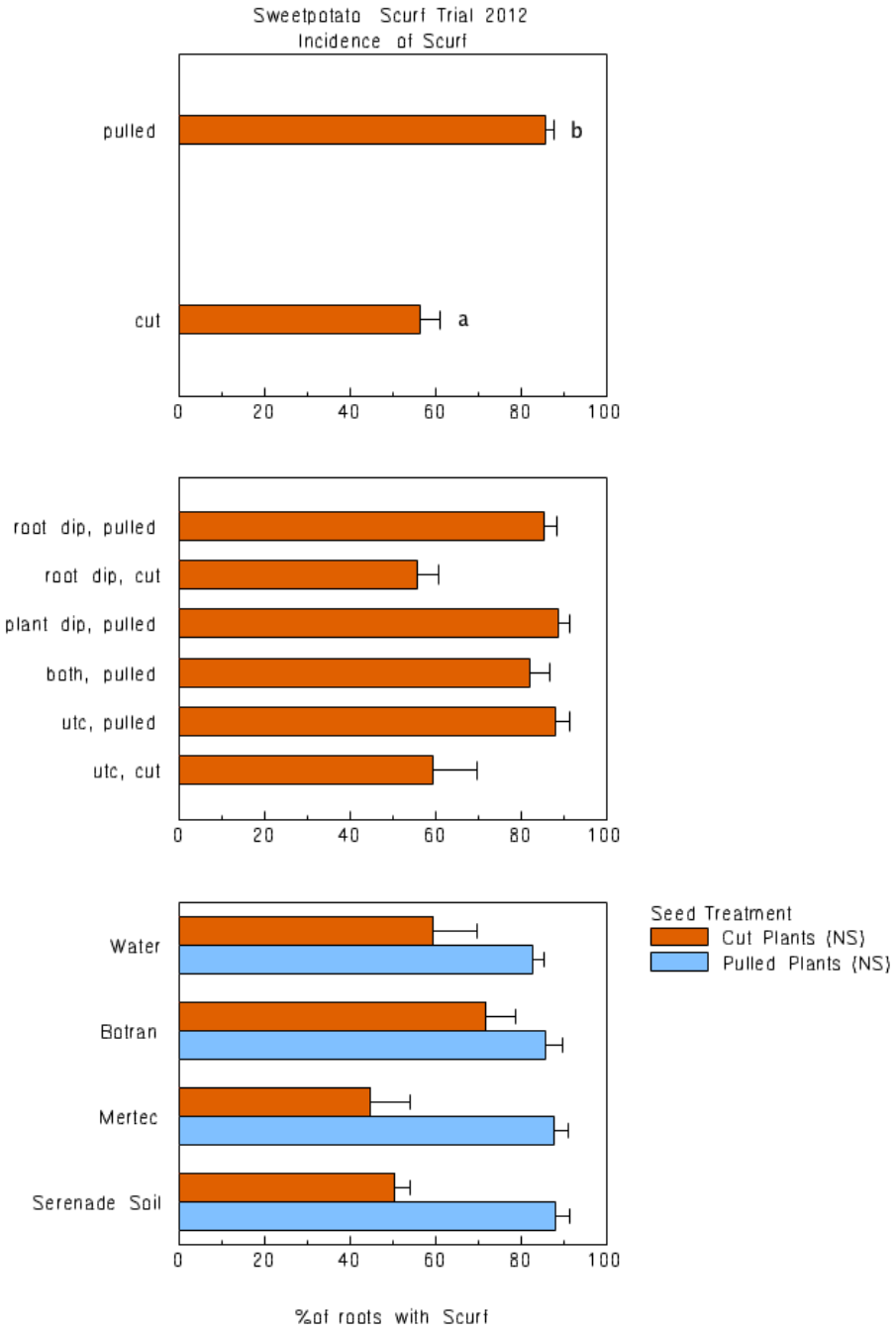


Figure 8. Percentage of sweetpotato roots with Scurf as affected by cutting and fungicide treatments.

Sweetpotato Field Fumigation Trial 2012

Scott Stoddard, Farm Advisor
UCCE Merced County

Objective: Evaluate different rates of C-35 and Telone + metam combinations on Diane sweetpotato production and quality.

Cooperators: Karl Kruppa and Paul Domecq, Tri-Cal.

Location: Northwest corner of Turner and Kilroy Rds, near Hilmar

Plot size: C35 plots 30 ft wide x 400 ft long — fumigated May 12
Telone + Metam plots 22 ft wide x 400 ft — fumigated May 23
UTC plots 22 ft wide x 100 ft long
Previous crop: wheat, green chopped, then ripped and disced
pre irrigated from flood on Monday, May 14
Transplant June 4. Diane 12"
Nematode sample
Harvest Nov 6 - 8, 2012. Harvested 150 ft from center bed (2 rows) of each plot

Treatments:

		Lbs 1,3-d	Lbs Pic	Lbs metam
1	UTC	0	0	0
2	C-35 10 gpa (65% 1,3-D and 35% chloropicrin)	71	39	0
3	C-35 12.5 gpa	89	49	0
4	C-35 15 gpa	107	58	0
5	10 gpa Telone + 30 gpa Metam	100	0	128
6	8 gpa Telone + 20 gpa Metam	80	0	85
7	8 gpa Telone + 30 gpa Metam	80	0	128
8	10 gpa Telone + 20 gpa Metam	100	0	85
9	12 gpa Telone	120	0	0

Background.
Telone (1,3-dichloropropene) is an important tool for the control of nematodes in sweetpotatoes, but because of California DPR imposed caps, its use is limited by Township to 92,250 lbs per year. A Township is a 6 mile by 6 miles area, equaling 23,040 acres. At a standard rate (for sweetpotatoes) of 12 gpa, about 1600 acres may be fumigated because sweetpotatoes have been given special exemption to exceed the cap to twice the limited rate, or 184,500 lbs per township. This is not nearly enough to adequately fumigate the sandy areas in Merced County, especially when trees and vines also rely on soil fumigants when replanted. One method that can be used to stretch the amount of acres that can be treated with Telone is to lower the rate. There are limitations to this approach. Previous trials have shown that Telone has limited efficacy below 9 gpa (see Sweetpotato Research Progress Report 2009). However, rates as low as 6 gpa were effective when combined with metam potassium at 35 and 50 gpa.

The objective of this trial was to evaluate low rates of Telone +chloropicrin and Telone + metam combinations on weeds, nematodes, and yield of Diane sweetpotatoes.

Methods. Tri-Cal made all fumigation applications for this test using two different application rigs. As a result of excessive trash in the field, the Telone + metam applications were delayed 11 days so the field could be disked more to better incorporate the wheat cover crop. Initial Telone rates (6 gpa) were too low for the equipment to apply uniformly, and even with 8 gpa were difficult to obtain. Telone C-35 was

injected at 18" on 18" centers, followed by a ring roller to seal the soil (Figure 1). Plots were 30 feet wide and 400 ft long. The Telone + metam treatment was applied simultaneously, where the Telone was injected to 18" on 18" centers, followed by metam sprayed to the soil surface and power incorporated with a rotary mulcher to 4" and sealed with a press-roll (Figure 2). Plots were about 15 feet wide (one pass). This same equipment was used previously in my hotbed fumigation trials and had excellent weed and nematode control. Sweetpotato cultivar "Diane" was transplanted to preformed 80" beds on June 4 and grown using standard techniques. Weeds were controlled with cultivation and hand hoeing. Post-treatment nematode samples were taken in June and again before harvest in October by taking soil cores 0-12" at 15 random locations within each plot. Harvest was done using a standard 1-row digger and using the grower's crew to weigh marketable #1, medium, and jumbo size roots from 150 feet of the center bed of each plot.

Results

Problems at the time of application of the fumigants resulted in smaller plots (only 1 pass) and a lack of fumigant uniformity in the field for the Telone + metam treatments. The main problem was lack of uniform application at reduced rates (there were no application issues with C-35). Furthermore, no weed evaluations were made, as hoeing crews went through the plots before an evaluation. Pigweed strips through the field before this did indicate that the metam plots suppressed weeds where it was applied.

Yield and nematode results are shown in Table 1. All of the treatments significantly increased yield as compared to the untreated control. Furthermore, the untreated control had the highest amount of culls. Best overall treatment was observed with 8 gpa Telone + 30 gpa metam at 25.4 bins per acre (at 88% packout), but there was little yield difference between any of the other treatments. Overall yields in this field were low, which suggests other factors were impacting these results. There was no difference in root knot nematodes (RKN) counts between any of the treatments at the fall sampling, though values would be considered elevated and indicate this field needs to be fumigated again for 2013. No RKN were detected in the plots from the June sampling event.

The results of this test show that fumigation improves yield and quality of sweetpotatoes, but does not clearly indicate a superior rate or combination. Telone and metam combinations appear promising, but weed control from the addition of metam would be necessary to offset the cost of this treatment and make it an economically viable alternative.

Table 1. Diane sweetpotato yield and nematode counts as affected by fumigation treatment, Hilmar area, 2012.

	Treatment	TMY lbs/A	40 lb box/A No. 1's	Meds	Jumbos	TMY lb box/A	Market bins/A	No. 1's #1%	Culls cull%	Oct RKN J2s/100g
7	8 gpa Telone + 30 gpa Metam	28829.5	301.7	206.6	212.4	720.7	25.4	42.1%	6.6%	607
8	10 gpa Telone + 20 gpa Metam	23882.2	243.8	186.2	167.1	597.1	21.0	40.4%	9.5%	390
4	C-35 15 gpa	23407.3	242.6	160.2	182.4	585.2	20.6	40.3%	9.7%	177
5	10 gpa Telone + 30 gpa Metam	22161.8	234.9	161.4	157.8	554.0	19.5	42.4%	8.1%	635
3	C-35 12.5 gpa	21371.2	224.3	154.0	156.0	534.3	18.8	41.2%	10.3%	210
2	C-35 10 gpa	21016.9	225.0	149.5	150.8	525.4	18.5	42.8%	11.9%	690
6	8 gpa Telone + 20 gpa Metam	19501.7	231.0	151.5	105.1	487.5	17.2	47.2%	11.4%	1,012
9	12 gpa Telone	18464.2	190.0	150.3	121.3	461.6	16.2	40.7%	12.4%	475
1	UTC	13798.7	123.5	126.2	95.2	345.0	12.1	35.6%	18.2%	270
	Average	21090.0	220.7	159.6	146.9	527.2	18.6	41.4	11.0	493.6
	LSD 0.05	4872.0	65.6	32.3	68.4	121.5	4.3	ns	4.7	ns
	CV, %	23.1	29.8	20.3	46.6	23.1	23.0	17.0	42.7	156.0

LSD 0.05 = Least significant difference at the 95% confidence level. Means within a column separated by less than this amount are not significantly different.

ns, · Not significant, or insufficient data for statistical analysis.

CV = coeffecient of variation.

TMY = total marketable yield, #1's + Med + Jumbo

RKN = number of root knot nematode per 100 g of soil sampled in October.

Figure 1. Telone C-35 was injected 18" deep with shanks spaced 18" on the toolbar.

Figure 2. Telone + metam treatments were done with TriCal's "rotovate and roll" applicator simultaneously in one pass.

Sweetpotato Irrigation Trial 2012

Scott Stoddard, UCCE Merced Co

Cooperator:	Bob Weimer
Location:	NW corner of Sultana and Longview Rds
Variety:	Covington
Transplanted:	1-Jun-12
Harvest:	5-Nov-12 growing days: 159
Fertilizer:	5 injections, weekly, starting July 24. Total 150 lbs N/acre from CN17
Treatments:	begin 7/5/2012 end: 10/11/2012
	1 40%
	2 60%
	3 80%
	4 100%
	5 120%
	6 100% field cover Kc, extended irrigation
	7 Grower (water volume not measured)

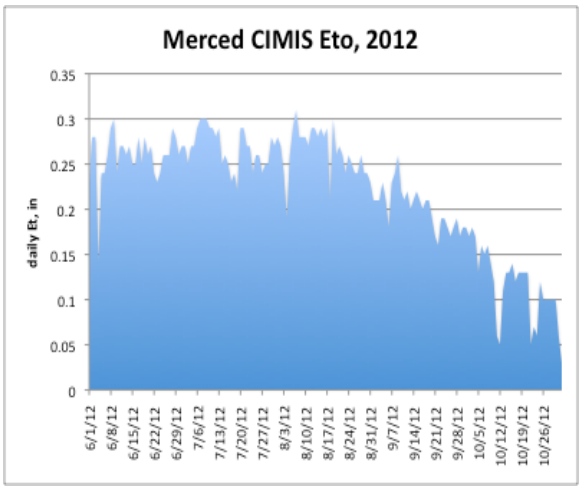
All treatments full irrigation for the first month, then % of Et x Kc.
irrigation treatments begin July 5.
Et from the Merced CIMIS station.
Kc values begin at 0.4, increase to 1.15, then down to 0.65.
Plots 1 bed (2 rows) by 75 or 125 ft, 4 reps
Watermark sensors at 12" in rep 1, at 24" in rep 3
Decagon sensors in plot #304 at 2, 6, 12, and 24" depth.
Drip Tape: John Deere Ro-Drip

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 and measure impacts on soil moisture. 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. This year, treatment 7 used Kc values based on crop cover and 100% Et for an extended duration of two weeks longer than the other treatments.

Since Kc values for sweetpotatoes are not determined for California growing conditions, a generic crop coefficient curve was utilized for treatments 1 - 6, beginning at 0.4, peaking at 1.15, and then declining to 0.65 for the last month of the growing season (Figure 1).



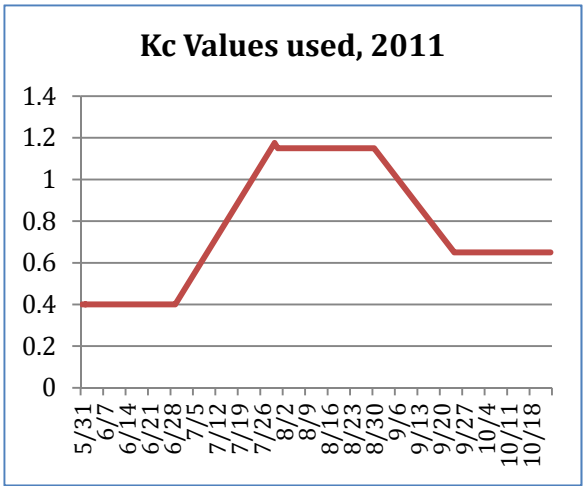


Figure 1. Kc values followed a general curve shown above, and were multiplied by the reference evapotranspiration (ETo, left) to calculate the amount of water to apply each week.

After transplanting, the drip lines were installed one week later and grower irrigated for the first week. On June 18 the plot area was attached to the treatment manifold and all treatments were irrigated for 3 hours each day until July 5 to establish the root system. After July, irrigation amounts were controlled through the use of battery operated timers attached to a 6-port irrigation manifold (Figure 2). 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. For this trial, calculated application times were extended by 15% to account for system inefficiency and leaching.

Decagon temperature and moisture sensors were installed in one area of the plot (not replicated) under treatment #4 (100% Et) at depths of 2, 6, 12, and 24 inches. Watermark soil moisture monitors were also installed under each treatment in reps 1 and 3 at 12" and 24" depth. Results are shown in Figures 3, 5, and 6. With the Decagon sensors, soil moisture in 2012 was about 0.18 (or 18%) in July for all depths, then segregated for the rest of the season. Overall, it ranged from 0.10 – 0.18 m^3/m^3 during most of this trial. The Watermark sensors paint a different story, suggesting severe water depletion at the 12" depth, for all but the 120% treatment for much of the season, but much less stressful conditions at 24". There was some correlation between the two sensors, but only at the 12" depth and only from 0 – 25 centibars. For the sandy soil at this location, plant available water ranges between 0.11 – 0.18 m^3/m^3 when measured volumetrically, or 0 – 25 centibars when measuring soil water tension. Better results could have been obtained with replication and improved placement. Sensors were placed in the plant row; better would have been about ½ the distance between the plant row and the drip tape.

Weekly water application amounts are shown in Figure 4, and the total water applied in Figure 5. Application rates ranged from 14.3 to almost 40 acre-inches. The early June spike in water application occurred as a result of over-estimating the watering needs of the crop until CIMIS water data could be obtained. Late season water in treatment 5 (120%) was excessive, indicating a leak had developed. While the timing of application was different, the total applied water for both 100% treatments was very similar, 29.5 and 29.0 acre-inches respectively.

Yield results are shown in Table 1. In general, the more water that was applied, up to 120% 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-sixth (109 boxes) that of the 120% water application (598 boxes). The extended irrigation treatment resulted in a root yield similar to that of the 80% treatment even though it received 7" more water, mostly at the end of the season. These results are very similar to 2010 and 2011, and indicate that sweetpotatoes require about 2.5 acre-ft of water (30 inches) for maximum production.

Table 1. Sweetpotato Irrigation Trial 2012 yield results.
SCRI site #3 (Sultana and Longview)

	Treatment	applied A-in	TMY lbs/A	40 lb box/A No. 1's	Medium	Jumbo	TMY lb box/A	Market bins/A	No. 1's #1%	Culls cull%
1	40%	14.27	25378.2	310.3	215.4	108.7	634.5	22.3	49.0%	5.2%
2	60%	19.00	38024.3	502.1	234.1	214.4	950.6	33.5	53.0%	5.2%
3	80%	22.76	44946.6	539.2	227.5	356.9	1123.7	39.6	48.0%	3.5%
4	100%	29.51	49377.9	572.6	210.9	450.9	1234.4	43.5	46.8%	5.5%
5	120%	39.66	58938.0	671.6	204.0	597.9	1473.5	51.9	45.6%	3.8%
6	100% field Kc*	29.05	47941.0	552.7	183.6	462.1	1198.5	42.2	46.0%	4.8%
7	Grower**	---	61332.2	560.7	204.1	768.5	1533.3	54.0	36.6%	3.7%
	Average	25.71	46562.6	529.9	211.4	422.8	1164.1	41.0	46.4%	4.5%
	LSD 0.05		4984	125	ns	177.1	125	4.4	ns	ns
	CV%		7.2	15.9	19.7	28.2	7.2	7.2	13.8	41.2

* field cover Kc, extened irrigation

** 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

Figure 2. Irrigation control manifold.

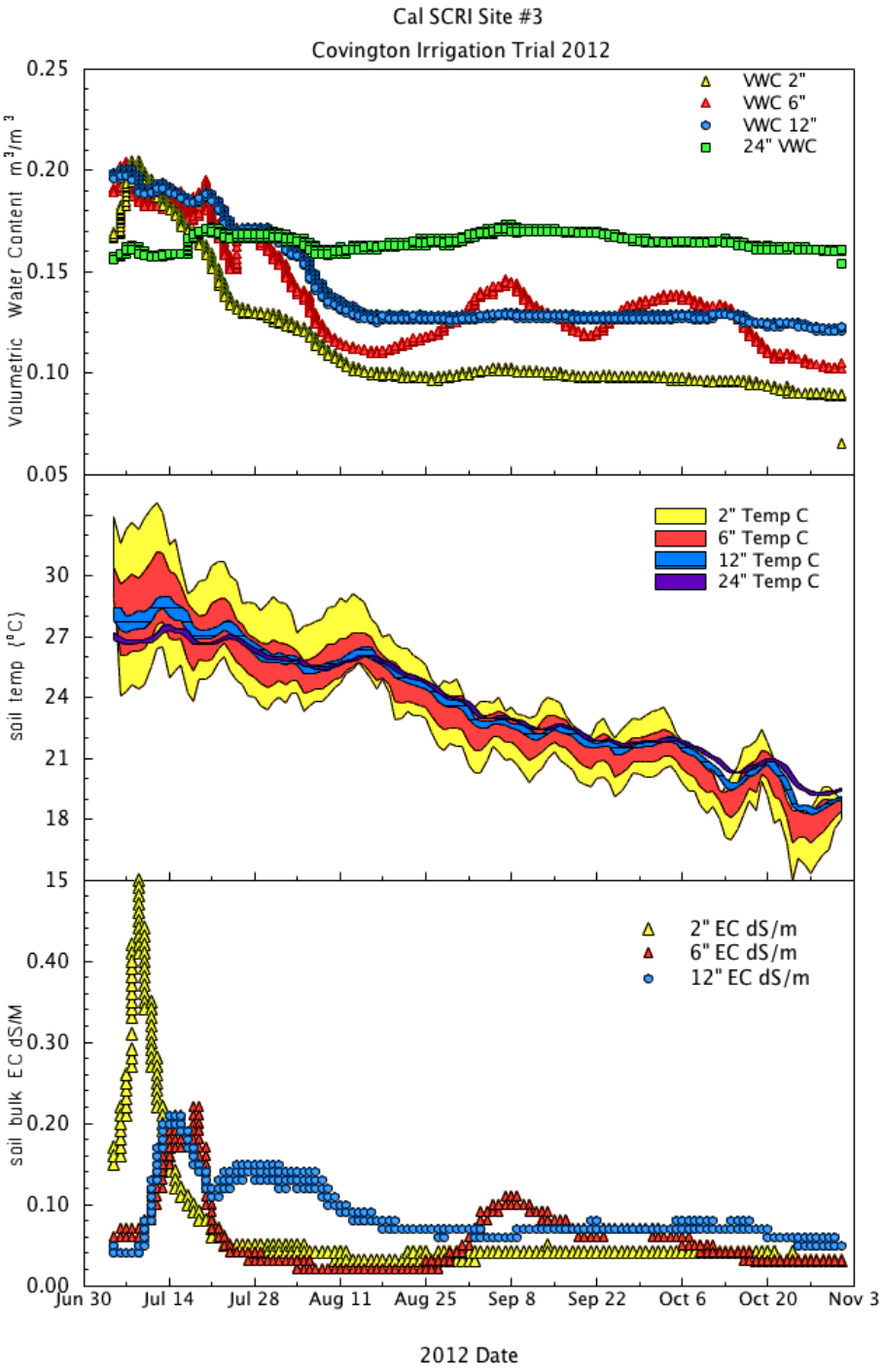


Figure 3. Soil moisture (top), temperature (middle), and soil bulk E.C. (bottom). Bulk E.C. is not the same as soil solution EC.

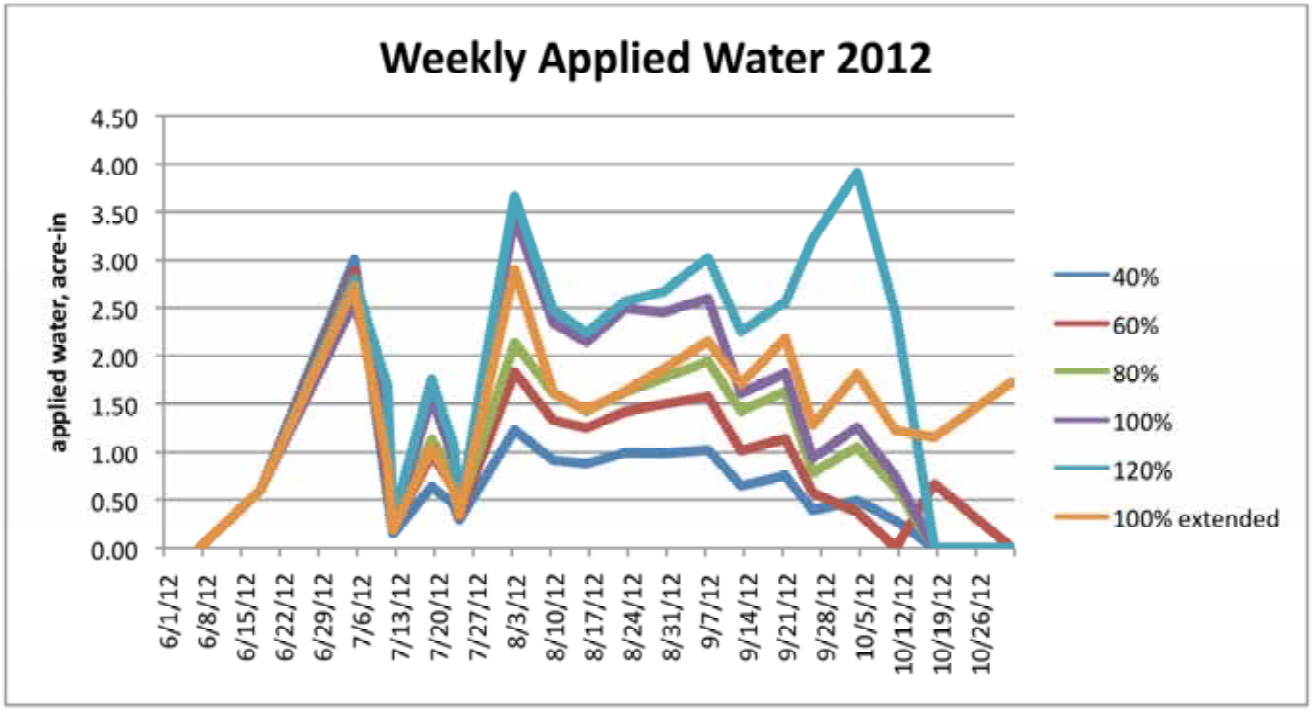


Figure 4. 2012 weekly irrigation water applied after starting irrigation deficit treatments.

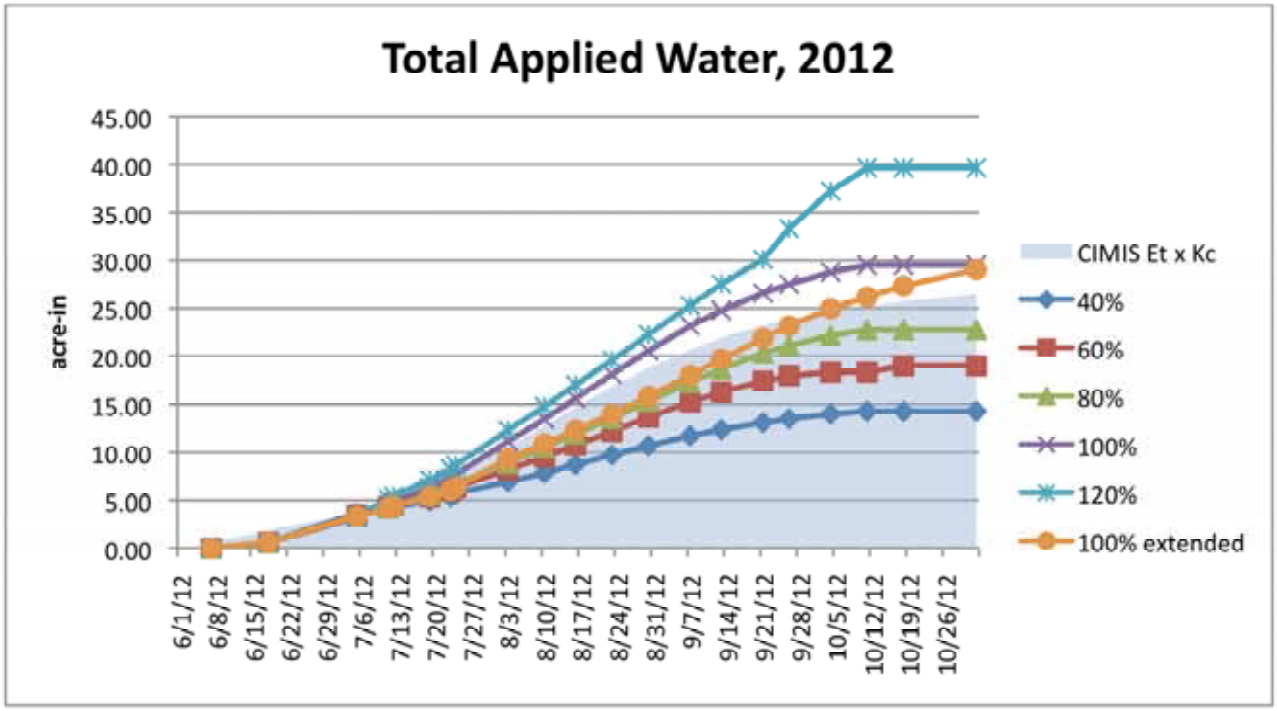


Figure 5. Total water application for the 2012 season for each of the irrigation treatments.

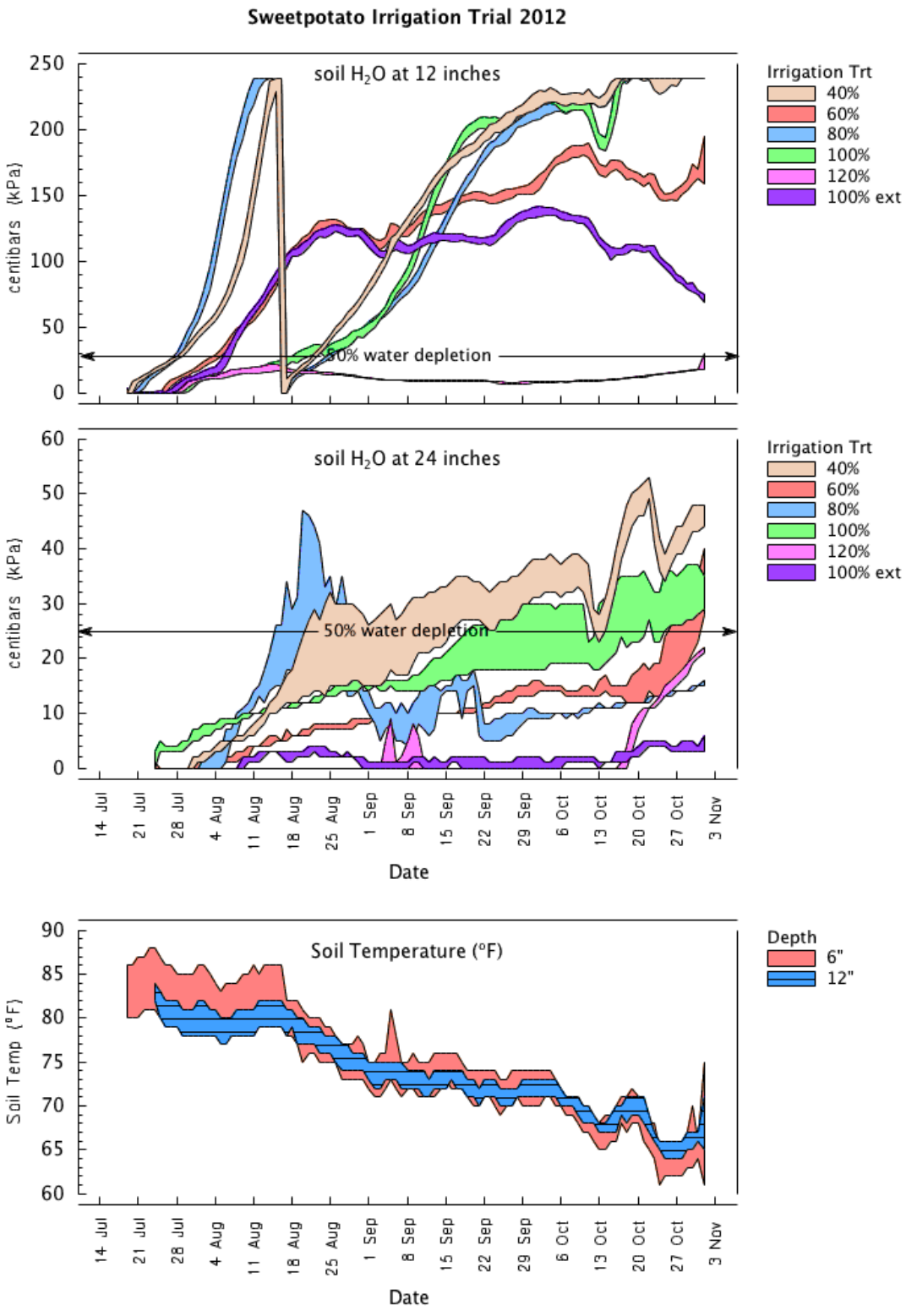


Figure 6. Soil water tension as measured using Watermark sensors for each treatment at 12" (top) and 24" (center). Soil temperature (F) at 6 & 12 inches is shown on the bottom graph.

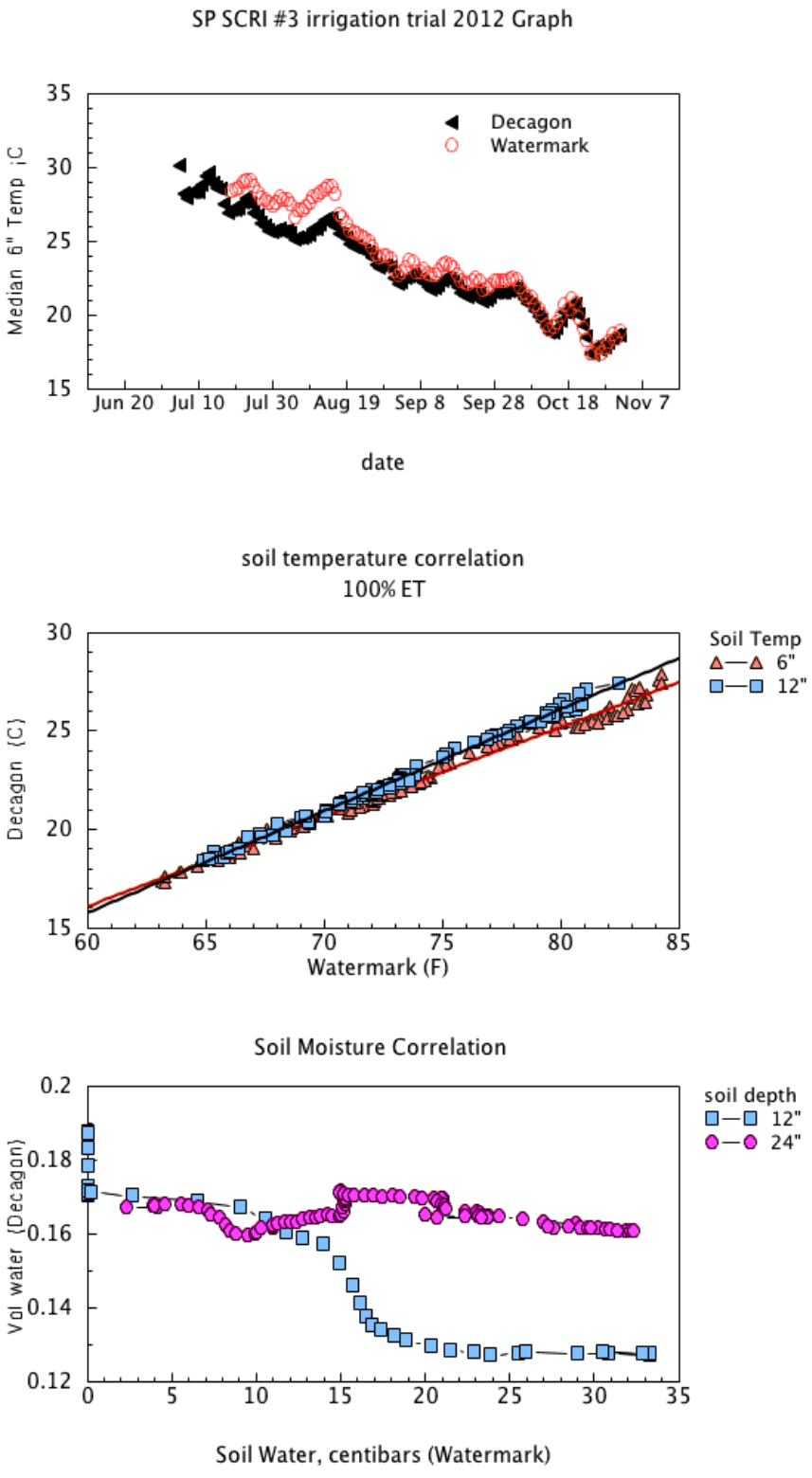


Figure 7. Soil temperature was very similar for both the Watermark and Decagon sensors (Top and middle), however, only the soil moisture at 12" showed any correlation, and only between 0 – 25 centibars).

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