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University of California
Agriculture and Natural Resources
Making a Difference for California

SWEETPOTATO TIPS

UCCE

Merced & Madera Counties Vol. 1, Jan, 2024

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IN THIS ISSUE:

Special Note:

Heavy metal sampling 2021-2023 showed very good results, 96.5% below 10 ppb.

There will be a Metam stewardship class from 9:00 - 11:00 am on Feb 13, 2024 (class required by CAC for growers using metam products)

Scott Stoddard, farm advisor

58th Annual

SWEETPOTATO MEETING

Thursday, February 8, 2024
8:00 am - noon
UCCE Classroom
2145 Wardrobe Ave., Merced

7:30 am	Signing in, coffee, and Jantz Sweetpotato muffins. Sponsored by Telios Ag Solutions.
8:05	Sean Runyon, Merced County Agriculture Commissioner. 1,3 dichloropropene and neonicotinoid regulatory update for 2024.
8:45	Brian Hegland, Teleos Ag Solutions. New use and cap updates for Telone.
9:05	Break
9:15	Scott Stoddard, Farm Advisor. Research update 1: variety development and virus management using clean seed.
9:45	Daniel Geisseler, UCCE Specialist in Nutrient Management. Nitrogen Mineralization from Organic Fertilizers and Composts.
10:05	Break
10:15	Scott Stoddard. Research update 2: Nematicide trial results and cultivar resistance to various races of RKN.
10:45	Heather Martin, CDFA State Nematologist. Guava RKN survey results. via Zoom.
11:05	Break
11:15	Jill Silverman Hough, Silverman I Hough, and Marilyn Freeman, Farmers Communication Exchange. Sweetpotato Council of California marketing plan update and first year CDFA grant summary.
11:45	Questions and surveys
12:00	Lunch. Sponsored by Simplot in Ballico.
1:30 pm	The Sweetpotato Council of California BOD meeting.

PRODUCTION NOTES

The winter of 2022-23 was one of the wettest on record for the Merced area. Based on the local CIMIS station, our rainfall was 24.68", the most in 50 years. Based on NWS measurements, it was 21.04", less than 1997 - 98 and 1982-83. Regardless, it was a top 3 year for rainfall based on records that go back to 1889.

While the sandy soils in Atwater and Livingston had no problem soaking up all the rain, it did delay plant bed production. Many fields were planted 2 to 3 weeks later than planned. However, all the moisture resulted in near ideal conditions for spring fumigation, and it also helped with pushing salts out of the upper soil profile.

Even with delayed field plantings, 2023 turned out to be a banner production year for sweetpotatoes and many annual crops in our area. The reason: extremely mild weather in June, which limited transplant stress and stand loss. With reference to Joe Nichols, most days were sunny and 75 the entire month, with only one day over 100° F and two days over 95° F. The result was excellent root set and above average yields across all varieties. This can be seen in both the Collaborators Trial yields (Table 1) as well as the results from my yield survey, where average yield in 2023 was about 7 bins/A better than 2022 (Table 2).

Figure 1. Surface rot (above) and tip rot (below).

However, Fusarium surface rot (*Fusarium oxysporum* + *F. solani* complex) and Charcoal rot (*Macrophomina phaseolina*) continue to be an issue. Both of these diseases are typically considered to be storage problems in sweetpotatoes. In September of 2022, however, Merced was treated to some of the hottest weather ever recorded — with several days above 105° F and a record high of 112° F on Sept 6 — and many fields that were still sizing and irrigated through this hot spell developed surface rot while still in the ground. In 2023, reports of surface rot have been limited to the sheds, but showing up within 2 to 3 months after harvest. Furthermore, tip rots have also been a problem in storage in the 2023 crop, which may be abiotic (e.g. salts) or caused by a different unknown pathogen (Figure 1).

One of the best management practices for surface rot is curing immediately after harvest, which is practically impossible for the California producer. Other suggested management practices include using thiabendazole (Mertect) fungicide in the hotbeds, using clean seed, cutting transplants above the soil line, managing nematodes, and timely harvests. More research projects are planned this year to determine the cause and improved management for both of these problems.

Table 1. Total marketable yields, boxes/A, from the Collaborators Trial 2020 - 2023 (Livingston).

	2020	2021	2022	2023
Cov.	984	1084	795	1414
Diane	1054	937	1087	1157
Bonita	783	623	not in trial	not in trial
Vermillion	851	1285	741	1069
Bellevue	807	1436	660	1222

Results from 1-row x 50 ft, 4 replications, one location.

Table 2. Yield survey results, Merced County.

	2022		2023	
	TMY bins/A	% #1's	TMY bins/A	% #1's
Murasaki	26.7	54	33.7	68
Reds	52.2	62	55.3	55
Bonita	26.3	57	45.9	48
Orange (yams)	43.2	53	52.3	59
weighted AVERAGE	**40.0**		**46.8**	

Yields estimated from 50 ft sample from center of field. 30 fields in 2022 and 24 fields in 2023.

ACRES

USDA has revised their estimates for production acres in California:

2018: 21,000

2019: 21,500

2020: 22,000

2021: 21,000

2022: 22,000

2023: not published

Assuming 35 bins/A average yield and 22,000 harvested acres, total production in 2022 was around 715 million pounds. USDA estimates for 2023 have not been published, but my guess is 21,000 acres at 40 bins/A, for total production of 756 million lbs.

HEAVY METAL SAMPLING RESULTS

For the past three years, I have collected roots for heavy metal analysis as part of a national survey to determine levels of Arsenic, Cadmium, Mercury, and Lead in sweetpotatoes. Roots were randomly selected from a #1 bin in storage from the previous year's crop, representing both organic and conventional growing systems. Only orange-flesh cultivars were sampled (Covington, Diane, Bellevue, and Vermillion). In each year, 30 samples were taken, representing different fields and growers from the Atwater and Livingston areas. Roots were then sent to Brooks Applied Labs in Washington for analysis. For the three years combined, almost all (96.5%) samples came back below 10 ppb (parts per *billion*). The current suggested guidelines are 20 ppb. These are extremely promising data, however, more sampling is probably needed to improve confidence in the numbers.

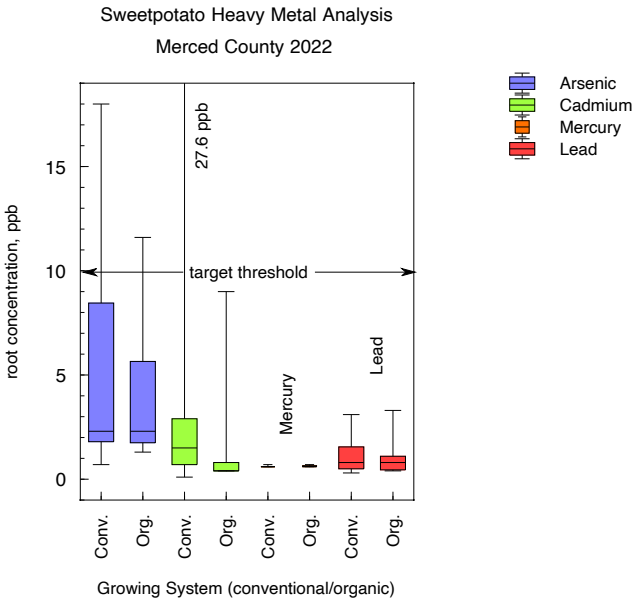

Figure 2. Sweetpotato heavy metal sampling results from the 2022 crop.

VIRUS TESTED SEED TRIAL

Since 2021, I have evaluated old vs G1 seed of Beauregard, Bellevue, and Vermillion for virus infection and yield. In 2022, G0 greenhouse plants were also added to the trial. "New" seed was from virus-tested plants that were grown for one year in the field (G1 seed); "old" seed was seed that I had been using in my variety trials for several years (G5+). Plots were 1-row by 50 feet, and were replicated 4 times using a RCB design. No special measures were done to keep the plants free of aphids, the primary vector for the four viruses that infect sweetpotatoes (SPFMV, SPV2, SPVC, SPVG). Yield results are shown in Table 3. In 2021, there was a 50% to 92% increase

in yield with G1 compared to old seed. In 2022, yields increased 0 - 20%, and in 2023, 16 - 22%.

Virus results indicate that virus infection occurs very rapidly in new, virus tested plants. In 2021, all roots, including G1 seed, were infected with viruses, but the old seed had greater number of infected roots as well as a much higher incidence of roots with more than one virus. In 2022, nearly all samples became infected with all four viruses in only one season, including the G0 greenhouse plants. 2023 roots are still being analyzed.

Table 3. Total marketable yield (bins/A) for old (G5+) and new (G1 or G0) virus tested seed, 2021-23.

	seed age	2021	2022	2023
Beauregard	G1/G2	30.9	46.8	42.6
	G6	20.7	38.7	36.8
Bellevue	G1/G2	71.8	33.0	61.1
	G6	39.3	33.7	- - -
Vermillion	G1/G2	64.2	37.0	53.4
	G6	33.4	31.3	- - -
Covington	G1	- - -	- - -	34.1
	G3	- - -	- - -	28.0

NEMATICIDE TRIAL RESULTS

Nematicide trials were conducted in 2020 - 22 in a commercial sweetpotato field in the buffer zone where no fumigant was used. The field had been in continuous sweetpotato production for 10 years. Treatments included Velum (fluopyram, Bayer Crop Science), Salibro (fluazaindolizine, Corteva Agriscience), and several biological nematicides, including Majestine and Grandevo (Marrone Bio Innovations). Treatments were designed to test different rates, timings, and combination of materials, and included Telone at 10 gpa and untreated controls.

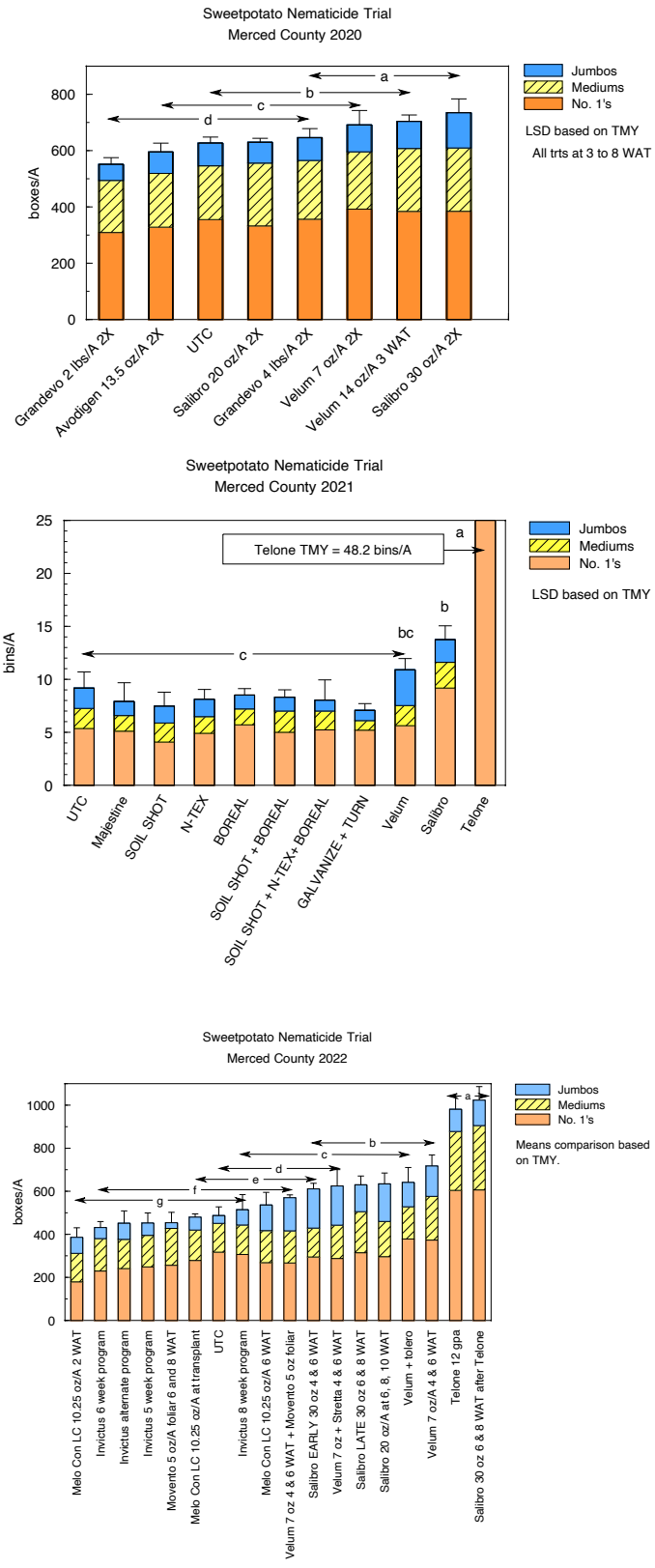

Figure 3. Nematicide trials results for years 2020 - 23. All years were in the same location with variety Diane.

Nematicide treatments were applied at 3 to 8 weeks after transplanting, depending on product use guidelines, by injecting into surface drip tape. Sweetpotato variety 'Diane' (RKN susceptible) was used. Harvest was done using the growers mechanical digger and crew.

Salibro and Velum improved yields as compared to the untreated control and the biological nematicides, however, yields were still significantly less than Telone (Figure 3). In 2021, nematode pressure was severe and untreated yields were very low, less than 10 bins per acre, with 53% culls because of obvious nematode symptoms. In neither year were nematode counts reduced by any treatment, except Telone.

In 2023, this trial was conducted with multiple varieties in a different location with no nematode pressure. Overall, there was a slight but insignificant improvement in yield from the nematicides (data not shown).

Over six years of testing, Salibro and Velum increased TMY in Diane by an average 35.5% and 18.0% respectively, as compared to the untreated control. While not as effective as Telone, they are helpful for reducing the yield impact from root knot nematodes in susceptible varieties. Salibro has much higher solubility than Velum, which may explain its better performance when injected through the drip tape. Velum has California registration, but Salibro does not. Corteva hopes for registration here in late 2024.

FINGER WEEDER RESULTS

A Carbon Robotics laser weeder and my Steketee finger weeder were compared in a field with heavy weed pressure, mostly purslane. The machines were run about 10 and 14 days after transplanting when the purslane was in the cotyledon stage. Both machines significantly reduced the number of weeds as compared to the untreated control (Table 3). Even after hand weeding, treatment effects could still be seen (Figure 4). More research is planned in 2024.

Scott Stoddard, farm advisor

Table 3. In-row weed control by weeding treatment, Livingston CA 2023.

	Treatment	6-Jun weeds/20 ft		% control		29-Jun weeds/20 ft		% control	
1	CR laser weeder	43.6	a	70.7%	a	8.5	b	27.7%	a
2	Finger weeder	9.2	a	95.5%	b	1.8	a	85.1%	a
3	UTC	183.0	b	---		11.8	b	---	
	AVERAGE	80.1		83.1		7.3		52.7	
	LSD 0.05	43.1		21.4		4.3		ns	
	CV, %	41.8		17.3		33.6		64.5	

Weed treatments on May 31 (laser weeder) and June 2 (finger weeder).

Plots handweeded on June 19.

LSD 0.05 = Least significant difference at he 95% confidence level.

Means with the same letter within a column are not significantly different.

Figure 4. Untreated (left) and finger weeder plots about one month after planting.