2018 Progress Report for CFCAB Supported Kern County Projects

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38th International Carrot Conference

In 2017 we organized, planned and conducted the 38th International Carrot Conference which was held in Bakersfield. There were over 150 attendees to the conference with many of them from outside of the US. International speakers gave presentations on pest management, crop production and carrot breeding. Several UC and other CFCAB supported researchers also made presentations to the international group. A field tour was conducted on the last day of this three day conference. Participants were shown new farming technology equipment, nematode resistant carrot varieties and a large carrot variety screening trial. The event was covered in several trade journals, radio and newspapers.

Carrot Variety Trials

Besides the carrot variety trial held at the 38th International Carrot Conference a major carrot variety is conducted each year at the Desert Research and Extension Center at Imperial County. Dr. Phil Simon screens all of his labs crosses and accessions at this winter production location. With carrots being a bi-annual crop this location is important to cut in half the time it takes to go from seed to a mature reproductive carrot plant. A public screening trial is also conducted where many new carrot varieties can be evaluated by the carrot industry. An organic carrot variety trial is also conducted at the DREC by Dr. Simon. Although the trials at the DREC are directed by Dr. Simon, my program is responsible for the financial administration of the carrot projects at the DREC.

Another carrot variety trial was conducted in January 2018 at a grower's field in Kern County. Again common standard carrot varieties used by the California carrot industry were grown side by side with newly released carrot varieties and potential new carrot varieties for release. All of the major seed breeders were represented with their varieties on display for everyone to evaluate.

Cavity Spot Trials

A biological screening trial to identify potential biological pesticides for managing cavity spot was conducted in 2017. A non-treated control and a Ridomil Gold standard were used for comparison to help determine the efficacy of these products. Unfortunately the level of cavity spot was too erratic to see any differences (table 1).

Another cavity spot trial was conducted as part of a larger multi-state grant. Our task of this multi-state Specialty Crop Research Initiative (SCRI) grant is to screen approximately a thousand carrot accessions obtained by the USDA for resistance to cavity spot. This first year's effort we began looking at 64 accessions in a replicated trial. We did find several accessions that

appeared to be very susceptible to cavity spot infection and several that showed some level of tolerance. However it must be noted that these are basically wild type carrots and the germination was very poor for many of these accession. In many of the zero percent cavity spot infection listed in table 2 are due to very low or no germination of carrot seeds. But some appear to show true tolerance to cavity spot. This is just the first of a continuing screening of these accessions to cavity spot tolerance or true resistance. The objective of this screening trial to identify potential sources of cavity spot resistance that could eventually be used in breeding cavity spot resistance into commercial carrot varieties.

Nematode Trials

Several nematicide trials were conducted at the UCCE-Shafter Research Farm. These included screening of biological products and new conventional nematicides. Unfortunately not all of the trials had significant nematode pressure to gather data or make any conclusions. Most disappointing was the biological trial where last year we showed some potential with a couple products. However we did obtain good results with some of the trials. Table 3 shows the results of the Nimitz trial. The data shows that applications made 7 to 10 days before planting are significantly better than the control or applications made at planting. There was phytotoxicity problems with applications made at planting. It had been known that applications at planting would cause phytotoxicity issues but we wanted to confirm those problems with Nimitz.

The Bayer product, Velum, showed some reduction in nematode injury but it was not significant (table 4).

Table 5 five shows the results of the tomato trial comparing DuPont's Salibro, Bayer's Velum and Adama's Nimitz. In this trial we had even distribution on nematode injury and the separation of the treatment means with great. All three of the products did an outstanding job of reducing the injury caused by root knot nematode. This trial shows the potential of these products to significantly reduce nematode injury on all crops.

Table 1. Cavity Spot Biological Trial

Treatment		Percent Cavity Spot
1. Control		26.4
2. Ridomil Gold @ 8.0 oz/A	Applied at planting and 2 post	32.3
3. Serifel @ 4 oz/A	Applied every 14 days	38.6
4. Serifel @ 16 oz/A	Applied every 14 days	41.8
5. Serenade Soil @ 2 qt/A	Applied every 14 days	33.9

Table 2. Cavity Spot USDA Screening Trial

Vareity Number	Field Number	Pedigree	% Cavity Spot
1	7539	1111B	0.0
2	7541	2327B	0.0
3	7542	2566B	0.0
4	7551	3180C	0.0
5	7556	4367B	4.8
6	7557	5238B	0.0
7	7560	5280B	0.0
8	7561	6274A	0.0
9	7565	6333B	0.0
10	7567	6366B	0.0
11	7569	7254B	0.0
12	7572	P7262B	16.7
13	7578	9304B	13.3
14	7580	0493B	0.0
15	7668	L1408B	4.2
16	7676	L2574B	9.1
17	7678	L2575B	15.2
18	7683	L2577B	9.7
19	7686	L3303B	0.0
20	7692	L7553B	0.0
21	7701	L9785B	0.0
22	7713	L9793B	0.0
23	7721	2144B	0.0
24	7725	6116B	2.4
25	7728	6480B	7.9
26	7733	FS	0.0
27	7741	PR2356B	0.0

Vareity Number	Field Number	Pedigree	% Cavity Spot
33	7769	R6093B	33.3
34	7771	R6220B	4.8
35	7775	R6304	8.9
36	7781	PR2347B	1.0
37	7789	BCVTHT x WWortel	7.0
38	7799	Y6364B	5.4
39	7805	Nb2159B	0.0
40	7806	Nb2205B	6.3
41	7813	Nbh2306B	9.4
42	7814	Nb3271B	5.3
43	7824	Npw6163B	0.0
44	7829	Nb4001B	0.0
45	7831	Nb4002B	0.0
46	7833	Ns5154B	1.8
47	7835	Nb6526B	4.2
48	7838	P1188B	11.1
49	7840	P5089B	0.0
50	7844	P5207B	0.0
51	7853	P5344B	6.7
52	7858	P5396B	4.2
53	7861	P6306B	0.0
54	7872	7262B	0.0
55	7879	Eregli '99	0.0
56	7906	1131B	0.0
57	7916	2289B	11.1
58	7921	2303B	0.0
59	7925	2327B	6.7
60	7931	3308B	0.0
61	7933	5438B	9.5
62	7937	2289B x dOr	0.0
63	7944	(LRSurrey x HCM) x HCM	0.0
64		3497P	0.0

Table 3. Nimitz Carrot Trial

	Nematode Rating (1 to 10)
1. Control	1.8
2. Nimitz 3.5 pt/A @ planting	1.4
3. Nimitz 5 pt/A @ planting	1.3
4. Nimitz 7 pt/A @ planting	2.6
5. Nimitz 5 pt/A @ 7-10 before planting	0.7
Probability	0.0632
% CV	59.79
$LSD_{0.05}$	1.257

Class Comparison for Nimitz Tomato Trial

Control vs All Nimitz Treatments

Sum of Squares = 0.397

Probability = NS

Control vs 2. Nimitz 3.5 pt/A @ planting

Sum of Squares = 0.400
Probability = NS

Control vs 3. Nimitz 5 pt/A @ planting

Sum of Squares = 0.576
Probability = NS

Control vs 4. Nimitz 7 pt/A @ planting

Sum of Squares = 1.444

Probability = 0.218

Control vs 5. Nimitz 5 pt/A @ 7-10 before planting

Sum of Squares = 3.249

Probability = 0.073

Table 4. Carrot Velum Trial

	Nematode Rating (1 to 10)
1. Control	2.6
2. Velum 6.5 fl oz/A	1.5
3. Velum 13.0 fl oz/A	2.1
4. Nimitiz 5 pt/A	1.5
Probability	0.5137
% CV	68.16
$LSD_{0.05}$	Not Significant

Table 5. Tomato Nematicide Trial

	Nematode Rating (1 to 10)
1. Control	8.0 A
2. Velum 6.5 fl oz/A	3.6 B
3. Nimitz 5 pt/A	1.4 B
4. Salibro 30.7 fl oz/A	2.5 B
Probability	0.0019
% CV	54.48
$LSD_{0.05}$	2.905