



TOMATO INFO

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**MEL ZOBEL
MUSTARD COVER CROP
VARIETY TRIAL RESULTS**

LUNCHEON FOR MEL ZOBEL

Former UC/Yolo County Farm Advisor Mel Zobel will be receiving an Award of Distinction from UC Davis for his years of outstanding service to the agricultural industry. Come congratulate Mel. Our format will be an open house including a light lunch. Our luncheon will be informal and free of charge. To sufficiently prepare for meals, please telephone us at (530) 666-8143 or send an e-mail note to emmiyao@ucdavis.edu.

When: Thursday October 14th anytime between 11am and 2pm

Where: UC Farm Advisors Yolo County Office, Norton Hall
70 Cottonwood Street, Woodland 95695



The formal award ceremony and reception is Friday, 5:30 pm, October 15 at Freeborn Hall on the UC Davis campus. Contact Rich Engel at 530 754-6249 for tickets to the event. Cost is \$12.50 per person.

Mel retired from the University in 1979. He moved to Watsonville and commercially fished with his brother where they launched from Moss Landing. In more recent years, Mel settled in southern Idaho, nearby one of his daughters.

Many of the tomato practices that Mel taught during the transitional years from hand pick to mechanical harvesting remain firmly in place: identification of irrigation management as the critical component to yield and quality improvement; early irrigation cut off to improve soluble solids and harvest ease; every-other-row irrigation for special situations; advocating moderate quantities of applied fertilizer needed to optimize production; development of a calendar of planting to harvest date estimation; construction of cost of production studies as multiple cropping operation; recognition of plant compensation flexibility with low populations. Helping growers through field consultations/visits was what Mel seemed to enjoy the most. Mel excelled in many arenas including writing newsletters with great frequency.

I hope you will be able to visit with Mel. Please join us.

MUSTARD COVER CROPPING

Mustard cover cropping received much interest and attention locally as well as statewide. UC Extension Veg Crop Specialist Tim Hartz tended field tests at UC Davis as well as coordinated commercial field tests in our area with the assistance of UC Plant Pathologist Mike Davis. Our hope was to evaluate the benefit of the fall planted mustard to bolster subsequent spring planted tomatoes.

With tomatoes cropped continuously over 3 years and two years of fall cover cropping with mustards, Hartz saw no yield benefit from the mustard plantings over the fallow bed (conventional) practice where yields ranged from 46 to 49 tons per acre under drip irrigation. To optimize any biofumigation activity, water was applied through sprinklers

immediately after flail mowing and soil incorporation of the mustards. While lab-measured levels of Vapam-like compounds varied among mustard species and between years, levels were always less than the equivalent of 5 gallons of Vapam per broadcast acre. Therefore, it was not surprising that bench test measurements of soil populations of *Fusarium* species and *Verticillium* were not significantly reduced. Hartz noted that winter rainfall runoff was reduced by about 50% with the mustard, but similar benefits were achieved with legumes.

We conducted a local test with Ashley Payne Farms with a fall-planted mustard crop following a 2003 wheat rotation. The subsequent tomato yield was reduced by 4 tons with the mustard cover compared to 52 tons per acre in the control. In this test, nitrogen levels in the tomato plant tissue were lower in the mustard plots and may have partially explained the yield reduction. *Fusarium solani* infection levels were moderate, but not significantly reduced with the mustard.

In a more extensive test with Jim Heidrick in the second consecutive year of tomato cropping, our test included a comparison of two mustard species, a legume mix, and a metham treatment. Yields tended to be lower with the cover crops compared to the conventional fallow treatment. The reduction in yield may have partially been due to the drier soil levels created by the cover crops when coupled with no rainfall after mid March this year. While the field was irrigated with a buried drip system, the upper soil profile remained dry. Additionally, a high population of darkling ground beetles was especially attracted to the mustard cover crop as well as was high in the legume cover plots. Multiple bait applications and a protective spray were needed, as well as subsequent replanting with replacement transplants to maintain a full stand. Our springtime applied metham via starter fertilizer knives (~28 gpa) reduced incidence of *Verticillium* wilt as well as increased yield from 54 in the control to 59 tons per acre. Soluble solids levels were lower, however. The mustards did not appear to reduce incidence of Vert.

A late scheduled tomato planting with Joe Muller and Sons compared a fall planted mustard blend against the conventional fallow bed treatment. The field was a back-to-back tomato planting following a 2003 tomato crop. Our plots were centered in an area with a high level of *Fusarium* wilt. The mustard cover crop created a slightly higher incidence of *Fusarium* wilt diseased plants over the non-mustard treatment. The infection began weeks after layby stage and continued beyond an 80% infection level. We abandoned plans to measure tomato fruit yield, as most plants were dead. Our mustard blend was NOT effective at reducing *Fusarium* wilt.

In a late scheduled tomato planting in the Woodland area with Harlan and Dumars, a November planted cover crop planting of a mustard blend was compared to a fallow treatment. The 2004 tomato crop was transplanted in rotation with 2003 tomatoes. We measured a 3-ton yield increase in this location up from 52 tons per acre in the controls. We were not able to attribute the difference to a reduction in *Verticillium* wilt, which was moderately low or to reduced corky root severity.

Bottom Line: Our experience with mustard cover cropping has been disappointing. Against corky root & *Fusarium* foot rot and especially *Fusarium* and *Verticillium* wilt, the mustards fall short on fungicidal activity. I do plan to pursue metham applications but with reduced rates to control *Verticillium*.

Local Variety Trials: Two local processing tomato variety evaluation trials were conducted: one early and one mid-maturity classes. Both trials were conducted in commercial fields and mechanically harvested with grower equipment to determine marketable yield. Fruit samples were collected and sent to a local PTAB inspection station to measure fruit color, Brix and pH. The early maturity trial contained only replicated entries while only replicated data is reported from the mid trial in this newsletter.

Our early-maturity variety trial was established near Winters with Tony Turkovich and Martin Medina of Button and Turkovich Ranches. We direct seeded on February 14 on double lines per bed. The previous crop was wheat on this class 1, Brentwood silty clay loam soil. Plants grew well during the season. Yields were higher than our visual estimate. Eight of the 13 varieties were in the top-yielding group led by U 250 with 48.3 tons/acre (table 1). HyPeel 45 and AGT 771 had the highest soluble solids with 5.4 and 5.2% respectively. Harvest was delayed beyond optimal. Percent sunburn was elevated especially with HA 3523, HyPeel 45 and Calista, which ranged from 16 to 12% among these varieties, followed by 11% levels with both U 250 and APT 410. Mold was highest at 7% with H 1100. PX 740 was a standout in our trial with firm, clean fruit at the time of harvest.

Table 1. Early-maturity variety trial, Button and Turkovich Ranches, Winters, 2004.

Variety	Yield tons/A		Brix	PTAB color	pH	% pink	% green	% sun burn	% mold	% end rot	lbs per 50 fruit
1 U 250	48.3	A	4.5	27.0	4.45	2	2	11	4	0	7.21
2 H 9280	47.6	AB	4.3	25.0	4.42	1	1	7	4	0	6.80
3 PX 740	47.1	AB	4.8	25.5	4.37	1	2	3	0	0	5.80
4 UG 8168	47.0	AB	4.9	25.0	4.41	1	1	3	3	0	5.86
5 H 5003	46.5	AB	5.1	24.0	4.44	1	0	5	2	0	5.73
6 H 9997	46.3	AB	4.7	23.3	4.45	1	1	5	2	0	6.09
7 H 1100	45.7	ABC	4.9	26.0	4.41	2	1	7	7	1	6.99
8 APT 410	44.7	ABC	4.7	24.8	4.45	1	1	11	2	0	6.72
9 HyPeel 45	44.1	BC	5.4	26.3	4.40	1	2	14	3	1	6.89
10 HA 3523	44.1	BC	4.5	24.0	4.55	1	2	16	3	0	5.79
11 Calista	42.0	CD	4.6	25.0	4.52	1	2	12	3	0	6.17
12 Sun 6358	42.0	CD	4.7	24.5	4.42	1	2	7	3	1	6.01
13 AGT 771	38.4	D	5.2	24.3	4.44	1	1	9	4	0	5.89
LSD 5%	4.1		0.30	1.2	0.05		0.9	4.6	2.6		0.76
% CV	6		4	3	1		49	38	61		8
Average	44.9		4.8	25.0	4.44	1.0	1.4	8.4	3.0	0.3	6.3

Our mid-maturity trial was conducted in a combination of class 1 Brentwood and class 2 Rincon silty clay loam soil together with some Capay silty clay west of Davis with Steve Meek and John Pon of JH Meek and Sons. Plants were started in the greenhouse by Westside Transplants and mechanically transplanted by the grower's crew on April 27, a 95°F, north windy day. Plants established well despite the adverse weather. Vines grew vigorously and set well. Verticillium wilt was prevalent. Some root rot was noted late. A number of varieties lost canopy cover during the ripening stage, resulting in extensive sunburn damage.

The top yielding varieties were led by Unilever 941, with 54.1 tons/acre, and followed closely by H 5803, La Rossa, H 8892, Halley and H 5503 (table 2). Heinz H 2601 was in the top-yielding group in 2003 while falling to the bottom ranking this year. H 5803 with high yields was also the top °Brix performer with 5.5. Percent pink, green, mold and blossom end rot levels were low to moderately low. Sunburn levels were at or above 18% in a number of varieties, indicative of loss of canopy during the late stages of fruit ripening. H 9665 was uncharacteristically severely set back with loss of canopy cover. U 005 also suffered from poor canopy cover.

Table 2. Transplanted, mid-maturity variety trial, J.H. Meek and Sons, Davis, 2004.

Variety	Yield tons/A	Brix	PTAB color	pH	% pink	% green	% sun burn	% mold	% end rot	lbs per 50 fruit
1 U 941	54.1 a	4.7	25.0	4.41	1	0	13	0	2	7.17
2 H 5803	54.0 a	5.5	24.5	4.39	2	1	18	1	1	6.19
3 La Rossa	53.9 a	4.5	25.0	4.43	1	1	12	2	3	8.41
4 H 8892	53.8 a	4.3	24.8	4.38	0	0	12	0	1	5.32
5 Halley	53.7 a	5.1	25.8	4.35	1	1	8	2	0	7.73
6 H 5503	52.8 ab	4.8	24.5	4.36	1	1	11	1	1	5.45
7 PS 296	50.8 bc	5.2	25.5	4.29	1	1	11	0	0	6.57
8 UG 151	50.7 bc	4.5	24.5	4.53	1	0	15	0	0	7.14
9 Sun 6119	50.5 bc	4.5	27.3	4.44	2	1	12	1	0	6.32
10 H 9665	50.1 bcd	4.7	25.3	4.41	1	1	21	1	0	6.24
11 H 2401	49.7 cd	4.7	25.3	4.30	0	1	21	0	1	5.12
12 CPL 4863	49.3 cd	4.7	25.0	4.36	1	1	11	1	2	5.39
13 Red Sky	49.0 cd	5.0	24.0	4.42	0	1	14	1	1	5.93
14 Sun 6360	48.2 cde	4.8	23.8	4.46	0	0	24	1	2	7.65
15 H 2501	47.5 de	4.8	23.5	4.41	2	1	23	0	0	7.29
16 U 005	45.7 e	4.9	25.5	4.33	2	1	24	1	0	6.74
17 PS 607	45.3 ef	5.1	24.8	4.39	2	1	13	0	0	7.67
18 H 2601	42.6 f	5.1	25.0	4.50	0	1	22	1	3	6.74
LSD 5%	2.8	0.25	1.1	0.08	NS	NS	7.4			1.5
% CV	4	4	3	1	102	108	33	94	114	16
Average	50.1	4.8	24.9	4.40	1	0.6	16	0.8	1.1	6.61

I'm alarmed at the rate of vine decline we experienced in the last 30 days prior to harvest in our local area. While powdery mildew may explain some of the problems, I plan to investigate the problem through field tests in an attempt to maintain plant vigor, which should translate to higher yields and improved fruit quality.

Please contact me if you'd be interested in cooperating in field tests in 2005.

Submitted by,

Gene Miyao

Farm Advisor, Yolo, Solano & Sacramento counties

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