Pepper News

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California Pepper Industry Report

Chairman, California Pepper Commission
Glen Fischer, Saticoy Foods

The California Pepper Commission continues to focus its efforts on improving the chemical, disease and pest issues that concern the pepper industry. The Commission met earlier this year with the purpose of discussing any current and future issues and finding research projects that can improve the California pepper industry.

Our annual newsletter contains summaries of the research projects completed during the 2010-11 year. Each of these projects was considered by the Commission's Research Committee and then recommended to the Commission for approval. Most of our projects have been ongoing, focusing on the more practical issues of farming peppers, while some focus on more basic research that the Commission feels deserves attention.

The Commission continues to work with Valent and the Department of Pesticide Regulation on obtaining a Special Local Need 24C on Chateau. Due to revisions and updates to the label and the user agreement document, the process has been rather lengthy. The three parties appear to be coming to a conclusion and if there is a consensus in regard to these final changes, Chateau will be available to growers for a pre-transplanting application for weed control on mallow in the furrow.

Dual Magnum continues to be available as a 24C label from Syngenta through their website www.farmassist.com. You can also find a pepper related pesticide list, which is provided to the industry by the California League of Food Processors at their website www.clfp.com. You can sign in to view this list with the ID: **nathan@tabcomp.com** and password **nathan93618**.

For the past several years the Commission has been a member and active participant with the California Specialty Crop Council (CSCC). The CSCC provides the Commission the opportunity to work with similar groups to focus on research, education, and regulatory activities, which may affect California agriculture. By representing a variety of groups, the CSCC is well supported when communicating industry issues with state and federal agencies. The CSCC also acts as a conduit of information between its members and various entities. For more information you can visit the CSCC website at www.specialtycrops.org.

As sustainability becomes a bigger topic in the agricultural community a Multiple Commodity Sustainable Practice Program has been actively working on an in house analysis where growers will be able to do a self-assessment on their operations. Once the self-assessment sustainability program is written, it will be revised specifically for the pepper industry. This will provide us with procedures set and implemented by those with the agricultural community and possibly avoid federal and state guidelines written by those who may not be familiar with our practices.

In an effort to continue keeping the California pepper industry informed, the Commission has authorized the construction of a website where industry members can have access to research reports and Board information. Once launched you can visit the website at www.calpeppers.com.

The Commission and staff are always available to answer questions or assist in any way they can. Jerry Munson (jerry@tabcomp.com) is the Board Manager, and Nathan Sano (nathan@tabcomp.com) is the Assistant Manager, and they can be contacted via email or at 531-D North Alta Avenue, Dinuba, CA 93618 and at 559/591-3925.

2010 Project Reports

Effect of Nirtrogen Fertilizer on Yield & Quality
Michelle Le Strange, UCCE Farm Advisor Tulare Co. and Marita Cantwell, UC Davis

Many growers use drip irrigation and apply liquid nitrogen fertilizers through the drip system. Nitrogen best management practices have not been updated for many years, nor has there been a recent study that investigates the relationship between nitrogen fertilizer and pepper quality at harvest, when grown under drip irrigation.

A field study was established at the UC WSREC to investigate five rates of nitrogen fertilizer on the yield and postharvest quality of drip irrigated bell peppers. The variety Baron was transplanted and grown without plastic mulch or poles on 40-inch beds with a manifold system that allowed different nitrogen rates to be applied simultaneously through subsurface drip irrigation to different parts of the test plot.

Excessive soil residual nitrogen foiled the field conditions and we did not observe a yield response to the nitrogen treatments. In general preplant soil samples with NO3-N concentration less than 10 PPM suggests limited residual soil N, and normal fertilization practices are appropriate. Even though we tried to deplete residual nitrogen by growing a crop of wheat followed by sudan grass there was still 25 ppm nitrate nitrogen in the top 6 inches of soil, which is enough to support a crop for several weeks.

In the field you could easily pick out the low and high nitrogen plots but the middle treatments were not discernible. Low N treatments were less green and much shorter than the lush green foliage of the taller plants in the high nitrogen treatments. No differences were observed in pepper whole leaf tissue samples, pepper biomass, or in pepper yields as a result of the nitrogen applications.

Postharvest evaluations of mature green fruit revealed that the lower N treatments resulted in fruit with less weight, the thinnest pericarp wall, yet the highest % dry weight. Red peppers had higher % dry weight than mature-green peppers, but were notably less firm. There were significant differences in final red color of the peppers: peppers from the higher N treatments developed the reddest color (lower hue value).

Also percent weight loss in peppers in storage was substantially lower in red peppers than in mature-green peppers. This is likely due to greater wax and cuticle development on the red peppers. Although some post harvest quality results were obtained, several key characteristics did not separate out and need further field and postharvest laboratory investigation.

Evaluation of Cucumber Mosaic Controls
Joe Nunez, UCCE Kern County

Silver reflective mulch has been used as a method to repel aphids and thrips from various crops to prevent virus transmission. It is often used on tomatoes, melons, and peppers to prevent virus infection such as tomato spotted wilt virus (TSWV), tobacco mosaic virus (TMV), CMV and others. Other colored plastic mulches have been shown to increase plant size and yield. Probably the main use of plastic mulch on vegetables here in California however is for weed control. Black colored plastic mulch does an excellent job of shading the soil surface thus preventing weed growth. Sometimes clear plastic mulch is used to warm the bed for early season planting in the spring.

The objective of the 2010 study was to determine which plastic mulches besides silver reflective mulch could repel aphids and thrips to prevent virus transmission. Another objective was to determine if a more cost effective spray on mulch could be used to repel aphids and thrips. Lastly determine what effect these different mulches have on plant growth and yield.

The treatments used in 2010 were
1. Control-bare soil
2. Black plastic mulch
3. Silver reflective plastic mulch
4. Silver plastic mulch (more like a grey color in reality)
5. White plastic mulch
6. Green plastic mulch
7. Red plastic mulch
8. Kaolin clay sprayed on canopy
9. Kaolin clay sprayed on soil surface.

Aphids and thrips were monitored on a weekly basis by the use of yellow sticky cards that were placed a few inches above the canopy. Total aphid counts trapped

over the entire 10 week period showed all the treatments were significantly better than the bare soil control. The best treatments were the silver reflective and silver mulches with the red, green and kaolin clay applied on the soil surface close behind. Thrip counts were significant after the first week and stayed high during the course of the season. The silver reflective and silver mulch along with the kaolin clay sprayed on the canopy had significantly less thrips than the control. The white colored mulch actually increased the number of thrips by a significant amount.

During the course of the growing season obvious differences in growth could be seen between the various colored mulches. The black, silver, red and green plastic mulch had significantly greater plant mass than the bare soil control. All other treatments were the same as the bare soil control.

Our 2010 findings show that black, red and green plastic mulches increased the size of the plants. This growth difference was easily visible during the entire season. All of the treatments reduced aphid flights onto the plots as compared to bare soil control. Thrips were reduced by the use of silver reflective and silver mulch along with the kaolin clay sprayed on the canopy.

After three years of trials some conclusions can be made. First, any colored plastic mulch or kaolin clay spray can significantly reduce aphid flights onto plants. Secondly, the amount of virus that may appear in a crop can be reduced significantly by reducing aphid flights onto that crop. And lastly, black, red and green plastic mulch will have a positive impact on plant growth and vigor which may result in increased marketable yields of peppers.

2010 Data

Table1. Dry weights of plants 8 weeks after transplanting

	Dry Wt (g) 5/21/10		
Treatment	Top Wt.	Root Wt.	Total
1. Control	55.4 bcd	6.9 c	62.3 cd
2. Black	64.1 ab	7.9 abc	72.0 ab
3. Silver Reflective	49.4 d	6.8 c	56.1 d
4. Silver	68.5 a	8.6 ab	77.1 a
5. White	58.9 bc	7.1 bc	66.0 bc
6. Green	71.3 a	8.8 a	80.0 a
7. Red	68.9 a	7.3 abc	76.1 a
8. Surround Canopy	47.8 d	8.0 abc	55.8 d
9. Surround Soil	54.9 cd	6.9 c	61.8 cd
P=	0.0000	0.0707	0.0000
%CV=	10.48	13.85	9.03
LSDp=0.05	9.163	1.530	8.891

Table 2. Total aphids and thrips trapped during season.

	Total Aphids and Thrips	
Treatment	Aphid	Thrips
1. Control	135.3 a	6125.5 b
2. Black	49.8 bcd	4787.0 bcde
3. Silver Reflective	30.6 d	4687.2 cde
4. Silver	30.7 d	4263.0 de
5. White	71.8 bc	9774.5 a
6. Green	48.4 cd	5595.8 bcd
7. Red	45.9 cd	4920.3 bcde
8. Surround Canopy	74.4 b	3923.0 e
9. Surround Soil	46.3 cd	5657.8 bc
P=	0.0000	0.0000
%CV=	30.05	16.83
LSDp=0.05	25.965	1357.377

Table 3. Total harvest weights of peppers.

	Totals (lbs)		
Treatment	Market	Process	Total
1. Control	6.7 abc	3.4	10.1
2. Black	7.4 ab	3.4	10.7
3. Silver Reflective	5.5 c	3.5	9.0
4. Silver	8.4 a	3.6	12.0
5. White	6.5 bc	3.2	9.7
6. Green	7.5 ab	2.9	10.4
7. Red	7.3 ab	3.8	11.1
8. Surround Canopy	5.6 c	3.6	9.2
9. Surround Soil	6.9 abc	3.4	10.3
P=	0.0425	0.9167	0.2145
%CV=	17.31	24.09	15.06
LSDp=0.05	1.737	NS	NS

Weed Control Trials

Richard Smith, UCCE Farm Advisor, Monterey Co.

Five trials were conducted in Monterey and San Benito Counties in 2010. The focus of four of the trials was to evaluate the efficacy of Chateau impregnated on a dry fertilizer (0-0-5 a mix of potassium sulfate and lime) as a means of applying this material safely to peppers at layby. The purpose of this technique was to overcome potential leaf and fruit spotting problems with directed sprays of Chateau at layby. We think that Chateau would be an excellent layby material for peppers if we can find a safe way to apply it, as it is highly effective on many broadleaf weeds and controls difficult-to-control weeds such as malva.

Chateau was applied to the 0-0-5 and was applied to the field with a tractor in strips several beds wide by the length of the field, at the equivalent of 4.0 and 8.0 ounces per acre. These trials provide good evidence that this use pattern is safe to the peppers as little phytotoxicity was

observed and there was no impact on yield at the 4.0 ounce rate.

The bigger challenge is getting a good pattern of the dry fertilizer material on the surface of the bed in order to provide a uniform application of the active ingredient to effectively control weeds. These trials were only moderately effective in this regard, as weed control was not as good as we would have liked. In addition, the edge of the beds were steep and the Chateau/fertilizer rolled down to the furrow bottom and allowed significant weed growth on that part of the bed. In general, this technique looks promising, but the issue of getting a complete pattern with dry fertilizer will be a key drawback.

In a small plot trial, we evaluated a number of herbicides at layby. There were no differences in weed control among the treatments on the first evaluation date on July 15, but there was greater phytotoxicity in the Zeus treatment due to necrotic spotting of the leaves where the directed spray touched leaf tissue. However, on the second evaluation date on August 10, there were more weeds in the untreated control and weeding time was higher as well.

Chateau on fertilizer had more weeds than Broadstar on this evaluation date. Broadstar had many more granules per unit area than Chateau on fertilizer and gave better distribution of the chemical on the soil surface which may have accounted for the difference between the two materials (even though the rate of flumioxazin was the same).

Dual Magnum + Prowl H2O and Broadstar had the fewest weeds on September 1 and lower weeding time. None of the treatments had phytotoxicity symptoms on this date and there were no differences in yield between the treatments.

Insect Pest Management on Peppers

John T. Trumble, William Carson, and Greg Kund, UC Riverside

Pepper field trials were conducted at the University of California South Coast Research and Extension Center (SCREC). The project included both a chemical screening trial and an IPM trial. The chemical screening trial was used to identify new compounds that can potentially be used in a commercial IPM program. The IPM program was conducted using a large scale commercial field design and was used to evaluate treatment rotations against a complex group of insects for efficacy as well as economic benefits for pepper growers.

Chemical trials examined Admire Pro, Oberon 240 SC, Baythroid, 2EC, Movento 240 SC, Synapse 240 WG and Radiant individually and in combinations. Admire Pro was applied once at 14 oz/Ac via drip irrigation as part of treatment #2. Oberon, Baythroid, and Movento were used in a rotation for treatment #2. Treatment #3 consisted of Oberon, Synapse and Movento. Radiant was a separate treatment by itself.

The IPM trials examined two rotational treatments and a chemical standard. IPM treatment #1 consisted of Actara 25 WG, Coragen SC, and Dipel. IPM treatment #2 consisted of Voliam Flexi 40 WG, Baythroid 2EC, and Leverage 2.7 SE. The other treatment representing a chemical standard was Lannate 2.4 LV, combined with Pounce 3.2 EC. The materials used in the IPM trial were applied according to rotational strategies that would support a commercial grower operation. Actara was applied three times, and the last application of Actara included Coragen. Dipel and Movento were applied together one time separately. The chemical standard of Lannate and Pounce were applied three times. The fruit from the chemical and IPM trials were harvested and assessed for insect damage. The chemical screening trial focused primarily on insect damage and the IPM trial included insect damage and a harvest yield component.

Worm pressure and the pepper weevil populations were low this field season. Whitefly and leafminer pressure were low in the chemical and IPM trials. Due to low insect pressure from the pepper weevils and worms, we were unable to show any differences between the treatments. We believe reduced insect pressure was from cooler weather patterns and precipitation. We did see some differences between the treatments for psyllid (*Bactericera cockerelli*) numbers. Peppers treated with Baythroid, Leverage, Lannate, and Pounce had higher psyllid numbers at harvest. These insecticides could be negatively affecting beneficial populations which help control the psyllids, and the use of these types of materials has been shown to actually increase populations of psyllids in the field. For a complete copy of the report contact the California Pepper Commission.

Additional behavior and developmental studies on leafminer and potato psyllids are being conducted. We have tested the repellency of several insecticides on both leafminers and psyllids. It is clear that imidicloprid applied as a drench or through the drip repels the psyllids

and greatly reduces populations for up to six weeks. Repellency studies with other materials that are not pesticides are underway and appear promising. Investigations on the sampling and biocontrol of psyllids are in progress and should be completed this year.

Funds from the Hansen's Trust, UC ANR, and the USDA Pesticide Management Alternatives Program were also acquired to support our pepper research.

Farm Advisors

The following is a list of Farm Advisors by county, who are part of the University of California Pepper working group. Not all counties or farm advisors are listed. For more information go to www.sfp.ucdavis.edu.

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Listing of 2011-12 Approved Projects

Baameur/Smith – Evaluating Nitrogen Uptake	9,800
Jim Prince – Bio-control of Powdery Mildew	10,459
Smith/LeStrange – Pre-emergence of Weed Control	9,856
John Trumble – Insect Management	22,000
LeStrange Cantwell – Effect of Nitrogen Fertilization	9,000
Brenna Aegerter – Pepper Powdery Mildew Control	6,000
	Total $67,115

California Pepper Commission 2010-13

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California Pepper Commission

Financial Report

Fiscal Year: March 1, 2010 through February 29, 2011

Account Name	*Amount*
INCOME	
Carry-over from 2009-10	$155,163
Assessment Income, 2010-11	132,532
Assessments Prior	302
Interest Income	2,906
Total Available Funds	**$290,903**
EXPENDITURES	
Management Services	$40,200
Audits	1,990
Office Supplies	809
Telephone	712
Postage	1,007
Reports & Publications	88
Travel & Mileage	824
Meetings	484
Insurance	690
Marketing Branch, CDFA	6,611
Production Research	43,807
California Minor Crops Council	6,000
Total Expenditures	**$103,222**
Carry-over to 2011-12	187,681
Total Expenses & Reserve	**$290,903**

2010-11 Financial Report

The accompanying Financial Report shows that the Commission continues to be in excellent financial shape, despite falling just short of the expected income from marketed peppers. The Commission budgeted on the basis of receiving income from the equivalent of 380,000 tons of fresh peppers, which would bring in $133,000 at the $.35 per ton rate. However, the actual tonnage from the 2010 crop brought in $132,532. While the surplus carry-over might seem large, the Commission has chosen to keep a substantial reserve to prevent the possibility of needing to fund a project without having the money available.

The Commission's books are audited annually by an independent Certified Public Accountancy firm, and any pepper industry member wanting a copy of said audit may apply to the Commission office.

Complete research reports available
from the Commission office