Pepper News

Published by the California Pepper Commission, 531-D North Alta Ave., Dinuba CA 93618, 559-591-3925

March 2014

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 discussing research projects that can improve the California pepper industry.

Our annual newsletter contains summaries of the research projects completed during the 2013-14 year. Each project 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 has continued to be a proactive partner to the industry, aggressively seeking to maintain the best possible representation to the industry's growers, handlers, and shippers. It is in the Commission's best interest that the industry continues to progress during a time when farming has taken more than its share of negative exposure. My experience with the Commission has reassured me that there are possibilities to continue to improve the Commission's value to the industry and overcome some of the obstacles we all face. The Commission is the only avenue the Pepper industry has to confront new issues in a changing world.

The Commission recently went through a referendum where the producers and processors had an opportunity to submit ballots to approve the continuation of the Pepper Commission for another five years. This referendum is overseen by the California Department of Food and Agriculture who mails out the ballot to the industry from a list provided by the Commission office. With the approval for another five years, the Commission continues to focus on representing the industry on funding research that benefits the producers and processors.

The Commission worked with Valent and the Department of Pesticide Regulation on obtaining a Special Local Need (SLN) 24C on Chateau. Chateau is available to growers for a pre-transplanting application for weed control on mallow in the furrow bed. The Label can be found on the Valent website www.valent.com. Dual Magnum continues to be available as a 24C label from Syngenta through their website www.farmassist.com. Without the assistance of the Pepper Commission, herbicides such as Chateau and Dual Magnum as well as the registered fungicide Rally would not be available to the industry.

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 on the Pesticide Program page 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 Crops 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.

With the demand for agricultural sustainability increasing from the retailers, buyers and consumers, several commodity groups worked to put together a strategic plan growers and industry members can use to determine if their industry practices fall in line with the sustainability standards being set by those demanding them. Being a

part of that process the pepper industry now has a strategic plan available on the Commission website or you can request a copy from the Commission office.

Among Commission activities, the agricultural sustainability strategic plan and research reports, this newsletter can be found on the website www.calpeppers.com. You will also find links to the SLN Labels for Chateau and dual magnum along with a link to the CLFP site.

In order for the Commission to communicate research information to the industry a Research Symposium is being considered for December where researchers can present their findings. More information on this event will be provided later in the year.

The Commission is always available to answer questions or assist in any way they can. Nathan Sano (nathan@tabcomp.com) is the Manager, and Kim Sakamoto (kim@tabcomp.com) the Assistant Manager.

2013 Project Reports

Developing Integrated Pest Mangment (IPM) Tools for Managing Thrips & TSWV

Aziz Baameur, UCCE Santa Clara County, Shimat Joseph, Steve Koiki, UCCE Monterey County,

This field study was set up to investigate (a) the effect of insecticide treatments and (b) the effect of varietal resistance on the occurrence of *Tomato spotted wilt virus* (TSWV). However, during the 2013 season, no TSWV was found in our trial. In fact, we did not detect neither of the other two commonly found viruses in the area--impatiens necrotic spot virus (INSV) and cucumber mosaic virus (CMV).

Table 1. Treatments used in thrips management trial

Treatment code	Treatment description
1	Control: no treatment
2	Treat at transplant (Cyazypyr) only (5/24)
3	Treat at transplant, followed by 3 Radiant applications (5/24; 6/6; 6/14; 6/21)
4	Grower's -no insecticide to control insects other than thrips

This field study was planned in two parts. One part consisted of screening 20 sweet pepper entries with reported resistance to TSWV. The other part comprised plots that combined resistance and insect management approach. Three bell pepper varieties were used in this field trial. Two (Riata and UG 1112408) with reported resistance to TSWV and one (Baron) susceptible. Three insect management treatments and a non-treated control were used in this trial. Each treatment consisted of one-bed plots each 75 feet long and replicated four times.

The first spray-drench application (treatments 2 and 3) took place on May 24, 2013). Plants were sprayed with 13.5 fl oz/acre equivalent of Cyazypyr (Verimark) in transplant trays one hour before transplanting in the field. The control and grower's treatments (numbers 1 and 4) were not treated at that time.

For post-plant treatments, we used Spinetoram (Radiant) on June 6, 14, and 21 to plots in treatment number 3. The spray solution dosage was of 10 fl oz/acre equivalent. Adjuvant (Dyna-mic) was added to each spray solution.

Sticky traps deployed during the season and wash and beat-cup sampling method used at different intervals showed that thrips presence was detected for the whole season in the plots, although seasonal dynamics of thrips were significant. Thrips populations were low early in the season but eventually increased in numbers (Fig. 1). From mid-July to mid-August, thrips counts ranged from 800 to near 5,000 counts per trap. Then, it decreased to around 500's toward the end of the season.

Since no incidence of TSWV was observed or detected in the essayed plant samples, it is safe to deduce that most of the thrips invading the field were non-virulent.

In the absence of TSWV, yield data from the treated plots only reflected varietal differences. Across treatments "Riata" produced significantly higher yield than "UG 1112408" and "Baron," producing 3.21, 2.79, and 2.75 lbs/plant, respectively.

Several other entries, from the resistance screening plots, showed good production levels of 6 lbs/plant (RPP 28634, E20B.24971), while many others produced over 5 lbs/plant as shown in table 2.

Figure 1. Traps profile of tri-weekly counts of seasonal dynamics of thrips in a pepper field in Gilroy, 2013

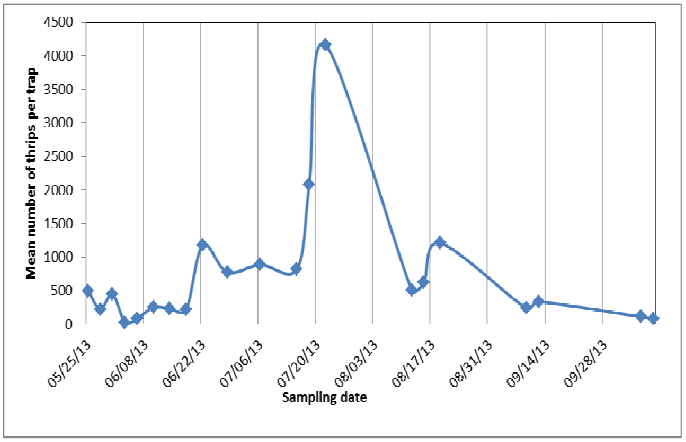


Table 2. Yield characteristics of bell pepper varieties: Gilroy, 2013

Code	Name	Lbs plant		Fruit plant	Tons acre
7	RPP 28634	6.12	A	10	34.3
12	E20B.24971	6.01	A	8.9	33.7
11	Procraft	5.55	AB	8.6	31.1
10	RPP 33100	5.45	AB	7.5	30.5
20	PPX 1841	5.38	AB	8.5	30.2
6	RPP 28627	5.34	ABC	8.5	30
8	Bayonet	5.34	ABC	6.8	29.9
16	UG 113508	5.21	ABC	6.8	29.2
4	Red Victory	5.14	ABC	7.8	28.8
9	Cutlass	5.12	ABCD	6.6	28.7
3	Red Belt	5.07	ABCD	8.8	28.4
19	Riata	4.73	BCD	7.2	27.7
5	Rising Sun	4.91	BCD	7.2	27.5
15	UG 1112408	4.78	BCD	7.1	26.8
13	E20B.24972	4.51	BCD	7.1	25.3
21	Baron (field variety)	4.31	CDE	8.3	24.2
14	UG 111208	4.06	DE	5.3	22.8

Insect Pest Management on Peppers

John T. Trumble, Sean Prager, 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.

Chemical trials examined GF 2860 WG, Radiant SC, Intrepid 2F plus Warrior CS, Grandevo DF2, and MBI 206. All of these materials were applied weekly.

The IPM trials examined a rotational treatment and a chemical standard. The IPM treatment consisted of a rotation of Torac 15 EC, Lannate 2.4 LV plus Pounce 3.2 EC, and Vydate L. The other treatment representing a chemical standard was Lannate combined with Pounce. The materials used in the IPM trial were applied according to rotational strategies that would support a commercial grower operation. The IPM treatment had Torac, Lannate plus Pounce, and Vydate applied twice. The chemical standard of Lannate and Pounce were applied six times. The fruit from the chemical and IPM trials were harvested and assessed for insect damage. The assessment included damage from worms, pepper weevils, stink bugs, and potato psyllids.

Worm pressure populations were moderate this field season. Pepper weevil numbers were moderate-high this season with the control sustaining 14% damage. Several treatments reduced pepper weevil damage significantly. Whitefly and leafminer pressure were low in the chemical and IPM trials. We did see some differences between the treatments for psyllid (*Bactericera cockerelli*) numbers. Peppers treated with Lannate plus Pounce and Intrepid plus Warrior had higher psyllid numbers at harvest. These insecticides either stimulated the psyllids to oviposit or negatively affected beneficial populations, which help control the psyllids. The use of these types of materials, carbamates and pyrethrins, has been shown to actually increase populations of psyllids in the field in other locations. For a complete copy of the report contact the California Pepper Commission.

Laboratory studies to determine resistance levels of thiamethoxam and imidacloprid to psyllids have been completed. We found that psyllids from Texas collected in 2012 are showing some levels of resistance to imidacloprid, but not to thiamethoxam. California collected psyllids did not show any level of resistance to imidacloprid or thiamethoxam. These studies were published.

We are beginning to investigate the ecological and epidemiological relationships among solanaceous plants, plant pathogenic viruses, vectoring, and non-vectoring insects. We have determined that plants infected with viruses will alter the responses of potato psyllids. Future work will investigate how infection with viruses such as TSWV influences transmission of CLso. We prepared a USDA-NIFA grant for this research.

Funds from UC ANR, the USDA Pesticide Management Alternatives Program, and USDA RAMP also supported our pepper research.

Pepper Preemergence Weed Control Trials

Richard Smith, UCCE Monterey County

In 2013 the efficacy and safety of a number of herbicides were evaluated for use on bell peppers. In addition a non-registered material, Zeus from FMC Corp., was available

for evaluation under a research authorization and was tested in large test strips. Malva is a key weed in pepper production fields in the coastal production district that is not well controlled by most herbicides available for use in pepper production.

Zeus had the lowest number of malva plants per plot and lowest total weeds. Zeus at 4.5 oz/A had unacceptable phytotoxicity and caused delay in the maturity of bell peppers; in addition, there were fewer red fruit at harvest in the 4.5 oz/A rate, but no overall reduction in yield. Zeus at 3.0 oz/A was less phytotoxic and should be further evaluated in future trials.

The standard treatment, Dual Magnum + Prowl H2O, was safer on the peppers than Zeus at 3.0 or 4.5 oz/A, but did not control malva as well. Nortron (Bayer Corp) at 24 oz/A was the most phytotoxic treatment, but yielded equal to the standard treatment. Outlook (BASF Corp) at 14 oz/A had acceptable phytotoxicity and yielded equal to the standard treatment.

In summary, Zeus looked promising in the large scale strip trials and provided good control of Malva and should be further evaluated in 2014.

Monitoring of thrips/*Tomato spotted wilt virus* (TSWV) in California peppers and the development of a regional IPM strategy for reducing the incidence and severity of TSWV

Ozgur Batuman, Neil McRoberts and Bob Gilbertson, UC Davis, Brenna Aegerter, UCCE San Joaquin County

Western flower thrips (*Frankliniella occidentalis*) population densities and *Tomato spotted wilt virus* (TSWV) incidence in representative direct-seeded and transplanted pepper fields in San Joaquin County (SJC) and Solano County in 2013. Low populations of thrips (10-350 thrips/yellow sticky card/two weeks) were detected in pepper fields in Solano County in March until late May. By early June, thrips populations increased and remained high (>500-2000 thrips/yellow sticky card/two weeks) through harvest (Fig. 1). In SJC, peppers were not planted until early May; here, relatively high thrips populations were detected shortly after planting and then throughout the season, dropping to low levels in October (Fig. 1). The first detection of TSWV in pepper plants was 1 May in Solano County and 24 May in SJC. TSWV was eventually detected in all eight monitored fields (these fields were not planted with resistant varieties); however, the overall incidence was relatively low (<4%). Incidence of TSWV in early-planted pepper fields was less (<1%) than in late-planted fields (3-4%). Together, these results indicate that thrips populations built-up slowly on peppers, and that TSWV appeared after thrips populations had increased to relatively high levels. These results also indicated that peppers were unlikely to be serving as the major inoculum source for other crops (at least for this season and in these areas).

Winter and spring weed surveys revealed very low levels of TSWV infection in weeds (a total of 12 TSWV-infected weeds detected/435 tested; overall incidence 2%). A notable exception was rough-seeded buttercup (*Ranunculus muricatus*) in SJC and Solano County where this weed was identified as a potentially important reservoir of TSWV. Large numbers of buttercup weeds showing virus disease symptoms and high rates (85%) of TSWV infection were detected in 9/17 walnut orchards surveyed. This weed may be an important potential reservoir host for TSWV in peppers, and may explain the observation by growers of an association between TSWV outbreaks and proximity to walnut orchards.

During the 2013 growing season, a web site for the thrips phenology (degree-day) model was made available for growers, and was regularly updated to provide thrips population projections for each surveyed county. This model, developed for processing tomato production in the Central Valley, also accurately predicted the timing of adult thrips generations (~80% accuracy) in monitored pepper fields. Thus, we believe that this model can be used as a reliable predictor of when thrips populations begin to increase in pepper fields in the spring, and when it is best to apply thrips management strategies. The degree-day model can be accessed via its webpage: http://ucanr.edu/sites/TSWVfieldriskindex/Thrips_Population_Projections/

We started to work on development of a TSWV Risk Index (TRI), for predicting potential losses due to TSWV in pepper fields in the Central Valley. Based on gathered information for each monitored pepper field, the TRI for all monitored fields in 2013 was predicted to be moderate to high. This did not correlate well with observed TSWV incidences. Thus, this model needs to be modified further and tested again until proven to be reliable for predicting TSWV in pepper fields.

An IPM strategy for thrips and TSWV in peppers: The following integrated pest management (IPM) strategy for thrips and TSWV management in peppers is proposed based on the results of our surveys and we believe that this IPM strategy can be highly effective at reducing disease incidence, particularly if followed regionally.

Before planting

i) evaluate planting location/time of planting-this will involve determining proximity to potential inoculum sources during the time of planting (if possible avoid hot spots, planting near fields with bridge crops and weedy orchards or late planting dates).

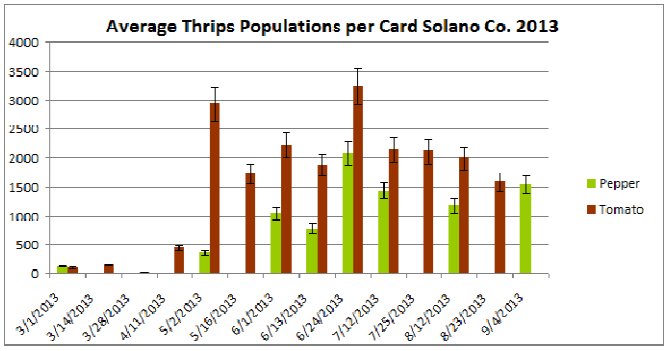
ii) use TSWV- and thrips-free transplants

iii) plant TSWV resistant varieties (possessing the Tsw gene)-these are available, but may not be necessary if other practices are followed. At least, resistant cultivars should be used in hot-spot areas or in late-planted fields that will be established near early-planted pepper or tomato fields in which TSWV infections have already been identified.

iv) implement weed management-maintain weed control in and around pepper fields and especially in fallow fields and orchards, as some weeds are TSWV hosts, such as rough-seeded buttercup. Weeds growing in fallow fields can amplify thrips and TSWV and serve as inoculum sources for peppers.

During the season
i) monitor fields for thrips with yellow sticky cards or use the predictive phenology (degree-day) model to estimate when thrips populations begin to increase.
ii) manage thrips with insecticides at early stages of crop development and when thrips populations begin to increase.
iii) rotate insecticides to minimize development of insecticide resistance in thrips.
iv) monitor fields for TSWV and remove infected plants early in development (<30 days old) and when percent infection is low (<5%)
v) implement weed management-maintain effective weed control in and around pepper fields.

After harvest
i) promptly remove and destroy plants after harvest
ii) avoid planting bridge crops that are thrips/TSWV reservoirs or monitor for and control thrips and TSWV in these crops
iii) control weeds/volunteers in fallow fields, non-cropped or idle land near next years pepper fields.



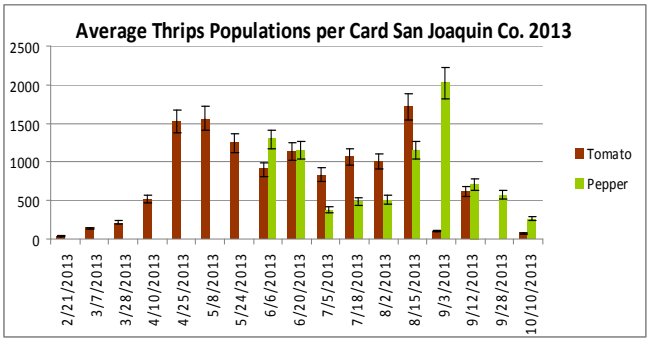


Figure 1. Average thrips counts per yellow sticky card in monitored pepper and tomato fields in Solano and San Joaquin Counties in 2013.

Effect of Foliar Applied Potassium Nitrate and Score Foliar Nutrients on Bell Pepper Yields
Bill Weir, UC Emeritus
A field scale bell pepper test was conducted to verify earlier findings obtained from a small replicated study. In 2012, foliar KNO3 was applied in a test consisting of three 60 inch beds by 50 feet long for each of five treatments and replicated four times. Substantial yield increases were measured when compared to an untreated check. A similar test was conducted in 2013 using the grower's sprayer tractor, harvesting crew and packing facilities. Non-replicated blocks of 3.7 acres received each of two treatments and were compared to an untreated check.

On May 20, 2013, three blocks of 3.7 acres each were identified and marked with flags. One block received a foliar application of 5.0 pounds of KNO3 per acre. A second 3.7 acre block was sprayed with 1.0 quart per acre of Score Foliar Nutrients (4-47-12) plus 1.0 quart per acre of Albion Micro-nutrients (0-0-24). The untreated check was not treated. Two weeks later the same materials and rates were applied to the same blocks of peppers. Hand harvesting crews conducted a first pick of green fruits on July 13, 2013, and a second pick on July 27, 2013. The treated blocks were harvested separately, taken to the packing house, graded for size and packed in 20 pound cartons.

The KNO3 treated block produced 1684.58 cartons of peppers per acre, 52.3% of which were in the extra large size category. The block receiving Score Foliar Nutrients produced a total of 1464.85 cartons per acre, 27% of which were extra large. The untreated check had 1255.6 cartons per acre, of which 32.4% were extra large.

Even without statistical analyses, differences can be seen with respect to yield and quality. These data indicate that properly timed foliar applications of KNO3 might result in more cartons of peppers per acre and higher percentages of extra large fruits.

Complete research reports available Online at WWW.Calpepper.com

Listing of 2014-15 Approved Projects

Richard Smith –	
Pre-emergence of Weed Control	5,000
John Trumble –	
Insect Management	22,000
Bill Weir –	
Plant Growth Regulating Compounds	5,000
Bob Gilbertson –	
Monitoring Thrips/IPM Strategy	15,000
Total	**$47,000**

2013-14 Financial Report

The accompanying Financial Report shows that the Commission continues to be in good financial shape, due partly to meeting 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 $114,000 at the $.30 per ton rate. 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.

California Pepper Commission

Financial Report
Fiscal Year: March 1, 2013 through February 29, 2014

Account Name	*Amount*
INCOME	
Carry-over from 2012-13	$211,451
Assessment Income, 2013-14	114,367
Assessments Prior & Other Income	6,379
Interest Income	1,125
Total Available Funds	**$333,322**
EXPENDITURES	
Management Services	$40,200
Audits	2,588
Office Supplies	311
Telephone	554
Postage	704
Reports & Publications	298
Travel & Mileage	1,175
Meetings	473
Insurance	797
Website	1,800
Marketing Branch, CDFA	14,000
Market Enforcement Branch	800
California Specialty Crops Council	7,500
Production Research	69,500
Chemical Research	3,575
Total Expenditures	**$144,275**
Carry-over to 2014-15	189,047
Total Expenses & Reserve	**$333,322**

Every three years the Commission is required to provide industry members the opportunity to participate in a nomination to represent their district as a member or alternate to the Commission. Prior to the annual 2013 Commission meeting nomination meetings were held throughout the state to set the current roster for the years 2013-16.

California Pepper Commission 2013-16

MEMBERS	ALTERNATES
Producer Representatives	
Burt Silva King City	John Hook King City
Ryan Talley Arroyo Grande	William Terry Oxnard
Mike Chuck Gilroy	Dan Fiorio Gilroy
Bob Giampaoli Le Grand	Patrick Cerutii Newman
Richard W. Bradford La Quinta	Adrian Zendejas Coachella
Handler Representatives	
Matthew Terra Escalon	Tim Chiala Morgan Hill
Juan Lopez Hanford	*Vacnacy*
Glen A. Fischer Ventura	Jerry Hensley Ventura
Tim Baloian Fresno	Edward Chell Camarillo
Bob Heisey Hollister	Terry Berke Woodland
Public Representative	
Dave Nirenberg Camarillo	Peter Iverson King City
Staff	
Nathan Sano/Manager Dinuba	Kim Sakamoto/Ast. Mgr Dinuba

Recycling Drip Tape
The Commission office was contacted earlier this year about the purchasing of recycled drip tape. If you are interested in selling old drip tape contact Henry Kao of Meridian Wealth Management Inc., 1-866-891-1077 ext. 101 for more information. The Commission is not affiliated with Henry Kao or Merdian Wealth Management Inc.