# Pepper News

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## July, 2015

### 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 along with research projects that can improve the California pepper industry.

Our annual newsletter contains summaries of the research projects completed during the 2014-15 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 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 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 increasing demand for agricultural sustainability 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.

A new relationship has the Commission contributing to the Alliance for Food and Farming www.foodandfarming.info to help support the safe fruits and veggies message of eat more produce. Using science based data safe fruits and veggies are educating the consumer on how conventional produce is just as safe as organic and how we should be consuming more. Consumers can visit the site www.safefruitsandveggies.com.

Among Commission activities, the agricultural sustainability strategic plan, research reports and 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.

*Monitoring of Thrips/Tomato Spotted Wilt Virus (TSWV) in CA Peppers & the Development of a Regional IPM Strategy for Reducing the Incidence & Severity of TSWV*

**Bob Gilbertson, UC Davis**

Pepper fields in the Central Valley were monitored again for thrips populations and *Tomato spotted wilt virus* (TSWV) incidence. Thrips populations were detected beginning in March, and increased substantially beginning in mid-April, one month earlier than in 2013. Overall thrips populations in early-planted pepper fields was initially low (50-300 thrips/yellow sticky card/two weeks) until late-April, when populations increased significantly by early-May and high thrips populations (>500-2500 thrips/yellow sticky card/two weeks) were observed throughout the season in all monitored fields through harvest (Fig. 1). In all monitored pepper fields, high thrips populations were detected in early May, which fluctuated through September (Fig. 1), and persisted throughout the season and gradually declined through the end of October (Fig.1).

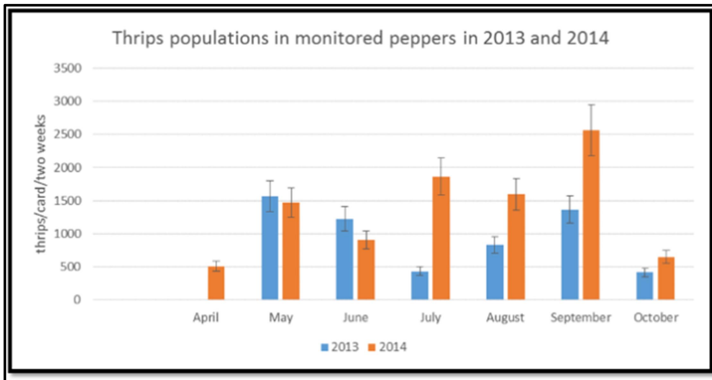


Figure 1: Average Thrips Counts per Yellow Sticky Card in Monitored Pepper Fields in 2013 & 2014

In 2014, TSWV was first detected in mid-April and correlated with thrips population increases. This was about a month earlier than in 2013, when the thrips population increase was in mid-May. TSWV appeared in all 8 monitored pepper fields, including those with TSWV-resistant pepper varieties (with *Tsw*-gene). TSWV incidences in early-planted field were low (~2%), whereas highest TSWV incidences (8-14%) were in late-planted fields near tomato fields with TSWV (Table 1). Moreover, the detection of TSWV in TSWV-resistant pepper fields in Byron-Brentwood in SJC indicated that these production areas were under high TSWV disease pressure in 2014 and peppers without *Tsw*-gene could have been affected substantially.

In some late-planted green and red pepper fields monitored in 2014, TSWV incidences were higher (8-14%) and increased up to 14%-20% in parts of the fields by the end of the season (Table 1). In some of these fields, TSWV came in late, probably via thrips from nearby processing tomato fields that were being harvested. However, even in these fields, damage from TSWV appeared to cause minimal economic loss, but clearly the potential for loss due to TSWV exists.

In 2014, *Alfalfa mosaic virus* (AMV) was more widespread than TSWV (or any other disease) in monitored pepper fields, with incidences as high as 40-60% in some fields early in the season (Table 1). Interestingly, AMV did not seem to cause any visible damage to pepper fruits and, later in the season, plants recovered from viral infection with little or no yield loss.

| Monitored Pepper Fields in 2014 | | | | | | |
|---|---|---|---|---|---|---|
| Fields | Solano County | | TSWV % | TRI | Points | Other Virus Incidences |
| HM | Hamel Ln., Davis | early-planted | 2 | Moderate | 140 | 6% AMV and 1%BCTV |
| PH | Phillips Rd., Dixon | early-planted | 2 | Moderate | 150 | 3% AMV and 1% BCTV |
| SI | Sievers Rd., Dixon | early-planted | 14 | High | 170 | 20 % AMV and 1% BCTV |
| TR | Tremont Rd., Dixon | late-planted | 8 | High | 200 | 5% AMV and 1% BCTV |
| BU | Bulkley Rd., Dixon | early-planted | 2 | Moderate | 135 | 8% AMV and <1% CMV |
| HK | Hackman Rd., Dixon | early-planted | <2 | Moderate | 150 | 4% AMV |
| | | | | | | |
| | San Joaquin County | | | | | |
| AR | Arch Rd., Stockton | early-planted | 2 | Moderate | 125 | 2% BCTV |
| MC | Marsh Creek Rd, Brentwood | early-planted | <1 | Low | 45 | 1% BCTV |

Table 1: Pepper Fields Monitored in 2014: Locations, TSWV & Other Virus Incidence & TSWV Risk Index (TRI) Values

Additionally, very low (sporadic and <1%) levels of other pepper-infecting viruses including a necrotic strain of AMV (the strain that usually causes necrosis on leaves, stems and fruits and did not show recovery), *Cucumber mosaic virus* (CMV) and *Tobacco etch virus* as well as phytoplasma and bacterial spots diseases were detected in some of the monitored fields (Fig. 2).


Figure 2: Examples of Some of the Diseases & Their Charactiersitic Symptoms that Observed in Monitored Pepper Fields 2014. TSWV; Tomato Spotted Wilt Virus, AMV; Alfalfa Mosaic Virus, BCTV; Beet Curly Top Virus, CMV; Cucumber Mosaic Virus

In 2014, weeds were collected from surveyed areas and tested for TSWV. Most weeds collected before and during the pepper growing season were symptomless and tested negative for TSWV (with immunostrips and/or PCR). A small number of weeds with symptoms including rough-seeded buttercup, bindweed, sowthistle and prickly lettuce were infected with TSWV. The overall incidence of TSWV infection in weeds was very low (~2% or 9 TSWV-positive weeds/395 tested). This was similar to results from previous years, and continues to indicate that weeds in the Central Valley of California are not extensively infected with TSWV.

In 2013 and 2014, our degree-day model predicted generations of adult thrips in peppers with ~80% accuracy. Interestingly, for both years, the degree-day model targeted the 2nd thrips generations in early-planted peppers, and the 3rd generation in late-planted pepper fields for thrips control. Thus, the thrips degree-day model reliably detected the appearance of thrips populations and can be used by growers to time the application of thrips control measures early in the season. The degree-day model can be accessed via its webpage:
http://ucanr.edu/sites/TSWVfieldriskindex/Thrips_Population_Projections/

A TSWV risk index (TRI) for peppers was developed. In fall 2014, we gathered most of the information about each monitored pepper field from growers, and we calculated TRI for each field and compared this with the known levels of TSWV in each field. Based on the current pepper TRI, the fields were assigned high, moderate and low risk (Table 1). When these TRI values were compared with the actual TSWV incidences in 2014 growing season for each monitored field, we noticed a good correlation. In other words, the calculated TRI identified risk categories for our monitored pepper fields (Table 1). Thus, TRI now can be used by growers to predict the threat of TSWV for a particular field and can be accessed via its webpage:
http://ucanr.edu/sites/TSWVfieldriskindex/Field_Risk_Index/

By using the information generated in this project, we have developed the following IPM program for TSWV and thrips in peppers in the Central Valley of California. We believe that implementation of this program (all or in part) will help reducing TSWV to levels where economic losses can be substantially reduced, 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 tomato or 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. If weeds are allowed to grow in fallow fields, they 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 (usually 2nd and/or 3rd thrips generations).
**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

*Utilization of Nitrogen Uptake Data to Refine Nitrogen Management Tool for Peppers*
**Aziz Baameur, UCCE Santa Clara**

This second year field study was established across seven bell pepper commercial production fields. From each field we collected plant, fruit, and soil samples that were submitted to UC Davis Analytical laboratory.

We harvested the experimental plots at the same time the production fields were harvested. Data showed that yields varied from 42 to 62 tons per acre. In comparison to 2012, the 2014 study average yield was 30% higher. However, 2014 average dry matter production was only 9% as compared to 2012.

2012 study showed very little difference in N and K content in plant (51%) and fruit tissues (49%). It also indicated that 70% of phosphorous (P) was located in the fruit. Similarly in 2014, fruit tissue contained 90% of P. The 2014 study, showed plant tissue had slightly higher nitrogen concentration (3.8%) than did fruit (3%). Both fruit and plant had similar amounts (3.4%) of Potassium (K).

Putting this information in a more practical sense, biomass (fruit and plant) removed 181 pounds of N each from each cultivated acre. Phosphorus uptake in fruit was 26 pounds per care (Lbs/acre), in contrast to 12 lbs taken up by the plant. Potassium was 18% higher in fruit (211 lbs/acre) than in the plant (172 lbs/acre).

By extrapolating the information on hand, one can estimate NPK requirement inputs for pepper production. To produce one ton of above-ground biomass (fruit and plant combined), the grower would need to supply 9.5, 1, and 10 lbs of NPK, respectively (ratio of N:P:K = 9.5:1.0:10.1).

On the other hand, to produce one ton of fruit, a grower would supply a minimum of 7 lbs of N, 1 lb of P, and 8 lbs of K (ratio of N:P:K = 7:1:8).

There have been rare instances where a grower's reported nutrient inputs fell short of the total nutrients detected in plant biomass. While this may seem unrealistic, it may highlight the role of some soils' buffering and reserve ability to temporarily supplement grower's inputs and.

Further analyses are ongoing to combine these data with canopy size and soil nutrient levels and incorporate them into ANR CropManage, an online analysis tool for growers and managers.

*Evaluation of the Effect of Soil & Foliar Applied Plant Growth Regulators on Bell Pepper Yields*
**Bill Weir**

An experiment was conducted on Classic Bell Pepper to evaluate possible benefits of applying three different plant growth regulators (PGR's). The PGR's were: Indolbuteric acid (IBA) to enhance root initiation and growth, Gibberlic acid (GA3) to increase fruit size, and Ethephon to hasten maturity for the reds market. Since none are registered for pepper, the crop was destroyed. All materials were applied at label rates for the respective crops for which they were registered. The statistical design was a randomized complete block replicated four times.

IBA was applied as a soil drench immediately after transplanting in one treatment. In another treatment IBA was applied as soil drench immediately after transplanting and again three days later. Plant heights were measured on June 11 and on June 23, 2014.

On June 10, 2014, GA3 was applied by backpack sprayer as the plants were setting and developing fruits. The GA3 application was repeated on the same plants on June 25th.

Ethephon was applied at a rate of 1.0 quart per acre by backpack sprayer to another treatment on July 20, 2014, approximately two weeks prior to harvest.

The treatments were as follows:

1. Untreated check
2. Indolebuteric acid, one application
3. Gibberelic acid, two applications
4. Indolebuteric acid, two applications
5. Ethephon

Site Location: Live Oak Farms, Le Grand, CA

Host Crop Variety: Classic Bell Pepper

Description & Size: Two five foot beds by 10 feet long for each treatment, replicated four times.

Experimental Design: Randomized complete block

RESULTS:
Table 1 shows that plant height measurements of the IBA treated plants increased as rates of IBA increased. On June 11th, the two IBA treatments were measured and were about one inch taller than the untreated control. By June 23rd, the single IBA treatment was about two inches taller and the double treated plants were about three inches taller than the untreated control.

It was difficult to detect earliness during the first harvest since weights were extremely variable. Treatment #4 (Indolebuteric acid, 2X) may have shown an indication of more mature fruits. There was also no definite pattern from the second harvest on July 19th. By the third harvest on August 2nd, treatments #2 (Indolebuteric acid, 1X) and #4 (Indolebuteric acid, 2X) were high yielders indicating late maturity.

Peppers were harvested three times which corresponded closely with the grower's commercial harvest dates. They were harvested on July 12th, July 19th and August 2nd, 2014.

Table 1 – Relative heights in inches, of pepper plants on two dates, treated with IBA.

| TREATMENTS: | June 11, 2014 | June 23, 2014 |
|---|---|---|
| 1. Untreated check | 10.25 | 13.25 |
| 2. Indolebuteric acid, 1X | 11.23 | 15.50 |
| 4. Indolebuteric acid, 2X | 11.38 | 16.25 |

The ANOVA in table 2 shows that there were no significant differences among treatment means at the 95% confidence level. Multiple range tests give means for each of the treatments and show that treatment #2 yielded 1246 – 40 lb boxes per acre, while the untreated control and the Gibberlic acid treatments yielded only 828 and 823 boxes, respectively.

The Ethephon applied two weeks prior to harvest resulted in an average of 20% chocolate and red compared to 1 – 3% in the untreated control.

Table 2 - Multifactor ANOVA – TOTAL YIELDS

Dependent variable: YIELDS
Factors:
TREATMENTS
REPS

Number of complete cases: 20

**Analysis of Variance for YIELDS - Type III Sums of Squares**

| *Source* | *Sum of Squares* | *Df* | *Mean Square* | *F-Ratio* | *P-Value* |
|---|---|---|---|---|---|
| MAIN EFFECTS | | | | | |
| A:TREATMENTS | 529767. | 4 | 132442. | 1.05 | 0.4202 |
| B:REPS | 712296. | 3 | 237432. | 1.89 | 0.1850 |
| RESIDUAL | 1.50711E6 | 12 | 125592. | | |
| TOTAL (CORRECTED) | 2.74917E6 | 19 | | | |

All F-ratios are based on the residual mean square error.

The ANOVA table decomposes the variability of YIELDS into contributions due to various factors. Since Type III sums of squares (the default) have been chosen, the contribution of each factor is measured having removed the effects of all other factors. The P-values test the statistical significance of each of the factors. Since no P-values are less than 0.05, none of the factors have a statistically significant effect on YIELDS at the 95.0% confidence level.

**Multiple Range Tests for YIELDS by TREATMENTS**

Method: 95.0 percent LSD

| *TREATMENTS* | *Count* | *LS Mean* | *LS Sigma* | *Homogeneous Groups* |
|---|---|---|---|---|
| 3 | 4 | 823.925 | 177.195 | X |
| 1 | 4 | 828.65 | 177.195 | X |
| 5 | 4 | 934.825 | 177.195 | X |
| 4 | 4 | 1091.53 | 177.195 | X |
| 2 | 4 | 1246.13 | 177.195 | X |

CONCLUSIONS:
The total peppers, excluding reds, were highest in treatment #2 (Indolebuteric acid, one application) at 1246.13 cartons per acre, and treatment #4 (Indolebuteric acid, two applications) at 1091.53 cartons per acre. It appears that IBA gave the best yield benefits.

*Preemergence Weed Control Trials in Peppers*
**Richard Smith, UCCE Monterey County**

**Objective**
Examine potential pre-transplant herbicides (Outlook and Zeus) for safety and effectiveness in weed control for peppers

**Methods:** The trial was conducted on a commercial bell pepper farm south west of Greenfield on a site with Elder loam soil. Treatments were applied to shaped beds prior to transplanting on May 23. A proprietary Anaheim pepper variety was transplanted the same day in two seedlines on the beds; transplants were watered with sprinkler irrigation immediately after planting. Each plot was one 40-inch bed wide by 20 feet long and replicated four times in a randomized complete block design. All materials were applied with two passes of a one-tip wand with an 8008E nozzle applying the equivalent of 69 gallons per acre. Yield was measured on September 25 by harvesting the fruit from 6 plants in the middle of the plot and grading them according to maturity and quality. See tables for evaluations and dates.

**Results:** There was very light weed pressure at this site and the weed evaluation on June 26 (34 days after treatment) showed no differences among the treatments (Table 1). The July 30 weed evaluation was following hand weeding of the field, and this evaluation was to determine the weed control treatments have longer-term ability to suppress weeds; no weeds reemerged in the plots and no weeds were present. Phytotoxicity ratings taken on June 12 and June 26, 20 and 34 days after treatment, respectively, showed clear unacceptable phytotoxicity from Outlook and slight phytotoxicity from Zeus at 4.5 ounces/A and the combination of Prowl + Dual Magnum (the standard treatment). The unacceptable phytotoxicity from Outlook was still evident on July 30 (64 days after treatment). Yield was measured on September 25, and there were fewer reds in the Outlook treatment. Overall there was a trend that indicated that the 4.5 ounce/A rate of Zeus had less yield than the 3.0 ounce/A rate which is consistent with observations made in the 2013 trial giving further evidence that on lighter soils, the rate of Zeus should be closer lower to assure crop safety.

Table 1. Weed counts (no./20 $ft^2$) on two dates and phytotoxicity ratings on three dates.

| Treatment | Material/A | Weeds June 26 | Weeds July 30 | Phyto[1] June 12 | Phyto June 26 | Phyto July 30 |
|---|---|---|---|---|---|---|
| Untreated | ---- | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| Prowl H2O | 2.00 pt | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dual Magnum 7.62<br>Prowl H2O | 1.67<br>2.00 | 0.5 | 0.0 | 1.1 | 0.9 | 0.5 |
| Outlook 6.0 | 14.0 oz | 0.8 | 0.0 | 3.0 | 3.1 | 2.5 |
| Zeus 4F | 3.0 oz | 0.5 | 0.0 | 0.3 | 0.1 | 0.0 |
| Zeus 4F | 4.5 oz | 0.4 | 0.0 | 1.0 | 0.5 | 0.0 |
| | Pr>F treat | 0.6076 | NA | <0.0001 | <0.0001 | <0.0001 |
| | LSD 0.05 | NS | NA | 0.6538 | 0.4815 | 0.3726 |

Table 2. Yield Evaluation on September 25

| Treatment | Material/A | Red | | Breaker | | Green | | Cull | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. | Wt. | No. | Wt. | No. | Wt. | No. | Wt. | No. | Wt. |
| Untreated | ---- | 32.7 | 9.1 | 15.0 | 4.2 | 72.3 | 19.4 | 0.3 | 0.1 | 120.3 | 32.8 |
| Prowl H2O | 2.00 pt | 32.0 | 8.9 | 18.0 | 5.0 | 72.3 | 19.0 | 1.0 | 0.3 | 123.3 | 33.2 |
| Dual Magnum 7.62<br>Prowl H2O | 1.67<br>2.00 | 29.0 | 8.1 | 16.7 | 4.5 | 71.0 | 19.0 | 2.3 | 0.8 | 119.0 | 32.5 |
| Outlook 6.0 | 14.0 oz | 23.7 | 6.2 | 19.7 | 5.4 | 66.7 | 17.3 | 0.7 | 0.2 | 110.7 | 29.1 |
| Zeus 4F | 3.0 oz | 28.7 | 7.9 | 15.3 | 4.3 | 75.7 | 20.4 | 0.3 | 0.1 | 120.0 | 32.7 |
| Zeus 4F | 4.5 oz | 29.0 | 8.0 | 13.0 | 3.6 | 70.3 | 18.3 | 1.3 | 0.4 | 113.7 | 30.3 |
| | Pr>F treat | 0.0504 | 0.0301 | 0.4994 | 0.4284 | 0.7670 | 0.5323 | 0.3939 | 0.2440 | 0.5689 | 0.3121 |
| | LSD 0.05 | 5.5 | 1.6 | NS | NS | NS | NS | NS | NS | NS | NS |

*Insect Pest Management on Peppers*

**John T. Trumble, Sean Prager, William Carson, & 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 and IPM trials were combined this year 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 Radiant SC, and Intrepid 2F plus Warrior CS. These materials were applied on a weekly basis.

The IPM trials examined a rotational treatment and a chemical standard. The IPM treatment consisted of a rotation of Verimark 200 SC, Acatara 25 WG plus BeetleGone!, and Closer SC plus BettleGone!. The other treatment representing a chemical standard was Lannate 2.4 LV plus Pounce 3.2 EC. The materials used in the IPM trial were applied according to rotational strategies that would support a commercial grower operation. The IPM treatment had Verimark applied once as a soil drench, Actara plus BeetleGone! applied twice, and Closer plus BeetleGone! applied three times. The chemical standard of Lannate and Pounce was 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-high this field season. Pepper weevil numbers were moderate-high this season with the control sustaining 15% 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.

We investigated 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. In particular, potato psyllids seem to avoid plants that are infected with pathogenic viruses. This leads to less landing on plants and also to less oviposition. We investigated how infection with viruses such as TSWV influences transmission of CLso. Additionally, we collaborated with researchers at the USDA to determine biochemical responses correlated with these behaviors and infection rates. We have submitted a manuscript for publication.

Funds from the USDA Pesticide Management Alternatives Program, and Specialty Crop Research Initiative (SCRI) also supported our pepper research.

**2014-15 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 carryover might seem large, the Commission has chosen to keep a substantial rserve 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.

**Fiscal Year: March 1, 2014 through February 28, 2015**

| ***Account Name*** | ***Amount*** |
|---|---|
| **INCOME** | |
| Assessment Income, 2014-15 | 130,827 |
| Assessments Prior | 3,305 |
| Interest Income | 798 |
| **Total Income** | 134,930 |
| **Carryover from 2013-14** | 192,960 |
| **Income/Carryover** | **$327,890** |
| **EXPENDITURES** | |
| Management Services | $40,200 |
| Audits | 2,718 |
| Office Supplies | 831 |
| Telephone | 636 |
| Postage | 451 |
| Reports & Publications | 0 |
| Subscriptions | 2,000 |
| Travel & Mileage | 704 |
| Meetings | 782 |
| Insurance | 785 |
| Website | 1,950 |
| Marketing Branch, CDFA | 12,919 |
| Market Enforcement Branch | 800 |
| California Specialty Crops Council | 5,000 |
| Production Research | 48,150 |
| Chemical Research | 3,375 |
| **Total Expenditures** | **$121,300** |
| Cash-Balance 5/31/15 | $206,590 |

The Commission and staff are always available to answer questions or assist in any way they can. Nathan Sano (nathan@tabcomp.com) is the Board Manager, and Kim Sakamoto (kim@tabcomp.com) is the Assistant Manager, and they can be contacted via email or at 559/591-3925.

## Complete research reports available from the Commission office