



# Pepper News

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**May, 2008**

## **California Pepper Industry Report**

*Glen Fischer, Saticoy Foods*

*Chairman, California Pepper Commission*

As chairman of the California Pepper Commission for the past ten years, and as a member and alternate for an additional six years, I have had the pleasure of experiencing the commitment and dedication Commission members have towards improving the California pepper industry. Consisting of growers and handlers, the Pepper Commission is able to represent the entire industry. With this type of representation, the Commission, as a whole, can work towards improving the chemical, disease and pest issues that concern the pepper industry.

With the support of the industry, the Commission has been able to fund numerous research projects pertaining to the needs of the industry. We feel there is a responsibility to focus on current and future issues by seeking out researchers who have the same passion for their work as our industry members have for ours. Even though we review each project proposal every year, many of the researchers have been working with us for years and have a strong understanding of the industry's needs. The Research Committee, run by Bob Heisey, dedicates their time to search out these researchers, and then review the proposals submitted. The Committee is set up with some of the most dedicated individuals concerned with making sure the industry is receiving the best possible support available by analyzing and carefully recommending research projects. This newsletter provides summaries of last year's research projects.

Along with our focus on research projects as a Commission dedicated to the industry, we have worked extensively providing Dual Magnum and Rally to the industry. We currently have a Section 24© on Dual Magnum (available through the Commission office) and have worked with the DPR and Dow AgroSciences on registering Rally. As it sits right now, Rally has just been registered in California for use on Peppers. The significance of these chemicals to the industry is obvious, which is why the Commission feels it is important to take the time to see that they are continually available.

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.

You will be receiving in the next few weeks a ballot for a referendum vote of the industry. This referendum for the continuation of the Commission is required every five years by law. I am asking you to vote and return your ballot. If you have any questions feel free to call me at (805) 340-0078 or you can speak with Jerry Munson, Commission Manager, or Nathan Sano, Assistant Manager at the Commission office at (559) 591-3925.

## **Resistance Management Critical W/**

### **Use of Rally for Powdery Mildew**

*Bob Heisey, Research Committee Chairman*

With the full registration of Rally, California pepper growers have new options for more cost-effective and more flexible spray programs for Powdery Mildew control. However, the reported appearance of Rally-resistant strains of Powdery Mildew on tomatoes in the Central Valley of California in 2007 underscores the importance of disease "resistance management" strategies as a part of any spray program. These strategies include alternating chemicals with different modes of action and/or tank mixes of chemicals.

Although we are not sure of the exact relationship of tomato and pepper isolates of the fungus, they are currently considered to be able to cross-infect (the Pepper Commission is funding research this year to examine this situation). If that is the case, we might see the Rally resistant PM appear on peppers in the near future. Currently in addition to Rally we have two other products registered for PM control, sulfur and the strobilurins (Quadris, Cabrio, and Flint), with a new chemical, Quintec, in the process of California registration.

Please check with your PCA. Disease resistance management as part of a spray program is vital for long-term control of PM on peppers in California.

## **Chemical Use List**

The California League of Food Processors has provided the Commission with a list of Chemicals that can be used on peppers in California. Contact the Commission office to obtain a copy.

# 2007 Project Reports

## Disease prediction Model for Powdery Mildew

Mike Coffey, UC Riverside

Powdery mildew research in 2007 focused on collected environmental data and monitoring disease progress. We collected data at 5 sites this year. At two of them different weather monitoring datalogging systems, Hobo and Spectrum Watchdog, were compared. Hobo weather stations are very robust and easy to operate and download usable data. Spectrum Bulldogs are currently used by our project advisor Dr Remigio Guzman-Plazola in Mexico for refining his predictive model. From a user perspective, Watchdog dataloggers proved to be the most reliable. Unfortunately, powdery mildew appeared either very early before the dataloggers were properly in place or extremely late in the season when observations were no longer taking place.

## Novel Chemical Methods for *Verticillium* Control

Mike Coffey, UC Riverside

In research on the **chemical control** of *Verticillium* wilt we focused on the use of materials that activate different plant defense mechanisms. The combination of specific concentrations of Actigard and Phostrol resulted in reduced disease symptoms in most instances. Occasionally, Actigard alone caused a reduction in symptoms. In all cases *Verticillium* was isolated from the stems of inoculated plants. The enhanced activity of specific combinations of Phostrol and Actigard is presumably due to their ability to activate different plant defense mechanisms in pepper sufficient to reduce but not prevent infection.

## Weed Control Trials --Evaluations in Peppers

Richard Smith and Michelle LeStrange, Farm Advisors in Monterey County and Tulare Counties, respectively

Peppers are long-season vegetables that have several weed control challenges: (1) They compete weakly with weeds for the first 40 to 60 days following transplanting. (2) They are a long-season crop in many production districts that can be subject to flushes of both winter and summer weeds over the course of their growing cycle. (3) The preemergence herbicides registered for peppers have gaps in the spectrum of weeds that they control.

As a result, growers may spend from \$200 to \$350/acre on weed management. Field selection, field sanitation, cultivation and the use of plastic mulches are cultural practices that reduce weed pressure in production fields. Fumigation provides substantial weed control and is frequently used in conjunction with plastic mulches which improves the level of weed control provided by both techniques. Goal Tender was registered in California in 2004 for use with plastic mulch and provides control of Little Mallow (*Malva parviflora*) which is only partially controlled by fumigants and other preemergence herbicides registered for use on peppers. However, many acres of peppers are not grown with plastic mulch, and weed control is a challenge. Devrinol, Prefar and Treflan are registered preemergence herbicides in peppers. Dual Magnum is registered under a 24C and provides good control of hairy nightshade (*Solanum sarrachoides*) and yellow nutsedge (*Cyperus esculentus*) which are not controlled by the other preemergence materials. Late season weed control is also an important issue in this crop. The objective of these studies was to examine at transplant and layby herbicide combinations for peppers that can provide long-term and economical weed control

for peppers grown without plastic mulch.

The South San Joaquin Valley trial investigated the utility of several preemergent herbicides applied at-planting and/or at layby in transplanted bell peppers. Dual Magnum 7.62 and Outlook 6.0 were the main herbicides that were evaluated, but Dacthal 75W, Matrix, Prowl H<sub>2</sub>O, Spartan 4F and V-10142 were also tested. At-planting applications of Dual Magnum and Outlook provided excellent weed control with very minor crop phytotoxicity. Layby applications of Dual Magnum, Prowl H<sub>2</sub>O, and Dacthal were also excellent at controlling weeds. V-10142 applied at layby also provided excellent weed control. Spartan applied at a low rate (0.1 lb a.i./A) at layby provided insufficient weed control over this spectrum of weeds. Matrix applied over-the-top at planting was too harsh on pepper transplants causing loss of stand, significant yield loss, and only mediocre weed control perhaps exacerbated by lack of pepper stand.

Overall, V-10142 provided an excellent late-season weed control option for peppers as it was safe for use as a directed spray and controlled many weed species. Valent Corp. has decided to not pursue registration of this material for use on peppers at this time due to long-term carryover issues. At transplanting applications of Dual Magnum provided good weed control 102 days after treatment (DAT) at the Fresno trial; however following the at transplanting application of Dual Magnum with layby applications of Dual Magnum, Dacthal or Prowl H<sub>2</sub>O provided nearly complete weed control. This level of weed control was not seen in the Monterey County trial; it is unclear why this occurred, but it may have been due to lower weed pressure that made detecting differences among treatments at the site difficult. Dacthal is already registered for use on peppers and can provide a useful tool for late-season weed control in peppers. Prowl H<sub>2</sub>O was registered for use on peppers in 2008 and will provide good control of key weeds in peppers (i.e. purslane, lambsquarters and pigweed) as well as partial control of Malva. We are working with Syngenta Corp to clarify the wording of the Dual Magnum label to allow its use as a layby application for peppers. Tank mixes of Prowl H<sub>2</sub>O and Dual should provide good control of a wide spectrum of weeds in peppers. In all, these materials should provide growers producing peppers on un-mulched beds with options to deal with early as well as late-season weeds in peppers.

## Insect Pest Management

John 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 Avaunt 30 WD, A15452 300 SC, A15365 250 SC, Lannate 2.4 LV, Movento 240 SC, Platinum 240 SC, Pounce 3.2 EC, QRD 200 EC, Radiant, and Synapse 24WG. QRD 400 and Avaunt were part of the same treatment and were sprayed alternating each week. Platinum, A15452, and A15365 were applied one time with a soil drench post planting. The Synapse, Movento, Radiant, and the Lannate /Pounce combination were applied weekly.

The IPM trials examined a low input treatment of Movento 240 SC, Synapse 24 WG, and Xentari DF. 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.

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 was high and the pepper weevil populations were significant. Potato psyllid, whitefly, and leafminer pressure were low in the chemical and IPM trials. Most of the treatments in the chemical trial provided good worm control. The best control of pepper weevils was from the QRD 400 and Avaunt treatment. In the IPM trial, the low input strategy consisting of Movento, Synapse, and Xentari performed well against worm pests. Both the low input and chemical treatments provided significantly better suppression of pepper weevils when compared to the untreated control. For a complete copy of the report contact the California Pepper Commission.

Additional funding has been received from the University of California Agriculture and Natural Resources (UC ANR) to expand the project to include trials in the desert at the Coachella Valley Agricultural Research Station (CVARS). These trials are underway with an additional trial to be performed in Ventura County next year. Funding was also obtained from the Hansen's Trust to test varietal resistance in peppers, allowing us to develop a comprehensive program for insect suppression. These tests are also in progress. We will report all of these results to the California Pepper Commission as well.

### **Insecticides for Control of Pepper Weevil**

*Dave Holden*

In a randomized complete block design (RCBD) trial, eight different insecticide treatments were evaluated against an untreated check, to screen for efficacy against Pepper weevil (*Anthonomus eugeni*). Pepper weevil adults were routinely caught in pheromone traps set up around the field, yet at no time during the course of this trial were any weevils found infesting the mature peppers. Data was also collected for Western flower thrips (*Frankliniella occidentalis*) and Potato Psyllid (*Paratrioza cockerelli*). No significant control of either of these pests was observed with any of the applications. All data rated as significant was done so utilizing the New Duncan's Multiple Test Range at a 95% confidence level.

### **Fungicides for Powdery Mildew Control**

*Dave Holden*

In a randomized complete block design (RCBD) trial, nine different fungicide treatments were evaluated against an untreated check, to screen for efficacy against Powdery mildew (*Leveillula taurica*). Conditions in the field did not favor the development of this disease, but in the final analysis, though disease pressure was light, all products tested did show significant reduction in disease incidence and severity over the untreated check. All data rated as significant was done so utilizing the New Duncan's Multiple Test Range at a 95% confidence level.

Of the nine tested products, four showed no development at any

time of any Powdery mildew. Those four products were Cabrio, Inspire, Inspire/Revus combination, and Quadris. The following five products on average never showed more than 2% incidence of Powdery mildew on all leaves evaluated: Flint, Rally, Quintec, Milstop (Potassium bicarbonate), and DuPont LEM 17. In conjunction with these trials of materials and ratings, weekly data was collected by this investigator for Dr. Mike Coffey for the final six weeks of the trial for daily average temperatures and leaf wetness to work on a model to correlate this data to Powdery mildew development.

### **Pepper Screening for Herbicide Resistance/Tolerance**

*Michelle Lestrangle, UCCE Farm Advisor, Tulare County*

To register new herbicides is a long and costly process and the economic necessity is to develop products with potential for a large market and long shelf-life. Peppers are a specialty crop grown on relatively few acres compared to major agricultural commodities and any new herbicides for use in peppers are only likely to be due to their registration in other crops.

Researchers have studied some varieties of peppers and found differences in herbicide tolerance, which suggests that incorporating tolerance into susceptible cultivars through plant breeding procedures may be possible. So, if herbicide tolerance could be incorporated into commercial pepper varieties and if the subsequent registration of the herbicide for use in pepper would occur, then this would improve the effectiveness of chemical weed control in peppers substantially.

The pepper germplasm pool has approximately 120 lines from accessions from all over the world. **The goal of this project** was to screen some pepper acquisitions to see if peppers have tolerance or resistance to a few herbicides registered for use in other crops that could likely be registered for use in peppers.

A pilot study was conducted in a pepper field at the UC WSREC in the summer of 2007. Germplasm of approximately 45 lines of different pepper types were seeded and grown by a commercial transplant producer before they were mechanically transplanted in the field on June 20. Seedlings were weak and non-uniform; stand establishment in the field was further hindered by heat and salt stress. Original plans were to spray the plants about 4-6 weeks after transplanting (layby) but stand establishment was so poor and erratic that spraying was postponed. On September 11 six herbicides (none registered for use in peppers) were sprayed over the top of 16 different lines of maturing pepper plants. None of the plants died from the treatments, a few lines were moderately damaged by the sprays, several lines were only slightly damaged, and in the majority of cases the plants were unaffected.

From this pilot study it was visually observed that there was difference in germplasm vigor making stand establishment more difficult than usual. Future studies to determine herbicide resistance within germplasm by screening peppers with herbicides would need a larger supply of seed and/or be conducted in a greenhouse or nursery setting.

One bright note is that several commercial herbicides look like they could be tested in standard pepper varieties to see if there is weed control without phytotoxicity and then perhaps expand their labels to include peppers. Some of this is already being accomplished through another research project sponsored by CPC, but now the list of herbicides might be expanded.

**Listing of 2008-09 Approved Projects**

Aziz Baameur – Alternate Mulches	\$2,800
Aziz Baameur – Insecticide Trtmt./Virus Reduction	8,800
Mike Coffey – Powdery Mildew	13,750
Mike Coffey – DNA/Powdery Mildew	12,100
David Holden – Powdery Mildew	7,950
David Holden – Chemical Trial Phytophthora	12,400
Mike Matherton – Phytophthora & Root Rot	4,000
Joe Nunez – Cucumber Mosaic	3,615
Smith/LeStrange – Weed Control	8,392
John Trumble – Insect Management	17,000
<b>Total</b>	<b>\$90,807</b>

**California Pepper Commission 2007-10**

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**California Pepper Commission**

**Financial Report**

Fiscal Year: March 1, 2007 through February 29, 2008

<i>Account Name</i>	<i>Amount</i>
<b>INCOME</b>	
Carry-over from 2006-07	\$ 66,280
Assessment Income, 2007-08	175,139
Interest Income	<u>4,373</u>
<b>Total Available Funds</b>	<b>\$245,792</b>
<b>EXPENDITURES</b>	
Management Services	\$36,540
Legal Counsel	357
Audits	1,698
Office Supplies	872
Telephone	616
Postage	1,050
Reports & Publications	70
Travel & Mileage	2,305
Meetings	1,330
Insurance	558
Marketing Branch, CDFA	10,000
Production Research	88,551
California Minor Crops Council	5,000
Chemical Research	<u>1,400</u>
<b>Total Expenditures</b>	<b>\$150,347</b>
Carry-over to 2008-09	<u>95,445</u>
<b>Total Expenses &amp; Reserve</b>	<b>\$245,792</b>

**2006-07 Financial Report**

The accompanying Financial Report shows that the Commission continues to be in excellent financial shape, with the income from marketed peppers again exceeding the Commission's budget. The Commission budgeted on the basis of receiving income from the equivalent of 350,000 tons of fresh peppers, which would bring in \$140,000 at the \$.40 per ton rate. However, the actual tonnage from the 2007 crop brought in closer to \$171,000, which was augmented by an additional \$3,900 from prior year crops.

It should be noted that the expenses listed in the Financial Report include what is only a cost estimate from CDFA's Marketing Branch. The amount shown is the amount budgeted, but CDFA is several months behind in their billing, so the amount is subject to change.

At this year's annual meeting, the Commissioners agreed to keep the same assessment rate as the previous year, a move partially prompted by the expected carry-over into the 2008-09 year of over \$95,000.

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  
at the Commission office