

Stychnine	Stychnine	Rod.	244	6,618.07	1	10	exempt	rodenticide
Sulfur		F			385	11,948.06	exempt	
Tall Oil Acids		I	11	460	22	740.7	exempt	
Tebufenozide	Confirm 2F	I			221	8,536.55	1.0 ppm	Seed use only. Currently in active review
Thiram	Tripomol	F		17,170.27		7,114.87		
Trifloxystrobin	Flint	F			1	26.00	0.5 ppm	
Trifluralin	Treflan	H	164	4,620.30	190	4,756.00	0.05 ppm	
NEW REGISTRATIONS OR NOTICES								
Oxiate Broad Spectrum							exempt	application for registration with EPA
COMPOUNDS USED BUT NOT REGISTERED FOR USE IN CALIFORNIA								
Alachlor	Lasso	H			1	44		not registered for use
Cypermethrin	Ammo, Fury	I			1	6.50		no CA reg. for peppers
Dithiopyr		I			1	6.00		no CA reg. for peppers
Lambda Cyhalothrin		I			2	19.4		no CA reg. for peppers
Linuron	Linex, Lorox	H			1	9		not reg. for peppers
Mancozeb	Dithane	F			2	54		not reg. for use on peppers
Prometryn	Caparol, Prometrex	H			2	23.6		not reg. for use on peppers
Propyzamide	Kerb	H			1	7		not reg. for use on peppers
Triadimefon =	Sayleton	F			3	12.00	(0.5 ppm) exp 1997	Sec 18s in CA 1992-1995, not currently reg for use on peppers
(1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazole-1-y)-2-butanone								
COMPOUNDS WITH NO CALIFORNIA REGISTRATION, BUT HAVE A TOLERANCE								
Beniazon	Basagran, Forte	H					0.05 ppm	no CA reg.
Bifenoxin	Brigade, Capture	I					0.5 ppm	no CA reg. for peppers
Carbofuran	Furadan	I					2.0 ppm	no CA reg. for peppers
Chlorothalonil	Bravo	F					1.0 ppm	no CA reg. for peppers
Clethodim	Prism	H					1.0 ppm	no CA reg. for peppers
Clomazone	Command	H					0.05 ppm	no CA reg.
Diphenamid	Enide	H					0.1 ppm	no longer reg. in CA
Diquat Bromide		H					0.02 ppm	no CA reg. for peppers
Fluridone	Sonar	H					0.1 ppm	no CA reg. for peppers
Methamidophos	Monitor	I					1.0 ppm	no longer reg. for peppers (1997)
Methoxychlor	Dymet	I					14.0 ppm	no longer reg. for use in CA
Methyl Parathion	Penncapp-M, Methyl Parathion	I					1.0 ppm	no longer reg. for peppers; import tolerance
Mevinphos	Phosdrin	I					0.25 ppm	no longer reg. for peppers (1995); import tolerance
Parathion		I			2	26.00	1.0 ppm	no longer registered for use
Streptomyacin	Agrimycin	F					0.25 ppm	no longer reg. for peppers in CA

Prepared by Gabriele Ludwig, Schramm, Williams Associates



Pepper News

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Annual Report Issue

2001-02 Year in Review

For the second year in a row, the Commission members and staff found themselves on the front lines of an effort to retain current chemical registrations and secure new ones. Included with this annual report is a comprehensive list (pages 6-8), compiled by Schramm, Williams & Associates from Washington D.C., of pesticides used on peppers and their associated status and tolerances. This gives an indication of how critical it is for the Commission to aggressively remain involved in the fight to protect the rights of the pepper growers in California.

In dealing with the chemical issues we were talking to Commission members, growers, and the California Department of Pesticide Regulation, as well as various chemical companies. As we reported to you last year, the Commission decided to begin funding fungicide trials for the purpose of evaluating

Assessment Rate Remains Low
For the second consecutive year, the Commission voted to set the assessment at the reduced rate of \$.30 per ton, to be paid half by the grower and half by the handler.

current and potential compounds for their effectiveness in controlling powdery mildew. The trials were conducted by Jim Campbell, with Crop Science Services, and on the next page is a summary of his results. As usual, we have included layman's reports on the Commission's funded research

activities for the past year. If you have any questions please call Jerry Munson, Commission Manager, or Ken Melban, Assistant Manager at (559) 591-3925.

Section 18 on Rally®

For the 6th consecutive year it appears that Rally, through the efforts of the Commission, will again be registered on peppers in California under a Section 18.

Improving *Phytophthora* Tolerance in an Open-pollinated Bell Variety for California

Molly Jahn, Assistant Professor, Department of Plant Breeding & Biometry, Cornell University

In contrast to many problems in pepper, resistance to *Phytophthora capsici* in pepper has received an enormous amount of attention over the last several decades. Hundreds of papers have been published in the last thirty years detailing many aspects of the biology, genetics and ecology of the interaction between this pathogen and *Capsicum*. Resistant varieties are available that derive from several different sources.

Generally, resistance is due to several genes with quantitative inheritance, and at least one study has been published that reports the genetic mapping of at least some of these loci from the source *C. annum* Perennial. A number of other sources have also been used by breeders, and a general consensus

List of Pesticides Used on Peppers and Their Associated Status and Tolerances

Status as of 1/7/02

I - insecticide H - herbicide PGR - plant growth reducer F - fungicide IR - insect repellent Fum - fumigant Rod - rodenticide

RED = Reregistration Eligibility Document; IRED = Interim Reregistration Eligibility Document; NRDC = Natural Resources Defense Council

Chemical Name	Commercial Name	Type	1999 Applications and Acres Treated		Tolerance	Comments on use/reg/review
			Treated	Acres Treated		
Avermectin	Agri-Mek,	I	282	4,919.74	0.02 ppm	
Acaphate	Orthene	I		9,646.11	4.0 ppm	Awaiting RED by 8/2002
Aluminum Phosphide	Phostoxin	Fum/Rod	1		exempt	RED 9/98
Ampelomyces Quisqualis	AQ 10 Biofungicide	F	23	700	exempt	
Azinophos-Methyl	Guthion	I			0.3 ppm	IRED 11/01; Pepper use to be cancelled
Azadirachtin	Amazin/Ecozin	I		14	233.75	
Azoxystrobin	Abound	F		16	2.0 ppm	
Bacillus Thuringiensis	BT, Dipel, Javelin, Crymax	I	69	1,861.59	20,284.48	
Beauveria Bassiana Strain	Botaniguard, Mycotrol	I	1		8,160.00	
Benomyl	Benlate	F				Dupont voluntarily cancelled registration effective 7/1/01. Existing stock may be sold through 12/31/02.
Bensulide	Prefar	H	56	1,368.50	0.2 ppm	IRED 9/00; RED by 8/02
Captan	Captan	F			25.0 ppm	also seed treatment; RED 9/99
Carbaryl	Sevin	I		101	3,049.00	NRDC settlement requires IRED by 6/30/03; start of review planned for 2002
Chloropicrin	Chlor-o-pic	Fum	49	964.9	10.0 ppm	starting review at CDPR
Chlorothal-dimethyl	Dacthal, DCPA	H	11	274.1	25.0 ppm	
Chlorpyrifos	Lorsban	I		3	63	IRED 11/01; NRDC settlement by 9/30/01
Clarified Hydrophobic	Neem Oil, Margosa Oil	I	34	962.5	exempt	
Extract of Neem Oil	Kocide	F	127	4,893.18	exempt	
Copper Hydroxide	Kryocide	I	149	4,560.50	7.0 ppm	
Cryolite	Baythroid	I	52	1,494.80	0.5 ppm	
Cyfluthrin	Tri-Gard	I	79	2,201.02	1.0 ppm	
Cyromazine	Diazinon	I	8	3,697.25	0.5 ppm	Awaiting RED by 8/02; NRDC settlement requires IRED by 7/02; Reg. being switched to a 24c registration in CA/TX
Diazinon	Telone	Fum	22	533.19	exempt	RED 9/98; Township Cap issue in CA
1,3-Dichloropropene	Dicofol	I		5	377.00	
Dicofol	Dimethoate	I	168	4,477.74	5.0 ppm	Awaiting RED by 8/02
Dimethoate	Di-Syston	I	88	1,743	2.0 ppm	Awaiting RED by 8/02
Disulfoton	Thiodan	I	42	1,134.50	0.1 ppm	RA released 9/01. Active review at EPA; NRDC settlement requires RED by 7/31/02
Endosulfan					2.0 ppm	

Prepared by Gabriele Ludwig; Schramm, Williams Associates

Rally, at the rates tested, with the Cabrio treatment a little better than Quadris. It is important to note that the rate of a.i. recommended with Cabrio, was five times higher than Quadris. Flint had less effective control based on the incidence, severity or percent control observations. Keep in mind Flint applications began two weeks after the other treatments, when significant disease was present, and was tested at the lowest level of a.i. in the group.

Yields were similar in most treatments to that of the untreated control, though the Flint treatment was less, probably a result of disease levels. Sunburning amounted to about 15% of fruit in the untreated plots, and there was less sunburning where mildew control was best, as would be expected. At the Kings City site and at the Oxnard site, (which had the same rates and timing, except for the flint which was not included), there was no phytotoxicity observed at any period of the trial.

Potential for Altering Morphological and Physiological Properties of Pepper Pod Walls/cuticles to Reduce Bruising, Cracking, and Wrinkling

Molly Jahn, Assistant Professor, Department of Plant Breeding & Biometry, Cornell University

In a survey conducted on our behalf by the California Pepper Commission early in 2001, pepper fruit wall characteristics emerged as a major area of concern for a number of growers. Growers and handlers of several different pepper types indicated that their varieties needed improvement in one or more characteristics that related to fruit morphology, physiology, or wall characteristics. While the specific nature of the concerns varied from grower to grower and from pepper type to type, it prompted us to go to the literature to determine what potential exists for focused genetic modification of these traits.

For several years we have been conducting more fundamental studies that have identified some of the genes that have both small and large effect on fruit shape, wall thickness and pungency, but this information has not been applied in any breeding programs. An important reason for this is that we have not defined precisely what the pod

characteristics are that have the most important effects on the qualities growers describe. In addition, we have just begun to collect feedback in an organized way on the preferences of growers, handlers, shippers, processors with respect to particular modifications of pod characteristics.

Our proposal aimed to elucidate which characteristics of pod walls are related to the negative attributes encountered by growers and to determine what potential exists for modification of varieties to address these problems. This money was also used as a seed grant for an application that was submitted to the USDA Initiative for Future Agriculture and Food Systems funding program in April, 2001.

We are still working on the first objective of our grant in which we will be using a microscopy-based approach to examine the pepper pod wall and cuticle. The most significant progress in this area to date is that in September, 2001, we were awarded a \$2.25 million 3 year grant focused on many aspects of *Capsicum*, particularly fruit quality. This study will be integrated with much more detailed (and expensive) studies that will allow us to track changes in levels of expression of specific genes and correlate them with wall properties of practical interest. This contract was instrumental in demonstrating the practical value of issues related to pod wall, and we are delighted that USDA has finally made a significant investment in *Capsicum* from their pool of competitive research funds.

The second objective of this study arose in our studies of capsaicin supported by last year's grant. We approached that work with the conventional idea that genetic variability in peppers that affects the amount of pungency expressed in the pod, but have encountered some apparent differences in placental structure that appear to affect capsaicin content. If these claims bear closer scrutiny, this may represent another way to modify or stabilize pungency.

Our inheritance studies are underway now and will be evaluated early in February in the field in Florida and later in the spring in the greenhouse in Ithaca. In the meantime, we have studied this structure in detail and feel it is more accurate to call it a "blister" rather than a gland. There is

considerable variability for distribution of these blisters in pepper varieties, which we have begun to record digitally. We have also initiated work to determine, in more detail than is known now, the composition of the yellow substance in the placentas of bell peppers.

Finally, we sought funds that would augment a study already scheduled to occur in California during the summer, 2001 focused on pungency so that we could make pod measurements of this population. This information will allow us to create tools that may make it much easier for pepper breeders to "adjust" fruit size or shape while retaining most or almost all the characteristics of a variety. Survey results indicated several growers/handlers who had a nearly ideal variety except for fruit size or shape, or wall thickness. We requested additional funds to allow us to take fruit measurements in a large population of F₃ families derived from a cross between a tiny bird pepper, *C. frutescens* by a large NuMex type that was grown in Modesto thanks to cooperation with Gilroy Foods during the summer and fall, 2001.

Our long-term goal is to understand the genetics that govern pepper quality, pungency, other flavor attributes and morphology. This may enable us to determine the potential to develop peppers that are enhanced for certain morphological, physiological and/or organoleptic qualities. Once we have established the genetics and heritability of these traits, we should be able to guide breeding programs with more precision where the objectives are related to fruit characteristics.

Weed Control Trials

Richard Smith, Monterey County Farm Advisor

Dual Magnum provides additional weed control over the standard herbicide treatment Devrinol + Prefar. Common purslane and hairy nightshade control was superior in the Devrinol + Prefar + Dual Magnum and the Dual Magnum alone treatments over the Devrinol + Prefar + Dual Magnum combination treatment, and caution is advised regarding this combination. Depending upon the weed spectrum, Dual Magnum alone may provide sufficient weed control with no further need to combine it with Devrinol + Prefar.

Prowl improved the control of Barnyard grass in one trial and Sandea provided excellent control of yellow nutsedge and crop safety to peppers. Sulfentrazone provided excellent weed control and safety to peppers, but its registration status is unclear in California. Herbicide applications dramatically reduced the time to hand weed peppers.

Evaluation of Pepper Varieties for Resistance to *Phytophthora capsici*

*James P. Prince, Department of Biology
California State University, Fresno*

We are interested in characterizing the genetic basis for resistance in pepper to the root rot pathogen, *Phytophthora capsici*. The specific goals of our project were:

- To continue to evaluate currently available commercial pepper varieties for their resistance to various California isolates of *P. capsici*.
- To examine F₁ and F₂ progeny of crosses between these varieties and additional genotypes in order to begin to understand the genetics of resistance.
- To start to characterize field isolates (mating type, fungicide sensitivity, other characteristics)

We currently have over 20 isolates of *P. capsici* obtained from diseased pepper tissue harvested from various locations around California (Gilroy, Paso Robles, Stockton, San Juan Bautista, Modesto, Fresno, Hanford, Napa, and Santa Maria). We have been supplied with four additional California field isolates by Dr. Tom Day of Sakata, and we have eight isolates from the UC Riverside collection of Dr. Mike Coffey.

These isolates are being screened against a variety of pepper genotypes in randomized complete block design with three replicates per *P. capsici* isolate. Testing has been done on ten isolates so far, with replications having been completed with confidence for three isolates. We saw a range from 100% of plants dying to 100% of plants showing no symptoms at all. Cayenne 193, CDM (=CM334, or Criollo de Morelos), Fidel, and Paladin showed no

symptoms with any of the three isolates tested in full replication. PI201234 showed minor symptoms when challenged with the Gilroy strain. The differences that we see when comparing between different isolates may or may not have a genetic basis.

In order to study the inheritance of resistance to *P. capsici*, the 11 lines of pepper that are being screened for resistance/susceptibility were crossed in reciprocal fashion in the summers of 2000 and 2001. The F₁ generations of the crosses made in 2000 were advanced to F₂ in 2001. All possible crosses were attempted and most were successful. When we finish our screening of the eleven genotypes, we will begin screening selected F₁ and F₂ populations.

Registration on Dual Magnum®

The Commission has secured a 24C (SLN) for the herbicide *Dual Magnum* on bell peppers in California. The Commission pursued this registration based on trials conducted by Richard Smith, Farm Advisor in Monterey County.

The trials reported that Dual Magnum was very effective in weed control, especially hairy nightshade. The Commission determined there was a justifiable need among the pepper growers in California for an effective herbicide, and the Department of Pesticide Regulation agreed, issuing the label in July of 2001.

The label is a little different than anything previously issued in that any grower wanting to apply the product must return a notarized "waiver of liability" agreement before the label will be issued. In essence, this waiver protects the manufacturer from liability if the grower experiences crop damage.

As planting season is here, we wanted to remind you that through the efforts of the Commission you now have a potential new alternative to add to your ever shrinking arsenal of compounds. If you are interested in receiving a label, or just have some questions feel free to contact the Commission office. You should remember that the usual requirements for filing with your County Ag Commissioner will still apply.

California Pepper Commission 2001-04

Producer Representatives

Members		Alternates
Burt Silva King City 831/385-1428	1	Michael Griva Greenfield 831/674-5835
Ryan Talley Arroyo Grande 805/489-2508	2	Danny Pereira, Jr. Oxnard 805/986-8568
Mike Chuck Vice-Chairman Gilroy 408/848-6373	3	Dan Fiori Gilroy 408/842-1809
Bob Giampaoli Le Grand 209/389-4576	4	Nick Maddalena Chowchilla 559/665-2403
Richard Bradford Heber 760/413-2696	5	Abel Balderama Coachella 760/399-4278

Handler Representatives

	Classification	
Dave Veneman Escalon 209/838-4040	Bell Pepper Processing	Mark Edsall Modesto 209/538-5450
Todd Hunter Greenfield 831/674-5571	Dehydrated Chili Peppers	Dan Goman Turlock 209/667-2777
Glen Fischer Chairman Saticoy 805/647-5266	"Other" Pepper Processing	Kurt Williams Fresno 559/237-5583
Tim Baloian Fresno 559/485-9200	Fresh Pepper Handler	Edward Chell Camarillo 805/987-7702
Robert Heisey San Juan Bautista 831/623-4554	Pepper Seed Handler	Ken Owens Dixon 707/693-6815

Public Representatives

Paul Gniffke King City 831/385-1370	Dave Nirenberg Camarillo 805/484-2692
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