Safe Pesticide Use Consultancy Peaches, Plums and Nectarines

Project Leader: Robert Krieger, Ph.D.

ABSTRACT

Having the CTFA consultancy in place for 2 years allowed us at PCEP to meet short-term needs to support our graduate-extension program and to make progress on a variety of projects related to technical aspects of pesticide science as detailed above. The initiatives represent positive advances in the field, but not completed projects. Most importantly, as far as this consultancy is concerned, PCEP activities have not been successfully connected with work that advanced specific causes and needs of CTFA.

INTRODUCTION

Several statements in the 2008 proposal Introduction reflected this expectation. These included the following:

Although pesticides are the most thoroughly regulated chemical technology in modern agriculture in the United States, labor, environmental, and consumer concerns often emerge to threaten the economic well-being of members of the Tree Fruit Agreement, the public perception of the wholesomeness of the food supply, and the soundness of modern agriculture, traditional and organic alike, in general.

This proposal offers a high level, continuing professional consultancy to the Tree Fruit Agreement. The proposal is based upon a continuing commitment to the application of sound scientific principles. Four examples of potential impact areas are offered as justification for initiation of this ongoing consultancy. Priority among other areas of opportunity will be established with the guidance of industry liaisons.

OBJECTIVES

The following language from the proposal was important, but at the same time, problematical as these aspects were difficult to accomplish.

“These specific objectives will guide the initial studies, but the project should not be viewed as a residue review. The consultancy must be an ongoing effort with continual contact between industry liaison and PCEP to assure that our work is meaningful to the Tree Fruit Agreement. The residue work will be our first big push, but other opportunities for understanding or service will not be ignored.”

I envisioned consultancies in grapes and strawberries to complement our work with CTFA. The hoped for project in grapes, which has a relatively weak worker exposure data base, and continuing our long-

standing strawberry research focused on plant metabolites, residues and bio monitoring in addition to a major effort already underway to address EWG "Dirty Dozen" issues. Progress in these areas has been uneven and we were not successful in linking our efforts at UCR with productive areas of action and concern of CTFA.

Some of the initiatives that we have developed or subjects where we have awareness and made progress include the following:

1. Completed survey of the pesticide residue database for USDA Pesticide Data Program used as foundation for the Environmental Working Group "Shopper's Guide to Pesticides." Based upon maximum residue levels reported, gender and age specific average serving size and body weight a no effect level pesticide dosage has been calculated. See Appendices 1 and 2.

2. Vitamin C, and likely other nutritives (vitamins and minerals), protect consumers from excessive consumption of fruits containing trace levels of pesticide residues used in conventional agriculture. Raw data are available for risk assessment, but a strategy for risk communication is lacking. For perspective, see Appendix 2.

3. Calculated pesticide applicator exposures for use scenarios in tree fruits and collected a large set of harvester exposure data for risk assessment (reports and abstracts to be organized into bibliography). The best set of data for the estimation of mixer/loader/applicator exposures in tree fruit remain the generic Pesticide Handler Exposure Database (PHED). This database has widespread industrial and regulatory acceptance and will be the foundation for a more advanced version that will become available in the future (anticipated earlier, but availability is now uncertain). Registrations are not limited by lack of M/L/A data at this time.

4. Demonstrated that pesticide biomarkers formed in produce are the same as biomarkers formed in consumers of pesticide treated produce. As a result, urine biomarker levels do not necessarily represent pesticide exposures. This work is perhaps the most significant paper published by PCEP regarding the significance of biomarkers of exposure that are formed in plants and later excreted by consumers. The work demonstrated that the urine biomarkers cannot be assumed to have come from a pesticide exposure---more likely than not, they come from breakdown products in produce when organophosphorous insecticides (the best-studied group) are considered.

5. Urged CDC (EPA) to distinguish pesticides and metabolites in National Report on Human Exposure to Environmental Chemicals. The CDC has clarified the classification of biomarkers to a limited extent; they have more improvements to make before clearly distinguishing pesticides and their breakdown products in blood and urine. The CDC database should be a valuable tool instead of a liability in the hands of anti-chemical technology advocacy groups.

6. Prepared a demonstration research proposal on chemical spray drift to show that spraying was inevitably linked with drift at some level. Environmental pollution via drift is a regulatory point of emphasis in the Obama EPA. I continue to believe that drift is among the top 3 regulatory issues in California agriculture (the other 2 being water and the significance of trace level chemical exposures).

7. Water pollution by pesticides is a second point of increased emphasis in the current EPA at both state and federal levels. The UCR PCEP has undertaken no specific initiatives at this time beyond recognition of potential importance of trace levels in water. Basin plans for water use are extremely restrictive and, to my knowledge, agriculture has not been effective in identifying Beneficial Uses of water that will permit traditional pesticide use practices.

8. Numerous continuing education presentations that emphasize the importance of clothing, personal protective equipment, and safe use practices have been prepared and delivered.

9. Food safety issues of the produce industry are focused upon microbial contamination of the food supply, yet "95% of persons who buy organic produce do so to avoid pesticide residues." This may represent a teachable moment! It is so easy to promote fear, and so difficult to *unteach* it! I think the material reported in Appendix 2 is relevant to the issue, but the 95% of the people who have chosen to avoid pesticide residues are not likely to change the way they spend their food dollar! Maybe the approach has to be put in terms of supply—if pesticides did not protect this crop it would not be available at this price or for this period. A *"California Select"* strategy may also be effective if linked to food safety and below tolerance pesticide residues (even though those are very different issues from a scientific perspective).

10. December 2009. "The U.S. Environmental Protection Agency plans to strengthen its assessment of pesticide health risks. EPA's proposal would include a more thorough assessment of risks to workers, including farm workers and farm children, as well as risks posed by pesticides that are not used on food. The agency is asking the public to comment on the new approach and how best to implement the improvements." This plan to strengthen the regulation of exposure of children and workers could have major impact on persons who do work following application of pesticides to tree fruits. This issue is a political one, rather than one driven by health and safety issues. Reentry issues are at stake.

11. The *Hayes' Handbook of Pesticide Toxicology*, 3rd Edition, has been published, February 2010, Elsevier/Academic Press, San Diego. Robert Krieger, Editor.

Conclusion

Having the CTFA consultancy in place for 2 years allowed us at PCEP to meet short-term needs to support our graduate-extension program and to make progress on a variety of projects related to technical aspects of pesticide science as detailed above. The initiatives represent positive advances in the field, but not completed projects. Most importantly, as far as this consultancy is concerned, PCEP activities have not been successfully connected with work that advanced specific causes and needs of CTFA.

What will make it different in the year ahead? Graduate student support is not at issue for the year ahead. The work to be completed will be what I can schedule and perform as part of the consultancy (and an Extension Toxicologist). I am willing to confer with appropriate CTFA liaisons to clarify expectations about the nature and scope of materials that I might provide to CTFA.

I think better focusing what we are already doing and probably not doing some things that are peripheral to central objectives will be beneficial. New projects or refocused old ones may be required. I will try to make efficient use of time and be of service to CTFA as it relates to pesticide issues (for example, the potential new risk assessment methodology currently proposed by USEPA).

Appendix 1. Frequency of Sampling, Pesticide Data Program of the Department of Agriculture, 1992-2008

Year	Commodity		
	Peach	Nectarine	Plum
1992	-	-	-
1993	Fresh	-	-
1994	Fresh	-	-
1995	Fresh	-	-
1996	Fresh	-	-
1997	Fresh	-	-
1998	-	-	-
1999	-	-	-
2000	-	Fresh	-
2001	Fresh	Fresh	-
2002	Fresh	-	-
2003	Canned	-	-
2004	Canned	-	-
2005	-	-	Fresh and dried
2006	Fresh	-	Fresh and dried
2007	Fresh	Fresh	-
2008			

Open boxes indicate No sampling or residue Data

Appendix 2. Servings Equivalent to No Effect Levels of Peaches That Contain Residues

Child of 10 kg consuming 52 g peaches	Highest residue ppm	Dosage mg/kg-day	NOAEL mg/kg-day	Equivalent Servings of Peaches[a]
2007 Phosmet	2.2	0.0114	4.5	393
2006 Iprodione	7.4	0.037	20	520
2002 iprodione	33	0.172	20	117

[a] **NOAEL x Body weight x 1000]/Highest residue x serving size**

The residues in peaches, nectarines and plums are safe since there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated

dietary exposures and all other exposures for which there is reliable information. This includes exposure through drinking water and in residential settings, but does not include occupational exposure. [1]

Section 408(b)(2)(C) requires EPA to give special consideration to exposure of infants and children to the pesticide chemical residue in establishing a tolerance and to ensure that there is a reasonable certainty that no harm will result to infants and children from aggregate exposure to the pesticide chemical residue.

That certainty of safety has been met by our review of available residue data and the estimation of no effect levels of peaches as presented in Appendix 2. We have similar data for the years 2000 (single serving and composite), 2001, 2002, 2006, and 2007 based upon the USDA PDP reports. We also have a 1991-2004 Market Basket survey derived from Food and Drug Administration surveys. In every case, hundreds to tens of thousands of average servings of fruit containing the highest levels of residue are equivalent to no effect levels of produce for children, teens, women and men. Pesticide residues in produce are not a health issue with respect to dose.

[1] The December 2009 initiative of EPA to change the methodology for exposure assessment will include occupational exposure in the aggregate estimate. This would have a very significant impact on reentry intervals if implemented as proposed. This proposal (subject of an earlier e-mail) should be monitored by CTFA.

This page left intentionally blank.