

Stormwater Runoff Water Quality Newsletter
Devoted to Urban/Rural Stormwater Runoff
Water Quality Management Issues

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This issue of the Newsletter presents information on conferences that will be held in August and September 2006 devoted to aspects of water quality impacts of agriculture runoff/discharges. It also presents an update on aquatic life toxicity of aerially applied pyrethrin pesticide that has been used to control mosquitoes that carry the West Nile virus.

**Information on Conferences on Water Quality Impacts
of Agricultural Runoff/Discharges**

International Conference on the Future of Agriculture

The 2006 International Conference on "The Future of Agriculture: Science, Stewardship, and Sustainability," will be held in Sacramento, CA, August 7-9, 2006. This conference is being organized by the Center for Hazardous Substance Research, Kansas State University, Manhattan, KS with an organizing committee representing US EPA, USDA, California EPA, California Department of Food and Agriculture, several universities and others. Information on this conference is available at, <http://www.dce.ksu.edu/dce/conf/ag&environment/agenda0719.pdf>.

Several of the conference sessions are devoted to impact of agriculture on water quality and its management. According to Ellen Stauffer, Engineering Program Coordinator, Div. of Continuing Education, Kansas State University, Manhattan, KS phone 785-532-2562, ellen@ksu.edu, www.dce.ksu.edu the proceedings will be available approximately six months after the conference. A CD will be mailed to each paid registrant at that time (it is part of the registration fee). Additional copies on CD can be ordered online on the regular registration form for \$8 each or a paper copy can be ordered for \$35. Future information on the conference proceedings will be available at www.dce.ksu.edu/dce/conf/ag&environment/.

Drs. G. Fred Lee and Anne Jones-Lee will present a paper at this conference,

Preprint

Lee, G. F. and Jones-Lee, A., "Agriculture-Related Water Quality Problems in the San Joaquin River," Proceedings of 2006 International Conference on The Future of Agriculture: Science, Stewardship, and Sustainability, Center for Hazardous Substance Research, Kansas State University, Manhattan, KS (2006). <http://www.members.aol.com/annejlee/SJRAgAug06Paper.pdf>

PowerPoint Slides

Lee, G. F. and Jones-Lee, A., "Agriculture-Related Water Quality Problems in the San Joaquin River," PowerPoint slides presented at 2006 International Conference on "The Future of Agriculture: Science, Stewardship, and Sustainability," Sacramento, CA, August 7 (2006). <http://www.members.aol.com/annejlee/SJRAgAug06Sli.pdf>

This paper is a summary of their report,

"Lee, G. F. and Jones-Lee, A., "San Joaquin River Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA, June (2006). <http://www.members.aol.com/annejlee/sjr-WQIssues.pdf>.

American Chemical Society Agrochemical Division

The American Chemical Society (ACS) 232nd National Meeting, will be held in San Francisco, CA, September 10-14, 2006. This meeting includes several sessions that are of potential interest to those interested in agriculture related water quality issues. One of the sessions at this conference (2 days) is devoted to presentations on pyrethroid pesticides including a one half day poster session. Another session is devoted to nutrient/fertilizer issues. Information on the American Chemical Society Agrochemical Division sessions on Plant Nutrients and Pyrethroid Pesticides is available at, <http://oasys.acs.org/acs/232nm/techprogram/>. Information on the overall ACS meeting organization and registration is available at <http://acswebcontent.acs.org/nationalmeeting/sf06/home.html>.

Drs. Lee and Jones-Lee will present a paper at this session,

Lee, G.F., and Jones-Lee, A. "Assessing the Water Quality Significance of Nitrogen and Phosphorus Compounds Concentrations in Agricultural Runoff", to be presented at the 232nd ACS National Meeting, San Francisco, CA, September 10-14, 2006. This paper is part of the symposium entitled "Plant Nutrient Issues Impacting Trade, Water, Air & Soils".

This paper evolved from the Dr. Lee's involvement in California Regional Water Quality Control Board Central Valley Conditional Waivers of Waste Discharge Requirements for Discharges from Irrigated Lands program (http://www.waterboards.ca.gov/centralvalley/programs/irrigated_lands/index.html). This program requires that agricultural interests in California begin to monitor nitrogen and phosphorus compounds in agriculture stormwater runoff/discharges. This paper provides guidance on interpretation of the nutrient concentration data with respect to assessing potential water quality impacts. Drs. Lee and Jones-Lee previous writings on nutrient water quality issues are available at, <http://www.gfredlee.com/pexfert2.htm> including,

Lee, G. F., and Jones-Lee, A., "Interpretation of Nutrient Water Quality Data Associated with Irrigated Agricultural Ag Waiver Monitoring," Submitted to Central Valley Regional Water Quality Control Board, Rancho Cordova, CA, by G. Fred Lee & Associates, El Macero, CA, November (2005). <http://www.members.aol.com/annejlee/InterprNutrWQData.pdf>

Evaluating the Aquatic Life Toxicity of Aerially Applied Pyrethrin Pesticide

Stormwater Runoff Water Quality Newsletter NL 9-3 (available at, <http://www.gfredlee.com/newsindex.htm>) discussed the unreliability of trying to estimate the aquatic life toxicity of some pesticides based on chemically measured concentrations. The situation that prompted this discussion was that the Sacramento/Yolo Mosquito and Vector Control District hired a consultant to determine if the aerially spraying of pyrethrin pesticide to try to control mosquito's in the Sacramento/Yolo counties that are vectors of West Nile virus. This consultant approached this issue by measuring the chemical concentrations of the pyrethrin in waterbodies after spraying. As discussed in the Newsletter, there are many factors that determine whether a pesticide causes aquatic life toxicity. As Dr. Lee discussed in NL 9-3, for many pesticides and especially the pyrethroid based pesticides, the reliable approach to determine if a pesticide is toxic to aquatic life is to measure toxicity using appropriate test organisms.

Recently, L. Speare, UP3 Project Manager Urban Pesticide Pollution Prevention Project, San Francisco Estuary Project/ABAGnd has forwarded a note to the Urban Pesticide Committee from Dr. K. Moran of TDC Environmental that an online article has been recently published on this issue in the journal Environmental Science & Technology (ES&T). A copy of an ES&T story about the article is presented below. It shows that the aerially spraying of pyrethrin for mosquito control apparently caused aquatic life toxicity.

Environmental Science and Technology

Science News –

July 26, 2006

New consequences of household pesticides

A chemical that boosts pesticides' killing power also increases the toxicity of legacy pesticides in stream sediments.

Who would have thought that banning a class of pesticides from household products would result in so many environmental problems? As ES&T reported last October, Don Weston, Adjunct Professor of Ecotoxicology at the University of California, Berkeley, found toxic levels of pyrethroids in creeks flowing through Sacramento, Calif. Weston's latest paper, published today on ES&T's Research ASAP website (DOI: 10.1021/es0601540), examines how piperonyl butoxide (PBO) increases the toxicity of these insecticides that are bound up in stream sediments.



Erin Amweg

Small streams and creeks meandering through urban environments are slowly becoming contaminated with pesticides washing off lawns and the foundations of house.

PBO is a chemical commonly added to pyrethroid sprays because it stops cellular enzymes from breaking down the insecticides, increasing their lethality. Pyrethroids are less toxic to humans than the organophosphates that they have replaced in consumer insecticides. However, pesticide manufacturers have not adequately tested whether pyrethroids are harmful to small crustaceans living in stream sediment, where the pesticides are now building up after washing off suburban lawns.

Weston's interest in the environmental effects of PBO was piqued in the summer of 2005 when Sacramento County officials began an aerial spraying program for mosquitoes, to combat West Nile virus. The pesticide was a mix of 60% PBO and 6% pyrethrins. Pyrethrins are natural insecticides produced by certain species of the chrysanthemum plant, and pyrethroids are their synthetic counterparts. Weston wanted to know what

would happen when the PBO washed off city streets and into the local creeks where he had already found high levels of pyrethroids.

“I felt it was an opportunity that could not be passed up,” he says, noting that, because of health concerns, California officials rarely conduct aerial spraying anymore. Plus, nobody had ever examined how a pesticide synergist might interact with legacy pesticides.

When Weston sampled creeks flowing through the sprayed area, he found widespread occurrence of PBO at concentrations of 2–4 ppb. He then took sediment from the creeks back to the lab. He had previously noted that the creek mud was poisonous because of pyrethroids washing out of local neighborhoods, so he mixed the samples with clean mud to cut the toxicity. Then, he spiked the samples with 4 ppb of PBO and introduced hyalella, small bottom-dwelling crustaceans that are sensitive to pesticides. He found that adding the PBO doubled the mortality rate.

Weston says that the interaction between a relatively benign ingredient like PBO and pesticides already in the creek is something that the U.S. EPA has not addressed in its regulations. In fact, he thinks that the agency has not even collected any data to consider the issue. Weston’s suspicion was somewhat confirmed in an email ES&T received from EPA. “We do not have data to show that applying PBO to a water body increases the toxicity of any pesticide that is already present,” wrote EPA spokesperson Enesta Jones. Weston’s coauthor, Michael Lydy, an associate professor of zoology at Southern Illinois University, Carbondale, says that the problem of pesticide synergists may be widespread. “We know that DDT is still at high concentrations in sediments,” he says. “It may also synergize as well.” Lydy says that he is now applying for grants to study other U.S. streams.

The new study “underscores the complexity of pesticide regulation,” says the director of California’s Department of Pesticide Regulation, Mary-Ann Warmerdam. She says that California must work with local water boards and pesticide manufacturers to protect the environment.

To do so, California is beginning a reevaluation of 600 pyrethroid products. The state is one of the largest U.S. markets for pyrethroids, and their use there has climbed in recent years. In 2000, pesticide companies and agriculture producers applied 695,000 lb of pyrethroids in California. In 2005, that climbed to 1.1 million lb. These numbers do not include the pyrethroids applied by consumers in bug sprays and lawn-care products, but Warmerdam suspects that the levels are equivalent.

In fact, Warmerdam’s department recently announced that its latest audit had uncovered \$34 million in unreported pesticide sales in California. California expects to collect over \$700,000 in penalties and back payments from retailers who did not pay environmental fees on these sales.” —PAUL D. THACKER