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The WSU-FEQL has a long-standing interest and professional involvement in understanding the environmental fate and transport of trace-level volatile and semi-volatile organics in air, water, and on land surfaces. Our current research focus is on international trade concerns regarding dietary risks from pesticides. Our facility is also currently developing sensitive analytical methods to assess bee colony exposure to certain nitro-substituted neonicotinoid insecticides (and their metabolites) implicated in colony collapse disorder. Other areas of recent research include: 1) developing assessment tools for specific biomarkers useful for monitoring chemical exposures to sensitive subpopulations in agricultural communities 2) a region-wide residential air monitoring program for understanding implications of off-target fumigant movement on public health, 3) sublethal chemical assessments in surface waters that can have neurobehavioral effects on endangered salmonid species, and 4) characterizing/isolating bioactive animal/plant volatile emissions that may prove useful in enhancing conservation biological control in cropping systems. Principle responsibilities of my state-mandated appointment includes *i*) oversight on ecological risk and dietary risk assessment studies under federal 40CFR Part 160 Good Laboratory Practices (GLP), and *ii*) advancing collaborative research supporting PNW agriculture and public health. The WSU-FEQL has completed over 70 human and environmental regulatory science submissions. These deliverables to state and federal public health and environmental agencies contribute directly to regulatory decision-making at the state and national level. Additionally, this state-mandated facility provides field-analytical study direction oversight, system design, state of the art trace-level instrumentation support (multiple GC/LC chromatographic detection and MS platforms) with a professional staff fostering collaborative research in the areas of natural product research, environmental toxicology, chemical fate and transport, and chemical exposures impacting public and environment.

#### **Peer-reviewed Journal Publications (Year 2000 to present)**

- Lu Z, Hebert V, Miller G. Gas-phase reaction of methyl isothiocyanate and methyl isocyanate with hydroxyl radicals under static relative rate conditions. *J.Agric. Food Chem.* (in review)
- Laetz C, Baldwin D, Hebert V, Stark J, Scholz N. Elevated temperatures increase the toxicity of pesticide mixtures to juvenile coho salmon. *Aquatic Toxicol.* <http://dx.doi.org/10.1016/j.aquatox.2013.10.022> (2013).
- Laetz C, Baldwin D, Hebert V, Stark J, Scholz N. The interactive neurobehavioral toxicity of diazinon, malathion, and ethoprop to juvenile coho salmon. *Environ Sci Tech* 47, 2925-2931. (2013)
- Peck G, Ferguson H, LePage J, Hebert V, O'Neal S, Walsh D. Evaluation of sunlight-exposed pyrethroid-treated netting for the control of face fly and housefly (Diptera:Muscidae). *Pest Manag Sci* DOI 10.1002/ps3537 (2013).
- James D, Hebert V, LePage J. The prosternal gland in Pacific Northwest butterfly larvae with preliminary chemical analyses of emissions. *J. Lepidop. Soc.* 66(3) 137-142 (2012),
- Littke, M., LePage, J., Hebert, V. Methyl isothiocyanate flux following changes in fumigant field application practices. *Pest Manage. Sci.* DOI 10.1002/ps.3414 (2012).
- Trott, D., LePage, J., Hebert, V. Assessing natural isothiocyanate air emissions after field incorporation of mustard cover crop. *Bull. Environ. Contam. and Toxicol.* 88:482-485. (2012)

- Knight A, Stelinski L, Hebert V, Gut L, Light, D. Pear Ester Plus Sex Pheromone Dispensers for Mating Disruption of Codling Moth (Lepidoptera: Tortricidae). *J. Appl. Entomol.* 136 (2011)
- Chen, XD, Culbert E, Hebert V, Stark J. Mixture effects of the nonylphenyl polyethoxylate, R-11 and the insecticide, imidacloprid on population growth rate and other parameters of the crustacean, *Ceriodaphnia dubia*. *Ecotoxicology and Environ. Safety* 73 132–137(2010)
- Laetz C, Baldwin DH, Collier T, Hebert V, Stark J, and Scholz NJ. The synergistic toxicity of pesticide mixtures: implications for ecological risk assessment and the conservation of threatened Pacific salmon. *Environ. Health Perspecs.* 117 (3) 349-353 (2009).
- Merriman, J, Hebert VR. Methyl Isothiocyanate Residential Community Air Assessment; South Franklin County, Washington. *Bull. Environ. Contam. & Toxicol.* 78(1), 17-21 (2007).
- Weppner, S, Elgeth K, Lu C, Hebert VR\*, Fenske R. Methamidophos residues on residential surfaces and children's hands following an aerial application of Monitor 4 in central Washington State. *J. Expos. Anal. Environ. Epidemiol.* (accepted, March 2005).
- LePage J, Hebert VR, Tomaszewska E, McCauley L, Rothlein J. Determination of acephate in human urine. *J. AOAC Internat.* 88: 1788-1792 (2005).
- Tsai MY, Elgeth K, Ramaprasad J, Yost M, Felsot AS, Hebert VR, and Fenske RA. The Washington aerial spray drift study: Modeling pesticide spray drift deposition from an aerial application. (accepted in *Atmos Environ*, June 2005)
- Tomaszewska E, Hebert VR\*, Brunner J, Jones V, Doerr M. Evaluating Chemical Release from Commercial Codling Moth Mating Disruption Dispensers. *J. Agric. Food Chem* 53: 2399-2405 (2004).
- Ramaprasad, J, Tsai MY, Elgeth K, Hebert VR\*, Felsot, A, Yost MG, Fenske RA. The Washington aerial spray drift study: assessment of off-target organophosphorus insecticide atmospheric movement by plant surface volatilization. *Atmos. Environ.* 38; 5703-5713 (2004).
- Tomaszewska E, Hebert VR. Method for the determination of O,S-dimethyl thiophosphorate in urine, a specific biomarker for methamidophos. *J. Agric. Food Chem.* 51: 6103-6109 (2003).
- Hebert, VR, Middleton, JR, Tomaszewska, E, Fox, LK. Methodology for Quantifying Residues of Chlorhexidine in Raw Dairy Milk *J. Agric. Food Chem.*; 51(3); 567-570 (2003).
- Middleton JR, Hebert VR, Fox LK, Tomaszewska E, Lakritz J. Disposition of chlorhexidine in milk following intramammary infusion to therapeutically cease lactation in mastitic mammary quarters. *J Am Vet Med Assoc.* 222 (12): 1746-1749 (2003).
- Hebert, VR, Hoonhout C, Miller GC. Use of stable tracer studies to evaluate gas-phase pesticide photolysis at elevated temperatures. *J. Agric. Food. Chem*, Vol. 48: (2000). 1916-1921.
- Hebert, VR, Hoonhout C, Miller GC. Reactivity of certain gas-phase organophosphorus insecticides toward hydroxyl radicals at elevated air temperatures. *J. Agric. Food. Chem*, Vol. 48: (2000): 1922-1928.

#### **Invited Reviews, Book Chapters, Peer Reviewed (2000 to present)**

- Hebert, VR\*. Understanding the tropospheric transport and fate of semivolatile pest management chemicals. In: *Environmental Fate and Safety Management of Agrochemicals* ACS Symposium Book Series 899, ed. JM Clark, pp 70-82 (2005).
- Hebert VR\*, Tomaszewska E, Brunner JF, Jones VP, and Doerr M, Evaluating the Efficacy of Field Managed Pheromone Control Approaches." *Certified Organic and Biologically Derived Pesticides.*" ed. AS Felsot, K. Racke. American Chemical Society Symposium Series (accepted, January 2005).
- Hebert VR\* and Miller GC. Understanding the tropospheric fate of agricultural pesticides, in *Reviews of Environmental Contamination and Toxicology*, ed. G. Ware, Vol. 181 pp 1-36 (2004).
- Woodrow J, Hebert VR\*, LeNoir J. "Monitoring Of Agrochemical Residues In Air." in "*Handbook of Residue Analytical Methods for Agrochemical Residues*" (P. Lee ed., two volume series) John Wiley & Sons. pp. 908-935 (2003).