

## Curriculum Vitae

Kevin W. Wanner, *B.Sc., M.P.M., Ph.D.*

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### Research Interests

My current research focuses on the genomics and functional genomics of the insect chemical senses. My goal is to use functional genomics to study behaviors mediated by the chemical senses across several levels of biological organization in a multidisciplinary approach, from genes and genomics to behavior and ecology. Currently I work with three emerging model insect species whose genomes have been sequenced; the silkworm *Bombyx mori* (Order Lepidoptera), the honey bee *Apis mellifera* (Order Hymenoptera), and the jewel wasp *Nasonia vitripennis* (Order Hymenoptera). These three species represent three diverse and contrasting insect groups that have economic, scientific and social significance: Herbivorous pests, pollinators and beneficial parasitoids. Along with collaborators in the US, New Zealand and Australia I am extending our research broadly to include important pest species ( for more details, <http://www.life.uiuc.edu/robertson/personnel/kevin.html> ).

### Education

Ph.D., 2004, University of British Columbia, Department of Plant Science, Vancouver, B.C.  
Thesis Title: "Characterization of the Chemosensory Protein Gene Family from the Eastern Spruce Budworm, *Choristoneura fumiferana*". Co-Advisors: Dr. Murray Isman and Dr. David Theilmann .

Master of Pest Management, 1994, Simon Fraser University, Burnaby, B.C.  
"Microbial and Insect Colonization of Douglas-fir Stumps and Roots, with Special Reference to *Phellinus weirii* and Glyphosate Application". Advisors: Dr. Zamir Punja and Dr. John Borden.

B.Sc. (Honors Biology), 1990, University of Victoria, Victoria, B.C.  
Honours Thesis (Dr. Louis Hobson, Advisor): "Characterization of the Net Photosynthetic Oxygen Relations of a Marine Diatom, *Thalassiosira weissflogii*, for the Purpose of Demonstrating RuBisCO Oxygenase Activity".

Science Transfer Program, 1987, Okanogan College, Kelowna, B.C.

## Teaching and Supervisory/Mentoring Experience

During graduate studies at Simon Fraser University I was twice employed as a teaching assistant (a first year and a 3<sup>rd</sup> year biology course), and I received positive student evaluations for both. More significantly, I was employed by the Sault College of Applied Arts and Technology to develop the curriculum for, and instruct, Integrated Forest Pest Management & Environmental Impact (Forestry 342), a 3<sup>rd</sup> year level course offered to Integrated Resource Management students. My performance was evaluated by a student survey and directly by the dean of the Faculty of Natural Resources. I received positive reviews which I feel reflected the enthusiasm and dedication to teaching that I brought. This experience included lecturing, tutoring, designing exams and assignments, grading exams and papers, and laboratory instruction. In addition, I have supervised/mentored employees throughout my professional career. Most significantly, I was responsible for supervising as many as six B.Sc. level research assistants at Mycogen corp., where I took a strong mentorship role in their skill and career development for which I was recognized. Currently I am supervising two undergraduate research projects.

## Professional Experience

April 2005- **Post Doctoral Research Associate**

Current University of Illinois at Urbana-Champaign, Department of Entomology

- Genomics and functional genomics of insect chemosensory genes. Molecular and functional characterization of insect odorant and gustatory receptors. Host plant volatile receptors, sex and social pheromone receptors. Includes annotation, phylogenetics, gene expression (microarrays and qPCR), and heterologous expression in *Xenopus* oocytes and insect cells for *in vitro* characterization.
- Molecular approaches to chemical ecology, from genes and genomics to behavior and ecology. Volatile collection, GC-MS analysis, *in vitro* receptor-based screening of extracts, behavioral olfactometer assays.

Feb. 1998- **Research Associate**

May 2000 Mycogen Corp./ Dow AgroSciences, San Diego, California

- Within the Entomology Group; maintain, continue to develop and manage the primary screen (a whole insect throughput screening bioassay), the first step in the effort to discover insecticidal proteins from microbial sources.
- Within a team environment, oversee the development and implementation of insect bioassays as a service to the Toxin Discovery Group (sample throughput potential of 1000 per week); including data management, protocol validation and methods development.
- Supervise and hire staff (six Research Assistant/Biologist positions).

Sept. 1996- **Research Contractor**

Feb. 1998 Sault Ste. Marie, Ontario

- By contract with the Canadian Forest Service (CFS) and Parks Canada; design, implement, and analyze field and laboratory studies to evaluate alternative pesticides for the control of cedar leaf miners (systemic injections of neem seed extract and acephate).
- By contract with the Canadian Forest Service and DowElanco Inc; design, implement, and analyze field and laboratory studies to evaluate the insecticide spinosad for control of Gypsy Moth on ornamental trees.

- Jan. 1997-  
May 1997      **Instructor, Integrated Forest Pest Management & Environmental Impact**  
Sault College of Applied Arts and Technology, Sault Ste. Marie, Ont.
- Develop curriculum for, and instruct, Integrated Forest Pest Management & Environmental Impact (Forestry 342), offered to third year Integrated Resource Management students during the 1997 spring semester.
- June 1993 -  
March 1996      **Provincial Pest Management Specialist**  
Ontario Forest Research Institute, Ontario Ministry of Natural Resources, Sault Ste. Marie, Ont.
- Develop and implement a pest management program (operational and research) to service Ontario tree improvement (50+ seed orchards).
  - Administer an annual operations and research budget of ~ \$50 000, hire and supervise seasonal technical staff.
  - Liaison with provincial, federal, university and industrial scientists /professionals to identify pest management priorities and to develop and administer research contracts.
  - Deliver integrated pest management programs through the transfer of scientific information; provide field extension and on-site training.
- Sept. 1990 –  
May 1993      **Graduate Student**  
Simon Fraser University, Burnaby, B.C.
- Sept. 1991 –  
April 1992      **Teaching Assistant**  
Simon Fraser University, Burnaby, B.C.
- As a graduate student, I instructed tutorial sessions for first year biology students and a laboratory session for a third year plant morphology course.

### **Training Workshops Completed**

- Facilitative Leadership Workshop (4 days)
- Interpersonal Communication Workshop (3 days)

### **Professional Memberships**

- Association for Chemoreception Sciences
- Entomological Society of Canada
- Entomological Society of America

### **Other Activities**

- Co-Organizer, 2008 International Chemoreception Workshop on Insects
- Member of the *Nasonia* genome annotation group

### **Scholarships and Fellowships**

- NSERC Post Doctoral Fellowship, April 2005 – April 2007, 40,000/year
- University Graduate Fellowship, U. British Columbia, Sept./02 to Aug./03, \$16000/year.
- Killam Pre-Doctoral Fellowship, Sept./00 to Aug./02, \$22,000/year.

## Travel Awards

- AChemS Junior Scientist Travel Fund, April 2006, \$850
- UBC Travel Award, Nov./04, \$500.

## Research Grants – Currently Held

2006(Dec) -2008, CSREES NRI (USDA), Title: “Chemical Perception Genes from the Lepidoptera, Odorant and Gustatory Receptors Mediating Host Selection and Feeding Behavior”. Dr. Kevin Wanner, Co-PI. \$ 375,000.

2006-2007 The Bilateral Research Activities Programme of the International Science and Technology (ISAT) Linkages Fund, Government of New Zealand. Dr. Kevin Wanner and Dr. Hugh Robertson, co-applicants with Dr. Richard Newcomb. \$ 10,082.

## Research Grants - Past

Note: These are grants that were held in the name of, and managed by, my M.P.M supervisor (S.F.U., Burnaby, B.C.). I was the principal investigator, and I wrote the grant proposals and research updates.

\$69 200 Science Council of B.C., Technology B.C. Grant, 1993/1994

\$40 000 B.C. Ministry of Forests, Research Grant, 1991/1992/1993

\$ 4 000 FERDA Grant, 1991/1992

\$ 2 000 Canadian Pacific Forest Products Ltd., Research Contract, 1991

## Collaborative Research Projects

“*Silkworm odorant receptors that mediate host plant selection*” with Dr. Richard Newcomb, The Horticulture and Food Research Institute of New Zealand.

“*Large scale functional analysis of insect odorant receptors*” with Charles Luetje, Department of Molecular and Cellular Pharmacology, University of Miami School of Medicine.

“*Nasonia odorant receptors involved in mate and host recognition*” with Dr. Juergen Gadau, Arizona State University.

“*The role of chemosensory proteins in development*” with Dr. Ryszard Maleszka, The Australian National University.

## Invited Book Chapters

**Wanner, K.W.** and Robertson, H.M. 2008. Odorant and gustatory receptor gene families in the Lepidoptera. In: *Molecular biology and genetics of Lepidoptera*. Editors, Marian R. Goldsmith and Frantisek Marec. CRC Press, to be published in 2008.

## Publications, In Preparation

**Wanner, K.W.** and Robertson, H.M. The silkworm gustatory receptor family; annotation and molecular characterization.

Anderson, A.R., **Wanner, K.W.**, Trowell, S.C., Robertson, H.M. and Newcomb, R.D. Functional characterization of female-biased silkworm odorant receptors expressed in Sf9 cells.

**Wanner, K.W.**, Mooney, A. and Robertson, H.M. A larval-specific lineage of silkworm odorant receptor genes that mediate olfactory attraction to host volatiles.

**Wanner, K.W.**, Gadau, J., and Robertson, H.M. Evolution of the chemoreceptor superfamily in the hymenoptera; odorant and gustatory receptors in a parasitic wasp *Nasonia vitripennis* compared to the honey bee *Apis mellifera*.

## **Publications**

1. **Wanner, K.W.**, Nichols, A.S., Walden, K.K.O., Brockmann, A., Luetje, C.W. and Robertson, H.M. 2007. A honeybee odorant receptor for the queen substance, 9-oxo-2-decenoic acid. *Proceedings of the National Academy of Sciences U.S.A.* Accepted.
2. **Wanner, K.W.**, Anderson, A.R., Trowell, S.C., Theilmann, D.A., Robertson, H.M. and Newcomb, R.D. 2007. Female-biased expression of odorant receptor genes in the adult antennae of the silkworm, *Bombyx mori*. *Insect Molecular Biology*. 16:107-19.
3. Forêt, S., **Wanner, K.W.** and Maleszka, R. 2007. Chemosensory proteins in the honey bee: insights from the annotated genome, comparative analyses and expressional profiling. *Insect Biochemistry and Molecular Biology*. 37:19-28. Epub 2006 Oct 6.
4. Robertson, H.M. and **Wanner, K.W.** 2006. The chemoreceptor superfamily in the honey bee *Apis mellifera*: expansions of the odorant, but not gustatory, receptor families. *Genome Research*. 16(11):1395-403. Epub 2006 Oct 25.
5. **Wanner, K.W.**, Isman, M.B., Feng, Q. Plettner, E. and Theilmann, D.A. 2005. Developmental expression patterns of four chemosensory protein genes from the Eastern spruce budworm, *Choristoneura fumiferana*. *Insect Molecular Biology*. 14:289-300.
6. **Wanner, K.W.**, Willis, L.G., Theilmann, D.A., Isman, M.B., Feng, Q. and Plettner, E. 2004. Analysis of the insect *os-d*-like [chemosensory protein] gene family. *Journal of Chemical Ecology* 30:883-905.
7. **Wanner, K.W.**, Helson, B.V. and Harris, B.J. 2002. Laboratory evaluation of two novel strategies to control first-instar gypsy moth larvae with spinosad applied to tree trunks. *Pest Management Science* 58:817-824.
8. Helson, B.V. , Lyons, B.D., **Wanner, K.W.** and Scarr, TA. 2001. Development and validation of a pressurized tree injection device for systemic application of neem-based bioinsecticides to large conifer trees for control of foliage-feeding insects. *Canadian Entomologist* 133:729-744.
9. **Wanner, K.W.**, Helson, B.V. and Harris, B.J. 2000. Laboratory and field evaluation of spinosad against the gypsy moth, *Lymantria dispar*. *Pesticide Science* 56:855-860.
10. **Wanner, K.W.**, Kostyk, B.C. and Helson, B.V. 1999. Recommendations for control of cone and seed insect pests of black spruce, *Picea mariana* (Mill.) B.S.P., with insecticides. *Forestry Chronicle* 75:685-691.

11. **Wanner, K.W.**, Helson, B.V. and Kostyk, B.C. 1997. Foliar and systemic applications of neem seed extract for control of spruce budworm, *Choristoneura fumiferana* (Clem.) (Lepidoptera:Tortricidae), infesting black and white spruce seed orchards. *Canadian Entomologist* 129:645-655.
12. Kostyk, B.C. and **Wanner, K.W.** 1997. Control of insect damage to black spruce seed cones with neem. *Northern Journal of Applied Forestry* 14(1):40-43.
13. **Wanner, K.W.** and Kostyk, B.C. 1995. Evaluation of a neem seed extract against spruce budworm, *Choristoneura fumiferana* (Clem.), in white spruce, *Picea glauca* (Moench) Voss., seed orchards. *Proceedings of the Entomological Society of Ontario* 126:91-93.

### **Invited Talks**

**Wanner, K.W.**, Walden, K.O. and Robertson, H.M. Identifying Pheromone Receptors from the Honeybee Genome. *Invited talk*. XV International Congress of the International Union for the Study of Social Insects (IUSI), 30 July - 5 August 2006, Omni Shoreham Hotel, Washington, D.C., USA.

### **Seminars**

**Wanner, K.W.** Odorant receptors from moths and bees. Presented at: The Horticulture and Food Research Institute of New Zealand, Auckland; The Queensland Brain Institute, University of Queensland, Brisbane, Australia; and the Research School of Biological Sciences, Australian National University, Canberra, Australia. March 2007.

**Wanner, K.W.** Insect Olfaction: Phylogenetic Characterization of Odorant Receptors from Moths and Bees. Seminar Talk (with honorarium), 5 May 2006, Department of Biological Sciences, University of Wisconsin at Parkside, Kenosha, WI.

### **Presentations**

**Wanner, K.W.**, Walden, K.O., and Robertson H.M. Odorant receptor genes from moths, bees and wasps: Annotation and expression profiling. Entomological society of America Annual Meeting, 10-13 December, 2006, Indianapolis, Indiana.

**Wanner, K.W.** Annotating the *Nasonia vitripennis* Odorant Receptor Family. *Nasonia* Genome Annotation Meeting, 9-12 July, 2006. New York, NY.

**Wanner, K.W.**, Anderson, A.R., Trowell, S.C., Theilmann, D.A., Robertson, H.M. and Newcomb, R.D. Sex specific expression of silkworm odorant receptors. The XXXII International Chemoreception Workshop on Insects, January 22-25, 2006. Key West, Florida.

**Wanner, K.W.**, Theilmann, D.A., Isman, M.B., Feng, Q. and Plettner, E. (2004). Molecular characterization of four chemosensory protein genes from the spruce budworm, *Choristoneura fumiferana* (Lepidoptera: Tortricidae). Paper presented at the Entomological society of America Annual Meeting, 14-17 Nov., 2004, Salt Lake City, Utah.

**Wanner, K.W.**, Theilmann, D.A., Isman, M.B., Feng, Q. and Plettner, E. (2003). The insect chemosensory protein family. Paper presented at the 2003 Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of B.C., 1-5 Nov., 2003, Kelowna, B.C.

## Posters

**Wanner, K.W.**, Forêt, S. and Maleszka, R. Two Ancient Lineages of the Chemosensory Protein Family Originate in the Arthropods: Gene Expression Patterns Support a Role in Development. 5<sup>th</sup> International Symposium on Molecular Insect Science, May 20-24, 2006, Tucson, Arizona.

**Wanner, K.W.**, Anderson, A.R., Trowell, S.C., Theilmann, D.A., Robertson, H.M. and Newcomb, R.D. Female specific odorant receptors expressed in the adult antennae of the silkworm *Bombyx mori*. The XXVIII meeting of the Association for Chemoreception Sciences, April 25-30, 2006, Sarasota, Florida.

Robertson, H.M., **Wanner, K.W.** and Walden, K.O. The chemoreceptor superfamily in honey bees: support for the one receptor- one neuron- one glomerulus model for insect olfaction. The IX European Symposium for Insect Taste and Olfaction, 24-30 September, 2005, Villasimius, Sardinia, Italy. *Presented by K.W. Wanner.*

**Wanner, K.W.**, Kostyk, B.C. and Helson, B.V. (1996) Efficacy of neem seed extract for control of spruce budworm defoliation damage to white spruce seed orchards in Ontario, Canada. *In: Proceedings of the International Neem Conference, February 4-9, 1996. St. Lucia, Australia. Presented by B.V. Helson.*

## Student Posters (Student projects that I have supervised)

Mooney, A. and **Wanner, K.W.** Odorant receptor gene expression in larval silkworm (*Bombyx mori*) chemosensory organs. Entomological Society of America Annual Meeting, 10-13 December, 2006, Indianapolis, Indiana.

## Technical Reports

Nitschke, P. and **K. Wanner**. 1994. Ontario's seed orchard program: an update. pp 95-100 *In: Biology, damage and management of seed orchard pests. Turgeon, J.J. and P. de Groot eds. Natural Resources Canada, Canadian Forest Service. Information Report FPM-X-89.*

**Wanner, K.W.**, Kostyk, B.C. and Meyer, T.R. Tree Improvement Pest Management Annual Report, 1994-1995, Ontario Forest Research Institute, Ministry of Natural Resources, Sault Ste. Marie, Ont.

*Ontario Tree Improvement Pest Notes Series, Ontario Forest Research Institute, Ministry of Natural Resources, Sault Ste. Marie, Ont.*

de Groot, P., Zylstra, B. and **Wanner, K.** Timing spring applications of insecticide for control of white pine weevil - September 1994. Pest Note # 2.

Kostyk, B.C. and **Wanner, K.W.** Eastern spruce budworm-September 1994. Pest Note 3.

Kostyk, B.C. and **Wanner, K.W.** Spruce cone maggots - July 1995. Pest Note #4.

Kostyk, B., and **K. Wanner**. 1995. Black spruce cone survey. Pest Note # 8.

**Wanner, K.W.** White pine weevil - June 1994. Pest Note # 1.

**Wanner, K.W.** and MacDonnell, N. Timing insecticide application for the control of lepidopteran grazing and cone maggot damage to black spruce cones - July 1995. Pest Note #5.