2012-0334-1332

September 25, 2012

Marianne Lewis, Registration Division
Office of Pesticide Programs,
Environmental Protection Agency
1200 Pennsylvania Ave. NW.,
Washington, DC 20460–0001
Filed online at www.regulations.gov

Attn: Docket No. EPA-HQ-OPP-2012-0334 Comment

Re: Emergency Petition for Suspension of Registration - Clothianidin dated March 20, 2012

Dear Ms. Lewis,

This additional comment is submitted on behalf of the Center for Food Safety which was the lead author of the above-referenced Petition. Please see the attached 60-page compilation, "Literature on Effects of Neonicotinoid Insecticides". It provides comprehensive, although not completely exhaustive, references under the subheadings below (due to the length of this compilation effort it may not incorporate very recent studies):

- Acute Toxicity
- Residual Toxicity
- Sublethal Toxicity
- Chronic Toxicity
- Immune Suppression and Synergistic Effects
- Studies on Metabolites
- Residues
- Guttation Fluid Studies
- Toxicity of Contaminated Dust
- Incident Studies
- Reviews of Registrant Studies
- Summary Reviews of Literature Articles
- Risk Assessment Process and Tests for Bees
- Articles Claiming No Effects from Neonicotinoids at Environmentally Relevant Concentrations
- Related Studies for Neonicotinoids and Bees
- Environmental Fate and Ecotoxicity Studies
- Ecotoxicity Studies for Other Non-target Organisms

The Center for Food Safety submits this compilation as it provides a preponderance of evidence showing unreasonable adverse effects of clothianidin and other neonicotinoid insecticides. It

provides further basis in addition to the Petition itself, our supplemental filings in the docket and our other comments that EPA should grant the Petition in full.

Please contact me if you have any questions.

Sincerely,

/s/

Larissa Walker, Project Organizer
Center for Food Safety
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Washington, DC 20003
Tel: (202) 547-9359; email: lwalker@centerforfoodsafety.org

Attachment

Attachment

Literature on Effects of Neonicotinoids

Acute Toxicity

Bailey, J., C. Scott-Dupree, R. Harris, J. Tolman, and B. Harris. 2005. Contact and oral toxicity to honey bees (*Apis mellifera*) of agents registered for use for sweet corn insect control in Ontario, Canada. *Apidologie* 36(4): 623-633.

Bianu, E., D. Nica, G. Chioveanu. 2008. A case of acute intoxication with acetamiprid in bee colonies. 3rd European Conference of Apidology. Belfast. Sept 8-11, 2008.

Gregorc, A., J.D. Ellis. 2011. Cell death localization *in situ* in laboratory reared honey bee (*Apis mellifera L.*) larvae treated with pesticides. *Pest Biochem Physio*. 99: 200–207.

Incertii, F., L. Bortolotti, C. Porrini, A. M. Sbrenna, G. Sbrenna. 2003. An extended laboratory test to evaluate the effects of pesticides on bumblebees. Preliminary results. *Bull Insectol. 56 (1): 159-164, 2003* ISSN 1721-8861 http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-159-164incerti.pdf

Iwasa, T., N. Motoyama, J.T. Ambrose, R. M. Roe. Mechanism for the differential toxicity of neonicotinoid insecticides in the honey bee, *Apis mellifera*. 2004. *Crop Protection* 23: 371-378.

Laurino, D, M. Porporato, A. Patetta, A. Manino. 2011. Toxicity of neonicotinoid insecticides to honey bees laboratory tests. *Bull Insectol* 64:107–113.

Marletto, F., A. Patetta, Manno, A. 2003. Laboratory assessment of pesticide toxicity to bumblebees. *Bull Insectol 56 (1): 155-158.* http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-155-158marletto.pdf

Nauen, R. and R. Schmuck. 2001. Bayer. Toxicity and nicotinic acetylcholine receptor interaction of imidacloprid and its metabolites in *Apis mellifera Pest Manag Sci* 57:577-586

Nica, D., E. Bianu, G. Chioveanu. 2008. A case of acute intoxication with thiamethoxam in bees. 3rd European Conference of Apidology. Belfast, Ireland. Sept 8-11, 2008. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Stark, J.D., P.C. Jepson, and D.F. Mayer. 1995. Limitations to use of topical toxicity data for predictions of pesticide side effects in the field. *J Econ Entomol*. 88: 1081–1088.

Suchail, S.,D. Guez, and L. P. Belzunces.2000. Characteristics of imidacloprid toxicity in two *Apis mellifera* subspecies. *Environ Toxicol Chem*. 19:1901–1905.

Suchail, S., D. Guez, and L.P. Belzunces. 1999. Characteristics of imidacloprid toxicity in two *Apis mellifera* subspecies. *Environ Toxicol Chem*. 19(7): 1901–1905.

Residual Toxicity

Mayer, D.F. and J.D. Lunden. 1997. Effects of imidacloprid insecticide on three bee pollinators. *Horticultural Science*. 29:93-97.

Sublethal Toxicity

Abbott, V.A., J. L. Nadeau, H. A. Higo, and M. L. Winston. 2008. Lethal and Sublethal Effects of imidacloprid on *Osmia lignaria* and clothianidin on *Megachile rotundata* (Hymenoptera: Megachilidae). *J Econ Entomol* 101(3):784-796.

Aliouane, Y., A.K. Hassani, V. Gary, C. Armengaud, M. Lambin, and M. Gauthier. 2009. Subchronic exposure of honeybees to sublethal doses of pesticides: effects on behavior. *Environ Tox Chem* 28(1):113-122.

Armengaud, C., M. Lambin, M. Gauthier. 2002. Effects of imidacloprid on the neural processes of memory in *Honey bees: estimating the environmental impact of chemicals*, J. Devillers and M.H. Pham-Delegue, (eds). New York: Taylor & Francis, 85-100.

Bai, D., S.C.R. Lummis, W. Leicht, H. Breer, D.B. Sattelle. 1991. Actions of imidacloprid and a related nitromethylene on cholinergic receptors of an identified insect motor neuron. *Pestic Sci.* 33:197-204.

Bailez, O. 1996. Études du comportement de butinage et des capacités de discrimination olfactive dans la relation abeille (*Apis mellifera*)-colza (*Brassica napus* L.). Thèse de Doctorat University of Paris XIII. Paris, France.

Beliën, T., J. Kellers, K. Heylen, W. Keulemans, J. Billen, L. Arckens, R. Huybrechts, B. Gobin. 2009. Effects of sublethal doses of crop protection agents on honey bee (*Apis mellifera*) global colony vitality and its potential link with aberrant foraging activity. *Commun Agric Appl Biol Sci*. 74: 245–253.

Belzunces, L.P., S. Tchamitchien, J.L. Brunet. 2012. Neural effects of insecticides in the honey bee. *Apidologie*. http://smallbluemarble.org.uk/wp-content/uploads/2012/04/NeuralEffectsBelzunces2012.pdf

Bonmatin, J.M., I. Moineau, R. Charvet, M.E. Collin, C. Fleche, E.R. Bengsch. 2005. Behavior of imidacloprid in fields. Toxicity for honey bees in *Environmental Chemistry: Green Chemistry and Pollutants in Ecosytems*. Eric Leihtfourse, J. Schwarzbauer, and D. Robert (eds). New York: Springer.

Bortolotti, L., R. Montanari, J. Marcelino, P. Medrzycki, S. Maini, C. Porrini. 2003. Effects of sub-lethal imidacloprid doses on the homing rate and foraging activity of honey bees. *Bull Insectol* 56(1): 63-67. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-063-067bortolotti.pdf

Buckingham, S. D., B. Lapide, H. LE. Corronc, F. Grolleau, and D. B. Sattelle. 1997. Imidacloprid actions on insect neuronal acetylcholine receptors. *J Experimental Biology* 200: 2685-2692.

Colin, M.E., J.M. Bonmatin, I. Moineau, C. Gaimon, S. Brun, J.P. Vermandere. 2004. A method to quantify and analyze the foraging activity of honey bees: relevance to the sublethal effects induced by systemic insecticides. *Arch Environ Contam. Toxicol.* 47:387-395.

Colombo A, and E. Buonocore. 1997. Effetto di trattamenti al terreno con imidacloprid sull'attivita' deibombi. *L'Informatore Agrario* 53:85–87.

Decourtye, A., M.H. Pham-Delegue. 2002. The proboscis extension response: assessing the sublethal effects of pesticides on the honey bee In *Honey Bees: Estimating the Environmental Impact of Chemicals.* J. Devillers and M.H. Pham-Delegue, (eds). New York: Taylor & Francis, 67-84.

Decourtye, A., E. Lacassie, and M.H. Pham-Delègue. 2003. Learning performances of honeybees (*Apis mellifera L.*) are differentially affected by imidacloprid according to the season. *Pest Manage Sci.* 59: 269–278.

Decourtye, A., J. Devillers, S. Cluzeau, M. Charreton, and M.H. Pham-Delègue. 2004(a). Effects of imidacloprid and deltamethrin on associative learning in honeybees under semi-field and laboratory conditions. *Ecotoxicol Environ Safety* 57: 410–419.

Decourtye, A., C. Armengaud, M. Renou, J. Devillers, S. Cluzeau, M. Gauthier, and M. H. Pham-Delègue. 2004(b). Imidacloprid impairs memory and brain metabolism in the honeybee (*Apis mellifera* L.). *Pestic. Biochem. Phys.* 78: 83–92.

Decourtye, A., J. Devillers, E. Genecque, K. LeMenach, H. Budzinski, S. Cluzeau, and M.H. Pham-Delegue. Pham-Delègue, 2005. Comparative sublethal toxicity of nine pesticides on olfactory learning performances of the honeybee *Apis mellifera. Arch Environ Contam Toxicol.* 48:242-250.

Decourtye, A., M. Tisseur, J.N. Tasei, M.H. Pham-Delegue. 2005. Toxicite et risques lies a l'emploi de pesticides chez les pollinisateurs: cas de l'abeille domestique. In Enjeuzx Phytosanitaires pour L'agriculture et L'environment au XXI Siecle, C. Regnault-Roger, (ed). pp. 283-99. Paris:Lavoisier.

Deglise, P., B. Grunewald, M. Gauthier. 2002. The insecticide imidacloprid is a partial agonist of the nicotinic receptor of honeybee Kenyon cells. *Neurosci Letter* 321:13-16.

Desneux, N., A. Decourtye, and J-M. Delpuech. 2007. The sublethal effects of pesticides on beneficial arthropods. *Annu Rev Entomol.* 52: 81–106.

Eiri, D.M. and J.C. Nieh. 2012. A nicotinic acetylcholine receptor agonist affects honey bee sucrose responsiveness and decreases waggle dancing. *J Experimental Biol.* 215: 2022-2029.

El Hassani, A.K., M. Dacher, M. Gauthier, C. Armengaud. 2005. Effects of sublethal doses of fipronil and thiamethoxam on the behavior of the honeybee (*Apis mellifera*). *Arch Environ Contam Toxicol* 54:653-661.

El Hassani, A.K., M. Dacher, V. Gary, M. Lambin, M. Gauthier, and C. Armengaud. 2008. Effects of sublethal doses of acetamiprid and thiamethoxam on the behavior of the honeybee (*Apis mellifera*). *Arch Environ Contam Toxicol.* 54(4): 653-61.

Franklin, M.T., M.L. Winston, and L.A. Moradin. 2004. Effects of clothianidin on *Bombus impatiens* (Hymenoptera: Apidae) colony health and foraging ability. *J Econ Entomol* 97: 369-373.

Gregorc, A. and M.I. Smodis Skerl. 2008. Lethal and sublethal effects of pesticides on individual bees and their tissues. 3rd European Conference of Apidology. Belfast, Ireland. Sept 8-11, 2008. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Guez, D., S. Suchail, M. Gauthier, R. Maleszka, and L.P. Belzunces. 2001. Contrasting effects of imidacloprid on habituation in 7- and 8-day old honeybees (*Apis mellifera*). *Neurobiol Learn Mem.* 76(2):183-191.

Han, P., C-Y Niu, C-L Lei, J-J Cui, N. Desneux. 2010. Use of an innovative T-tube maze assay and the proboscis extension response assay to assess sublethal effects of GM products and pesticides on learning capacity of the honey bee *Apis mellifera L. Ecotoxicology.* 19(8): 1612-19.

Henry, M., M. Beguin, F. Requier, O. Rollin, J-F. Odoux, P. Aupinel, J. Aptel, S. Tchamitchian, A. Decourtye. 2012. A common pesticide decreases foraging success and survival in honey bees. *Science.* 336(6079): 348-350.

Heylin, K., B. Gobin, L. Arckens, R. Huybrechts, J. Billen. 2010. The effects of four crop protection products on the morphology and ultrastructure of the hypopharyngeal gland of the European honeybee, *Apis mellifera. Apidologie.* DOI: 10.1051/apido/2010043.

Kacimi El Hassani, A, M. Dacher, V. Gary, M. Lambin, M. Gauthier, and C. Armangaud. 2008. Effects of sublethal doses of acetamiprid and thiamethoxam on the behaviour of the honeybee (*Apis mellifera*). *Arch Environ Contamin Toxicol* 54(4): 653-61.

Kirchner, W. H. 1999. Mad-bee-disease? Sublethal effects of imidacloprid (Gaucho®) on the behaviour of honeybees. *Apidologie* 30:422.

Lambin, M., C. Armengaud, S. Raymond, M. Gauthier. 2001. Imidacloprid induced facilitation of the proboscis extension reflex habituation in the honeybee. *Arch. Insect Biochem Physiol.* 48:129-34.

Laurino, D., A. Manino, A. Patetta, M. Ansaldi, M. Porporato. 2010. Neonicotinoid toxicity towards bees. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010. http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Matsuda, K. S.D. Buckingham, D. Kleier, J.J. Rauh, M. Grauso, D.B. Sattelle. 2001. Neonicotinoid insecticide acting on insect nicotinic acetylcholine receptors. *Trends Pharmacol Sci* 22:573-580.

Medrzycki P., R. Montanari, L. Bortolotti, A.G.Sabatini , S. Maini, C. Porrini. 2003. Effects of imidacloprid administered in sub-lethal doses on honey bee behaviour. Laboratory tests. *Bull Insectol* 56 (1): 59-62. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-059-062medrzycki.pdf

Morandin, L.A. and M. Winston.2003. Effects of novel pesticides on bumble bee (Hymenoptera: Apidae) colony health and foraging ability. *Environ Entomol* 32: 555-563.

Pereira, A.M., R.C.F. Nocelli, O. Malaspina, O.C. Bueno. 2011. Side effects of acetamiprid in adult Africanized honeybee. 11th International Symposium of the ICP-BR Bee Protection Group. The Netherlands. Nov 2-4, 2011.

Ramirez-Romero, R.,J. Chaufaux, and M-H. Pham Delègue. 2005. Effects of Cry1Ab protoxin, deltamethrin, and imidacloprid on the foraging activity and the learning performances of the honeybee *Apis mellifera*, a comparative approach. *Apidologie* 36:601–611.

Schneider, C. W., J. Tautz, B. Grünewald, S. Fuchs. 2012. RFID tracking of sublethal effects of two neonicotinoid insecticides on the foraging behavior of *Apis mellifera*. *PLoS ONE*. 7:e30023.

Siquiera, K.M., L. Keill, M.S. Coelho, D. Araujo, D. Gama, I.O. Lima, M. Ribiero.2011. Effects of agrochemicals in the pattern of visitation of *Apis mellifera* in *Cucumis melo*. 4th European Conference of Apidology. Sept 7-9, 2010. Ankara, Turkey.

Skerl, M.I. S., and A. Gregorc. 2010. Heat shock proteins and cell death in situ localization in hypopharyngeal glands of honeybee (*Apis melligera carnica*) workers after imidacloprid or coumaphos treatment. *Apidologie*. 41(1): 73-86.

Tome, HVV, GF Martins, MAP Lima, LAO Campos. 2012. Imidacloprid induced impairment of mushroom bodies and behavior of the native stingless bee melipona quadifasciata anthiodes. *PLosOne* 7(6): e38406. Doi:10.1371/journal.pone.0038406.

Wallner, K., A. Schur, and B. Stürz. 1999. Test regarding the danger of the seed disinfectant, Gaucho® 70WS, for honeybees. *Apidologie* 30:423.

Wallner, K. 2001. Test regarding effects of imidacloprid on honey bees. Les Colloques de l'INRA. 98:91–94.

Wu, J., C.M. Anelli, and W.S. Sheppard. 2011. Sub-lethal effects of pesticide residues in brood comb on worker honey bee (*Apis mellifera*) development and longevity. *PLoS ONE* 6(2):e14720.doi:10.1371/journal.pone.0014720.

Wu, J. V. Krischik, and M. Spivak. 2012. Sub-lethal effects of imidacloprid exposure on honey bee queen egg-laying and activity. American Bee Research Conference. Feb 7-8, 2012. Greenbelt, MD.

Yang, E.C., Y.C. Chuang, Y.L. Chen, L.H. Chang. 2008. Abnormal foraging behavior induced by sublethal dosage of imidacloprid in the honeybee (Hymenoptera: Apidae). *J Econ Entomol* 101(6):1743-1748.

Zhu, G., M. J. Petersen, G. Liu, D.C. Peck. 2012. Learning performances of honeybees (Apis mellifera L.) are differentially affected by imidacloprid according to the season. *Pest Manage Sci.* doi: 10.1002/ps.3394.

Chronic Toxicity

Bortolotti, L., E. Grazioso, E. Porrini, G. Sbrenna. 2001. Effect of pesticides on the bumblebee, *Bombus terrestris L.* in the laboratory In Proceedings of the 7th International Symposium "Hazards of pesticides to bees." Sept. 7-9, 1999. Avignon, France.

Dechaume-Moncharmont, F.X., A. Decourtye, C. Hennequet-Hantier, O. Pons, M.H. Pham-Delegue. 2003. Statistical analysis of honeybee survival after chronic exposure to insecticides. *Environ Toxicol Chem.* 22:3088-94.

Decourtye, A., J. Devillers, E. Genecque, K. Le Menach, H. Budzinski, S. Cluzeau, MH Pham-Delegue. 2001 Impairment of olfactory learning performances in the honey bee after long-term ingestion of imidacloprid. In: Belzunces LP, C. Pellissier, G.B. Lewis (eds) *Hazard of pesticides to bees.* INRA, Paris, pp 113–117

Decourtye, A., E. Lacassie, and M.H. Pham-Delègue. 2003. Learning performances of honeybees (*Apis mellifera L.*) are differentially affected by imidacloprid according to the season. *Pest Manage Sci.* 59: 269–278.

Gels, J.A., D.W. Held and D.A. Potter. 2002. Hazards of insecticides to the bumble bees *Bombus impatiens* (Hymenoptera: Apidae) foraging on flowering white clover in turf, *Ecotoxicology* 95: 722–728.

Henry, M., M. Beguin, F. Requier, O. Rollin, J-F. Odoux, P. Aupinel, J. Aptel, S. Tchamitchian, A. Decourtye. 2012. A common pesticide decreases foraging success and survival in honey bees. *Science.* 336(6079): 348-350.

Laycock, I., K.M. Lentall, A.T. Barratt, J.E. Cresswell. 2012. Effects of imidacloprid, a neonicotinoid pesticide, on reproduction in worker bumble bees (*Bombus terrestris*). *Ecotoxicology.*

Lu, C., K.M. Warchol, R.A. Callahan. 2012. In situ replication of honey bee colony collapse disorder. *Bull Insect* 65(1): 99-106.

http://www.bulletinofinsectology.org/pdfarticles/vol65-2012-099-106lu.pdf

Mommaerts, V and G. Smagghe. 2011. Side-effects of pesticides on the pollinator Bombus: an overview. In: Stoytcheva, M (ed) *Pesticides of the modern world*. InTech, Rijeka, pp 507–552.

Mommaerts, V., S. Reynders, J. Boulet, L. Besard, G. Sterk, G. Smagghe. 2010. Risk assessment for side-effects of neonicotinoids against bumblebees with and without impairing foraging behaviour. *Ecotoxicology* 19:207–215.

Moncharmont, F.D. et al. 2003. Statistical analysis of honeybee survival after chronic exposure to insecticides. *Environ Tox Chem* 22(12): 3088-3094.

Suchail, S., D. Guez, L.P. Belzunces. 1999. Toxicity of imidacloprid and its metabolites in Apis mellifera In Hazards of Pesticides to Bees. L.P. Belzunces, C. Pelissier, and G.B. Lewis. Avignon, France. 7th International Symposium of the ICP-BR Bee Protection Group.

Suchail, S.,D. Guez, and L. P. Belzunces.2001. Discrepancy between acute and chronic toxicity induced by imidacloprid and its metabolites in *Apis mellifera*. *Environ Toxicol Chem*. 20: 2482–2486.

Whitehorn, P.R., S. O'Connor, F.L. Wachers, D. Goulson. 2012. Neonicotinoid pesticide reduces bumble bee colony growth and queen production. *Science*. 336(6079): 351-2.

Immune Suppression and Synergistic Effects

Alaux, C., J-L.Brunet, C. Dussaubat, F. Mondet, S. Tchamitchan, M. Cousin, J. Brillard, A. Baldy, L.P. Belzunces, Y. Le Conte. 2010. Interactions between *Nosema* microspores and a neonicotinoid weaken honeybees (*Apis mellifera*). *Environ Microbiol* 12, 774–782.

Aufauvre, J., R. Fontbonne, M. Roudel, C. Vidau, M. Deogon, D. Pointclous, H. El Alaoui, C. Texler, B. Vigues, N. Blot, and F. Delboe. 2010. Impact of pesticides on emergence of *Nosema ceranae*, an emerging parasite of the honeybee, *Apis mellifera*. COLOSS Workshop. Bologna, Italy. Nov 25-26, 2010.

Dussaubat, C., C. Alaux, A. Maisonnasse, J-L Brunet, S. Tchamitchan, F. Mondet, M. Cousin, J. Brillard, L. Belzunces, E. Plettner, Y. Le Conte. 2008. Interaction between *Nosema* spp. and a neonicotinoid affect honey bees at the individual and social level. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010.
http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Gregorc, A., J.D. Evans, J. Ellis. 2010. Do varroa mites and pesticides synergize to affect bee larvae. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010.
http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Gregorc, A., J.D. Evans, M. Scharf, J.D. Ellis. 2012. Gene expression in honey bee (*Apis mellifera*) larvae exposed to pesticides and Varroa mites (*Varroa destructor*). J Insect Physio. 58: 1042-1049.

James, R.R. and J. Xu. 2012. Mechanisms by which pesticides affect insect immunity. *J Invert Path.* 109: 175-182.

Krzjl, J. 2010. Imidacloprid enhances outbreak of nosemosis in honey bees. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010. http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Pettis, J. 2009. Status of Pollinator Health. USDA-ARS Bee Research Lab, Beltsville, MD. http://www.ndswcs.org/documents/Rapid%20City%20conference/Friday/PollinatorsPettis-London08.pdf .

Pettis, J.S., D. van Engelsdorp, J. Johnson, G. Dively. 2012. Pesticide exposure in honey bees results in increased levels of the gut pathogen *Nosema. Naturwissenschaften* 99: 153–158.

Vidau, C., M. Diogon, J. Aufauvre, R. Fontbonne, B. Vigues, J-L. Brunet, C. Texier, D.G. Biron, N. Blot, H. El Alaoui, L.P. Belzunces, F. Delbac. 2011. Exposure to sublethal doses of fipronil and thiacloprid highly increases mortality of honeybees previously infected by *Nosema ceranae. PLoSONE.* 6(6):e21550.

Wu, J.Y., M.D. Smart, C.M. Anelli, W.S. Shepppard. 2012. Honey bee (*Apis mellifera*) reared in brood combs containing high levels of pesticide residues exhibit increased susceptibility to *Nosema* (Microsporidia infection. *J. Invert Path.* 109(3): 326-9.

Studies on Metabolites

Brunet, J-L, A. Badiou, L.P. Belzunces. 2005. In vivo metabolic fate of ^{14}C-acetamiprid in six biological compartments of the honeybee. *Apis mellifera L. Pest Manage Sci.* 61(8): 742-748.

Decourtye, A., E. Lacassie, and M.H. Pham-Delègue. 2003. Learning performances of honeybees (*Apis mellifera L.*) are differentially affected by imidacloprid according to the season. *Pest Manage Sci.* 59: 269–278.

Guez, D, L.P. Belzunces, R. Maleszka. 2003. Effects of imidacloprid metabolites on habituation in honeybees suggest the existence of two subtypes of nicotinic receptors differentially expressed during adult development. *Pharmacol Biochem Behav* 75:217–222.

Kamel, A., G. Dively, D. Hawthorn, and J. Pettis. Unpublished research examining the fate of imidacloprid and its metabolites in honey bee hives.

Nauen, R.and R. Schmuck. 2001 Bayer. Toxicity and nicotinic acetylcholine receptor interaction of imidacloprid and its metabolites in *Apis mellifera. Pest Manag Sci* 57:577-586.

Nauen, R., U. Ebbinghaus-Kintscher, V.L. Salgado, and M. Kaussmann. 2003. Bayer. Thiamethoxam is a neonicotinoid precursor converted to clothianidin in insects and plants. *Pest Biochem Physiol* 76: 55-69.

Shah, R.G., J. Lagueux, S. Kapur, P. Levallois, P. Ayotte, M. Tremblay, J. Zee, and G.G. Poirier. 1997. Determination of genotoxicity of the metabolites of the pesticides Guthion, Sencor, Lorox, Reglone, Daconil and Admire by 32P-postlabeling. *Mol Cell Biochem.* 169(1-2):177-84.

Suchail, S.,D. Guez, and L. P. Belzunces.2001. Discrepancy between acute and chronic toxicity induced by imidacloprid and its metabolites in *Apis mellifera. Environ Toxicol Chem.* 20: 2482–2486.

Suchail, S., L. Debrauwer, and L. P. Belzunces.2003. Metabolism of imidacloprid in *Apis mellifera. Pest Manag Sci.* 60:291–296.

Suchail, S., G. De Sousa, R. Rahmani, L.P. Belzunces, 2004. In vivo distribution and metabolism of ^{14}C-imidacloprid in different compartments of *Apis mellifera L. Pest Manag Sci* 60: 1056-1062.

Thyssen, J., L. Machemer. 1999. Imidacloprid: toxicology and metabolism In *Nicotinoid Insecticides and the Nicotinic Acetylcholine Receptor*, ed. I. Yamamoto, J.E. Casida, 213-11. Tokyo: Springer-Verlag.

Residues

Bernal J., E. Garrido-Bailon, M.J. del Nozal, A.V. Gonzalez-Porto, R. Martin-Hernandez, J.C. Diego, J.J. Jimenez, J.L. Bernal, M. Higes. 2010. Overview of pesticide residues in stored pollen and their potential effect on bee colony (*Apis mellifera*) losses in Spain. *J Econ Entomol* 103:1964–1971.

Bonmatin, J.M., P.A. Marchand, R. Carvet, M.E. Colin. 1994. Fate of systemic insecticides (imidacloprid and fipronil) and risks for pollinators. *First European Conference of Apidology.* Udine. Sept 19-23, 2004.

Buchholz, A. and R. Nauen. 2002. Translocation and translaminar bioavailability of two neonicotinoid insecticides after foliar application to cabbage and cotton. *Pest Manag Sci* 58(1): 10–16.

Charvet, M.P., M. Katouzian-Safadi, M.E. Colin, P.A. Marchand, J.M. Bonmatin. 2004. Systemic insecticides: new risk for pollinator insects. *Ann Pharm Fr.* 62(1): 29-35.
Chauzat, M. P., J. P. Faucon, A. C. Martel, J. Lachaize, N. Cougoule, and M. Aubert. 2006. A survey of pesticide residues in pollen loads collected by honey bees in France. *J. Econ. Entomol.* 99:253–262.

Chauzat, M and J. Faucon. 2007. Pesticide residues in beeswax samples collected from honey bee colonies (Apis mellifera L.) in France. *Pest Manage Sci.* 1106: 1100-1106.

Dively, G. P., and A. Kamel. 2012. Insecticide residues in pollen and nectar of a cucurbit crop and their potential exposure to pollinators. *J Agri Food Chem.* 60:4449-4456.

Eitzer, B. 2011. The role of pesticides in honeybee declines. http://www.ct.gov/caes/lib/caes/documents/plant_science_day/plant_science_day_spring/2011/spring_open_house_2011_eitzer.pdf.

Laurent, F.M. and E. Rathahao. 2003. Distribution of [^{14}C]imidacloprid in sunflowers (*Helianthus annuus* L.) following seed treatment. *J Agric Food Chem.* 51: 8005–8010.

Mohapatra, S., M. Deepa, S. Lekha, B. Nethravathi, B. Radhika, S. Gourishanker. 2012.Residue dynamics of spirotetramat and imidacloprid in/on mango and soil. *Bull Environ Contam Toxicol.* DOI:10.1007/s00128-012-0762-0.

Rortais, A., G. Arnold, M. Halm, R. Touffet-Briens. 2005. Modes of honeybees exposure to systemic insecticides: estimated amounts of contaminated pollen and nectar consumed by different categories of bees. *Apidologie* 36:71-83.

Smodis Skerl, MI, S. Velikonja Bolta, H. Basa Cesnik, A. Gregorc. 2009. Residues of pesticides in honeybee (*Apis mellifera carnica*) bee bread and in pollen loads from treated apple orchards. *Bull Environ Contam Toxicol* 83:374–377

Stoner, K. and B. Eitzer. Pesticides in pollen collected from honey bee hives in Connecticut. http://www.millersriver.net/pollen/talks/Microsoft%20PowerPoint%20-%20Kim%20Stoner%20pdf%20for%20posting.pdf.

Stork, A., 1999 Residues of 14C-NTN33893 (Imidacloprid) in blossoms of sunflower after seed dressing. Bayer report #MR-550/99

Guttation Fluid Studies

Girolami, V.L., Mazzon, A. Squatini, N. Mori, M. Marzaro, A. Dibernardo, M. Greatti, C. Giorio, and A. Tapparo. 2009. Translocation of neonicotinoid insecticides from coated seeds to seedling guttation drops: a novel way of intoxication for bees. *J Econ Entomol* 102: 1808-1815.

Hoffmann, E. J. and S. J. Castle. 2012. Imidacloprid in melon guttation fluid: A potential mode of exposure for pest and beneficial organisms. *J Econ Entomol* 105:67-71.

Maresch, Karl. 2009. Bees killed by neo-nicotinoids in expressed maize sap. http://www.farminguk.com/news/Bees-killed-by-Neo-nicotinoids-in-expressed-Maize-sap10986.asp

Wallner, K. 2011. Orienting experiments on guttation fluid of seed treated maize (Zea mays L) in relation to the water collecting behavior of honey bees (*Apis mellifera L.*) ICP-BR Bee Protection Symposium, Wageningen, The Netherlands. Nov 2-4, 2011.

Toxicity of Contaminated Dust

Apenet. 2009. Effects of coated maize seed on honey bees. http://www.cra-api.it/online/immagini/Apenet_2009_eng.pdf

Forster, R. 2009. Bee poisoning caused by insecticidal seed treatment of maize in Germany in 2008. *Kulius Kuhn Archive*. 423: 126-131.

Georgiadis, P., J. Pistorius, U. Heimbach, M. Stahler, K.Schwabe. 2011. Dust drift during sowing of maize – effects on honey bees. 11th International Symposium of the ICP-BR Bee Protection Group. https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=323.

Girolami, V., M. Marzaro, L. Vivan, C. Giorio, D. Marton, A. Tapparo. 2012. Aerial powdering of bees inside mobile cages and the extent of the toxic neonicotinoid cloud surrounding corn drillers. *J. Appl. Entomol.* 136: 17-36.

Greatti, M., R. Barbattini, A.Stravisi, G.Sabatini, S. Rossi S. 2006. Presence of the a.i. imidacloprid on vegetation near corn fields sown with Gaucho® dressed seeds. *Bull Insectol* 59(2): 99-103. http://www.bulletinofinsectology.org/pdfarticles/vol59-2006-099-103greatti.pdf

Greatti, M., A.G. Sabatini, R. Barbattini, S. Rossi, and A. Stravisi. 2003. Risk of environmental contamination by the active ingredient imidacloprid used for corn seed dressing: Preliminary results. *Bull. Insectol.* 56(1): 69–72. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-069-072greatti.pdf

Heimbach, U., J. Pistorius, K. Schwabe, M. Stahler, D. Rautman, D. Schenke, P-Th. Georgiadis. 2011. Dust drift during sowing of pesticide treated seeds. Julius Kuhn-Institute. http://precedings.nature.com/documents/5738/version/1.

Krupke. C.H., G.J. Hunt, B.D. Eitzer, G. Andino, K. Given. 2012. Multiple routes of pesticide exposure for honey bees living near agricultural fields. *PLoS One*. 7(1): e29268. doi:10.1371/journal.pone.0029268.

Marzaro, M., L. Vivan, A. Targa, L. Mazzon, N. Mori, M. Greatti, E. Petrucco Toffolo, A. Di Bernardo, C. Giorio, D. Marton, A. Tapparo, V. Girolami. Lethal aerial powdering of honey bees with neonicotinoids from fragments of maize seed coat. *Bull. Insectol.* 2011, 64: 119-126. http://www.bulletinofinsectology.org/pdfarticles/vol64-2011-119-126marzaro.pdf.

Sgolastra, F., T. Renzi, S. Draghetti, C. Sciò, P. Medrzycki, M. Lodesani, S. Maini, C. Porrini. Effects of neonicotinoid dust from maize seed-dressing on honeybees. 11th International Symposium of the ICPBR Bee Protection Group.

Tapparo, A., D. Martin, C. Giorio, A. Zanella, L. Solda, M. Marzaro, L. Vivan., V. Girolami. 2012. Assessment of the environmental exposure of honeybees to particulate matter containing neonicotinoid insecticides coming from corn coated seeds. *Environ Sci Technol.* 46(5): 2592-9.

Tremolada, P., M. Mazzoleni, F. Saliu, M. Colombo, M. Vighi. 2010. Field trial for evaluating the effects on honeybees of corn sown using Cruiser and Celest xl treated seeds. *Bull Environ Contam Toxicol* 85(3): 229-34.

van der Geest, B. 2010. Bee poisoning incidents in the Pomurje region of Eastern Slovenia in 2011. 4th European Conference of Apidology. Sept 7-9, 2010. Ankara, Turkey.

Incident Studies

ApeNet. 2011. Effects of coated maize seed on honey bees. Report based on results obtained from the second year (2010) activity of the APENET project.

Bacandritsos, N., A. Granato, G. Budge, I. Papanastasiou, E. Roinioti, M. Caldon, C. Falcaro, A. Gallina, F. Mutinelli. 2010. Sudden deaths and colony population decline in Greek honey bee colonies. *J Invertebr Pathol* 105:335–340.

Biesmeijer, J.C., S.P.M. Roberts, M. Reemer, R. Ohlemüller, M. Edwards, T. Peeters, A.P. Schaffers, S.G. Potts, R. Kleukers, C.D. Thomas, J. Settele and W.E. Kunin. 2006. Parallel declines in pollinators and insect pollinated plants in Britain and the Netherlands, *Science* 313: 351–354.

Biesmeijer, K. 2008. European wild bees: status and threats. 3rd European Conference of Apidology. Belfast, Ireland. Sept 8-11, 2008. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Bortolotti, L., A.G. Sabatini, D. Tesoriero, P. Medrzycki, F. Mutinelli, M. Astuti, A. Lavazza, R. Piro, F. Sgolastra, C. Porrini. 2008. Spring honeybee losses in Italy. 3rd European Conference of Apidology. Belfast, Ireland. Setp 8-11, 2008. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Cameron, S.A., J.D. Lozier, J.P. Strange, J.B. Koch, N. Cordes, L.F. Solter, T.L. Griswold. 2011. Patterns of widespread decline in North American bumble bees. *PNAS* 108(2): 662-667.

Cane, J.H. and V.J. Tepedino. 2001. Causes and extent of declines among native North American invertebrate pollinators: detection, evidence, and consequences. *Conserv Ecol.* 5:1.

Canadian Association of Professional Apiculturists (CAPA) Report of Bee Losses. 2010. http://capabees.com/main/files/pdf/2010winterloss.pdf.

Canadian Association of Professional Apiculturists (CAPA) Report of Bee Losses (CAPA). 2011. http://www.capabees.com/main/files/pdf/canwinloss.pdf.

Carvalho, S., T. Roat, A. Pereira, E. Silva-Zacain, R. Nocelli, O. Malaspina. 2011. Brazilian bee loss. 4th European Conference of Apidology. (Eurobee 2010). Sept 7-9, 2011. Ankara, Turkey.

Colla, S.R. and L. Packer. 2008. Evidence for decline in eastern North American bumblebees (Hymenoptera: Apidea), with special focus on *Bombus affinis* Cresson, *Biodiversity and Conservation* 17:1379–1391.

Crailsheim, K., R. Brodschneider, U. Riessberger-Galle. 2004. 3rd European Conference of Apidology. Belfast. Sept 8-11, 2008. Analysis of colony losses in Austria (2007/2008) – strategies of monitoring and parameters to be tested.

Ellis, J.D., J.D. Evans, J.S. Pettis. 2010. Colony losses, managed colony population decline, and colony collapse disorder in the United States. *J Apicul Research* 49, 134–136.

Faucon, J. P., L. Mathieu,M. Ribière,A-C. Martel, P. Drajnudel, S. Zeggane, C. Aurières,and M.F.A. Aubert. 2002. Honey bee winter mortality in France in 1999 and 2000. *Bee World* 83: 14–23.

Finley, J., S. Camazine, and M. Frazier, 1996. The epidemic of honey bee colony losses during the 1995-1996 season. *Am Bee J.* 136:805-808.

Fitzpatrick, U., M.G. Murray, R.J. Paxton, J. Breen, D. Cotton, V. Santorum and M.J.F. Brown. 2007. Rarity and decline in bumblebees – a test of causes and correlates in the Irish fauna, *Biological Conservation* 136:185–194.

Goulson, D. 2006. The demise of the bumblebee in Britain, *Biologist* 53:294–299.

Grixti, J.C., L.T. Wong, S.A. Cameron and C.Favret. 2009. Decline of bumble bees (*Bombus*) in the North American Midwest. *Biological Conservation.* 142 (1): 75-84.

Health Canada Incident Reporting System. http://www.hc-sc.gc.ca/cps-spc/pest/registrant-titulaire/reporting-declaration/index-eng.php.

Hendrikx P., Chauzat M.P., Debin M., Neuman P., Fries I., Ritter W., Brown M., Mutinelli F., Le Conte Y., Gregorc A. (2009) Bee Mortality and Bee Surveillance in Europe, EFSA-Report, http:// www.efsa.europa.eu.

Janke, M., W. von der Ohe, D. Brasse, R. Forster. Colony losses – interactions of plant protection products and other factors. Julius-Kühn-Archiv, 423, 2009, 10th International Symposium of the ICP-BR Bee Protection Group, Hazards of Pesicides to bees, Bukarest 08. – 10. Oktober 2008, S. 153 – 154.

Janke, M., P. Rosenkranz. Bee poisoning incidents in Germany: preliminary results from a four years monitoring project. Julius-Kühn-Archiv, 423, 2009, 10th International Symposium of the ICP-BR Bee Protection Group, Hazards of Pesicides to bees, Bukarest 08. – 10. Oktober 2008, S. 108 – 117.

Jones, W.A. 2007. Future Development on the Australian Honey Bee Industry. Testimony - House of Representatives Standing Committee on Agriculture, Fisheries and Forestry.

Kosior, A., W. Celary, P. Olejniczak, J. Fijal, W. Król, W. Solarz and P. Plonka. 2007. The decline of the bumble bees and cuckoo bees (Hymenoptera: Apidae: Bombini) of western and central Europe, *Oryx* 41: 79–88.

Mullin, C.A., M. Frazier, J.L. Frazier, S. Ashcraft, R. Simonds, D. vanEngelsdorp, J.S. Pettis, J.S. 2010. High levels of miticides and agrochemicals in North American apiaries: implications for honey bee health. *PLoS ONE* 5 (3), e9754. http://dx.doi.org/10.1371/journal.pone.0009754.

Neumann, P. 2008. An introduction to honeybee colony losses. 3rd European Conference of Apidology. Belfast, Ireland. Sept 8-11, 2012. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Neumann P. and NL Carreck. 2010. Honey bee colony loss. *J Apic Res*. 49(special issue):1–6

Notestine, M., S. Chen, K.A. MacKenzie, and A.L. Averill. A comparison of current and historical native bee populations in Massachusetts cranberry: evidence of decline (in preparation for *Conservation Biology*).

Notestine, M., S. L. Haire, S. Chen, and A.L. Averill. Effects of agricultural intensification on native pollinators of Massachusetts cranberry (in preparation for *Conservation Biology*).

Pistorius, J., G. Bischoff, U. Heimbach, and M. Stähler. 2009. Bee poisoning incidents in Germany in spring 2008 caused by abrasion of active substance from treated seeds during sowing of maize. pp. 118 – 126 *in* P. A. Oomen and H. M. Thompson (editors) In Hazards of Pesticides to Bees, 10th International Symposium of the ICP-BR Bee Protection Group, Bucharest (Romania), October 8 – 10, 2008. Julius Kühn Arch 423

Porrini, C., A.G. Sabatini, S. Girotti, F. Fini, L. Monaco, G. Celli, L. Bortolotti, S. Ghini. 2003. The death of honey bees and environmental pollution by pesticides: the honey bees as biological indicators. *Bull Insectol* 56(1): 147-152. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-147-152porrini.pdf

Porrini C., Sgolastra F., Sabatini A.G. 2008. Rete per il monitoraggio dei fenomeni di spopolamento e mortalità degli alveari in Italia (APENET). *Apoidea*, 5(2): 83-87.

Potts, S.G., S.P.M. Roberts, R. Dean, G. Marris, M. Brown, R. Jones, and J. Settele. 2008. Status and trends of honeybees in Europe: severe declines in central Europe. 3rd European Conference of Apidology. Belfast. Sept 8-11, 2008.

Project MELISSA. 2012. Investigations on the occurrence of bee losses in corn and canola-growing regions of Austria and possible association with bee disease and the use of pesticides. http://bee-life.eu/en/doc/199/.

http://bee-life.eu/medias/temp/melissa_austrian-monitoring.pdf

Rasmont, P., A. Pauly, M. Terzo, S. Patiny, D. Michez, S. Iserbyt, Y. Barbier and E. Haubruge. 2006. The survey of wild bees (Hymenoptera, Apoidea) in Belgium and France, *Status of the World's Pollinators*, Food and Agriculture Organisation of the United Nations, Rome, p. 18.

Rogers, R.E.L. and J.R. Kemp. 2003. Bayer. Imidacloprid, potatoes, and honey bees in Atlantic Canada: is there a connection? *Bull. Insectol.* 56:83-88. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-083-088rogers.pdf

Sarospataki, M., J. Novak and M. Viktoria. 2005. Assessing the threatened status of bumble bee species (Hymenoptera: Apidae) in Hungary, Central Europe, *Biodiversity and Conservation* 14: 2437–2446.

Thompson, H. M. and D. Thorbahn. 2009. Review of honey bee pesticide poisoning incidents in Europe – evaluation of the hazard quotient approach for risk assessment. In P. A. Oomen and H. M. Thompson (editors) Hazards of Pesticides to Bees 10th International Symposium on the ICP-BR Bee Protection Group. Bucharest (Romania), October 8 – 10, 2008. Julius Kühn Arch

UNEP Report. 2011. Global Honey Bee Colony Disorder and Other Threats to Insect Pollinators. http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf.

Van der Zee, R., et al. 2008. Honeybee colony losses 2009-10 in 23 countries using mainly the COLOSS 2009-10 questionnaire. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010. http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Van der Zee, R. 2010. Colony losses in the Netherlands. *J Apicultural Research*. 49(1):121-123.

Van der Zee, R. et al. 2012. Managed honey bee colony losses in Canada, China, Europe, Israel, and Turkey for the winters of 2008-9 and 2009-10. J Apicultural Research. 51(1): 100-114.

vanEngelsdorp, D., D. Cox Foster, M. Frazier, N. Ostiguy, and J. Hayes. 2007. "Fall dwindle disease": Investigations into the causes of sudden and alarming colony losses experienced by beekeepers in the fall of 2006. Preliminary report: First revision. http://maarec.cas.psu.edu/pressReleases/FallDwindleUpdate0107.pdf

vanEngelsdorp, D., J Hayes (Jr), R. M. Underwood, J. Pettis. 2008. A Survey of Honey Bee Colony Losses in the U. S., Fall 2007 to Spring 2008. *PLoSONE* 3(12):e4071.doi:10.1371/journal.pone.0004071.

vanEnglesdorp, D. et al. 2012. A national survey of managed honey bee 2010-11 winter colony losses in the USA: results from the Bee Informed Partnership. J Apicultural Research. 51(1): 115-124.

Reviews of Registrant Studies

Canadian Water Quality Guidelines. 2007. Imidacloprid. Scientific supporting document. Canadian Council of Ministers of the Enviornment, Winnepeg. http://www.ccme.ca/assets/pdf/imidacloprid_ssd_1388.pdf. Review of the fate and toxicological effects of imidacloprid to non-target organisms.

European Commission Working Document on Clothianidin. Finalized in the Standing Committee on the Food Chain and Animal Health at its meeting on Jan 27, 2006. http://ec.europa.eu/food/plant/protection/evaluation/newactive/list_clothianidin.pdf.

European Commission Working Document for Thiamethoxam. Finalized in the Standing Committee on the Food Chain and Animal Health at its July 14, 2006 meeting. http://ec.europa.eu/food/plant/protection/evaluation/newactive/thiamethoxam_en.pdf.

European Draft Assessment Report: Imidacloprid. Annex B, B.7. February 2006

Fossen, M. 2006. Environmental Fate of Imidacloprid. Department of Pesticide Regulation, California. http://www.cdpr.ca.gov/docs/emon/pubs/fatememo/Imidclprdfate2.pdf. (also contains reviews of ecotox studies for bees).

Health Canada. Pest Management Regulatory Agency. 2007. Evaluation Report for Thiamethoxam. http://publications.gc.ca/collections/collection_2007/pmra-arla/H113-26-2007-1E.pdf.

Health Canada PMRA (Pest Management Regulatory Agency). 1995. Imidacloprid NTN (33893). Chapter 3: Impact on human and animal health. Draft.

Health Canada PMRA. Veridian 0.33G and Veridian 25WG containing thiamethoxam. ERC2011-05. http://www.hc-sc.gc.ca/cps-spc/pubs/pest/_decisions/erc2011-05/index-eng.php

Health Canada PMRA (Pest Management Regulatory Agency). 2001. Imidacloprid. Regulatory Note. REG2001-11. Ottawa: Health Canada, Pest Management Regulatory Agency. Available at http://www.pmra-arla.gc.ca/english/pdf/reg/reg2001-11-e.pdf

Scientific and Technical Committee on the Study of Multifactorial Disorders of Bees. 2003. Imidacloprid used in seed coatings and disorders of honey bees. https://docs.google.com/open?id=0B-ALJSQEiEvRbDBwT3RQdVpDNIE.

U.S. EPA (United States Environmental Protection Agency). 1994. Office of Pesticides Programs. Toxoneliners: Imidacloprid. Washington, D.C., p.1.

U.S. EPA. 2003. Clothianidin Pesticide Fact Sheet. http://www.epa.gov/opprd001/factsheets/clothianidin.pdf.

U.S. EPA. Feb 2003. Miachel Rexrode et al. EFED risk assessment for the seed treatment of clothianidin 600 FS on corn and canola. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-02-20a.pdf

U.S. EPA. April 2003. Miachel Rexrode. Addendum referring to EFED's risk assessment on clothianidin use as a seed treatment on corn and canola. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-04-10a.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Maus and Schoning. Effects of Diet (Sugar Solution) Spiked with TI-435 (Imidacloprid) Technical on Behavior and Mortality of Honey Bees *(Apis mellifera)*. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20i-45422434.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Schmuck and Schoning. Residues of TI-435 in Nectar Blossoms, Pollen and Honey Bees Sampled from a British Summer Rape Field and Effects of These Residues on Foraging Honey Bees. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20h-45422433.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Schmuck and Schoning. Residues of TI-435 in Nectar Blossoms, Pollen and Honey Bees Sampled from a French Summer Rape Field and Effects of These Residues on Foraging Honey Bees. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20h-45422433.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Maus and Schoning. Effects of TI-435 Technical Residues in Pollen on the Development of Small Bee Colonies and on Behavior and Mortality of Honey Bees. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20L-45422440.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Scott-Dupree, Spivak, Bruns, Blenkinsop, Nelson. The Impact of GAUCHO@ and TI-435 Seed Treated Canola on Honey Bees, Apis *mellifera* L. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20j-45422435.pdf.

U.S. EPA. Mar 2003. Data evaluation record for Bayer pollinator field study. Maus and Schoning. Residue Levels of TI-435 FS 600 and its Relevant Metabolites in Pollen of Maize Plants from Dressed Seeds (Test Location: Farmland "Hofchen"). http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-03-20K-45422439.pdf.

U.S. EPA. July 2003. Data evaluation record for Bayer pollinator field study. Schmuck and Schoning. Residues of TI-435 in Nectar Blossoms, Pollen and Honey Bees Sampled from a Summer Rape Field in Sweden and Effects of These Residues on Foraging Honey Bees. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2003-07-16a-45422431.pdf.

U.S. EPA. Nov 2004. Federoff. EFED chapter for clothianidin for use on tobacco, turf, apples, pears, and ornamentals. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2004-11-24a.pdf.

U.S. EPA. Sept 2005. Federoff. EFED chapter for clothianidin for use on potatoes and grapes as a spray treatment and as a seed treatment for sorghum and cotton. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2005-09-28a.pdf.

U.S. EPA. Nov 2007. Vaughan. Review of Cutler field study: An Investigation of the Potential Long Term Impact of Clothianidin Seed Treated Canola on Honey Bees, *Apis melilfera* L. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2007-11-16a.pdf

U.S. EPA. 2008. Ecological Risk Assessment for the Section 3 New Use Registration of Thiamethoxam on Citrus Fruits and Tree Nuts. Sujatha Sankula and Faruque Khan.

U.S. EPA. Nov. 2010. Decant. Reclassification of Cutler field study. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2010-11-02a.pdf.

U.S. EPA. Nov 2010. Decant. Clothianidin registration of Prosper T400 seed treatment on mustard seed and Poncho/Votivo seed treatment on cotton. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2010-11-02b.pdf.

U.S. EPA. Dec 2010. Revised assessment for clothianidin registration of Prosper T400 seed treatment on mustard seed and Poncho/Votivo seed treatment on cotton. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-2010-12-03b.pdf.

U.S. EPA. Dec 2010. Steeger. Rereview of Cutler field study. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-090201-113501-079801-2010-12-22a.pdf.

U.S. EPA. Dec 2010. Pease. Reclassification of Cutler field study. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044309/044309-090201-113501-079801-2010-12-22a.pdf.

U.S. EPA. May 31, 2011. Memorandum. Barry O' Keefe and Leung Cheng. Dinotefuran Section 18 Emergency Exemption for Use on Pome Fruits and Stone Fruits in Virginia, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, and North Carolina to Control Stink Bugs. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/044312/044312.htm.

U.S. EPA. 2011. Ecological risk assessment for the proposed rate increase of thiamethoxam as a seed treatment and foliar spray for cotton. Anita Ullagaddi and Christopher Koper.

USDA, Forest Service. Imidacloprid – Human Health and Ecological Risk Assessment. Dec 28, 2005. http://www.fs.fed.us/foresthealth/pesticide/pdfs/122805_Imidacloprid.pdf.

Summary Reviews of Literature Articles

Association of Institutes for Bee Research Report of the 56th Seminar in Schwerin. March 24-26, 2009. *Apidologie*. 40(6): 651-670.

Blacquiere, T., G. Smagghe, C. van Gestel, V. Mommaerts. 2012. Neonicotinoids in bees: a review on concentrations, side-effects, and risk assessment. *Ecotoxicology*. 21(4): 973-92.

Congressional Research Service. Renee Johnson. Honey Bee Colony Collapse Disorder. Jan 7, 2010. http://www.fas.org/sgp/crs/misc/RL33938.pdf.

Cox, C. 2001. Insecticide Fact Sheet: Imidacloprid. *J Pest Reform*. 21(1):15-21.

Extension Toxicology Network (EXTOXNET). 1998. Imidacloprid Pesticide Information Profile. [Online]. Available at http://extoxnet.orst.edu/pips/imidaclo.htm. (Verified 09 January 2006). Oregon State University, Corvallis, OR.

Hopwood, J., M. Vaughan, M. Shepherd, D. Biddinger, E. Mader, S.H. Black, C. Mazzacano. 2012. Are neonicotinoids killing bees? Xerces Society for Invertebrate Conservation. http://www.xerces.org/neonicotinoids-and-bees/.

ICP-BR Bee Protection Group. 7th International Symposium of the ICP-BR Bee Protection Group. Hazards of Pesticides to Bees. Les Colloques No.98. INRA, Paris.

ICP-BR Bee Protection Group. Proceedings of the 8th International Symposium of the ICP-BR Bee Protection Group. Hazards of Pesticides to Bees. Bologna, Italy. Sept 4-6, 2002. *Bull Insect*. 56: 1-206.

ICP-BR Bee Protection Group. 9th International Symposium of the ICP-BR Bee Protection Group. Hazards of Pesticides to Bees. Lakeside Conference Centre of the Central Science Laboratory. Oct 12-14, 2005. *Pest Manage Sci*. 63(11): 1047-1050.

ICP-BR Bee Protection Group. 10th International Symposium of the ICP-BR Bee Protection Group. Hazards of pesticides to bees. Bucharest, Romania, Oct 8-10, 2008. http://www.jki.bund.de/fileadmin/dam_uploads/_veroeff/JKI_Archiv/JKI_Archiv_423.pdf

ICP-BR Bee Protection Group. 11th International Symposium of the ICP-BR Bee Protection Group. Wageningan, The Netherlands. Nov 2-4, 2011. https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=323

Johnson, R. M., M.D. Ellis, C.A. Mullin, M. Frazier. 2010. Pesticides and honey bee toxicity – USA. *Apidologie*. 41:312-331.

Kindemba, V. 2009. The impact of neonicotinoid insecticides on bumblebees, honey bees and other non-target invertebrates. Buglife Invertebrate Conservation Trust, UK. http://www.buglife.org.uk/resources/buglife/revised%20neonics%20report.pdf.

Maini, S., P. Medrzycki, C. Porrini. 2010. The puzzle of the honey bee losses: a brief review. *Bull Insect.* 63: 153-160. http://www.bulletinofinsectology.org/pdfarticles/vol63-2010-153-160maini.pdf.

National Pesticide Information Center (NPIC). 2010. Imidacloprid Technical Fact Sheet. http://npic.orst.edu/factsheets/imidacloprid.pdf.

New York State Department of Environmental Conservation. 2007. Denial of application for registration of four new pesticide products which contain clothiandin. July 17, 2007. http://pmep.cce.cornell.edu/profiles/insect-mite/cadusafos-cyromazine/clothianidin/clothianidin_den_0707.pdf.

Orme, S. and S. Kegley. 2003. PAN Pesticide Database, Pesticide Action Network. Imidacloprid. www.pesticideinfo.org.

Proceedings of the First European Conference of Apidology, Udine. September 19-23, 2004. http://www.eurbee.org/Files/EurBee1_Abstract_New.pdf

Proceedings of the Second European Conference of Apidology. Prague. Sept 10-16, 2006. http://www.eurbee.org/Files/Sbornik%20EurBee%20pro%20web.pdf.

Proceedings of the Third European Conference of Apidology. Belfast, Ireland. Sept 8-11, 2008. http://www.eurbee.org/Files/EurBee3_Abstracts_Final.pdf

Proceedings of the Fourth European Conference of Apidology. Ankara, Turkey. Sept 7-9, 2010 http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf.

The First International Symposium and Workshop on Honey Bee Behavioral Plasticity. Ankara, Turkey. Sept 7-9, 2010. Bull Insect. 64(1): 151-152. http://www.bulletinofinsectology.org/pdfarticles/vol64-2011-151-152abramson.pdf

USDA. 2010. Colony Collapse Disorder Progress Report. http://www.ars.usda.gov/is/br/ccd/ccdprogressreport2010.pdf.

Wallner, K. Neonicotinoids and Pollinators. 2011. http://www.slu.se/PageFiles/103909/Klaus_Wallner.pdf

Risk Assessment Process and Tests for Bees

Alix, A. and C. Vergnet. 2007. Risk assessment to honey bees: a scheme developed in France for non-sprayed systemic compounds. *Pest Manag Sci.* 63: 1069–1080.

Alix, A., M. P. Chauzat, S. Duchard, G. Lewis, C. Maus, M. J. Miles. E. Pilling. H. M. Thompson, K. Wallner. 2009. Environmental Risk Assessment Scheme for Plant Protection Products – Chapter 10: Honey bees – Proposed Scheme. *Pages* 27 - 33 in P. A. Oomen and H. M. Thompson (editors) International Commission for Plant-Bee Relationships Bee Protection Group 10th International Symposium Hazards of Pesticides to Bees, Buscharest (Romania). October 8 – 10, 2008. Julius – Kühn Archiv

Alix, A., M. P. Chauzat, S. Duchard, G. Lewis, C. Maus, M. J. Miles, E. Piling, H. M. Thompson, and K. Wallner. 2009. Guidance for the assessment of risks to bees from the use of plant protection products applied as seed coating and soil applications – conclusions of the ICP-BR dedicated working group. Pages 15 – 27 *in* P. A. Oomen and H. M. Thompson (editors) Hazards of Pesticides to Bees, 10th International Symposium of the ICP-BR Bee Protection Group, Bucharest (Romania), October 8 – 10, 2008. Julus Kühn Arch 423.

Aupinel, P. D. Fortini, B. Michaud, P. Mderzycki, E. Padovani, D. Przygoda, C. Maus, J-D. Charriere, V. Kilchenmann, U. Riessberger-Galle, J. J. Vollmann, L Jeker, M. Janke, J-F. Odoux, J-N. 2009. Pesticide toxicity on honebee brood in laboratory conditions. Pages 96 – 102 in P. A. Oomen and H. M. Thompson (editors) Hazards of Pesticides to Bees 10th International Symposium of the ICP-BR Bee Protection Group. Bucharest (Romania), October 8 – 9, 2008. Julius Kühn Archiv 423.

Aupinel, P.D., Fortini, D., Dufour, H., Tasei, J.N., Michaud, B., Odoux, J.F., Pham-Delegue, M.H., 2005. Improvement of artificial feeding in a standard in vitro method for rearing *Apis mellifera* larvae. *Bull Insectol* 58, 107–111.

Aupinel, P.D., Fortini, D., Michaud, F., Marolleau, J., Tasei, J.N., Odoux, J.F., 2007. Toxicity of dimethoate and fenoxycarb to honey bee brood (*Apis mellifera*), using a new *in vitro* standardized feeding method. *Pest Manage Sci* 63: 1090–1094.

Bakker, F. and J. Calis. 2003. A semi-field approach to testing effects of fresh or aged pesticide residues on bees in multiple-rate test designs. *Bull Insectology* 56(1):97-102. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-097-102bakker.pdf

Celli, G. and B. Maccagnani. 2003. Honey bees as bioindicators of environmental pollution. *Bull Insect.* 56(1): 137-139. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-137-139celli.pdf

Decourtye, A., C. Bagnis, J. Devillers, F. Brun, P. Aupinel, J. Fourrier, M. Gauthier. 2010. A methodology to evaluate the effects of pesticides to honeybees: Recording individual behavior using microchips. 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010. http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Decourtye, A., J. Devillers, P. Aupinel, F. Brun, C. Bagnis, J. Fourrier, M. Gauthier. 2011. Honeybee tracking with microchips: a new methodology to measure the effects of pesticides. *Ecotoxicology* 20:429–437

Eisenbeck, B. M., D. E. Mullins, S.M. Salom and L. T. Kok. 2009. Evaluation of ELISA for imidacloprid detection in eastern hemlock (*Tsuga canadensis*) wood and needle tissues. *Pest Manag. Sci*: 65: 122–128

EPPO. 1993. Decision making scheme for the environmental risk assessment of plant protection products. Chapter 10 Honeybees. Bull. OEPP/EPPO Bull. 23: 151-165.Halm, M, A. Rortais, G. Arnold, N. Tasei, S. Rault. 2006. New risk assessment approach for systemic insecticides: the case of honey bees and imidacloprid (Gaucho). *Environ Sci Technol*. 40:2448-2454.

Kevan, PG. 1990. Pollinators as bioindicators of the state of the environment: species, activity, and diversity. *Agric Ecosyst Environ*. 74: 373-393.

Khoury, D.S., M.R. Myerscough, A.B. Barron. 2011. A quantitative model of honey bee colony population dynamics. *PLoSONE*. 6(4): e18491. Doi:10.1371/jounal.pone.0018491.

Laramee, S. 2007. Honeybees as bioindicators of ecotoxicological pollutant: the case of the insecticide imidacloprid. M. Sci. thesis. University of Sherbrooke, Quebec, Canada.

Pham-Delegue, M-H., A. Decourtye, L. Kaiser, J. Devillers. 2002. Behavioural methods to assess the effects of pesticides on honey bees. *Apidologie*. 33(5): 425-432.

Schur, A., I. Tornier, D. Brasse, W. Muhler, W. Von Der Ohe, K. Wallner, M. Wehling. 2003. Honey bee brood ring-test in 2002: Method for the assessment of side effects of plant protection products on the honey bee brood under semi-field condition. *Bull Insectol* 56(1): 91-96.

Smirle, M.J., M.L. Winston, and K.L. Woodward. 1984. Development of a sensitive bioassay for evaluating sublethal pesticide effects on the honey bee (Hymenoptera: Apidae). *J Econ Entomol* 77:63-67.

Steen J., J. M. Van Der. 2001. Review of the methods to determine the hazard and toxicity of pesticides to bumblebees. *Apidologie*, 32: 399-406.

Tasei, J-N., M-H. Pham-Delegue, L. Belzunces. 2003. Registration of systemic insecticides and EPPO guidelines. *Bull Insect*. 56(1): 189-191. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-189-191tasei.pdf

Thompson, H. M. and C. Maus. Bayer. 2007. Perspective: the relevance of sublethal effects in honey bee testing for pesticide risk assessment. *Pest Manag Sci*. 63:1058 – 1061.

Thompson, H. M., 2001. Assessing the exposure and toxicity of pesticides to bumblebees (*Bombus* sp.). *Apidologie*, 32:305-321.

Thompson, H. M. 2003. Behavioural effects of pesticides in bees: their potential for use in risk assessment. *Ecotoxicology* 12: 317–330.

Thompson, H. M., Hunt L. V. 1999. Extrapolating from honeybees to bumblebees in pesticide risk assessment. *Ecotoxicology*, 8: 147-166.

Thompson, H. M. and C. Maus. Bayer. 2007. Perspective: the relevance of sublethal effects in honey bee testing for pesticide risk assessment. *Pest Manag Sci.* 63:1058 – 1061.

Thompson, H.M. 2010. Risk assessment for honey bees and pesticides - recent developments and new issues. *Pest Manag Sci.* 66:1157-1162.

Venturi, S., P. Medrzycki, G. Bogo, S.Tosi, F.Sgolastra, M. Lodesani: A new experimental method for studying trophallaxis as an additional determining factor in the effects of chemicals on foraging bees (*Apis mellifera*). 11th International Symposium of the ICP-BR Bee Protection Group. The Netherlands. Nov 2-4, 2011.

Villa, S., M. Vighi, A. Finizio, G.B. Serini. 2000. Risk assessment for honeybees from pesticide-exposed pollen. *Ecotoxicology* 9:287-97.

Xu, T., C.M. Jacobsen, I. K. Cho, A. H. Hara, Q.X. Li. 2006. Application of an enzyme-linked Immunosorbent assay for the analysis of imidacloprid in Wiliwili tree, *Erythrina sandwicensis* O. Deg. For control of the wasp *Quadrastichus erythrinae*. *J Agric Food Chem.* 54: 8444-8449.

Articles Claiming No Effects from Neonicotinoids at Environmentally Relevant Concentrations

Chauzat, M.P., P. Carpentier, A.C. Martel, S. Bougeard, N. Cougoule, P. Porta, J. Lachaize, F. Madec, M. Aubert, J.P. Faucon. 2009. Influence of pesticide residues on honey bee (Hymenoptera: Apidae) colony health in France. *Environ Entomol.* 38(3): 514-23.

Chauzat, M. P., J. P. Faucon, A. C. Martel, J. Lachaize, N. Cougoule, and M. Aubert. 2006. A survey of pesticide residues in pollen loads collected by honey bees in France. *J. Econ. Entomol.* 99:253–262.

Cresswell, J.E. 2011. A meta-analysis of experiments testing the effects of a neonicotinoid insecticide (imidacloprid) on honey bees. *Ecotoxicology* 20(1): 149-57.

Cresswell, J.E., N. Desneux, D. van Engelsdorp. 2012. Dietary traces of neonicotinoid pesticides as a cause of population declines in honey bees: an evaluation by Hill's epidemiological criteria. *Pest Manage Sci.* 68(6): 819-827.

Curé, G., H. W. Schmidt, and R. Schmuck.Bayer. 2000. Results of a comprehensive field research programme with the systemic insecticide imidacloprid (Gaucho). Belzunces, L. P.,C.

Pelissier, and G. B. Lewis (eds) *Hazards of Pesticides to Bees*. 49–59. Institut National de la Recherche Agronomique. Avignon, France.

Cutler, G.C., C.D. Scott-Dupree. 2007. Bayer contract study. Exposure to clothianidin seed-treated canola has no long-term impact on honey bees. *J Econ Entomol*. 100(3): 765-772.

Faucon, J-P et al. 2004. Etude experimentale de la toxicite de l'imidaclopride distribute dans le sirop de nourrisseurs a des colonies d'abeilles (*Apis mellifera*). http://www.affaire-gaucho-regent.com/pdf_abeilles/Rapportafssa2004.pdf.

Maus, C., G. Cure, R. Schmuck. 2003. Bayer. Safety of imidacloprid seed dressings to honey bees: a comprehensive overview and compilation of the current state of knowledge. *Bull Insectol* 56(1): 51-57. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-051-057maus.pdf

Nauen, R., U. Ebbinghaus-Kintscher, and R. Schmuck. 2001. Bayer. Toxicity and nicotinic acetylcholine receptor interaction of imidacloprid and its metabolites in *Apis mellifera* (Hymenoptera: Apidae). Bayer. *Pest Manag Sci.* 57: 577–586.

Nguyen, B.K., C. Saegerman, C. Pirard, J. Mignon, J. Widart, F.J. Verheggen, D. Berkvens, E. De Pauw, E. Haubruge. 2009. Does imidacloprid seed-treated maize have an impact on honey bee mortality? *J. Econ Entomol*. 102(2):616-23.

Reetz, J.E., S. Zuhlke, M. Spiteller, K. Wallner. 2011. Neonicotinoid insecticides translocated in guttation droplets of seed-treated maize and wheat: a threat to honeybees? *Apidologie*. 42(5): 596-606.

Schmuck, R., Bayer.1999. Bayer. No causal relationship between Gaucho® seed dressing in sunflowers and the French bee syndrome. *Pflanzenschutz-Nachr*. Bayer 52:257–299.

Schmuck, R., Bayer. 2004. Bayer. Effects of a chronic dietary exposure of the honeybee *Apis mellifera* (Hymenoptera: Apidae) to imidacloprid. Bayer. *Arch Environ Contam Toxicol*. 47:471-78.

Schmuck, R., R. Nauen, U. Ebbinghaus-Kintscher. Bayer. 2003. Effects of imidacloprid and common plant metabolites of imidacloprid in the honeybee: Toxicological and biochemical considerations. *Bull Insectol* 56(1): 27-34.
http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-027-034schmuck.pdf

Schmuck, R.,R. Schöning,A. Stork,and O. Schramel.Bayer. 2001. Risk posed to honeybees (*Apis mellifera* L, Hymenoptera) by an imidacloprid seed dressing of sunflowers. *Pest Manag Sci.* 57: 225–238.

Schnier, H., G. Wenig, F. Laubert, V. Simon, R. Schmuck. 2003. Bayer. Honey bee safety of imidacloprid corn seed treatment. *Bull Insectol*. 56(1): 73-75.
http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-073-075schnier.pdf

Scott-Dupree, C.D., L. Conroy, C.R. Harris. 2009. Bayer contract study. Impact of currently useful insecticides for canola agroecosystems on *Bombus impatiens* (Hymenoptera: Apidea), *Megachile rotundata* (Hymentoptera: Megachilidae) and *Osmia lignaria* (Hymentoptera: Megachilidae). *J Econ Entomol*. 102(1): 177-82.

Stadler, T., D.M. Gines, and M. Buteler, 2003. Bayer contract study. Long-term toxicity assessment of imidacloprid to evaluate side effects on honey bees exposed to treated sunflower in Argentina. *Bull Insectol* 56(1): 77-81. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-077-081stadler.pdf

Tasei, J.N., G. Ripault, and E. Rivault. 2001. Hazards of imidacloprid seed coating to *Bombus terrestris* (Hymenoptera: Apidae) when applied to sunflower. *J Econ Entomol*. 94(3): 623–627.

Tasei, J.N., J. Lerin, G. Ribault. 2000. Sub-lethal effects of imidacloprid on bumblebees, *Bombus terrestris* (Hymenoptera: Apidae) during a laboratory feeding test. *Pest Manag Sci*. 56:784-88.

Related Studies for Neonicotinoids and Bees

Barbendreier, D., N. Kalberer, J. Romeis, P. Fluri, F. Bigler. 2004. Pollen consumption in honey bee larvae: a step forward in the risk assessment of transgenic plants. *Apidologie*. 35:293-300.

Balderrama N.M., Almeida L.O., Núñez J.A. 1992. Metabolic rate during foraging in the honeybee. *J.Comp. Physiol*. B 162: 440–447.

Becher, M. A., H. Hildenbrandt, C. K. Hemelrijk, and R. F. A. Moritz. 2010. Brood temperature, task division and colony survival in honeybees: A model. *Ecological Modelling*. 221:769-776.

Besard L, V. Mommaerts, G. Abdu-Alla, G. Smagghe. 2011. Laboratory assessment of lethal and sublethal side-effects supports a more benign profile of spinetoram compared to spinosad in the bumblebee *Bombus terrestris*. *Pest Manag Sci* 67:541–547.

Bishop, G. 1961. Growth rates of honey bee larva. *J. Exp. Zool*. 146:11-20.

Bonmarco, R. O. Lundin, H.G. Smith, M. Rundiof. 2012. Drastic historic shifts in bumble-bee community composition in Sweden. PRS. 279 (1727): 309-315.

Brian, A. D. 1954. The foraging of bumble bees. Part I. Foraging behaviour, *Bee World* 35: 61–67.

Brittain, C. and S.G. Potts. 2011. The potential of insecticides on the life-history traits of bees and the consequences for pollination. *Basic Applied Ecol*. 12(4): 321-331.

Buchmann, L. and G.P. Nabhan. 1996. The Forgotten Pollinators, Island Press, Washington, D.C., p. 292.

Burdick, E., and D.M. Caron. 2006. *MAAREC Beekeeper Survey*. http://maarec.cas.psu.edu/pdfs/MAARECSurveyPub.pdf

Bryne, F.J., J.G. Morse, P.K. Vischer, E.E. Grafton-Cardwell, W. Leimkuehler. 2011. Determination of exposure levels of honey bees foraging on flowers of citrus trees previously treated with imidacloprid. Bayer CropScience, performing laboratory University of California Riverside. Bay Report # EBNTL056-7. March 20, 2011.

Cameron, S.A., H.M. Hines and P.H. Williams. 2007. A comprehensive phylogeny of the bumble bees (*Bombus*). *Biological Journal of the Linnean Society*, London 91:161–188.

Canadian Water Quality Guidelines Imidacloprid Lorox, Reglone, Daconil and Admire by ^{32}P-postlabeling. *Mol Cell Biochem* 169:177-184.

Canadian Water Quality Guidelines Imidacloprid potato fields in Prince Edward Island (2001-2002). Environment Canada, Environmental Protection Branch, Atlantic Region. Surveillance Report EPS-5-AR-04-05.

Carvell, C. 2002. Habitat use and conservation of bumblebees (*Bombus* spp.) under different grassland management regimes. *Biological Conservation* 103:33–49.

Carvell, D.B. Roy, S.M. Smart, R.F. Pywell, C.D. Preston and D. Goulson. 2006. Declines in forage availability for bumblebees at a national scale. *Biological Conservation* 132: pp. 481–489.

Chauzat MP, AC Martel, N Cougoule, P. Porta, J. Lachaize, S. Zeggane, M. Aubert, P. Carpentier, JP Faucon. 2011. An assessment of honeybee colony matrices, *Apis mellifera* (Hymenoptera Apidae) to monitor pesticide presences in continental France. *Environ Toxicol Chem* 30:103–111

Claudianos, C, H. Ranson, RM Johnson, S. Biswas, MA Schuler, MR Berenbaum, R. Feyereisen and JG Oakeshott. A deficit of detoxification enzymes: pesticide sensitivity and environmental response in the honeybee. *Insect Mol Biol* **15 (5)**: 615-636 (2006)

Cloyd, R.A., J.A. Bethke. 2011. Impact of neonicotinoid insecticides on natural enemies in greenhouse and interiorscape environments. *Pest Manag Sci.* 67(1): 3-9.

Colla, S.R., M.C. Otterstatter, R.J. Gegear and J.D. Thomson. 2006. Plight of the bumble bee: pathogen spillover from commercial to wild populations, *Biological Conservation* 129:461–467.

Collison, C.; Sheridan, A. A Closer Look: Neonicotinoids. *Bee Culture* [Online] 2011. http://www.beeculture.com/storycms/index. cfm?cat=Story&recordID=766 (accessed July 1, 2011).

Committee on the Status of Pollinators in North America, 2007 Committee on the Status of Pollinators in North America National Research Council, Status of Pollinators in North America, National Academies Press, Washington, D.C.

Corbet, S.A., I.H. Williams and J.L. Osborne. 1991. Bees and the pollination of crops and wildflowers in the European Community, *Bee World* 72:47–49.

Corbet, S.A., M. Fussell, R. Ake, A. Fraser, C. Gunson, A. Savage and K. Smith. 1993. Temperature and the pollinating activity of social bees, *Ecolog Entomol* 18:17–30.

Cox, R.L., W.T. Wilson. 1987. The behavior of insecticide-exposed honey bees. *Am. Bee J.* 127:118-119.

Crailsheim, K.; Hrassnigg, N.; Gmeinbauer, R.; Szolderits, M.J.; Schneider, L.H.W. and U. Brosch. 1993. Pollen utilization in non-breeding honeybees in winter. *J. Insect Physiol.* 39 (5): 369-373.

Crailsheim, K.,Schneider, L.H.W; Hrassnigg, N.; Bühlmann, G.; Brosch, U.; Gmeinbauer, R.; and B. Schöffmann. 1992. Pollen consumption and utilization in worker honeybees (*Apis mellifera carnica*): dependence on individual age and function. *J. Insect Physiol.*, 38 (6): 409-419.

Culp, J.M., K. Liber, A. Cessna, K. Doe. 2006. Improved ecological risk assessment of imidacloprid in aquatic ecosystems: PSF Final Report – February 2006. Pesticide Science Fund, Environment Canada.

Dacher, M., A. Lagarrigue, M. Gauthier. 2005. Antennal tactile learning in the honeybee: Effect of nicotinic antagonists on memory dynamics. *Neuroscience* 130:37-50.

Das Graças Vidal, M., de Jong, D., Wien, H.C. and R.A. Morse. 2006. Nectar and pollen production in pumpkin (*Cucurbita pepo* L.). *Revista Brasileira de Botânica*: 29(2).

Davis, A.R. and R.W. Shuel. 1988. Distribution of C(14)-Labeled carbofuran and dimethoate in royal jelly, queen larvae and nurse honeybees. *Apicologie*, 19 (1):37-50.

DeGrandi-Hoffman, G., S. A. Roth, G. L. Loper, and E. H. Erickson. 1989. Beepop - A Honeybee Population-Dynamics Simulation-Model. *Ecological Modelling* 45:133-150.

DeGrandi-Hoffman, G., Y. Chen, E. Huang and M. H. Huang. 2010. The effect of diet on protein concentration, hypopharyngeal gland development and virus load in worker honey bees (*Apis mellifera* L.). *J Insect Physiol* 56:1184 – 1191.

Deitz, A. and E.N. Lambremont. 1970. Caste Determination in Honey Bees. II. Food Consumption of Individual Honey Bee Larvae, Determined with 32P-Labeled Royal Jelly. *Annals of the Entomological Society of America.* 63 (5):1342-1345.

De la Rua, R. Jaffe, R. Dall-Olio, J. Munoz, J. Serrano. 2009. Biodiversity, conservation, and current threats to European honeybees. *Apidologie*. 40: 263-284.

Devillers, J., M-H. Pham-Delegue, A. Decourtye, H. Budzinski, S. Cluzeau, G. Maurin. 2003. Modeling the acute toxicity of pesticides to *Apis mellifera*. *Bull Insect*. 56(1): 103-109. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-103-109devillers.pdf.

Elbert, A., B. Becker, J. Hartwig, and C. Erdelen. 1991. Imidacloprid-a new systemic insecticide. Pflanzenschutz-Nachr. Bayer 44: 113-136.

Elber, A., H. Overbeck, K. Iwaya, and S. Tsuboi. 1990. Imidacloprid, a novel systemic nitromethylene a nalogue insecticide for crop protection. Brighton Crop Protection Conference, Pests and Diseases 2: 21-28.

Genersch, E, W. von der Ohe, H. Kaatz, A. Schroeder, C. Otten, R. Buchler S. Berg, W. Ritter, W. Muhlen, S. Gisder, M. Meixner, G. Liebig, P. Rosenkranz. 2010. The German bee monitoring project: a long term study to understand periodically high winter losses of honey bee colonies. *Apidologie* 41:332–352

Gibbs, J. Neonicotinoids in Australia. http://theabk.com.au/article/neonicotinoids-australia.

Goulson, D. and B. Darvill. 2004. Niche overlap and diet breadth in bumblebees: are rare species more specialized in their choice of flowers?, *Apidologie* 35:55–63.

Goulson, D., G.C. Lye and B. Darvill. 2008. Decline and conservation of bumble bees, *Ann Review Entomol* 53:191–208.

Goulson, D., M.E. Hanley, B. Darvill, J.S. Ellis and M.E. Knight. 2005. Causes of rarity in bumblebees, *Biological Conservation* 122:1–8.

Goulson, D. 2003. Bumblebees: Their Behaviour and Ecology. Oxford University Press, Oxford.

Hardstone, M.C. and J.G. Scott. 2010. Is *Apis mellifera* more sensitive to insecticides than other insects? *Pest Manage Sci*. 66(11): 1171-1180.

Haynes, K.F. 1988. Sublethal effects of neurotoxic insecticides on insect behavior. *Annu Rev Entomol*. 33:149-68.

Higes M, R. Martin-Hernandez, A. Martinez-Salvador, E. Garrido-Bailon, AV Gonzalez-Porto, A. Meana, JL Bernal, MJ del Nozal, J. Bernal. 2010. A preliminary study of the epidemiological factors related to honey bee colony loss in Spain. *Environ Microbiol Rep* 2:243–250.

Ho, M. W. and J. Cummins.Mystery of disappearing honeybees. 2007. *Sci. Soc*. 34: 35–36.

Hovda, L.R. and S.B. Hooser. 2002. Toxicology of newer pesticides for use in dogs and cats. The Veterinary Clinics: *Small Animal Practice*. 32(2):455-467.

Jandt, JM and A. Dornhaus. 2009. Spatial organization and division of labour in the bumblebee *Bombus impatiens*. *Anim Behav* 77: 641–651.

Imidacloprid in Canada. From Informed Discussion of Beekeeping Issues and Bee Biology on Behalf of Stan Sandler. http://www.honeybeeworld.com/imidacloprid/canada.htm.

James, D.G. and T. S. Price. 2002. Fecundity in two-spotted spider mite (Acari: Tetranychchidae) is increased by direct and systemic exposure to imidacloprid. *J Econ Entomol.* 95(4): 729-732.

Jeshke, P. and R. Nauen. Bayer CropScience. 2008. Neonicotinoids – from zero to hero in insecticide chemistry. *Pest Manage Sci.* 64: 1084-1098.

Jeschke, P., R. Nauen, M. Schindler, A. Elbert. Bayer CropScience. 2011. Overview of the status and global strategy for neonicotinoids. *J Agric Food Chem.* 59(7): 2897-2908.

Johansen, C.A., D.F. Mayer, J.D. Eves, and C.W. Kious. 1983. Pesticides and bees. *Environ Entomol* 12:1513-1518.

Jones, AK, V. Raymond-Delpech, SH Thany, M. Gauthier, DB Sattelle. 2006. The nicotinic acetylcholine receptor gene family of the honey bee, *Apis mellifera. Genome Res* 16:1422–1430

Kamble, S.T. and R.K. Saran. 2005. Effect of concentration on adsorption of three termiticides in soil. *Bull Environ Contam Toxicol.* 75: 1077–1085.

King, M.J. 1993. Buzz foraging mechanism of bumble bees, *J Apicultural Research* 32: 41–49.

Klein, AM, BE Vaissiere, JH Cane, I. Steffan-Dewenter, SA Cunningham, C. Kremen, T. Tscharntke. 2007. Importance of pollinators in changing landscapes for world crops. *Proc R Soc* B 274:303–313

Kleijn, D. and I. Raemakers, 2008. A retrospective analysis of pollen host plant use by stable and declining bumble bee species, *Ecology* 89:1811–1823.

Kluser S, Neumann P, Chauzat M-P, Pettis JS (2011) UNEP emerging issues: global honey bee colony disorder and other threats to insect pollinators. http://www.unep.org.

Kobori, Y. and H. Amano. 2004. Effects of agrochemicals on life-history parameters of *Aphidius gifuensis* Ashmead (Hymenoptera: Braconidae). *Appl. Entomol. Zool.* 39(2): 255–261.

Krischik, V. 2011. Landscape management of Emerald Ash Borer. http://www.lccmr.leg.mn/PeerReview/2011/final_addendums/subd_6c_krischik.pdf

Mauelshagen, J. and U. Greggers. 1993. Experimental access to associative learning in honeybees. *Apidologie.* 24:249-266.

Menzel, R. 1985. Learning in honey bees in an ecological and behavioral context *In Experimental Behavioral Ecology* Hölldobler, B. and M. Lindauer (eds). 55–74. Stuttgart, Germany: Fischer.

Menzel, R. 1999. Memory dynamics in the honeybee. *J. Comp. Physiol.* 185:185–340.

Mommaerts, V, G.Sterk, G. Smagghe. 2006a. Hazards and uptake of chitin synthesis inhibitors in bumblebees *Bombus terrestris*. *Pest Manag Sci* 62:752–758

Mommaerts, V, G. Sterk, G. Smagghe. 2006b. Bumblebees can be used in combination with juvenile hormone analogues and ecdysone agonists. *Ecotoxicology* 15:513–521

Morandin, L.A., M.L. Winston, M.T. Franklin, V.A. Abbott. 2005. Lethal and sub-lethal effects of spinosad on bumble bees (*Bombus impatiens Cresson*). *Pest Manag Sci* 61(7): 619-26.

Morandin, L.A. 2005. Wild Bees and Agroecosytems. Thesis for Doctor of Philosophy. Simon Fraser University. http://ir.lib.sfu.ca/retrieve/2429/etd2029.pdf.

Moring, J.B., J.H. Kennedy, and J. Wiggins. 1992. Assessment of the potential ecological and biological effets of NTN 33893 on aquatic ecosystems as measured in fibreglass pond systems. Report prepared by Miles Inc., Agriculture Division. Bayer CropScience Report No. 102600.

Mullins, J. W. 1993. Imidacloprid: A new nitroguanidine insecticide. Am. Chem. Soc. Symposium Series 5240097–6156.

Multinelli, F., A.G. Sabatini, M. Astuti, C. Porrini, C. Neonicotinoids precautionary ban in Italy. *Am. Bee J.* 2009, 149: 269–270.

Ohe, W. von der, M. Janke: Bienen im Stress. ADIZ. 43 (04) 2009: 10-11. http://www.carnica-celle.imkerei-poehlitz.de/Jahresbericht_2009.pdf.

Oldroyd, B. P. 2007. What's killing American honey bees? *PLoS Biol.* 5:168.

Osbrone, J.L., A.P. Martin, N.L. Carreck, J.L. Swain, M.E. Knight, D. Goulson, R.J. Hale, R.A. Sanderson. 2008. Bumblebee flight distances in relation to the forage landscape. *J Anim Ecol.* 77(2): 406-15.

Page, R. E., G. E. Robinson, M. K. Fondrk, and M. E. Nasr. 1995. Effects of worker genotypic diversity on honey-bee colony development and behavior (*Apis mellifera* L.). *Behav Ecol Sociobiol.* 36:387–396.

Ratnieks, F. L. W.; Carreck, N. L. Clarity on honey bee collapse? *Science* 2010, 327 (5962), 152–153.

Raupp, M.J., R.E. Webb, A. Szczepaniec. D. Booth, R. Ahern. 2004. Incidence, abundance and severity of mites on hemlocks following applications of imidacloprid. *J. Arboriculture*. 30(2): 108-113.

Ruiz, J.A., M. Gutierrez, C. Porrini, F. Puerta, J.M. Fernandez. 2010. Will it be possible use of Apis mellifera as a tool of certification for the evaluation of the environmental and agro-alimentary bio-security? 4th European Conference of Apidology. Ankar, Turkey. Sept 07-09, 2010. http://www.eurbee.org/Files/EurBee5_2010_Abst.pdf

Scheiner, R., R. E. Page, and J. Erber. 2004. Sucrose responsiveness and behavioral plasticity in honey bees (Apis mellifera). *Apidologie* 35: 133-142.

Schmidt, H-W., D. Brasse, C. Kunast, W. Muhler, W. von der Ohe, J. Tornier, K. Wallner. Bayer. 2003. Introduction of indices for the evaluation of tent tests and field tests with honeybees. *Bull Insect.* 56(1): 111-117. http://www.bulletinofinsectology.org/pdfarticles/vol56-2003-111-117schmidt.pdf.

Sclar, D.C., D. Gerace, and W.S. Cranshaw. 1998. Observations of population increases and injury by spider mites (Acari: Tetranychidae) on ornamental plants treated with imidacloprid. *J Econ Entomol.* 91(1): 250-255.

Shi, X., R.A. Dick, K.A. Ford, J. Casida. 2009. Enzymes and inhibitors in neonicotinoid insecticide metabolism. *J.Agric Food Chem.* 57(1): 2861-4866.

Spivak, M., E. Mader, M. Vaughan, N.H. Euliss. *Environ Sci Technol.* 2011. The Plight of the Bees. *45* (1): 34–38.

Stamm, M.D., F.P. Baxendale, T.M. Heng-Moss, B.D. Siegfried, E.E. Blankenship, R.E. Gaussoin. 2011. Dose-response relationships of clothianidin, imidacloprid, and thiamethoxam to *Blissus occidus* (Hemiptera:Blissidae). *J Econ Entomol* 104(1): 205-210.

Svensson, B., 2003. Silent spring in northern Europe? http://www.beekeeping.com/intoxications/silent_spring.htm

Szczepaniec, A. S.F. Creary, K.L. Laskowski, J.P. Nyrop, M.J. Raupp. 2011. Neonicotinoid insecticide imidacloprid causes outbreaks of spider mites on elm trees in urban landscapes. *PLoSOne.* 6(5):e20018.doi:10.1371/journal.pone.0020018. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0020018.

Tennekes, H.A., F. Sanchez-Bayo. Time-dependent toxicity of neonicotinoids and other toxicants: implications for a new approach to risk assessment. 2011. *J Environ Anal Toxicol* http://dx.doi.org/10.4172/2161-0525.S4-001.

Tennekes, H.A. 2010. The systemic insecticides: a disaster in the making. ETS Nederland BV Zutphen. The Netherlands. http://www.disasterinthemaking.com/

Tew, J.R., 2002. Bee Culture's beeyard: Disappearing disease - An urban myth? Is this a disease? How can you tell? *Bee Culture.*

Thurber, F.F. 1976. Disappearing-yes; disease-no! *Gleanings in Bee Culture* 104:260-261.

Tomizawa, M. and J. E. Casida. 1999. Minor structural changes in nicotinoid insecticides confer differential subtype selectivity for mammalian nicotinic acetylcholine receptors. *Brit J Pharmacol.* 127:115–122.

Tomizawa,M.and J.E. Casida. 2000. Imidacloprid, thiacloprid, and their imine derivatives up-regulate the α4β2 nicotinic receptor in M10 cells. *Toxicol Applied Pharmacol* 169:114-120.

Tomizawa, M. D.L. Lee, and J.E. Casida. 2000. Neonicotinoid insecticides: Molecular features conferring selectivity for insect versus mammalian nitotinic receptors. *J Agric Food Chem.* 48: 6016-6024.

Tomizawa, M. and J.E. Casia. 2003. Selective toxicity of neonicotinoids attributable to specificity of insect and mammalian nicotinic receptors. *Ann Rev Entomol.* 48: 339-364.

Tomizawa, M. and J.E. Casida. 2005. Neonicotinoid Insecticide Toxicology: Mechanisms of Selective Action in *Ann Review Pharmacol Toxicol.* 45: 247-268.

Tomlin, C.D.S. 2000. The Pesticide Manual. Twelfth Edition. British Crop Protection Council. Surrey, U.K.

Vandame, R., M. Meled, M.E. Colin, and L.P. Belzunces, 1995. Alteration of the homing flight in the honeybee Apis mellifera L. exposed to sublethal dose of deltamethrin. *Environ Toxicol Chem.* 14:855-860.

Vandenberg, J.D., H. Shimanuki. 1987. Technique for rearing worker honeybees in the laboratory. *J Apicul Res* 26: 90–97.

vanEngelsdorp, D., J.D. Evans, C. Saegerman, C. Mullin, E. Haubruge, E, B.K. Nguyen, ; M. Frazier, J. Frazier, D. Cox-Foster, Y. Chen, R. Underwood, D.R. Tarpy, J.S. Pettis. Colony collapse disorder: a descriptive study. *PLoS ONE* 2009, 4, e6481.

vanEngelsdorp, D., J.D. Evans, L. Donovall, C. Mullin, M. Frazier, J. Frazier, D.R. Tarpy, J. Hayes, J.S. Pettis. 2009. Entombed pollen'': a new condition in honey bee colonies associated with increased risk of colony mortality. *J Invert Path* 101: 147–149.

Visscher, P.K., R. Dukas. 1997. Survivorship of foraging honeybees. *Insectes Soc.* 44:1-5.

Visser, A. 2009. Subletale effecten van neonicotinen. Bijennieuws. July 12, 2009. Electroniche Nieuwsbrief bijen@wur.

Von Frisch, K. 1967. The Dance Language and Orientation of Bees. Cambridge, MA: Harvard Univ. Press, 566 pp

Zhang, S.W., M. Lehrer, M.V. Srinivasan. 1999. Honeybee memory: navigation by associative grouping and recall of visual stimuli. *Neurobiol Learn Mem.* 72:180-201.

Environmental Fate and Ecotoxicity Studies

Aguera, A., E. Almansa, S. Malato, M.I. Maldonado, A.R. Fernandez-Alba. 1998. Evaluation of photocatalytic degradation of imidacloprid in industrial water by GC-MS and LC-MS. *Analusis* 26(7): 245-251.

Alsayeda, H., S. Pascal-Lorber, C. Nallanthigal, L. Debauwer, F. Laurent. 2008. Transfer of the insecticide 14C imidacloprid from soil to tomato plants. *Environ Chem Lett* 6:229-234.

Anderson, C. 1991. Photodegradation of NTN 33893 in water. Yuki Institute, Ibaraki, Japan. 128 pp. Miles Report No. 101956. (Reviewed in Mulye 1995)

Anderson, J.P.E. 1995. Mineralization of [imidazolidin-4,5-^{14}C] NTN 33893 to $^{14}CO_2$ in sterile and microbiologically active samples of 2 agricultural soils. Bayer AG, Leverkusen, Germany. 6 pp. Report No. 107300. (Reviewed in Mulye 1997a)

Armbrust, K.L. and H.B. Peeler. 2002. Effects of formulation on the run-off of imidacloprid from turf. *Pest Management Science*. 58:702-706.

Arora, P.K., G. Jyot, B. Singh, R.S. Battu, B. Singh, P.S. Aulakh. 2009. Persistence of imidacloprid on grape leaves, grape berries and soil. *Bull Environ Contam Toxicol*. 82(2):239-242.

Bacey, J. 2000. Environmental fate of imidacloprid. Environmental Monitoring and Pest Management Branch. Department of Pesticide Regulation, California. www.cdpr.ca.gov/docs/emprm/pubs/fatememo/imid.pdf.

Bakker, F. and J. Calis. 2003. A semi-field approach to testing effects of fresh or aged pesticide residues on bees in multiple-rate test designs. *Bull Insectol* 56(1):97-102.

Baskaran, S., R.S. Kookana, and R. Naidu. 1997. Determination of the insecticide imidacloprid in water and soil using high-performance liquid chromatography. *Journal of Chromatography* A 787(1-2):271-275.

Beedle, E.C. and Harbin,A.M. 2011. Determination of residues of imidacloprid and its metabolites 5- hydroxy imidacloprid and imidacloprid olefin in bee relevant matricies collected from cotton, grown at locations treated with imidacloprid at least once per year during two consecutive years. Bayer CropScience, Research Triangle Park, NC. Report Number: EBNTL056-01.

Bernal, J., E. Garrido-Bailon, M.J. Del Nozal, A.V. Gonzalez-Porto, R. Martin-Hernandez, J.C. Diego, J.J. Jimenez, J.L. Bernal, M. Higes. 2010. Overview of pesticide residues in stored pollen and their potential effect on bee colony (*Apis mellifera*) losses in Spain. *J Econ Entomol*. 103(6): 1964-71.

Bonmatin, J. M., I. Moineau, R. Charvet, C. Fleche, M. E. Colin, and E. R. Bengsch. 2003. A LC/APCI-MS/MS method for analysis of imidacloprid in soil, in plants, and in pollens. *Anal. Chem.* 75:2027–2033.

Bonmatin, J.M., P.A. Marchand, R. Charvet, I. Moineua, E.R. Bengsch, and M.E. Colin. 2005. Quantification of imidacloprid uptake in maize crops. *J. Agric. Food Chem.* 53: 5336–5341.

Brimble, S., P. Bacchus, and P.Y. Caux. 2005. Pesticide utilization in Canada: a compilation of current sales and use data. Environment Canada, Ottawa.

Byrtus, G., A. Anderson, K. Saffran, G. Bruns, and L. Checknita. 2002. Determination of new pesticides in Alberta's surface waters (1999-2000). The Water Research User Group, Alberta Environment.
http://www3.gov.ab.ca/env/water/reports/NewPesticidesInSurfaceWaters_1999_2000.pdf

Capri, E., M.G. Camisa, F. Flores-Céspedes, C.R. Glass, E. Gonzalez-Pradas, and M. Trevisan. 2001. Imidacloprid and pyrimethanil soil sorption. *Agrononomie* 21:57-64.

CEI (Cantox Environmental Inc.). 2003. Review on pesticide use research and monitoring activities in the maritime region (Nova Scotia, New Brunswick and Prince Edward Island). Marine Environmental Sciences Division, Department of Fisheries and Oceans.

Celis, R. and W.C. Koskinen. 1999. Characterization of pesticide desorption from soil by the isotopic exchange technique. *Soil Science America Journal* 63: 1659-1666.

Choo, H.Y., H.H. Kim, H.K. Kaya. 1998. Effects of selected chemical pesticides on Agameris unka (Nematoda: Mermiethidae), a parasite of the brown plant hopper, Nilaparvata lugens. *Biocontol Sci Technol* 8(3): 413-427.

Clark, T., E. Kaußmann, E. Römer, and G. Schepers. 1998. The fate of imidacloprid in tobacco smoke of cigarettes made from imidacloprid-treated tobacco. *Pestic. Sci.* 52: 119–125.

Claudianos, C. H. Ranson, R.M. Johnson, S. Biswas, M.A. Schuler, M.R. Berenbaum, R. Feyereisen, J.G. Oakeshott. 2006. A deficit of detoxification enzymes: pesticide sensitivity and environmental response in the honeybee. *Insect Mol Biol.* 15(5):615-636.

Cowles, R.S., M.E. Montgomery, CASJ Cheah. 2006. Activity and residues of imidacloprid applied to soil and tree trunks to control hemlock woolly adelgid (Hemiptera: Adelgidae) in forests. *J Econ Entolmol* 99(4): 1258-1267.

Cox, L. 1997a. Changes in sorption of imidacloprid with incubation time. Bayer Corporation, Kansas City, Missouri. Report No. 107685. 28 pp. (Reviewed in Mulye 1997a)

Cox, L., W. Koskinen, and P.Yen. 1997b. Sorption-desorption of imidacloprid and its metabolites in soils. *J. Agric. Food Chem.* 45(4): 1468–1472.

Cox, L., W.C. Koskinen, and P.Y. Yen. 1997c. Sorption-desorption of imidacloprid and its metabolites in soils. *J. Agric. Food Chem.* 45(4):1468-1472.

Cox, L., W. Koskinen, and P. Yen. 1998a. Changes in sorption of imidacloprid with incubation time. *Soil Sci. Soc. Am. J.* 62(2): 342–347.

Cox, L., W. Koskinen, R. Celis, P. Yen, M. Hermosin, and J. Cornejo. 1998b. Sorption of imidacloprid on soil clay mineral and organic components. Soil Sci. Soc. Am. J. 62(4): 911–915.

Cox, L., W. Koskinen, and P. Yen. 1998c. Influence of soil properties on sorption-desorption of imidacloprid. *J. Environ. Sci. Health.* B33(2): 123–134.

Cox, L., W.C. Koskinen, and P.Y. Yen. 1998d. Influence of soil properties on sorption-desorption of imidacloprid. *J. Environ. Sci. Health* B33(2): 123-134.

Dikshit A.K., D.C. Pachauri, and T. Jindal. 2003. Maximum residue limit and risk assessment of betacyfluthrin and imidacloprid on tomato (*Lycopersicon esculentum* Mill). *Bulletin of Environmental Contamination and Toxicology*. 70:1143-1150.

Dilling, C., P. Lambdin, J. Grant and R. Rhea. 2010. Spatial and temporal distribution of imidacloprid in eastern hemlock in the southern Appalachians. *J. Econ. Entomol.* 103(2): 368-373

Donnarumma, L., P. Pulcini, D. Pochi, S. Rosati, L. Lusco, and E. Conte. 2011. Preliminary study on persistence in soil and residues in maize of imidacloprid. *J. Environ Sci Health* 46(6): 469-72.

Drobne, D. Blazic, M. Gestel, C. A. M. van Leser, V. Zidar, P. Jemec and A. Trebse, P. 2008. Toxicity of imidacloprid to the terrestrial isopod *Porcellio scaber* (Isopoda, Crustacea) *Chemosphere.* 71: (7) 1326-1334

Elbert, A., B. Becker, J. Hartwig, and C. Erdelen. 1991. Imidacloprid-a new systemic insecticide. *Pflanzenschutz-Nachr. Bayer* 44:113–136.

ENKON Environmental Limited. 2001. Survey of Pesticide Use in British Columbia : 1999.

Environment Canada. 2005. Toxicity testing using imidacloprid: inland silverside test report. Prepared by Stantec Inc. for the National Guidelines and Standards Office, Environment Canada. Ottawa.

Environment Canada. 2006 (Draft). Presence, levels and relative risks of priority pesticides in selected Canadian aquatic ecosystems. Summary of 2003-2005 surveillance results. Prepared by Cantox Environmental for the National Water Quality Monitoring Office, Environment Canada, Ottawa.

Environment Canada. 2006. BC Ministry of Environment, Lands and Parks. Surrey, British Columbia.

Felsot A.S. and Ruppert, J.R. 2002. Imidacloprid residues in Willapa Bay (Washington State) water and sediment following application for control of burrowing shrimp. *Journal of Agriculture and Food Chemistry*. 50(15):4417-4423.

Felsot, A.S., W. Cone, J. Yu, and J.R. Ruppert. 1998. Distribution of imidacloprid in soil following subsurface drip chemigation. *Bull. Environ. Contam. Toxicol.* 60:363–370.

Felsot, A.S., W. Cone, J. Yu, and J.R. Ruppert. 1998. Distribution of imidacloprid in soil following subsurface drip chemigation. *Bull. Environ. Contam. Toxicol.* 60:363-370.

Fernandez-Bayo, J.D., R. Nogales, E. Romero. 2008. Evaluation of the sorption process for imidacloprid and diuron in eight agricultural soils from southern Europe using various kinetic models. *J Agric Food Chem.* 56:5266-5272.

Fernandez-Perez, M., E. Gonzalez-Pradas, M.D. Urena-Amate. 1998. Controlled release of imidacloprid from a lignin matrix: Water release kinetics and soil mobility study. *J Agric Food Chem.* 46:3828-3834.

Fischer D. and T. Moriarty. 2011. Pesticide risk assessment for pollinators: summary of a SETAC Pellston Workshop. Society of Environmental Toxicology and Chemistry (SETAC), Pensacola

Flores-Cespedes, F., E Gonzalez-Pradas, M. Fernandez-Perez, M. Villafranca-Sanchez, M. Socias-Viciana, and M.D. Urena-Amate. 2002. Effects of dissolved organic carbon on sorption and mobility of imidacloprid in soil. *J. Environ. Qual.* 31:880-888.

Flores-Céspedes, F., E. González-Pradas, M. Fernández-Pérez, M. Villafranca-Sánchez, M. Socías-Viciana, and M.D. Ureña-Amate. 2002. Effects of dissolved organic carbon on sorption and mobility of imidacloprid in soil. *J. Environ. Qual.* 31: 880–888.

Fritz, R. and A. Brauner. 1988. Leaching behaviour of NTN 33893 aged in soil. Miles Report No. 99635. Bayer AG, Leverkusen, Germany. 45 pp. (Reviewed in Mulye 1995)

Fritz, R., and E. Hellpointner. 1991. Degradation of pesticides under anaerobic conditions in the water/sediment system: imidacloprid. Miles Report No. 101346. Bayer AG, Leverkusen, Germany. 69 pp. (Reviewed in Mulye 1995)

Giroux, I. 2003. Contamination de l'eau souterraine par les pesticides et les nitrates dans les régions en culture de pommes de terre. Campagne d'échantillonnage de 1999-2000-2001. Direction de suivi de l'état de l'environnement, Ministère de l'Environnement, Gouvernement du Québec, Québec. www.mddep.gouv.qc.ca/pesticides/pomme_terre/Pesticides_pomme_terre.pdf

Gonzalez-Pradas, E., M.D. Urena-Amate, F. Flores-Cespedes, M. Fernandez-Perez, J. Garratt, and R. Wilkins. 2002. Leaching of imidacloprid and procymidone in a greenhouse of southeast of Spain. *SSAJ.* 66:1821-1828.

Goring, C.A.I., D.A. Laskowski, J.H. Hamaker, and R.W. Meikle. 1975. Principles of pesticide degradation in soil. *In*: Haque, R. and V.H. Freed, eds. *Environmental dynamics of pesticides.* pp 135 – 172. Plenum Press, New York. (Cited in Mulye 1995)

Guay, I. 1998. Recommandation de critères de qualité de l'eau pour l'imidacloprid pour la protection de la vie aquatique. Direction du suivi de l'état de l'environnement, Service des avis et des expertises, Ministère de l'Environnement du Québec, Québec.

Gupta, S., V.T. Gajbhiye, and N.P. Agnihotri. 2002. Leaching behavior of imidacloprid formulations in soil. *Bull. Environ. Contam. Toxicol.* 68: 502–508.

Gupta, S., V.T. Gajbhiye, R.K. Gupta. 2008. Soil dissipation and leaching behavior of a neonicotinoid insecticide thiamethoxam. *Bull Environ Contam Toxicol.* 80:431-437.

Heim, D., Z. Yan, and P.P. Halarnkar. 1996. Anaerobic aquatic biotransformation of [pyridinyl-^{14}C-methyl] imidacloprid at 5°C. Bayer Corporation, Kansas City, Missouri. Report No. 107546. 138 pp.

Heimbach and Hendel. 2001. Unpublished study. Bayer CropScience AG, Monheim am Rhein, Germany. (Cited in Krohn and Hellpointner 2002)

Hellpointner, E. 1994a. Degradation and translocation of imidacloprid under field conditions on a lysimeter. Bayer AG, Leverkusen-Bayerwerk, Germany. Report No. 106426. 74 pp. (Reviewed in Mulye 1996)

Hellpointner, E. 1994b. Degradation and translocation of imidacloprid under field conditions on a lysimeter: amendment to the original report. Bayer AG, Leverkusen-Bayerwerk, Germany. Report No. 106426-1. 42 pp. (Reviewed in Mulye 1996)

Henneböle, J. 1998. Aerobic metabolism of imidacloprid, ^{14}C-NTN 33893, in an aquatic model ecosystem under xenon light and sunlight conditions. Bayer AG, Institute for Metabolism Research and Residue Analysis, Leverkusen-Bayerwerk, Germany. Report No. PF 4337.

Hoffmann, E.J. and S.J. Castle. 2012. Imidacloprid in melon guttation fluid: a potential mode of exposure for pest and beneficial organisms. *J Econ Entomol.* 105(1): 67-71.

Júnior, R.P.S., J.H. Smelt, J.J.T.I. Boesten, R.F.A. Hendriks, and S.E.A.T.M. van der Zee. 2004. Preferential flow of bromide, bentazon, and imidacloprid in a dutch clay soil. *J. Environ. Qual.* 33: 1473–1486.

Karmakar, R., S.B. Singh, G. Kulshrestha. 2006. Persistence and transformation of thiamethoxam, a neonicotinoid insecticide in soil of different agroclimatic zones of India. Bull *Environ Contam Toxicol.* 76:400-406.

Karmakar, R., R. Bhattacharya, and G. Kulshrestha. 2009. Comparative metabolite profiling of the insecticide thiamethoxam in plant and cell suspension culture of tomato. *J Agric Food Chem.* 57:6369-6374.

Kennedy, J.M. and R.E. Talbert. 1977. Comparative persistence of dinitroaniline type herbicides on the soil surface. *Weed Science* 25: 373-381. (Cited in Mulye 1995)

Koch, H. and P. Weißer. 1997. Exposure of honey bees during pesticide application under field conditions. *Apidologie.* 28: 439-447.

König, T. 1997. Method for the determination of imidacloprid in water by LC-MS-MS with solid phase extraction. Bayer AG, Crop Protection-Development, Institute for Metabolism Research and Residue Analysis, Monheim, Germany. 19 pp.

Krohn, J. 1989. Water solubility of NTN 33893. Miles report No. 99859. Bayer AG, Wuppertal-Elberfeld, Germany. 10 pp. (Reviewed in Mulye 1995)

Krohn, J. 1996a. Water solubility and partition coefficient of desnitro compound. Bayer Corporation, Kansas City, Missouri. Report No. 107676. (Reviewed in Mulye 1997a)

Krohn, J. 1996b. Water solubility and partition coefficient of urea compound. Bayer Corporation, Kansas City, Missouri. Report No. 107677. 15 pp. (Reviewed in Mulye 1997a)

Krohn, J. and E. Hellpointner. 2002. Environmental fate of imidacloprid. *Pflanzenshutz-Nachrichten Bayer* 55: 1–26.

Li, K. and Q.X. Li. 2000. Development of an enzyme-linked Immunosorbent assay for the insecticide imidacloprid. *J Agric Food Chem.* 48:3378-3382.

Liu, S., Z. Zheng, F. Wei, Y. Ren, W. Gui, H. WU, G. Zhu. 2010. Simultaneous determination of seven neonicotinoid residues in food by ultraperformance liquid chromatography tandem mass spectrometry. *J Agric Food Chem.* 58:3271-3278.

Lückmann, J., Hofmann, S., Munderle, M.; *et al.* 2010 Field survey on guttation of maize seedlings under agronomic use conditions in Austria and assessment of the relevance of guttation fluid for honey bees: Final Report. Project Number: M/355018/02/1, R09105, EBTIL065. Unpublished study prepared by RIFCon GmbH. 251 p. (MRID 479753-01)

Maus, C., C. Anderson and L. Doering, 2004. Determination of the residue levels of imidacloprid and its relevant metabolites in nectar, pollen and other plant material of Horse Chestnut Trees (Aesculus hippocastanum) after trunk injection application and sampling 2001. Project Number: MAUS/AM023, E/370/2057/4. Unpublished study prepared by Bayer CropScience. 27.

McCall, P.J., D.A. Laskowski, R.L. Swann, and H.J. Dishburger. 1981. Measurement of sorption coefficients of organic chemicals and their use in environmental fate analysis. *In: Test protocols*

for environmental fate and movement of toxicants. Proceedings of a symposium. Pages 89 – 109. Association of Official Analytical Chemists. 94th Annual Meeting, October 21 – 22, 1980. Washington, DC. (Cited in Mulye 1997a)

McGee, B., H. Berges, and K. Callow. 2004. Survey of pesticide use in Ontario, 2003: Estimates of pesticides used on field crops, fruit and vegetable crops, and other agricultural crops. Ontario Ministry of Agriculture and Food, Guelph, Ontario.

MENVIQ (Ministère de l'Environnement du Québec). 1990 (rév. 1992). Méthodologie de calcul de critères de qualité de l'eau pour les substances toxiques. Service d'évaluation des rejets toxiques, Direction de l'expertise scientifique, Ministère de l'Environnement du Québec, Québec. 147 p.

Miles, Inc. 1992. Premise termiticide - Environmental fate: Terrestrial field dissipation for California site. Volume No. 51950–0032. Department of Pesticide Regulation, Sacramento, CA.

Miles, Inc. 1992. Premise termiticide - Environmental fate: Terrestrial field dissipation for California site. Volume No. 51950–0032. Department of Pesticide Regulation, Sacramento, CA.

Miles, Inc. 1993a. NTN 33893 (imidacloprid) - Environmental fate summary. Volume No. 51950–0113. Department of Pesticide Regulation, Sacramento, CA.

Mineau, P., K. M. Harding, M. Whiteside, M. H. Fletcher, D. Garthwaite, and L. D. Knopper. 2008. Using reports of bee mortality in the field to calibrate laboratory-derived pesticide risk indices. *Environ Entomol* 37(2): 546 – 554.

MMPP (Manitoba's Management Plus Program). 2003. Regional pesticide usage analysis (2001-2004). Manitoba Rural Adaptation Council, Manitoba Agriculture and Food, and Manitoba Crop Insurance Corporation. http://www.mmpp.com/Home_Page.htm Accessed: September 2004.

Mobay Chemical Corp. 1992. Premise termiticide - Environmental fate: Hydrolysis; Aqueous and soil photolysis. Volume No. 51950–0027. Department of Pesticide Regulation, Sacramento, CA.

Mobay Chemical Corp. 1992. Premise termiticide - Environmental fate: Hydrolysis; Aqueous and soil photolysis. Volume No. 51950–0027. Department of Pesticide Regulation, Sacramento, CA.

Moza, P.N., K. Hustert, E. Feicht, and A. Kettrup. 1998. Photolysis of imidacloprid in aqueous solution. *Chemosphere*. 36(3): 497–502.

Mukherjee, I. and M. Gopal. 2000. Environmental behaviour and translocation of imidacloprid in eggplant, cabbage and mustard. *Pest Management Science* 56: 932-936

Murphy, C and Mutch, J.. 2005. Multimedia Pesticide Monitoring Programs in Prince Edward Island, New Brunswick and Nova Scotia. Year 1 and Year 2 (2003/04, 04/05) Progress Report, Environment Canada and Prince Edward Department of Environment, Energy and Forestry.

Murphy,C., J.P. Mutch, D. Reeves, T. Clark, S. Lavoie, H. Rees, L. Chow, L-A. Nunn, and D. Hebb. 2006. Multi-media pesticide monitoring programs in Prince Edward Island, New Brunswick and Nova Scotia, Final Project Report of 3-year monitoring program, 2003/04 – 2005/06. Environment Canada, Environmental Protection Branch, Charlottetown.

Nauen, R., U. Ebbinghaus-Kintsher, V.L. Salgado, and M. Laussmann. 2003. Thiamethoxam is a neonicotinoid precursor converted to clothianidin in insects and plants. *Pest Biochem Physiol.* 76: 55-69.

Nemeth-Konda, L., G. Füleky, G. Morovjan, and P. Csokan. 2002. Sorption behaviour of acetochlor, atrazine, carbendazim, diazinon, imidacloprid and isoproturon on Hungarian agricultural soil. *Chemosphere* 48: 545-552.

Oi, M. 1999. Time-dependent sorption of imidacloprid in two different soils. *J. Agric. Food Chem.* 47: 327–332.

Papiernik, S.K., W. C. Koskinen, L. Cox, P.J. Rice, S. A. Clay, N. R. Werdin-Pfisterer, K. A. Norberg. 2006. Sorption-desorption of imidacloprid and its metabolites in soil and vadose zone materials. *J Agric Food Chem.* 54:8163-8170.

Peterson, C.J. 2007. Imidacloprid mobility and longevity in soil columns at a termiticidal application rate. *Pest Mangement Science*, 63(11):1124-1132.

Pettis, J. S. and K. S. Delaplane. 2010. Coordinated responses to honey bee deline in the USA. *Apidologie*. 41: 256- 263).

Pham-Delègue M. and A. Bonjean. 1983. La pollinisation du tournesol en production de semence hybride, *Bull. Tech. Agric.* 10, 211–218

Phillips, P.J. and R. W. Bode. 2002. Concentrations of pesticides and pesticide degradates in the Croton River Watershed in Southeastern New York, July-September 2000. [Online]. Available at http://ny.water.usgs.gov/pubs/wri/wri024063/wrir02-4063.pdf.. USGS-NY, Troy, NY.

Philpot, J.D. and P.Y. Yen. 1998a. Terrestrial field dissipation of imidacloprid on bare loam soil in Ontario, Canada, 1994. Bayer Report No. 107819. 265 pp. (Reviewed in Mulye 1999)

Philpot, J.D. and P.Y. Yen. 1998b. Terrestrial field dissipation of imidacloprid on potatoes in Prince Edward Island, Canada, 1994. Bayer Report No. 107820. 264 pp. (Reviewed in Mulye 1999)

Philpot, J.D. and P.Y. Yen. 1998c. Terrestrial field dissipation of imidacloprid on turf in Ontario, Canada, 1994. Bayer Report No. 107817. 419 pp. (Reviewed in Mulye 1999)

Philpot, J.D. and P.Y. Yen. 1998d. Terrestrial field dissipation of imidacloprid on turf in British Columbia, Canada, 1995. Bayer Report No. 107821. 206 pp. (Reviewed in Mulye 1999)

Ping, L. C., Zhang, Y. Zhu, M. Wu, F. Dai, X. Hu, H. Zhao and Z. Li. 2010. Imidacloprid adsorption by soils treated with humic substances under different pH and temperature conditions. African Journal of Biotechnology Vol. 9(13), pp. 1935-1940

Pirard, C., J. Widart, B.K. Nguyen, C. Deleuze, L. Heudt, E. Haubruge, E. De Pauw, J.F. Focant. Development and validation of a multi-residue method for pesticide determination in honey using on-column liquid-liquid extraction and liquid chromatography-tandem mass spectrometry. J. Chromatography. 1152:116-123.

PMU (Pesticide Management Unit). 2005. Sales 2003 Report for Pesticides. Prepared for New Brunswick Department of the Environment and Local Government.

PubChem Substance. 2005. National Centre of Biotechnology Information Access (NCBI). http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pcsubstance

Ratte, H.T., and U. Memmert. 2003. Biological effects and fate of imidacloprid SL 200 in outdoor microcosm ponds. Bayer AG, Crop Protection, Leverkusen, Germany. Report No. 811776.

Redlich, D., N. Shahin, P. Ekici, A. Friess, H. Parlar. 2007. Kinectical study of the photoinduced degradation of imidacloprid in aquatic media. *Clean.* 35(5):452-458.

Rice, F., D. Judy, D. Koch, and K. Cain. 1991. Terrestrial field dissipation for NTN 33893 in Minnesota soil. ABC Laboratories, Inc., Columbia, MO. 510 pp. Miles Report No. 101988. (Reviewed in Mulye 1995)

Rouchaud, J., F. Gustin, and A. Wauters. 1994. Soil Biodegradation and Leaf Transfer of Insecticide Imidacloprid Applied in Seed Dressing in Sugar Beet Crops. *Bull Environ Contam Toxicol.* 53: 344-350.

Rouchaud, J., F. Gustin, and A. Wauters. 1996. Imidacloprid insecticide soil metabolism in sugar beet field crops. *Bull Environ Contam Toxicol.* 56: 29–36.

Rouchaud, J., A. Thirion, A. Wauters, F. Van de Steene, F. Benoit, N. Ceustermans, J. Gillet, S. Marchand, and L. Vanparys. 1996. Effects of fertilizer on insecticide adsorption and biodegradation in crop soils. *Arch Environ Contam Toxicol.* 31(1): 98–106.

Sabbagh, G.J., M.F. Lenz, J.M. Fisher, and E.L. Arthur. 2002. Significance of binding on imidacloprid degradation in soils, and effects of soil characteristics on imidacloprid adsorption capacity. Report No. 200327. Bayer CropScience, Stilwell, Kansas.

Sanchez-Bayo, F. and K. Goya. 2006. Influence of light in acute toxicity bioassays of imidacloprid and zinc pyrithione to zooplankton crustaceans. *Aquat Toxicol* 78(3): 262-271.

Sarkar, M., P. Biswas, S. Roy, R. Kole, and A. Chowdhury. 1999. Effect of pH and type of formulation on the persistence of imidacloprid in water. *Bull Environ Contam Toxicol.* 63(5): 604–609.

Sarkar, M.A., S. Roy, R.K. Kole, A. Chowdhury. 2001. Persistence and metabolism of imidacloprid in different soils of West Bengal. *Pest Manage Sci.* 57(7):598-602.

Schad, T. 2001. Calculation of temperature referenced first order DT_{50} of imidacloprid based on field dissipation studies conducted in Europe. Internal Report Bayer AG, Leverkusen.
Scholz, K. 1991. Degradation of NTN 33893 in soil under vegetation. Bayer AG, Leverkusen, Germany. Report No 103202. 83 pp. (Reviewed in Mulye 1997a)

Scholz, K. and M. Spiteller. 1992. Influence of groundcover on the degradation of ^{14}C-imidacloprid in soil. Proc. Brighton Crop Protection Conference – Pests and Dis. 883–888.

Schoning, R. and R. Schumck. Bayer. 2003. Analytical determination of imidacloprid and relevant metabolite residues by LC MS/MS. *Bull Insectol.* 56(1):41-50.

Schuette, J., J. Troiano, M. Pepple, and J. Dias. 2004. 2004 Update of the Well Inventory Database. [Online]. Available at http://www.cdpr.ca.gov/docs/emprm/pubs/ehapreps/eh0404.pdf. CDPR, Sacramento, CA.

Segawa, R. and J. Walters. 2002. Preliminary Monitoring Results of Imidacloprid Applications for Glassy-winged Sharpshooter Control in Residential Areas of Santa Clara County. [Online]. Available at http://www.cdpr.ca.gov/docs/gwss/r101602.pdf. CDPR, Sacramento, CA.

Segawa, R., J. Walters, and S. Fan. 2004. Preliminary Monitoring Results of Imidacloprid and Cyfluthrin Applications for Glassy-Winged Sharpshooter Control in a Residential Area of Solano County. [Online]. Available at http://www.cdpr.ca.gov/docs/gwss/gwss091704.pdf. CDPR, Sacramento, CA.

SFOPH (Swiss Federal Office of Public Health). 2005. GS Toxic Substances List. July 2005 edition.

Shimomura, M., H. Okuda, K. Matsuda, K. Komai, M. Akamatsu, and D.B. Sattelle. 2002. Loops D and F of nicotinic acetylcholine receptors and their role in neonicotinoid sensitivity. Poster presentation. http://nara-kindai.unv.jp/02gakka/03ouyou/web-content/gyoseki/shimomura.pdf.

Shippers, N., W. Schwack. 2008. Photochemistry of imidacloprid in model systems. *J Agric Food Chem.* 56: 8023-8029.

Škerl, M.I.S, S.V. Bolta, H.B. Česnik, H.B. and A. Gregorc. 2009. Residues of pesticides in honeybee (*Apis mellifera carnica*) bee bread and in pollen loads from treated apple orchards. *Bull Environ Contam Toxicol.* 83: 374-377.

Spiteller, M. 1993. Aerobic metabolism of imidacloprid, ^{14}C-NTN 33893, in an aquatic model ecosystem. Bayer AG, Institute for Metabolism Research, Leverkusen-Bayerwerk, Germany. Report No. PF 3950.

Staedtler, T. 2009. Determination of residue levels of clothianidin and its metabolites TZMU and TZNG in pollen harvested from maize plants grown in commercial practice from Poncho Pro® dressed seeds (nominally 1.25 mg clothianidin/seed) in the Upper Rhine Valley in Germany. Bayer CropScience. Report No. R08188-2.

Starner, K. and KS Goh. 2012. Detections of the neonicotinoid insecticide imidacloprid in surface waters of three agricultural regions of California, USA, 2010-2011. *Bull Environ Contam Toxicol* 88(3): 316-21.

Stephan, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman and W.A. Brungs. 1985. Guidelines for deriving numerical national water quality criteria for the protection of aquatic organisms and their uses. U.S. Environmental Protection Agency, Washington, DC. PB85-227049.

Stevens, J. and P.P. Halarnkar. 1996. Aerobic aquatic (water only) biotransformation of [pyridinyl-^{14}C-methyl] imidacloprid at 22°C. Bayer Corporation, Kansas City, Missouri. Report No. 107547. 171 pp.

Stoner, K.A., B.D. Eitzer. 2012. Movement of soil-applied imidacloprid and thiamethoxam into nectar and pollen of squash (Cucurbita pepo). *PLoS One*. 7(6): e39114. Epub 2012 Jun 27.

Struger, J., T. Fletcher, P. Martos, B. Ripley, and G. Gris. 2002. Pesticide concentrations in the Don and Humber River Watersheds (1998-2000). Environment Canada, Ontario Ministry of the Environment, and City of Toronto. 21 pp.

Szolderits, M..J. and K. Crailsheim. 1993. A comparison of pollen consumption and digestion in honey bee (*Apis mellifera carnica*) drones and workers. *J. insect Physiol.* 39 (10): 877-881.

Tisler, T., A. Jemec, B. Mozetic, P. Trebse. 2009. Hazard identification of imidacloprid to aquatic environment. *Chemosphere*. 76:907-914.

Tornier, I., A. Kling, A. Schur. Honey bee testing in Southern Europe: from the laboratory to the relevant crop in the field. *Bull Insectol.* 56(1):185-187.

Uneme, H. 2011. Chemistry of clothianidin and related compounds. *J Agric Food Chem*. 59(7): 2932-7.

U.S. EPA (United States Environmental Protection Agency). 1975. Chemodynamic parameters – partition coefficient. Guidelines for registering pesticides in the United States. 40 FR 123: 26880.

U.S. EPA (United States Environmental Protection Agency). 1995. Imidacloprid (NTN); Pesticide Tolerances and a Feed Additive Regulation. 40 CFR Parts 180 and 186.August 30, 1995 60(168). http://www.epa.gov/fedrgstr/EPA-PEST/1995/August/Day-30/pr-392.html

U.S. EPA (United States Environmental Protection Agency). 2005. Pesticide Fate Database. Environmental Fate and Effects Division of the Office of Pesticide Programs. http://cfpub.epa.gov/pfate/home.cfm

Vilchez, J.L., R. El-Khattabi, J. Fernandez, A. Gonzalez-Casado, and A. Navalon. 1996. Determination of imidacloprid in water and soil samples by gas chromatography-mass spectrometry. *Journal of Chromatography* A 746(2): 289-294.

Vilchez, J.L., R. El-Khattabi, R. Blanc, and A. Navalon. 1998. Photochemical-fluorimetric method for the determination of the insecticide imidacloprid in water samples. *Analytica Chimica Acta* 371(2-3): 247-253.

Weichel, L., R. Nauen. 2003. Uptake, translocation, and bioavailability of imidacloprid in several hop varieties. *Pest Manage Sci.* 60(5): 440-446.

Wamhoff, H. and V. Schneider. 1999. Photodegradation of imidacloprid. *J. Agric. Food Chem.* 47(4): 1730–1734.

Williard, T.R. 2012. Thiamethoxam Magnitude of Residues in Leaves and Flowers from Tomato in California. Final Report. Syngenta Crop Protection. Report Number TK0025811.

Wilmes, R. 1988. Range-finding tests for abiotic degradation. Miles Report No. 94366. Bayer AG, Monheim, Germany. 11 pp. (Reviewed in Mulye 1995)

Wohlers, K. 1988. Dissociation constant of NTN 33893. Miles Report No. 99863. Bayer AG, Leverkusen, Germany. 4 pp. (Reviewed in Mulye 1995)

Yoshida, H. 1989. Hydrolysis of NTN 33893. Yuki Institute, Ibaraki, Japan. 34 pp. Miles Report No. 99708. (Reviewed in Mulye 1995)

Zhao, X., X. Shao, Z. Zou, X. XU. 2010. Photodegradation of novel nitromethylene neonicotinoids with tetrahydropyridine-fixed cis configuration in aqueous solution. *J Agric Food Chem.* 58:2746-2754.

Zheng, W. and W. Liu. 1999. Kinetics and mechanism of the hydrolysis of imidacloprid. *Pestic. Sci.* 55(4):482–485.

Ecotoxicity Studies for Other Non-target Organisms

Abou-Donia, M.B., L.B. Goldstein, S. Bullman, T. Tu, W.A. Khan, A.M. Dechkovkaia, and A.A. Abdel-Rahman. 2008. Imidacloprid induces neurobehavioral deficits and increases expression of glial fibrillary acidic protein in the motor cortex and hippocampus in offspring rats following in utero exposure. *J Toxicol Environ Health* 71(2):119-30.

Albajes, R., C. López, and X. Pons. 2003. Predatory fauna in cornfields and response to imidacloprid seed treatment. *J. Econ. Entomol.* 96(6): 1805–1813.

Alexander, A.C. 2006. Sublethal effects of imidacloprid on mayflies and oligochaetes. M.Sc. thesis. University of New Brunswick, Fredericton. http://dspace.hil.unb.ca:8080/handle/1882/43620.

Araki, Y., W. Bornatsch, A. Brauner, T. Clark, G. Dräger, S. Kurogochi, H. Sakamato, and K. Vogeler. 1994. Metabolism of imidacloprid in plants. Proc. IUPAC Congress, Wash. 2B:157.

Avery, M.L., D.G. Decker, and D.L. Fischer. 1994. USDA/Bayer study. Cage and flight pen evaluation of avian repellency and hazard associated with imidacloprid-treated rice seed. *Crop Protection*. 13(7):535-540.

Avery, M.L., D.G. Decker, D.L. Fischer, and T.R. Stafford. 1993. USDA/Bayer study. Responses of captive blackbirds to a new insecticidal seed treatment. *Journal of Wildlife Management*. 57(3):652-656.

Avery, M.L., D.L. Fischer and T.M. Primus. 1997. USDA/Bayer study. Assessing the hazard to granivorous birds feeding on chemically treated seeds. *Pesticide Science* 49(4):362-366.

Bal, R, G. Türk, O. Yılmaz, E. Etem, T. Kuloğlu, G. Baydaş, M. Naziroğlu. 2012. Effects of clothianidin exposure on sperm quality, testicular apoptosis and fatty acid composition in developing male rats. *Cell Biochem Funct* 28(3): 187-200.

Bal, R, M. Naziroğlu, G. Türk, O.Yilmaz, T. Kuloğlu, E. Etem, G. Baydas. 2012. Insecticide imidacloprid induces morphological and DNA damage through oxidative toxicity on the reproductive organs of developing male rats. *Cell Biochem Funct*. Doi:10.1002/cbf.2826.

Beketov, M.A. and M. Liess. 2008. Acute and delayed effects of the neonicotinoid insecticide thiacloprid on seven freshwater arthropods. *Environ Tox.* 28:461-470.

Beketov, M.A. and M. Liess. 2008. Potential of 11 pesticides to initiate downstream drift of stream macroinvertebrate. *Archives of Environ Contam Tox*. 55:247-253.

Benzidane, Y. S. Touinsi, E. Motto, A. Jadas-Hecart, PY Communal, L. Leduc, SH Thany. 2010. Effect of thiamethoxam on cockroach locomotor activity is associated with its metabolite clothianidin. *Pest Manag Sci*. 66(12): 1351-9.

Boiteau, G., W.P.L. Osborn. 1997. Behavioral effects of imidacloprid, a new nicotinyl insecticide, on the potato aphid, *Macrosiphum euphorbiae* (*Thomas*) (Homoptera aphididae). *Canadian Entomologist*. March/April 1997. 241-249.

Bostanian, N.J., Hardman, J.M., Ventard, E. and Racette, G., 2005. The intrinsic toxicity of several neonicotinoids to Lygus lineolaris and Hyaliodes vitripennis, a phytophagous and a predacious mired. *Pest Manag Sci*. 61: 991-996.

Boucias, D.G., C. Stokes, G. Storey, and J.C. Pendiand. 1996. The effects of imidacloprid on the termite Reticulitermes flavipes and its interaction with the mycopathogen Beauveria bassiana. *Pflanzenschutz-Nachrichten Bayer*. 49(2): 103-144.

Bowers, L.M. 1996a. Toxicity of NTN 33893 2F to the blue-green alga *Anabaena flos-aquae*. Bayer Corporation, Kansas City, Missouri. Report No. 107549. 31 pp.

Bowers, L.M. 1996b. Acute toxicity of ^{14}C-NTN 33838 to *Chironomus tentans* under static conditions. Bayer Corporation, Kansas City, Missouri. Report No. 107316. (Reviewed in Mulye 1997a)

Bowers, L.M. and C.V. Lam. 1998. Acute toxicity of 6-chloronicotinic acid (a metabolite of imidacloprid) to *Chironomus tentans* under static renewal conditions. Bayer Report No 108127. (Reviewed in Mulye 1999)

Bowman, J. and J. Bucksath. 1990a. Acute toxicity of NTN 33893 to bluegill (*Lepomis macrochirus*). Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting laboratory). 31 pp. Mobay Project ID: Report No. 100348.

Bowman, J. and J. Bucksath. 1990b. Acute toxicity of NTN 33893 to rainbow trout (*Oncorhynchus mykiss*). Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting laboratory). 29 pp. Mobay Project ID: Report No. 100349.

Brown, L.A., M. Ihara, S.D. Buckingham, K. Matsuda, D.B. Sattelle. 2006. Neonicotinoid insecticides display partial and super agonist actions on native insect nicotinic acetylcholine receptors. *J Neurochem*. 99: 608-615.

Brunner, J.F., J.E. Dunley, M.D. Doerr, and E.H. Beers. 2001. Effects of pesticides on *Colpoclypeus florus* (Hymernoptera: Eulophidae) and *Trichogramma platneri* (Hymenoptera: Trichogrammatidae), parasitoids of leafrollers in Washington. *J Econ Entomol* 94(5): 1075-1084.

Bullock, R.C., R.R. Pelosi. 1993. Toxicity of imidacloprid to selected arthrodpods in the citrus greenhouse and grove. *Proc Fla St Hort Soc*, 106, pp. 42-47.

Byrne, F.J. and N.C. Toscano. 2007. Lethal toxicity of systemic residues of imidacloprid against Homalodisca vitripennis (Homoptera: Cicadellidae) eggs and its parasitoid Gonatocerus ashmeadi (Hymenoptera: Mymaridae). *Biol Control* 43:130-135.

Calderón-Segura, ME, S. Gómez-Arroyo, R. Villalobos-Pietrini, C. Martínez-Valenzuela, Y. Carbajal-López, M. Del Carmen Calderón-Ezquerro, J.Cortés-Eslava, R. García-Martínez, D. Flores-Ramírez, M..Isabel Rodríguez-Romero, P. Méndez-Pérez, E. Bañuelos-Ruiz. 2012. Evaluation of genotoxic and cytotoxic effects in human blood lymphocytes exposed in vitro to neonicotinoid insecticides. *J. Toxicol.* doi: 1155/2012/612647.

Canadian Water Quality Guidelines Imidacloprid. 2007. Scientific Supporting Document. Canadian Council of Ministers of the Environment. (terrestrial toxicity section – birds) http://www.ccme.ca/assets/pdf/imidacloprid_ssd_1388.pdf.

Capowiez, Y., M. Rault, C. Mazzia, L. Belzunces. 2003. Earthworm behaviour as a biomarker – a case study using imidacloprid. *Pedobiologia.* 47:542-547.

Capowiez, Y., M. Rault, G. Costagliola, and C. Mazza. 2005. Lethal and sublethal effects of imidacloprid on two earthworm species. *Biol Fertil Soils* 41(3): 135-143.

Capowiez, Y., F. Bastardie, and G. Costagliola. 2006. Sublethal effects of imidacloprid on the burrowing behavior of two earthworm species: Modifications of the 3-D burrow systems in artificial cores and consequences on gas diffusion in soil. *Soil Biol Biochem* 38:

Capowiez, Y., A. Berard. Assessment of the effects of imidacloprid on the behavior of two earthworm species (*Aporrectodea nocturna* and *Allolobophora icterica*) using 2D terraria. *Ecotoxicol Environ Saf* 64(2): 198-206.

Chen XD, E. Culbert, V. Hebert, JD Stark. 2010. Mixture effects of the nonylphenyl polyethoxylate, R-11 and the insecticide, imidacloprid on population growth rate and other parameters of the crustacean, *Ceriodaphnia dubia. Ecotoxicol Environ Saf* 73:132–137

Cloyd, R.A. and J.A. Bethke. 2011. Impact of neonicotinoid insecticides on natural enemies in greenhouse and interiorscape environments. *Pest Manag Sci.* 67: 3-9.

Cohen, H., A.R. Horowitz, D.Nestel, D. Rosen. 1996. Susceptibility of the woolly apple aphid parasitoid, *Aphelinus mali* (hym.: aphelinidae), to common pesticides used in apple orchards in Israel. *Entomophaga.* 41:225-233.

Cohle, P. and J. Bucksath 1991. Early Life Stage Toxicity of NTN 33893 Technical to Rainbow Trout (*Oncorhynchus mykiss*) in a Flow-Through System. Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting company). Report Number 101214. 85 pp.

D'Amour, K.A. and J.E. Casia. 1999. Desnitroimidacloprid and nicotine binding site in rat recombinant α4β2 neuronal nicotinic acetylcholine receptor. *Pest Biochem Physiol* 64:55-61.

Delbeke, E., P. Vercruysse, L. Tirry, P. de Clercq,D. Degheele. 1997. Toxicity of diflubenzuron, pyriproxyfen, imidacloprid and diafenthiuron to the predatory bug *Orius laevigatus* (het.: anthocoridae). *Entomophaga.* 42:349-358.

Demsia, G., D. Vlastos, M. Goumenou, and D.P. Matthopoulos. 2007. Assessment of the genotoxocity of imidacloprid and metalaxyl in cultured human lymphocyctes and rat bone marrow. *Mutat Res* 634(1/2): 32-39.

Dittbrenner, N., R. Triebskorn, I. Moser, Y. Capowiez. 2010. Physiological and behavioural effects of imidacloprid on two ecologically relevant earthworm species (*Lumbricus terrestris* and *Aporrectodea caliginosa*). *Ecotoxicology.* 19(8): 1567-73.

Dobbs, M.G. and J.T. Frank. 1996. Acute toxicity of ^{14}C-NTN 33519 to *Hyalella azteca* under static conditions. Bayer Corporation, Kansas City, Missouri. Report No. 107148. 31 pp.

Dondero, F, A. Negri, L. Boatti, F. Marsano, F. Mignone, A. Viarengo. 2010. Transcriptomic and proteomic effects of a neonicotinoid mixture in the marine mussel (*Mytilus galloprovincialis, Lam.*). *Sci Total Environ* 408:3775–3786

Dorgerloh, M. 2000. Imidacloprid - Influence on the growth of green alga, *Selenastrum capricornutum*. Bayer AG, Crop Protection - Development, Institute for Environmental Biology, Leverkusen-Bayerwerk, Germany. GLP-Study No. E 323 1806-3. Report No. DOM 20018. 26 pp.

Dorgerloh, M. and H. Sommer. 2001. Influence of imidacloprid (tech.) on development and emergence of larvae of *Chironomus riparius* in a water-sediment system. Bayer AG, Crop Protection

Drobne, D., M. Blazic, C.A.M. vanGestel, V. Leser, P. Zidar, A. Jemec, P. Trebse. 2008. Toxicity of imidacloprid to the terrestrial isopod *Porcello Scaber* (Isopoda, Crustacea). *Chemosphere.* 71:1326-1334.

England, D., and J.D. Bucksath. 1991. Acute toxicity of NTN 33893 to *Hyalella azteca*. ABC Laboratories, Inc., Columbia, Missouri (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting company). Columbia, Missouri. 29 pp. Report No. 101960.

Fahem, Muhammad and M. F. Khan. 2010.Toxicity of imidacloprid (nicotinoid) against earthworm, *pheretima posthuma* with reference to its effects on protein. *J Basic Applied Sci* 6(1): 55-62

Fahrbach, S. E. 2006. Structure of the mushroom bodies of the insect brain. *Annu. Rev. Entomol.* 51:209–232.

Feng, S., Z. Kong, X. Wang, L. Zhao, and P. Peng. 2004. Acute toxicity and genotoxicity of two novel pesticides on amphibian. Rana N. Hallowell. *Chemosphere* 56(5): 457-463.

Fitzpatrick, U., T.E. Murray, R.J. Paxton, J. Breen, D. Cotton, V. Santorum, M.J.F. Brown. 2007. Rarity and decline in bumblebees – a test of causes and correlates in the Irish fauna. *Biol Conserv*, 136:185-194.

Ford, K.A. and J.A. Casida. 2006. Unique and common metabolites of thiamethoxam, clothianidin, and dinotefuran in mice. *Chem Res Toxicol.* 19: 1549-1556.

Gagliano, G.G. 1991. Growth and survival of the midge (*Chironomus tentans*) exposed to NTN 33893 technical under static renewal conditions. Mobay Corporation, Stilwell, Kansas (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting company). 43 pp. Mobay Report No. 101985.

Gagliano, G.G. 1992. Raw data and statistical analysis supplement for early life stage toxicity of NTN 33893 to rainbow trout (Oncorhynchus mykiss). ABC Laboratories, Inc., Columbia, Missouri (performing laboratory). Miles Incorporated, Agriculture Division, Kansas City, Missouri (submitting company). Miles Report No. 101214-1. 295 pp.

Gagliano, G.G., and L.M. Bowers. 1991. Acute toxicity of NTN 33893 to the green alga (*Selenastrum capricornutum*). Mobay Corporation, Stilwell, Kansas (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting company). 30 pp. Mobay Report No. 101986.

Gomez-Eyles JL, C. Svendsen, L. Lister, H. Martin, ME Hodson, D. Spurgeon. 2009. Measuring and modelling mixture toxicity of imidacloprid and thiacloprid on *Caenorhabditis elegans* and *Eisenia fetida*. *Ecotoxicol Environ Saf* 72:71–79

Grau, R. 1986. Summary of Report No. VK-300: Bird oral toxicity/ Canary bird. Bayer AG, Leverkusen-Beyerwerk, Germany. Report No. 106610. Bayer AG

Grau, R. 1987a. Summary of Report no. VT-113: Bird oral toxicity/ Pigeon. Bayer AG, Leverkusen-Beyerwerk, Germany. Report No. 106611. Bayer AG

Grau, R. 1987b. The acute toxicity of NTN 33893 Techn. to golden orfe (*Leuciscus idus melanotus*) in a static test. Final Report FO-1042, Study No. E 2820089-9. Bayer AG, Leverkusen, Germany. 11+ pp.

Grau, R. 1988a. Acute oral LD_{50} of NTN 33893 to Japanese quail. Bayer AG, Leverkusen, Germany. Report No. 106608. 42 pp.

Grau, R. 1988b. The acute toxicity of NTN 33893 technical to rainbow trout (*Salmo gairdneri*) in a static test. Bayer AG, Leverkusen-Bayerwerk, Germany (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting company). 18 pp. Report No. 101303.

Green, T., A. Toghill, R. Lee, F. Waechter, E. Weber, J. Noakes. 2005. Thiamethoxam induced mouse liver tumors and their relevance to humans. Part 1: Mode of action studies in the mouse. *Tox Sciences*. 86 (1): 36-47.

Green, T., A. Toghill, R. Lee, F. Waechter, E. Weber, R. Peffer, J. Noakes, M. Robinson. 2005. Thiamethoxam induced mouse liver tumors and their relevance to humans. Part 2: Species differences in response. *Tox Sciences* 86(1): 48-55.

Hall, A.T. 1996. Toxicity of NTN 33893 2F to the freshwater diatom *Navicula pelliculosa*. Bayer Corporation, Kansas City, Missouri. Report No. 107658. 31 pp. (Reviewed in Mulye 1997a)

Hammer, M. and R. Menzel. Learning and memory in the honeybee. *J Neuroscience*. 15(3):1617-1630.

Hancock, G.A. 1996. NTN 33893 technical: an acute oral LD50 with mallards. Bayer Corporation, Kansas City, Missouri. Report No. 107354. 32 pp. (Reviewed in Mulye 1997a)

He, Y., J. Zhao, D. Wu, K.A. Wychuys, K. Wu. 2011. Sublethal effects of imidacloprid on *Bemisia tabaci* under laboratory conditions. *J Econ Entomol*. 104(3): 833-8.

Heimbach, F. 1986. Growth inhibition of green algae (*Scenedesmus subspicatus*) caused by NTN 33893 (technical). Bayer AG, Leverkusen, Germany Report HBF/A1 27. 16 pp.

Hendel, B. 2001. Influence of imidacloprid (tech.) of *Gammarus pulex* in a water-sediment system under static conditions. Bayer AG, Crop Protection Research, Environmental Research, Institute for Environmental Biology, Leverkus, Germany. Report No. HDB/SP 10-00. 41 pp.

Hewitt, M. 2006. Characterizing potato pesticide impacts in aquatic systems of Atlantic Canada. Project Report submitted under the Pesticide Science Fund, Environment Canada.

Hill, T.A., R.E. Foster. 2000. Effects of insecticides on the Diamondback Moth (Lepidoptera: Plutellidae) and its parasitoid Diadegman insulare (Hymenoptera: Ichneumonidae) *J Econ Entomol* 93(3): 763-768.

Hovda, L.R. and S.B. Hooser. 2002. Toxicology of newer pesticides for use in dogs and cats. The Veterinary Clinics: *Small Animal Practice*. 32(2):455-467.

James, D.G. 1997. Imidacloprid increases egg production in *Amblyseius victoriensis* (Acari: Phytoseiidae). *Exp Appl Acarol*. 21:75-82.

James, D.G. and B. Vogele. 2001. The effect of imidacloprid on survival of some beneficial arthropods. *Plant Prot Quart*. 16: 58-62.

James, D.G. and T.S. Price. 2002. Fecundity in two-spotted spider mite (Acari: Tetranychidae) is increased by direct and systemic exposure to imidacloprid. *J. Econ Entomol*. 95(4): 729-32.

Jemec, A., T. Tisler, D. Drobne, K. Sepcic, D. Fournier, and P. Trebse. 2007. Comparative toxicity of imidacloprid, of its commercial liquid formulation and of diazinon to a non-target arthropod, the microcrustacean Daphnia magna. *Chemosphere* 68(8): 1408-1418.

Jepson, J.E.C., L.A. Brown, D.B. Sattelle. 2006. The actions of the neonicotinoid imidacloprid on cholinergic neurons of *Drosophila melanogaster*. *Invert Neurosci*. 6:33-40.

Julian, S. and J. Howard. 1999. Effects of three insecticides (carbaryl, chlorpyrifos, and imidacloprid) on hatching and development of four amphibian species, *Rana pipiens, Pseudacris triseriata, Ambyst oma jeffersonianum,* and *Bufo americanus*. Thesis for MSci. Frostburg University. http://archive.lib.msu.edu/tic/thesdiss/julian-s2000a.pdf.

Kaakeh, N., W. Kaakeh, and G.W. Bennett. 1996. Topical toxicity of imidacloprid, fipronil, and seven conventional insecticides to the adult convergent lady beetle (Coleoptera: Coccinellidae). *J. Entomol. Sci.* 31: 315–322.

Karabay, N.U. and M.G. Oguz, 2005. Cytogenetic and genotoxic effects of the insecticides, imidacloprid and methamidophos. *Genet Mol Res* 4(4): 653-662.

Key, P., K. Chung, T. Siewicki, and M. Fulton. 2007. Toxicity of three pesticides individually and in mixture to larval grass shrimp. *Ecotoxicol Environ Saf* 68(2): 272-277.

Kimura-Kuroda, J., Y. Komuta, Y. Kuroda, M. Hayashi, H. Kawano. 2012. Nicotine-like effects of the neonicotinoid insecticides acetamiprid and imidacloprid on cerebellar neurons from neonatal rats. *PLoS One*. 7(2): e32432. Doi:10.1371/journal.pone.0032432.

Kocaman, A.Y., M. Topaktag. 2007. In vitro evaluation of the genotoxicity of acetamiprid in human peripheral blood lymphocytes. *Environ Mol Mutagenesis*. 48(6): 483-490.

Koester J. 1992. Comparative metabolism of (pyridinyl-^{14}C-methyl)-imidacloprid in plant cell suspension cultures. Proc. Brighton Crop Protection Conference – *Pests and Dis*. 2: 901–906

Kreutzweiser, D., K. Good, D. Chartrand, T. Scarr, and D. Thompson. 2007. Non-target effects on aquatic decomposer organisms of imidacloprid as a systemic insecticide to control emerald ash borer in riparian trees. *Ecotoxicol Environ Safety*. 68(3): 315-25.

Kreutzweiser, DP, Good,KP, Chartrans, DT, Scarr, TA, Thompson, DG. 2008. Are leaves that fall from imidacloprid-treated maple trees to control Asian longhorned beetles toxic to non-target decomposer organisms? *J Environ Qual*. 37(2): 639-46.

Kreutzweiser, DP, Good, KP, Chartrand, DT, Scarr, TA, Holmes, SB, Thompson, DG. 2008. Effects on litter-dwelling earthworms and microbial decomposition of soil-applied imidacloprid for control of wood-boring insects. *Pest Manag Sci*. 64(2): 112-8.

Kreutzweiser, D.P., K.P. Good, D. Chartrand, T.A. Scarr, and D.G. Thompson. 2008. Toxicity of the systemic insecticide, imidacloprid, to forest stream insects and microbial communities. *Bull Environ Contam Toxicol.* 80(3):211-4.

Kreutzweiser, D.P., D.G. Thompson, and T.A. Scarr. 2008. Imidacloprid in leaves from systemically treated trees may inhibit litter breakdown by non-target invertebrates. *Ecotoxicol Environ Safety*, 72(4): 1053-1057.

Krischik, V.A., A.L. Landmark, G.E. Heimpel. 2007. Soil-applied imidacloprid is translocated to nectar and kills nectar-feeding *Anagyrus pseudococci (girault)* (Hymendoptera: Encyrtidae). *Environ Entomol.* 36(5): 1238-45.

Kunkel, B.A., D.W. Held, and D.A. Potter. 1999. Impact of halofenozide, imidacloprid, and bendiocarb on beneficial invertebrates and predatory activity in turfgrass. *J Econ Entomol* 92(4): 992-930.

Kunkel, B.A., D.W. Held, D.A. Potter. 2001. Lethal and sublethal effects of bendiocarb, halofenozide, and imidacloprid on *Harpalus pennsylvanicus* (coleopteran: Carabidae) following different modes of exposure in turfgrass. *J Econ Entomol.* 94:60-67.

Lal, O.P., R.K. Palta, YNS, Srivastava. 2001. Impact of imidacloprid and carbofuran on earthworm castings in Okra Field. *Ann Plant Prot Sci* 9(1): 137-138.

Langer-Jaescich, M., H-R. Kohler, A. Gerhardt. 2010. Assessing toxicity of the insecticide thiacloprid on *Chironomus riparius* (Insecta: Diptera) using multiple end points. *Arch Environ Contam Toxicol.* 58(4): 963-72. nj

Laskowski, R. 2001. Why short-term bioassays are not meaningful – effects of a pesticide (imidacloprid) and a metal (cadmium) on pea aphids (Acyrthosipon pisum Harris) *Ecotoxicology* 10(3): 177-183.

Lee, S.-G., Hilton, S.A., Broadbent, A.B. and Kim, J.-H., 2002, Insecticide Resistance in Phytoseiid Predatory Mites, Phytoseiulus persimilis and Amblyseius cucumeris (Acarina: Phytoseiidae), Journal of Asia-Pacific Entomology vol 5, p 123-129

Li, P. J. Ann, G. Akk. 2011. Activation and modulation of human α4β2 nicotinic acetylcholine receptors by the neonicotinoids clothianidin and imidacloprid. *J Neurosci Res.* 89(8): 1295-301.

Lim, U.T. and A.M.A. Mahmoud. 2008, Ecotoxicological effect of fenitrothion on *Trissolcus nigripedius* (Hymenoptera: Scelionidae) an egg parasitoid *of Dolycoris baccarum* (Hemiptera: Pentatomidae). *J Asia-Pacific Entom.* 11:207–210.

Lintott, D.R. 1992. NTN 33893 (240 FS formulation): acute toxicity to the mysid, *Mysidopsis bahia*, under flow-through conditions. Toxicon Environmental Sciences, Jupiter, Florida (performing laboratory). Miles Incorporated, Kansas City, Missouri (submitting company). 43 pp. Miles Report No. 103845.

Liu, M.Y., J. Lanford, J.E. Casida. 1995. Relevance of [^{3}H]imidacloprid binding site in house fly head nicotinic acetylcholine receptor to insecticidal activity of 2-nitromethylene- and 2-nitroimino-imidazolidines. *Pestic. Biochem. Physiol.* 46:200–206.

Lucas, E., S. Giroux, S. Demougeot, R-M Duchesne, D. Coderre. 2004. Compatibility of a natural enemy, Coleomegilla maculata lengi (Col., Coccinellidae) and four insecticides used against the Colorado potato beetle (*Col., Chrysomelidae*). *J Applied Entom.* 128:233-239.

Lukančič, S., U. Žibrat, T. Mezek, A. Jerebic, T. Simčič, A. Brancelj. 2010. Effects of exposing two non-target crustacean species, *Asellus aquaticus L.*, and *Gammarus fossarum Koch.*, to atrazine and imidacloprid. *Bull Environ Contam Tox.* 84:85-80.

Luo, Y., Y. Zhang, Y. Zhong, and Z.M. Kong. 1999. Toxicological study of two novel pesticides on earthworm *Eisenia foetida*. *Chemosphere* 39(13): 2347-2356.

Mahdian, K., T. Van Leeuwen, L. Tirry, P. De Clercq. 2007, Susceptibility of the predatory stinkbug *Picromerus bidens* to selected insecticides. *BioControl.* 52:765-774.

Matsuda K., M. Shimomura, Y. Kondo, M. Ihara, K. Hashigami, N. Yoshida, V. Raymond, N.P. Morgan, J.C. Freeman, K. Komai, and D.B. Sattelle. 2000. Role of loop D of the α 7 nicotinic acetylcholine receptor in its interaction with the insecticide imidacloprid and related neonicotinoids. *Br. J. Pharmacol.*130:981-6. (Cited in Hovda and Hooser 2002)

Miles, Inc. 1993b. Imidacloprid (syn. PREMISE, NTN 33893) - Comparative metabolism in plant cell suspension cultures. Volume No. 51950–0078. Department of Pesticide Regulation, Sacramento, CA.

Mizell, R.F., M.C. Sconyers. 1992. Toxicity of imidacloprid to selected arthropod predators in the laboratory. *Florida Entomologist.* 75(2): 277-280.

Moghaddam, N.S., M.P. Zakaria, D. Omar, K. Sijam, R. Khakvar. 2011. Effects of imidacloprid on the biodiversity of soil microbes in selected soils of Malaysia. 2011. Second International Conference on Environmental Science and Development. IPCBEE vol 4.

Modal, S., R.C. Ghosh, M.S. Mate, D.B. Karmakar. 2009. Effects of acetamiprid on immune system in female Wistar rats. *Proc Zool Soc.* 62(2): 109-117.

Mostert, M.A., A.S. Schoeman, M. Van der Merwe. 2000. The toxicity of five insecticides to earthworms of the Pheretima Group, using an artificial soil test. *Pest Manag Sci* 56(1): 1093-1097.

Mostert, M.A., A.S. Schoeman, M. Van der Merve. 2002. The relative toxicities of insecticides to earthworms of the Pheretima Group (Oligochaeta). *Pest Manag Sci* 58(5): 446-450.

Mota-Sanchez, D. B.M. Cregg, D.G. McCullough, T.M. Poland, R.M. Hollingworth. 2009. Distribution of trunk-injected 14C-imidacloprid in ash trees and effects on emerald ash borer (Coleoptera:Buprestodae) adults. *Crop Protection* 28:655-661.

Nagata, K., J-H. Song, T. SHono, T. Narahashi. 1998. Modulation of the neuronal nicotinic acetylcholine receptor-channel by the nitromethylene heterocycle imidacloprid. *J Pharm Experiment Therapeutics.* 285(2): 731-738.

Nauen, R., B. Koob, A. Elbert. Antifeeding effects of sublethal dosages of imidacloprid on Bemisia tabaci. *Entomologia Experimentalis et Applicata*. 88:287-293.

Nauen, R., K. Tietjen, K. Wagner, and A. Elbert. 1998. Bayer. Efficacy of plant metabolites of imidacloprid against *Myzus persicae* and *Aphis gossypii* (Homoptera: Aphididae). *Pestic Sci*. 52: 53–57.

Okumoto, T. and Y. Ozoe. 2002. Evaluation of affinity of neonicotinoid insecticides for rat brain nicotinic acetylcholine receptors by 3H Epibatidine-binding assay. J Pest Sci 27:145-146.

Overmyer, J.P., B.N. Mason, K.L.Armbrust. 2005, Acute toxicity of imidacloprid and fipronil to a nontarget aquatic insect, *Simulium vittatum Zetterstedt cytospecies IS-7. Bull Environ Contam Tox.* 74:872-879.

Papachristos, D.P. and P.G. Milonas. 2008. Adverse effects of soil applied insecticides on the predatory coccinellid Hippodamia undecimnotata (Coleoptera: Coccinellidae). *Biological Control*, 47(1):77-81.

Pastoor, T., P. Rose, S. Lloyd, R. Peffer, T. Green. 2005. Case study: Weight of evidence evaluation of the human health relevance of thiamethoxam-related mouse liver tumors. *Tox Sciences* 86(1): 56-60.

Pavlaki, MD, R. Pereira, S. Loureiro, AMVM. Soares. 2011. Effects of binary mixtures on life traits of *Daphnia magna. Ecotoxicol Environ Saf* 74:99–110

Peck, D.C. 2009. Long-term effects of imidacloprid on the abundance of surface- and soil-active nontarget fauna in turf. *Ag Forest Entomol.* 11(4): 405-419.

Pestano, J.L.T., S. Loureiro, D.J. Baird, A.M.V.M. Soare. 2009. Fear and loathing in the benthos: Responses of aquatic insect larvae to the pesticide imidacloprid in the presence of chemical signals of predation risk. *Aquatic Tox* 93(2-3): 138-149.

Pestano, J.L.T., A.C. Alexander, J.M. Culp, D.J. Baird, A.J. Cessna, A.M.V.M. Soares. 2009. Structural and functional responses of benthic invertebrates to imidacloprid in outdoor stream mesocosms. *Environ Pollution*. 157(8-9):2328-2334.

Pike, K.S., G.L. Reed, G.T. Graf, and D. Allison. 1993. Compatibility of imidacloprid with fungicides as a seed-treatment control of Russian wheat aphid (Homoptera: Aphidae) and effect on germination, growth, and yield of wheat barley. *J Econ Entomol* 86(2): 586-593

Quintela, E., C. MacCoy. 1997. Effects of imidacloprid on development, mobility, and survival of first instars of Diaprepes abbreviatus (Coleoptera:Curcilionidae). *J Econ Entomol* 90(4): 988-995.

Rogers, M.A., V.A. Krischik, L.A. Martin. 2007. Effect of soil application of imidacloprid on survival of adult green lacewing, Chrysoperla carnea (Neuroptera:Chrysopidae) used for biological control in greenhouse. *Biol. Control* 42:172-177.

Roney, D.J., and L.M. Bowers. 1996. Acute toxicity of ^{14}C-NTN 33823 to *Hyalella azteca* under static conditions. Bayer Corporation, Kansas City, Missouri. Miles Report No. 107315. 34 pp. (Reviewed in Mulye 1997a)

Rouchaud, J. F. Gustin, A. Wauters. 1996. Imidacloprid insecticide soil metabolism in sugar beet field crops. *Bull. Environ. Contam. Toxicol.* 56:29-36.

Sánchez-Bayo, F. and K. Goka. 2005. Unexpected effects of zinc pyrithione and imidacloprid on Japanese medaka fish (*Oryzias latipes*). *Aquatic Toxicol.* 74: 285–293.

Sánchez-Bayo, F., and K. Goka. 2006. Influence of light in acute toxicity bioassays of imidacloprid and zinc pyrithione to zooplankton crustaceans. Aquat. Toxicol. 78: 262-271.
Sánchez-Bayo, F., and K. Goka. 2006. Ecological effects of the insecticide imidacloprid and a pollutant from antidandruff shampoo in experimental rice fields. *Environ Toxicol Chem.* 25(6): 1677-1687.

Sanchez-Bayo, F. 2006. Comparative acute toxicity of organic pollutants and reference values for crustaceans. I. Branchiopoda, Copepoda and Ostracoda. *Environ Pollution.* 139: 385-420.

Sardo, A.M. and A.M.V.M. Soares. 2010. Assessment of the effects of the pesticide imidacloprid on the behavior of the aquatic oligochaete *Lumbriculus variegatus*. *Arch Environ Contam Toxicol.* 58:648-656.

Sclar, D.C., D. Gerace, W.S. Cranshaw. 1998. Observations of population increases and injury by spider mites (Acari: Tetranychidae) on ornamental plants treated with imidacloprid. *J Econ Entomol.* 91: 250-255.

Smith, S. F. and V. A. Krischik. 1999. Effects of systemic imidacloprid on Coleomegilla maculata. (Coleoptera: Coccinellidae). Environ. Entomol. 28(6): 1180-1195.

Song, M.Y., J.D. Stark, J.J. Brown. 1997. Comparative toxicity of four insecticides, including imidacloprid and tebufenozide, to four aquatic arthropods. *Environ Tox Chem.* 16: 2494-2500

Song, M.Y. and J.J. Brown. 1998. Osmotic effects as a factor modifying insecticide toxicity on *Aedes* and *Artemia*. *Ecotoxicol. Environ. Safety.* 41:195-202.

Song, M.Y. and J.J. Brown. 2006. Influence of fluctuating salinity on insecticide tolerance of two euryhaline arthropods. *J Econ Entom.* 99:745-751.

Sone, S., K. Nagata, S. Tsuboi, T. Shomo. 1994. Toxic symptoms and neural effects of a new class of insecticide, imidacloprid, on the American cockroach. *J. Pesticide Sci* 19:62-72.

Stafford, T.R. 1991. NTN 33893 2.5G: an acute oral LD_{50} with house sparrows, *Passer domesticus*. Mobay Corporation, Kansas City, Missouri. Report No. 101324. 23 pp. (Reviewed in Mulye 1996)

Stafford, T.R. 1992. Technical NTN 33893: a one-generation reproduction study with mallard ducks. Miles Report No. 103813. Miles, Inc., Kansas City, MO. 99 pp.

Stapel, J.O., A.M. Cortesero, W.J. Lewis. 2000. Disruptive sublethal effects of insecticides on biological control: altered foraging ability and life span of a parasitoid after feeding on extrafloral nectar of cotton treated with systemic pesticides. *Biol Control* 17:243-49.

Stark, J.D., P.C.Jepson, D.F. Mayer. 1995. Limitations to use of topical toxicity data for predictions of pesticide side effects in the field. *J Econ Entomol.* 88: 1081-1088.

Stoughton, S.J. 2006. Toxicity of imidacloprid to two aquatic invertebrates, *Chironomus tentans* and *Hyalella azteca*, under different exposure conditions. M.Sc. Thesis. University of Saskatchewan, Saskatoon.

Stoughton, S., J. Leber, J. Culp, and A. Cessna. 2008. Acute and chronic toxicity of imidacloprid to the aquatic invertebrates Chironomus tentans and Hyalella azteca under constant- and pulse-exposure conditions. *Arch Environ Cont and Tox.* 54(4):662-673.

Taira, K., Y. Aoyama, T. Kawakami, M. Kamata, T. Aoi. 2011. Detection of chloropyridinyl neonicotinoid insecticide metabolite 6-chloronicotinic acid in the urine: six cases with subacute nicotinic symptoms. *Chudoku Kenkyu.* 24(3): 222-30.

Takada, T. 1986. NTN 33893: Acute fish toxicity on common carp. Nitokuno, Basic Research Division, Toxicity Research Department. Report No. RW86102.

Tanaka, K., S. Endo, H. Kazano. 2000, Toxicity of insecticides to predators of rice planthoppers: Spiders, the mirid bug and the dryinid wasp. *Applied Entom Zool.* 35:177-187.

Tišler, T., A. Jemec, B. Mozetič, P. Trebše. 2009. Hazard identification of imidacloprid to aquatic environment. *Chemosphere.*. 76:907–914.

Torres, J.B. and J.R. Ruberson. 2004. Toxicity of thiamethoxam and imidacloprid to *Podisus nigrispinus (Dallas)* (Heteroptera: Pentatomidae) nymphs associated to aphid and whitefly control in cotton. *Neotrop Entom.* 33:99-106.

Toll, P.A. 1990b. Technical NTN 33893: a subacute dietary LC_{50} with mallard ducks. Miles, Inc., Stilwell, KS. 36 pp. Miles Report No. 100238. (Reviewed in Mulye 1995)

Toll, P.A. 1990c. Technical NTN 33893: a one-generation reproduction study with bobwhite quail. Miles, Inc., Stilwell, KS. 114 pp. Miles Report No. 101203. (Reviewed in Mulye 1995)

Toll, P.A. 1990d. Technical NTN 33893: an acute oral LD_{50} with bobwhite quail. Miles, Inc., Stilwell, KS. 25 pp. Miles Report No. 100059. (Reviewed in Mulye 1995)

Tomizawa, M. and I. Yamamoto. 1992. Binding of nicotinoids and the related compounds to the insect nicotinic acetylcholine receptor. *J Pest Sci.* 17:231-236.

Tomizawa, M. and J.E. Casida. 1999. Minor structural changes in nicotinoid insecticides confer differential subtype selectivity for mammalian nicotinic acetylcholine receptors. *British J. Pharmocol* 127:115-122

Tomizawa, M., D.L. Lee, and J.E. Casida. 2000. Neonicotinoid insecticides: Molecular features conferring selectivity for insect versus mammalian nicotinic receptors. *J Agric Food Chem.* 48:6016-6024.

Tomizawa, M., A. Cowan, J.E. Casia. 2001. Analgesic and toxic effects of neonicotinoid insecticides in mice. *Toxicol Applied Phramacol* 177:77-83.

Tomizawa, M. and J.E. Casida. 2002. Desnitro-imidacloprid activates the extracellular signal-regulated kinase cascade via the nicotinic receptor and intracellular calcium mobilization in N1E-115 cells. *Toxicol Applied Phramacol* 184:180-186.

Tomizawa, M. and J.E. Casida. 2003. Selective toxicity of neonicotinoids attributable to specificity of insect and mammalian nicotinic receptors. *Ann Rev Entomol.* 48: 339-364.

Tomizawa, M., D. Maltby, T.T. Talley, K.A. Durkin, K.F. Medzihradszky, A. L. Burlingame, P. Taylor, J.E. Casida. 2008. Atypical nicotinic agonist bound conformations conferring subtype selectivity. *PNAS.* 105(5):1728-1732

U.S. EPA. Nov 2000. Michael Doherty. Thiamethoxam - Dietary exposure and risk analysis for the Section 3 seed treatment uses on canola, barley, cotton, sorghum, and wheat with a separate analysis for the use on canola seed. http://www.epa.gov/pesticides/chemical/foia/cleared-reviews/reviews/060109/060109.htm.

Valdovinos-Nunez, G.R., J.J.G. Quezada-Euan, P. Ancona-Xiu, H. Moo-Valle, A.Carmona, and E.R.Sanchez. 2009. Comparative toxicity of pesticides to stingless bees (Hymenoptera: Apidae: Meliponini). *J Econ Entomol.* 102:1737-1742.

Van Dijk, T.C. 2010. Effects of neonicotinoid pesticide pollution of Dutch surface water on non-target species abundance. MSc Thesis Utrecht University. http://igitur-archive.library.uu.nl/student-theses/2010-0722-200330/MSc%20Thesis%20Tessa%20van%20Dijk.pdf.

Vincent, C., A. Ferran, L. Guige, J. Brun. 2000. Effects of imidacloprid on coccinellid larval biology and locomotor behavior. *Eur J Entomol* 97(4):501-506.

Walters, J., H. Casjens, and K. Goh. 2001. Preliminary Monitoring Results of Imidacloprid and Cyfluthrin Applications for Glassy-Winged Sharpshooter Control in Commercial Areas of Butte County. [Online]. Available at http://www.cdpr.ca.gov/docs/gwss/r1018_01.pdf. CDPR, Sacramento, CA.

Wang, H.Y., Y. Yang, J.Y.Su, J.L. Shen, C.F.Gao, C.F.,Y.C. Zhu. 2008. Assessment of the impact of insecticides on *Anagrus nilaparvatae* (Pang et Wang) (Hymenoptera: Mymanidae), an egg parasitoid of the rice planthopper, *Nilaparvata lugens* (Hemiptera: Delphacidae). *Crop Protection.* 27:514-522.

Ward, G.S. 1990a. NTN-33893 technical: acute toxicity to sheepshead minnow, *Cyprinodon variegatus*, under static conditions. Toxicon Environmental Sciences, Jupiter, Florida (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting laboratory). 36 pp. Mobay Project ID: Report No. 100354.

Ward, G.S. 1990b. NTN 33893 technical: acute toxicity to the mysid, *Mysidopsis bahia*, under flow-through test conditions. Toxicon Environmental Sciences, Jupiter, Florida (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting laboratory). 46 pp. Mobay Report No. 100355.

Ward, G.S. 1991. NTN 33893 technical: chronic toxicity to the mysid *Mysidopsis bahia* under flow-through conditions. Toxicon Environmental Sciences, Jupiter, FL. 87 pp. Miles Report No. 101347

Williams III, L., L.D. Price, V. Manrique. 2003. Toxicity of field-weathered insecticide residues to *Anaphes iole* (Hymenoptera: Mymaridae), an Egg Parasitoid of *Lygus lineolaris* (Heteroptera: Miridae), and implications for inundative biological control in cotton. *Biological Control.* 26:217-223.

Williams III, L. and L.D. Price. 2004. A space-efficient contact toxicity bioassay for minute Hymenoptera, used to test the effects of novel and conventional insecticides on the egg parasitoids *Anaphes iole* and *Trichogramma pretiosum*. *BioControl.* 49:163-185.

Wu, G., S. Jiang, T. Miyata. 2004. Effects of synergists on toxicity of six insecticides in parasitoid *Diaeretiella rapae* (Hymenoptera: Aphidiidae). J Econ Entomol. 97:2057-2066.

Youn, Y.N., M.J. Seo, J.G. Shin, C. Jang, Y.M. Yu. 2003. Toxicity of greenhouse pesticides to multicolored Asian lady beetles, *Harmonia axyridis* (Coleoptera: Coccinellidae). *Biol Control* 28:164-170.

Young, B.M. and G.C. Blakemore. 1990. 21-day chronic static renewal toxicity of NTN 33893 to *Daphnia magna*. Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri (performing laboratory). Mobay Corporation, Kansas City, Missouri (submitting laboratory). 84 pp. Mobay Report No. 100247. 50 *Canadian Water Quality Guidelines Imidacloprid*

Zang, Y., Y. Zhong, Y.Luo, Z.M. Kong. 2000. Genotoxicity of two novel pesticides for the earthworm, *Eisenia fetida*, Environ Poll. 108:271-278.

Zhang, J-J., Y. Wang, H-Y Xiang, M-X Li, K-G. Ma, X-Z. Wang, J-H Zhang. 2011. Oxidative stress: Role in acetamiprid induced impairment of the male mice reproductive system. *Ag Sci China*. 10(5):786-796.