

## Grants:

2008 "Analysis of genes and gene regions affecting agronomically important honey bee behaviors". PI: G. Hunt, NRI 2008-35302-18803, \$479,134.

2008 "Identify, conserve and determine the effectiveness of wild pollinators in Pennsylvania tree fruit orchards", State Horticultural Association of Pennsylvania, PDs: David Biddinger and Ed Rajotte, 3 grants totaling \$35,044.

2008 "Colony Collapse Disorder in Honey Bees; Defining Associated Pathology and Enabling Reuse of Equipment" PDs: Cox-Foster DL, vanEngelsdorp D, and Ostiguy N., Pennsylvania Department of Agriculture, \$xxx

2009 "Sustainable Systems for Cucurbit Crops on Organic Farms". PD: Mark Gleason, Co-PIs, S. Fleischer, E. Sanchez, B. Gugino & D. Biddinger. USDA-Organic Agricultural Research & Extension Initiative Grant, \$1,047,000.

2010 "Behavioral, physiological and molecular effects of multiple factors impacting honey bee health". PDs: Christina Grozinger and Jim Tumlinson USDA-AFRI, \$398,871.

2010 "Epigenetic gene regulation in the social bee, *Apis mellifera*". PDs: Soojin Yi and Michael Goodisman (Georgia Tech University), Co-PD: Christina Grozinger, NSF-MCB grant \$260,779 (to Penn State).

2010 "Sustainable Solutions for Preserving Pollinator Health in East Africa". PDs: Jim Tumlinson, Jim Frazier, Maryann Frazier, Christina Grozinger, Harland Patch (Penn State) and Eluid Muli and Dan Masiga (icipe, Nairobi, Kenya) have received an NSF-BREAD Grant \$397,181.

2010 "Exploring using RNAi as a method for controlling *Varroa destructor*." PDs: Huang, Z.Y. and Z. Xi. The Foundation for the Preservation of Honey Bees, Inc, \$14,850.

2010 "Exploring using RNAi as a method for controlling *Varroa destructor*." PDs: Huang, Z.Y. and Z. Xi. National Honey Board, \$20,190,

2010 "Exploring using RNAi as a method for controlling *Varroa destructor*." PDs: Huang, Z.Y. and Z. Xi. Almond Board of California, \$17,000.

2010 "Toxicity of various pyrethroid insecticides to *Varroa mites*". PDs: Huang, Z.Y., K. Dong, Generating Research and Extension to meet Economic and Environmental Needs, MSU, \$30,000.

2010 "Effect of endoparasites, *Nosema* spp, on honey bee behavior and physiology," PD: Huang, Z.Y. Generating Research and Extension to meet Economic and

Environmental Needs, MSU, \$15,000.

2010 “Determining the Role of and Limiting Factors Facing Native Pollinators in Assuring Quality Apple Production in Pennsylvania; a Model for the Mid-Atlantic Tree Fruit Industry”. PD – D. Biddinger & E. Rajotte, Co-PIs: M. Frazier, J. Schupp, D. Mortenson, J. Frazier, C. Mullin, T. Leslie, & M. Vaughn. – USDA Specialty Crop Research Initiative 3-year Research & Extension Grant, \$1,380,000.

2011 “Pesticide nosema interactions across developmental stages of honey bees”, PD: Huang, Z.Y. Generating Research and Extension to meet Economic and Environmental Needs, MSU, \$12,000.

2011 “Are workers previously exposed as larvae to pesticides more susceptible to Nosema ceranae?,” PD: Huang, Z.Y. 2011, National Honey Board, \$13,080.

2011. “Field exposure to propiconazole fungicides in blueberry”, PI: F. Drummond, Wyman & Sons, \$10,000.

2011 “Molecular and behavioral studies of host-parasite interactions in honey bees”. PI: H. Holt. Mentor: C. Grozinger. NSF Graduate Research Fellowship. \$121,500.

2011 “Developing Information for Vegetable Growers on the Squash Bee and on Floral Resources for Pollinators”. PI: K. Stoner, Natural Resource Conservation Service - CT office Conservation Improvement Grant. \$75,000.

2011 “Quantifying routes of exposure of honeybees to neo-nicotinoid seed treatments of corn”. PIs: Christian Krupke, Greg Hunt, and Brian Eitzer. NAPCC, \$9,000.

2011 “Multifunctional cover crop cocktails for organic systems” PI Jason Kaye and Co-PIs M. Barbercheck, S. Cornelisse, T. DuPont, D. Hartman, M. Hautau, D. Luthe, D. Mortensen, M. Schipanski, and C. White, USDA Organic Agriculture Research and Extension Initiative Grant, \$2,300,000.

2011 “Native Pollinators of Eastern Apple Orchards and How to Conserve Them”. Northeast IPM Center IPM Partnership PD John Losey – Cornell University, PIs – Cornell – A. Agnello & M. Park, Penn State University – D. Biddinger & E. Rajotte. Northeast IPM Center IPM Partnership, \$19,923.

2011 “National Conservation Innovation Grant”. PDS: David Biddinger and Ed Rajotte, USDA-NRCS in partnership with the Xerces Society, \$45,000.

2011 “Honey bee toxic interactions with formulation ‘inerts’ and pesticide residues frequently found in U.S. apiaries”. PDS: Mullin, C. A.; Frazier, J. L.; Frazier, M. T., USDA/AFRI Competitive Grant, \$297,000.

2011 "Honeybee modulation of infection with the Israeli Acute Paralysis Virus, in asymptomatic, acutely infected and CCD colonies." ,PIs: Nor Chejanovsky and D.L. Cox-Foster, BARD grant (Binational Agricultural Research & Development Fund), \$xxx

2011 "Determining the interaction of nutrition and pesticide use on viral infections and immune gene expression in bees." PIs: Cox-Foster, D.L., Frazier, M.T., Frazier, J., and Mullin C., Grant from Center for Pollinator Research, Penn State University , \$xx

### **Publications:**

Kocher, S. 2009. Molecular and physiological mechanisms underlying chemical communication in the honey bee. Ph.D. Thesis. North Carolina State University, Raleigh, NC. 271 pp.

Kocher, S. D., F. J. Richard, D. R. Tarpy, and C. M. Grozinger. 2009. The effects of mating and instrumental insemination on honey bee behavior, physiology, and brain gene expression. *Insect Molecular Biology* <http://dx.doi.org/10.1111/j.1365-2583.2009.00965.x>.

Kocher, S. D., F. J. Richard, D. R. Tarpy, and C. M. Grozinger. 2009. Queen reproductive state modulates queen pheromone production and queen-worker interactions in honey bees. *Behavioral Ecology* 20:1007-1014.

Aronstein, K., A. Averill, F. Drummond, B. Eitzer, J. D. Ellis, N. Ostiguy, S. Sheppard, M. Spivak, and K. Visscher. 2010. A peek at the distribution of viruses in stationary honey bee colonies in the U.S. *American Bee Journal* 150(4):132.

Chen, Y.P., and Z.Y. Huang. 2010. *Nosema ceranae*, a newly identified pathogen of *Apis mellifera* in the U.S. and Asia. *Apidologie* 41: 364-374.

Huang, Z.Y. 2010. Honey bee nutrition. *American Bee Journal* 150: 773-776.

Huang, Z.Y. 2010. Honey bee nutrition. *Bee Culture* 138: (9) 22-26.

Huang, Z.Y. 2010. Honey bee nutrition.  
[http://www.extension.org/pages/Honey\\_Bee\\_Nutrition](http://www.extension.org/pages/Honey_Bee_Nutrition)

Mullin, C. A., M. Frazier, J. L. Frazier, S. Ashcraft, R. Simonds, D. vanEngelsdorp, and J.S. Pettis. 2010. High levels of miticides and agrochemicals in North American apiaries: Implications for honey bee health. *PLoS ONE* 5:1-19 e9754.

Ostiguy, N. 2010. Managed Pollinator CAP Coordinated Agricultural Project: Sustainable Beekeeping. *American Bee Journal* 150(2):149-152.

vanEngelsdorp D, N. Speybroeck, J. D. Evans, B. K. Nguyen, C. Mullin, M. Frazier, J. Frazier, D. Cox-Foster, Y. Chen, D. R. Tarpy, E. Haubruge, J. S. Pettis, and C. Saegerman. 2010. Weighing risk factors associated with bee Colony Collapse Disorder by Classification and Regression Tree Analysis. *J. Econ. Entomol.* 103(5):1517-1523.

Fan, Y., F. J. Richard, C. Rouf, and C. M. Grozinger. 2010. Effects of queen mandibular pheromone on nestmate recognition in worker honey bees (*Apis mellifera*). *Animal Behavior* 79(3):649-6.

Frazier, M., E. Muli, T. Conklin, D. Schmehl, B. Torto, J. Frazier, J. Tumlinson, J. Evans, and S. Raina. 2010. A scientific note on *Varroa destructor* found in East Africa; threat or opportunity *Apidologie* 41:453-465.

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

Williams, G. R., D. R. Tarpy, D. Vanengelsdorp, M. P. Chauzat, D. L. Cox-Foster, K. S. Delaplane, P. Neumann, J. S. Pettis, R. E. Rogers, and D. Shutler. 2010. Colony Collapse Disorder in context. *Bioessays*. 2010 Aug 20. Epub. <http://dx.doi.org/10.1002/bies.201000075>.

Solter, L.F. 2010. Microsporidia: Friend, Foe (And Intriguing Creatures). *American Bee Journal* 150, 1147-1149.

Shpigler, H., H. M. Patch, M. Cohen, Y. Fan, C. M. Grozinger, and G. Bloch. 2010. The transcription factor Kruppel homolog 1 is linked to hormone mediated social organization in bees. *BMC Evol. Biol.* 10:120.

Singh, R., A. L. Levitt, E. G. Rajotte, E. C. Holmes, N. Ostiguy, D. vanEngelsdorp, W. I. Lipkin, C. W. Depamphilis, A. L. Toth, and D. L. Cox-Foster. 2010. RNA viruses in hymenopteran pollinators: evidence of inter-Taxa virus transmission via pollen and potential impact on non-*Apis* hymenopteran species. *PLoS One* 5(12):e14357.

Corman, S. R., M. C. Schatz, S. J. Johnston, Y. P. Chen, J. Pettis, G. Hunt, L. Bourgeois, C. Elsik, D. Anderson, C. M. Grozinger, and J. D. Evans. 2010. Genomic survey of the ectoparasitic mite *Varroa destructor*, a major pest of the honeybee *Apis mellifera*. *BMC Genomics* 11:602.

Eitzer, B., F. Drummond, J. D. Ellis, N. Ostiguy, K. Aronstein, W. S. Sheppard, K. Visscher, D. Cox-Foster, and A. Averill. 2010. Pesticide analysis at the stationary apiaries. *American Bee Journal* 150(5):500.

Solter, L.F. and Huang, W-F. 2010. Sweeter than honey: Honey bee health. INHS Reports, Summer Issue No. 404

Ciarlo, T., J. Frazier, and C. Mullin. 2010. Inert ingredients in pesticides may impair foraging behavior in honey bees (*Apis mellifera ligustica*). In: Entomology 2010, 58<sup>th</sup> Annual Meeting of the Entomological Society of America, San Diego, CA. (D0230 Poster Abstract)

Hunt GJ, Breeding bees for resistance to parasites and diseases. 2010. Am Bee J 150(7):667-669.

Aronstein, K.A., Murray, K.D. 2010. Chalkbrood disease in honey bees. J. Invertebr. Pathol.103:20-29.

Aronstein, K.A., Daniel Murray, K.D., Saldivar, E. 2010. Transcriptional responses in Honey Bee larvae infected with Chalkbrood fungus. BMC Genomics, 11:391.

Aronstein, K. A. 2010. Detect Nosema Parasite in Time to Save Bee Colonies. 2009. Am. Bee J.150 (1): 63-65.

Aronstein, K. A. 2010. Detect Nosema Parasite in Time. Bee Culture, Feb: 19-21.

Grozinger, C. M. and G. E. Robinson. 2010. Sociogenomics. In: Breed, M. and J. Moore (eds.) Encyclopedia of Animal Behavior. Oxford: Elsevier Press. pp. 2672.

Grozinger, C. M. 2010. Genomic approaches to behavioral ecology and evolution. In: Westneat, D. F. and Fox, C. W. (eds.) Evolutionary Behavioral Ecology. New York City. Oxford University Press pp. 488-505.

Hunter, W., J. Ellis, D. vanEngelsdorp, J. Hayes, D. Westervelt, E. Glick, M. Williams I. Sela, E. Maori, J. Pettis, D. Cox-Foster, and N. Paldi. 2010. Large-scale field application of RNAi technology reducing Israeli acute paralysis virus disease in honey bees. (*Apis mellifera*, Hymenoptera: Apidae). PLoS Pathog. 6(12):e1001160.

Kocher, S. D., J. F. Ayroles, E. A. Stone, and C. M. Grozinger. 2010. Individual variation in pheromone response correlates with reproductive traits and brain gene expression in worker honey bees. PLoS One 5(2):e9116.

Kocher, S. D., D. R. Tarpy, and C. M. Grozinger. 2010. The effects of mating and instrumental insemination on queen honey bee flight behaviour and gene expression. Insect Mol. Biol. 19(2):153-62.

Bahn, D. G. 2011. Qualitative analysis of effects of formulation additives on metabolism of chlorothalonil in honeybees. Honors Thesis, Department of Entomology, The Pennsylvania State University Schreyer Honors College, University Park, PA. 45 pp.

Seeley, T.D. 2011. Die Weisheit des Schwarms. Deutsches Bienen-Journal (May):

Seeley, T.D. 2011. House hunting by honey bees. Bee Craft (May): 9-13.

Seeley, T.D. 2011. House hunting honey bees. Northern Woodlands (Summer): 28-31

Ciarlo, T. J., C. A. Mullin, and J. L. Frazier. 2011. Pesticide adjuvants and inert ingredients may impair foraging behavior in honey bees (*Apis mellifera*). In: Entomological Society of America Eastern Branch 82<sup>nd</sup> Annual Meeting, Harrisburg, PA, p. 37. (Poster Abstract #9)

Frazier, J. L., M. T. Frazier, C. A. Mullin, and W. Zhu. 2011. Does the reproductive ground plan hypothesis offer a mechanistic basis for understanding honey bee health? In: American Bee Research Conference, Galveston, TX. Amer. Bee J. 151(5): 510. (Abstract)

Frazier, J., C. Mullin, M. Frazier, and S. Ashcraft. 2011. Managed Pollinator CAP Coordinated Agricultural Project: Pesticides and their involvement in Colony Collapse Disorder. Amer. Bee J. 151(8): 779-784.

Mullin, C. A., T. J. Ciarlo, W. Zhu, M. T. Frazier, and J. L. Frazier. 2011. Analyzing pesticide formulation adjuvants to assess their impact on pollinator health. In: Analytical Challenges for Crop Protection Products Symposium, AGRO 10, 242<sup>nd</sup> ACS National Meeting, Denver, CO. Picogram 80:82. (Abstract)

Mullin, C. A., J. L. Frazier, M. T. Frazier, and T. J. Ciarlo. 2011. A primer on 'inerts' and honey bees. In: American Bee Research Conference, Galveston, TX. Amer. Bee J. 151(5): 513. (Abstract)

Hunt GJ, Shenefield D, Given K, Tsuruda J. 2011. An update on breeding efforts in Indiana. Bee Culture Nov. 25-31.

Andino GK, Hunt GJ. 2011. A scientific note on a new assay to measure honeybee mite-grooming behavior. Apidologie 42:481-484.

Aronstein, K.A., Eduardo Saldivar, E., Webster. T.C. 2011. Evaluation of *Nosema ceranae* spore-specific polyclonal antibodies. Journal of Apicultural Research 50(2): 145-151.

Aronstein K A, and Adamczyk, J. 2011. Influence of Genomics: The Post Genomic Era in the Honey Bee Research. . The Journal of the Texas Beekeepers Association. 11(1): 12-17.

Webster, T and Aronstein, K.A. (ed. Samataro). 2011. Honey Bee Colony Health: Challenges and Sustainable solutions (ed. Diana Sammataro): CRP Press, Taylor and Francis, LLC Chapter 10 "Nosema ceranae Detection by Microscopy and Antibody Tests", pp.115-120.

Aronstein, K.A., H.E. Cabanillas, H.E. (ed. Samataro) 2011. Book:"Honey Bee Colony Health: Challenges and Sustainable solutions", CRP Press, Taylor and Francis, LLC Chapter 11 "Chalkbrood re-examined", pp. 121-130.

Aronstein, K. A., Oppert, B and Lorenzen, M.D. (ed. Paula Grabowski). 2011. Book "RNA Processing", Book Chapter 8: RNAi in the agriculturally important arthropods, in RNA Processing. InTech, pp157-180.

Abbot, P., J. Abe, J. Alcock, and C. M. Grozinger, et al. 2011. Nature 471:7339.

Bahn, D. G. 2011. Qualitative analysis of effects of formulation additives on metabolism of chlorothalonil in honeybees.

Bloch, G., and C. M. Grozinger. 2011. Social molecular pathways and the evolution of bee societies. Philos. Trans. R. Soc. Lond. B. Biol. Sci. 366:1574:2155-70.

Frazier, J., C. Mullin, M. Frazier, and S. Ashcraft. 2011. Managed Pollinator CAP Coordinated Agricultural Project: Pesticides and their involvement in Colony Collapse Disorder. Amer. Bee J. 151(8):779-784.

Fussnecker, B. L., A. M. McKenzi, and C. M. Grozinger. 2011. cGMP modulates responses to queen mandibular pheromone in worker honey bees. J Comp. Physiol. A Neuroethol. Sens. Neural Behav. Physiol. 197(9):939-48.

Nino, E. L., D. R. Tarpy, and C. Grozinger. 2011. Genome-wide analysis of brain transcriptional changes in honey bee (*Apis mellifera* L.) queens exposed to carbon dioxide and physical manipulation. Insect Mol Biol. 20(3):387-98.

Richard, F. J., C. Schal, D. R. Tarpy, and C. M. Grozinger. 2011. Effects of instrumental insemination and insemination quantity on Dufour's gland chemical profiles and vitellogenin expression in honey bee queens (*Apis mellifera*). J. Chem Ecol. 37(9):1027-36.

Tokarz, R., C. Firth, C. Street, D. L. Cox-Foster, and W. I. Lipkin. 2011. Lack of evidence for an association between Iridovirus and colony collapse disorder. PLoS One 6(6):e21844.

Delaplane, K.S. 2011. Integrated pest management in Varroa. In Varroa - Still a Problem in the 21st Century? International Bee Research Association, Cardiff, UK, pp. 43-51

Delaplane, K.S. 2011. Understanding the impact of honey bee disorders on crop pollination. In Honey bee colony health (D. Samataro and J.A. Yoder, eds.). CRC Press, pp. 223-228

Hunter, W. B., J. Ellis, D. Vanengelsdrop, J. Hayes, D. Westervelt, M. Williams, I. Sela,

E. Maori, J. S. Pettis, D. Cox-Foster, and N. Paldi. *In Press*. 2010 Large-scale field application of RNA interference (RNAi) technology to reduce impact of Israeli Acute Paralysis Virus (IAPV) induced disease in honey bees (*Apis mellifera*, Hymenoptera: Apidae). *Plos Pathogens*.

Krupke CH, Hunt GJ, Eitzer B, Andino G, Given K, *In Press*. Multiple routes of pesticide exposure for honey bees living near agricultural fields. *PLoS One*.