

Livy Williams, III

Education

- 1982 The University of Arizona, Tucson, AZ, Entomology, B.S.
 1985 University of Arkansas, Fayetteville, AR, Entomology, M.S.
 1993 University of Idaho, Moscow, ID, Entomology, Ph.D.

Experience

- 1993-1995 Postdoctoral Associate, Cornell University, Geneva, NY
 1995-1997 Associate in Research & Extension, The University of Arizona, Tucson, AZ
 1997-2005 Research Entomologist, USDA-ARS Southern Insect Management Research Unit, Stoneville, MS
 2000-2002 Adjunct Assistant Professor, Delta State University, Cleveland, MS
 2002-2004 Adjunct Assistant Professor, Texas A & M University, College Station, TX
 2005-2010 Lead Scientist and Research Entomologist, USDA-ARS Exotic and Invasive Weeds Research Unit, Reno, NV
 2005-2010 Adjunct Assistant Professor, University of Nevada, Reno, NV
 2010-present Lead Scientist and Research Entomologist, USDA-ARS European Biological Control Laboratory, Montpellier, France

Background

Dr. Livy Williams is a Research Entomologist in the European Biological Control Laboratory, Montpellier, France. This assignment is new since July 2010. He serves as Lead Scientist of the research project entitled “*Discovery and Evaluation of Classical Biological Control Agents for Invasive Eurasian Weeds Affecting Agricultural and Natural Areas*”, which encompasses the research of five scientists. Livy also serves as Acting Laboratory Director when necessary. He has authored or co-authored 43 peer-reviewed papers (1248 citations, h-index = 21, i10 index = 32). Livy is trained as an insect biologist, with additional emphasis in plant biology and statistics. His research is focused on studies of plant-arthropod interactions, usually in a pest control setting. His areas of expertise include chemical ecology, insect behavior, nutritional ecology as related to conservation biological control, parasitoid biology, spatial ecology, and herpetology. He also has experience in foreign field research, including exploration for natural enemies of weeds and insects on several continents. He has worked in a variety of crop systems, including cotton, spring pea/fall wheat, soybean, alfalfa, olives, grapes, cole crops, and melons, in addition to natural desert ecosystems. Insect groups on which he has worked include plant bugs, stink bugs, whiteflies, leafhoppers, Coleoptera, Lepidoptera, tephritid fruit flies, as well as natural enemies of these groups. His experience with weeds includes saltcedar, perennial pepperweed, and Russian olive, and the insects associated with them. Livy has been a member of the Entomological Society of America for more than 30 years, and has served the society at several times; currently he is Governing Board Representative for the International Branch.

Peer-Reviewed Journal Articles

1. **Williams, L., III**, J. R. Phillips and N. P. Tugwell. Field technique for identifying causes of pinhead square shed in cotton. *J. Econ. Entomol.* 80: 527-531. 1987.
2. **Williams, L., III** and L. E. O'Keefe. An ultrasonic procedure for cleaning sticky-trapped arthropods. *J. Kansas Entomol. Soc.* 63: 461-462. 1990.
3. Brown, P. D., M. J. Morra, J. P. McCaffrey, D. L. Auld and **L. Williams, III**. Allelochemicals produced during glucosinolate degradation in soil. *J. Chem. Ecol.* 17: 2021-2034. 1991.
4. Quinn, M. A., S. E. Halbert and **L. Williams, III**. Spatial and temporal changes in aphid (Homoptera: Aphididae) species assemblages collected with suction traps in Idaho. *J. Econ. Entomol.* 84: 1710-1716. 1991.
5. **Williams, L., III** and J. L. Blackmer. A mating aggregation of *Thonalmus bicolor* (L.) (Coleoptera: Lycidae) feeding at *Morinda* sp. (Rubiaceae) nectaries in Jamaica. *Coleopt. Bull.* 45: 358-359. 1991.
6. **Williams, L., III**, L. E. O'Keefe and D. J. Schotzko. Chickpea, *Cicer arietinum*: a new host for the pea leaf weevil, *Sitona lineatus*. *Field Crops Res.* 27: 377-380. 1991.
7. **Williams, L., III**, D. J. Schotzko and J. P. McCaffrey. Geostatistical description of the spatial distribution of *Limonius californicus* (Mann.) (Coleoptera: Elateridae) wireworms in the northwestern United States, with comments on sampling. *Environ. Entomol.* 21: 983-995. 1992.
8. **Williams, L., III**, M. J. Morra, P. D. Brown and J. P. McCaffrey. Toxicity of allyl isothiocyanate-amended soil to *Limonius californicus* (Mann.) (Coleoptera: Elateridae) wireworms. *J. Chem. Ecol.* 19: 1033-1046. 1993.
9. McCaffrey, J. P., **L. Williams, III**, V. Borek, P. D. Brown and M. J. Morra. Toxicity of ionic thiocyanate-amended soil to the wireworm *Limonius californicus* (Coleoptera: Elateridae). *J. Econ. Entomol.* 88: 793-797. 1995.
10. **Williams, L., III**, D. J. Schotzko and L. E. O'Keefe. Pea leaf weevil herbivory on pea seedlings: effects on growth response and yield. *Entomol. Exp. Appl.* 76: 255-269. 1995.
11. Dennehy, T. J. and **L. Williams, III**. Management of resistance in *Bemisia* in Arizona cotton. *Pest. Sci.* 51: 398-406. 1997.
12. **Williams, L., III**, D. J. Schotzko and L. E. O'Keefe. Herbivory, seed priming, and tillage systems: impacts on the growth response of *Pisum sativum* L. *J. Entomol. Sci.* 33: 196-211. 1998.

13. **Williams, L., III** and N. P. Tugwell. Histological description of tarnished plant bug (Heteroptera: Miridae) feeding on small cotton floral buds. *J. Entomol. Sci.* 35: 187-195. 2000.
14. **Williams, L., III** and T. E. Martinson. Colonization of New York vineyards by *Anagrus* spp. (Hymenoptera: Mymaridae): overwintering biology, within-vineyard distribution of wasps, and parasitism of grape leafhopper, *Erythroneura* spp. (Homoptera: Cicadellidae) eggs. *Biol. Control* 18: 136-146. 2000.
15. Ruberson, J. R. and **L. H. Williams**. Biological control of *Lygus* spp.: a component of areawide management. *Southwest. Entomol. Suppl. No.* 23: 96-110. 2000.
16. Martinson, T. E., **L. Williams, III** and G. English-Loeb. Compatibility of chemical disease and insect management practices used in New York vineyards with biological control by *Anagrus* spp. (Hymenoptera: Mymaridae), parasitoids of *Erythroneura* leafhoppers. *Biol. Control* 22: 227-34. 2001.
17. **Williams, L., III**, P. E. Evans and W. S. Bowers. Defensive chemistry of an aposematic bug, *Pachycoris stallii* Uhler and volatile compounds of its host plant *Croton californicus* Muell.-Arg. *J. Chem. Ecol.* 27: 201-214. 2002.
18. Zhu, Y. C. and **L. Williams, III**. Detecting the egg parasitoid *Anaphes iole* (Hymenoptera: Mymaridae) in tarnished plant bug (Heteroptera: Miridae) eggs by using a molecular approach. *Ann. Entomol. Soc. Am.* 95: 359-365. 2002.
19. Rodriguez-Saona, C., S. J. Crafts-Brandner, **L. Williams, III** and P. W. Paré. *Lygus hesperus* feeding and salivary gland extracts induce volatile emissions in plants. *J. Chem. Ecol.* 28: 1733-1747. 2002.
20. **Williams, L., III**, L. D. Price and V. Manrique. 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. *Biol. Control* 26: 217-223. 2003.
21. Beach, J. P., **L. Williams, III**, D. L. Hendrix and L. D. Price. Different food sources affect the gustatory response of *Anaphes iole*, an egg parasitoid of *Lygus* spp. *J. Chem. Ecol.* 29: 1203-1222. 2003.
22. Byrne, D. N., D. L. Hendrix and **L. Williams, III**. Presence of trehalulose and other oligosaccharides in hemipteran honeydew, particularly Aleyrodidae. *Physiol. Entomol.* 28: 144-149. 2003.
23. **Williams, L., III** and T. E. Martinson. Nondestructive leaf area estimation of 'Niagara' and 'DeChaunac' grapevines. *Sci. Hortic.* 98: 493-498. 2003.

24. **Williams, L., III**, G. A. Logarzo, S. R. Shaw, L. D. Price and V. Manrique. *Leiophron argentinensis* Shaw (Hymenoptera: Braconidae): a new species of parasitoid from Argentina and Paraguay, with information on life history and potential for controlling *Lygus* bugs (Hemiptera: Miridae). *Ann. Entomol. Soc. Am.* 96: 834-846. 2003.
25. **Williams, L., III** and L. D. Price. 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. 2004.
26. Zhu, Y. C., E. W. Riddick, **L. Williams, III**, D. J. Schotzko, G. A. Logarzo and C. G. Jackson. Potential of detection and identification of nymphal parasitoids (Hymenoptera: Braconidae) of *Lygus* bugs (Heteroptera: Miridae) by using polymerase chain reaction and ITS2 sequence analysis techniques. *Ann. Entomol. Soc. Am.* 97: 743-752. 2004.
27. Blackmer, J. L., S. E. Naranjo and **L. H. Williams, III**. Tethered and untethered flight by *Lygus hesperus* and *Lygus lineolaris* (Heteroptera: Miridae). *Environ. Entomol.* 33: 1389-1400. 2004.
28. **Williams, L., III**, C. Rodriguez-Saona, P. W. Paré and S. J. Crafts-Brandner. The piercing-sucking herbivores *Lygus hesperus* and *Nezara viridula* induce volatile emissions in plants. *Arch. Ins. Biochem. Physiol.* 58: 84-96. 2005.
29. Manrique, V., W. A. Jones, **L. Williams, III** and J. S. Bernal. Olfactory responses of *Anaphes iole* (Hymenoptera: Mymaridae) to volatile signals derived from host habitats. *J. Ins. Behav.* 18: 89-104. 2005.
30. **Williams, L., III**, M. C. Coscarón, P. M. Dellapé and T. M. Roane. The shield-backed bug, *Pachycoris stallii*: description of immature stages, effect of maternal care on nymphs, and notes on life history. *J. Ins. Sci.* 5:29, available online: insectscience.org/5.29. 2005.
31. Logarzo, G. A., **L. Williams, III** and D. Carpintero. Plant bugs (Heteroptera: Miridae) associated with roadside habitats in Argentina and Paraguay: host plant, temporal, and geographic range effects. *Ann. Entomol. Soc. Am.* 98: 694-702. 2005.
32. Blanco, C. A., O. Perera, J. Ray, E. Taliercio and **L. Williams, III**. Incorporation of rhodamine B into male tobacco budworm moths to use as a marker for mating studies. *J. Ins. Sci.* 6:05, available online: insectscience.org/6.05. 2006. (*Order of junior authors chosen by alphabetical order of surname*).
33. **Williams, L., III** and T. M. Roane. Nutritional ecology of a parasitic wasp: food source affects gustatory response, metabolic utilization, and survivorship. *J. Ins. Physiol.* 53: 1262-1275. 2007.
34. **Williams, L., III** and D. L. Hendrix. Comparing different floral resources on the longevity of a parasitic wasp. *Agric. For. Entomol.* 10: 23-28. 2008.

35. **Williams, L., III**, C. Rodriguez-Saona, S. C. Castle and S. Zhu. EAG-active herbivore-induced plant volatiles modify behavioral responses and host attack by an egg parasitoid. *J. Chem. Ecol.* 34: 1190-1201. 2008.
36. **Williams, L., III**, J. L. Blackmer, C. Rodriguez-Saona, and S. Zhu. Plant volatiles influence electrophysiological and behavioral responses of *Lygus hesperus*. *J. Chem. Ecol.* 36: 467-478. 2010.
37. Lee, J. C., J. F. Negrón, S. J. Mcelwey, **L. Williams, III**, J. J. Witcosky, J. B. Popp, and S. J. Seybold. Biology of the invasive banded elm bark beetle (Coleoptera: Scolytidae) in the western United States. *Ann. Entomol. Soc. Amer.* 104: 705-717. 2011.
38. Rodriguez-Saona, C., I. Kaplan, J. Braasch, D. Chinnasamy, and **L. Williams, III**. Field responses of predaceous arthropods to methyl salicylate: a meta-analysis and case study in cranberries. *Biol. Control* 59: 294-303. 2011.
39. **Williams, L., III**, J. R. Hagler, and K. C. Tonkel. Retention of immunolabels by *Diorhabda carinulata* (Coleoptera: Chrysomelidae), a biological control agent of saltcedar. *Entomol. Exp. Appl.* 141: 154-162. 2011.
40. **Williams, L., III**, Y. C. Zhu, G. L. Snodgrass, and V. Manrique. Plant-mediated decisions by an herbivore affect oviposition pattern and subsequent egg parasitism. *Arthropod-Plant Inter.* 6: 159-169. 2012.
41. Gaskin, J. F., M. Schwarzlaender, **L. Williams III**, E. Gerber, and H. L. Hinz. Minimal genetic diversity in the facultatively outcrossing perennial pepperweed (*Lepidium latifolium*) invasion. *Biol. Invasions* 14: 1797-1807. 2012.
42. Gaskin, J. F., M. Schwarzlaender, H. L. Hinz, **L. Williams III**, E. Gerber, B. G. Rector, and D. Y. Zhang. Genetic identity and diversity of perennial pepperweed (*Lepidium latifolium*) in its native and invaded ranges. *Invasive Plant Sci. Manage.* 6: 268-280. 2013.
43. **Williams, L., III**, J. R. Hagler, and K. C. Tonkel. Does dimethyl sulfoxide increase protein immunomarking efficiency for dispersal and predation studies? *Entomol. Exp. Appl.* 148: 275-286. 2013.

Submitted

44. **Williams, L., III**, P. Deschodt, O. Pointurier and K. A. G. Wyckhuys. Sugar concentration and timing of feeding affect feeding characteristics and survival of a parasitic wasp. *J. Insect Physiol.* (revision in progress)
45. Deletre, E., F. Chandre, **L. Williams, III**, C. Dumenil, C. Menut and T. Martin. Electrophysiological and behavioral characterization of bioactive compounds of four essential oils against *Anopheles gambiae* and prospects for their use as bed net treatments. *Parasit. Vectors* (submitted)

46. *Deletre, E.*, B. Schatz, D. Bourguet, F. Chandre, **L. Williams, III**, A. Ratnadass and T. Martin. Prospects for repellency in pest control – current developments and future challenges. *Biol. Rev.* (submitted)
47. Pan, H., Y. Lu, C. Xiu, H. Geng, X. Cai, X. Sun, Y. Zhang, **L. Williams, III**, K. A. G. Wyckhuys and K. Wu. Volatile fragrances associated with flowers mediate the host plant alternation of a polyphagous mirid bug. *Proc. R. Soc. B.* (submitted)

Italicized names are students.

Presentations 2010- present

1. Rector, B. G., E. Gerber, L. Gultekin, R. Hayat, H. Hinz, **L. Williams, III**, and M. Cristofaro. Arthropod biological control candidates of perennial pepperweed, an invasive weed native to Eurasia. 58th Annual Meeting of the Entomological Society of America, San Diego, CA, 12-16 December 2010.
2. Rodriguez-Saona, C., I. Kaplan, and **L. Williams, III**. Field responses of predaceous arthropods to methyl salicylate. North American Cranberry Research and Extension Workshop, Wisconsin Dells, WI, 11-14 September 2011.
3. **L. Williams, III**, C. Rodriguez-Saona, S. C. Castle del Conte, and V. Manrique. Host plant volatile effects on arthropods in cotton fields. 59th Annual Meeting of the Entomological Society of America, Reno, NV, 13-16 November 2011. *Invitation*
4. Rodriguez-Saona, C., I. Kaplan, and **L. Williams, III**. Response of predaceous arthropods to methyl salicylate in agricultural fields. 59th Annual Meeting of the Entomological Society of America, Reno, NV, 13-16 November 2011. *Invitation*
5. **Williams, L., III** and K. C. Tonkel. Natural enemies associated with perennial pepperweed (*Lepidium latifolium* L.) in its introduced range. 52nd Annual Meeting of the Weed Science Society of America, Waikoloa, HI, 6-9 February 2012.
6. **Williams, L., III**, C. Rodriguez-Saona, S. C. Castle del Conte, and V. Manrique. Manipulation of natural enemies in agroecosystems: semiochemicals, nutritional ecology, habitat factors, and pesticide compatibility for sustainable insect pest control. Entomophagiste 2012, Montpellier, France, 23-25 May 2012.
7. **Williams, L., III**, Y. C. Zhu, G. L. Snodgrass, and V. Manrique. Plante à médiation décisions prises par un herbivore affecter modèle de ponte et le parasitisme des oeufs ultérieure. Entomophagiste 2012, Montpellier, France, 23-25 May 2012.
8. **Williams, L., III**, Y. C. Zhu, V. Manrique and G. L. Snodgrass. Oviposition choices by *Lygus lineolaris* affect egg parasitism by *Anaphes iole*. 3rd International Lygus Symposium, Scottsdale, AZ, 28-31 October 2012.
9. Hoelmer, K., Kirk, A., Bon, M.C., **Williams, L.**, Blanchet, A. Jones, W., Daane, K., Johnson, M. Wang, X., and Pickett, C. Biological control of the olive fruit fly in the USA. INRA-Antibes, France, January 2013.
10. **Williams, L., III**. Chemical and nutritional ecology of heteropterans and their natural enemies: advances toward biological control. *Invited seminar* at the Chinese Academy of Agricultural Science, Beijing, China, April 2013.
11. *Deletre, E.*, F. Chandre, **L. Williams, III**, B. Schatz, C. Menut and T. Martin. On the perception and mechanism of action of repellent odors. 1st National Meeting of the Young Chemical Ecologists, Montpellier, France, 5-7 June 2013.

12. *Deletre, E., T. Martin, L. Williams, III, C. Menut and F. Chandre.* Natural products as alternatives to pyrethroid control of the malaria vector, *Anopheles gambiae*. 29th International Society of Chemical Ecology Conference, Melbourne, Australia, 19-23 August 2013.
13. **Williams, L., III, O. Pointurier, P. Deschodt** and K.A.G. Wyckhuys. Effect of food, age, and feeding frequency on longevity of olive fruit fly parasitoids. 61st Annual Meeting of the Entomological Society of America, Austin, TX, 10-13 November 2013.
14. *Pointurier, O., P. Deschodt, K.A.G. Wyckhuys and Williams, L., III.* Nutritional ecology of a parasitic wasp – sugar concentration and timing of feeding affect survival. Colloque des Entomophagistes 2014, Louvain-la-Neuve, Belgium, 2-4 April 2014.
15. **Williams, L., III, O. Pointurier** and *P. Deschodt.* Food resources are vital for survival and fecundity of the olive fruit fly parasitoid, *Psytalia lounsburyi*, in the field. 98th Annual Meeting of the Pacific Branch, Entomological Society of America, Tucson, AZ, 6-9 April 2014.
16. **Williams, L., III, J. R. Hagler** and K. C. Tonkel. Characterization of retention and transfer of protein labels in the saltcedar leaf beetle for use in ecological studies. 4th International Symposium on Weeds and Invasive Plants, Montpellier, France, 19-23 May 2014.
17. **Williams, L., III, K. C. Tonkel** and M. Pitcairn. Natural enemies of perennial pepperweed, *Lepidium latifolium* L., in its introduced range. 4th International Symposium on Weeds and Invasive Plants, Montpellier, France, 19-23 May 2014.
18. **Williams, L., III** and C. Rodriguez-Saona. Synthetic herbivore-induced plant volatiles influence arthropod behavior in cotton fields. In the Symposium: Life after *Arabidopsis thaliana*: Using non-model organisms to understand species interactions. Botany 2014 – New Frontiers in Botany, Boise, ID, 26-30 July 2014. *Invited Presentation*, declined due to death in family.
19. **Williams, L., III, P. Deschodt, O. Pointurier,** and K. Wyckhuys. Providing food for natural enemies of an invasive pest – studies toward enhancing biological control of the olive fruit fly. 10th European Congress of Entomology, York, England, 3-8 August 2014. *Invited Keynote Presentation*, declined due to conflict with research.
20. **Williams, L., III, M. La Spina, P. Deschodt, O. Pointurier,** and *E. Deletre.* Suitability of sugars and honeydew as food sources for *Psytalia lounsburyi*, a parasitoid of olive fruit fly. 62nd Annual Meeting of the Entomological Society of America, Portland, OR, 16-19 November 2014.
21. Smith, L., R.F.H. Sforza, M.C. Bon, F. Hérard, J. Kashefi, and **L. Williams.** Classical biological control for the management of invasive alien insects and plants. Seminar to CBGB-INRA, Montpellier, France, 5 February 2015.

22. **Williams, L., III.** Management of arthropod pests of cassava in southeast Asia – biological control opportunities for the future. In international workshop, “Cassava Health in SE Asia: The Way Forward”, Buon Ma Thuot, Vietnam, 6-10 April 2015. *Invited presentation.*

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