

ALVARO ROMERO

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A. EDUCATION

National University of Colombia,	Bogota, Colombia	D.V.M.	1995
Kansas State University	Entomology	MSc.	2005

B. PROFESSIONAL EXPERIENCE

August 2005 to present. Graduate Research Assistant, Department of Entomology, University of Kentucky. Project: **Study of the biology, ecology and management of bed bugs.**

January 2003 to May 2005. Graduate Research Assistant, Department of Entomology, Kansas State University. Project: Determination of the role of microbial communities in oviposition responses and larval development of *Stomoxys calcitrans*.

August 2001 to December 2002. Visiting Scientist, Mosquito and Fly Research Unit, CMAVE- USDA- ARS, Gainesville, FL. Project: Studies of population dynamics of filth flies and characterization of their associated hymenopteran pupal parasitoids.

April 1995 to July 2001. Veterinary Parasitologist, National Program of Veterinary Epidemiology, Colombian Institution of Agricultural Research (CORPOICA). Bogotá, Colombia. Projects: improvement of *in vitro* diagnostic tests for regional surveys of ticks for resistance to pesticides. Development of attenuated trivalent vaccines against *Babesia bigemina*, *B. bovis* and *Anaplasma marginale*. Integrated pest management of ticks.

C. FELLOWSHIPS, SCHOLARSHIPS AND GRANTS

2006 National Pest Management Association (NPMA) Grant: \$29,957. "Sublethal effects of insecticides on the biology and behavior of bed bugs" Co-PI

2005 Kentucky Pest Control Association. \$10,000, "Bed bug research". PI.

2005 BASF: \$5,000, "Bed bug research"-UK.

- 2005 University of Kentucky-Urban Entomology Research Fellowship (20,000/year, four years) funded by proceeds from Kentucky pest control short course source.
- 2000 International Course on Advances of Animal Production and Animal Parasitic Diagnosis”. Organized by Veterinary Medicine School of Federal University of Bahia and Japan International Cooperation Agency (JICA), Salvador, Bahia, Brazil. November 6 - December 15, 2000.
- 1999 Training Course of Techniques for Resistance Diagnostic to Pesticides, Agricultural Department Food and Agriculture Organization of the United Nations (FAO). Juiz de Fora, Brazil, September 20 - October 30, 1999.
- 1996 Epidemiological and Economic Surveys as a Planning Base for Animal Health Programs. Germany Foundation for Development. Agriculture Pan-American School “Zamorano”. Honduras. April 15-May 11, 1996.

D. PUBLICATIONS

- Romero, A; Broce, A. and Zurek, L. (2006). Role of bacteria in the oviposition behaviour and larval development of stable flies. *Med.Vet. Entomol.* 20: 115–121.
- Benavides, E. and Romero, A. (2000). Preliminary Results of a larval resistance test to ivermectins using *Boophilus microplus* reference strains. *Ann. N.Y. Acad. Sci.* 916: 610-612.
- Benavides, E.; Vizcaíno, O.; Britto, C. M.; Romero, A. & Rubio, A. (2000). Attenuated trivalent vaccine against babesiosis and anaplasmosis in Colombia. *Ann. N.Y. Acad. Sci.* 916: 613-616.
- Benavides, E.; Rodríguez J. L. & Romero, A. (2000). Isolation and partial characterization of the Montecitos strain of *Boophilus microplus* (Canestrini, 1877) multi-resistant to different acaricides. *Ann. N.Y. Acad. Sci.* 916: 668-671.

E. PRESENTATIONS IN SCIENTIFIC MEETINGS

- Romero, A. National Pest Management Association (NPMA) Pest World Meeting. Oct.25-28. 2006, Grapevine, Texas **(Invited)**.
- Romero, A. Advances in bed bug research. Pest Control Short Course. University of Kentucky-Kentucky Pest Control Association. October, 2006, Lexington, KY. **(Invited)**.
- Romero, A.; Broce, A. and Zurek, L. (2004). Role of bacteria in mediating oviposition responses and larval development of *Stomoxys calcitrans* (L.) (Diptera: Muscidae). Oral presentation, National Meeting of the Entomological Society of America.

November, 2004. Salt Lake City, UT.

Romero, A.; Hogsette, J. A. and Coronado, A. (2003). Seasonal abundance of *Stomoxys calcitrans* and *Musca domestica* (Diptera: Muscidae) in a Northcentral Florida dairy. Poster, National Meeting of the Entomological Society of America. October 2003, Cincinnati, OH.

Romero, A.; Hogsette, J. A. and Coronado, A. (2003). Activity and seasonal abundance of natural Hymenopterous parasitoids that attack pupae of *Musca domestica* and *Stomoxys calcitrans* (Diptera: Muscidae) in semi-permanent habitats in Florida. Poster, National Meeting of the Entomological Society of America. October 2003, Cincinnati, OH.

F. MEMBERSHIP OF SCIENTIFIC ASSOCIATIONS

Entomological Society of America
Colombian Veterinary Medical Association.

Biology, Behavior and Management of the Bed Bug *Cimex Lectularius*

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Bed bug infestations are expected to increase in the next years presenting many challenges to pest controllers. Because bed bugs were infrequently encountered for decades, basic and practical knowledge about bed bugs is extremely limited compared to other major pest insects. The need for this knowledge becomes more evident as well-trained and thorough pest management specialists struggle to bring bed bug populations under control. The objectives of my research are designed to provide not only ready-to-use information, but also to begin to resolve the knowledge vacuum that surrounds this pest.

Research Areas

Behavioral ecology. Bed bugs show a nocturnal pattern of activity with little or no movement during daytime. Detailed information about this periodicity is lacking. For example, it is unknown whether the locomotor periodicity is under endogenous control. In the same way, very little is known about external and internal factors that can affect locomotion and feeding. Providing a better understanding of the normal activity of bed bugs will improve the design and analysis of future studies. Similarly, an understanding of temporal aspects of host-seeking could affect the most efficacious use of other control tactics; especially control measures with limited residual activity.

Chemical ecology. Identification and evaluation of compounds produced by bed bugs that affect aggregation can provide the basis for the development of tools for the early detection of bed bug infestations, or document effectiveness of a pest management program. My current research in this area deals with the analysis of chemical profiles of volatiles emitted from aggregations of bed bugs. The biological role of the identified compounds will be determined by electrophysiological methods and behavioral bioassays as well.

Insecticide resistance and sublethal effects. Little is known about the efficacy of commonly used insecticides for bed bug control. A question that arises from anecdotal

reports of poor insecticidal control is whether this difficulty is due to lack in insecticide efficacy because of resistance or problems of coverage or residual activity. I have developed a diagnostic assay to determine status of susceptibility of field strains collected in different parts of the USA. Pyrethroid resistance has been found in populations collected in Kentucky, Ohio, California, Florida, Kentucky, Michigan, Ohio, and Virginia. Currently, laboratory methods are being developed to determine the resistance mechanism involved. Elucidation of such mechanisms represents a potential area for the development of management strategies to overcome resistance phenomena.

Insecticides also can have non-lethal effects and the full impact of insecticide applications on bed bug populations cannot be understood without an understanding of how the application affects reproduction performance and their behavior (host harborage seeking). Results from this area will provide insights into modifications in inspection or management that may be necessary on return visits because of behavioral effects of such insecticides.

Bed bug-bacterial interaction. There are gaps in our knowledge of the interaction between bacterial agents and bed bugs. This information is important considering the potential number of bacteria that could be harbored and transmitted by bed bugs to humans. Thus, the goal of this study is to provide information about the fate and persistence of microbial agents within the bed bug body by periodical examination of tissues after an infected blood meal. Similarly, vertical and transtadial infection will be examined.