

ROBERT A. WHARTON, PROFESSOR

Department of Entomology
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PERSONAL INFORMATION:

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EDUCATION:

1. B.S. 1969. California State Polytechnic University, San Luis Obispo. Department of Biological Sciences, with honors, specializing in marine biology.
2. M.S. 1971. University of Connecticut. Biological Sciences Group. 1969-1971, specializing in marine biology.
3. University of North Carolina, Chapel Hill. Curriculum in Marine Sciences. 1971-1972.
4. Ph.D. 1976. University of California, Berkeley. Department of Entomological Sciences, specializing in biological control and systematics.

PROFESSIONAL EXPERIENCE:

Professor of Entomology, Texas A&M University, September 1992 to present.
Distinguished Visiting Scholar, Waite Agricultural Research Institute, University of Adelaide, Australia, Nov. 1989-Mar. 1990.
Associate Professor of Entomology, Texas A&M University, April 1987 to August 1992.
Assistant Professor of Entomology, Texas A&M University, November 1981 to April 1987.
Post-Doctoral Research Associate, Entomology, Texas A&M University, May 1980 to November 1981.
Post-Doctoral Research Associate, Invertebrate Ecology, Namib Desert Research Station, Namibia, November 1978 through February 1980.
USDA/ARS, Systematic Entomology Laboratory, Washington, D.C., contract to work in collaboration with Paul Marsh on systematics of opiine braconid parasitoids of Tephritidae, 1977.

ASSIGNMENT WITHIN TEXAS A&M UNIVERSITY SYSTEM:

1. Percent Budgeted Time Teaching 50% Research: 50%

ACHIEVEMENTS IN RESEARCH DISCOVERY, INTEGRATION AND APPLICATION

Tephritid fruit flies are key pests of edible fruits worldwide, with millions of dollars spent every year in the U.S. in detection and eradication efforts. I organized a comprehensive assault on this problem by obtaining substantial funding (as sole PI) to bring together an international team of experts to study the most damaging of these pests

in their native range in eastern Africa. Under my direction this project resulted in the dissemination of information about fruit-infesting tephritid pests and their natural enemies that has greatly facilitated the efforts of state and federal agencies involved in detection, eradication, and management (including biological control) of invasive, frugivorous pests such as Mediterranean fruit fly (medfly), olive fly, Natal fly, and various cucurbit flies. Both traditional and electronic, image-intensive publications have simplified pest and natural enemy identifications, and the first significant diagnostic tool for *Ceratitis* larvae has been developed, successfully tested, and published. The latter enables rapid identification of larvae in infested fruits during monitoring and detection programs, so that appropriate, species-specific protocols can be activated. Lists of susceptible host fruits, widely used in tephritid pest management, were significantly expanded for the seven species most frequently intercepted at ports of entry in Europe and America, as well as dozens of others in the genera *Ceratitis*, *Dacus*, *Bactrocera*, and *Trirhithrum*. The findings have been published and made available in web-accessible databases, together with detailed annotations on previous host records. These data provide some of the first assessments of patterns of host plant utilization by widespread tephritid pests in their area of endemicity, and support an East African origin of the medfly, one of the world's most serious invasive pests. The intensive collecting effort also provided baseline data for East Africa that enabled immediate detection of a newly invasive mango pest in Kenya and Tanzania. New species of tephritids and their parasitoids were discovered and described, and potential natural enemies of tephritid pests were reared, cultured, evaluated, and shipped to collaborating scientists for use in biological control programs in California, Hawaii, Guatemala, France (including La Reunion), and St. Helena.

Tephritid fruit flies have been the poster child for sympatric speciation, based on work conducted over the past 50 years primarily on temperate, North American species which exhibit remarkable host fidelity. The data generated during the applied research program are now being used by to address differences between tropical and temperate tephritids in patterns of host plant utilization, and the underlying causes. This research addresses one of the dominant, high-profile models of speciation in animals.

Many of the publications emanating from my laboratory are taxonomic, addressing both species-level and genus-level problems that hinder the identification of both pests and their natural enemies. During the past five years, we have also been one of the leaders in the transition from traditional outlets for systematics research (in the form of books and other hard-copy publications) to the electronic era. With funding primarily from the NSF's Program for the Enhancement of Expertise in Taxonomy, we have generated a number of products that reflect the ever-changing landscape for imaging and databasing. In close collaboration with Fredrik Ronquist's bioinformatics group in Sweden and Florida, we have developed an image database compatible with Ronquist's MorphBank. MorphBank is a database system for images used in morphological and taxonomic research, developed initially for certain groups of parasitic Hymenoptera. The ultimate goal for MorphBank is a web-compatible, image-based (fingerprint-like) identification system not only for all insects, but other living organisms as well. While MorphBank's goals are still a long way off, it has nonetheless provided a useful framework for efficient storage and retrieval and seamless sharing of thousands of images. Students and staff in my laboratory have developed the key utilities for quickly finding the desired images and loading them onto websites where they are used either as

stand-alone images on web pages or as the essential ingredients for on-line identification tools. The production of web-based identification tools (electronic keys) by my research group has greatly facilitated the work of scientists in other countries, particularly those with limited access to identification services or taxonomic literature. Similarly, our image-intensive web pages have enabled us to provide visual as well as extensive textual information for dissemination of specimen-based research.

Over the past three years, my research group has specialized in the dissemination of web-based tools for analyzing sequence data in systematics research. Using parasitic Hymenoptera as models, and in collaboration with members from Anthony Cognato's laboratory, we have addressed the role of secondary structure in the use of gene sequences in the assessment of phylogenetic relationships among organisms. This has been a long-standing issue in systematics, ever since the first sequences were generated and used for this purpose. The research conducted in my laboratory has provided a major alternative methodology for sequence analysis that addresses serious flaws in the most widely used methods. My own research on parasitic Hymenoptera has also resulted in a noteworthy contribution on the origin of parasitism in this large group of insects, providing the first well-supported hypothesis for one of the major features in the transition from herbivory to entomophagy.

Specific projects over the past 15 years include: **1)** Designed survey and inventory project for tephritids and associated parasitoids in Kenya, completed in 2005. This program had two basic components. The first included active collaborations with scientists in 5 other countries (Kenya, Guatemala, La Reunion, Mexico, and Sudan) on biological control of medfly and its relative the Natal fly, two of the world's most serious pests of fruits. The primary U.S. collaborators in this program have been John Sivinski (USDA/ARS, Gainesville) and Russell Messing (University of Hawaii). Medfly parasitoids have been shipped from Kenya to Hawaii, Guatemala, and St. Helena, and both medfly and Natal fly parasitoids to La Reunion. The second component provided taxonomic support for the work on the flies and their natural enemies, and involves close interaction among systematists in England, Belgium, Kenya, Australia, and Israel; and includes training of one scientist from Ghana. A major product of this effort was the development of a CABIKEY product (an electronic, multiple entry key available in CD format) for all known species of *Ceratitis* and *Trirhithrum* by Ian White. Current efforts include development of molecular tools for identification of pests and potential pests in the genus *Ceratitis*. Peripheral benefits from this program include sampling for olive fly and its natural enemies in response to establishment of this pest in California in 1999; discovery of natural enemies of cucurbit pests, some of which have now been shipped to the US and St. Helena; discovery of a new invasive species in Kenya that is now widespread across tropical Africa; and development of a pictorial key to Kenyan fruit (by Bob Copeland, who conducted most of the field work). **2)** Systematics research on parasitic Hymenoptera, primarily Braconidae (Opiinae and Alysiinae); includes training of 7 graduate students in parasitoid systematics in two collaborative NSF-sponsored PEET programs (the first with Jim Woolley) and scientists from Sweden, Canada, and England; student research completed to date: revision of *Entomacis* (Diapriidae), revision of *Gronotoma* group of genera (eucoiline Figitidae), revision of Nearctic *Opius* (subgenus *Gastrosema*); several databases developed. **3)** Directed preparation of a manual to New World genera of Braconidae, containing 37 chapters authored by 8

collaborators from 5 countries. The manual is widely used by both systematists and applied entomologists because of its heavily-illustrated, user-friendly format. Conducted 3 workshops in Latin America in connection with above manual, and given the obvious need, one of the Mexican students trained under this program (Imelda Mercado, with assistance from Hugo Delfin) prepared a Spanish language version, with copies distributed gratis. **4)** Designed and conducted survey of invertebrates associated with an endangered species of warbler in its nesting habitat; five faculty, two staff, and 18 students were involved with this program. Participated in public meetings associated with the research, which was funded as part of a mitigation program associated with widening highway 2222 through Travis County, Texas. **5)** Completed sterile fly release program in Baja California Sur, demonstrating the ability to overwhelm and eliminate a small, isolated population of *Anastrepha ludens* without use of pesticides. Work in involved collaboration with federal agencies in two countries, and was designed primarily to assist organic growers in the region.

ACHIEVEMENTS IN TEACHING AND GRADUATE EDUCATION

Taught graduate courses in Entomophagous Insects (Ento 621); Immature Insects (Ento 604); Seminars in systematics and biological control (Ento 681); and Undergraduate Courses in Insect Biology (Ento 313), Evolution of Insect Structure (Ento 305), and Insect Systematics and Biology (Ento 301 and Ento 302 and a new course combining these two). Taught 3-week course in tropical field ecology on island of Dominica (WFSC 300, 485, and 489) both on my own (1 year) and with a co-instructor (2 years). Innovative aspects included development of one of the first web sites in our department specifically associated with an undergraduate course; the first use of mass-collecting techniques at Texas A&M to demonstrate insect biodiversity; and development of the first underwater marine projects for the Dominica Study Abroad courses.

CURRENT GRADUATE STUDENTS:

	Chairman	Committee Member
Ph.D.	0	3
M.S.	3	1

PAST GRADUATE STUDENTS and CURRENT PLACEMENT:

Lynn Carroll (Ph.D.)	Formerly Smithsonian Postdoc
Leon Praetorius (M.S.)	USDA / APHIS Inspector
John Morris (M.S.)	unknown
Ruben Garces (Ph.D.)	Works for an agrochemical company in Mexico
Imelda Mercado (M.S.)	Molecular biologist in Houston
Michael Quinn (M.S.)	Invertebrate biologist for Texas Parks and Wildlife
Matthew Buffington (M.S.)	Research Scientist, USDA/SEL
Robert Kula (M.S.)	Research Scientist, USDA/SEL
Marcia Trostle (Ph.D.)	Manager at Terminex
Amy Bader (M.S.)	Part-time teacher
Kira Zhaurova (M.S.)	Houston Museum of Natural History
Matt Yoder (Ph.D)	Postdoc, Ohio State University

Served as research advisor on committee of two Mexican Ph. D. students (completed degrees in 2000 and 2001, respectively), one Sudanese Ph.D. student (completed degree in 2003), and one Ph.D. student from Ghana (completed degree in 2004).

GRANTS AND CONTRACTS:

- 2003-08 NSF-PEET. Monographic Research on Parasitic Hymenoptera. \$746,847.
- 2004-05 CONACYT. The natural enemies of *Rhagoletis* spp. (Diptera: Tephritidae) in Mexico, with emphasis on the apple maggot, *Rhagoletis pomonella*. \$25,000. (co-PI with Martin Aluja).
- 2003-2007. CDFA. Taxonomic needs for natural enemies of olive fly, *Bactrocera oleae* (Gmelin). \$70,000 for 4 separate, 1-year contracts.
- 2000-04 USDA, IFAFS. African Tephritidae: Invasive Species Affecting US Fruit and Vegetable Products. \$906,000.
- 1999-2002 USDA (various agencies) and CDFA. Medfly and olive fly biological control (1 of several collaborators, provides bridging money for my postdoctoral researcher in Kenya).
- 1999-2001 USAID. Building Systematics Expertise at ICIPE for Identification of Ceratitine Tephritidae and their Parasitoids. \$250,000.
- 1998-2000 USDA/CSREES, NRI. Systematics of Indigenous Parasitoids of Medfly and Its Relatives in East Africa. \$125,000.
- 1998-2003 NSF-PEET. Monographic Research on Parasitic Hymenoptera. \$746,000. Plus two different REU supplements (latest = \$11,997 in 2003).
- 1996-1998. Classical Biological Control of Tephritid Fruit Flies with Parasitoids from East Africa (1 of several collaborators, with R. Messing, Univ. Hawaii, as PI). My portion: \$23,500.
- 1994-96 NSF. Improvement of the Texas A&M University Collection. (Co-PI with Woolley, Riley, and Schaffner; H. Burke, PI). \$140,397.
- 1993-96 NSF. An Identification Manual for the New World Genera of the Braconidae. \$300,000 plus \$15,000 in REU supplements.
- 1993-94 Texas Department of Transportation. Invertebrate Species Available as Food for the Golden-cheeked Warbler in its Nesting Habitat. \$72,755.
- 1991-94 California Department of Food and Agriculture. The potential for control or eradication of high density populations of *Anastrepha ludens* in mango orchards using sterile insects alone and in combination with parasitoids or bait sprays. \$374,290.
- 1990-92 National Park Service. Biodiversity Survey of North Rosillos Mountains Harte Ranch Expansion Area, Big Bend National Park (1 of 8 Co-PI's from 3 universities). \$149,581.
- 1989-1992 NSF Grant. Improvement of the Texas A&M University Collection. (Co-PI with J. C. Schaffner, and J. B. Woolley; H. R. Burke, P.I.). \$86,459.
- 1989-91 Texas A&M Expanded Research Area in Environmental Quality. Molecular Systematics of Parasitic Hymenoptera. (Co-Investigator with M. Rose and S. Davis; PI: J. B. Woolley). \$78,040.
- 1989-91 Texas A&M Expanded Research Area in Environmental Quality. Biodiversity of Parasitic Hymenoptera and Birds in Texas. (Co-Investigators: J. B. Woolley and K. Arnold). \$50,000.
- 1989-90 University of Adelaide, Waite Agricultural Research Institute. \$3,400 collaborative research grant with A. Austin.
- 1988-89 California Department of Food and Agriculture Grant. Collection of larval and adult fruit-infesting *Dacus* of Asian origin. (with L. Carroll): \$27,500.

1986-87 California Department of Food and Agriculture Grant. Identification of Early Instars of Fruit Fly Larvae (Tephritidae). (with L. Carroll): \$11,427.
1985-86 USDA/OICD Scientific and Technical Exchange Program. Identification of Egg and Larval Stages of Mexican Fruit-infesting Anastrepha Species. (with L. Carroll): \$2,100.
1985-86 California Department of Food and Agriculture Grant. Fruit infesting Tephritid Larvae. (with L. Carroll): \$2,000.
1985-88 USDA/OICD Grant (with G. Steck. Taxonomy of Fruit Flies of the Genus Anastrepha (Diptera: Tephritidae). 1985-87. \$41,750 for a 3-year cooperative program with Costa Rica and Gainesville, Florida. \$8,366 extension granted through Sept. 1988.
Plus several small grants, mostly for travel to sort and identify specimens.

AWARDS AND FELLOWSHIPS:

Outstanding Entomology Professor (Undergraduate Student Organization), 1999/2000 and again in 2003/04.
Outstanding Professor Award, Entomology Graduate Student Organization, 1997/98
Distinguished Visiting Scholar, Waite Agricultural Research Institute, University of Adelaide, Australia, Nov. 1989-Mar. 1990.
NIH Trainee, Department of Entomological Sciences, University of California Berkeley.
Research on systematics and biology of New World Alysini (Hymenoptera, Braconidae).
Oct. 1972-June 1976.
Marine Sciences Trainee, Curriculum in Marine Sciences, University of North Carolina, Chapel Hill. Research on behavior and systematics of opisthobranch molluscs. Sept. 1971-June 1972.
Graduate Research Assistant, Biological Sciences Group, University of Connecticut. Research on population biology and physiological ecology of *Thais lapillus* (Mollusca). Sept. 1969-Aug. 1971.
Elected to membership in Phi Kappa Phi Honor Society, May 1968.

SELECTED PROFESSIONAL ACTIVITIES:

NSF panel member: 1) PEET proposals in systematic biology program, May 1995, 2) career proposals, April 1996.
Editorial Advisor, *Journal of Natural History* 1990-present.
Entomological Society of America National Meetings, 1980-1987, 1990, 1992-1994, 1996, 2001, 2003. Judge, section A student papers, 1984, 1992; judge for section A posters, 1994.
VI Latin American Congress of Entomology, 1996: section moderator.
Member, Entomological Society of America Standing Committees on Systematics Resources, 1985-88, (Chair 1987-8) and Common Names of Insects, 1985-88; Committee on Human Resources in Systematics, 1986-91; and Special Subcommittee of Publications Council dealing with voucher specimens, 1986-87.
International Congress of Entomology, Hamburg, West Germany 1984, and Vancouver, Canada 1988. Invited Presentations.
Association of Systematics Collections, Member of Council on Collections, 1986-88.
Interdisciplinary Conferences on Biological Control: 2001 (Bozeman), panel leader on critical issues in biological control; 1983 (Las Vegas), Co-chairman, taxonomy workshop.

Founding member, International Society of Hymenopterists, served as 1st secretary, 1982-88.
Chaired 3 National and 1 International Meetings; co-authored first Hymenopterists Directory.

Member of multi-state group that established Southern Region Project in Biological Control.

SERVICE TO DEPARTMENT, TAES AND THE UNIVERSITY:

Served as first quarantine officer for USDA-approved entomology quarantine facility at Texas A&M (1981). Sole quarantine officer for Department of Entomology quarantine facility from July, 1981 through April, 1982, responsible for coordination of shipments for biological control programs against boll weevil, graminaceous stem borers, and Medfly; development of quarantine protocol; repair and maintenance of quarantine facility. Supervised expanded quarantine operations from April, 1982 through November 1983. Assisted in all phases of planning and design for biological control facility completed in May, 1984.

Formerly: Chair, Departmental Seminar Committee (1986-87); Chair, Faculty-Student Relations Committee (1983-88); Chair, Graduate Education Committee (1987-89). Chair, Tenure Sub-Committee (1996-97); Chair, Faculty Advisory Committee (1999); Chair, search committee for faculty position in Molecular Systematics (1998-2000).

Entomology Graduate Student Organization Faculty advisor: 1983-89, 1995-2001; co-advisor: 1991-5, 2002-2005; Entomology Undergraduate Student Organization Faculty co-advisor, 2003-04. Linnaean games coach 1984-86, 1991-1994 branch and national teams; TAMU mentors; First time aggie contact team (2 x). MSC Conversations (Fall, 2002).

Member, Electron Microscopy Center Users Advisory Committee, 1987-89; Chair, 1988-89. Member, revitalized Microscopy and Imaging Center User Committee, 2003-04. Member, Sterling C. Evans Library Committee, 1996-98. Member, Ecology and Evolutionary Biology Faculty, 2005-present (EEB was established in 2005).

Built, in collaboration with Jim Woolley, a major research collection of parasitic Hymenoptera at Texas A&M University. Prior to my arrival, this was one of the weakest areas of the collection, with less than one full cabinet of material.

Outreach: organize and/or facilitate entomological component of BioBlitz, 2001-2003.

PROFESSIONAL AND HONOR ORGANIZATIONS:

American Association for the Advancement of Science
Canadian Entomological Society
Entomological Society of America
Entomological Society of Washington
International Organization for Biological Control
International Society of Hymenopterists
Pacific Coast Entomological Society
Society of Systematic Biology
Southern African Entomological Society
Southwestern Entomological Society

SELECTED PRESENTATIONS:

- 2006 Gains, losses and reversals: the evolution of some biological traits in apocritan wasps. Sixth International Conference of Hymenopterists. Sun City, South Africa.
- 2005 Fruit-infesting tephritids and their parasitoids in Kenya. CDFA exotic fruit fly pest symposium. Riverside, CA.
- 2004 Selecting agents for biological control of fruit-infesting Tephritidae. M. Trostle, S. Mohamed, B. Wharton, R. Messing, R. Overholt (presented by Wharton). International Congress of Entomology Symposium on selecting agents for classical biological control. Brisbane, Australia
- 2003 What's at the base? (presented by Wharton; co-authors J. Gillespie and M. Yoder) Annual meeting, Entomological Society of America.
- 2002 Parasitoids of tephritid pests in Kenya. CDFA exotic fruit fly pest symposium. Invited Presentation.
- 2002 co-author of one oral presentation on origin of Medfly and 3 poster presentations on parasitoids of medfly, Natal fly, olive fly, and mango flies. 6th International Symposium on Fruit Flies of Economic Importance, Stellenbosch, South Africa. (presented by collaborators, I did NOT attend)
- 2001: Dealing with wood (evolution of the Apocrita). Annual meeting, Entomological Society of America.
- 2000: Tephritid biological control. African fruit fly initiative conference, Nairobi, Kenya. Invited Presentation.
- 1999: 1) Can braconid classification be altered to facilitate portrayal of relationships? Fourth International Conference, International Society of Hymenopterists, Canberra, Australia. 2) Medfly biological control. Classification of the Braconidae University of Illinois. 2 Invited Presentations.
- 1998: 1) Diversity of fruit-infesting Tephritidae and their parasitoids in Tropical East Africa. ICIPE Donor Group Meeting. Invited Presentation. 2) Present status of Ichneumonoid Classification. Uppsala, Sweden. Invited Presentation.
- 1997: Parasitoids of Fruit-Infesting Tephritidae. ICIPE, Kenya, Invited Seminar.
- 1996: 1) Workshop on identification of Braconidae. Maracay, Venezuela (co-taught with M. Sharkey). 2) Biology and classification of opiinae Braconidae. Southwestern Louisiana State University, Lafayette. Invited Presentation. 3) Systematics in Biological Control. International Organization of Biological Control, Nearctic Region national meeting. Invited Presentation.

- 1995: Workshop on identification of Braconidae. Cd. Victoria, Mexico (co-taught with D. Quicke).
- 1994: Current Status of Texas/Mexico Collaboration on Biosystematics of Parasitic Hymenoptera. Entomological Society of America Branch Meeting. Monterrey, Mexico. Invited Symposium Presentation.
- 1993: Biodiversity of Braconidae and Encyrtidae in Big Bend National Park. Chihuahuan Desert Symposium, El Paso, Texas. Invited Presentation.
- 1992: Biological Control of Tephritidae. Queensland Entomological Society. Invited Presentation.
- 1990: Waite Agricultural Research Institute, Adelaide, Australia. Biological Control at Texas A&M University. Invited Presentation.
- 1989: 2nd Annual Horticultural Integrated Pest Management Conference, San Antonio, Texas. Invited Presentation.
- 1988: 1) International Congress of Entomology, Vancouver, Canada. Symposium on Biology of Parasitoids from an Evolutionary Perspective. Invited Presentation on opiine and alysiine biology.

PUBLICATIONS:

Refereed Publications:

- Mohamed, S. A., Overholt, W. A., Lux, S. A., Wharton, R. A., and Elameen, M. Eltoum. 2007. Acceptability and suitability of six fruit fly species (Diptera: Tephritidae) for Kenyan strains of *Psytalia concolor* (Hymenoptera: Braconidae). *Biocontrol Sci. Technology* 17: 247-259.
- Wharton, R. A. 2006. The species of *Sternaulopius* Fischer (Hymenoptera: Braconidae, Opiinae) and the braconid sternaulus. *J. Hymenoptera Res.* 15: 317-347.
- Wharton, R. A., M. J. Yoder, J. J. Gillespie, J. C. Patton, and R. L. Honeycutt. 2006. *Exodontiella*, a non-alysiine, exodont member of the family Braconidae (Insecta, Hymenoptera). *Zoologica Scripta* 35: 323-340.
- Barr, N. B., R.S. Copeland, M. De Meyer, D. Masiga, H. G. Kibogo, M. K. Billah, E. Osir, R. A. Wharton, and B. A. McPheron. 2006. Molecular diagnostics of economically important *Ceratitis* fruit fly species (Diptera: Tephritidae) in Africa using PCR and RFLP analyses. *Bulletin of Entomological Research* 96: 505-521.
- Mohamed, S. A., W. A. Overholt, R. A. Wharton, and S. A. Lux. Aug. 2006. Effect of temperature on developmental time and longevity of *Psytalia cosyrae* (Hymenoptera: Braconidae). *Biocontrol Science and Technology* 16: 717-726.
- Copeland, R. S. and R. A. Wharton. 2006. Year-round production of pest *Ceratitis* species (Diptera: Tephritidae) in fruit of the invasive species *Solanum mauritanum* in Kenya. *Annals Entomol. Soc. America* 99: 530-535.

- Copeland, R. S., R. A. Wharton, Q. Luke, M. De Meyer, S. Lux, N. Zenz, P. Machera, and M. Okumu. 2006. Geographic distribution, host fruit, and parasitoids of African fruit fly pests *Ceratitis anonae*, *Ceratitis cosyra*, *Ceratitis fasciventris*, and *Ceratitis rosa* (Diptera: Tephritidae) in Kenya. *Ann. Entomol. Soc. Am.* 99: 261-278.
- Billah, M. K., S. Kimani-Njogu, W. A. Overholt, R. A. Wharton, D. D. Wilson, and M. A. Cobblah. 2005. The effect of host larvae on three *Psytalia* species (Hymenoptera: Braconidae), parasitoids of fruit-infesting flies (Diptera: Tephritidae). *Journal of Tropical Insect Science* 25: 168-175.
- Carmichael, A.E., R.A. Wharton, and A.R. Clarke. 2005. Opiine parasitoids (Hymenoptera: Braconidae) of tropical fruit flies (Diptera: Tephritidae) of the Australian and South Pacific region. *Bull. Entomol. Res.* 95: 545-569.
- Kasparyan, D.R. and R.A. Wharton. 2005. A new species of *Mallochia* Viereck (Hymenoptera: Ichneumonidae, Cryptinae) from Florida. *Zoosystematica Rossica* 14: 123-126.
- Gillespie, J., M. J. Yoder, R. A. Wharton. 2005. Predicted secondary structures for 28S and 18S rRNA from Ichneumonoidea (Insecta: Hymenoptera: Apocrita): Impact on sequence alignment and phylogeny estimation. *J. Molecular Evol.* 61: 114-137.
- Ovruski, S. M., R. A. Wharton, P. Schliserman, and M. Aluja. 2005. Abundance of *Anastrepha fraterculus* (Diptera: Tephritidae) and its associated native parasitoids (Hymenoptera) in “feral” guavas growing in the endangered northernmost Yungas Forests of Argentina with an update on the taxonomic status of opiine parasitoids previously reported in this country. *Environ. Entomol.* 34: 807-818.
- Wharton, R., L. Vilhelmsen, G. A. P. Gibson. 2004. Characterizing basal apocritans (Hymenoptera: Apocrita). *Proc. Russian Entomol. Soc.* 75: 17-23. (Festschrift for Vladimir Tobias: Invitational Paper)
- Copeland, R. S., I. White, M. Okumu, P. Machera, R. A. Wharton. 2004. Insects associated with the fruits of the Oleaceae (Asteridae, Lamiales) in Kenya, with special reference to the Tephritidae (Diptera). *Bishop Museum Bull. Entomol.* 12:135-164. (Festschrift for Elmo Hardy: Invitational Paper)
- Belokobylskij, S. A., R. A. Wharton, and J. La Salle. 2004. Australian species of the genus *Opius* Wesmael (Hymenoptera: Braconidae) attacking leaf-mining Agromyzidae, with the description of a new species from South-east Asia. *Australian J. Entomol.* 43:138-147.
- Sanchez-Garcia, J. A., R. A. Wharton, J. Romero-Napoles, A. Gonzalez-Hernandez, V. Lopez-Martinez, A. Equihua-Martinez, H. Gonzalez-Hernandez, and J. L. Carrillo-Sanchez. 2003. Description of a new species of *Blacus* Nees (Hymenoptera: Braconidae) from Mexico, utilizing characters of the male external genitalia. *Pan-Pacific Entomol.* 79:135-144.
- Aluja, M., J. Rull, J. Sivinski, A. L. Norrbom, R. A. Wharton, R. Macias-Ordonez, F. Diaz-Fleischer, and M. Lopez. 2003. Fruit flies of the genus *Anastrepha* (Diptera: Tephritidae) and associated native parasitoids (Hymenoptera) in the tropical rainforest biosphere reserve of Montes Azules, Chiapas, Mexico. *Environ. Entomol.* 32:1377-1385.
- Mohamed, S. A., Overholt, W. A., Wharton, R. A., Lux, S. A., Elameen, M. Eltoum. 2003. Host specificity of *Psytalia cosyrae* (Hymenoptera: Braconidae) and the

- effect of different host species on parasitoid fitness. *Biological Control* 28: 155-163.
- Mercado, I. and R. A. Wharton. 2003. Mexican cardiochiline genera (Hymenoptera: Braconidae), including a preliminary assessment of species-groups in *Toxoneuron* Say and *Retusigaster* Dangerfield, Austin and Whitfield. *J. Nat. History* 37: 845-902.
- LaSalle, J. and R. A. Wharton. 2002. The identity and recognition of African *Tetrastichus* species (Hymenoptera: Eulophidae) associated with fruit flies (Diptera: Tephritidae). *African Entomol.* 10: 297-304.
- Delfin-Gonzalez, H. and R. A. Wharton. 2002. Distribution of species and species-groups of *Aleiodes* (Hymenoptera: Braconidae) in Mexico. *Folia Entomol. Mex.* 41: 215-227.
- Copeland, R. S., Wharton, R. A., Luke, Q., and De Meyer, M. 2002. Indigenous hosts of *Ceratitis capitata* (Diptera: Tephritidae) in Kenya. *Ann. Entomol. Soc. Am.* 95: 672-694.
- Yoder, M. and R. A. Wharton. 2002. Nomenclature of African Psilini (Hymenoptera: Diapriidae) and status of *Coptera robustior*, a parasitoid of Mediterranean fruit fly (Diptera: Tephritidae). *Canadian Entomol.* 134: 561-576.
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- Wharton, R. A. and P. E. Hanson. (2005) Biology and evolution of braconid gall wasps (Hymenoptera). In 'Biology, Ecology, and Evolution of Gall-inducing Arthropods', Vol. 2. (Eds. A. Raman, C. W. Schaefer, and T. M. Withers) pp. 495-505. Science Publishers, Inc., Enfield, NH, USA.
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Web-based Products (<http://hymeoptera.tamu.edu>):

Parasitoids of fruit-infesting Tephritidae
 Opiinae literature database
 Opiinae species database
 and lots more (see website)

CD:

A. González Hernández, R. Wharton, J. A. Sánchez García, V. López Martínez, J. R. Lomelí Flores, I. F. De La Rosa, and H. Delfín González. 2003. Catalogo ilustrado de Braconidae (Hymenoptera: Ichneumonoidea) en Mexico.

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