



United States Department of Agriculture

Research, Education and Economics
Agricultural Research Service

Ernest J. Harris Ph. D.
(Research Entomologist)

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Research Area: The assigned area of my research expertise is to develop information on the biology, field ecology, detection, and monitoring of tephritid fruit fly and parasitoid species for large area control by population suppression or eradication with sterile fly releases (SIT), male annihilation (MA), or augmentative parasitoid releases. In cooperation with other research team members, I develop new parasitoid strains, methods and strategies to use parasite augmentation for large area control and as an IPM tool. The approach to fruit fly ecology used is to consider the flies and the environment in which they occur a holistic entity that is interconnected requiring good understanding and intuition on how these factors are interconnected to manage tephritid fruit flies with minimal adverse effects on non target organisms. The assigned research area is to (1) develop methods to mass rear *B. arisanus* parasites in *Bactrocera dorsalis* and maintain high quality production; (2) investigate mating behavior and develop methods to rear and adapt the egg parasitoid *F. arisanus* to develop in the Mediterranean fruit fly, *Ceratitidis capitata* and the Melon fruit fly, *Bactrocera cucurbitae*. Long term goals are the establishment of laboratory cultures of this natural enemy to utilize this parasitoid for biological control of tephritid fruit flies in tropical and temperate climates where the parasitoids may not be present in the field. and, also develop innovative methods to evaluate the impact of parasitoid releases in the field.

Education

B.S. degree, Cum Laude, May 1951, University of Arkansas, Pine Bluff, (Biology).
M.S., December 1959, University of Minnesota, Saint Paul, (Entomology).
Ph.D., August 1975, University of Hawaii, Honolulu (Entomology).

Professional Experience

1957 to 1959, Graduate Research Assistant, Department of Entomology, University of Minnesota, Saint Paul, Minnesota.
1959 to 1962, Science Teacher, University of Arkansas, Pine Bluff.
1962 to 1969, Research Entomologist, USDA, ARS, Hawaiian Fruit Flies Laboratory, Honolulu, Hawaii.
1969 to August 1971, Leader Coordinator, U. S. Agency for International Development, North Africa Regional Mediterranean Fruit fly suppression program to reduce the damage done by this insect on export citrus crops, Tunis, Tunisia and Marrakech, Morocco.
1972 to 1979, Location Leader and Research Leader, USDA, Hawaiian Fruit Flies Laboratory,



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Honolulu, Hawaii.

1978 to 1979, Acting Research Leader, Commodity Treatment, Handling and Distribution Research Unit, Honolulu, Hawaii.

1980 to 1985, Research Leader, Biology and Ecology Research Unit, Tropical Fruit & Vegetable Research Laboratory, Honolulu, Hawaii.

1985 to Feb 2, 2006, Research Entomologist, U.S. Department of Agriculture, Agricultural Research Service, Pacific Basin Agricultural Research Center, Honolulu, Hawaii.

Professional Affiliations

Certified Professional Entomologist, 1979 to date. Certified by the Registry of Professional Entomologists Entomological Society of America.

Elected to fellowship in the Royal Entomological Society of London 6 December.

Alpha Phi, Alpha Fraternity Graduate Chapter

Alpha Kappa Mu National Honor Society

Hawaiian Entomological Society

Entomological Society of America

International Organization of Biological Control

Sigma XI Scientific Research Society

Florida Entomological Society

African Association of Insect Scientists

Honors, Awards, Recognition

Unit award for superior service for participation in unit recognized for outstanding performance in eradication of subtropical fruit flies 1964.

Member of the Affiliate Graduate Faculty University of Hawaii, Department of Entomology, 1969 to date.

Research Unit Award for superior service, 1970. Outstanding performance rating as Leader Coordinator of the North African Regional Mediterranean fruit fly control project, 1970.

Invited to serve as discussion leader on biological control of the Mediterranean fruit fly at the FAO/IAEA Panel on the Sterile-Male Technique for Control of Fruit Flies, IAEA, Vienna, Austria, Nov. 2-6, 1973.

Invited to serve as Chairman of the symposium on "Attractants" at the First Controlled Release Pesticide Symposium at the University of Akron, Ohio, Sept. 6-8, 1974

Invited to take an United Nations FAO assignment in Accra, Ghana, as a Regional Plant Production and Plant Protection Officer to promote plant production and protection in Africa member states in the whole region, March 1975. Incumbent declined the offer.

Humanitarian Award from the Wai Wai Nui Inc., National Association of Colored Women's Clubs for research leadership of the Hawaiian Fruit Flies Laboratory, 1978.

Certificate of Merit and cash award for technical and transfer of research technology to California Mediterranean fruit fly eradication program, 1983.

USDA-ARS Certificate of Merit for the outstanding research effort in developing the laboratory adapted strain of *B. arisanus* December 1996.

Total Publications 107



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(Publications Since 1991)

Harris, E. J. and Olalquiaga, G. 1991. Mediterranean fruit fly (Wiedemann) (Diptera: Tephritidae) occurrence and distribution in desert areas in Chile and Peru. *Environ. Entomol.* 20:174-78

Harris, E. J. and R. Y. Okamoto. 1991. A method for rearing *Biosteres arisanus* (Sonan) (Hymenoptera : Braconidae) in the laboratory. *J. Econ. Entomol.* 84:417-422.

Harris, E. J. 1991. Response to exotic fruit fly introductions into the United States: A research perspective pp 99-105 In *Exotic Pests In Africa Prevention and Control Symposium 9th Scientific Conference / AAIS 23-27 September 1991 Accra, Ghana.*

Harris, E. J., Okamoto, R. Y., Lee, C. Y. L. and T. Nishida. 1991. Suitability of *Dacus dorsalis* and *Ceratitis capitata* (Diptera : Tephritidae) as hosts of *Biosteres arisanus* (Sonan). *Entomophaga* 36:425-430.

Harris, E. J. and C. Y. L. Lee 1992. Comparison of two methods of rearing *Bactrocera dorsalis* (Hendel) and *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) from mock orange and coffee in the laboratory. *Proc. Hawaii. Entomol. Soc.* 31:133-138.

Harris, E. J. and G. Olalquiaga. 1993. Influence of habitat on *Ceratitis capitata* response to trimedlure in Chile and in Hawaii pp 217-222 In *Fruit Flies: Biology and Management*, edited by M. Aluja and P. Liedo, Springer-Verlag Published in 1993.

Harris, E. J. 1993. Relationship between host plant fruiting phenology and *Ceratitis capitata* distribution and abundance in Hawaii pp 137-143 In *Fruit Flies: Biology and Management*, edited by M. Aluja and P. Liedo, Springer-Verlag Published in 1993.

Harris, E. J., R. I. Vargas, and J. E. Gilmore. 1993. Seasonality in occurrence and distribution of Mediterranean fruit fly (Diptera: Tephritidae) in upland and lowland areas on Kauai, Hawaii. *Environ. Entomol.* 22:404-410.

Liquido, N.J., Ernest J. Harris, and L. Dekker. 1994. Ecology of *Bactrocera latifrons* (Diptera: Tephritidae) Populations: Host Plants, Natural Enemies, Distribution, and Abundance. *Ann. Entomol. Soc. Am.* 87:071-084.

Harris, E. J. and R. C. Bautista. 1994. Fruit trap: a detection and collection tool for opiine parasitoids (Hym.: Braconidae) of the oriental fruit fly, *Bactrocera dorsalis* (Dip.: Tephritidae) *Entomophaga* 39:341-349.



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Harris, E. J. and R. C. Bautista. 1996. Effects of fruit fly host, fruit species and host egg to female parasitoid ratio on laboratory rearing of *B. arisanus*. *Entomologia Experimentalis et Applicata* 79:187-194.

Bautista, R.C. and E. J. Harris. 1996. Effect of fruit substrates on the parasitization of tephritid fruit flies by the parasitoid *Biosteres arisanus* (Sonan) (Hymenoptera: Braconidae) *Environ. Entomol.* 25:470-475 .

Harris, E. J., Bautista, R. C., & N. J. Liquido. 1996. Augmentative biological control of tephritid fruit flies with the egg parasitoid *Biosteres arisanus*: real and perceived possibilities (Abstract). In: Proc. of the 2nd Meeting of the Working Group on Fruit Flies of the Western hemisphere, Vina del Mar, Chile, Nov. 3 - 8, 1996, p. 38.

Bautista, R. C. and E. J. Harris. 1997. Effects of multiparasitism on oviposition behavior and progeny development of oriental fruit fly parasitoids (Hymenoptera: Braconidae). *J. Econ. Entomol.* 90:757-764

Bautista, R. C. and E. J. Harris. 1997. Effect of insectary rearing on host preference and oviposition behavior of the fruit fly parasitoid, *Diachasimorpha longicaudata* (Ashmead) (Hymenoptera: Braconidae) *Entomologia Experimentalis et Applicata* 83:213-218.

Co-chair of the biological control section of the Fifth International Symposium on Fruit Flies of Economic Importance 1-5 June 1998 Penang, Malaysia.

Harris, E. J., R. C. Bautista, & J. P. Spencer 1998. Utilization of the Egg-Larval *Biosteres arisanus* for augmentative biological control of tephritid fruit flies. In Fifth International Symposium on fruit flies of Economic Importance, Panang, Malaysia, pp. 725-732

Lawrence, P. O., E. J. Harris, & R. Bautista 1998. Development and reproductive biology of the egg-pupal parasite, *Biosteres arisanus* in *Anastrepha suspensa*, a new tephritid host. In Fifth International Symposium on fruit flies of Economic Importance, Panang, Malaysia, 1-5 June 1998. pp 739-748.

Presented a poster at the Third Meeting of the Working Group on Fruit Flies of the Western Hemisphere Guatemala City, Guatemala July 4-9, 1999 entitled: Mass-Rearing of the Tephritid Fruit Fly Parasitoid *Fopius* (= *Biosteres*) *arisanus* (Hymenoptera: Braconidae) by **Renato C. Bautista, John Spencer, Ernest J. Harris, & Dwayne Ishimura.**

Harris, E J., R. C. Bautista and J. P. Spencer.1998 Utilization of the Egg-Larval Parasitoid *Biosteres arisanus*, for Augmentative Biological Control of Tephritid Fruit Flies . In Fifth International Symposium on fruit flies of Economic Importance, Panang, Malaysia) pp725-732

Bautista, R. C. and E. J. Harris. 1998. Biology and of the fruit fly parasitoid, *Biosteres arisanus*: clues to insectary propagation *Entomologia Experimentalis et Applicata* 83:213-218.

Ernest J. Harris & Renato C. Bautista. 1999. Effect of multiparasitism on the parasitization behavior of insect parasitoids. For publication in book: *Advances in Biopesticide Research*, Vol. 3 Chapter on: *Predators and Parasitoids* edited by Dr. O. Kouls, Director Insect Biopesticide



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Bautista, R. C., N. Mochizuki, J.P. Spencer, E. J. Harris, & D. Ishimura. 1999. Mass-Rearing of the Tephritid Fruit Fly Parasitoid, *Fopius arisanus* (Hymenoptera: Braconidae) *Biological Control* 15:134-144.

Bautista, R. C., N. Mochizuki, J.P. Spencer, E. J. Harris, & D. Ishimura. 2000 Effect of depth of oviposition dish and age of rearing host on efficiency of mass production of the tephritid fruit fly parasitoid *Psytalia fletcheri* *BioControl* 389-399

Bautista, R. C., E. J. Harris, & R.I. Vargas 2001 The fruit fly parasitoid *Fopius arisanus*: reproductive attributes of pre-released females and the use of added sugar as a potential food supplement in the field *Entomologia Experimentalis et Applicata* 101: 247-255.

Harris, E. J., N. J. Liquido, and J. P. Spencer. 2001. Distribution and host utilization of *Bactrocera latifrons* (Diptera: Tephritidae) on the island of Kauai, Hawaii *Proc. Hawaii. Entomol. Soc.* pp 55-66.

Harris E..J., Bautista, 2001. Implications of host mortality on the economics of *Fopius arisanus* (Hymenoptera: Braconidae) mass rearing. *BioControl* 46: 275-287

Currently I am a BIOLOGICAL SCIENCE COLLABORATOR at the USDA-ARS Pacific Basin Agricultural Research Center Honolulu, HI. 2727 Woodlawn Drive Honolulu 96822 USA



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