James R. Fuxa Career Achievements

1973-2009

Publications

- 4 books
- 21 book chapters including *Annual Review of Entomology*
- 120 refereed journal papers and refereed reports
- 1 patent
- 56 other publications

Achievements

! Established epizootiology as a discipline of insect pathology with the publication of a major reference, *Epizootiology of Insect Diseases*, which included formalized terminology and techniques, as well as a literature review of 16 sub-topics.

- Advocated epizootiology throughout the United States and internationally, in writings and talks, as fundamental to microbial control and environmental risk assessment.

! Published the most diverse and comprehensive body of refereed papers on ecology and epizootiology of nucleopolyhedroviruses, one of the major groups of entomopathogens, by any scientist in history. This work included comparative ecology of three major systems, quantitative ecology, viral persistence, biotic and abiotic transport, vertical transmission, resistance/reversion/fitness, short- and long-term host interactions, plant interactions, dynamics in soil, synergism, stressors, modeling, and theory (Agric. Ecosystems Environ. 103:27).

○ First to demonstrate:

- Quantified ecosystem competition between recombinant and wild-type baculoviruses
    - Resistance reversion to baculovirus and role of host fitness
- Highest level of lab resistance to baculovirus (co-P.I.)
- Evidence that vertical transmission plays a role in long-range viral transport
- Rates of baculovirus transport by predators and scavengers
- Compatibility of baculovirus epizootics with agricultural manipulations of soil
- Abnormal occlusion bodies in baculovirus vertical transmission
- Selection of a baculovirus strain for increased vertical transmission
    - Quantification of abiotic soil-to-plant baculovirus transport, including wind and rain, controlled soil types, depth, distance, proportions transported, and thresholds for epizootics (Microb. Ecol, in press)
- Biotic agent harming baculoviruses in soil and water

- Showed experimentally in two pathogen systems (virus, fungus) that moderate virulence

can be more conducive than high virulence in sustaining epizootics (Biol. Control 20:84, J. Invertebr. Pathol. 84:38)

- Served as the major spokesperson for the discipline of microbial control from 1987 to 1999, both in the United States and internationally, as indicated by invitations to give a U.S. Congressional briefing; a briefing for a USDA under-secretary; expert consultations for OTA, EPA, and CAST; many expenses-paid speaking invitations in Brazil, Japan, and all over the USA; and selection from the insect pathology world community as the leader of two microbial-control courses in Scandinavia.

- Documented successful releases of viruses for classical biocontrol of two soybean pests, velvetbean caterpillar (*Anticarsia gemmatalis*) and soybean looper (*Pseudoplusia includens*) (BioControl 44:403, La. Agric. 35:20). These are arguably the only two examples of classical biological control in row crops by any type of natural enemy in its 100+ year history.

- Published research on all four approaches to microbial control: short-term insecticide, seasonal-colonization insecticide, introduction/establishment, and environmental manipulation

! Pioneered an exposure-assessment approach to risk assessment for environmental release of recombinant-DNA viruses (Agric. Ecosystems Environ. 102:27). Some of these findings were used by the U.S. EPA to approve the first industry field trials of recombinant viruses in the U.S.

- Served as a consultant to assist Brazil in establishing a regulatory framework for biological control.

- Arguably the first scientist to point out (in a report to EPA and in an *Annu. Rev. Entomol*. paper, both 1987) the possibility and dangers of resistance development to plants expressing toxin genes of *Bacillus thuringiensis*.

! Documented long-term dynamics and impact of a microsporidium released into populations of red imported fire ant.

! Administrator (interim department head, two terms, 27 months) for all research, teaching, and extension programs in LSU AgCenter Entomology, up to 140 employees including 23 faculty and a budget of $4.5 million; integrated extension entomologists into the department.

Awards

! Environmental Science and Engineering Fellow, American Association for the Advancement of Science (1987)

! Promotion of Science Award, Japanese Society of Applied Entomology and Zoology; Keynote Speaker, Annual Meeting of the Japanese Society for Invertebrate Pathology (1996)

! Mississippi Chemical / Triad Nitrogen Award for the most significant contributions to the research programs of the Louisiana Agricultural Experiment Station during 1996-2000 (2000).

! Recognition of Career Contributions to the Discipline on Invertebrate Pathology from the international Society for Invertebrate Pathology (2009)

Grants and Contracts

● P.I. or co-P.I. on $5,511,993 received

<u>EXPENSES-PAID</u> Speaking/Consulting Invitations

● U.S. Government
U.S. Congressional Briefing
U.S. Congress Office of Technology Assessment
U.S. Environmental Protection Agency
USDA (2) including briefing for the USDA Under-Secretary

● Foreign Governmental Agencies
United Nations Development Program (Norway)
Inter-Am. Inst. for Coop. Agr. (Brazil)
EMBRAPA, Brazil (4)

● Foreign Academic Institutions
Finland (Scandinavia yearly invites one entomologist in the world to head a special topics course)
Czech Republic (CR Academy of Sciences)
Denmark (head a special topics course, same as Finland)
Inst. Oswaldo Cruz, Brazil
SiconBiol, Brazil
Int. Congr. Entomol., P.R. China
Eur. Congr. Entomol., Czech Republic
Japanese Soc. Appl. Entomol. Zool.
Kyoto Inst. Technol.

● U.S. Academic Institutions
UCLA Mol. Biol. Symposia
Boyce Thompson Institute (2)
Am. Assoc. for Advancement of Sci.
Haskin Shellfish Res. Lab., NJ
Am. Chem. Soc.
Soc. Invertebr. Pathol.
Entomol. Soc. Am., NC Br.
Entomol. Soc. Am., Pacific Br. (2)
Council for Agr. Sci. & Technol.
Auburn Univ.
Texas Tech Univ.
Univ. Arkansas
Univ. California, Davis
Univ. Florida
Univ. Nebraska

● Industry
Biosys
EcoScience
NOVO
Zeneca
Entotech

Editorial Boards

Journal of Invertebrate Pathology
Environmental Entomology (Chair)
Biological Control
Louisiana Agriculture

Major Elected Offices

Treasurer, Soc. Invertebr. Pathol. (SIP)
Council Member, SIP
Chair of Subsection Ce, ESA
Publications Council, Entomol. Soc. Amer. (ESA)
Chair, Regional Project S-265 (Microbial Control)

Almost-continuous service to professional societies from 1981 to 2006

Teaching

○ **LSU**

! Taught graduate courses in Insect Pathology and Biological Control for 27 years with excellent evaluations. This included extensive efforts to provide living host-pathogen systems for the course laboratories.

! Major professor for 21 graduate students and post-docs from 12 countries.

! Administrator (interim department head, two terms, 27 months) for all teaching in LSU Entomology.

! Developed departmental procedures for surveying exiting graduate students and evaluating effectiveness of the department's graduate training program.

! Particpated in the LSYou program (for economically disadvantaged high-school students) through the mid-1990s; Louisiana Attorney General Richard Ieyoub visited Fuxa's laboratory due to its success rate and participation in LSYou from its inception.

! Numerous other: graduate committees, guest lectures, advisor for high school science fair projects (including two state-level award winners).

○ **Outside LSU**

! Leader of international team of scientists for Insect Pathology short course, Helsinki, Finland, 1993. The Scandinavian governments cooperate to support the invitation of one scientist/teacher, worldwide, to head a once-a-year short course in any entomological discipline. The course leader then selects and leads a team of European scientists to present the course for Scandinavian graduate students.

! Leader of international team of scientists for Insect Pathology short course, Copenhagen, Denmark, 1999 (same as Finland).

! Instructor for International Course in Insect Pathology, Ciudad Victoria, Mexico, 2002.

! Recruiting talk to 60 students in Zamorano, Honduras, 1997

Diversity of insects, ecosystems, and entomopathogens in research projects

• *Spodoptera frugiperda* (fall armyworm, pastures, corn)
• *Anticarsia gemmatalis* (velvetbean caterpillar, soybean, wild marsh legumes)
• *Heliothis/Helicoverpa* complex (cotton, soybean, corn, sorghum)
• *Solenopsis invicta* (red imported fire ant, pastures, urban)
• *Trichoplusia ni* (cabbage looper, vegetables)

- *Pseudoplusia includens* (soybean looper)
- *Coptotermes formosanus* (Formosan subterranean termite, urban)
- *Labops hesperius* (rangeland mirid)
- *Diatraea saccharalis* (sugarcane borer)
- *Nezara viridula* (southern green stink bug, soybean)
- *Oebalus pugnax* (rice stink bug)
- *Curculio caryae* (pecan weevil)
- *Archips argyrospila* (fruit tree leafroller, forests)
- *Anthonomus grandis grandis* (boll weevil, cotton)
- *Cylas formicarius elegantus* (sweet potato weevil)

- Refereed publications on all five major groups of entomopathogens (viruses, protozoa, fungi, nematodes, bacteria)