

Appendix A

Professional Timeline with USDA

Year(s)	Event
1930	Bureau of Entomology and Plant Quarantine (BEPQ), Tlahualilo, Mexico – field aid; investigated pink bollworm.
1931	Bureau of Entomology and Plant Quarantine (BEPQ), Dallas, Texas – junior entomologist; investigated the biology and control of the screwworm.
1932-1935	Bureau of Entomology and Plant Quarantine (BEPQ), Galesburg, Illinois, and Ames, Iowa – junior entomologist; investigated biology, taxonomy, and control of cattle grubs, major pests of livestock and horse bots, major pests of horses.
1935-1937	Bureau of Entomology and Plant Quarantine (BEPQ), Valdosta, Georgia – junior entomologist; investigated the biology and control of the screwworm.
1937-1940	Bureau of Entomology and Plant Quarantine (BEPQ), Menard, Texas – assistant entomologist; investigated the biology and control of the screwworm.
1940-1942	Division of Insects Affecting Man and Animals, Portland, Oregon – in charge of the Portland station; investigated mosquitoes in Pacific Northwest.
1942-1946	Orlando, Florida – research director; investigated vectors of disease important to the armed forces, including malaria, typhus, and plague.
1946-1952	Division of Insects Affecting Man and Animals, Washington, District of Columbia – research director.
1953-1971	Agricultural Research Service (ARS), Beltsville, Maryland – director of the Entomology Research Division.
1971-1973	Agricultural Research Service, Washington, District of Columbia – science advisor to George W. Irving, Jr., Administrator of ARS.
1973-2000	Agricultural Research Service, Beltsville, Maryland – collaborator.

Appendix B

Honors and Awards

Year	Honor or Awards
1924	Salem Lutheran Church (Port Lavaca, Texas). Certificate of Confirmation.
1926	Port Lavaca (Texas) High School. Diploma.
1930	The Agricultural and Mechanical College of Texas. Bachelor of science degree.
1930	President of the United States of America. Commission, Second Lieutenant of Infantry, United States Army.
1932	Iowa State College of Agriculture and Mechanic Arts. Master of science degree.
1935	President of the United States of America. Commission, Second Lieutenant of Infantry, United States Army.
ca. 1941	United States Department of Agriculture. Recognition of 10 years of service as a federal employee.
1946	Gamma Sigma Delta Honor Society of Agriculture, Beta Chapter (Iowa State University). Membership.
1946	United States Department of Agriculture, Orlando Florida Laboratory. Award, to Edward Fred Knipling [accompanied an engraved wrist watch].
1946	United States War Department. United States of America Typhus Commission Medal.
1947	British Government. King's Medal for Service in the Cause of Freedom.
1947	The Cooperative Interbreed Cattle Association of New Jersey. Scroll for Distinguished Service to the Livestock Industry.
1947	Iowa State College of Agriculture and Mechanical Arts. Doctor of philosophy degree.
1947	Sigma Xi, The Scientific Research Society, Iowa State Chapter. Membership.
1947	United States Department of Agriculture. Award for Distinguished Service, to Edward Fred Knipling of the Orlando Florida Laboratory.
1947	United States Department of Agriculture. Award for Distinguished Service, to the Orlando Florida Laboratory.
1948	The President of the United States of America. Medal for Merit.

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Year	Honor or Awards
1950	National Pest Control Association. Honorary membership.
ca. 1951	United States Department of Agriculture. Recognition of 20 years of service as a federal employee.
1952	American Association of Economic Entomologists. Presidency for the year 1952.
1958	Bausch & Lomb. Honorary Science Award.
1958	The Chicago Alumni Association of Iowa State College. The Alumni Merit Award.
1958	Cosmos Club. Membership.
1959	<i>The Progressive Farmer</i> . Man of the Year in Service to Southern Agriculture.
1959	United States Department of Agriculture. Certificate of Merit.
1960	Texas Research Foundation. Hoblitzelle National Award in the Agricultural Sciences.
1960	United States Department of Agriculture. Award for Distinguished Service.
1961	The City of Philadelphia. John Scott Medal and Premium.
1961	Ford Farming. Distinguished Service Award.
1962	Academy of Achievement. Golden Plate Award.
1962	Agricultural and Mechanical College of Texas. Distinguished Alumni Award.
1962	Catawba College. Honorary doctor of science degree.
1962	United States Atomic Energy Commission. Commendation.
1963	United States Department of Agriculture, Agricultural Research Service, Entomology Research Division, Insect Nutrition and Rearing Conference. Certificate of Appreciation.
1964	American Agricultural Editors Association. Distinguished Service Award.
1964	American Association for the Advancement of Science. Fellowship.
1964	Cosmos Club. Cosmos Club Award.
1965	Entomological Society of America. Founders' Memorial Award.
1965	Entomological Society of India. Honorary Membership.
1966	National Academy of Sciences. Membership.

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Year	Honor or Awards
1966	The President of the United States of America. National Medal of Science.
1966	The Trustees of Princeton University. Rockefeller Public Service Award.
1967	North Dakota State University. Honorary doctor of science degree.
1968	Mathematics and Science Center (Richmond, Virginia). Certificate of Merit.
1970	American Academy of Arts and Sciences. Fellowship.
1970	Clemson University. Honorary doctor of science degree.
1970	Robinson, Donald. <i>The 100 Most Important People in the World Today</i> . New York: Putnam.
1971	The President of the United States of America. The President's Award for Distinguished Federal Civilian Service.
1971	Texas Animal Health Commission. Resolution of Honor.
1971	United States Department of Agriculture. Recognition of 40 years of service as a federal employee.
1971	University of Sydney. Thomas Lawrence Pawlett Visiting Scholarship Award [nomination].
1972	Entomological Society of America. Honorary membership.
1972	The President of the United States of America. Presidential Prize for Innovation [never officially awarded].
ca. 1973	The Wisdom Society for the Advancement of Knowledge, Learning, and Research in Education. Wisdom Hall of Fame.
1974	<i>Cotton Farming</i> March 1974. [framed cover featuring Knipling]
1974	United States Department of Agriculture Graduate School. Certificate of Appreciation.
1975	John and Alice Tyler Ecology Fund at Pepperdine University. Tyler Ecology Award.
1975	University of Florida. Honorary doctor of science degree.
1976	American Biographical Institute. <i>Notable Americans of the Bicentennial Era</i> .
1976	Arlington Outdoor Education Association. Title of Acre Saver.
1979	The Nobel Foundation. The Nobel Peace Prize [nomination].

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Year	Honor or Awards
1982	United States Department of Agriculture, Animal and Plant Health Inspection Service. Award of Appreciation.
1984	Entomological Society of America. Fellowship.
1986	United States Department of Agriculture, Agricultural Research Service. Honorary Citation.
1986	United States Department of Agriculture, Agricultural Research Service. Science Hall of Fame.
1988	Southwest Animal Health Research Foundation. Outstanding Service Award.
1988	United States Department of Agriculture, Agricultural Research Service. Dedication, Knipling-Bushland United States Livestock Insects Research Laboratory.
1990	Iowa State University Alumni Association. Distinguished Achievement Citation.
1991	Food and Agriculture Organization of the United Nations. Special Science Award.
1991	Mexico-United States Commission on the Eradication of Screwworm, Secretario de Agricultura y Recursos Hidráulicos de Mexico, United States Department of Agriculture. Certificate of recognition, to the Agricultural Research Service.
1991	President of the United States of America. Proclamation for World Food Day, 1991 and 1992.
1992	Charles Valentine Riley Memorial Foundation. Recognition of selection as a 1992 World Food Prize Laureate.
1992	The Entomological Foundation. Recognition of continued support for the science of entomology.
1992	United States Department of Agriculture. Special Recognition (1992 World Food Prize, 50 years of service).
1992	The World Food Prize Foundation. The World Food Prize.
1994	Calhoun County (Texas). Proclamation in honor of Edward Fred Knipling.
1994	Calhoun County (Texas) Cattlemen's Association. Hall of Fame.
1995	Prince William County (Virginia) Fire and Rescue. Phoenix Club.
1995	The Science and Technology Foundation of Japan. Japan Prize.
1995	Texas A&M University, College of Agriculture and Life Sciences. Outstanding Alumni Award.

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Year	Honor or Awards
1995	Iowa State University, Iowa Beta Chapter of Gamma Sigma Delta. Alumni Award of Merit.
1996	Texas A&M University. Honorary doctor of science degree.
1997	Florida Entomology Society. Pioneer Lecturer Honoree.
1999	<i>Progressive Farmer Magazine</i> . "Prominent agricultural researchers tribute."
n.d.	City of Uvalde, Texas. Key to city.
n.d.	North Dakota State University. President's Bronze Medallion.

Appendix C

Major Correspondents

Alfred H. Baumhover

Alfred H. Baumhover (1921-) began working with the United States Department of Agriculture (USDA) Screwworm Eradication Program in the early 1950s in Kerrville, Texas. He worked with Edward Fred Knipling and Raymond C. Bushland, two of the founding scientists of the screwworm program, to develop the sterile male technique. Baumhover was involved in the original tests for the Southeast Screwworm Eradication program in Florida and later in Curaçao, part of the Netherlands Antilles. Continuing to work with screwworms, Baumhover worked at the Mission, Texas, screwworm production plant until 1964 when he moved to the United States Department of Agriculture's Tobacco Insects Investigations at the Tobacco Research Laboratory in Oxford, North Carolina. Baumhover retired in 1984.

Raymond C. Bushland

Raymond C. Bushland (1910-1995) is often cited as Knipling's partner in developing the sterile insect technique. Knipling and Bushland worked together at the Menard, Texas, laboratory of the Bureau of Entomology and Plant Quarantine (BEPQ). Bushland later experimented with screwworm sterilization in Kerrville, Texas. He was able to prove, with the help of Donald E. Hopkins, that screwworms of both sexes could be sterilized and sterile male flies exhibited normal sexual competition when compared to normal males. Bushland worked with the screwworm experiments in Curaçao, and remained involved with pest management throughout his career, which included his position as Director of the United States Department of Agriculture Metabolism and Radiation Research Laboratory in Fargo, North Dakota. Bushland and Knipling were both awarded the World Food Prize in 1992.

Emory Clayton Cushing

Emory Clayton Cushing (1897-1974) identified the screwworm (*Cochliomyia hominivorax*) as being a different pest than the comparatively unimportant blowfly (*Cochliomyia macellaria*). Cushing served as Knipling's supervisor in an Orlando, Florida, research lab working on insect populations affecting the armed forces in World War II. Cushing was one of the United States Army's highest ranked entomologists during World War II and he later authored the book, *The History of Entomology During World War II*. In 1946, while on leave from the United States Department of Agriculture and completing his graduate studies at Iowa State University, Knipling wrote a letter to Cushing outlining his thoughts on the sterile insect technique for use in screwworm control. Cushing was at that time Chief of the Insects Affecting Man and Animals Division in the Bureau of Entomology and Plant Quarantine and Knipling's supervisor, a position he held until 1946 when he retired from the United States Department of Agriculture.

Arthur W. Lindquist

Arthur W. Lindquist (1903-1980) worked with Knipling and Raymond C. Bushland in Orlando, Florida, during World War II researching insects that were transmitting diseases to the armed

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forces. Lindquist worked on the Curaçao experiments to eradicate screwworm populations. Lindquist later became the Head of the Insect and Pest Control Section of the Food and Agriculture Organization (FAO) of the United Nations. Correspondence between Knipling and Lindquist spans their careers and offers insight into the partnership between the Food and Agriculture Organization and the United States Department of Agriculture in their joint efforts with pest control.

Hermann Joseph Muller

Hermann Joseph Muller (1890-1967) is the author of the 1950 article “Radiation Damage to the Genetic Material,” which explained how x-rays could be used for insect sterilization without affecting other sexual characteristics and behavior. Knipling worked with Muller in developing the sterile insect technique for screwworm control. Muller was the recipient of the Nobel Prize in Physiology or Medicine in 1946.

Appendix D

Related Collections

Listed below are screwworm related manuscript collections housed in Special Collections, National Agricultural Library as of June 2007.

Artifacts: Screwworm Eradication Program Records. Manuscript Collection 348.

Audiovisual Materials: Screwworm Eradication Program Records. Manuscript Collection 215.

Baumhover, Alfred H., Papers: Screwworm Eradication Program Records. Manuscript Collection 266.

Graham, Owen Hugh, Papers: Screwworm Eradication Program Records. Manuscript Collection 213.

Husman, Chester N., Awards: Screwworm Eradication Program Records. Manuscript Collection 349.

International Collection: Screwworm Eradication Program Records. Manuscript Collection 355.

Knipling, Edward Fred, Papers: Screwworm Eradication Program Records. Manuscript Collection 210.

Oral Histories: Screwworm Eradication Program Records. Manuscript Collection 305.

Promotional Materials: Screwworm Eradication Program Records. Manuscript Collection 214.

Severn Run's Cazador (Caz), Screwworm Detection Dog, Collection: Screwworm Eradication Program Records. Manuscript Collection 310.

Southeastern United States Collection: Screwworm Eradication Program Records. Manuscript Collection 212.

Southwestern United States and Mexico Collection: Screwworm Eradication Program Records. Manuscript Collection 211.

United States Department of Agriculture Entomology Research Division Records. Manuscript Collection 237.

Wyss, John, Papers: Screwworm Eradication Program Records. Manuscript Collection 338.

Appendix E Web Resources

Additional links to related resources accessed in September 2006 are listed below.

Adkisson, Perry, and James Tumlinson. "Edward F. Knipling, March 20-1909 – March 17, 2000." *Biographical Memoirs* 83. 2003.

<http://www.nap.edu/readingroom/books/biomems/eknipling.html>

Cooke, Linda, and Sean Adams. "Shrinking screwworm's domain: ARS assists FAO in groundwork for eradication effort." *Agricultural Research* (September 1993). USDA.

http://www.findarticles.com/p/articles/mi_m3741/is_n9_v41/ai_13281657

Knipling, Edward B. "The Life and Vision of Edward F. Knipling Concerning the Eradication of the Screwworm." Presented at the Screwworm Symposium and the 30th Anniversary of the Mexican-American Commission for the Eradication of Screwworm August 28, 2002. Tuxtla Gutierrez, Chiapas, Mexico: Agricultural Research Service, United States Department of Agriculture, 2002. <http://www.ars.usda.gov/aboutus/docs.htm?docid=1604&page=2>

Van der Vloedt, A.M., and Waldemar Klassen. "The development and application of the sterile insect technique (SIT) for New World screwworm eradication." *New World Screwworm Response to an Emergency*, special issue. Edited by R.D.S. Branckaert. Food and Agriculture Organization of the United Nations, 1991.

<http://www.fao.org/ag/AGa/AGAP/FRG/FEEDback/War/u4220b/u4220b0j.htm>

Appendix F List of Abbreviations

Word or Phrase	Abbreviation
Agricultural Research Service	ARS
American Association for the Advancement of Science	AAAS
American Association of Economic Entomologists	AAEE
Animal and Plant Health Inspection Service	APHIS
Association for the Advancement of Agricultural Sciences in Africa	AAASA
attraction-annihilation	A/A
Beltsville Agricultural Research Center	BARC
Binational Agricultural Research and Development	BARD
Bureau of Entomology and Plant Quarantine	BEPQ
Commonwealth Scientific and Industrial Research Organization	CSIRO
dichloro-diphenyl-trichloroethane	DDT
Entomological Society of America	ESA
Entomology Research Division	ERD
Food and Agriculture Organization of the United Nations	FAO
Insect Biology and Population Management Research Lab	IBPMRL
International Atomic Energy Agency	IAEA
International Bee Research Association	IBRA
Journal of Medical Entomology	JME
National Academy of Sciences	NAS
National Pest Control Association	NPCA
Southern Insect Management Laboratory	SIML
Southwest Animal Health Research Foundation	SWAHRF

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Word or Phrase	Abbreviation
Southwest Animal Research Foundation	SWARF
sterile insect technique	SIT
Subtropical Agricultural Research Laboratory	SARL
United Nations Development Programme	UNDP
United States Department of Agriculture	USDA
World Health Organization	WHO