

A History of Entomology

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CURRENT ROLE OF THE DEPARTMENT OF ENTOMOLOGY

The University of Missouri, founded in 1839, was the first state university established west of the Mississippi River, the first Land Grant institution west of that waterway, and the first educational entity in the western half of the United States to offer instruction in the subject of entomology. The primary mission of the Department of Entomology is to provide strong programs in the three principal areas of teaching, research and extension.

Presently, the resident **teaching program** includes offering all undergraduate and graduate courses in entomology at the University of Missouri-Columbia, contributing the entomology portion to basic courses offered by other departments, and providing quality graduate education leading to the M.S. and Ph.D. degrees in entomology.

In **research**, the department is responsible for developing and sustaining a balanced program in fundamental and applied entomology to meet the agricultural and entomological needs primarily of Missouri, but also of the regional, national and international communities. In addition, the research program is designed to meet the instructional requirements of advanced undergraduate and graduate students and to advance the science of entomology.

Extension entomology is charged with developing and initiating programs that will contribute and update information on insects and insect problems to extension area specialists, to agricultural producers, to the agribusiness industry, pest control operators, and to citizens throughout Missouri. Extension also provides educational opportunities in entomology for non-resident Missouri students.

The Department of Entomology at the University of Missouri-Columbia is unique and essential in Missouri for information and control recommendations on insects and their allies, and on insecticide use and safety. It constitutes a vital part of a teaching, research and extension network. Along with other departments of entomology, state and federal agencies, it forms part of a collective national resource.

Each year, insects in Missouri damage substantial amounts of food and fiber, transmit pathogens to plants and animals, and are a severe nuisance to humans and animals in both urban and rural settings. On the other hand, many insects benefit humanity as pollinators, predators, parasites, and producers of honey. In addition to dangers posed by pest insects indigenous to Missouri, constant threats are posed by species immigrating into and across the United States. The meadow spittle

bug, southwestern corn borer, horn fly, European corn borer, alfalfa weevil, face fly, and western corn rootworm are examples of introduced pests that now cause widespread damage to Missouri crops and livestock. The Asian tiger mosquito is a recently-introduced pest that has potential as a major human health problem in Missouri. It is only a matter of time before pests such as the Japanese beetle and the gypsy moth become established across the state.

The discipline of entomology is unique among the life sciences because there are more species of insects than all other species of animals combined, because of their high reproductive potential, and because of the extensive impact they have on humans and in nature. The Department of Entomology at the University of Missouri-Columbia is one with high quality faculty and graduate students serving the needs of Missouri. There are presently 15 resident and adjunct entomology faculty on the graduate faculty and nine are on the doctoral faculty. Most essential entomological disciplines are covered by faculty expertise. Teaching, research and extension, along with graduate programs, are synergistic in a beneficial manner to insure stronger programs in each function. An additional strength is that this interaction of functions has produced better quality graduate students who have been competitive in securing professional positions. Research assistantships are competitive with most other departments of entomology in the United States.

The Department of Entomology is also unique and strengthened by having a cooperative program with the U.S. Department of Agriculture's Biological Control of Insects Research Laboratory located in Columbia, as well as a USDA research unit on host plant resistance in corn. A total of nine USDA research scientists hold adjunct academic appointments in the department and interact with the department's faculty, students, and programs. The department also has cooperative research projects with the Columbia National Fisheries Research Laboratory. Evaluations by outside peer reviewers have been highly complimentary of the Department of Entomology's programs. The 1983-84 edition of the Gourman Report ranked the quality of the Department of Entomology graduate program as 22nd in the nation. Of those ranked higher, about 14 would generally be recognized as at the top, while the University of Missouri-Columbia and the remaining seven departments would be considered to have comparable programs in the top third among all departments of entomology across the country.

THE EARLY YEARS OF ENTOMOLOGY AT M. U.

A professorship of natural history was one of the original faculty positions established at the University of Missouri. Dr. Edward H. Leffingwell was the incumbent in 1844, only five years after the University was established. He was paid \$500 per year plus one sixth of all student fees, which added perhaps \$300 to his annual salary. From the opening of the University, subject matter in entomology was taught as an essential portion of instruction in natural history. Dr. Leffingwell was replaced for a year by Dr. A. Litton and was succeeded in 1851 by Dr. George Swallow. In 1853, Dr. Swallow was appointed State Geologist and was succeeded by Professor J. Locke. The catalog of 1844 specifically mentioned receipt of a gift to the University in the form of a copy of T. W. Harris' *Insects Injurious to Vegetation*, which was the standard entomological textbook for many years. By act of legislature, effective June 6, 1860, the president of the University and all the faculty were dismissed. The Board of Curators re-established four departments, one of which was Natural History and Natural Philosophy. Dr. Joseph G. Norwood was in charge of this department for a number of years before becoming dean of the medical faculty.

In 1868, Charles Valentine Riley was appointed State Entomologist of Missouri with the Missouri State Board of Agriculture. He served as lecturer in entomology with the University until 1875. The invasion of Missouri by the Rocky Mountain grasshopper and the Colorado potato beetle during the 1860s created a demand for insect control technology. Riley's series of reports, which he wrote while at the University, known as the "Missouri Reports" on his pioneering research, have become classics of American entomology. These reports, his association with the famous U.S. Entomological Commission, and his subsequent entomological career are well known. The University awarded him an honorary Ph.D. in 1873. The College of Agriculture at the University of Missouri-Columbia was established in 1870, and Professor Swallow was recalled to become the first professor of agriculture and natural science and later Dean of the College (1872). In his report of a proposed course of study, he stated that entomology should have a prominent role, and he recommended the study of bee culture and the care of silkworms. When Professor Riley discontinued his lectures, entomology and zoology were combined and offered in the college. At this time, a course in insect classification and the study of farm and garden pests was offered in the second semester of the sophomore year.

In 1878, S. M. Tracy was appointed professor of entomology and economic botany, as well as superintendent of grounds, taking over the work in entomology from Professor Swallow. He continued in this role until 1887, when for one year L. R. Taft, assistant professor of horticulture and zoology, offered courses in entomology and beekeeping. Dr. George D. Purinton came as a professor of botany in 1887, and in 1888 served as professor of botany and entomology in the College of Agriculture. In 1890, his title was changed to that of professor of botany, entomology, and zoology. He continued to teach entomology until 1894, when a separate professorship of entomology was established in the College of Agriculture.

During the years 1889-1893, T. Smith, F. L. Kilbourne, and C. Curtice, entomologists and veterinary researchers with the USDA, established that the disease Texas Cattle Fever was caused by a microscopic parasite transmitted by the cattle fever tick. This research, conducted at the University, was the first proven instance of an arthropod-vectored livestock pathogen.

THE ESTABLISHMENT OF THE DEPARTMENT OF ENTOMOLOGY

In 1895, J. M. Stedman came to the University as Professor of entomology and as entomologist for the Agricultural Experiment Station, probably as a direct result of public pressure caused by the invasion of Missouri by San Jose scale in the early 1890s. In that year, the Department of Entomology was established within the College of Agriculture. In 1903, George I. Reeves was added to the staff as instructor, and was followed from 1904 to 1906 by C. R. Crosby. Crosby in turn was succeeded by Leonard Haseman in 1906, who during 1907 and 1908 (while Stedman was abroad) was acting in charge of the Department of Entomology. The entire department was vacant from September 1909 to August 1910 while Haseman pursued his Ph.D. at Cornell. In all, Stedman was chairman from 1895 until 1909. Haseman succeeded Stedman as chairman of the Department of Entomology in 1910. In addition, he filled the roles of entomologist of the Agricultural Experiment Station, and chief plant inspector. He continued in these duties until 1925, when he assumed the additional role of state entomologist. In 1929, the regulatory work of plant inspection was transferred to the State Board of Agriculture, leaving Haseman free to devote full time to the work of the department. Prior to the creation of a separate Department of Entomology in 1895, courses in entomolo-

gy were offered along with other biological science courses, and enrollment was small. From 1895 until 1909, one or two beginning courses in entomology were offered yearly to agricultural students and in some years advanced courses were offered to a few students, especially those interested in entomology. The enrollment reached a peak of 41 students during 1908. It was not until 1915 that the departmental faculty began to give serious thought to graduate instruction. At that time, curricula leading to the master's and doctoral degrees were established, and the first M.S. and Ph.D. degrees in entomology were awarded in 1917 and 1918, respectively. One of the initial master's degrees was a study of Missouri scale insects by A. H. Hollinger.

THE HASEMAN ERA OF THE DEPARTMENT OF ENTOMOLOGY

Between 1910 and 1929, a number of entomologists served as assistants and instructors with Dr. Haseман. Among them, in chronological order, were T. J. Talbert, C. G. Vinson, K. C. Sullivan, A. H. Hollinger, S. R. McLane, J. H. Snow, H. Bock, O. C. McBride, C. N. Davis, and N. Turner. In 1929, T. E. Birkett became instructor in entomology and continued his teaching activities as assistant professor until 1943. He was absent during 1943-1947, but returned in extension education, teaching entomology by correspondence, and continued in that role until his retirement in 1964.

Until 1940, the teaching staff in entomology generally had been no larger than two faculty, but in that year Phillip C. Stone and Harry E. Brown were added as instructors in entomology. Both were absent during World War II, but they returned to the faculty afterward. During the war years, Lee Jenkins and Ruth Stone, spouse of P. C. Stone, carried on the work of instruction and administration in entomology. Dr. R. Stone was the first woman with an official entomological position in Missouri and in the department. In 1946, the instructional staff was augmented by the addition of former research assistants Curtis W. Wingo and Wilbur R. Enns as instructors. Organized extension work in the department began in 1916, following a national trend initiated by the Smith-Lever Act in 1914, although members of the resident staff began to make field surveys and to give demonstrations on control of insect pests as early as 1895. Early extension programs focused on chinch bug, scale insect, and grasshopper control systems. Extension project leaders over the years have

included C. C. Hamilton, T. J. Talbert, A. C. Burrill, O. Wade, G. D. Jones, H. Baker, V. F. Burk, S. Kyd, G. W. Thomas, W. S. Craig, T. R. Yonke, and R. E. Munson. In 1965, following controversy regarding use and potential misuse of pesticides, Craig was appointed to the entomology extension project to coordinate education in the safe use of these chemicals.

Most of the research in the department's early years dealt with the biology and control of the major insect pests, with fruit and truck crops receiving the most attention. The insect pests of field crops, such as Hessian fly, chinch bug, corn earworm, and grasshoppers, also received considerable study. Haseman felt that, "the true effectiveness of . . . experiment station research is to be measured by the success it has had in bringing the results of these researches directly to bear on the solution of the unsolved insect problems of Missouri farmers, fruit growers, and general laymen." In 1934, during a year of extensive drought, the University of Missouri-Columbia extension entomologists dispensed and demonstrated effective use of about one million gallons of federally obtained chinch bug oil. This saved forage sufficient to keep most of Missouri's livestock herds intact. The C. V. Riley Entomological Society, which currently serves as the student organization for entomology within the University, was established in 1935. The department's growth during the early part of this century was slow, and it consisted of only two to five faculty. By the early 1940s, however, the department numbered eight faculty who focused on undergraduate teaching, applied research and extension. In 1941, G. W. Bock, a physician in St. Louis, donated his private collection of about 300,000 beetles to the supervision of Dr. W. R. Enns in the department. Later, another St. Louis physician, E. P. Meiners, donated his collection of 35,000 insects. These gifts formed the nucleus of the present collection in the Missouri Entomology Museum (now the W. R. Enns Entomological Museum), which contains about one million arthropod specimens. In 1944, Haseman and L. F. Childers demonstrated that feeding honey bee colonies with sulfathiazole (a sulfa drug developed during World War II) protected them against American foulbrood disease. This finding saved millions of dollars for domestic apiculturists. The first survey entomologist position in the U.S. was filled in 1953 at the University of Missouri by George Thomas. During that year, the Board of Curators approved the establishment of an entomological museum.

THE DEPARTMENT OF ENTOMOLOGY FROM THE 1950s TO THE PRESENT

Dr. Haseman retired in 1954, after serving as chairman for a total of 44 years. Dr. Stone was appointed chairman at that time and served until 1968, when he died suddenly of a heart attack. P. L. Adkisson and L. Jenkins established a research program in 1956 to investigate the insect pests of cotton, corn, soybeans and vegetables in the farmlands of southeast Missouri. This program was moved from Sikeston to Portageville in 1960 when the Delta Center opened. In 1957, C. W. Wingo, of the department, and colleagues from the School of Medicine established that the brown recluse spider, *Loxosceles reclusa*, was the causative agent of many necrotic lesions on humans throughout the southcentral United States. In 1960, Stone, in collaboration with T. D. Luckey of the biochemistry department, demonstrated hormoligosis in crickets (growth stimulated by small amounts of a material that was actually harmful in larger quantities). These findings had important implications in nutritional experiments. The department moved from Whitten Hall to its present Agriculture Building home in 1960. In 1964, the construction of the USDA's Biological Control of Insects Research Laboratory was approved, and F. R. Lawson was appointed director. Work on the main laboratory began in 1966, and the building was dedicated in 1968. Staffing of the department increased throughout the 1950s and 1960s to meet changing agricultural needs. Significant changes during this time included a shift of focus toward graduate education and increased emphasis on entomological research. As new faculty were added to replace retiring or departing members, shifts in expertise allowed the department to remain in the forefront of national research priorities.

By 1968, the Department of Entomology faculty had increased to 15 professorial positions involving teaching, research and extension. Dr. Enns acted as chairman for approximately one year, and Dr. C. O. Knowles for a shorter period, until Dr. M. L. Fairchild was appointed to the chairmanship in 1969. In 1980, Fairchild left this position to assume responsibilities as coordinator of pest management for the college, and Dr. T. R. Yonke was appointed chairman at that time.

In 1976, the department discontinued the undergraduate degree program in entomology to concentrate resources toward graduate education. Faculty continued to teach several courses for undergraduates both within and out of the College of Agriculture. The M.S. and Ph.D.

programs continued to be strengthened during the 1970s and 1980s by improving the quality of instruction and by involving graduate students as an integral part of the department's other missions, especially research. During this time, the research program acquired more external grant support, and several faculty were hired or shifted to extension-research joint appointments, adding to the joint positions already existing between teaching and research. Dr. D. Barry was appointed in 1976 as an entomologist with the USDA Host Plant Resistance Research Unit and was located with the department. During 1981-1983, a University-wide reallocation program and reduction of funds led to the loss of three regular professorial positions, one research specialist, and one administrative assistant in the department. A second research specialist position was lost in 1987 to meet further reallocation. The department received a major endowment in 1984 in the form of the Gilbreath-McLorn bequest, a direct result of H. E. Brown's extension entomology involvement with ornamental plants and trees. Dr. Yonke took a year's leave of absence in 1988 to act as interim associate dean for extension programs in the college and Dr. G. M. Chippendale was appointed interim chairman. There are presently 13 professorial faculty on regular appointment in the department, including the coordinator of pest management and the chairman. Six scientists from the Agricultural Research Service, USDA, currently hold adjunct professorial appointments in the Department, and Benjamin Puttler, USDA-retired, was appointed USDA Entomology Collaborator in 1989 and is housed in the Agriculture Building.

Entomology professorial faculty on regular appointment at the University of Missouri since the late 1950's.

Name	Year appointed	Entomological specialty	Current status (1989)
E. A. Backus	1984	Behavior	Active
W. C. Bailey	1985	Forage Crops	Active
R. L. Brandenburg	1981	Forage Crops	Resigned, 1985
K. E. Brown	1973	Urban; veterinary	Resigned, 1975
G. M. Chippendale	1968	Physiology & Biochemistry	Active
W. S. Craig	1965	Extension	Retired, 1985
M. L. Fairchild	1959	Pest Management	Active
R. D. Hall	1977	Veterinary & Medical	Active
K. Harrendorf	1957	Cotton Insects	Resigned, 1981
J. L. Huggans	1968	Field Testing Specialist	Died, 1981
J. W. Johnson	1985	Horticultural Insects	Resigned, 1989
F. G. Jones	1976	Extension	Active
W. H. Kearby	1969	Forest Insects	Resigned, 1980
A. J. Keaster	1962	Field Crops	Active
R. L. Kirkland	1976	Biological Control	Resigned, 1981
C. O. Knowles	1965	Toxicology	Active
M. J. Linit	1981	Forest Insects	Active
J. W. Mullins	1979	Cotton Insects	Resigned, 1981
R. E. Munson	1967	Survey, field crops	Active
D. C. Peters	1957	Field crops	Resigned, 1959
L. L. Peters	1964	Survey; 4H	Resigned, 1972
D. P. Sanders	1982	Urban Entomology	Active
R. H. Ward	1977	Population Dynamics	Resigned, 1982
F. E. Wood	1960	Survey; 4H	Resigned, 1964
T. R. Yonke	1967	Biosystematics	Active

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