

*100
years*

ENTOMOLOGY

AT THE
UNIVERSITY OF MISSOURI



*On the cover:
Inspection of a honeybee colony on the east side of
Whitten Hall, MU campus. Date unknown.*

This manuscript began as Special Report 380, *A History of Entomology*, published in 1988 by the Missouri Agricultural Experiment Station. Appreciation is extended to all entomology faculty and friends who contributed to the current version. R. D. Hall assumes responsibility for errors or omissions and would be pleased to record updates and corrections. Address these to: Entomology History, 1-87 Agriculture Building, University of Missouri, Columbia, MO 65211. Susan York edited the manuscript, and Joe Vale designed the publication, both of Extension and Agricultural Information.

Entomology at the University of Missouri

Prepared in part by various Department of Entomology faculty
and edited by Robert D. Hall

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100
years

The University of Missouri, founded in 1839, was the first state university and the first land-grant institution established west of the Mississippi

River, and it was the first educational entity in the western half of the United States to offer instruction in entomology. Today, the primary mission of MU's Department of Entomology is to provide strong programs in the three principal areas of teaching, research and extension.

The resident teaching program offers all undergraduate and graduate courses in entomology at MU, contributes the entomology portion to many courses offered by other departments and provides internationally competitive graduate education leading to the master of science and doctorate degrees in entomology.

In research, the department has developed and sustained a balanced program in fundamental and applied entomology to meet the

agricultural and entomological needs of Missouri, primarily, but also of the regional, national and international communities. In

addition, the research program meets the instructional requirements of advanced undergraduate and graduate students and advances the science of entomology.

Extension entomology develops and initiates programs that contribute and update information on

The Department of Entomology's role in its centennial year



Early photograph of Whitten Hall, original home of the MU Department of Entomology (1903 – 1960). Note the insectary at rear. Date unknown.

insects and insect problems to extension area specialists, agricultural producers, the agribusiness industry, pest-control operators and citizens throughout Missouri. Extension also provides educational opportunities in entomology for off-campus students from Missouri.

In its 100th year, MU's Department of Entomology remains unique and essential to 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 and allied organizations, it forms part of a col-

lective national resource.

Insects benefit us as pollinators, predators, parasites and producers of honey. However, 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. In addition to dangers posed by pest insects indigenous to Missouri, species immigrating into and across the United States pose constant threats as well. The meadow spittlebug, 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 could cause a major human health problem in Missouri, and the full impact of tickborne pathogens is only now being measured. It is a matter of time before pests such as Japanese beetle and gypsy moth become fully 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. MU's Department of Entomology has high-quality faculty, staff and

students serving the needs of Missouri. Currently, 18 resident and adjunct entomology professors comprise the graduate faculty, and 13 are on the doctoral faculty. This expertise covers most essential entomological disciplines.

Teaching, research and extension, along with graduate programs, work together beneficially to ensure stronger programs in each function. An additional strength is that such interaction of functions has produced superior-quality graduate students who have been successful in securing professional positions. Research assistantships and stipends are competitive with most other entomology departments in the

United States.

The Department of Entomology also is unique and strengthened by having a cooperative program with the U.S. Department of Agriculture's (USDA) Biological Control of Insects Research Laboratory, located on a 10-acre tract in Columbia, as well as with the USDA Research Unit on Host Plant Resistance in corn. Eight USDA research scientists hold adjunct or nonregular 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 complimentary of the Department of Entomology's programs. The 1983-84 Gourman Report ranked the quality of MU's Department of Entomology graduate program as 22nd in the nation. Of those ranked higher, about half generally would be recognized as being at the top while Missouri and the remaining departments would be considered among the top third of all entomology departments in the nation to offer comparable programs. Such rankings have remained relatively stable during the past decade.



Early MU entomology research laboratory. Date unknown.

A professorship of natural history was one of the original faculty positions established at the newborn University of Missouri. Dr. Edward H. Leffingwell was the incumbent in 1844, only five years after MU was established. He earned \$500 a year plus one-sixth of all student fees, which at that time added perhaps \$300 to his annual salary.

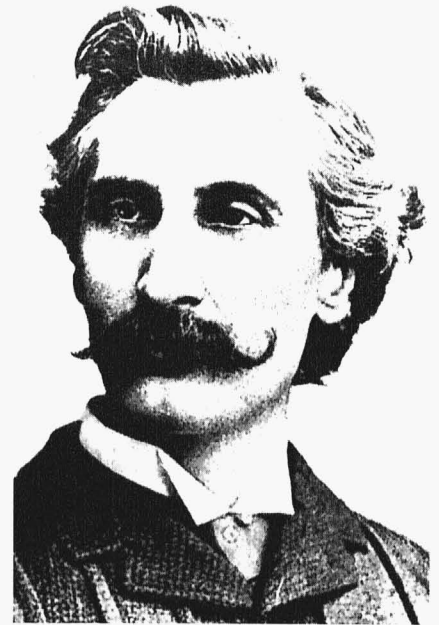
From the opening of the university, the subject matter of entomology was taught as an essential portion of natural-history instruction. The standard entomological textbook for many years was T. W. Harris' *Insects Injurious to Vegetation*, which the catalog of 1844 said had been a gift to the university.

Dr. A. Litton replaced Leffingwell for a year, and Dr.

The early years of entomology at MU

George Swallow succeeded him in 1851. In 1853, Swallow was appointed state geologist, and Professor J. Locke succeeded him. By act of legislature, effective June 6, 1860, the president of the university and all the faculty were dismissed. The board of curators then reestablished four departments, one of which was named Natural History and Natural Philosophy. Dr. Joseph G. Norwood led 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 state board of agriculture and in 1869 was appointed non-resident professor of entomology at MU. He served as lecturer in entomology with the university until 1875 and was officially responsible for 10 lectures annually. The invasion of Missouri by the Rocky Mountain grasshopper and the Colorado potato beetle during the 1860s created a demand for insect-control technology.



*Charles Valentine Riley
(1843 – 1895)*

Riley's series of lengthy papers on his pioneering research, known as the Missouri Reports and written while he was at the university, 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 doctorate in 1873.

The MU board of curators requested in April 1874 that Riley provide, by July of that year, an insect collection to support scientific studies and to serve as reference material. Riley assumed the role of curator and used duplicate specimens from his personal insect collection and from the state board of agriculture's cabinet. The minutes of the Dec. 9, 1874, curators' meeting reflect that the "Entomological

Cabinet” had been prepared. That “cabinet” constitutes the precursor of the current Wilbur R. Enns Entomological Museum, which occupies the south-central third floor of the Agriculture Building and contains more than one million arthropod specimens, principally species from Missouri.

MU’s College of Agriculture (now the College of Agriculture, Food and Natural Resources) was established in 1870, and Swallow was recalled to become the first professor of agriculture and natural science and later dean of the College

(1872). In his report on a proposed course of study, he said that entomology should have a prominent role, and he recommended the study of bee culture and the care of silkworms. When Riley discontinued his lectures, the College combined entomology and zoology and continued to offer the subjects. 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

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. In 1890, his title was changed to professor of botany, entomology and zoology. He continued to teach entomology until 1894, when a separate professorship of entomology was established in the College.

During the years 1889-1893, T. Smith, E. L. Kilbourne and C. Curtice, entomologists and veterinary researchers with the USDA,



MU entomology research laboratory in Whitten Hall. Mid-1930s.



L. Haseman and associate working with bees on the MU campus. Date unknown.



Lee C. Warth, a disabled World War I veteran and an old-time Missouri beekeeper, with P.C. Stone in 1963. Warth, who lived alone on his remote farm near Van Buren, donated money to the MU Department of Entomology "to promote beekeeping and a better understanding of the usefulness of bees." Warth died the following year.

established that the disease Texas cattle fever was caused by a microscopic parasite transmitted by *Boophilus* ticks. This research, conducted at MU, was the first proven

instance of an arthropod-vectored livestock pathogen and remains remarkable for the fact that transmission is transovarial. Their research paved the way for eradication programs that ultimately eliminated the Texas cattle fever tick from the United States.

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 brought about by an invasion of Missouri by San Jose scale in the early 1890s. In that year, the Department of Entomology was officially established within the College of Agriculture. George I. Reeves came to the staff as instructor in 1903,

and C. R. Crosby followed him from 1904 to 1906. Leonard Haseman succeeded Crosby in

1906. During 1907 and 1908, while Stedman was abroad, Haseman was in charge of the

The establishment of the Department of Entomology

Department of Entomology. The entire department was vacant from September 1909 to August 1910 while Haseman pursued his doctorate at Cornell. In all, Stedman was chairman from 1895 to 1909. Haseman succeeded Stedman as chairman in 1910. He also filled the roles of entomologist of the Agricultural Experiment Station and of chief plant inspector. In 1925, 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.

Before the creation of a separate Department of Entomology in 1895, courses in entomology had been offered along with other biological science courses, and enrollment was small. From 1895 to 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. 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 master of science and doctorate degrees in entomology were awarded in

1917 and 1918, respectively. One of the initial master's degrees was granted to A. H. Hollinger and was based, in part, on a study of Missouri scale insects.

Between 1910 and 1929, a number of entomologists served as assistants and instructors with Haseman. Among them, in chronological order, were T. J. Talbert, C. G. Vinson, K. C. Sullivan, 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 to teach as an assistant professor until 1943. He was absent during 1943 to 1947 but subsequently returned to extension edu-



*Leonard Haseman
(1884 – 1969)*

cation, teaching entomology by correspondence. He continued in that role until he retired in 1964.

The Haseman era of the Department of Entomology



*Philip Carlton Stone
(1911 – 1968)*

Until 1940, the teaching staff in entomology generally had been no larger than two faculty, but in that year Philip C. Stone and Harry E. Brown joined 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 Dr. Ruth Stone, who was P. C. Stone's wife, carried on the work of instruction and administration in entomology. Ruth Stone was the first woman with an official entomological position in Missouri and in the

Department of Entomology. In 1946, former research assistants Curtis W. Wingo and Enns joined 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 had begun to make field surveys and give demonstrations on control of insect pests as early as 1895. Early extension programs focused on chinch bug, scale insect and grasshopper control systems.



MU entomology teaching laboratory. Date unknown.

Entomology extension project leaders over the years have included C. C. Hamilton, Talbert, A. C. Burrill, O. Wade, G. D. Jones, H. Baker, V. E. Burk, S. Kyd, George W. Thomas, Wilfred S. Craig, Thomas R. Yonke, R. Eugene Munson, and Wayne C. Bailey. In 1965, following nationwide 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 Missouri insect pests, with fruit and truck crops receiving the most attention. Also studied were the insect pests of field crops, such as Hessian fly, chinch bug, corn earworm and grasshoppers. Haseman said, "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, MU extension entomologists dispensed and demonstrated effective use of about one million gallons of federally obtained chinch bug oil. This saved enough forage to keep most of Missouri's livestock herds intact.

The C. V. Riley Entomological



MU entomology laboratory in basement of Whitten Hall. Mid-1930s.

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 for many years it consisted of only two faculty members to five faculty members. 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 Enns' supervision. Later, another St. Louis physician, E. P. Meiners, donated his collection of 35,000 insects. These gifts significantly bolstered Riley's "Entomological Cabinet" and set the stage for future acquisitions by the Enns Entomological Museum.

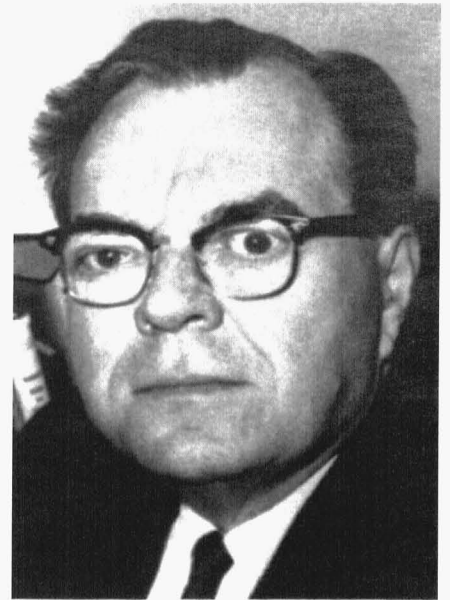
A number of important developments and studies have been conducted within MU's entomology department. In 1944, Haseman and L. E. Childers demonstrated that feeding honeybee colonies a diet containing sulfathiazole (a sulfa drug developed during World War II) protected them against American foulbrood disease. This finding saved millions of dollars for domestic apiculturists.

The first survey entomologist position in the United States was filled at MU in 1953 by George Thomas. During that year, the board of curators approved funding for the establishment of a bona fide entomological museum, which fur-

ther expanded the nucleus established by Riley in 1874.

Haseman retired in 1954 after 46 years of service and after serving as chairman of the Department of Entomology for 44 years, longer than any other chairman's tenure in the MU system. Stone was appointed chairman at that time and served until 1968, when he died suddenly of a heart attack.

In 1956, P. L. Adkisson and L. Jenkins established a research program to investigate the insect pests of cotton, corn, soybeans and vegetables in the farmlands of southeast Missouri. This program moved from Sikeston to Portageville in 1960 when MU's Delta Center opened. In 1957, Wingo, of the



*Harry Eugene Brown
(1911 – 1977)*

Department of Entomology, and colleagues from the School of Medicine established that the brown recluse spider, *Loxosceles reclusa*, caused many necrotic lesions on humans throughout the south central 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 actually was harmful in larger quantities). These results were important in subsequent nutritional experiments.

In 1960, the department moved from Whitten Hall to its current home in the Agriculture Building. In 1964, the construction was approved for the USDA's Biological Control of Insects Research Laboratory (BCIRL), and F. R. Lawson was appointed director. The

The Department of Entomology from the 1950s to today

research entomologists assigned were first housed in the Agriculture Building with the Department of Entomology, but from 1965 to 1967 they were located temporarily at 611 Missouri Ave., in a university-provided structure. Work on the main laboratory in Research Park began in 1966, the USDA entomologists moved from the Missouri Avenue location into the first-completed building at Research Park (the Insectary) in 1967 and the current BCIRL building opened 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 an increased emphasis on entomological research. As new faculty began 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. Enns acted as chairman for approximately one year and Dr. C. O. Knowles for a shorter period, until Dr. M. L. Fairchild became chairman in 1969. In 1980, Fairchild left this position to assume responsibilities as coordinator of pest management for the College, and Yonke was appointed interim chairman at that time and continued as chair until 1988.

In 1976, the entomology department discontinued its under-



MU Agriculture Building, home of the Department of Entomology since 1962. Photograph, taken from Hitt Street by J. Jarman, features the southwest entrance.

graduate-degree program in entomology to concentrate resources on integrated pest management and graduate education. Faculty continued to teach several courses for undergraduates both within and outside of the College of Agriculture. The master of science and doctoral programs grew in strength 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 as or shifted to extension-research joint

appointments, adding to the joint positions already existing between teaching and research.

In 1976, Dr. D. Barry was appointed as research entomologist with the USDA Host Plant Resistance Research Unit and was housed in the entomology department. During 1981 to 1983, a university-wide reallocation program and general reduction of funding led to the loss of three regular professorial positions, one research specialist and one administrative assistant in the department. This trend continued when a second research-specialist position was lost in 1987 to meet further reallocation and a third was lost in 1993.

The department received a major endowment in 1984 in the form of the Gilbreath-McLorn bequest, a direct result of Harry Brown's extension entomology involvement with ornamental plants and trees. Yonke took a year's leave of absence in 1988 to act as interim associate dean for agriculture extension programs in the College, and Dr. G. M. Chippendale was appointed interim chairman. Subsequently, the latter appointments became permanent.

In 1989, the College of Agriculture underwent a major administrative reorganization founded on departmental clusters or Resource Allocation Units. The



MU entomology faculty, early 1980s. Photo taken on the south steps of the Agriculture Building. Left to right; front row: Munson, Yonke, Sanders, Craig; second row: Thomas, Barry, Knowles, Fairchild, Jones; third row: Keaster, Brandenburg, Ignoffo, Linit, Chippendale, Enns; back row: Hall.

departments of Entomology, Agronomy, Horticulture and Plant Pathology were, at that time, combined into the Plant Sciences Unit. In effect, the departmental functions of fiscal management and faculty evaluation were consolidated at this Unit level. Because inception or elimination of university academic programs requires action by the board of curators, the Department

of Entomology remains responsible for the postgraduate curriculum in entomology. Chippendale's administrative duties were broadened to encompass coordination of plant pathology as well as entomology, and in 1994 those duties were broadened further to include partial responsibility as associate director of the Agricultural Experiment Station.

Currently, 11 professorial faculty remain on regular appointment in the department, plus five nonregular faculty with professorial title. Six scientists from the Agricultural Research Service, USDA, currently hold adjunct professorial appointments in the department.

MU entomology faculty, 1994. Photo taken on the south steps of the Agriculture Building. Left to right; front row: Chippendale, Puttler, Smith, Craig; second row: Bailey, Backus, Goodman, Steiner; third row: Munson, Sanders, Sites, McIntosh, Knowles; back row: Linit, Hall, Barrett, Keaster, Ignoffo, Enns. Not pictured: Jones, Showler, Sorenson, Wingo, Barry, Coudron, Greenstone. Photograph by J. Jarman.



Entomology professorial faculty at the University of Missouri since the late 1950s.

<u>Name</u>	<u>Year</u>	<u>Rank</u>	<u>Entomological specialty</u>	<u>Current Status (1994)</u>
P.L. Adkisson	1956	Assistant Professor	Field crops	Resigned, 1958
E.A. Backus	1984	Associate Professor	Behavior	Active
W.C. Bailey	1985	Associate Professor	Forage crops	Active
B.A. Barrett	1990	Assistant Professor	Horticultural insects	Active
B.D. Barry	1975	Adjunct Professor	Host-plant resistance	Active
T.E. Birkett	1929	Professor	General entomology	Retired, 1964
C.C. Blickenstaff	1957	Instructor	Forage crops	Transferred, 1963
R.L. Brandenburg	1981	Assistant Professor	Forage crops	Resigned, 1985
K.E. Brown	1973	Instructor	Urban, veterinary	Resigned, 1975
H.E. Brown	1940	Professor Emeritus	Plant-related entomology	Retired, 1973
G.M. Chippendale	1968	Professor	Physiology and biochemistry	Active
T.A. Coudron	1984	Adjunct Associate Professor	Insect biochemistry	Active
W.S. Craig	1965	Professor	Extension	Retired, 1985
D.M. Daugherty	1961	Adjunct Professor	Biocontrol, 1961-70; Kenya Project, 1988-92	Resigned, 1992
L.M. English	1978	Instructor	Pesticide Impact Assessment	Resigned, 1982
W.R. Enns	1946	Professor Emeritus	Taxonomy	Retired, 1978
M.L. Fairchild	1959	Professor Emeritus	Pest management	Retired, 1993
C.L. Goodman	1994	Research Assistant Professor	Biological control	Active
M.H. Greenstone	1984	Adjunct Associate Professor	Biological control	Active
R.D. Hall	1977	Professor	Medical and veterinary	Active
K. Harrendorf	1958	Assistant Professor	Cotton insects	Resigned, 1980
L. Haseman	1906	Professor Emeritus	Apiculture	Retired, 1954
E.C. Houser	1964	Instructor	Insect survey	Resigned, 1968
J.L. Huggans	1968	Associate Professor	Field-testing specialist	Died, 1981
C.M. Ignoffo	1971	Adjunct Professor	Biological control	Active
A.L. Jenkins	1942	Associate Professor	Horticultural insects	Retired, 1966
J.W. Johnson	1985	Assistant Professor	Horticultural insects	Resigned, 1989
F.G. Jones	1976	Associate Professor Emeritus	Extension	Retired, 1991
W.H. Kearby	1969	Professor	Forest insects	Resigned, 1980
A.J. Keaster	1962	Professor	Field crops	Active
R.L. Kirkland	1976	Assistant Professor	Biological control	Resigned, 1981
C.O. Knowles	1965	Professor	Toxicology	Active
F.R. Lawson	1964	Adjunct Professor	Biological control	Transferred, 1971
M.J. Linit	1981	Professor	Forest insects	Active
A.H. McIntosh	1984	Adjunct Associate Professor	Insect tissue culture	Active
J.W. Mullins	1979	Assistant Professor	Cotton insects	Resigned, 1981
R.E. Munson	1957	Associate Professor	Survey, field crops	Active
D.C. Peters	1957	Assistant Professor	Field crops	Resigned, 1959
L.L. Peters	1964	Instructor	Livestock, 4-H	Resigned, 1972
B. Puttler	1994	Extension Assistant Professor	Biological control	Active
M.E. Roof	1979	Instructor	Integrated Pest Management	Resigned, 1982
D.P. Sanders	1982	Professor	Urban entomology	Active
A.T. Showler	1993	Research Assistant Professor	Pest management	Active
R.W. Sites	1991	Assistant Professor	Taxonomy	Active
G.S. Smith	1992	Extension Assistant Professor	Pest management	Active
C.E. Sorenson	1992	Research Assistant Professor	Pest management	Active
W.M. Steiner	1985	Adjunct Associate Professor	Biological control	Active
P.C. Stone	1940	Professor	Insect nutrition	Died, 1968
G.W. Thomas	1947	Associate Professor	Extension, survey	Retired, 1983
R.H. Ward	1977	Assistant Professor	Population dynamics	Resigned, 1982
C.W. Wingo	1946	Professor	Medical and veterinary	Retired, 1977
F.E. Wood	1960	Instructor	Survey, 4-H	Resigned, 1964
T.R. Yonke	1967	Professor	Biosystematics	Died, 1994

