CURRENT PROGRAMMATIC PRIORITIES—ENTOMOLOGY:

Insects represent the largest and most diverse group of living organisms on earth and are also some of the most important model organisms used in science for research and teaching. The economic and health impacts of insect populations on plant and animal welfare have been well-documented and continue to be significant. Discoveries associated with insect biology, diversity, and ecology are also expanding our fundamental understanding of natural systems on which applied science rests. Because of the importance of insects in human society, there is a substantial need for trained entomologists to fill numerous jobs in industry, academia, and government.

The current programmatic priorities in Entomology seek to meet the demands for new knowledge and training about economically and ecologically important insects. Our priorities are: 1) maintain strong graduate student training programs, 2) facilitate research collaborations with leading scientists on campus and around the world, and 3) provide outreach education to industry, government agencies, and the public. Classroom training in entomology currently provides graduate and undergraduate students with a fundamental understanding of insect biology, classification, and ecology. Research utilizes novel approaches and tools to investigate original ideas and make important discoveries in the areas of insect molecular biology, behavior, ecology, and population management which benefit a wide variety of stakeholders. Extension and outreach education provides recommendations for managing economically important pest insects, certification for licensed pesticide applicators, and practical information to the general public.

To maintain and strengthen these priorities, we recommend hiring the following faculty positions (in no particular order) in the Division of Plant Sciences:

Position – Insect Chemical Ecologist

Responsibilities – Research would focus on chemically-mediated ecological interactions among insects, natural enemies, and plants. Laboratory and field methods would be used to investigate insect response to intra- and interspecific chemical stimuli. Research applicable to insects in agroecosystems is desirable. The successful candidate will be expected to establish a nationally competitive research program, advise graduate student research, and contribute to teaching.

Justification – A current research strength in entomology includes the chemical ecology of plant-insect interactions, but different labs approach the problem from very different perspectives. Programs either utilize laboratory studies to understand basic molecular/biochemical mechanisms or employ applied methods to monitor and control pest populations in the field. This position is proposed to link current research programs, and to facilitate collaborations that lead to translational research between the lab and field.

Position – Insect Molecular Ecologist

Responsibilities – Focus should be on the use of molecular-genetic approaches to address ecological interactions of insects with their environment. Potential research areas include insect population genetics, insect interactions with genetically modified organisms, spread of introduced and invasive species, phylogeography, adaptive function of genes, genetic diversity and relatedness, genetic basis of community interactions, and genetic basis for insecticide resistance. Research applicable to insects in agroecosystems is desirable. Would be expected to establish a nationally competitive research program, advise graduate student research, and contribute to teaching needs.

Justification – Current research strengths in entomology include ecology and molecular biology, however there is a need to bridge the gap between these two strengths. This position will facilitate collaborations among faculty members and strengthen graduate student training by providing an experimental perspective that spans molecular and ecological approaches and exposing faculty and students to molecular-genetic research tools used to examine applied ecological questions.

Position – Medical Entomologist

Responsibilities – Mosquitoes and other pathogen-carrying arthropods are serious vectors of many diseases. Research focus would be on medical entomology with emphasis on studies of arthropod vectors of disease at the cellular and/or molecular level. They should provide insight and experience with linking new scientific discoveries with technologies and applications for managing arthropod vectors. They would be responsible for developing an extramurally funded and nationally recognized research program. They would be expected to advise graduate students and contribute to teaching or extension needs.

Justification – Recent data indicate that vector-borne diseases in Missouri have increased rapidly in recent years and are likely to increase in the future, however there is no medical entomologist at MU or in the state of Missouri to deal with these challenges. External funding for a medical entomologist with research emphasis on vector-borne diseases is abundantly available currently from NIH, CDC, WHO, etc. There is also an urgent need for someone to provide outreach information to the citizens of Missouri, policy makers, and county extension agents throughout Missouri about insect vectors and the diseases they transmit.