NEWS RELEASE

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Scientist Heads $2.4 Million Project to Map Flies' Family Tree

FOR IMMEDIATE RELEASE

An international research team headed by a North Carolina State University entomologist has won a $2.4 million grant to fill a tall order – the order Diptera, that is.

As part of a massive National Science Foundation-funded effort called Assembling the Tree of Life, the team is creating a better picture of the evolutionary and genetic ties that link some 125,000 fly species that make up the order. The Tree of Life project – rooted in Charles Darwin's concept that all of life, from the smallest microorganism to the largest vertebrate, is genetically connected – aims to pull together a family tree for all 1.7 million known living species.

Dr. Brian Wiegmann, an associate professor in NC State's Department of Entomology, heads the team selected to assemble the fly Tree of Life. His collaborators include entomologists, biologists and geneticists from every continent. The researchers will create a picture of the historical relationships, explaining similarities and differences among flies, mosquitoes, gnats and midges since the first ones emerged 250 million years ago.

While they assemble the fly tree, the researchers also will train a large number of undergraduate and postgraduate students in Australia, Canada, the United States and Singapore. They also plan to share their findings with educators and others through a Web site.

Wiegmann's co-principal investigators in the five-year project are Drs. David Yeates, with Australia's Commonwealth Scientific and Industrial Research Organization; Rudolf Meier, of the National University of Singapore; Gregory W. Courtney, of Iowa State University; and Markus Friedrich, of Wayne State University.

These scientists and their collaborators will use a combination of genetic data, computer modeling and morphology – information on a species' form and structure – to figure out where the insects fit into life's genealogy.

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The team also includes taxonomists and data management experts, including F. Christian Thompson, of the U.S. Department of Agriculture's Systematic Entomology Laboratory, and Gail Kampmeier, of the Illinois Natural History Survey. They will create the kind of shortcuts needed to make sense of a huge amount of fly data, helping link names and relationships with fossil records, morphological studies and modern genetic maps.

Wiegmann said that information gleaned from the study could have implications for human health, food security and conservation. Flies transmit some of the worst viruses infecting people and animals, and they also take a heavy toll on crops.

Among the questions that the Tree of Life can help answer: why some mosquitoes can transmit viruses like those that cause malaria, West Nile and dengue fever, while others can't, and how certain species have become resistant to insecticides.

The tree will also provide information for protecting the environment and advancing our understanding of genetics. Fruit flies have long been the model species for genetics research, and flies are ecologically important, pollinating plants and decomposing waste.

Says Yeates, an Australian entomologist, "A big part of biodiversity is actually 'flyodiversity.' Of nearly 2 million living species known to science – and there are many more yet to be discovered – around 10 percent are flies, or Diptera, of some sort."

Wiegmann believes the Tree of Life project will help scientists get a better grasp of that diversity at a time when it is changing rapidly.

"Earth is such a diverse place, and we know relatively little about most organisms and what leads to changes over time," Wiegmann says. "Because of advances in computer speed and genomics, we have the technology to generate and organize an amazing amount of information into a broader framework that can help us understand this fragile and constantly changing diversity and its ramifications."

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