Insect population growth likely accelerated by warmer climate

October 30 2006

Insects have proven to be highly adaptable organisms, able through evolution to cope with a variety of environmental changes, including relatively recent changes in the world's climate. But like something out of a scary Halloween tale, new University of Washington research suggests insects' ability to adapt to warmer temperatures carries an unexpected consequence -- more insects.

It appears that insect species that adapt to warmer climates also will increase their maximum rates of population growth, which UW researchers say is likely to have widespread affects on agriculture, public health and conservation.

Many studies have shown that insects readily adapt to the temperature of their environment. For example, those living in deserts easily tolerate high temperatures but are much less tolerant of cold temperatures than insects living in mountains. Now UW biology researchers have found that insect species that have adapted to warmer environments also have faster population growth rates. The research shows, in effect, that "warmer is better" for insects, said Melanie Frazier, a UW biology doctoral student.

"Enhanced population growth rates for butterflies might be a good thing, but enhanced growth rates for mosquito populations is much more dubious," said Frazier, who is lead author of the new research, published in the October edition of the journal *The American Naturalist*.

Co-authors are Raymond Huey, a UW biology professor, and David Berrigan, a former UW biology researcher now with the National Cancer Institute.

The findings suggest that evolutionary adaptation to climate warming will have profound ecological effects because rates of population growth eventually will alter entire ecosystems, Frazier said. In addition, key ecosystem characteristics such as species diversity and food webs are very sensitive to the population growth rates of the species living and interacting in those ecosystems.

She noted that biochemical adaptation to warmer temperature is not the only possible insect response to climate warming. Some species might evade warmer temperatures by moving to cooler habitats, or they might alter their seasonal activity patterns. Others might not be able to adapt adequately and could become extinct. But those that do adapt should have elevated rates of population growth.

"No matter which scenario plays out for a given species, local ecosystems will be profoundly altered," Frazier said.

Source: University of Washington