Entomologists seek fungus to blunt mosquitoes' sense of smell

May 7 2009

Sick people often lose their sense of smell and their appetite. If this happened to mosquitoes, they would not be able to feed on humans and spread malaria. A team of Penn State entomologists is looking for an insect disease that will infect mosquitoes and impair their sense of smell.

Supported by a recent $100,000 grant from the Bill and Melinda Gates Foundation's Grand Challenges Explorations Initiative, the researchers were among 81 projects funded from more than 3,000 applications in the second round of the program. Grand Challenges focuses on novel approaches to prevent and treat infectious diseases, such as HIV, malaria, tuberculosis, pneumonia and diarrheal diseases.

The researchers, who include Thomas Baker and Matthew Thomas, professors of entomology and Andrew Read, professor of biology and entomology and Eberly College of Science distinguished senior scholar, are all part of Penn State's Centers for Chemical Ecology and for Infection Disease Dynamics. They plan to test a variety of naturally occurring insect pathogenic fungi.

"We will infect malaria mosquitoes with an insect-specific fungus to determine how much the infected mosquitoes' sense of smell is suppressed, thus reducing their ability to find human hosts and transmit malaria," said Thomas.

Mosquitoes transfer malaria parasites to humans when the female mosquitoes bite humans for blood meals to allow them to lay eggs. Male

mosquitoes and non-reproducing females sip nectar or other sources of sugar for energy. Mosquitoes do not have noses, but smell using their antennae.

The researchers will infect batches of mosquitoes with a variety of fungi known to infect insects. They will expose the mosquitoes and an uninfected control group to potential mammalian blood meal -- an animal in an adjacent cage. Those mosquitoes that approach the warm-blooded food source will be separated out from those that are uninterested.

Once the researchers know the individual mosquito's behavior, they will investigate their olfactory receptor neurons to see if the fungus has impaired the mosquitoes' ability to smell. When the researchers identify fungi that will impair mosquito smelling ability, they will find ways to introduce the fungi into the environment so the mosquitoes can infect themselves.

"Our aim is to impregnate bed-nets or other things like eave curtains, hanging cloth or residual sprays in human dwellings with an insect infecting fungus like one already registered in Africa to control locusts and grasshoppers and infect malaria mosquitoes so that they no longer can smell and attack humans," the researchers said.

Source: Pennsylvania State University (news : web)