

## Keeping the Enemy Closer

By KATELYN S. CROW

Mosquitoes are pesky and can even be deadly. Scientists at the University of Florida are conducting research to help limit mosquito populations using the same cells that mosquito larvae feed on.

Dov Borovsky, research foundation professor in the department of entomology and nematology, has discovered a hormone naturally excreted in the ovaries of mosquitoes that stops the digestion of food.

“My main interest is to find some ‘silver bullets,’” Borovsky said. “In other words, we are looking at hormones in insects [to determine] if applied at certain times, [they] will kill them. This will let us get away from insecticides.”

Created in 1990, a synthetic version of this hormone, called Trypsin Modulating Oostatic Factor, was found to be effective on other insects such as the citrus root weevil.

“It can be given to adult and larvae to prevent digestion of food and the laying of eggs,” said Charles Powell, professor in the department of plant pathology. “Not only causing death, but decreasing populations.

“We know it could be a very good biological control, but we lacked a delivery system,” Powell said. “The best part about this technology is that we now have ways to deliver anti-insect material and therefore reduce insect populations as part of a biological control strategy.”

This hormone also has the potential to save farmers a great deal of money by using less insecticides and pesticides, Borovsky said.

Scientists discovered that TMOF could be expressed on the coat protein of in the tobacco mosaic virus and can be applied to plants that many insects consume, such as alfalfa. Scientists are also researching ways to stably transform and express high quantities of TMOF in the alfalfa plant so the plants will produce TMOF naturally.

“The virus is attenuated so not to harm the plant and can be applied as an aerosol or by simply rubbing the virus on the leaves of the plant,” Powell said.

Possible control against the citrus root weevil can be achieved by planting genetically modified alfalfa plants producing TMOF around the foot of citrus trees. Insects that eat the genetically modified alfalfa will die before reaching the citrus root system.

Another advantage of using the tobacco mosaic virus expressing TMOF is that it is not harmful to humans.

“Anyone who eats plants will have TMOF in them because it is naturally occurring and has been since the beginning of time,” Powell said.



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### Malaria Medicine

Instead of using pesticides and aerial sprays to reduce outbreaks of malaria, scientists are looking to nature to provide its own solution to a disease that kills more than one million people worldwide each year.

University of Florida scientist Dov Borovsky is working with the Harvard School of Health to find more efficient ways to fight malaria, especially in third-world countries.

Borovsky and his colleagues are researching how to insert a synthetic version of a naturally occurring hormone found in mosquitoes. The synthetic version of the natural hormone is called Trypsin Modulating Oostatic Factor. TMOF inhibits mosquitoes' ability to digest food, which causes them to eventually die.

TMOF can be produced in the pollen of maize that mosquito larvae feed in nature in Africa. Once the larvae ingest the TMOF, they will not be able to reach maturity.

“Because it is unpractical to spray for insects in Africa, we are trying to express TMOF in maize since it is grown everywhere,” Borovsky said. “You will have your little garden around your house growing maize and you can control mosquitoes even if you live deep in the Bush.”

### Contact Information

Dr. Dov Borovsky: dobo@ufl.edu, (772) 240-7200

Dr. Charles Powell: capowell@ufl.edu, (772) 468-3922 ext. 123

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**UF Genetics: [ufgenetics@ufl.edu](mailto:ufgenetics@ufl.edu) or visit <http://ufgenetics.com>**