

Scientists are in the preliminary stages of developing a genetic vaccine for Johne's disease.

says. "The industry needs this kind of speed and accuracy in diagnosing infected animals for prevention to be successful."

Ellingson has identified and sequenced a gene known as the *hspX* gene. This discovery is the first scientific evidence of a heat shock-like molecular chaperone protein that appears to protect the bacteria from the cow's immune system.

He and Stabel have included this gene in a gene probe and have already developed a useful diagnostic tool for veterinary medicine. While they are still studying exactly how this gene functions, they are in the preliminary stages of developing a genetic vaccine for Johne's disease.

Until now, only two other gene sequences of *M. paratuberculosis* have been reported. These were developed by English and Belgian researchers in the early 1990s.—By **Linda Cooke McGraw**, ARS.

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## Nematode Dupes House Flies

Could this be the Trojan horse of biocontrol?

A parasitic nematode that deceives houseflies into spreading nematode offspring instead of fly eggs could become a classical biological control agent, according to ARS scientist Christopher J. Geden.

An entomologist with ARS' Center for Medical, Agricultural, and Veterinary Entomology's Mosquito and Fly Research Unit in Gainesville, Florida, Geden is evaluating this new discovery.

The nematode, *Paraiotonchium muscadomesticae*, has so far been found only in Serra Talhada, a small town in northeastern Brazil. University of Florida graduate student Reginald R. Coler is credited with the discovery.

How does such trickery work? A female nematode penetrates a host fly's larval cuticle and waits for the larva to metamorphose into an adult. When the adult fly emerges, the female nematode goes through a burst of reproductive activity, producing up to 40,000 young nematodes inside the fly.

"These young parasites invade and damage the fly's ovaries, causing parasitic castration—a relatively uncommon phenomenon," says Geden.

About 15 days after the nematode's initial penetration, the female fly attempts to deposit eggs into her favorite nesting material—usually moist manure. Instead of laying her own eggs, the female fly is unaware she is actually unloading thousands of young nematodes! These new nematodes mate, after which the males die and the females begin searching for more fly hosts to parasitize. The process then repeats.

In lab studies using modest application rates, nematodes reduced house fly numbers by about 90 percent. ARS is keeping under quarantine at Gainesville the only colony of the nematode outside its native Brazil. Geden has studies under way to determine the safety of releasing the nematode and the likelihood of its survival in a typical farm setting. He is also standardizing rearing procedures so that large quantities of infected flies can be easily and economically produced.

Geden says, "In the United States, house flies pose serious legal problems for farmers because of public health, sanitation, and nuisance concerns. The poultry industry alone spends over \$30 million per year on insecticides for fly control. This nematode could bring about an overall reduction in house fly populations."—By **Tara Weaver**, ARS.

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