

SHOO FLY!

Role of House Flies in Spreading *Salmonella* in Poultry

Common house fly,
Musca domestica.



STEPHEN AUSMUS (D1051-24)

It's common knowledge that house flies are carriers of disease. That's why there's such widespread effort to keep them out of our kitchens and away from our food.

But could the common house fly, *Musca domestica*, also play a role in spreading food poisoning bacteria such as *Salmonella enteritidis* to chickens—and their eggs—even before the foods get into the marketing chain?

Microbiologist Peter S. Holt and entomologist Christopher J. Geden were curious. Holt works in the Egg Safety and Quality Research Unit at ARS's Richard B. Russell Research Center in Athens, Georgia, while Geden is at the agency's Center for Medical, Agricultural, and Veterinary Entomology in Gainesville, Florida.

"We decided to investigate whether infected hens could pass the infection on to flies," says Holt, "and whether those flies could then infect healthy birds. If so, we wanted to see how that happens and where the *Salmonella* bacteria appear on—and in—the flies."

In three experiments, Holt placed chickens in individual, adjacent laying cages. Geden delivered fly pupae just 48 hours short of their emergence as flies; these were placed in an open box in the bird room. Three days later the hens were challenged with *Salmonella*.

"We found that about half the house flies became colonized with *Salmonella* soon after emergence," says Holt. The bacteria were detected in and on 45-50 percent of the flies within the first 48 hours, and levels remained at 50 percent or higher for the following 5 days.

Best If Ingested

Next, the researchers exposed uninfected hens to the newly infected flies. They found that just being around the contaminated flies didn't cause healthy birds to become infected, but eating infected flies did. And though the studies showed minimal bacterial contamination of the hens' crops, intestinal colonization occurred in about 38 percent of the birds by days 6 and 13 of the experiment. The crop is a small sack in the digestive system that stores predigested food.

"We found that simple physical contact may not be the primary method of transfer of *Salmonella* bacteria to different surfaces in a poultry house," says Holt. "But a hen's eating of contaminated

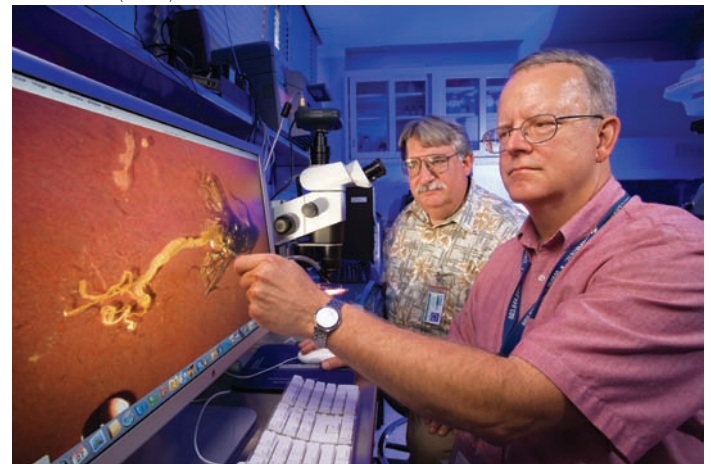
flies does seem to be the primary mechanism of transmission of *Salmonella* from flies to birds."

Holt has shown that flies in poultry houses are not only a nuisance, but also a threat to the safety of poultry products. "Though there is much more to learn about the relationship between *Salmonella*, flies, and poultry, this research shows that growers need to pay special attention to fly control using methods of surveillance and treatment that are already available," says Holt.—By **Sharon Durham, ARS.**

This research is part of Food Safety (animal and plant products), an ARS national program (#108) described on the World Wide Web at www.nps.ars.usda.gov.

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Using a dissecting scope, entomologist Chris Geden (left) and microbiologist Peter Holt identify which of a fly's internal organs should be examined for *Salmonella enteritidis* contamination.