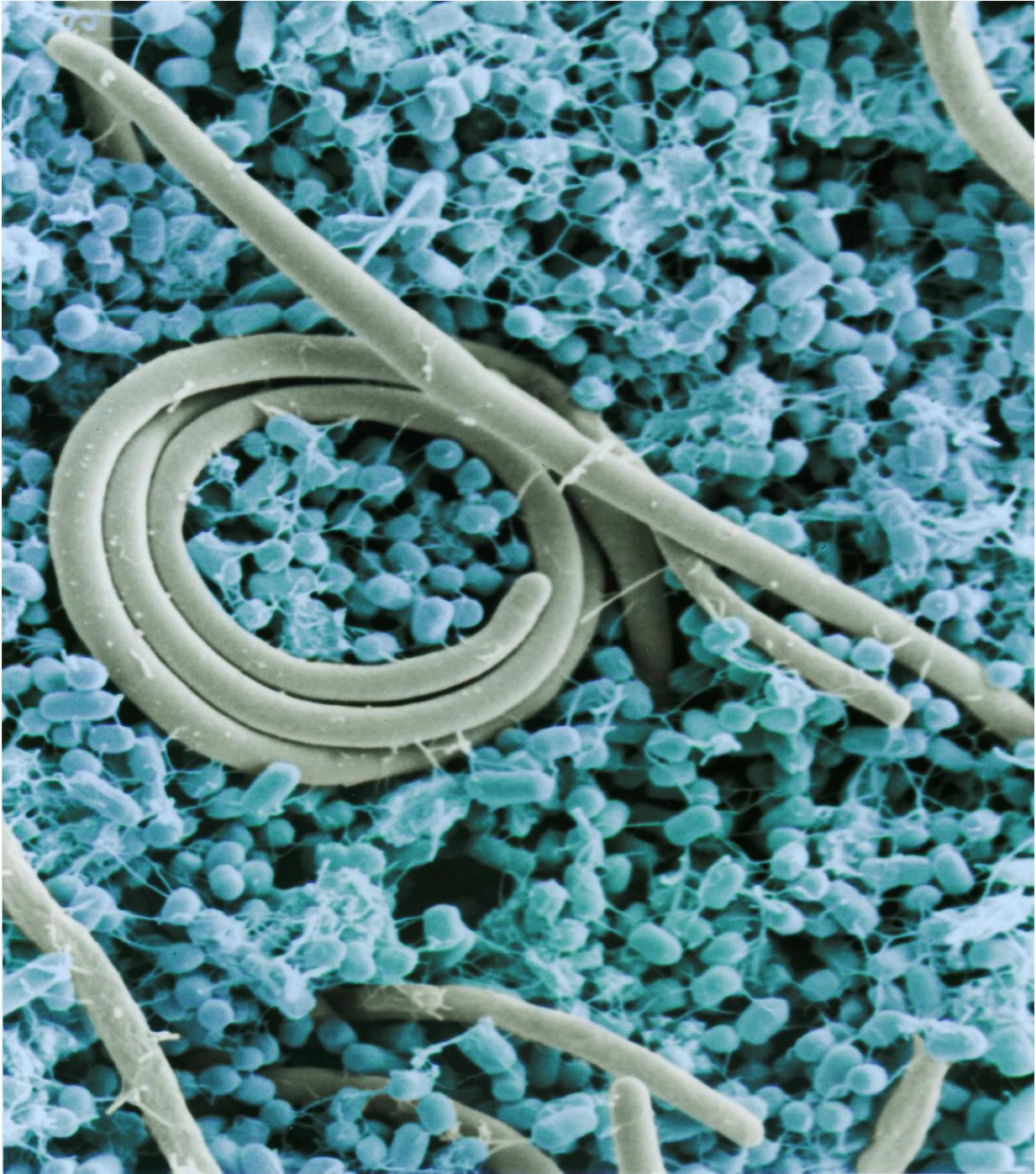


Eggs from small flocks just as likely to contain *Salmonella enteritidis*

September 14 2016, by A'ndrea Elyse Messer



Colorized SEM (scanning electron micrograph) of the foodborne pathogen *Salmonella enteritidis*. Blue is growth medium. Picture is colored in false colors to illustrate difference. Photo by Jean Guard, ARS. Credit: U.S. Department of Agriculture/public domain

Eggs from small flocks of chickens are just as likely to be contaminated with *Salmonella enteritidis*—often referred to as SE—as eggs sold in grocery stores, which typically come from larger flocks, according to researchers in Penn State's College of Agricultural Sciences.

That conclusion—which flies in the face of conventional wisdom that eggs from backyard poultry and small local enterprises are safer to eat than "commercially produced" eggs—was drawn from a first-of-its kind, six-month study done last year in Pennsylvania. Researchers collected and tested more than 6,000 eggs from more than 200 selling points across the state.

Salmonella enteritidis is a leading foodborne pathogen in the United States, with many outbreaks in humans traced back to shell eggs. The U.S. Food and Drug Administration requires shell-egg producers from farms with more than 3,000 chickens be in compliance with the FDA Final Egg Rule, which is aimed at restricting the growth of pathogens. However, small [flocks](#) with fewer than 3,000 layer chickens currently are exempted. Eggs from these producers often are marketed via direct retail to restaurants, health-food stores and farmers markets, or sold at on-farm roadside stands.

From April to September 2015, the researchers purchased two to four dozen eggs from each of 240 randomly selected farmers markets or roadside stands representing small layer flocks in 67 counties of Pennsylvania. Internal contents of the eggs and egg shells were cultured separately for *Salmonella* using standard protocols. *Salmonella* recovered were classified by serotype, and any *Salmonella enteritidis* isolates present were further characterized to evaluate their relatedness to isolates of the bacteria that have caused foodborne illness outbreaks.

Test results revealed that of the 240 selling points included in the study, eggs from five—2 percent—were positive for *Salmonella enteritidis*.

Eggs sold at one of the positive selling points contained the bacteria in egg shells; the eggs from the other four selling points had *Salmonella enteritidis* in internal contents.

That is a higher prevalence of the pathogen than that found in studies of eggs from large flocks, noted lead researcher Subhashinie Kariyawasam, microbiology section head at Penn State's Animal Diagnostic Laboratory. Those eggs, from flocks of more than 3,000 birds, are subject to federal regulations aimed at reducing *Salmonella enteritidis* contamination.

These regulations require measures such as placement of *Salmonella*-"clean" chicks, intensive rodent control, cleaning and disinfecting between flocks, environmental monitoring of pullet and layer houses, continuous testing of eggs from any *Salmonella*-positive houses, and diverting eggs from *Salmonella*-positive houses for pasteurization.

Kariyawasam—who presented the research findings to the American Veterinary Medical Association and the American Association of Avian Pathologists at their August meeting in San Antonio, Texas—said the study clearly demonstrated that *Salmonella enteritidis* is present in the eggs produced by small flocks.

"The research highlights the potential risk posed by the consumption of eggs produced by backyard and small layer flocks. And, analysis of the *Salmonella enteritidis* present in the eggs from small flocks shows they are the same types commonly reported to the Centers for Disease Control and Prevention from human foodborne outbreaks," she said.

"These findings emphasize the importance of small-producer education on *Salmonella enteritidis* control measures and perhaps implementation of egg quality-assurance practices to prevent contamination of eggs produced by backyard and other small layer flocks."

Eggs from small flocks make a negligible contribution to the table egg industry in the United States, Kariyawasam noted. But the growing demand for backyard eggs and eggs from nonfarm environments—with small egg-producing flocks managed in cage-free systems and pasture situations—suggests these production systems deserve some scrutiny.

"We were curious about Salmonella contamination of eggs produced by these flocks because the prevalence of this pathogen in smaller flocks was not known. Now we know that the prevalence of Salmonella enteritidis in eggs produced by small flocks is higher than in eggs produced by larger flocks."

Salmonella enteritidis, like other foodborne bacteria, is destroyed by proper cooking. However, Salmonella infections can be very serious, even life-threatening, especially to the very young, the elderly and people with weakened immune systems.

"The bottom line is, if you buy your eggs from the small producers, you need to worry about Salmonella just as if you bought eggs produced by large flocks," Kariyawasam said. "And, beyond the consumption of [eggs](#), birds in these flocks can have Salmonella, so people with backyard poultry need to be aware of the dangers with pet birds—there is a risk to allowing birds to come into the house and children playing with the chickens."

Other Penn State scientists who contributed to the study were Eva Wallner-Pendleton, senior research associate and avian pathologist, Gregory Martin, poultry science extension educator, and Thomas Denagamage, postdoctoral scholar in veterinary and biomedical sciences.

Provided by Pennsylvania State University

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