

Horizontal Transmission of *Salmonella* and *Campylobacter* Among Caged and Cage-Free Laying Hens

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Important Findings

In each of five sequential trials, laying hens (56–72 wk of age) were challenged with *Salmonella* and *Campylobacter*, and 1 wk postinoculation, the challenged hens ($n = 3$) were commingled with nonchallenged penmate hens ($n = 12$) in conventional wire cages, on all-wire slats, or on all-shavings floor housing systems. The overall results of this study indicate that the caged housing system provided the lowest horizontal transmission level (by 28 to 40%) of *Salmonella* and *Campylobacter* among egg-laying hens (Figure 1).

Significance of Findings

The horizontal transmission of *Salmonella* from challenged hens between caged and cage-free housing systems was not significantly different. However, when residual *Salmonella* Typhimurium was taken into account, the shavings housing system provided the greatest horizontal transmission. The shavings housing system also provided the greatest horizontal transmission of *Campylobacter*. Therefore, with regard to food safety, the overall results of this study

indicate that the caged housing system provides the lowest potential for horizontal transmission of *Salmonella* and *Campylobacter* among egg-laying hens.

Additional Information

Salmonella and *Campylobacter* are common causes of foodborne bacterial gastroenteritis in the United States and worldwide and are considered to be the most important zoonotic pathogens with regard to poultry. *Salmonella* infection among laying hens is a primary food safety concern for the commercial table egg industry because *Salmonella enterica* serovar Enteritidis is the primary pathogen that intermittently contaminates eggs and eggs are the main food source for transmission of *Salmonella* Enteritidis to humans. Greig and Ravel recently analyzed the international foodborne outbreak data reported between 1988 and 2007 and found that 43% of *Salmonella* Enteritidis outbreaks were associated with eggs.

Eggs can become contaminated before oviposition as a result of the reproductive tissues (ovary and oviduct) being infected, at oviposition when the eggshell passes through the cloaca, or after oviposition when the egg comes in contact with contaminated environmental surfaces, and these routes of contamination have been identified as transovar-

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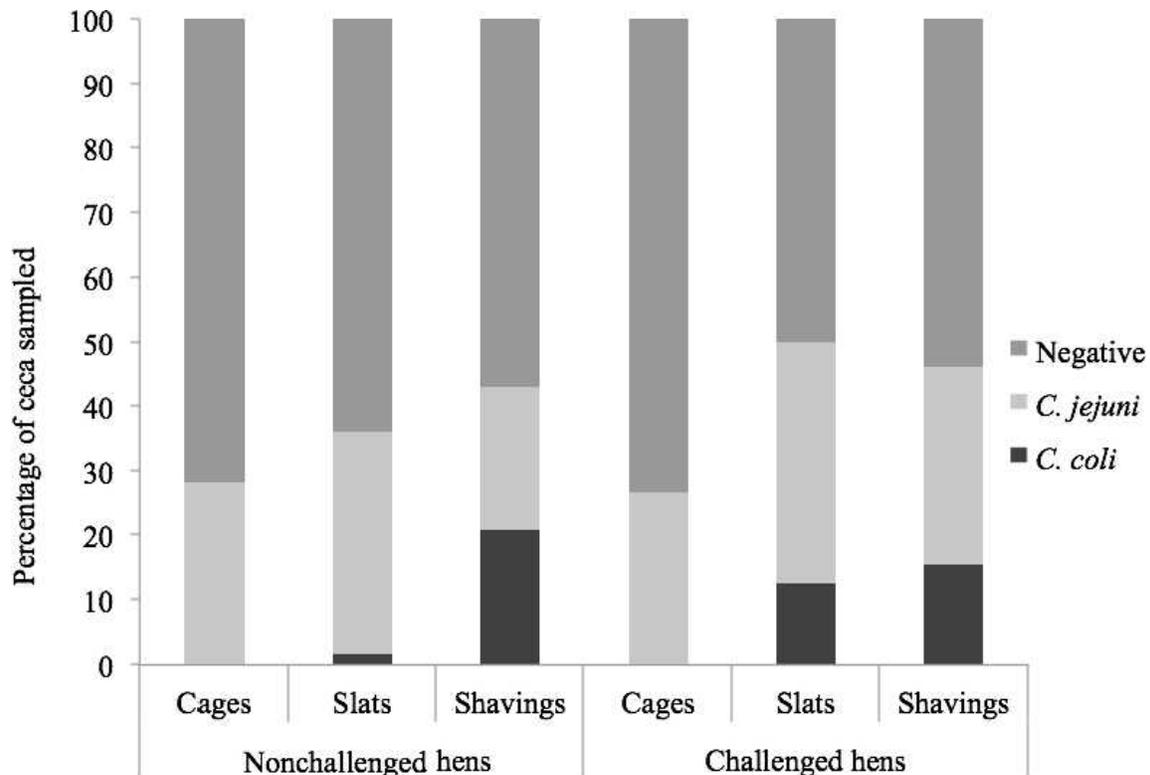


Fig. 1. Percentage of cecum samples collected from nonchallenged and challenged penmate hens in cages, slats, and shavings housing systems positive for *Campylobacter coli* or *C. jejuni* or that were negative.

Fig. 1. Porcentaje de muestras de ciego recolectadas de gallinas sometidas a desafío y no sometidas al desafío en el mismo alojamiento en sistemas de alojamiento de jaulas, tarimas y recortes de madera positivas a *Campylobacter coli* o a *C. jejuni* o que fueron negativas.