Introduction

Agricultural fairs provide an opportunity for people from all backgrounds to interact with various animals, and can serve as an invaluable educational opportunity. However, these fairs can also facilitate the spread of fecal zoonotic pathogens to animals and humans due to the repeated contact between visitors and the animals on display.1 Between 1991 and 2005, there were 51 outbreaks of enteric disease among humans associated with fairs and petting zoos.2 Furthermore, these fairs pose a risk for pathogens entering the food supply. While most commercial farms have strict disease prevention protocols, most hobbyist and farmers do not, which puts commercial animals at risk in a fair setting.3 As fairs provide opportunities for human animal interaction and education, it is essential that the risk of disease transmission at these fairs be minimized, so people and animals can attend the fair at minimal risk.

Methods

At the fair:
- Fecal and bedding samples were collected opportunistically. Carry-Blair media was used to preserve Campylobacter organisms in the fecal sample.
- Participating 4-H and FFA youth completed a multiple-choice survey to characterize risk factors and behavior.

In the lab:
- Salmonella testing: Fecal samples were enriched in selenite, and bedding samples were enriched in both selenite and TSB broth. Samples were incubated on XLD agar. Suspect colonies were further screened using TSI agar, LIA agar, urease test, and Simmons citrate test.
- Campylobacter testing: Samples were enriched in TSB broth, and then incubated on CVA agar. Any suspect colonies were further screened with a gram stain, a catalase test, and an oxidase test.

Results

A total of 207 fecal sample and 126 bedding sample from animal pens were collected across three county fairs in California. Due to the small number of animals found shedding Campylobacter, a risk factor analysis was not possible.

| Table 1 – Prevalence of pathogens found in samples collected at the county fair |
|-----------------------------|-----------------------------|-----------------------------|
|                            | Salmonella spp. | Campylobacter spp. |
| Goat                        | 0% (0/38)        | 0% (0/38)            |
| Cattle                      | 0% (0/58)        | 3.5% (2/58)          |
| Sheep                       | 0% (0/56)        | 0% (0/56)            |
| Swine                       | 10.9% (6/55)     | 0% (0/55)            |
| Bedding                     | 3.2% (4/126)     | 0% (0/126)           |

- Eleven percent of the swine fecal samples tested positive for Salmonella.
- Three percent of bedding samples collected from animal pens tested positive for Salmonella. Three of the pens contained swine and one contained sheep.
- Three percent of the cattle fecal samples tested positive for Campylobacter.
- Swine were found to be 7 times more likely to be shedding Salmonella than cattle as a reference species (P=0.08). Sheep and goats did not have a greater risk of shedding Salmonella using a logistic regression analysis.
- The following behaviors were not associated with increased or reduced risk of animals shedding Salmonella: age of the animal, sharing of pens, hand washing of owner before interacting with their animal, use of dedicated clothing and/or footwear by the owner around the animal, frequency of washrack use, frequency of bedding change, sharing of tools, washing of tools, and attending previous fairs.

Conclusion

To the author’s knowledge, this is the first report of prevalence of Salmonella and Campylobacter in bedding at county fairs. The presence of Salmonella in the bedding indicates that the animal’s environment is a potential source of infection for animals as well as humans.

The prevalence of Salmonella in swine was consistent with the literature assessing the prevalence of Salmonella in swine at county fairs.1 The prevalence of Campylobacter in cattle found in this study was less than prevalence that was previously reported at county fairs.

Swine were found to have an increased risk of shedding Salmonella, which may be due to their management, behavior, or biology. Exhibitors and visitors at the county fair should be especially cautious when handling swine or interacting with the swine’s environment.

Although pathogens were not found at high levels at these fairs, their presence still warrants caution. Fair visitors and exhibitors should be reminded of good biosecurity practices, such as washing their hands before and after touching an animal and refraining from eating or drinking around the animals.

The data gathered in this study will be shared back with the 4-H community through the “Mitigating Zoonotic and Animal Disease Risks in 4-H Animal Science Projects through Coordinated Education and Research” research project, in which this project is based. The study uses a case-control approach to study the effects of administering biosecurity education to 4-H youth groups that raise animals on biosecurity practices at home and at the fair.

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References