

ZOONOTIC PATHOGENS IN PEST RODENTS OF FINNISH SWINE AND CATTLE FARMS

Heidi Rossow¹, Maria Simola², Jukka Ranta¹, Jukka Niemimaa³, Otso Huitu³, Heikki Henttonen³, Pirkko Tuominen¹

¹Risk Assessment Unit, Laboratory and Research Division, Finnish Food Authority, Helsinki, Finland • ²Microbiology Unit, Laboratory and Research Division, Finnish Food Authority, Helsinki, Finland
³Natural Resources Institute Finland, Helsinki, Finland

INTRODUCTION AND METHODS

Pest animals are considered a source of zoonotic bacteria in primary production. However, it is still unclear to which extent rodents or other small mammals maintain these bacteria. The main objective of this study was to obtain information about the occurrence of zoonotic bacteria in pest animals of farm environments. Pest animals caught from the surroundings of the production farms were screened for the presence of the following zoonotic bacteria: salmonella, campylobacter, *Yersinia enterocolitica*, *Y. pseudotuberculosis* and Shiga-Toxin Producing *Escherichia coli* (STEC). Small mammals were trapped at 38 farms (18 cattle farms and 20 swine farms) in Southern and Western Finland. Rodent trapping was carried out at each farm in fall 2017 and 2018. One hundred traps were placed on the premises of each farm for two nights. The laboratory methods used are presented in Figure 1. The prevalence of the bacteria in pest animals, (Figure 2), was estimated using hierarchical model for the k th sample outcome from the $i[k]$ th farm as: $P(+vek)=1-(1-pi[k])^{n[k]}$ with $n[k]$ as the pool size and $\text{logit}(pi) \sim N(\text{logit}(p0),\sigma^2)$. The prior for between farm variation was $\sigma \sim U(0,100)$ and $p0 \sim U(0,1)$. Posterior distribution was simulated with 50,000 iterations.

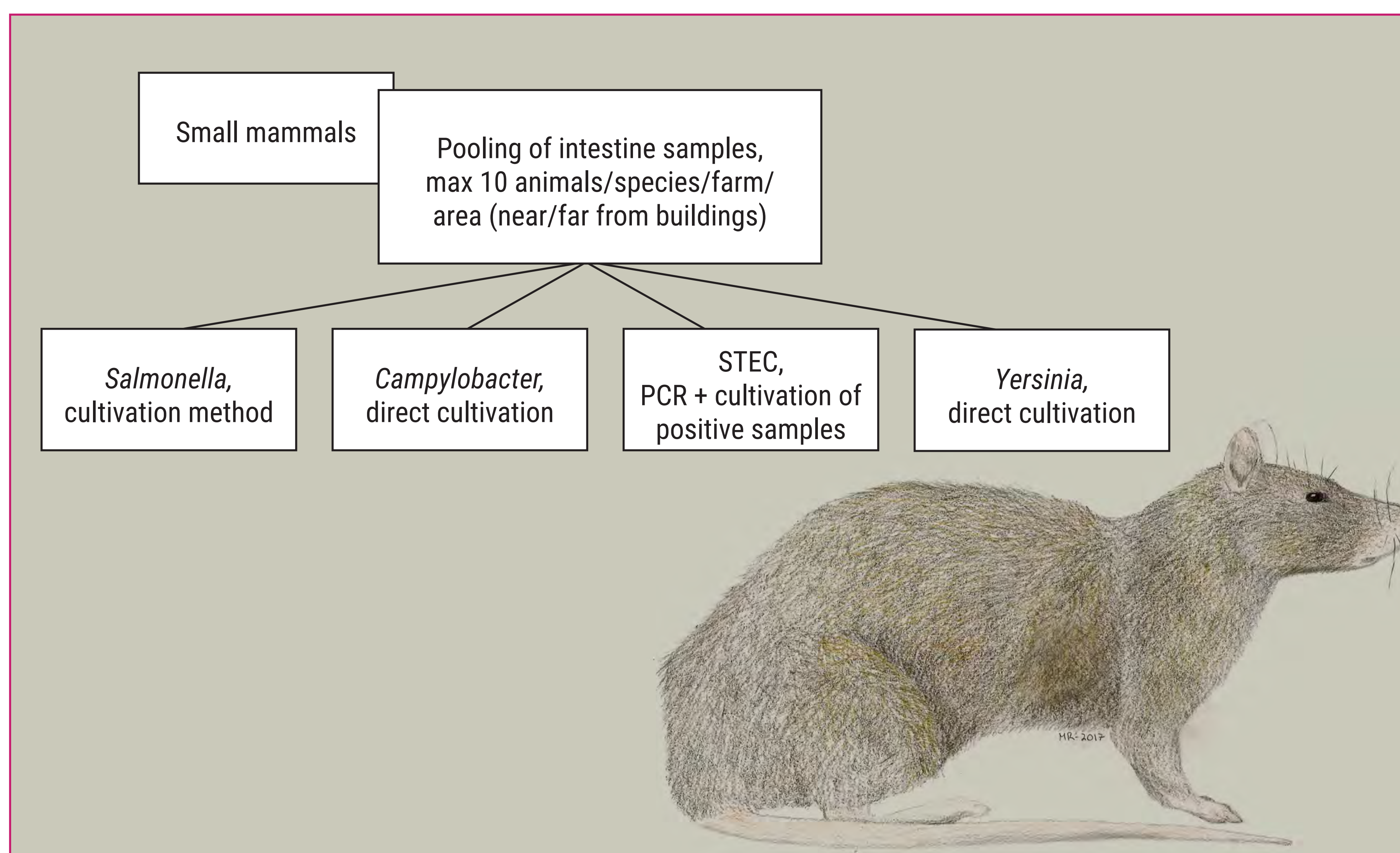


Figure 1. Laboratory analyses of the samples.

RESULTS AND DISCUSSION

In total, more than 1200 small mammals were collected. The most commonly captured species were yellow-necked mouse (*Apodemus flavicollis*), bank vole (*Myodes glareolus*) and house mouse (*Mus musculus*). After pooling 1-10 (median 2) samples from the same farm, same area and same species, 609 pooled samples were analyzed. The most common finding was *Campylobacter jejuni* which was cultured from 189 (27%) samples. Other zoonotic bacteria were rare. *Salmonella* Bispebjerg was isolated from eight pooled samples collected from four different farms. No other salmonella serotypes were detected. STEC was cultured from 7 samples collected from 6 farms. *Y. enterocolitica* was grown from 42 samples. No *Y. pseudotuberculosis* was found. Our results suggest that zoonotic bacteria other than campylobacter are rare in pest animals in Finland. Pest animals may spread these bacteria, but it is unlikely that they act as the primary reservoir of them. The obtained data can be further utilized in risk assessment to evaluate the exposure of production animals to these bacteria via pest animals.

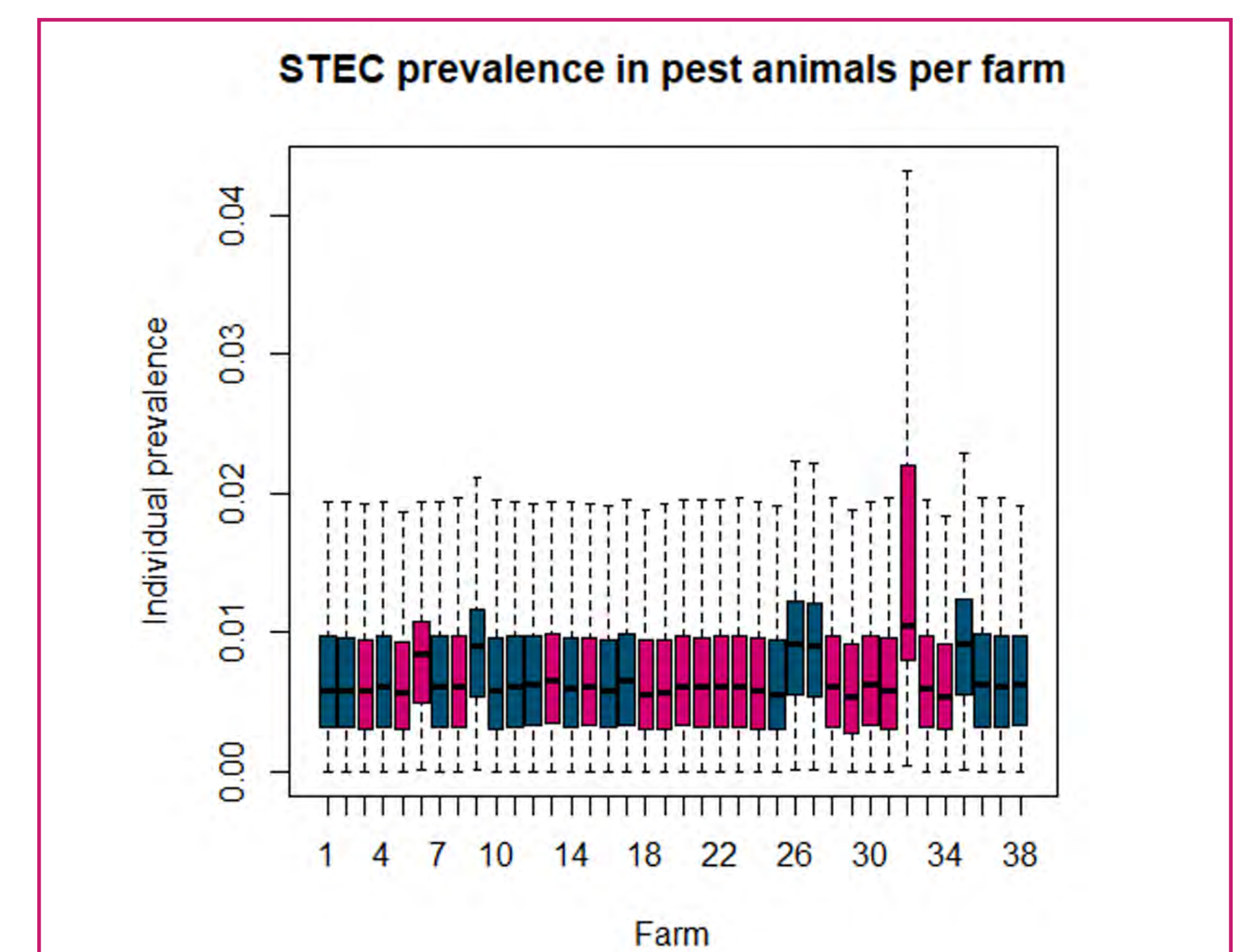
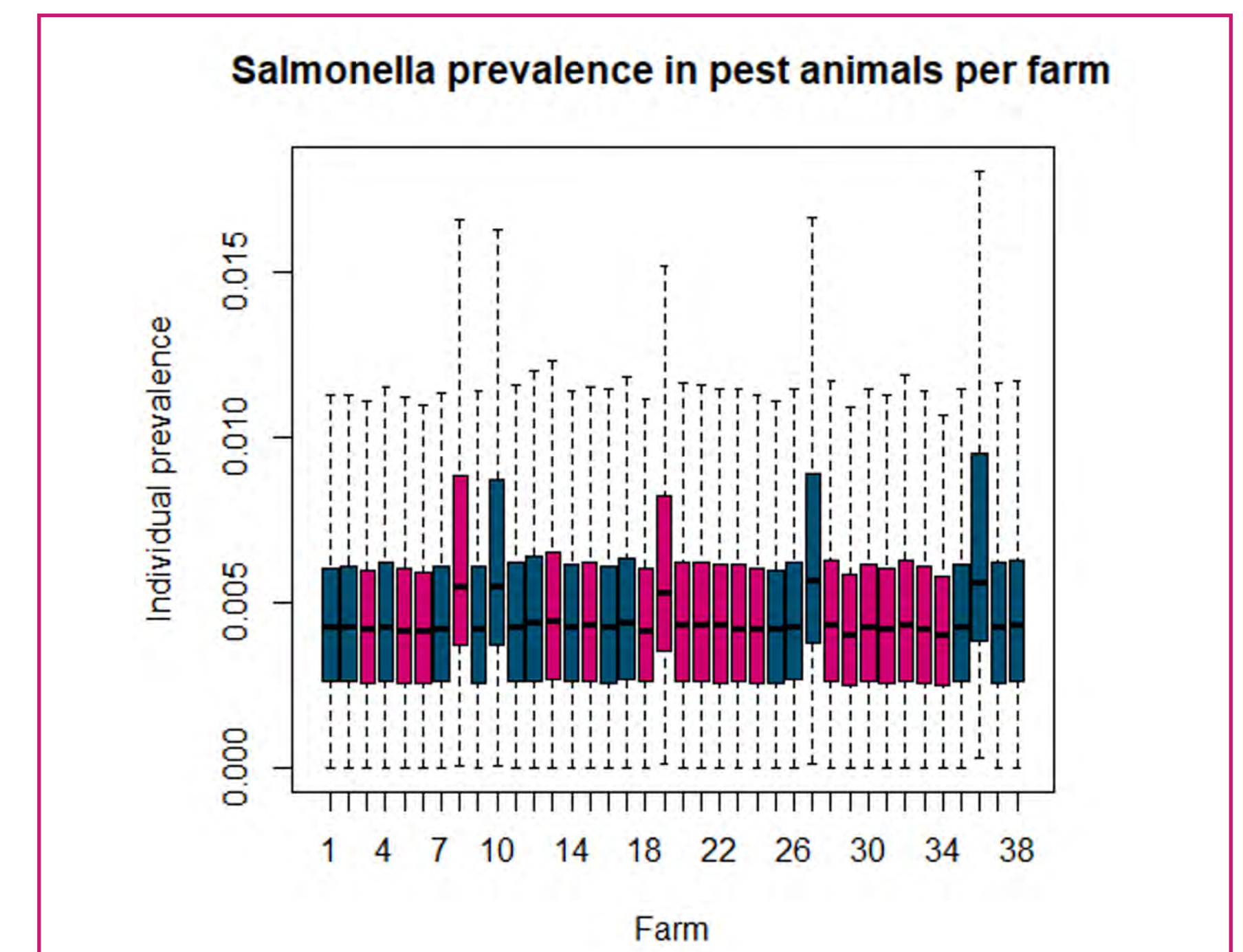
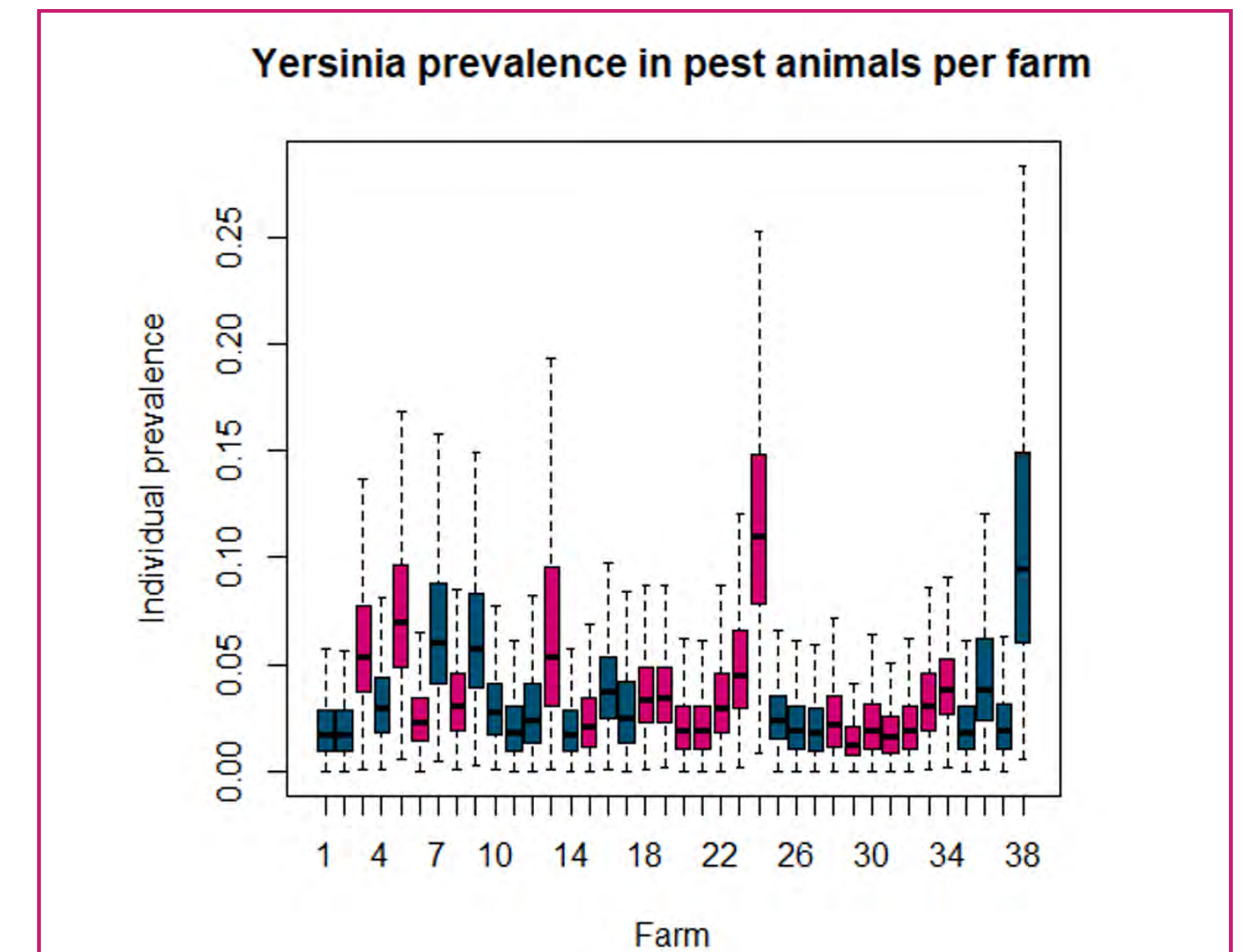
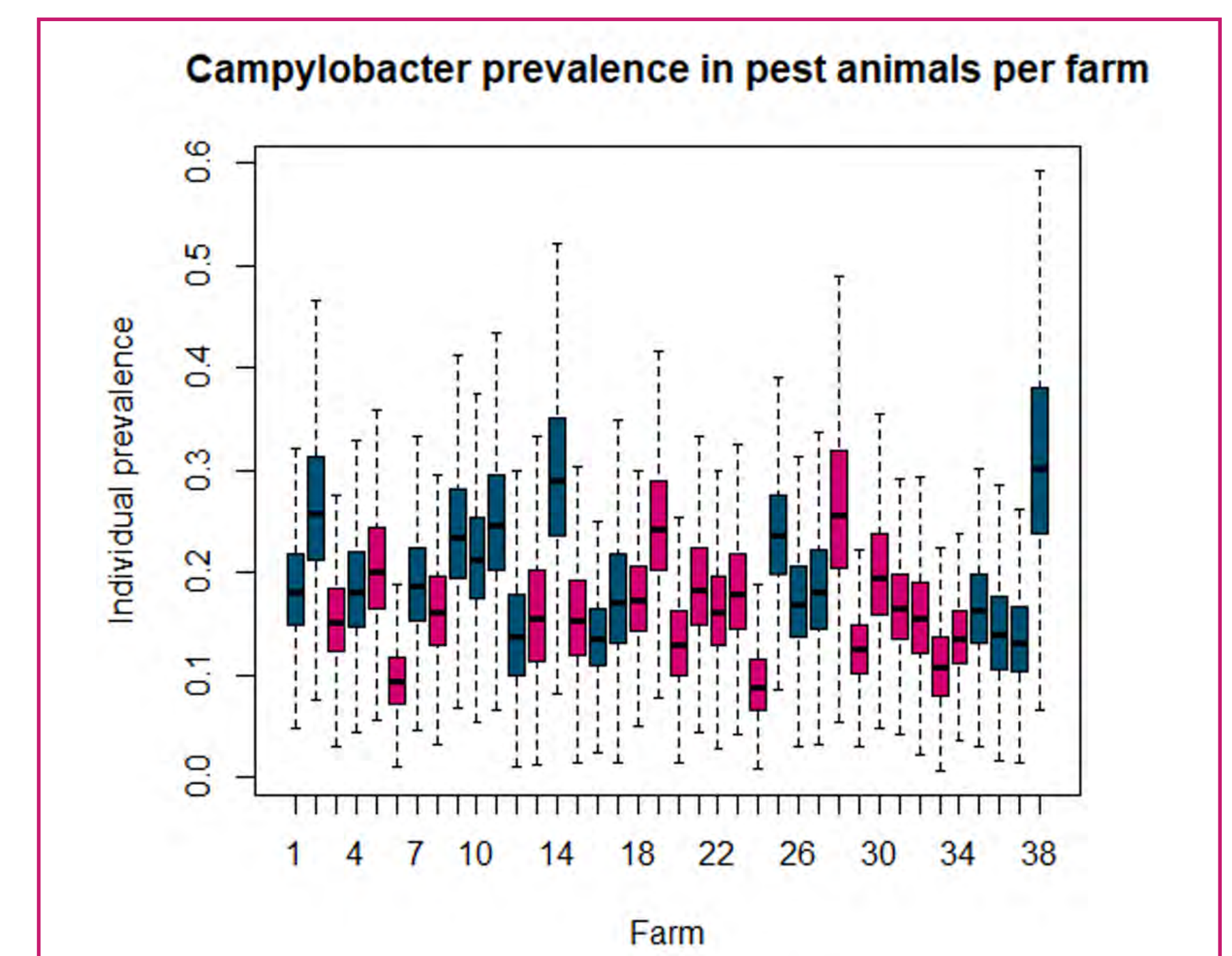


Figure 2 a-d. Estimated prevalence of the zoonotic bacteria in pest animals. Red: pig farm, blue: cattle farm