

Q fever within-herd seroprevalence in infected dairy herds: assessment using an ELISA applied to bulk tank milk



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INTRODUCTION

- Q fever: worldwide distributed zoonosis due to *Coxiella burnetii*
- Ruminants shedders are considered as main source of human infection
- To limit the infection of humans or animals, decrease the exposure to shedders animals is crucial
- Vaccination using a phase 1 vaccine has been shown to be efficient on susceptible animals
- In routine practice vaccination is implemented in infected herds: to ensure its efficacy, its use should be restricted to animals which are still susceptible (herds with a low within-herd prevalence)
- Within-herd seroprevalence is usually estimated using an ELISA applied to individual blood samples: time-consuming and costly method
- ELISA applied to the bulk tank milk: alternative time-saving and cheaper option

Aim of the study: to describe the distribution of the within-herd seroprevalence and to assess the interest of an ELISA applied to the bulk tank milk to estimate the within-herd seroprevalence.

MATERIAL AND METHODS

Data

- 56 naturally infected dairy herds with repeated recent abortions du to Q fever (positive PCR on placenta)
- Concomitant blood sampling of all lactating cows, dry cows, heifers of at least 12 months and Bulk Tank Milk (BTM)

ELISA test

- All samples sent to the same laboratory (IDAC-44, Nantes, France), and tested using the Q fever LSI ELISA kit (LSI, Lissieu, France) according to manufacturer's instructions
- Samples were considered positive as follow:
 - cow seropositive if S/P ratio (S/P * 100) > 40
 - BTM in 4 levels, positive if S/P ratio >30:
 - 30 < S/P ratio < 100: low positive
 - 100 < S/P ratio ≤ 200: positive
 - S/P ratio > 200: high positive

Strategy of analysis

- Distribution of the within-herd seroprevalence at the herd, cows (multiparous, primiparous) and heifers levels
- Distribution of the within-herd seroprevalence according to S/P level in BTM

RESULTS

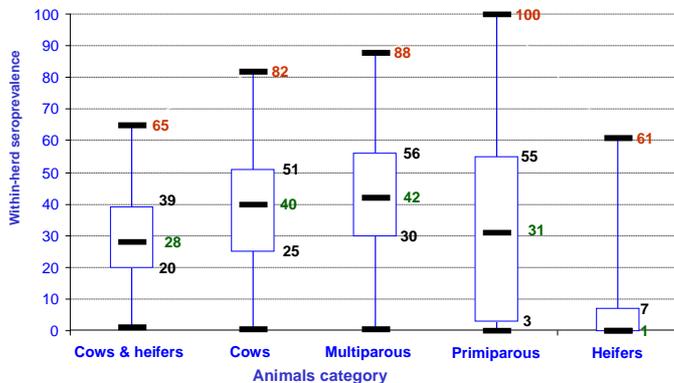


Figure 1. Within-herd seroprevalence in 56 infected dairy herds

- Positive relationship between the within-herd seroprevalence in lactating cows and the BTM S/P ratio (Figure 2)
- 3 herds out of 4 (75%) with a BTM S/P ratio < 100 show a within-herd seroprevalence in lactating cows < 20%
- In herds with a BTM S/P ratio > 100, at least 10% of lactating cows are seropositive to Q Fever

- Within-herd seroprevalence highly variable (Figure 1)
- infected herds comprise 1 to 65% of seropositive animals
- Within-herd seroprevalence is higher in cows than in heifers
- No differences between primiparous and multiparous
- The within-herd seroprevalence in heifers is low to nul

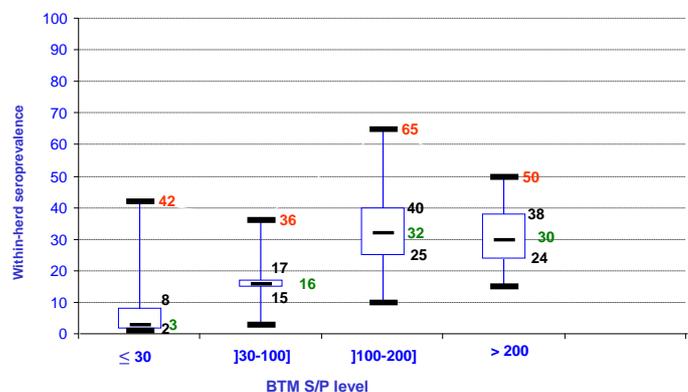


Figure 2. BTM S/P ratio (S/P*100) level and within-herd seroprevalence in lactating cows

CONCLUSIONS

- Among infected herds, the within-herd seroprevalence is highly variable but heifers are quite all still susceptible
- The within-herd seroprevalence increases with increased S/P ratio in BTM: ELISA applied to BTM seems to be a relevant tool to assess the within-herd seroprevalence in dairy herds
- Vaccination with a phase 1 vaccine targetting herds comprising susceptible animals could be implemented in herds with a BTM S/P ratio < 100, where a high proportion of still susceptible lactating cows is expected