# Prevalence of Q fever in small ruminants in Switzerland – implications for

## public health

J. Hunninghaus<sup>1</sup>, S. Scherrer<sup>2</sup>, G. Schüpbach-Regula<sup>1</sup>, M.M. Wittenbrink<sup>2</sup>, A. Hamburger<sup>2</sup>, K.D.C. Stärk<sup>3</sup>, I. Magouras<sup>1</sup>

<sup>1</sup> Veterinary Public Health Institute, Vetsuisse Faculty, University of Bern, Switzerland <sup>2</sup> Institute of Veterinary Bacteriology, Vetsuisse Faculty, University of Zurich, Switzerland <sup>3</sup> Royal Veterinary College, London, United Kingdom

## Key words

Q fever, zoonosis, seroprevalence, abortion, public health

#### Aim of the study

The aim of this study was to determine the seroprevalence of Q fever in sheep and goats in Switzerland, to gain data on the amount shed in aborted materials from small ruminants and to assess the public health risk.

### Material and methods

Sheep and goat blood samples were collected in the framework of the 2011 nation-wide, mandatory crosssectional survey of the Federal Veterinary Office to document freedom from *Brucella melitensis* infection. Sera of 500 sheep from 100 flocks and of 321 goats from 72 flocks were randomly selected. From each selected flock, 5 serum samples from sheep and 2-5 serum samples from goats were analyzed. The sera were tested in duplicates for antibodies against *Coxiella burnetii* using a commercial ELISA test (CHEKIT Q fever Antibody ELISA Test Kit, IDEXX, Liebefeld, Switzerland). A flock was considered seropositive when at least one animal tested positive in the ELISA. A total of 97 aborted placentas were collected between December 2010 and February 2012, of which 54 originated from sheep and 43 originated from goats, respectively. PCR analysis was done using a commercial real-time PCR assay (LSI Taqvet *C. burnetii*, Laboratoire Service International). The quantified *Coxiella burnetii* DNA was interpreted as negative, low positive (LP = 1 to 100 bacteria/ml), positive (P= 100-10000 bacteria/ml), or high positive (HP= >10000 bacteria/ml), respectively. These data were used in a quantitative risk assessment to estimate the annual number of human infections through sheep and goats, respectively.

## **Results and significance**

The 172 tested herds were geographically distributed throughout Switzerland. The over-all animal-level seroprevalence was 1.8% (9/500) for sheep (95% CI: 0.8-3.4) and 3.4% (11/321) for goats (95% CI: 1.7-6) respectively. At flock level, prevalence was 5% (5/100) for sheep (95% CI: 1.6-11.3) and 11.1% (8/72) for goats (95% CI: 4.9-20.7). Regarding abortion samples, 44.2% from goats and 44.4% from sheep tested positive in the real-time PCR, respectively. Shedding in abortion material was massive with levels >10,000 bacteria/mg per sample in 13.4% (13/97) of all samples tested of which 11.1% (6/54) originated from sheep and 16.28% (7/43) from goats, respectively. In the quantitative risk assessment, the number of symptomatic Q fever cases during a reproductive season was estimated at 79 [95% CI: 0-384] cases related to sheep and 139 [95%CI: 0-491] cases related to goats. The data presented in this study provide useful information about the epidemiological situation of Q fever in small ruminants in Switzerland. Due to the fact that shedding during abortions or normal births can be massive, Coxiella burnetii remains a public health threat.

#### Publications, posters and presentations

Hunninghaus, J. (2012) Prevalence of Q fever in small ruminants in Switzerland-implications for public health. Dissertation, Veterinärmedizinische Fakultät, Universität Bern.

Annual meeting VPHI, ILS & EPI (December 2011), Q Fieber in der Schweiz-Seroprävalenz beim Kleinwiederkäuer und Bedeutung für den Menschen

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