

## Epidemiology of bovine cysticercosis, risk factor and cost analyses for Switzerland, and evaluation of diagnostic strategies

Flütsch<sup>1</sup> F., Eichenberger<sup>1</sup> R., Heinzmann<sup>1</sup> D., Mathis<sup>1</sup> A., Stephan<sup>2</sup> R., Deplazes<sup>2</sup> P.,<sup>1</sup>Institute of Parasitology, University of Zürich, Switzerland, <sup>2</sup>Institute for Food Safety and Hygiene, University of Zürich, Switzerland

### Key words

*Taenia saginata*, epidemiology, risk factors, cost analysis, diagnostic strategies

### Aim of the study

Bovine cysticercosis caused by *Taenia saginata* represents an unsolved problem. Cysts in meat cause financial losses due to reduction in meat value and pose a steady source for human tapeworm infections. Aims of the study are: identification of risk factors for transmission of bovine cysticercosis on farm level in Switzerland, estimation of costs, critical analysis of diagnostic strategies on abattoir and laboratory level, critical evaluation of existing control strategies.

### Material and methods

Prevalence data were collected between 2002 and 2005 from six abattoirs (469,317 animals). Based on a questionnaire, the financial losses were calculated for 80 farms. A case-control study on farm-level was set up to identify risk factors for bovine cysticercosis. The case group (n=119) consisted of farms with infected animals identified by meat inspection in 2005 and 2006. The control group (n=66) comprised farms with a confirmed history of absence of cysticercosis. Personal interviews with farmers yielded epidemiological information. Data were analysed by logistic regression. The abattoirs' routine diagnosis was extended by additional incisions in the heart muscle. Meat and blood serum were collected for validated and in-house serological methods.

### Results and significance

Positively associated with the occurrence of bovine cysticercosis infections were: the presence of a railway line or a car parking area close to cattle feeding areas, leisure-activities around these areas, use of purchased roughage and having visitors on the farm. Meat inspection revealed an average prevalence of 0.58% in slaughtered cattle. Deduction were on average CHF 721.- (n=62) for infected cows and CHF 1075.- (n=18) for cattle. The yearly costs for Switzerland can be estimated to reach Fr. 2'000'000.- but they would be much higher if an improved diagnostic procedure would be applied.

In an ongoing study in two EU-approved abattoirs ten cysticercosis cases were detected among 570 animals investigated (1.75%), by the routine legal procedure, but there were 21 further cases (3.7%) identified by extended cuts in the heart muscle only. Hence, the prevalence of bovine cysticercosis is heavily underestimated (3 to 10 times) and the actual control strategy is inefficient. For an enduring control of the epidemiological situation, improved routine diagnostic procedures at slaughterhouses but also a new control strategy including a reporting system involving a quarantine of the affected farms as well as an analysis of the source of infection are required. Further research should concentrate on improving diagnostic methods, treatment of infected animals on farm level and vaccination of herds under high infection risk.

### Publications, posters and presentations

Flütsch, F., Heinzmann, D., Mathis, A., Hertzberg, H., Stephan, R., Deplazes, P.: Case-control study to identify risk factors for bovine cysticercosis on farms in Switzerland. *Parasitology* 135, 641-646 (2008).

Flütsch, F. und P. Deplazes (2007). "Rinderbandwurm - einfacher Zyklus und schwierige Bekämpfung." *BVET-Magazin* 3: 5-6. Eichenberger R. and P. Deplazes. „Bedarf von neuen Bekämpfungsstrategien gegen den Rinderfinnenbefall?“ *Zoonosebericht BVET 2009* (in press). Reviews addressing bovine cysticercosis are planned for a National (journal: SAT) and an International (journal: *Veterinary Parasitology*) target audience.

**Posters and presentations:** Stäbler, S.: Risikofaktoren der bovinen Zystizerkose in der Schweiz. DVG-Tagung, Celle, D, 04.-06.06.2007. Deplazes P.: Risk factors for bovine cysticercosis in Switzerland. 21st International Conference of the World Association for the Advancement of Veterinary Parasitology (WAAVP), Gent, Belgien, 19.-23.08.2007.

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