SEROLOGICAL AND EPIDEMIOLOGICAL INVESTIGATIONS FOR ANALYSING RISK FACTORS OF SALMONELLA INFECTIONS IN PIG HERDS

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Introduction and Objectives

Salmonella causes important zoonotic diseases. Nearly 20 % of human salmonellosis in Germany are due to pork products (Steinbach et al., 1999). Salmonella contamination of food can occur in the primary production, at the slaughter and in the food production chain. In some countries Salmonella surveillance - and - control programs were implemented few years ago. In Denmark, for example, the pig herds are classified into three different categories, depending on the seroprevalence of meat-juice samples collected at slaughter. The true herd prevalence of Salmonella spp. in pigs and pork has markedly declined when comparing the status before starting the program and the situation 4 years later (Andersen et al., 2001). In Germany, a Salmonella control program is now running on a voluntary basis. For the implementation of effective control measures further investigations are needed to get more information about the infection dynamics of Salmonella in pig herds.

Material and Methods

The study was performed in 52 breeding herds. For the serologic monitoring, blood samples (10 per herd) were collected in 4-week intervals. The sampling was restricted to pigs at an age of 5 month.
The monitoring period was 3 years and in total about 13500 samples could be included. Serology was determined by use of an ELISA (Salmotype®, LDL, 04109 Leipzig).
For the risk factor analysis all herds were visited once. The data collection is based on a questionnaire and an examination of the pig herds and and their environments. The seroprevalences are evaluated via statistical description and by means of the (generalized) linear model.

Results

The statistical analysis of the optical density values of the ELISA test shows markedly seasonal variations. In the summer quarters 2 and 3 the average optical density values about all herds are much lower than during the winter quarters 1 and 4. The factor “time of the year” has a statistical significant ($p < 0.05$) stronger influence on the optical density values than the factor “herd”. Nevertheless the statistical analysis shows that the factors “herd” and “time of the year” do only explain 30% of the OD's variation.

Discussion

The investigations show a higher prevalence in pigs with antibodies against Salmonella during winter (quarter 1 and 4) than during summer. This could possibly explained with a higher rodent burden during the winter months which could be responsible for a higher Salmonella-infection-rate in this period.
The higher prevalence of other diseases and the strong climatic variations in winter can also lead to a higher susceptibility of the pigs for Salmonella- infections.
Our results show that high prevalence of Salmonella antibodies in summer has to be judged more critical than high prevalence in winter.
However, earlier investigations in Iowa achieved different results, the highest prevalence of Salmonella antibodies could be observed in quarter 3 (Baum et al., 1998).
Overall, this shows that additional risk factors have to be taken into account, and that factors on the farm level have to be investigated.

Conclusion

For the characterization of others factors influencing the OD- values further statistical analysis of the results of the questionnaire and the herd examinations are the objective of the ongoing data analysis. The factors that are focused at are such as: herd size, animal movement, biosecurity, rodent control, cleaning and disinfection, bird control, feed storage and many others more.

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Figure 1: Geometrical mean of the OD- values per quarter