RISK FACTORS ASSOCIATED WITH SEROLOGICAL
SALMONELLA PREVALENCE IN FINISHING PIG
HERDS IN SOUTHERN BRAZIL

Jalusa Deon Kich1; Nelson Morés2; Carlos Eugênio Vidal2, Itamar Piffer2;
Waldomiro Barioni Júnior2; Armando Amarat2; Lucas Ramminger1; Marisa
Cardoso1

1 Setor de preventiva – FAVET - UFRGS, Av. Bento Gonçalves 9090, CEP 91 540-000, POA-RS,
Brasil, mcardoso@vortex.ufrgs.br
2 Embrapa Suínos e Aves - Caixa Postal 21, CEP 89700-000, Concórdia, SC, Brasil.

Abstract: The present study aimed to identify risk factors associated to the Salmonella seroprevalence in commercial swine finishing herds in Southern Brazil. Five risk factors were identified associated to high prevalence: barns with dunging gutter filled with water, no whitewashing after cleaning and disinfection, no burial of dead animals, no rodent control strategies, and having only one livestock supplier.

Keywords: Salmonella, swine, risk factors

Introduction: The reduction of Salmonella positive animals at slaughtering plants is an important control measure. Epidemiological studies have been carried out to associate risk factors and Salmonella infection. In Southern Brazil although swine industry takes an important place in the food animal production, no such studies have been conducted so far.

Materials and Methods: A transverse observational study was carried out in 33 farrow-to-finish and 32 finishing herds, in the states of Rio Grande do Sul and Santa Catarina. Personnel at each herd was asked to answer a questionnaire, and blood was sampled from approximately 40 animals, one week before slaughter. The sera were submitted to a polyvalent ELISA test based on lipo-polysaccharide antigens of serovars Typhimurium, Choleraesius, and Anatum. The cut-off (OD 0.130) represents the cross-point between the serum-OD curves of positive and negative control populations. Feeds and water samples were collected at each visit to herds, and tested for fecal coliforms. Feeds were also submitted to bacteriologic test, PCR for Salmonella, and particle size assay. The assessment of risk factors comprised the analyses results and the questionnaire answers, as being
explanatory variables. Seroprevalence was the response variable. At first, the relationship between explanatory and response variables was studied using the $\chi^2$ test. When associated ($p \leq 20$), these two variables underwent multiple correspondence analysis (ACM) (SPAD, 1998).

**Results:** Out of the 65 pig herds visited, 78% (51/65) of sampled animals were ELISA-positive, with seroprevalence ranging between 2.4% and 97.4%. The scatterplot for risk factors and seroprevalence is shown in Figure 1. On the right, the herds (●) having low seroprevalence (Salmonella1) were associated to not have barns with dunging gutter filled with water (SIC1), to whitewashing of facilities after cleaning and disinfection (CAL1), to burial of dead animals (DES1), rodent control strategies (ROE1), and having more than one livestock supplier. The left side of the same scatterplot shows the herds (■) with high seroprevalence (Salmonella3), associated to have barns with dunging gutter filled with water (SIC2), to no whitewashing of facilities after cleaning and disinfection (CAL2), to random disposal of dead animals (refuse dumping sites, woods) (DES2), no rodent control (ROE2), and to have only one livestock supplier (NFO2). The supplemental variables dirty compartment floor (LIB2), less than 100 sows in the herd (FEM2), and finishing herds (TER) appear for the low prevalence herds. The variables clean compartment floor (LIB1) and herd having more than 100 sows (FEM3) appear for the high *Salmonella* seroprevalence herds. An association between dirty compartment floor and not having barns with dunging gutter filled with water was observed ($p = 0.002$): herds without the aforementioned system showed dirty compartment floors (49/55). As for in herds using the system, dirty (5/10) and clean (5/10) compartment floors occurred alike.

**Discussion:** Barns with dunging gutter filled with water system did not prove to be a risk factor in the studies formerly reviewed, possibly for being very seldom used in other countries. This system facilitates fecal-oral transmission since the animal remains in contact with the feces dissolved in water. Animal excretion on the gutter filled with water apparently decreases the amount of feces in the barns, and might be the reason for dirty floor (LIB2) be associated to herds not using this system. Moreover, herds showing dirty floors presented low seroprevalence. Negative correlation had been previously observed between the accumulation of feces on the compartment floors and the isolation of *Salmonella* (Funk et al., 1999). The inappropriate disposal of dead animals effects recontamination through vectors, and the presence of dead animals for more than one day at the floors has already been appointed as a risk factor for the prevalence of *Salmonella* (Baum, 1998). Rodent control is a critical control point since rats are an important reservoir of *Salmonella* Typhimurium, a serovar frequently found in Brazil. The number of
livestock suppliers showed a negative association with prevalence, differently from other studies (Quessy et al., 1999). These finishing herds admitting livestock of different sources administer antimicrobial agents to the animals at the first stage of growth, and also use the all in/all out system. This may lead to lower infection rates.

**Factor 2 (17.08%)**

**Factor 1 (31.00%)**

**Figure 1:** Scatterplot for risk factors associated to *Salmonella* prevalence; ○ = herds category Salmonela1, ♦ = herds category Salmonela2, ■ = herds category Salmonela3.

**Acknowledgements / Financiers**

This study was supported by EMBRAPA, FAPERGS e CNPq.

**References**


SPADN- site SPAD version 3.7 (1998)