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Short communication

Prevalence of nematodes in Danish industrialized sow farms with loose housed sows in dynamic groups

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ABSTRACT

The aim of this study was to investigate the prevalence of nematodes in sows and gilts in modern pig herds which practiced loose housing of sows and gilts. Seventy hundred and ninety fecal samples were examined from seventy-nine farms. *Oesophagostomum* spp. was found in 15% of farms and *Ascaris suum* was found in 76% of the farms. *Trichuris suis* was found in a very few instances. No other nematodes were found. The prevalence of *Oesophagostomum* spp. within an infected farm was ~50% and the prevalence of *Ascaris suis* within an infected farm was ~30%. Housing procedure, farm size and the degree of contact with feces could not be correlated to prevalence on a farm level. It was concluded that in modern sow farms with loose housing systems *A. suum* and *Oesophagostomum* spp. are sufficiently prevalent to be considered a threat to productivity.

1. Introduction

Over recent years pig farms have changed their production system from tethered, or single stalled sows to loose housing. This has increased the potential for transmission of nematodes between sows as there is more direct exposure to feces. This is particularly the case in environments where droppings are only partially removed and where sties are never fully emptied and disinfected. This is exemplified by dynamic groups, where sows in different stages of gestation move in and out on a weekly basis.

Infection with nematodes in swine results in reduction in average daily gain and other losses related to poorer productivity of infected pigs compared to non-infected pigs. Notwithstanding, there are indications that losses vary greatly, dependent on geographic region, type of housing, management, nutrition, pig breed, and strain, and species of the parasite.

Worldwide the four most important intestinal nematodes in pig farms are considered to be *Strongyloides ransomi* and *Ascaris suum*, which mainly inhabit the small intestine, and *Trichuris suis* and *Oesophagostomum* spp., that mainly inhabit the colon and caecum (Stewart and Hoyt, 2006). Only *A. suum* and *Oesophagostomum* spp. are expected to be found in modern intensively managed pig farms. The life cycles of *T. suis* and *Strongyloides* are compromised by modern systems of management (Roepstorff and Jorsal, 1989, 1990; Dangolla et al., 1996; Fig. 1).

The aim of this study was to detect the prevalence of nematodes in sows and gilts in large pig herds practicing loose sow housing and to investigate if stalling, herd size or mixing of sows and gilts had any impact on the prevalence of herds infected with helminths. Only the feces of sows and gilts were examined, since they are the primary source of infections to their offspring.

2. Material and methods

Ten veterinary clinics specializing in swine advisory services were asked to collect and submit fecal samples from pig herds. The farms had to be practicing modern farming techniques that included housing sows in a loose

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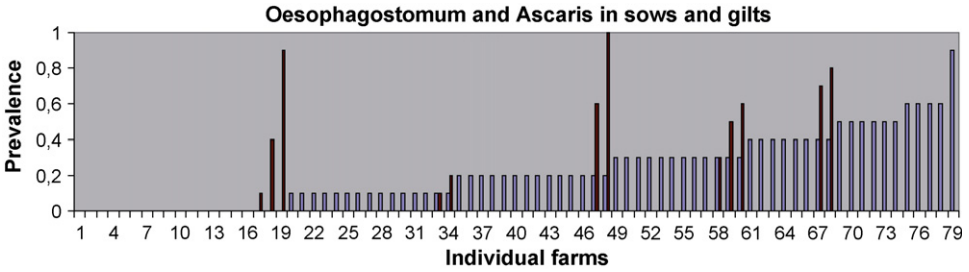

Fig. 1. This figure shows the prevalence of nematodes (excluding *Trichuris suis*) found in individual farms. Sows and gilts are considered one sample. Blue columns are prevalences of *Ascaris suum*, red columns are *Oesophagostomum* spp. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of the article.)

system, with large dynamic groups (i.e. sows were not separated in breeding stage, but were mixed, with new sows coming in or going out of the large group, on a regular basis). No treatments with anthelmintics were allowed during the three months before sample collection.

Fecal examinations were performed by means of a modified McMaster method (Henriksen and Aagaard, 1976). By this procedure one egg counted equates to 50 eggs shed/g of feces.

Ten samples were taken from each farm, five from sows and five from gilts. These numbers were selected on the basis of calculations performed with Herdacc (Jordan, 1995) and FreeCalc (Cameron and Baldock, 1998). Calculations show, that with a prevalence of 50%, the probability of identifying a true positive herd as positive and a true negative herd as negative is 95%.

The veterinarians were asked to report the following data from each farm:

1. The number of sows.
2. The mixing procedures of gilts and sows:
   a. Gilts and sows are separated into two groups or
   b. Gilts and sows are mixed in one group.
3. Housing type and level of contact with feces from other animals:
   a. Dry lying area with little contact with feces (good hygiene).
   b. Dry lying area with high contact with feces (intermediary hygiene).
   c. Deep straw bedding or lying area with straw mixed with feces (poor hygiene).

All statistics are performed using a Student's Chi-square test.

3. Results

Seventy-nine farms were included in the study. The average herd size were 712, ranging between 240 to 2470 sows. Forty-five farms mixed sows and gilts whereas thirty-four farms reared sows and gilts separately. Twelve farms had a good hygiene, forty-five had intermediate hygiene and twenty-two farms had deep straw bedding or similar with poor hygiene.

A. suum was found in one or more sample in sixty farms (76%), and *Oesophagostomum* spp. in twelve farms (15%). *T. suis* was found in three farms in four sows only. No other intestinal parasites were found. In 16 of 79 (20%) farms no eggs from intestinal parasites were found. The frequency of shedding of *Oesophagostomum* spp. eggs was 7.1% and 8.6% in gilts and sows respectively (Table 1) and in farms that had one or more animals shedding eggs the frequency was 43.1% and 52.3% respectively.

The frequency of shedding of *A. suum* eggs was 23.1% and 20.8% in gilts and sows respectively (Table 1) and in farms that had one or more animals shedding eggs the

Table 1
Individual sows and gilts and their shedding of eggs. Frequency in all animals in all farms and frequency in all animals in farms infected with the respective helminth is shown.

	Gilts-*Oesophagostomum*	Sows-*Oesophagostomum*	Gilts-*Ascaris*	Sows-*Ascaris*
Number of samples	395	395	395	395
Overall frequency all animals (%)	7.1	8.6	23.1	20.8
Frequency in positive herds (%)	43.1	52.3	31.0	28.3
Average number of eggs shed/g feces (standard deviation)	2191 (642)	3560 (3543)	1995 (2597)	1651 (3087)

Table 2
The shedding of eggs in relation to the amount of fecal contact. The results show, that there is no significant differences in shedding of either of the nematodes, irrespective of the level of fecal contact. The numbers of positive farms are shown, together with the total numbers of farms in brackets. NS = Non-significant.

Amount of fecal contact	1	2	3	Level of significance
Farms positive with *Ascaris*	10 (12)	33 (45)	17 (22)	NS
Farms positive with *Oesophagostomum*	0 (12)	8 (45)	4 (22)	NS