



Semina: Ciências Agrárias

ISSN: 1676-546X

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Universidade Estadual de Londrina
Brasil

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Semina: Ciências Agrárias, vol. 37, núm. 6, noviembre-diciembre, 2016, pp. 4157-4160

Universidade Estadual de Londrina
Londrina, Brasil

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Occurrence of *Cryptosporidium* spp. and *Giardia* spp. in pigs at weaning

Ocorrência de *Cryptosporidium* spp. and *Giardia* spp. em suínos ao desmame

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Abstract

Cryptosporidium spp. and *Giardia* spp. are parasites and have been reported in many species of mammals, including humans. The goal of this research was to investigate the occurrence of *Cryptosporidium* spp. and *Giardia* spp. in 45-days-old pigs. Fecal samples of 107 pigs were collected at three alternate days in piggeries in Araçatuba, São Paulo State, Brazil. *Cryptosporidium* oocysts were observed in 4.7% (5/107) of animals by Kinyoun acid-fast stain method and cysts of *Giardia* spp. were observed in 1.9% (2/107) of the animals by the method of Faust. Of all animals, 85 presented feces with normal consistency and 22 showed diarrhea in at least one collection. Two diarrheic samples showed positivity for both *Cryptosporidium* spp. and *Giardia* spp. From these results it is possible to infer that the occurrence of *Cryptosporidium* and *Giardia* was low because of the good management practices and both protozoa were not associated the presence of symptoms.

Key words: Protozoonosis. Cysts. Diarrhea. Feces. Oocysts. Piggery.

Resumo

Cryptosporidium spp. e *Giardia* spp. são parasitas e têm sido relatados em várias espécies de mamíferos, incluindo humanos. O objetivo deste trabalho foi investigar a ocorrência de *Cryptosporidium* spp. e *Giardia* spp. em suínos de 45 dias de idade. Amostras fecais de 107 suínos foram coletadas em três dias alternados de pocilgas em Araçatuba, São Paulo, Brasil. Oocistos de *Cryptosporidium* foram observados em 4,7% (5/107) dos animais por meio do método de Kinyoun e cistos de *Giardia* spp. em 1,9% (2/107) dos animais pelo método de Faust. Dentre os animais, 85 apresentaram fezes com consistência normal e 22 com diarreia em pelo menos uma coleta. Em duas amostras diarreicas foram observadas presença de oocistos de *Cryptosporidium* spp. e cistos de *Giardia* spp. A partir destes resultados é possível inferir que a ocorrência de *Cryptosporidium* e *Giardia* foi baixa devido a práticas de boa gestão e que ambos os protozoários não foram associados à presença de sintomas.

Palavras-chave: Protozoonose. Cistos. Diarreia. Fezes. Oocistos. Pocilga.

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Cryptosporidium and *Giardia* may cause significant economic losses by weight reduction in piglets (HAMNES et al., 2007). Researchers in several countries reported a prevalence of *Cryptosporidium* spp. in a range between 1.4 and 33.2% for domestic pigs (WIELER et al., 2001; NGUYEN et al., 2012).

Cryptosporidium species have been reported worldwide in domestic pigs (JENÍKOVÁ et al., 2011; KVÁC et al., 2013). It was particularly incident between the sixth and the 12th weeks of life, which is a stage in the post-weaning period (MADDOX- HYTTEL et al., 2006; HAMNES et al., 2007; JOHNSON et al., 2008). *Giardia* has been reported between 11 and 18 days of age (HAMNES et al., 2007). Fecal shedding of cysts of these protozoa was intermittent with a pattern similar to several other animal species (HAMNES et al., 2007).

The goal of this research was to investigate the occurrence of *Cryptosporidium* spp. and *Giardia* spp. in 45-days-old pigs in Araçatuba, São Paulo, Brazil. The experimental group was carried all (three) existing sites of Araçatuba, São Paulo, Brazil, during the year 2007 and 2008, with all pigs from 45 days of age (15 days after weaning), consisting of 107 piglets comprising 60 females and 47 males belonging to landrace or hybrid (Landrace and Large White) breeds in piggeries.

Piggeries 1 and 3, respectively with 59 and 36 pigs, had all animals removed from pens for seven days and during this period disinfectants like quaternary ammonia compounds, iodine and formaldehyde were then alternately used and animals were introduced only after the facilities were completely dry. Blowtorches were used three times a year. Piggery 2, with 12 animals, had animals removed for up to two months and blowtorches used up to five times per year together with cresols and lime.

All three piggeries had featured intensive production with water and food administered *ad libitum*. The animals were separated in lots and kept in elevated pens or over cement flooring with daily cleaning with high pressure water. Ivermectin 1% was given to the sows 15 days before parturition and to the post weaning piglets.

Three fecal samples of all litters were collected on alternate days from February to November 2008. Feces were collected directly from the rectal ampulla of each animal and processed following the centrifuge-flotation technique (FAUST et al., 1938) with a zinc sulfate solution (density 1,200g·cm⁻³) for the detection of *Giardia* spp. cysts. Next, the fecal smears were stained by the Kinyoun acid-fast stain (LENNETTE, 1985), for detection of *Cryptosporidium* spp. oocysts.

A fecal sample was prepared including variables such as sex, breed, consistency and hydration of fecal samples of each animal as well as the structure and sanitary management of each piggery.

Samples positive for both parasites were detected in July. *Giardia* spp. has a greater incidence in the seasons in which temperature is cooler (SILVA et al., 2007). This fact can be explained by the fact that animals are bunched together for warmth (ABRANTES; SILVEIRA, 2009).

In addition to the diagnostic technique, the management seems to have some influence on positivity since all examined animals were confined to elevated pens with concrete flooring. Open air raising presented a higher rate of occurrence of *Giardia* spp. and *Cryptosporidium* spp. when compared to indoor piggeries (JOHNSON et al., 2008).

The period of 21 days after weaning is considered a critical stage in pig production due to stressing factors, like separation from the sows or change in environment and nutrition, which may cause diarrhea (LIMA; MORÉS; SANCHES, 2009). *Clostridium perfringens*, *Escherichia*

coli, rotaviruses, *Isospora suis* and *Strongyloides ransomi* may be held as possible causal agents of enteric manifestations (LIPPKE et al., 2011).

Of all animals, 85 presented feces with normal consistency and 22 showed diarrhea in at least one collection. Of these, two demonstrated concomitant positivity for *Cryptosporidium* spp. and *Giardia* spp. Despite the positive findings, the cause of those diarrhea instances is not certain since no other copro-parasitological tests have been carried out in those pigs. Previously have reported significant association between diarrhea and *Cryptosporidium* positivity in piglets (HAMNES et al., 2007) and presence of *Cryptosporidium* was not significantly associated with decreased fecal consistency in pigs in Central Vietnam (NGUYEN et al., 2012).

Using the direct immunofluorescence microscopy (DFA) technique, Budu-Amoako et al. (2012) found 26% (163/ 633) of piglets positive for *Cryptosporidium* spp. in Canada. In Brazil, Quadros et al. (2006) did not observe positivity for *Cryptosporidium* in swines of different ages using the auramine-O dye and the Ziehl Neelsen technique.

Daily pen cleaning with high pressure water, the use of disinfectants, adequate food, water from artesian wells given by nipple feeders, concrete floors or elevated pens and the habit of the pigs to defecate always in the same place are factors that reduce agent presence in the environment and must have contributed to the low parasitic occurrence observed in this study.

Formaldehyde and iodine have bactericidal and germicidal properties. Lime associated with water it generates a large amount of heat thus featuring a high disinfectant value (SOBESTIANSKY et al., 1981). Maddox-Hyttel et al. (2006) observed that the cleaning of the floor (high pressure water, disinfection and drying the premises before introduction of animals) have reduced the excretion of *Giardia* cysts and of *Cryptosporidium* oocysts.

Animals were positive for *Cryptosporidium* spp.

or *Giardia* spp. at only one of three collections. Among those positive for *Cryptosporidium* spp., two were found at the first collection (45th day) and three at the second one (47th day), while those positive for *Giardia* presented the parasite at the second collection only (47th day). These results agree with the findings of Guselle et al. (2003) who evaluated cryptosporidiosis in swine. Hamnes et al. (2007) also concluded that *Giardia* cysts are excreted in a non-continuous way in other animals, probably showing the same pattern in pigs.

Conclusions

From the results obtained, it is possible to infer that occurrence of *Cryptosporidium* and *Giardia* is low in post-weaning piglets in piggeries with good sanitary management and with adequate facilities.

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