PIG ENDOPARASITES IN ESTONIA

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ABSTRACT

Current study includes 12 industrial large farms with pig number of 245 -10500, 8 smaller conventional farms (13-87 pigs), 18 small farms (1-7 pigs), 2 ecological outdoor farms and one wild boar farm. In total 1918 faecal samples were collected in 2006-2007 and investigated for parasite eggs and oocysts. Helminth intestinal infections on industrial large farms were limited to *Ascaris suum* (8.1%) and *Oesophagostomum* spp. (1.6%) infections only with low (20 – 100) epg-s in some sow and fattener groups. Infection prevalence of pigs in smaller farm fattener groups was 48% with *Ascaris suum,* 74% with *Oesophagostomum* spp. and 59.6 % *Eimeria* spp. with high opg-s in all age groups (up to 10,000). On small farms 37.5% infection with *Ascaris suum,* 55.6% with *Oesophagostomum* spp. and 46.1% *Eimeria* spp. has been observed. Parasites found in pigs on the ecological farms: 89,4% *Oesophagostomum* spp., 31,5% *Ascaris suum,* 9% *Strongyloides ransomi,* up to 100% *Eimeria* spp. and *Cryptosporidium* sp. The wild boar farm results were: *Oesophagostomum* spp. 64%, *Trichuris suis* 21%, *Metastrongylus* sp. 7% and *Eimeria* spp. 100% with low epg/opg-s. Pigs on ecological farms were more intensively infected than on other farms. The identified *Eimeria* species in domestic pigs were*: E. porci, E. polita, E. suis, E. neodebliecki*. Wild boars had two more species: *E. scrofae* and *E. guevarai*. Industrial management on large farms with regular antiparasitic treatments seems to be successfully reducing the parasite infection level and species variety. Biological approach to parasite control on ecological farms should be studied further.

KEY WORDS: pig parasites, intestinal infections, farms.

INTRODUCTION

Intestinal nematodes and coccidian infections cause serious health and economic problems in swine herds in many countries and it is unfortunately a well-known fact that endoparasitic infestations in pigs, especially with helminths, are still common as well in European countries as well over the world [7, 16, 1, 11, 2, 13, 21]. The species of parasites in pigs have been diagnosed and the distribution level of pig parasitosis has been determined in several countries. Indoor intensive rearing is considered to be a protective system compared to outdoor rearing systems [14, 15, 9]. In numerous works there is proved that regular anthelmintic animal treatment should effectively prevent infestation. Nevertheless, studies from Australia, Denmark, France, Poland and Germany have reported that helminths may be found in intensive indoor pig farms [10, 14, 1, 2, 13]. Helminth infestation can cause economic losses, decreasing daily weight gain and increasing feed expenses [18, 6, 13] or could be a risk factor for other digestive tract diseases, such as intestinal infection of *Salmonella* [17].

While indoor production systems has dominated in many West European countries for decades, the outdoor pig production has also a long tradition in some areas as in United Kingdom, Denmark and Scandinavian states [22, 19, 8, 3]. In most recently developed outdoor systems, the sows are kept permanently on pasture where they farrow even in winter, while the large majority of growing pigs are moved indoors for the whole fattering period. During 2001 – 2003 influence of season and host age on wild boar parasites has been studied in Corsica [5].

In order to determine the level and distribution of pig parasites in Estonian pig herds and in purpose to study whether management practices in the farms allow pig intestinal parasite infestation, the data of our recent parasitological survey are presented and analysed in current study.

MATERIAL AND METHODS

A total of 41 pig farms with 30307 pigs were involved in the survey from March 2006 to December 2007 in purpose to determine the prevalence of internal parasites and examine the relationship between parasite infections and management practices. Faecal samples were collected randomly in total from 1918 pigs in 6 age groups: 1) piglets <5 weeks old, 2) weaners 2-3 months old, 3) small fatteners 3-4 months old, 4) large fatteners 5-6 months old, 5) sows >6 months old, 6) boars 1-2 years old and examined for the presence of eggs of helminth parasites and coccidian. In addition animals from ecological farms and wild boar farm were investigated.

Different farms were as follows: 1) 12 industrial large farms with 245 -10500 pigs; 2) 8 smaller conventional farms (13-87 pigs); 3) 18 small farms (1-7 pigs); 4) 2 ecological farms (56 pigs); 5) one wild boar farm (37 animals). The farms were located in different Estonian districts: Tartu, Harju, Viljandi, Valga and Hiiumaa. A retrospective review of technical profile on each farm had been described: 1) numbers of sows, piglets per litter, young pigs, fatling pigs and boars; 2) management; 3) working and sanitary conditions on farms. Faecal examinations were carried out during the whole investigation period and egg counts were determined by the modified McMaster method. The results are displayed as parasite counts per gram of faeces (epg or opg).

RESULTS AND DISCUSSION

In our study from 1918 collected faeces samples helminth eggs were found in 493 (25.7%) and *Eimeria* oocysts in 252 (13.1%) samples. The results show that groups of larger fatteners and sows were more commonly affected than other pig classes (Figures 1, 2). *Ascaris suum* was the most common species of worm found in fattener pigs and sows. Oocysts of coccidian were found in pigs from 9.9% of piglets and 22.3% from sows and fatteners. *Oesophagostomum* spp. occurred to be another prevalent worm species, being found in 17.1% of piglets and in 18.7% of older swine groups. The average *Oesophagostomum* spp. egg counts were 20 – 800 epg, *Ascaris suum* 20 – 600 epg and *Eimeria* spp. 220 – 1000 opg. The level of infection varied depending on the herd and age group (piglets, fatteners or sows). Large differences exist in infections between pig production systems. Thus, only *Ascaris suum* and *Oesophagostomum* spp. are common in traditional indoor systems, but the large round worm *Ascaris suum* eggs were absent in wild boar farm. According to the data of literature can be supposed that *Ascaris suum* infections may stimulate the development of strong protective immunity, dependent on the level of exposure period. Thus, according to some authors, in pigs that have been continuously exposed to parasites, migrating larvae may be killed even before they reach the liver [20, 4]. In the European southern regions in wild boar populations were more detected external parasites as ticks, louse, *Haematopinus suis* etc. and main nematodes were *Ascaris suum* and *Metastrongylus* sp. [5].

The nodular worms of pigs are represented in our pig herds with *Oesophagostomum dentatum* and *O. quadrispinulatum*, which commonly co-exist. It is notable that even heavily infected pigs (over 1000 epg) may not show any clinical symptoms. *Oesophagostomum* spp. eggs were absent on large industrial farms and there was very few eggs of *Ascaris suum*.

Trichuris suis and *Strongyloides ransomi* occurred in our samples with low densities and registered rarely as natural foci, *Metastrongylus* spp. was found only in pigs of wild boar farm. In comparable, studies carried on in Denmark, Finland, Iceland, Norway and Sweden swine herds showed that *Ascaris suum*, *Oesophagostomum* spp and *Eimeria* spp. were

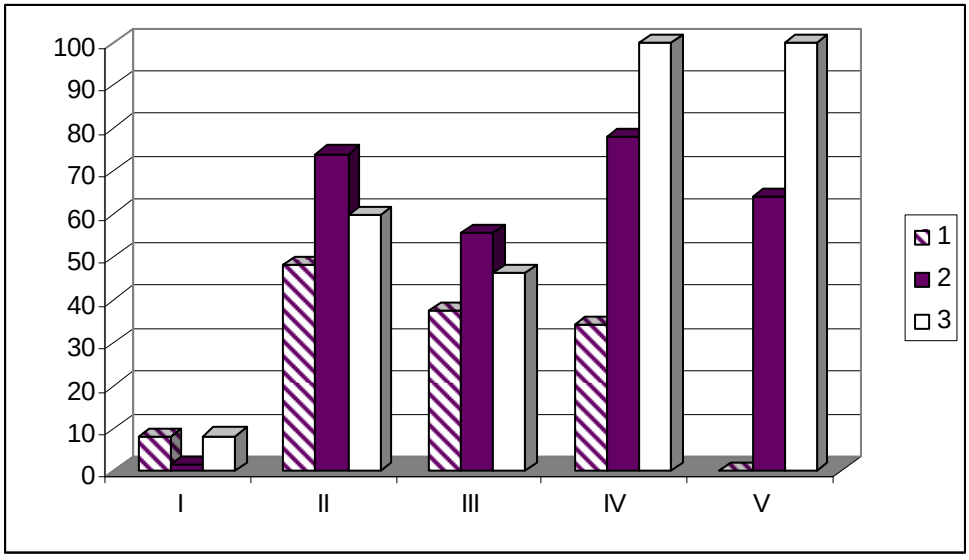

Figure 1. **Parasite infection level (%) of pig intestinal parasites *Ascaris suum, Oesophagostomum* spp. and *Eimeria* spp. in Estonian swine herds in different farm management systems (2006-2007)**
1 – *Ascaris suum*; 2 – *Oesophagostomum* spp.; 3 – *Eimeria* spp.;
I – large industrial farms; II – conventional farms (13-87 pigs); III – small farms (1-7 pigs);
IV – ecological organic farms (16-38 pigs); V – wild boar farm (37 pigs)

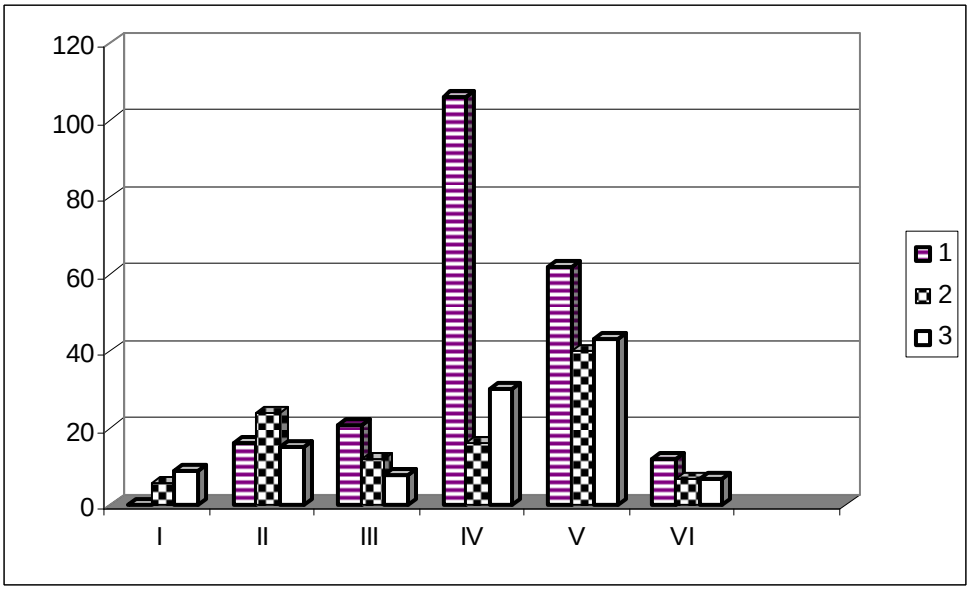

Figure 2. **Infection rate of main internal parasites on the Estonian pig farms in different swine age groups (2006-2007)**
1 – *Ascaris suum;* 2 – *Oesophagostomum* spp.; 3 – *Eimeria* spp.;
I – piglets <5 weeks old; II – weaners 2-3 months old; III – small fatteners 3-4 months old;
IV – large fatteners 5-6 months old; V – sows >6 months old; VI – boars 1-2 years old

common species, while *Trichuris suis* and *Strongyloides ransomi* eggs occurred sporadically. Large fatteners were most frequently infected with *A. suum* (5-35%), *Oesophagostomum* spp. were most prevalent in adult pigs in the southern regions (21-43%) than in the northern regions (4-17%). *Eimeria* spp. had the highest prevalence in adult pigs (max 9%) without clear geographical differences [16, 12]. In China (Guangdong Province) on intensive pig farms the most common parasites were *Oesophagostomum* spp. (of the 3636 pigs 24.9%) *Trichuris suis* (5.7%), *Ascaris suum* (5.2%) and *Coccidia* (47.2%) [21]. *Oesophagostomum dentatum* occurred to be the predominant species also in Poland, followed by *Trichuris suis*, *Strongyloides ransomi* and *Ascaris suum* [13].

The occurrence of swine intestinal parasites on pig farms as well as infection densities are markedly influenced by the type of swine production system used: high infection levels were observed in the present study on small conventional farms and in pigs of ecological farms. A major difference between conventional, outdoor production and organic production is in proportion of organic feed and applied anthelmintics. High prevalence rates and infection are large restricted to outdoor herds. The prevalence rates and infection intensities of the most common helminth species in different age groups of pigs are strongly seem to be influenced by their immunity. *Eimeria* spp. oocysts are most common in older pigs particularly in outdoor pigs. Nowadays organic farms represent pioneers in organic pig production, but on the other hand, outdoor farming and organic pig production may in the future be connected with serious problems because of particularly favourable conditions for helminth transmission and their reproduction. In addition, on organic farms preventive usage of anthelmintics is not permitted [12].

This study shows that organic pigs have higher infection rates with helminth parasites compared with sows and pigs housed indoor in intensive systems. Anthelmintics were used in most indoor herds, but treatments on several conventional farms had been carried out irregularly.

CONCLUSIONS

1. The main digestive tract parasites in swine are *Ascaris suum* and *Oesophagostomum* spp. roundworms.
2. In Estonian indoor intensive management system the helminths are controlled, but swine parasites can still be present in separate swine groups of large farms.
3. The level of pig infection in indoor conditions varied, depended on the herd and age group and reached a maximum in fatteners and sows.
4. A higher level of infestation was observed in the smaller herds of conventional farms and in farms of outdoor management.
5. On most indoor pig farms hygiene efforts must be continued.
6. Data on species composition and infection levels would help improve the monitoring and control of parasitism in swine populations.

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