**Gastro – intestinal parasites in outdoor pigs in Ireland: what factors affect parasitic load?**

**Authors and Affiliations**

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**Application**

We must address the high prevalence of some species of gastro – intestinal parasites observed in outdoor pigs to ensure the successful expansion of the outdoor production sector in Ireland.

**Introduction**

Societal concerns about animal welfare in conventional production systems, and European Union policies such as the Green Deal and “Farm to Fork”, promoted interest in outdoor/organic pig production systems. However, gastrointestinal parasites pose a threat to domestic pigs in outdoor systems. Left uncontrolled, these can significantly undermine performance, result in substantial economic losses, and potentially lead to pig mortality (Roepstorff et al., 2011). Studies on the prevalence and occurrence of such parasites in Ireland are scarce. Hence, the objective of this study was to identify the specific parasites present in outdoor pigs, to compare parasitic loads across seasons, and evaluate associations between these loads and various pig and management related characteristics.

**Materials and methods**

A total of 61 pig faecal samples were collected from 20 outdoor pig farms located across the island of Ireland on two separate visits during Winter (n = 33) and Summer (n = 28) 2023. Between 2 and 4 spontaneously voided faecal samples were collected per paddock, and mixed thoroughly to achieve paddock level composite samples. These were stored from 0 to 4 °C, then analysed using an improved - McMaster floatation method (described by Taylor et al., 2016). Parasitic egg types were identified by their morphology, the number of eggs counted, and Faecal Egg Count (FEC - number of eggs/gram). Body condition score (BCS) was individually recorded on 432 pigs using a five point scoring system and averaged at paddock level. Data relating to the animal (sex and age) and farm (anthelmintic usage and paddock rotation) were also collected. Data were analysed using non–parametric tests. The effects of season, paddock rotation and anthelmintic treatment on FEC were analysed using Wilcoxson sign rank tests, and the effects of age and sex on FEC were analysed using Kruskal – Wallis tests. Relationships between FEC and BCS were analysed with Pearson correlation tests. R studio (R version 4.2.1) statistical analysis software was used.

**Results**

Four types of gastrointestinal parasitic eggs were identified: *Eimeria*, Strongyles, *Ascaris suum* and *Trichuris suis* (Table 1). Due to the challenge of identifying several species, *Eimeria* and Strongylids were grouped under the broad categories of *Eimeria spp*. and Strongyle. Both *Eimeria spp*. (winter: 82%, summer: 94%) and strongyles (winter: 94%, summer: 82%) had a high prevalence across farms in both seasons. *Ascaris suum* had a prevalence of 35% in winter and 29% in summer. *Trichuris suis* was recorded in one farm (6%) in winter and two farms (12%) in summer. The effects of season, sex, antihelminthic use, and paddock rotation on FEC are shown in Tables 1 and 2. Juvenile pigs (<8 months) had a higher (P < 0.001) *Eimeria spp.* FEC than adults, whereas adult pigs (>8 months) had a higher Strongyle FEC (P<0.01) (data not shown). The Strongyle load and body condition of pigs was negatively correlated (*r* = -0.2401, P = 0.001).

**Conclusions**

Prevalence of *Eimeria spp.* and Strongyle was high, and the seasonal effect on the prevalence was minimal. However, the FEC for both seasons implied that there was a seasonal effect for *Eimeria spp.* and Strongyles. Paddock rotation and anthelmintic usage appeared effective in reducing parasite load (FEC). Male pigs had higher FEC levels of helminth eggs, including Strongyle and *Ascaris suum* and this could be due to the male pigs being rotated less frequently. BCS negatively correlated with the Strongyle FEC, suggesting that the welfare of the animal is compromised when there are high helminth counts. Considering the potential zoonotic threat associated with *Ascaris spp.* and *Trichuris spp.*, further studies are needed to efficiently identify and treat outdoor pigs.

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Table 1 – Effect of season and host gender on parasite load (median FEC eggs/g) of pigs (n=61) across 20 outdoor farms, Ireland.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Season | | P - value |  | Sex |  | P - value |
| Winter | Summer | Male | Female | Mix |
| *Eimeria spp.* | 475 | 3350 | <0.001 | 600 | 1150 | 3250 | 0.001 |
| Strongyle | 475 | 150 | 0.0237 | 800 | 150 | 300 | 0.02 |
| *Ascaris suum* | 0 | 0 | 0.9321 | 50 | 0 | 0 | <0.001 |
| *Trichuris suis* | 0 | 0 | 0.1275 | 0 | 0 | 0 | 0.5882 |

Table 2 – Effect of anthelmintics and paddock rotation on parasite load (median FEC eggs/g) of pigs (n=61) across 20 outdoor farms, Ireland.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Anthelmintic use | | P - value | Paddock rotation | | P - value |
| Yes | No | Yes | No |
| *Eimeria spp.* | 2775 | 1025 | 0.003 | 1050 | 4300 | 0.0006 |
| Strongyle | 0 | 500 | <0.001 | 250 | 350 | 0.5275 |
| *Ascaris suum* | 0 | 0 | 0.365 | 0 | 0 | 0.2752 |
| *Trichuris suis* | 0 | 0 | 0.6853 | 0 | 0 | 0.0002 |

**References**

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