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# The influence of endoparasites on selected production parameters in pigs in various housing systems

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ABSTRACT

The aim of the study was to determine the level of lean meat content and daily gains of 400 fatteners infected by endoparasites and kept in two systems (shallow and deep litter). Slaughter evaluation of the pigs was conducted according to the EUROP carcass classification.

In order to evaluate the average daily gains (g) during finishing period, body weights were investigated twice: at the beginning and at the end of the finishing period.

The housing system affected the presence of *Ascaris suum* and *Oesophagostomum* spp. Infestation was found to be higher on shallow than on deep litter, and it significantly affected selected fattening and slaughter parameters of the fatteners. Infected animals were characterized by gains approximately 60 g lower than those of uninfected ones, while meatiness was higher in fatteners which were not infected at the end of the fattening period compared to animals with parasites (55.2% *vs.* 52.0%).



## 1. Introduction

Prevention of diseases resulting from an infection with digestive tract parasites often only involves clinical symptom treatment, which leads to drug resistance of the parasites (Pejsak, 2007). Nosal and Eckert (2005) noted that an occurrence of parasites is an important issue not only concerning health status but also economic results. Recent studies indicate that the range of such parasitic diseases spreading is high (Ramisz and Balicka-Ramisz, 1997).

The latest reform of the Common Agricultural Policy in the European Union imposes the fulfillment of *cross-compliance* requirements, however it does not implement mandatory deworming, but only superficial one without considering the parasitological diagnosis (Karpiesiuk, 2009).

The rules of parasitic diseases prevention and diagnostics should be systematized. Regular testing of pig feces should be a standard. The implementation of such measures must be based on the intention to protect health of people taking care of animals and health of consumers (Perry and Randolph, 1999).

Parasitic diagnosis is also an important issue in the selection of an appropriate drug, which reduces the risks of parasite resistance on active substances. An adapted antiparasitic prevention requires involvement of both, veterinarian and animal owner, and only such collaboration will lead to decisions and actions, resulting in effective protection of health of pigs and servicing staff (Pejsak, 2007). A producer, who does not implement pigs deworming program based on parasitological diagnosis, suffers losses resulting from: reduced production results (lean meat content, daily gains), increased general costs of animal housing and extension of the finishing period (Jackson and Cockcroft, 2007; Pejsak and Tarasiuk, 1994; Smets et al., 1999). These losses can be partially or completely reduced. First of all, herd should be monitored in terms of internal parasites and a control program, including effective drug administration at appropriate parasite development period and production cycle, should be applied. Not only type of housing system affects profitability of pig production, but also health status of animals is the main factor determining the efficiency (Knecht et al., 2011a).

The concentration of livestock production is associated with a greater epizootic threat. Health status is important in both, production and breeding herds, since the genetic potential can only appear in a healthy and strong animals (Truszczyński and Pejsak, 2006).

In our latest research we demonstrated that the housing system (shallow and deep litter) affects survival of gastro-intestinal parasites, especially *Oesophagostomum spp* and *Ascaris suum*, and reduces slaughter efficiency of fatteners (Knecht et al., 2012). The aim of present research is the diagnosis of intestinal parasites and endoparasites presence during the finishing period in two housing systems and its effect on growth rate and meat quality.

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## 2. Materials and methods

### 2.1. Field study

The study was conducted on five farms producing fatteners in a closed cycle (based on the maintenance of all production groups on one farm), in the period from 2009 to 2011. Annual fattener production was at a level of approximately 600 heads. The farms qualified for the study were specialized in the manufacture of one product, and belonged to a group of pig producers according to the Act on Agricultural Producers Groups (Dz.U., 2000, vol. 88, issue 983 as amended).

Due to the affiliation of the examined sites to a group of agricultural producers, no considerable differences in terms of feeding system or animal genetic value were noted. The area of each farm was about 30 hectares.

The examined animals were fed with complete mixture, while the dosing rules were in accordance with the nutritional program of the selected fodder manufacturer, the same on all the farms.

Environmental conditions were similar at all examined sites. The farms applied mechanical ventilation, with fluent regulation of air exchange, depending on room temperature and animal number in each pen.

The animals were treated in a similar manner. Zootechnical practices were uniform in all the groups. Initially after birth, the piglets fangs were cut, while on the second day the animals were administered with iron in the form of an injection, 2 ml of Ferrodex, and the boars were castrated.

The level of foundation stock was approximately 30 sows at all examined sites. The sows were introduced to the farrowing rooms 14 days before expected farrowing date. A similar ratio of primiparous to multiparous sows was taken into account in the experiment. Sows of Large Polish White × Polish Landrace (LPW × PL), Large Polish White (LPW) and Polish Landrace (PL) breeds included in the experiment were inseminated. The selected breed variant (Polish Landrace) of boar semen used for insemination was chosen in accordance with the mating program accepted by the group of agricultural producers.

Each group of fatteners selected for the experiment had no possibility to come in contact with other groups, except sows with piglets maintained for 24 days. No accompanying animals stayed in the livestock buildings.

Growers of a weight of 20 kg (200 heads) were selected for the experiment, and ear-tagged, each group with a different color and number. Two hundred fatteners were evaluated in total over the whole experiment – two breed crossbreeds PLW × PL (120 animals on shallow litter and 80 on deep litter).

The fatteners on shallow litter were maintained in pens with concrete floors.

Fatteners on deep litter were housed in pens, where they were kept until they reached a slaughter weight of 110 kg. The stock was 40 heads. The fodder was administered using an automated feeding line. The animals collected fodder and water on a landing situated at the end of the pen. The fatteners housed on deep litter appointed lair and manure sectors by themselves. The manure seasoned on production sites was removed after the fattening period.

The fatteners both on shallow and deep litter were housed in accordance with the "whole room empty–whole room full" rule.

The dimensions of the pens for the animals were consistent with the Directive of the Ministry of Agriculture and Rural Development of 2 September 2003 (Dz.U., 2003, vol. 167, issue 1629) concerning the minimum conditions of particular farm animal maintenance.

The farms included in the study did not conduct any program related to anti-parasitic prevention, and no veterinary doctor examined the animals for nematode occurrence. No anti-parasitic medicines were used in a preventive manner during the study, and rat control was not conducted on the farms.

### 2.2. Evaluation of meat quality and daily gains

Fattener carcasses were examined using the SEUROP classification system for slaughter animals. In the case of pigs, this means an animal classification is dependent on the percentage of meat content in a carcass (post-slaughter examination of pig carcass).

The carcasses were registered according to SEUROP commercial quality classes under the Directive of the Ministry of Agriculture and Rural Development of 29 June 2004 concerning the determination of pig carcass commercial quality (Dz.U. UE L 74 of 19 March 2005, item 62, as amended (Dz.U., 2005)).

The SEUROP classification is obligatorily applied in slaughter houses, in which the slaughter rate exceeds 200 heads per week.

The evaluation was performed in a meat plant on the fatteners of body weight of 110 kg using an Ultra-Fom 300 apparatus – the device authorized for this evaluation in Poland (Dz.U. UE L 74 of 19 March 2005, item 62, as amended).

The SEUROP classification system distinguishes the following classes of pig carcass commercial quality: class S – meat content in carcass 60% and more, class E – meat content in carcass 55% and more, but less than 60%, class U – meat content in carcass 50% and more, but less than 55%, class R – meat content in carcass 45% and more, but less than 50%, class O – meat content in carcass 40% and more, but less than 45%, class P – meat content in carcass lower than 40%.

In order to evaluate mean daily gains (g), the body weight of the animals (previously ear-tagged) was controlled twice over the fattening period, at the beginning and the end of fattening period, *i.e.* after fattener introduction for fattening and at the end of the fattening period. Daily gains were calculated based on the sum of the two measurements divided by the number of fattening days (approximately 3-month period). Mensor WM150P1 electronic scales were used for animal body weight measurement on each farm.

### 2.3. Sample collection and laboratory procedures

It was demonstrated in the pilot study conducted before the experiment that the percentage of animals infested with coccidia oocysts was insignificant; therefore, this group was not taken into account in further analysis. For that reason, wide-ranging conclusions, taking into account relationships between the examined factors and such a poorly represented group of parasites, would be liable to too high a degree of error.

Parasitological analysis of the herds was conducted based on coprological methods.

The samples were collected two times in each pig parlor. Five grams of feces was collected from the bedding immediately after defecation and placed in plastic containers with 4% formalin solution. The eggs were diagnosed and identified based on their shape, structure of the sheath, number and size of blastomeres. An identification was performed based on elaborations of Thienpont et al. (1986) and Zajac and Conboy (2006).

Due to the high biometric and morphological similarity of the eggs of nematodes belonging to *Oesophagostomum* genus, their detailed identification is practically impossible. For that reason, the eggs in the subsequent part of the study were only identified to genus level – *Oesophagostomum* spp.

The total number of fecal samples collected in the whole experiment was 400.

The number of samples collected on each farm was as follows: fatteners – 20 fecal samples: 10 samples at the beginning of fattening – fatteners (30–50 kg) – sampling I, 10 samples at the end of fattening – fatteners (50–110 kg) – sampling II.