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Behavior, sexual maturity and productive traits in gilts reared under different floor area

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Abstract. A trial with 16 gilts of Danubian White breed has been performed. The gilts have been divided into two groups (8 pigs per group) equal by origin, age and live weight. The experiment has been performed during the spring on 2012 year. The gilts from I group have been kept on floor area of 1.5 m²/head and the gilts from II group have been kept on floor area of 2.5 m²/head. Growth of gilts, age at first heating, back fat thickness, carcass meat percent, age at first feeding, behavior of gilts (movement, lying and feeding time) during pregnancy, number of live born and weaned pigs per sow have been controlled. The gilts kept on floor area of 2.5 m²/head have reached sexual maturity at an average age of 178.71 days, while their sisters kept on floor area of 1.5 m²/head at an average age of 199.50 days – 20.79 days later (P<0.001). The gilts kept in larger floor area had thinner back fat, more meat in the carcass, have moved more, have lied less, had more live born and weaned pigs.

Keywords: gilts, floor area, sexual maturity, behavior, productive traits

Introduction

The main reasons for increased popularity of organic farming nowadays are the requirements for human treatment to agricultural animals and ensuring larger space gives them abilities for free movement and occurrence of their natural behavior. In organic pig production systems pigs are kept in groups and the floor area per head is one of the main environmental factors. According to Stahle (2000) the floor area, even limited, plays an important role in group housing systems ensuring the pigs a space for lying, feeding and defecating. Group housing of pigs with floor area of above 2 m²/head with either straw bed or walking yards is assumed an organic pig production (Schafter et al., 1988; Hesse, 1993; Krause, 1995; Arkenau, 1996).

The investigations of organic pig farming revealed that regardless of pig welfare, it ensures controversial results regarding some biological and productive trait. Germanova (1995), Benkov et al. (1996) and Todorova (2007) concluded that in group housing the larger area stimulates sexual maturity. Rudhner et al. (1992), Rudhner et al. (1994) and Rozeboom et al. (1995) found out that higher growth intensity increases meat percentage in the carcass but delays sexual maturation. Other authors (Todorova, 2008; Todorov and Kirov, 2009) reported that larger floor area and movement abilities decrease growth intensity but stimulate sexual maturity. As floor area is one of the main factors of human rearing of swine, controversial results regarding its influence on the swine productive traits increases the research interests in this field.

The aim of the study was to investigate the influence of floor area in rearing gilts of Danubian White breed on sexual maturity age, behavior and productive traits of the gilts.

Material and methods

The experiment was conducted during the spring of 2012, at the experimental farm of the Agricultural Institute in Shoumen with 16 gilts Danubian White breed. The pigs have been divided in two groups (8 pigs per group) equal in age, weight and origin. The pigs have been kept as follows:

- I group – in group pen with 1.5 m² per head;
- II group – in group pen with 2.5 m² per head.

The floor of the pens was solid made of floor bricks. Dividing movement and occurrence of their natural behavior. In organic pig farming systems pigs are kept in groups and the floor area per head is one of the main environmental factors. According to Stahle (2000) the floor area, even limited, plays an important role in group housing systems ensuring the pigs a space for lying, feeding and defecating. Group housing of pigs with floor area of above 2 m²/head with either straw bed or walking yards is assumed an organic pig production (Schafter et al., 1988; Hesse, 1993; Krause, 1995; Arkenau, 1996).

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Results and discussion

Growth of pigs and back fat thickness, at first estrus, are shown in Table 1. Gilts kept on floor area of 2.5 m²/head (II group) have reached sexual maturity considerably earlier (20.79 days) compared to their sisters from I group kept on floor area of 1.5 m²/head (P<0.001). The larger area for I group, as main environment factor,
Our results correspond to the conclusions of other authors (Benkov, 1987; Benkov and Marchev, 1993; Todorova, 2007). As for the feeding time, there is no large difference in the feeding time between groups.

On 30th day of pregnancy the gilts kept on floor area of 2.5 m²/head (II group) have moved 5.07% longer time compared to their sisters from I group that have been quiet 4.36% longer time (Table 2).

As for the feeding time, there is no large difference in the feeding time between groups.

Around 60th day of pregnancy an alignment of the time for lying and movement in the two groups was observed. On 90th day of pregnancy the back fat thickness was thinner in gilts kept on larger floor area (II group) but the differences between the groups are not significant (P>0.05). The back fat in both groups was thinner than the minimal required thickness of 13 mm at first mating of gilts for good performance and longevity of the sows (Andreev et al., 2008). The back fat thickness varies largely. The thickness of m. longissimus and m. longissimus dorsi at back fat point X₂ is also significantly lower in gilts of II group compared to those of I group. The data regarding performance of sows are shown in Table 3. Sows from II group had more live born (0.87 pcs.) and more weaned (3.03 pcs.) pigs, respectively. Our results correspond to the conclusions of other authors (Benkov, 1987; Benkov and Marchev, 1993; Todorova, 2007). As for the feeding time, there is no large difference in the groups. This could be explained by the fact that the larger area in group II increases the social contacts and the social tension within the group.
pigs (0.5 pcs.) compared to the sows of I group but the differences are insignificant (P>0.05). The birth weight of piglets from sows of I group was significantly higher (P<0.05) compared to the live weight of piglets from sows of II group (1.512 vs. 1.442 kg). On 21st day of age the live weight of piglets from sows of I group is also significantly higher that those of II group (P<0.05). At 35th day of age the live weight of piglets from sows of I group is again higher than those of II group, but the difference is not significant (P>0.05). The average daily gain for the period 22-35 day as well as the average daily gain of pigs born by the sows of I group is significantly higher (P<0.05). The higher live weight of piglets born by the sows of I group at birth, on 21st and on 35th day as well as their higher average daily gain could be explained by larger number of live born and weaned pigs by the sows of II group.

Conclusion

The gilts kept on floor area 2,5 m²/head reached first estrus at an average age of 178.71 days, while their sisters kept on floor area of 1,5 m²/head – at an average age of 199.50 days. The age difference of 20.79 days is statistically significant (P < 0.001). The larger floor area in keeping gilts increases the time for movement of sows and decreases the time for lying, accelerates sexual maturity, increases the number of live born and weaned pigs per sow.

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