

LIVE WEIGHT AND GROWTH OF PIGS IN RELATION TO THE CONDITION OF SOWS

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Abstract

The aim of research work was to observe live weight and growth of piglets that came from 11 sows, cross-breeds the Large white x Landrace. The piglets came from the sows that were at 2nd litter. We observed their body condition according to ultra-violet measurement of backfat thickness (method of self performance test). The measurements were carried out close to farrowing and at the date of weaning. For a consideration of found values of backfat thickness of sows before farrowing we created 3 comparison groups: 1st group contained animals with over body condition (overfat) where back fat thickness was over 23 mm (5pcs), 2nd group was created by animals with optimal body condition where backfat thickness was from 20 to 22 mm (3 pcs) and 3rd group created by animals where backfat thickness was less then 20 mm (3 pcs). Before farrowing of our particular groups of sows the backfat thickness reached these average values: 1st group 27,95 mm, 2nd group 20,67 mm and 3rd group 17,17 mm. The highest reduction of back fat thickness during suckling period was observed in sows of 3rd group (6,83 mm) and the lowest reduction of back fat thickness was observed in group with over body condition (overfat) (1st group = 4,33 mm). The reduction of back fat thickness in sows from 2nd group was 5,56 mm. The average number of all and live born piglets for particular groups was following: 1st group 11,33, resp. 8,00 pcs, 2nd group 13,00 resp. 11,00 pcs, 3rd group 11,50 resp. 11,00 pcs. The highest average live weight at birth reached piglets born by sows with optimal body condition (1,50 kg) and the lowest weight had piglets that came from sows with declined body condition (group 3) namely 1,24 kg. Those tendencies were proven also by weighting of piglets at 21th day and at weaning day. Piglets that came from sows from 1st group reached live weight at weaning 8,03 kg, 2nd group 9,20 kg and 3rd group 6,91 kg. By watching of piglets growth 1 week after weaning (weighting was realized every day) we did not record any reduction of weight in 2nd group after weaning and we also recorded the highest growth of whole group in comparison to other group piglets. The highest and the longest lasting reduction of weight after weaning was found in piglets from group 1 (3days). Reduction of weight after weaning was observed in group 3 but lower than in piglets from group 1. Until the end of the first week after weaning piglets of 3rd group gained higher live weight at the end of the research period in comparison to piglets from 1st group.

Key Words: Weight of piglets, growth of piglets, live weight of weaning piglets, growth of pigs after weaning, body condition of sows

Introduction

The intensity of growth and fattening period of piglets associated with live weight at birth. The number and weight of piglets at birth depends on several factors. One of them is the body condition of the sows. This matter is also studied by Holendová, Čechová, Trčka (2006) and they found that the backfat thickness very significantly affected ($P < 0,001$) the number of all born piglets, but showed no trend.

Successful pig breeding depends largely on the viability and birth weight of the piglets. The minimum weight should be 1,6 to 1,8 kg. With a higher birth weight increases linearly the stayability of piglets to the weaning. From these piglets we can expect higher lifetime performance compared to the weaker siblings (Čeřovský, 2005).

Piglets with birth weight 1,8 kg compared to piglets with a birth weight 1,1 kg gain about 3 to 5 kg more weight (Červenka, Neužil, 2002) at the weaning.

Quiniou et al. (2002) Increasing litter size from ≤ 11 to ≥ 16 piglets results in a reduced mean birth weight from 1,59 to 1,26 kg, which corresponds to a mean decrease of 35 g per each additional piglet born. Concomitantly, the proportion of small piglets, i.e. weighing less than 1 kg, increases from 7 to 23% of total born in these litters. Below 1,0 kg BW, more than 11% of piglets are stillbirths and thereafter more than 17% die within the first 24 h. The corresponding values above 1,0 kg average 4 and 3%, respectively. Despite a low number of small animals still alive at weaning, our data indicate that the higher is the birth weight the higher is the average daily gain both over the sucking, the post-weaning and the growing–finishing periods.

The heritability for within-litter SD in birth weight was 0,08 and 0,06 for within-litter SD in piglet weight at 3 wk. The genetic correlation between these two traits was 0,71. Little maternal genetic variance was found for the change in within-litter SD in piglet weight during suckling, and

opportunity for genetic improvement of this trait by selective breeding seems limited (Damgaard et al., 2003).

The result of adequate feeding strategies during the pregnancy should be moderately fast growth and we maintain roughly the same amount of back fat for each subsequent birth. The amount of back fat 18-22 mm is recommended. Significant loss of body reserves are harmful to the subsequent reproduction. Sows at the first litter, that consume large amounts of body reserves during lactation have reduced capacity for further admission, reduced abundance at the further litters and milkiness deteriorated in the following lactation (Whittemore, 1996).

Lean sows have a reduced ability to mobilize an adequate amount of body reserves to support milk synthesis. On the other hand, there is no advantage in the sows, that carry excess amount of fat 22-24 mm. In gilts, with the amount of back fat that at the time of admission (insemination) was less than 16 mm was found impaired milkiness, extending of the interval from weaning to the first estrus and higher percentage of culling. As a normal phenomenon can be considered when in the sows during lactation decrease of the back fat is about 4 - 5 mm. Gaughan et al. (1995) showed a statistically significant dependence between the number of litters per a year for a sow and the actual amount of back fat.

Hanyková et al. (2005) evaluated fitness with 65 pieces of sows. The average backfat thickness before birth (18,60 mm), after weaning the piglets (16,70 mm), lean meat content before birth (50,74 %) and after weaning (53,34 %) were detected by the ultrasound instrument SonoMark 100. The average sow weight was 265,29 kg (before birth) and 220,00 kg (after weaning). The middle statistical highly meaningful correlation coefficient ($r_{xy} = 0.413+++$) was found between the lactation period weight loss and milk efficiency.

Average live weight before farrowing in a set of 90 sows in the nucleus herd was 271,2 +/- 6,0 kg (variation range 177 - 368 kg). After farrowing and lactation the live weight of 79 sows was 224,4 +/- 5,5 kg (variation range 131 - 300 kg). The live weight loss 47 kg corresponded with the lactation performance of sows (on average 50 kg). Average backfat thickness in the set before farrowing was 19,8 +/- 0,46 mm, after farrowing and lactation it was 15,3 +/- 0,4 mm. In the farrowing house 79% of sows were characterised by condition degree 3, 3.5 and 4, after piglet weaning the percentage of these sows dropped to 59 (Matoušek et al., 2006)

Estimated heritabilities for sow weight and backfat at farrowing and change of weight and backfat during lactation were low to moderate (0,10 to 0,47). The authors found significant genetic correlations between change of weight and backfat during lactation and piglet survival and growth, indicating that sows with the genetic capacity for rapid early piglet growth and high survival rate may lose more body reserves during lactation (Grandinson et al., 2005).

Material and Methods

The aim of the research was to observe live weight of the piglets in connection to body condition of sows by measuring of backfat thickness. We watched 11 sows, cross-breeds the Large white x Landrase. The sows were at 2nd litter.

The body condition was evaluated by measuring of backfat thickness observed according to the ultrasound method at the P2 position.

For a consideration of found values of backfat thickness in sows before farrowing we created 3 comparison groups:

- 1st group contained animals with over body condition (overfat) where backfat thickness was over 22 mm,
- 2nd group was created by animals with optimal body condition where backfat thickness was from 20 to 22 mm
- 3rd group was created by animals where backfat thickness was less then 20 mm.

The measurements were carried out close to farrowing and at the date of weaning.

The sows were weighted at the day of measuring of backfat thickness.

We observed the following parameters in born piglets:

- piglets live weight at the birth (kg)
- piglets live weight at 21st day (kg)
- piglets live weight at weaning (28th day),(kg)
- piglets live weight 1 week after weaning measured every day by individual weighting

Results were processed by MS Excel.

Results and Discussion

The aim of our research was to observe piglets' growth level measured from the farrowing to the period after the weaning in relation to body condition of their mothers.

In table 1 are presented measured values for backfat thickness in sows. The range of measured values of backfat thickness 1 week before farrowing was following: in 1st group of sows was minimum value 23,3 mm and maximum 30,67 mm; in 2nd group we found range between minimum and maximum from 20,00 to 21,33 mm and in 3rd group the values varied from 16,67 to 17,67 mm. At the time of weaning (28th day) we measured in sows following values of backfat thickness: 1st group from 20,33 to 28,00 mm, 2nd group from 13,67 to 16,67 mm and in 3rd group from 9,67 to 11,00 mm. The highest reduction in backfat thickness over the suckling period was observed in sows from 3rd group (6,83 mm) and the lowest reduction in backfat thickness was observed in group with over body condition (overfat) (1st group = 4,33 mm). The loss of backfat thickness in sows from 2nd group was 5,56 mm.

In table 2 we presented statistical indexes for live weight of sows measured 1 week before farrowing and at the day of the weaning. The highest live weight was found in

sows from 1st group (with backfat thickness 22 mm). The weight loss in this group varied after farrow from 12,00 to 58,50 kg. The highest contrast in live weight of sows before farrowing and at the day of weaning we spotted in group 2, namely in sows with optimal value of body condition. The difference in live weight in group 2 varied from 44,50 to 82,00 kg. The difference in live weight in group 3 varied after farrowing from 43,00 to 47,00 kg.

The difference in body weight prior to farrowing and after weaning onwards, are the most consistent with the data of the authors Hanyková et al. (2005).

The highest declination in the thickness of fat after

giving birth we found in group 3 compared to reveal of the authors Gaughan et al. (1995). For other groups the results were comparable with findings of those authors.

The average number of all live born piglets for particular groups was following: 1st group 11,33, 2nd group 13,00, 3rd group 11,50. The lowest average number of live born piglets per litter was recorded in 1st group (8,00 pcs). In 2nd and 3rd group was average number of live born piglets per litter the same (11,00 pcs). Mortality of piglets in the period till weaning was recorded in group 1 (4 pcs) and in group 3 (1 pc). Any mortality till the weaning wasn't recorded in group 2.

Table 1. Indicators of backfat thickness in sows before farrowing and at weaning

Group of sows	Backfat thickness of sows one week before delivery			Backfat thickness of sows at the day of weaning piglets		
	\bar{x}	s	v	\bar{x}	s	v
1.group	27.95	2.63	9.41	23.61	2.67	11.31
2.group	20.67	1.15	5.59	15.11	1.50	9.95
3.group	17.17	10.33	4.12	10.33	0.94	9.12

1. group: sows with over body condition (overfat) (=backfat thickness before delivery >22 mm)

2. group sows with the optimal condition (=backfat thickness before delivery 20 – 22 mm)

3. group sows with the bad condition (=backfat thickness before delivery <20 mm)

Table 2. Indicators of live weight in sows before farrowing and at the weaning

Group of sows	Live weight of sows one week before delivery			Live weight of sows at the day of weaning piglets		
	\bar{x}	s	v	\bar{x}	s	v
1.group	256.58	17.66	6.88	210.33	12.18	5.79
2.group	242.33	32.84	13.55	178.50	17.20	9.63
3.group	210.25	22.98	10.93	165.25	20.15	12.20

In table 3 are presented values for live weight of piglets at an early stages of their live. The highest average live weight at farrowing had piglets born to sows with optimal body condition before the farrow (1,50 kg). Values varied from 0,70 kg to 2,20 kg. The lowest live weight at the farrow was observed in group 3, namely 1,24 kg, piglets came from the sows with declined body condition. These tendencies were proven also by weighting of piglets at 21th day after farrowing and also at the day of weaning. The highest live weight at the weaning day (9,20 kg) was gained by piglets came from mothers with optimal body condition and the lowest (6,91 kg) was gained by piglets that came from mothers with declined body condition.

In table 4 and in graph 1 are introduced values for live weight of piglets observed 1 week after weaning compared to live weight measured at the day of weaning (weighting was realized every day). During watching of piglets growth 1 week after weaning we didn't observe any weight loss after weaning in 2nd group and we recorded also the highest weight growth in whole group in comparison to piglets from other groups. The highest and the longest lasting reduction of weight after weaning was found in piglets that came from group 1. Their live weight reached the weaning weight level only at 4th day. Reduction of the weight after weaning was recorded also in group 3, but lower than in piglets from 1st group. Until

the end of the 1st week after weaning piglets from group 3 gained higher live weight at the end of the research period in comparison to piglets from group 1.

The results can be compared with the authors, who agree that piglets with higher birth weight can achieve better

results at weaning onwards and fattening (Quiniou et al. 2002, Čerovský, 2005, Červeka, Neužil, 2002).

As well as the authors, who describe that number of piglets at the litter depends on the body condition of sows on the basis of the detection of back fat (Holendová et al., 2006).

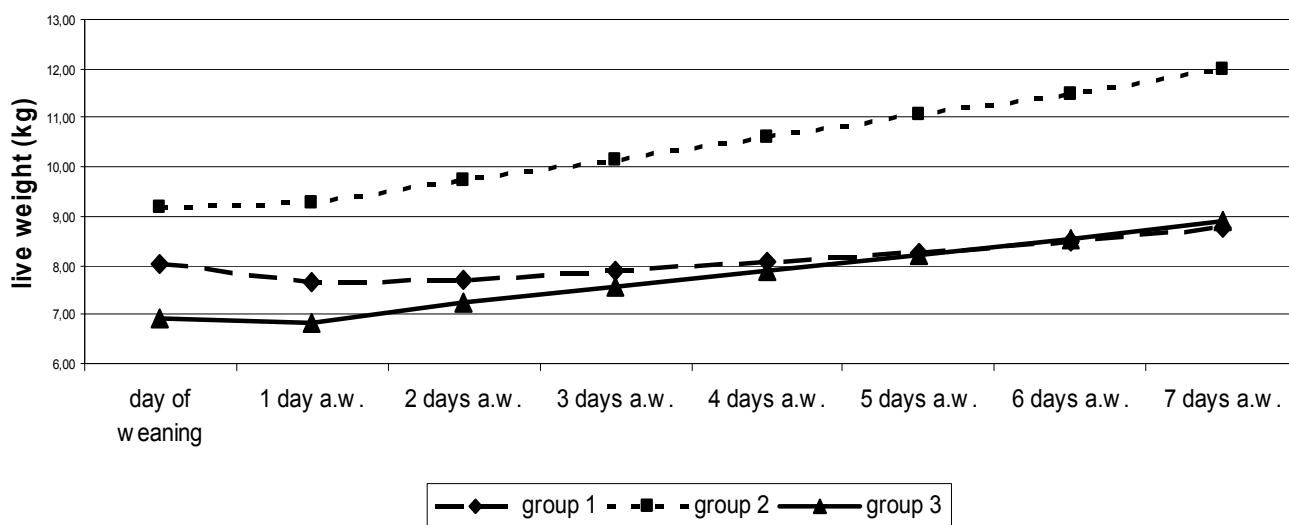
Table 3. Indicators of live weight of piglets

Indicator	Group of sows	\bar{x}	s	v	min	max
Live weight at birth (kg)	1.group	1.41	0.26	18.51	0.75	1.90
	2.group	1.50	0.42	28.11	0.70	2.20
	3.group	1.24	0.38	30.77	0.70	1.90
Live weight of piglets at the age of 21 days (kg)	1.group	6.14	1.28	20.86	2.95	8.40
	2.group	6.73	1.40	20.73	4.46	9.79
	3.group	5.97	1.38	23.09	3.34	9.03
Live weight at weaning pigs aged 28 days (kg)	1.group	8.03	1.44	17.87	4.00	10.56
	2.group	9.20	2.22	24.17	4.70	13.51
	3.group	6.91	1.27	18.34	4.27	9.73

Table 4. Growth of piglets one week after weaning

Group of sows	Day of weaning	1 day after weaning	2 days after weaning	3 days after weaning	4 days after weaning	5 days after weaning	6 days after weaning	7 days after weaning
1.group	8.03	7.67	7.72	7.88	8.06	8.27	8.50	8.76
2.group	9.20	9.27	9.73	10.13	10.60	11.06	11.48	12.00
3.group	6.91	6.82	7.23	7.58	7.87	8.20	8.51	8.90

Figure 1. Live weight of piglets one week after weaning



Conclusion

In the research we evaluated growth of piglets till the weaning in correlation to body condition of their mothers. Tendencies that the best growth results were gained by piglets that came from sows with optimal body condition before farrow were proven. The highest mortality at the farrow was observed in group of sows with over body condition (overfat) and the lowest growth level of piglets was recorded in group that came from mothers with declined body condition before farrowing. The level of body condition in sows was proved to affect other reproduction abilities in sows. The worst results were found in group of sows with over body condition (overfat), where was recorded average number of days from weaning untill next successful insemination (conception) even 55 days.

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