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Effect of birth weight of piglets on growth rate and rearing performance up to 8 weeks of age

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Abstract: *Effect of birth weight of piglets on growth rate and rearing performance up to 8 weeks of age.* The aim of the experiment was to determine the effect of the birth weight of piglets on their rearing results up to 56th day of age, as expressed by growth rate and survival. Observations were made on 277 crossbred piglets from 22 litters of F1 sows (Polish Landrace × Polish Large White) derived from crossbred boars (Duroc × Pietrain), which were kept and fed the same way. Piglets were reared with mothers for 5 weeks and observed for 8 weeks. At 1st, 7th, 21st and 56th day of age, piglets were individually weighed. The body weight on day 1 of age served as a basis for dividing the piglets into groups I, II, III and IV (≤1.2; 1.21–1.39; 1.40–1.59; and ≥1.60 kg body weight, respectively). Coefficients of correlation were estimated between body weight on day 1 of age and at day 7, 21 and 56 of life, and daily gains. In the subsequent rearing periods, daily gains in groups I–IV increased and the differences between the groups showed similar relationships. Differences between groups II and III were small (P >0.05), and those between groups I and IV considerable and highly significant. The coefficients of correlation for piglets from groups I (the lightest at birth) and IV (the heaviest at birth) confirm the relationship between birth weight and body weight at 7th (P ≤0.01), 21st (P ≤0.01) and 56th day of age (P ≤0.05), with a downward tendency for the calculated relationships. Furthermore, in group I piglet birth weight was correlated with daily gains from 1st to 7th day (r = +0.365, P ≤0.01) and from 1st to 56th day of age (r = +0.291, P ≤0.05). With the increasing mean body weight at birth, piglet survival increased and was higher in group IV vs I by 13.64 percentage points. The birth weight ≥1.60 kg ensured the best growth rate and survival of the piglets.

Key words: piglets, body weight, daily gains, survival

INTRODUCTION

The biological potential of the species (18 piglets born per litter and 44 piglets per sow per year) is not used to the full, but the performance parameters continue to increase. Improvements in reproductive traits of pigs have been reported in many countries of Europe, including Poland. Over the last three decades of the 20th century, the number of piglets reared per sow per year increased on well-managed farms from 16 to 22, currently standing at 28–30 (Orzechowska and Mucha 2010, Blicharski et al. 2016). Modern sows are characterized by high fertility, prolificacy and milk yield, which has been achieved due to breeding work, selection programmes, crossbreeding, as well as improvements in feeding programmes and management (Baxter et al. 2013, Rutherford et al. 2013, Douglas 2015). After substantial progress in litter size was made, neonatal weight was

observed to decrease (Škorjanc et al. 2007, Wolf et al. 2008, Beaulieu et al. 2010, Douglas 2015, Hales et al. 2015). This is associated with impaired growth and development of the mammalian embryo/fetus or its organs during pregnancy – IUGR (Wu et al. 2004, Wang et al. 2005, Rekiel et al. 2014b). This phenomenon concerns not only multifetal and multiparous species, such as pigs, rabbits, mink, chinchillas, dogs, cats, mice or rats (Dzierżanowska et al. 2014, Rekiel et al. 2014b, Święcicka et al. 2016), but also those giving birth to one or 2–3 young, such as sheep, goats, cattle, and horses (Wang et al. 2005, Rekiel and Królewska 2014). Realized fertility of sows was found to be conducive to reducing neonatal weight, as confirmed by the correlation $r = -0.46$, estimated by Milligan et al. (2002). According to Foxcroft et al. (2006), this relationship may be due to limited nutrient and oxygen transfer to the fetus. Prenatal nutritional deficiencies during myogenesis are conducive, according to many authors (Bee 2004, Wang et al. 2005, Królewska et al. 2014, Rekiel et al. 2014b), to reducing birth weight of piglets and slowing postnatal growth and development. In the offspring born to sows underfed during gestation, Bee (2004) observed not only lower body weight, but also increased mortality during the first days of life. Highly significant positive coefficients of correlation between the body weight of suckling piglets and the growth rate of young pigs were reported by Bocian et al. (2011). These relationships are supported by the findings of Václavková et al. (2012). In the context of the presented subject matter, it is important to cite Rehfeldt et al. (2012), who believe that despite the limited compensatory growth of piglets after birth, it may occur later on in pigs.

The effect of the birth weight of piglets on rearing performance and survival during the suckling period is economically important and so has been the subject of many analyses (Bocian et al. 2011, Królewska et al. 2014, Rekiel et al. 2015). It also influences the rate of growth later in the rearing period (i.e. after weaning and during fattening), as well as the quality of slaughter material (Gondret et al. 2005, Bocian et al. 2011, Václavková et al. 2012, Rekiel et al. 2014a, b). Fatteners with low birth weights were characterized by increased deposition of fatty tissue, which is unfavourable for processors and consumers (Gondret et al. 2005, Rekiel et al. 2014a).

The aim of the experiment was to determine the effect of the birth weight of piglets on their rearing results up to 56 days of age, as expressed by growth rate and survival.

MATERIAL AND METHODS

The experiment was conducted on a commercial farm located in the Mazowieckie province. Subjects were 277 crossbred piglets from 22 litters of F1 sows (Polish Landrace × Polish Large White) derived from crossbred boars (Duroc × Pietrain). Piglets were reared with mothers for 35 days and observed until 56th day of age. All the experimental piglets were subjected to routine veterinary and management procedures, such as: marking, tail docking, teeth clipping, iron supplementation, preventive vaccinations; the young boars were castrated. Sows were moved into farrowing pens with crates

7 days before predicted parturition. Sows and their offspring were kept on partially slatted floor, and piglets were warmed with heating mats and infrared heaters. After weaning, piglets from two litters were placed into groups of around 20 and maintained in slatted floor pens without bedding. From the first day of life, all piglets were allowed continuous access to water (nipple drinkers), and from 6–7 days to solid feed (ad libitum feeding). Bonni-M Forte (Sano) was used as the first feed, and a week after weaning (day 42) a farm-produced feed based on cereals and Piglet concentrate (Josera) was introduced; it was fed from automatic feeders for 2 weeks, up to the end of observations at 56th day of age.

At 1st, 7th, 21st and 56th day of age, all piglets were individually weighed. The body weight (b.w.) on first day of age served as a basis for dividing the piglets into quartile groups, with 66, 73, 72 and 66 piglets in groups I (b.w. ≤1.20 kg), group II (b.w. 1.21–1.39 kg), group III (b.w. 1.40–1.59 kg) and group IV (b.w. ≥1.60–2.51 kg), respectively. The effect of piglet birth weight on growth rate and survival to 56nd day of rearing was monitored.

The results were statistically analysed using one-way analysis of variance (IBM SPSS Statistics 24). Pearson's coefficients of correlation were estimated within groups between piglet body weight on first day of age, subsequent body weights, and daily gains.

RESULTS AND DISCUSSION

In our study, the number of piglets born per litter averaged 12.59, which is considered satisfactory. The increase in litter size at birth results from the selection for prolificacy, the creation of lines with very good reproductive traits, and the widespread use of maternal heterosis, which is found in two-breed cross sows. The increases in sow fertility but also piglet mortality have been reported in many European herds of pigs (Boulot et al. 2008, Orzechowska and Mucha 2010). Quiniou et al. (2002) report that when litter size increased from 11 to 16 piglets, the mean birth weight of piglets decreased by around 330 g and the proportion of light piglets (weighing less than 1 kg) increased by 16%. The percentage of stillborn animals increased among newborn piglets with such a low birth weight. There was also an increase in mortality on first day of age. The increased differences in neonatal body weight, similar to the body weight itself, may influence the productive traits, including the growth rate during rearing and fattening, as well as carcass muscling and fatness; low body weight has a slowing effect on weight gains and reduces carcass slaughter value (Milligan et al. 2002, Tribout et al. 2003, Gondret et al. 2005, Boulot et al. 2008, Beaulieu et al. 2010).

The mean body weight of piglets obtained in our study (Table 1) is considered satisfactory (Rekiel et al. 2015). According to Quiniou et al. (2002), heavier newborn piglets are more viable and adapt more rapidly to the extrauterine environment. Share of 35% of piglets weighing less than 0.8 kg are stillborn, and those whose birth weight averages between 1.2 and 1.4 kg, account for only 4% of stillbirths.

Daily gains during the first week of life were greater in groups II and III

TABLE 1. Characteristics of experimental animals

Trait	Descriptive statistics	Total	Group I	Group II	Group III	Group IV
Body weight of piglet at day 1 of age (kg)	*n*	277	66	73	72	66
	mean	1.40	1.04	1.30	1.49	1.79
	min	0.58	0.58	1.21	1.40	1.60
	max	2.51	1.20	1.39	1.59	2.51
	SD	0.30	0.16	0.05	0.06	0.19
Body weight of piglet at day 7 of age (kg)	*n*	258	58	68	68	64
	mean	2.54	2.01	2.40	2.60	3.09
	min	1.12	1.12	1.47	1.76	2.36
	max	4.43	2.69	3.08	3.27	4.43
	SD	0.53	0.38	0.35	0.30	0.46
Body weight of piglet at day 21 of age (kg)	*n*	253	56	65	68	64
	mean	6.10	5.46	5.90	6.09	6.86
	min	3.54	3.54	4.21	4.72	4.64
	max	9.76	7.62	7.80	7.70	9.76
	SD	0.96	0.79	0.80	0.62	1.03
Body weight of piglet at day 56 of age (kg)	*n*	247	53	65	67	62
	mean	17.30	15.33	16.89	17.53	19.16
	min	9.84	9.84	11.92	11.76	12.34
	max	24.74	20.66	24.74	23.02	24.46
	SD	2.82	2.16	2.72	2.35	2.68

vs I ($P \leq 0.05$), and in group IV vs I, II, III ($P \leq 0.01$) – Table 2. The differences between groups II and III were not significant ($P > 0.05$). Weight gains in group IV vs I, II and III were greater by 50.3 g (37.1%), 29.8 g (19.1%) and 27.9 g (17.7%), respectively. From 7th to 21st day of rearing, weight gains differed significantly between groups I and III vs IV ($P \leq 0.01$) and between group II vs IV ($P \leq 0.05$). Weight gains in group IV, in relation to groups I, II and III were greater by 24 g (9.8%), 19.3 g (7.7%) and 20.1 g (8.1%), respectively. From 22nd to 56th day of age, daily gains differed significantly between group I vs II, III, IV ($P \leq 0.01$), and between groups II and III vs IV ($P \leq 0.05$). In group IV compared to groups I, II and III, piglet weight gains were greater by 69.8 g (24.8%), 37.1 g (11.8%) and 23.8 g (7.5%), respectively. Daily gains from birth to 56 days of age showed significant differences between groups I vs II, III, and IV, and between groups II and III vs IV ($P \leq 0.01$); no statistically significant differences were found between groups II and III ($P > 0.05$). The mean daily gains were greater in group IV compared to groups I, II and III by 55.7 g (21.9%), 31.9 g (11.5%) and 23.9 g (8.3%), respectively. The results obtained between 8th and 21st day of age appear to be indicative of the preliminary stage of compensatory growth in piglets from groups I, II and III (Rehfeldt et al. 2012). The coef-

TABLE 2. Daily gains of piglets

Trait	Total		Group I b.w. ≤1.20		Group II b.w. 1.21–1.39		Group III b.w. 1.40–1.59		Group IV b.w. ≥1.60	
	$\bar{x}$	*SE*	$\bar{x}$	*SE*	$\bar{x}$	*SE*	$\bar{x}$	*SE*	$\bar{x}$	*SE*
Daily gains from day 1 to 7 (g)	159.4	3.212	135.6 Aa	6.645	156.1 Ab	6.000	158.0 Ab	5.910	185.9 B	6.144
Daily gains from day 8 to 21 (g)	253.6	3.137	245.2 A	6.675	250.0 a	6.027	249.2 A	5.937	269.3 Bb	6.172
Daily gains from day 22 to 56 (g)	319.9	4.436	281.3 A	9.030	314.0 Ba	8.154	327.3 Ba	8.032	351.1 Bb	8.349
Daily gains from day 1 to 56 (g)	283.4	3.052	254.6 A	6.073	278.3 B	5.484	286.4 B	5.401	310.3 C	5.615

b.w. – body weight of piglet at day 1 of age (kg).
A, B – means in rows with different capital letters differ significantly at $P \leq 0.01$.
a, b – means in rows with different small letters differ significantly at $P \leq 0.05$.

ficients of correlation for piglets from groups I (the lightest at birth) and IV (the heaviest at birth) confirm the relationship between birth weight and body weight at 7th ($P \leq 0.01$), 21st ($P \leq 0.01$) and 56th day of age ($P \leq 0.05$), with a downward tendency for the calculated relationships (Table 3). Furthermore, in group I piglet birth weight was correlated with daily gains from 1st to 7th day (r = +0.365, $P \leq 0.01$) and from 1st to 56th day of age (r = +0.291, $P \leq 0.05$). Nissen et al. (2004) (citing Rekiel et al. 2015) demonstrated positive coefficients of correlation between birth weight and weaning weight (r = +0.53), as well as between birth weight, weight at slaughter, and mean gain to slaughter weight (r = +0.29 and r = +0.24). Highly significant correlations of birth weight with body weight measured during maternal nursing and after weaning were also reported by Škorjanc et al. (2007) and Bocian et al. (2011). The coefficient of correlation estimated by Canario et al. (2010) between the number of piglets born alive and their weight on day 21 was r = +0.40. The correlation obtained by the authors cited above between neonatal weight and body weight at 21 days was (r = +0.59). These relationships show the need to increase the mean body weight of the piglets as well as litter weight at birth, and to make it uniform. This is possible through hormonal and dietary treatment of pregnant sows during intensive fetal myogenesis (Rekiel et al. 2015).

The increasing liter size is paralleled by the increasing variation in neonatal weight, which clearly shows that piglets in the litter are becoming less uniform. The low birth weight combined with high within-litter variation is negatively cor-

TABLE 3. Coefficients of correlation

Correlation between body weight on day 1 of age	Group I b.w. ≤1.20		Group II b.w. 1.21–1.39		Group III b.w. 1.40–1.59		Group IV b.w. ≥1.60	
	r	*P*	*r*	*P*	*r*	*P*	*r*	*P*
Body weight on day 7	+0.639	0.001	+0.136	0.270	+0.102	0.406	+0.517	0.001
Body weight on day 21	+0.449	0.001	−0.052	0.682	+0.215	0.078	+0.332	0.007
Body weight on day 56	+0.342	0.012	+0.074	0.556	−0.006	0.961	+0.312	0.014
Weight gains from day 1 to 7	+0.365	0.005	−0.010	0.933	−0.092	0.457	+0.123	0.332
Weight gains from day 8 to 21	+0.194	0.152	−0.109	0.386	+0.199	0.103	+0.120	0.343
Weight gains from day 22 to 56	+0.173	0.173	+0.102	0.420	−0.063	0.611	+0.195	0.129
Weight gains from day 1 to 56	+0.291	0.035	+0.055	0.662	−0.031	0.806	+0.245	0.055

b.w. – body weight of piglet at day 1 of age (kg).

related with piglet survival. In our study, mortality was 19.70, 10.96, 6.94 and 6.06% in groups I, II, III and IV, averaging 10.83% for the investigated group of piglets. Piglet survival in the groups is presented in the figure. The results obtained in groups III and IV vs I were better by about 13 percentage points and show that the neonatal weight of piglets should be optimized to about 1.4 kg.

According to Quiniou et al. (2002), postnatal survival decreases by 95 to 15% when birth weight of piglets is reduced by 1.80 kg to <0.61 kg. In herds with medium fertility and neonatal weights, the losses do not exceed 6–8%, but an increase in litter size from 11 to 16 was found to result in mortality of 28%. Data confirming the high losses among piglets born to high-fertility sows, are also provided by Polish researchers. According to Jarczyk et al. (2009), depending on farm and production cycle, mortality ranged from 3–5 to 14–17%. Mortality was 14–16% in litters of 13 to 15 piglets, and from 24 to over 30% in litters with more than 16 piglets. Jarczyk et al. (2009) also found a relationship between litter size and birth weight of piglets. The greater the litter size, the lower the neonatal weight: when sow fertility was ≥16 and ≤9, the mean birth weight of piglets was 1.27 and 1.73 kg, respectively (difference of 0.46 kg). This had an effect on the growth rate and body weight at days 21 and 82. The body weight of piglets from small litters was higher than for piglets from very large litters, by 0.60 kg ($P \leq 0.05$) and 1.02 kg ($P \leq 0.01$) on the above days of rearing, respectively. Similar results were obtained by Boulot et al. (2008). When litter size increased from 7 to 16 piglets, Quiniou et al. (2002) found

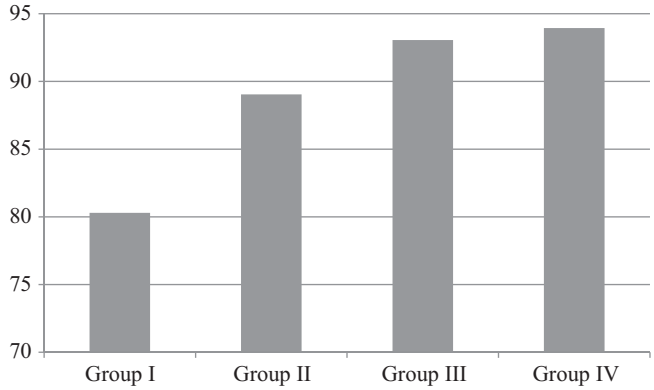

FIGURE. Survivability (%) of piglets (age of 1–56 days)

greater differences in neonatal weight, lower litter uniformity, and 5 times as many stillborn piglets. The proportion of the lightest piglets (weighing <1 kg at birth) and the heaviest piglets (weighing >1.8 kg) changed in the litters from 3 and 63 to 15 and 13%, respectively. Quiniou et al. (2002) and Wu et al. (2004) hold the view that in practice, about 15–20% of piglets weigh 1 kg or less at birth, which considerably reduces their survival.

CONCLUSION

It is concluded based on the findings of the present study that the mean body weight of piglets at 7th, 21st and 56th days of age differed between groups I, II, III and IV. Daily gains in groups I–IV increased with each rearing period (day 1–7, 8–21, 22–56). The differences between groups II and III were small (P >0.05), and those between groups I and IV considerable and highly significant. The coefficients of correlation for piglets from groups I (the lightest at birth) and IV (the heaviest at birth) confirm the relationship between birth weight and body weight at 7th ($P \leq 0.01$), 21st ($P \leq 0.01$) and 56th days of age ($P \leq 0.05$), with a downward tendency for the calculated relationships. Furthermore, in group I piglet birth weight was correlated with daily gains from 1st to 7th day ($r = +0.365$, $P \leq 0.01$) and from 1st to 56th day of age ($r = +0.291$, $P \leq 0.05$). Mortality among neonatal piglets with low birth weight (≤1.20 kg) was high (19.7%). With an increasing mean body weight at birth, piglet survival increased and in group IV it was higher by 13.64 percentage points in relation to group I. The birth weight of piglets ≥1.60 kg ensures the best growth rate and survival of the piglets.

REFERENCES

BAXTER E.M., RUTHERFORD K.M.D., D'EATH R.B., ARNOTT G., TURNER S.P., SANDOE P., MOUSTSEN V.A., THORUP F., EDWARDS S.A., LAWRENCE A.B., 2013: The welfare implications of large litter size in the domestic pig II: management factors. Anim. Welfare 22: 219–238. http://dx.doi.org/10.7120/09627286.22.2.199.

BEAULIEU A.D., AALHUS J.L., WILLIAMS N.H., PATIENCE J.F., 2010: Impact of piglet birth weight, birth order, and litter size on subsequent growth performance, carcass

quality, muscle composition and eating quality of pork. J. Anim. Sci. 88: 2767–2778. doi:10.2527/jas.2009-2222.

BEE G., 2004: Effect of early gestation feeding, birth weight, and gender of progeny on muscle fiber characteristics of pigs at slaughter. J. Anim. Sci. 82: 826–836.

BLICHARSKI T., HORBAŃCZUK J., ŁUKASZEWICZ M., PIERZCHAŁA M., PTAK J., SNOPKIEWICZ M., 2016: Performance results 2015. Pigs. PZHiPTCh „POLSUS". Warszawa: 1–64.

BOCIAN M., GRAJEWSKA S., KAPELAŃSKA J., WIŚNIEWSKA J., WŁODARSKI W., 2011: Wpływ masy ciała prosiąt przy urodzeniu na efekty ich odchowu i wyniki tuczu. Roczn. Nauk. Zoot. 38 (2): 189–195.

BOULOT S., QUESNEL H., QUINIOU N., 2008: Management of high prolificacy in French herds: can we alleviate side effects on piglet survival? Adv. Pork Prod. 19: 213–220.

CANARIO L., LUNDEHEIM N., BIJMA P., 2010: Pig growth is affected by social genetic effects and social litter effects that depend on group size. Proceedings of the 9th World Congress on Genetic Applied to Livestock Production (WCGALP), 1–6 August 2010, Leipzig, Germany.

DOUGLAS S.L., 2015: Management and nutritional strategies to improve the postnatal performance of light weight pigs. PhD. School of Agriculture Food and Rural Development. Newcastle University: 1–141.

DZIERŻANOWSKA-GÓRYŃ D., BRZOZOWSKI M., GÓRAL-RADZISZEWSKA K., 2014: Young chinchillas weight gain, depending on their body mass at birth. Ann. Warsaw Univ. Life Sci. – SGGW, Anim. Sci. 53: 95–101.

FOXCROFT G.R., DIXON W.T., NOVAK S., PUTMAN C.T., TOWN S.C., VINSKY M.D., 2006: The biological basis for prenatal programming of postnatal performance in pigs. J. Anim. Sci. 84 (E Suppl.): 105–112.

GONDRET F., LEFAUCHEUR L., LOUVEAU I., LEBRET B., PICHODO X., Le COZLER Y., 2005: Influence of piglet birth weight on postnatal growth performance, tissue lipogenic capacity and muscle histological traits at market weight. Livest. Prod. Sci. 93: 137––146.

HALES J., MOUSTSEN V.A., NIELSEN M.B.F., HANSEN C.F., 2015: Temporary confinement of loose-housed hyperprolific sows reduced piglet mortality. J. Anim. Sci. 93: 4079–4088. doi:10.2527/jas2015-8973.

JARCZYK A., MILEWSKA W., WINIARSKI K., KOBAK K., SITKIEWICZ D., 2009: Reproductive performance on Pen Ar Lan sows in the small and large farms. Roczn. Nauk. PTZ 5 (4): 145–154.

KRÓLEWSKA B., REKIEL A., WIĘCEK J., 2014: Effect of birth body weight of piglets on their rearing up to the age of 10 weeks. Ann. Warsaw Univ. Life Sci. – SGGW, Anim. Sci. 53: 21–28.

MILLIGAN B.N., FRASER D., KRAMER D.L., 2002: Within-litter birth weight variation in the domestic pig and its relation to pre-weaning survival, weight gain, and variation in weaning weights. Livest. Prod. Sci. 76: 181–191.

ORZECHOWSKA B., MUCHA A., 2010: Ocena użytkowości rozpłodowej loch. Stan hodowli i wyniki oceny świń. Wyd. IZ, Kraków, 3–19.

QUINIOU N., DAGORN J., GAUDRE D., 2002: Variation of piglets' birth weight and consequences on subsequent performance. Livest. Prod. Sci. 78: 63–70.

REHFELDT C., STABENOW B., PFUHL R., BLOCK J., NÜRNBERG G., OTTEN W., METGES C.C., KALBE C., 2012: Effects of limited and excess protein intakes of pregnant gilts on carcass quality and cellular properties of skeletal muscle and subcutaneous adipose tissue in fattening pigs. J. Anim. Sci. 90: 184–196.

REKIEL A., BARTOSIK J., WIĘCEK J., BATORSKA M., KUCZYŃSKA B., ŁOJEK A., 2014a: Effect of piglet birth weight on selected characteristics of pork. Ann. Anim. Sci. 14 (4): 967–975. doi: 10.2478/aoas-2014-0033.

REKIEL A., KRÓLEWSKA B., 2014: Wewnątrzmaciczne zahamowanie wzrostu u zwierząt – syndrom IUGR. Przegl. Hod. 81 (5): 10–12.

REKIEL A., WIĘCEK J., BATORSKA M., KULISIEWICZ J., 2014b. Effect of sow prolificacy and nutrition on pre- and postnatal growth of progeny: a review. Ann. Anim. Sci. 14 (1): 3–15. doi: 10.2478/aoas-2013-0060.

REKIEL A. WIĘCEK J., SOŃTA M., 2015: Naukowe i praktyczne aspekty optymalizacji urodzeniowej masy ciała prosiąt. Przegl. Hod. 4: 15–17.

RUTHERFORD K.M.D., BAXTER E.M., D'EATH R.B., TURNER S.P., ARNOTT G., ROEHE R., ASK B., SANDOE P., MOUSTSEN V.A., THORUP F., EDWARDS S.A., BERG P., LAWRENCE A.B., 2013: The welfare implications of large litter size in the domestic pig I: biological factors. Anim. Welfare 22: 199–218. http://dx.doi.org/10.7120/09627286.222.199.

ŠKORJANC D., BRUS M., POTOKAR M.C., 2007: Effect of birth weight and sex on pre-weaning growth rate of piglets. Arch. Tierz. Dummerstorf 50, 5: 476–486.

ŚWIĘCICKA N., BERNACKA H., ZAWIŚLAK J., 2016: Mean body weight gains in standard mink depending on the number of kits in a litter. Ann. Warsaw Univ. Life Sci. – SGGW, Anim. Sci. 55 (2): 293–300.

TRIBOUT T., CARITEZ J.C., GOGUÉ J., GRUAND J., BILLON Y., BOUFFAUD M., LAGANT H., Le DIVIDICH J., THOMAS F., QUESNEL H., GUÉBLEZ R., BIDANEL J.P., 2003: Estimation, par utilisation de semence congelée, du progrès génétique réalisé en France entre 1977 et 1998 dans la race porcine Large White: Résultats pour quelques caractères de reproduction femelle. Journ. Rech. Porc. Fr. 35: 285–292.

VÁCLAVKOVÁ E., DANĚK P., ROZKOT M., 2012: The influence of piglet birth weight on growth performance. Res. Pig Breed. 6 (1): 59–61.

WANG T., HUO Y.J., SHI F.X., XU R.J., HUTZ R.J., 2005: Effects of intrauterine growth retardation on development of the gastrointestinal tract in neonatal pigs. Biol. Neonate 88: 66–72. doi. 10.1159/000084645.

WU G., BAZER F.W., CUDD T.A., MEININGER C.J., SPENCER T.E., 2004: Maternal nutrition and fetal development. J. Nutr. 134: 2169–2172.

WOLF J., ZAKOVA E., GROENEVELD E., 2008: Within-litter variation of birth weight in hyperprolific Czech Large White sows and its relation to litter size traits, stillborn piglets and lossed until weaning. Livest. Sci. 115: 195–205.

Streszczenie: *Wpływ masy ciała prosiąt przy urodzeniu na tempo wzrostu i wyniki odchowu do wieku 8 tygodni*. Celem badań było określenie wpływu masy ciała prosiąt przy urodzeniu na wyniki ich odchowu do 56. dnia życia, wyrażone tempem wzrostu i przeżywalnością. Obserwacjami objęto 277 prosiąt mieszańców z 22 miotów od loch F1 (polska biała zwisłoucha × wielka biała polska) po knurach krzyżówkowych (Duroc × Pietrain), jednakowo żywionych i utrzymywanych. Odchów potomstwa przy matkach trwał 5 tygodni a obserwacje 8 tygodni. W 1., 7., 21., oraz 56. dniu życia prosięta ważono indywidualnie. Masa ciała w 1. dniu życia była podstawą do podziału prosiąt na grupy: I, II, III, IV, odpowiednio: ≤1,2; 1,21–1,39; 1,40–1,59; ≥1,60 kg m.c. Oszacowano współczynniki korelacji między masą ciała prosiąt w 1. dniu życia a w 7., 21. i 56. dniu życia oraz przyrostami dobowymi. W kolejnych okresach odchowu przyrosty dobowe w grupach I–IV zwiększały się, przy czym ich zróżnicowanie pomiędzy grupami wykazywało zbliżone zależności. Między grupami II i III różnice były niewielkie (P >0,05), między grupami I i IV znaczne i wysoko istotne statystycznie. Obliczone dla prosiąt z grupy I (najlżejsze przy urodzeniu) i z grupy IV (najcięższe przy urodzeniu) współczynniki korelacji potwierdzają zależność między masą ciała przy urodzeniu a masą ciała w 7. (P ≤0,01), 21. (P ≤0,01) i 56. dniu życia (P ≤0,05), z tendencją malejącą dla obliczonych zależności. Ponadto, w grupie I stwierdzono zależność między masą ciała prosiąt przy urodzeniu a przyrostami dobowymi od 1. do 7. dnia (r = +0,365, P ≤0,01) oraz od 1. do 56. dnia życia (r = +0,291, P ≤0,05). Przy zwiększającej się średniej masie ciała przy urodzeniu przeżywalność prosiąt zwiększała się, była większa w grupie IV w porównaniu z grupą I o 13,64 punktów procentowych. Masa ciała przy urodzeniu ≥1,60 kg gwarantowała najlepsze tempo wzrostu i przeżywalność prosiąt.

Słowa kluczowe: prosięta, masa ciała, przyrosty dobowe, przeżywalność

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