Backfat thickness during gestation and lactation period in respect to reproductive performance of primiparous and multiparous sows

Grubość słoniny w czasie ciąży i laktacji loch pierwiastek i wieloródek a cechy ich użytkowości rozpłodowej

Maria BOCIAN, Hanna JANKOWIAK*, Jacek GÓRSKI, Karina FRĄTCZAK, Wojciech KAPELAŃSKI

Department of Pig Breeding and Horses, University of Technology and Life Sciences in Bydgoszcz, Mazowiecka 28, 85-084 Bydgoszcz, Poland, Tel. +48 052 374 97 48, *correspondence jankowiak@utp.edu.pl

Abstract

The aim of the study was to determine the effect of backfat thickness measured during gestation and after lactation of primiparous and multiparous sows on the value of reproductive traits. Backfat thickness was determined at mating, at 105 day of gestation and after weaning and were correlated with selected reproductive indicators including placenta weight. The study was carried out 20 primiparous and 20 multiparous sows of Polish Landrace breed. The nutrition and housing conditions were the same for all pigs. Backfat and loin depth (P_2, P_4 , P_4 M) were measured using PIGLOG 105 device. The evaluation of reproductive performance included the weight of placenta at parturition, the number of born piglets, litter weight, piglet body weight at birth, at 21 and at weaning (28 days). Multiparous sows were characterized by greater fatness than primiparous sows in all periods of use. In all examined sows the backfat depth during gestation increased and decreased after lactation. Those changes were more pronounced in multiparous sows than in primiparous sows ($P \leq 0.01$). Multiparous sows born and reared more piglets to 21 and 28 days of life ($P \leq 0.01$). There have not been dead piglets in primiparous litters. Litters weight from multiparous sows were higher than from primiparous sows only at birth ($P \leq 0.01$) and similar in rest periods of rearing. Individual body weight of piglets from primiparous was higher than that from multiparous sows at 21 and 28 days of life ($P \leq 0.01$). Fatness changes during lactation, particularly in multiparous sows, were positively correlated with litter weight at birth and negatively correlated with piglet's weight at 21 and 28 days of life and their daily gains ($P \leq 0.05$). Correlations between placenta weight and backfat thickness during lactation were positive in both groups of sows ($P \leq 0.01$).

Keywords: backfat thickness, piglets, pigs, sows, weight and efficiency of placenta

Streszczenie

Celem badań było określenie wpływu grubości słoniny mierzonej w czasie okresu ciąży i po przebytej laktacji zarówno u pierwiastek jak i wieloródek na wartość cech użytkowości rozpłodowej. Grubość słoniny była określana przy kryciu, w 105 dniu ciąży i po odsadzeniu i była skorelowana z wybranymi wskaźnikami rozrodu z uwzględnieniem masy łożyska. Badaniami objęto 20 pierwiastek i 20 wieloródek rasy polskiej białej zwisłouchej. Warunki utrzymania oraz żywienie były ujednolicone dla wszystkich zwierząt. Grubość słoniny i mięśnia polędwicy (P_2, P_4 , P_4 M) były mierzone za pomocą aparatu PIGLOG 105. Ocena użytkowości rozpłodowej obejmowała masę łożyska przy porodzie, liczbę urodzonych prosiąt, masę miotu, masę prosiąt przy urodzeniu, w 21 dniu oraz w dniu odsadzenia (28 dni). Wieloródki charakteryzowały się większym otłuszczeniem niż pierwiastki we wszystkich okresach pomiaru. Grubość słoniny u wszystkich badanych loch wzrosła w czasie ciąży i zmniejszyła się po laktacji. Zmiany te były bardziej widoczne u wieloródek niż u pierwiastek ($P \leq 0.01$). Wieloródki rodziły i odchowywały więcej prosiąt do 21 i 28 dnia życia ($P \leq 0.01$). Nie zanotowano martwo urodzonych prosiąt w miotach pierwiastek. Masa miotów urodzonych przez wieloródki była wyższa niż pierwiastek tylko przy urodzeniu ($P \leq 0.01$) i zbliżona w pozostałych okresach odchowu. Indywidualna masa ciała prosiąt pierwiastek była większa niż wieloródek w 21 i 28 dniu życia ($P \leq 0.01$). Stopień otłuszczenia podczas laktacji, szczególnie u wieloródek były pozytywnie skorelowane z masą miotu przy urodzeniu i negatywnie skorelowane z masą prosiąt w 21 i 28 dniu życia oraz z ich przyrostami dziennymi ($P \leq 0.05$). Korelacje pomiędzy masą łożyska a grubością słoniny podczas laktacji były pozytywne u obu grup loch ($P \leq 0.01$).

Słowa kluczowe: grubość słoniny, prosięta, świnie, lochy, masa i wydajność łożyska

Streszczenie szczegółowe

Intensywna selekcja świń w kierunku zwiększenia ich mięsności, spowodowała zmniejszenie grubości słoniny u zwierząt zarodowych. Nadmierne otłuszczenie nie sprzyja zwiększeniu efektów użytkowania rozpłodowego, a z kolei odpowiednia rezerwa tłuszczu może korzystnie wpływać na efektywność krycia i płodność loch. Optymalizacja otłuszczenia może więc być jednym z ważniejszych elementów poprawy efektów użytkowania rozpłodowego loszek i loch. Istotny wpływ na ilość i masę urodzonych i odchowanych prosiąt może mieć masa łożyska, gdyż jego wielkość determinuje prenatalny wzrost komunikacji między płodem a środowiskiem śródmacicznym i wpływa na liczbę żywo i martwo urodzonych prosiąt oraz na masę ich ciała przy urodzeniu i w konsekwencji także na wyniki odchowu prosiąt.

Celem badań było określenie wpływu grubości słoniny mierzonej w czasie okresu ciąży i po przebytej laktacji zarówno u pierwiastek jak i wieloródek na wartość cech użytkowości rozpłodowej z uwzględnieniem masy łożyska. Badaniami objęto 40 loch (20 pierwiastek i 20 wieloródek) rasy polskiej białej zwisłouchej - po 4. (tych samych) knurach w grupie pierwiastek i wieloródek. Warunki żywienia, utrzymania oraz pielęgnacji zwierząt podczas odchowu i użytkowania rozrodczego były w pełni ujednolicone. W trakcie użytkowania - w dniu krycia, w 105 dniu ciąży i po przebytej 28-dniowej laktacji określano grubość słoniny (w punktach P_2 i P_4) oraz grubość

mięśnia polędwicy (P_4 M) przy pomocy aparatu PIGLOG 105 według procedur oceny przyżyciowej dla zwierząt z przeznaczeniem do dalszej hodowli. W ocenie rozpłodowej uwzględniono liczbę prosiąt w 1, 21 i 28 dniu życia oraz indywidualny ich wzrost do 21 i 28 dnia odchowu.

We wszystkich okresach użytkowania wykazano większe otłuszczenie u loch wieloródek, a zaistniałe różnice w większości potwierdzono jako statystycznie istotne. Wieloródki rodziły i odchowywały więcej prosiąt do 21 i 28 dnia życia ($P \leq 0.01$). W miotach pierwiastek nie odnotowano prosiąt martwo urodzonych. Masy miotów przy urodzeniu loch pierwiastek i wieloródek były zróżnicowane ($P \leq 0.01$), natomiast wyrównane w pozostałych okresach odchowu. Indywidualna masa ciała prosiąt od pierwiastek była wyższa w 21 i 28 dniu życia ($P \leq 0.01$). Wykazano istotne korelacje pomiędzy grubością słoniny w okresie laktacji w punkcie P_2 u loch pierwiastek a liczbą prosiąt przy urodzeniu ($r=0.873^{xx}$) i masą łożyska ($r=0.804^{xx}$), a także pomiędzy P_4 a masą ciała prosiąt przy urodzeniu ($r=0.656^{x}$) ($P \leq 0.01$). U loch wieloródek grubość słoniny w okresie laktacji była natomiast skorelowana w punkcie P_4 M z masą miotu przy urodzeniu ($r=0.520^{x}$) i ujemnie z masą ciała prosięcia w 21 i 28 dniu życia ($r=-0.491^{x}$ i $r=-0.539^{x}$) oraz ze średnimi przyrostami od 1 do 28 dnia ($r=-0.517^{x}$) ($P \leq 0.05$) i dodatnio skorelowana z masą łożyska ($r=0.577^{xx}$) ($P \leq 0.01$).

Introduction

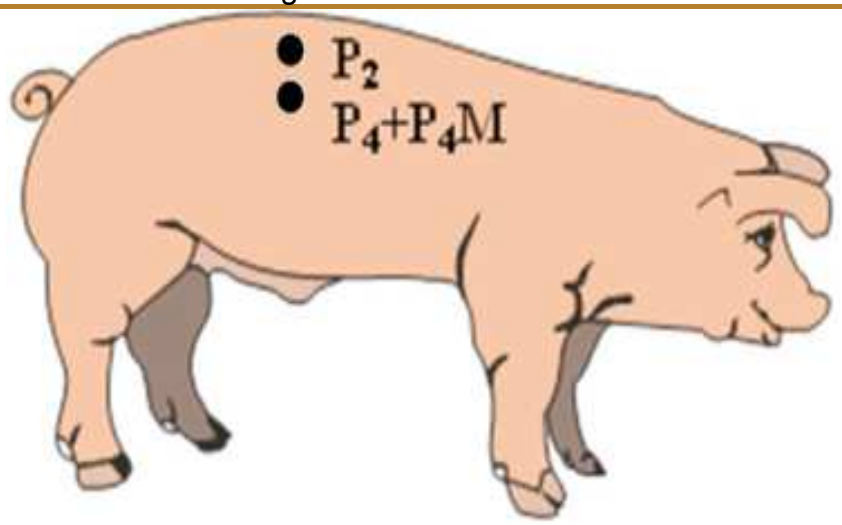
Optimization of the fattening in gilts and sows reproductive performance can be one of the most important elements to improve their effectiveness of reproductive performance. It is commonly considered that excessive fatness do not conductive the expected effects of reproductive performance. On the other hand it is known that adequate reserve of fat can have a beneficial impact on the efficiency of mating and fertility of sows (Bocian et al., 2010b; Mucha et al., 2010; Rekiel et al., 2000).

Intensive selection of pigs to increase their meatiness caused reducing backfat thickness of breeding animals. The study of these correlations seems to be constantly interesting and needed.

Definitely too little attention is paid to the sows placenta weight which can have significant impact on number and weight of born and reared piglets. The size of placenta determine prenatal increase of communication between the fetuses and the intrauterine environment. It also impact on number of life and still born piglets and on body weight at birth and on the results of piglets rearing (Belkacemi et al., 2010; Gajewczyk et al., 2008; Mesa et al., 2003; Rekiel et al., 2011; Van Rens et al., 2005; Wilson et al., 1999).

Material and Methods

The study included 40 sows (20 primiparous and 20 multiparous) of Polish Landrace breed which were mated the same 4 boars. The group of multiparous sows were contributed by sows which farrowed at the second and third time. There were the same nutrition and housing conditions and sows care (during rearing and use). On mating day, at 105 days of gestation and after 28 days of lactation the backfat thickness was determined using PIGLOG 105 device according to intravital evaluation for gilts intended for further breeding (Eckert and Żak, 2012). Measurements were made on live animals in the following points (Figure 1. rys. 1. - Garlicki, 2011):



P_2 - measurement of backfat thickness per last rib, 3 cm below the center line

P_4 - measurement of backfat thickness per last rib, 8 cm below the center line,

P_4 M – thickness of the loin muscle at P_4 point

Fig. 1 Measurement points at animal body

We also evaluated the reproductive performance of sows by specifying parameters such as number, body and litter weight at 1, 21 and 28 days of life, as well as individual growth of piglets by weighing in the same periods of control. On the farrowing day was evaluated the weight of excreted placenta. Also the placenta capacity was calculated according to following schema (Van Rens et al., 2005):

$$\frac{\text{litter weight at birth, kg}}{\text{placenta weight, kg}}$$

Obtained results were statistically elaborated. Calculated the arithmetic mean (x) and standard deviation (sd). The analysis ANOVA was performed, the significance of differences between groups were estimated using Duncan and Student test. Also calculated the correlations between backfat thickness during gestation and lactation in respect to reproductive performance traits of primiparous and multiparous sows. For the calculations was used the STATISTICA 8 PL (2008) program.

Results and Discussion

Table 1 shown the results of backfat thickness and meat percentage in primiparous and multiparous sows at mating, at 105 days of gestation and after lactation.

There was demonstrated that multiparous sows were characterized by thicker backfat than primiparous sows in all periods of use. Those differences mostly were statistically significant ($P \leq 0.01$). Particularly large differences occurs at 105 days of gestation (23.63 mm vs. 13.22 mm) and at 28 days of lactation (16.68 mm vs. 10.78 mm). During mating the multiparous sows also had thicker backfat than primiparous sows. However those differences were slightly smaller than in next periods. On the other hand, primiparous sows were characterized by greater meat content than multiparous sows. On mating day the difference was not statistically significant. In the next periods of use those differences were significantly greater and proved to be statistically significant ($P \leq 0.01$). Significant differences of backfat thickness during gestation and lactation period were demonstrated in multiparous sows. In P_2 and P_4 points the increase of backfat thickness was 9.37 mm and 7.74 mm and backfat thickness decrease during lactation was 6.74 mm and 6.05 mm ($P \leq 0.01$). However, the opposite relations were shown for percentage meat content in the body of sows. During gestation the muscling was decreased about 8.40% and during lactation increased about 5.80% ($P \leq 0.01$). Rekiel et al. (2000) shown in their research the higher values of backfat thickness in all measurement points on mating day. Similar data to presented shown Nowachowicz et al. (2009). Many authors report a positive impact of greater fatness of sows to increased number of born and reared piglets in the litter (Bocian et al., 2010b; Grzyb et al., 2007; Matysiak et al., 2010; Rekiel et al., 2000; Tummaruk et al., 2007).

Table 2 shown the number of piglets in litter in following measurement days and their mortality depending on group of sows.

Multiparous sows born more piglets than primiparous sows. Those differences in all periods of control were statistically significant ($P \leq 0.01$). Better fertility of multiparous sows is a commonly known fact. It is caused by many factors and we can only suspect that one of them is greater fatness of sows and hence a better prepare to reproduction. Grzyb et al. (2007) shown that increased meatiness of Landrace gilts and their lower fatness did not affect the deterioration of reproductive performance. Whereas Matysiak et al. (2010) demonstrated that sows with thickness loin muscle ≤ 46.0 mm reared statistically significant more piglets than sows with greater thickness of loin muscle (≥ 54.1 to 46.1 mm) ($P \leq 0.01$). Similar results obtained Bocian et al. (2010a).

In primiparous litters did not stated the still born piglets. Mortality of piglets up to 28 day of life also was lower than in multiparous litters. Rekiel et al. (2000) state that excessive fatness of sows caused increase number of still born piglets. According to Wolf et al. (2008) lower mortality of piglets in primiparous sows has relation with lower litter size. In other studies (Bocian et al., 2011; Foxcroft et. al., 2009) shown that large number of piglets in litters decreased their birth weight and increase variability of their body weight in litter.

Table 1. Backfat thickness and meatiness at mating, at 105 day of gestation and after lactation period at day 28 of primiparous and multiparous sows

Tabela 1. Grubość słoniny i umięśnienie loch przy kryciu, w 105 dniu ciąży i po 28 dniach laktacji u loch pierwiastek i wieloródek

Item – Cecha	Measurements of backfat thickness and meatiness in the body sows Pomiary grubości słoniny i zawartości mięsa w ciele loch			Backfat thickness during Grubość słoniny w okresie	
	at mating przy kryciu	at 105 day of gestation w 105 dniu ciąży	after lactation period at 28 day po przebytej laktacji w 28 dniu	Gestation ciąży	Lactation laktacji
Primiparous - Pierwiastki					
- P_2 (mm)	$10.22^{x} \pm 2.44$	$13.22^{X} \pm 3.19$	$10.78^{X} \pm 4.02$	$+3.00^{X}$	-2.44^{X}
- P_4 (mm)	11.67 ± 2.12	$13.44^{X} \pm 3.57$	$12.55^{x} \pm 2.79$	$+1.77^{X}$	-0.89^{X}
- P_4M (mm)	44.67 ± 6.00	45.89 ± 5.67	48.44 ± 6.87	+1.22	+2.55
- % meat - % mięsa	58.17 ± 2.86	$55.04^{X} \pm 3.41$	$58.01^{X} \pm 3.95$	-3.13^{X}	$+2.97^{x}$
Multiparous - Wieloródki					
- P_2 (mm)	$14.26^{By} \pm 4.85$	$23.63^{AY} \pm 4.93$	$16.89^{BY} \pm 4.17$	$+9.37^{Y}$	-6.74^{Y}
- P_4 (mm)	$13.89^{B} \pm 5.13$	$21.63^{AY} \pm 7.22$	$15.58^{By} \pm 3.61$	$+7.74^{Y}$	-6.05^{Y}
- P_4M (mm)	44.31 ± 4.40	48.00 ± 8.74	43.53 ± 5.94	+3.69	-4.47
- % meat - % mięsa	$53.99^{B} \pm 6.58$	$45.59^{AY} \pm 5.30$	$51.39^{BY} \pm 4.81$	-8.40^{Y}	$+5.80^{y}$

Means in the same row with different letters are significantly different: A, B ($P \leq 0.01$)
Wartości w wierszach oznaczone różnymi literami różnią się istotnie: A, B przy $P \leq 0,01$

Means in the same column between primiparous and multiparous sows with different letters are significantly different: x, y ($P \leq 0.05$); X, Y ($P \leq 0.01$)
Wartości w kolumnach pomiędzy pierwiastkami a wieloródkami oznaczone różnymi literami różnią się istotnie: x, y przy $P \leq 0,05$); X, Y przy $P \leq 0,01$

Table 2. Litter piglets number in following measurement days and their mortality depending on group of sows
Tabela 2. Liczba prosiąt w miocie w kolejnych dniach pomiaru oraz ich śmiertelność w zależności od grupy loch

Item - Cecha	Group of sows - Grupa loch: Primiparous - pierwiastki (p)	Multiparous - wieloródki (w)	Differences (p - w) Różnice (p - w)
Number of piglets (n) Liczba prosiąt (n)			
- at birth (day 1) - przy urodzeniu (1 dzień)	$9.55^{A} \pm 1.24$	$12.84^{B} \pm 2.24$	-3.29
- dead (day 1) - martwe (1 dzień)	0.00^{a}	$0.84^{b} \pm 0.96$	-0.84
- at 21 day of life - w 21 dniu życia	$8.89^{A} \pm 1.05$	$10.78^{B} \pm 1.78$	-1.89
- at weaning (day 28) -przy odsadzeniu (28 dzień)	$8.89^{a} \pm 1.05$	$10.63^{b} \pm 1.80$	-1.74
Mortality of piglets (n/%) Śmiertelność prosiąt (n/%)			
- from 1 to 28 day of life - od 1. do 28 dnia życia	0.66 (6.91%)	2.21 (17.21%)	-1.55 (-10.30%)

p - primiparous - pierwiastki; w- multiparous – wieloródki
Means in the same row with different letters are significantly different: a, b ($P \leq 0.05$); A, B ($P \leq 0.01$)
Wartości w wierszach oznaczone różnymi literami różnią się istotnie: a, b przy $P \leq 0,05$; A, B przy $P \leq 0,01$

Table 3 shown litter and piglets weight in following measurement days, piglets daily gains, weight and efficiency of placenta depending on group of sows

Litter weight of primiparous and multiparous sows were varied and the differences were statistically significant ($P \leq 0.01$). The differences were caused by a greater number of piglets in multiparous litters. During following periods of rearing (to 21 and 28 day of life) multiparous litters weight were still higher but the differences were not statistically significant. The average piglets weight at birth in both groups were aligned, however in the following periods of rearing there was a significant diversity.

Primiparous sows reared much heavier piglets than multiparous sows. The differences were statistically significant and amounted to 0.64 and 1.02 kg ($P \leq 0.01$). This variation of piglets weight at 21 and 28 day of life was caused by different rate of growth. Piglets from primiparous litters grown on average 242 g per day and piglets from multiparous litters 206 g per day. These differences as well as differences in daily gains to 21 days were statistically significant ($P \leq 0.01$).

Table 3. Litter and piglets weight in following measurement days, piglets daily gains, weight and efficiency of placenta depending on group of sows
Tabela 3. Masa miotu i masa ciała prosięcia w kolejnych dniach pomiaru, średnie przyrosty dobowe, masa i wydajność łożyska w zależności od grupy loch

Item - Cecha	Group of sows - Grupa loch		
	Primiparous - pierwiastki (p)	Multiparous - wieloródki (w)	Differences (p - w) Różnice (p - w)
Litter weight (kg)			
Masa miotu (kg)			
- at birth (day 1)	14.83^{A} ±1.72	19.73^{B} ± 2.74	-4.90
- przy urodzeniu (1. dzień życia)			
- at 21 day of life	57.53 ± 7.36	61.65 ± 9.78	-4.12
- w 21 dniu życia			
- at weaning (day 28)	73.78 ±10.29	79.65 ± 11.56	-5.87
- przy odsadzeniu (28. dzień życia)			
Body weight piglet (kg)			
Masa ciała prosięcia (kg)			
- at birth (day 1)	1.55 ± 0.29	1.54 ± 0.27	+0.01
- przy urodzeniu (1. dzień życia)			
- at 21 day of life	6.41^{A} ± 0.60	5.77^{B} ± 1.08	+0.64
- w 21 dniu życia			
- at weaning (day 28)	8.36^{A} ± 0.71	7.34^{B} ± 1.41	+1.02
- przy odsadzeniu (28. dzień życia)			
Average daily gain (g)			
Średnie przyrosty dobowe (g)			
- from 1 to 21 day of life	230^{A} ± 29	200^{B} ± 50	+30
- od 1. do 21. dnia życia			
- from 1 to 28 day of life	242^{A} ± 23	206^{B} ± 50	+36
- od 1. do 28 dnia życia			
Placenta weight (kg)	2.30^{A} ± 0,30	3.04^{B} ± 0.41	-0.74
Masa łożyska (kg)			
Placenta efficiency (kg/kg)	6.50 ± 0,66	6.53 ± 0,66	-0.03
Wydajność łożyska (kg/kg)			

p - primiparous - pierwiastki; w- multiparous – wieloródki
Means in the same row with different letters are significantly different: A, B (P ≤ 0.01)
Wartości w wierszach oznaczone różnymi literami różnią się istotnie: A, B przy P ≤ 0,01

Multiparous sows were characterized by greater placenta weight which indicates a higher development of reproductive system. The difference (0.74 kg) was statistically significant ($P \leq 0.01$). Greater fertility of multiparous sows and thus greater litter weight caused that the placenta efficiency in both groups was very similar. Van Rens et al. (2005) shown that among three items (i.e. piglets weight at birth, weight and efficiency of placenta) the best indicator of the piglets vitality is body weight at birth and is also the easiest to measure. Gajewczyk et al. (2008) shown that placenta weight can affect the number and weight of born and reared piglets and number of still born piglets. Multiparous sows had definitely heavier placenta compared to primiparous sows ($P \leq 0.05$). Rekiel et al. (2011) determined relationship between placenta weight and fatness of sows in high gestation, their body weight and reproductive indicators. They demonstrated that sows with greater placenta weight were characterized by significant greater fatness and higher body weight, and a larger number of born piglets and their body weight compared to sows with lower placenta weight ($P \leq 0.05$ and $P \leq 0.01$).

The impact of sows fatness in period from mating to 105 day of gestation on reproductive performance items were tested by calculating the correlations between fatness gain in gestation period and loss in lactation period. The data are presented in Table 4.

Fatness in gestation period were not significant correlated with any of the reproductive items taking into account in both groups. Backfat thickness occurring in lactation period were significant by correlated with some of items characterizing the reproductive performance of sows ($P \leq 0.01$; $P \leq 0.05$). Backfat thickness of primiparous sows in point P_2 were positively correlated with number of born piglets and placenta weight ($P \leq 0.01$). In multiparous sows backfat thickness in P_4 point were positively correlated with litter weight at birth ($r = 0.520^{x}$) and negatively correlated with piglets weight at 21 and 28 day of life and with piglets daily gains during rearing ($r = -0.517^{x}$) ($P \leq 0.05$). The correlation between placenta weight and backfat thickness in lactation period were positive in both groups of sows ($P \leq 0.01$).

Conclusions

In this work, there was no found unambiguous relationship between backfat thickness in primiparous and multiparous sows and their fertility and effects of piglets rearing and weight and efficiency of uterine. The reduction of backfat thickness during lactation had a positive impact on the results of rearing piglets in group of multiparous sows.

Table 4. Correlation coefficients between backfat thickness during gestation and lactation and items of reproductive performance of primiparous and multiparous sows

Tabela 4. Współczynniki korelacji pomiędzy grubością słoniny w okresie ciąży i laktacji a cechami użytkowości rozpłodowej loch pierwiastek i wieloródek

Item - Cecha	Sows - lochy	Backfat thickness during - Grubość słoniny w okresie							
		Gestation – ciąży				Lactation - laktacji			
		P_2	P_4	P_4M	% meat % mięsa	P_2	P_4	P_4M	% meat % mięsa
Number of piglets (n) - Liczba prosiąt (n)									
- at birth (day 1)	p	-0.250	0.449	-0.535	-0.290	0.873^{xx}	-0.223	-0.056	-0.359
- przy urodzeniu (1 dzień)	w	0.141	-0.186	0.189	-0.150	0.072	0.441	-0.140	-0.145
Litter weight (kg) - Masa miotu (kg)									
- at birth (day 1)	p	0.087	0.221	0.342	0.094	0.401	-0.258	-0.137	-0.083
- przy urodzeniu (1. dzień życia)	w	0.094	-0.213	0.392	-0.057	0.188	0.520^{x}	-0.069	-0.180
Piglet body weight (kg) - Masa ciała prosięcia (kg)									
- at birth (day 1)	p	0.185	0.226	-0.218	-0.439	-0.162	0.469	0.656^{x}	0.273
- przy urodzeniu (1. dzień życia)	w	-0.072	0.220	0.168	0.331	-0.044	-0.331	-0.028	-0.127
- at 21 day of life	p	-0.102	-0.042	0.084	-0.003	0.027	-0.152	0.289	0.447
- w 21 dniu życia	w	-0.140	0.416	-0.087	0.030	-0.067	-0.491^{x}	0.100	0.152
- at weaning (day 28)	p	-0.630	0.057	-0.317	0.197	0.406	-0.406	-0.304	-0.113
- przy odsadzeniu (28. dzień życia)	w	-0.276	0.167	-0.247	0.369	-0.053	-0.539^{x}	0.285	0.081
Average daily gains (g) - Średnie przyrosty dobowe (g)									
- from 1 to 28 day of life	p	-0.591	-0.031	-0.188	0.320	0.396	-0.505	-0.485	-0.191
- od 1. do 28 dnia życia	w	-0.321	0.096	-0.331	0.366	-0.041	-0.517^{x}	0.315	0.099
Placenta weight (kg)	p	0.145	0.590	-0.177	-0.343	0.804^{xx}	-0.367	-0.174	-0.315
Masa łożyska (kg)	w	0.087	-0.385	0.210	0.055	0.199	0.577^{xx}	-0.150	-0.439

p - primiparous - pierwiastki; w- multiparous – wieloródki xx - $P \leq 0.01$; x - $P \leq 0.05$

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