

CHANGES IN RANGE OF PERFORMANCE TEST RESULTS OF GILTS OF POLISH  
LARGE WHITE BREED PRODUCED IN POLAND IN BYDGOSZCZ BREEDING REGION  
ZMIANY W ZAKRESIE WYNIKÓW OCENY PRZYŻYCIOWEJ LOSZEK RASY WIELKIEJ  
BIAŁEJ POLSKIEJ PRODUKOWANYCH W POLSCE W BYDGOSKIM OKRĘGU  
HODOWLANYM

GRAŻYNA MICHALSKA, JERZY NOWACHOWICZ, TOMASZ BUCEK, PRZEMYSŁAW DARIUSZ  
WASILEWSKI

University of Technology and Life Sciences, Faculty of Animal Breeding and Biology, Department of Animal Product Evaluation,  
ul. Ks. Kordeckiego 20, 85-225 Bydgoszcz, Poland, tel. +48 52 374 93 07, e-mail: surzwierz@utp.edu.pl

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**ABSTRACT**

The aim of the paper was analysis of changes in range of performance test results of 19782 gilts of Polish Large White conducted in years 1995-2004, produced in Poland in the area activity of Bydgoszcz Breeding Region, covering Kujawy-Pomorze Province. Animals were evaluated regarding to the same obligatory methodology in years 1995-2004. Within the space of 10 analyzed years 1995-2004 fat content decreased, i.e. backfat thickness in P<sub>2</sub> and P<sub>4</sub> points decreased by 4.1 and 3.3 mm, respectively. Body meat content of tested pigs increased by 4 % and performance test selection index increased by 14.2 points. Systematic increase in analyzed years performance test selection index value of gilts (from 110.7 points in 1995 up to 124.9 points in 2004) in Bydgoszcz Breeding Region shows effective improvement of pigs of Polish Large White breed in this area of Poland.

KEY WORDS: Polish Large White, gilts, performance test

**STRESZCZENIE**

Celem pracy była analiza zmian w zakresie wyników oceny przyżyciowej 19782 loszek rasy wielkiej białej polskiej przeprowadzonej w latach 1995-2004 wyprodukowanych w Polsce na terenie bydgoskiego okręgu hodowlanego, obejmującego woj. kujawsko-pomorskie. Zwierzęta zostały ocenione według tej samej metodyki obowiązującej w latach 1995-2004. Na przestrzeni 10 analizowanych lat 1995-2004 nastąpiło zmniejszenie otłuszczenia, tj. grubości słoniny w punktach P<sub>2</sub> i P<sub>4</sub> odpowiednio o 4,1 i 3,3 mm, zwiększenie zawartości mięsa w ciele badanych świń o 4% oraz indeksu selekcyjnego oceny przyżyciowej o 14,2 pkt. Systematyczny wzrost w analizowanych latach wartości indeksu selekcyjnego oceny przyżyciowej loszek (od 110,7 pkt. w 1995 r. do 124,9 pkt. w 2004 r.) w bydgoskim okręgu hodowlanym świadczy o skutecznym doskonaleniu świń rasy wielkiej białej polskiej w tym rejonie Polski.

SŁOWA KLUCZOWE: wielka biała polska, loszki, ocena przyżyciowa

## DETAILED ABSTRACT

Celem prezentowanej pracy była analiza zmian w zakresie wyników oceny przyżyciowej loszek rasy wielkiej białej polskiej produkowanych w Polsce w bydgoskim okręgu hodowlanym, obejmującym woj. kujawsko-pomorskie. Analizą statystyczną objęto wyniki oceny przyżyciowej 19782 loszek od 1995 (kiedy zmodernizowano metodykę i do określania indeksu selekcyjnego obok wykorzystywanego wcześniej parametru, tj. przyrostu dobowego masy ciała wprowadzono również procentową zawartość mięsa w ciele) do 2004 r. (ostatniego roku obowiązywania tej samej metodyki). Na przestrzeni 10 ocenianych lat 1995-2004 nastąpiła poprawa dotycząca cech charakteryzujących otluszczenie i umięśnienie oraz wartości indeksu selekcyjnego oceny przyżyciowej świadczącej o wartości hodowlanej pod względem cech tucznych i rzeźnych badanych zwierząt. Grubość słoniny mierzona w punktach  $P_2$  i  $P_4$  zmniejszyła się odpowiednio o 4,1 i 3,3 mm a wysokość oka połędwicy i zawartość mięsa w ciele loszek zwiększyła się o 3,4 mm i 4%. Indeks selekcyjny oceny przyżyciowej wzrósł o 14,2 pkt., tj. od 110,7 pkt. w 1995 r. do 124,9 pkt. w 2004 r. Systematyczny wzrost w kolejnych analizowanych latach wartości indeksu selekcyjnego oceny przyżyciowej loszek produkowanych w Polsce w bydgoskim okręgu hodowlanym świadczy o skutecznym doskonaleniu świń rasy wielkiej białej polskiej w tym rejonie kraju.

## INTRODUCTION

Improvement of performance traits of pigs is obtained by applying right evaluation methods and use their results in conducted selection. One of them is performance test, which shows breeding value of pigs regarding to growth and slaughter performances. Research done on the base of results of this evaluation caused significant progress of genetic value of pigs in Poland and in other countries [2, 3, 15, 16, 17].

The level of performance traits, including also traits connected with performance test of different breeds and lines of pigs and crossbreeds came from specified crossing variants, bred in Poland and in particular regions of the country is diversified and changes within the space of following years [1, 4, 7, 9, 10, 11, 12, 15].

Productivity of nucleus and mass herds of pigs depends from many factors, i.e. from breeding value of maternal components used in breeding. It includes also pigs of Polish Large White breed, which regarding to their number are on second position in the country and their share is c.a. 34 % of nucleus pig herds [13]. Polish

Large White breed is characterized by good growth and slaughter performances [18]. Breeding research aims to improve their meat content and decrease fat content [14].

The aim of presented paper was analysis of the changes in range of performance test results of gilts of Polish Large White produced in Poland in Bydgoszcz Breeding Region from year 1995 (when methodology was modernized and to estimate selection index, beside used earlier parameter, i.e. daily gain of body weight also percentage body meat content was introduced) till year 2004 (last year of obligatory the same methodology).

## MATERIAL AND METHODS

The aim of research were the results of performance test of 19782 gilts of Polish Large White breed produced in Poland in the area activity of Bydgoszcz Breeding Region, covering Kujawy-Pomorze Province in 10 following years, i.e. 1995-2004. Animals were performance tested regarding to the same methodology, obligatory in years 1995-2004 [5, 6]. Body meat content of gilts was calculated on the base of ultrasonic measurements done by PIGLOG 105 apparatus, concerned backfat thickness in  $P_2$  and  $P_4$  points and height of loin eye in  $P_4M$  point [6].

Performance test selection index formula was as presented [6]:

$$I = 0.1678X_1 + 3.7134X_2 - 189.5119$$

where:

$X_1$  –daily gain standardized on 180<sup>th</sup> day of life,

$X_2$  –percentage carcass meat content.

Results were statistically elaborated by one-way variance analysis. Significance of differences between the results obtained in tested years (noted as groups 1-10) was estimated by Duncan test. Calculations were made by formulas given by Ruszczyk [19] and computer program Statistica PL [20].

## RESULTS AND DISCUSSION

In Table 1 there were given number and results in range of growth traits of gilts of Polish Large White Breed performance tested in Bydgoszcz Breeding Area in analyzed years (1995-2004). Age on performance test day of tested gilts was from 167 days in year 2001 up to 177 days in year 2003, thus was in accordance with obligatory methodology [5, 6]. Their body weight on test day shaped from 93.4 kg in year 1997 up to 101.1 kg in year 2003, and average value of this trait in analyzed 10

Table 1. Number and results in range of growth traits of gilts of Polish Large White breed  
Tabela 1. Liczebność oraz wyniki w zakresie cech tucznych loszek rasy wielkiej białej polskiej

Trait	1995 1	1996 2	1997 3	1998 4	1999 5	2000 6	2001 7	2002 8	2003 9	2004 10	Population average 1995-2004	Significance of differences P ≤ 0.01	
													Year
Number (pcs.)	n	760	1378	1612	1655	1614	1785	2256	2986	3142	2593		
Age on test day (days)	$\bar{x}$	172	169	169	170	168	169	167	171	177	173	171	1-2,3,4,5,6,7,9
	s	17	14	13	17	14	15	14	15	15	15	15	2,3,4,5,6-7,8,9,10 7-8,9,10; 8-9,10 9-10
Body weight on test day (kg)	$\bar{x}$	99,9	94,7	93,4	94,0	94,5	94,4	94,0	96,0	101,1	100,3	96,6	1-2,3,4,5,6,7,8,9
	s	12,1	10,6	9,6	10,7	10,7	10,9	11,1	10,7	10,8	10,5	11,1	2-3,8,9,10 3-5,8,9,10; 4,5,6,7- 8,9,10; 8-9,10
Daily gain of body weight standardised on 180th day (g)	$\bar{x}$	594	576	568	570	578	574	581	572	579	590	578	1-2,3,4,5,6,7,8,9
	s	73	65	65	61	61	57	59	47	46	43	55	2-3,4,7,10 3-5,6,7,9,10 4-5,7,9,10; 5,7-8,10 6-7,10; 8-9,10; 9-10

Table 2. Results in range of slaughter traits and performance test selection index of gilts of Polish Large White breed  
Tabela 2. Wyniki w zakresie cech rzeźnych oraz indeksu selekcyjnego oceny przyzyciowej loszek rasy wielkiej białej polskiej

Trait	Year										Population average 1995-2004	Significance of differences P ≤ 0.01
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004		
Backfat thickness in P <sub>2</sub> point (mm)	$\bar{x}$	14.4	12.7	12.4	11.9	11.3	-	10.7	10.6	10.3	11.4	1-2,3,4,5,6,8,9,10
	s	3.5	2.8	2.6	2.4	2.1		2.0	2.0	2.0	2.5	2-3,4,5,6,8,9,10 3-4,5,6,8,9,10; 4,5-6,8,9,10; 6-8,9,10; 8,9-10
Backfat thickness in P <sub>4</sub> point (mm)	$\bar{x}$	14.0	13.4	12.1	11.6	10.9	-	10.8	10.9	10.7	11.4	1-2,3,4,5,6,8,9,10
	s	4.1	3.6	2.9	2.4	2.2		1.8	2.0	1.9	2.6	2-3,4,5,6,8,9,10 3-4,5,6,8,9,10 4,5-6,8,9,10
Average backfat thickness (mm)	$\bar{x}$	-	-	-	-	-	10.8	10.7	10.8	10.5	10.7	10-7,8,9
	s						1.8	1.6	1.6	1.6	1.6	
Height of loin eye (mm)	$\bar{x}$	46.3	48.1	47.1	47.2	47.4	48.0	48.3	49.2	49.7	48.1	1-2,3,4,5,6,7,8,9,10
	s	5.5	6.3	5.3	4.7	4.2	4.1	4.0	4.5	4.4	4.7	2-3,4,5,6,9,10 3,4,5,6-7,8,9,10 7,8-9,10; 9-10
Body meat content (%)	$\bar{x}$	54.0	55.4	55.9	56.3	56.9	57.3	57.5	57.6	58.0	56.9	1-2,3,4,5,6,7,8,9,10
	s	3.0	2.7	2.3	2.0	1.8	1.8	1.6	1.6	1.6	2.2	2-3,4,5,6,7,8,9,10 3-4,5,6,7,8,9,10 4,5-6,7,8,9,10; 6-7,8,9,10; 7-9,10; 8,9-10
Performance test selection index (points)	$\bar{x}$	110.7	112.9	113.4	115.4	116.5	120.9	120.1	121.7	124.9	118.8	1-2,3,4,5,6,7,8,9,10
	s	13.9	13.2	11.9	10.4	10.1	11.0	9.5	10.1	9.8	11.3	2,3-4,5,6,7,8,9,10 4-5,6,7,8,9,10 5-6,7,8,9,10 6-7,8,9,10; 7,9-10 8-9,10

years was 96.6 kg. Daily gain of body weight standardized on 180<sup>th</sup> day of life was the highest in gilts tested in years 1995 and 2004, because it shaped on the level 594 and 590g. The lowest growth rate, amounted 568 g, had gilts performance tested in year 1997. Daily gain of body weight of gilts standardized on 180<sup>th</sup> day of life within the space of 10 analyzed years shaped averagely on the level of 578 g.

Growth rate, which characterized gilts of Polish Large White breed performance tested in Bydgoszcz Breeding Area in years 1995 and 1996 was higher as compared to the results obtained by gilts of the same breed performance tested in the whole country [5, 6]. In years 1997-2001 results in range of this trait were comparable with average value in country, however in years 2002-2004 were worse [6]. Nowachowicz et al. [12] stated, that among 9 groups of gilts, including 7 pure breed groups, i.e. Polish Large White (PLW), Polish Landrace (PL), Belgian Landrace, Hampshire, Duroc, Pietrain, Line 990 and 2 crossbred groups (PLW x PL and PL x PLW) performance tested in year 2001 in Bydgoszcz Breeding Area, gilts of Polish Large White breed obtained better result regarding growth rate, placed on 4<sup>th</sup> position after pigs of Belgian Landrace, Pietrain and Polish Landrace. In research of Buczyński et al. [1] gilts of Polish Large White breed performance tested had higher daily gain of body weight from pigs of Pietrain and Polish Landrace breed. According to Jarczyk et al. [8] domestic breeds of pigs Polish Large White and Polish Landrace used in crossing are characterized by similar or a bit better daily gain of body weight compared to the hybrids after PIC boars.

In Table 2 there were presented results regarding to slaughter traits of tested gilts. In following analyzed years fat content of tested gilts was decreasing. The thickest backfat measured in points P<sub>2</sub> and P<sub>4</sub> had animals performance tested in year 1995 and the differences between this results and the results from remaining years were statistically high significant. The thinnest backfat in points P<sub>2</sub> and P<sub>4</sub> had gilts tested in year 2004. Within the space of 10 analyzed years backfat thickness in points P<sub>2</sub> and P<sub>4</sub> decreased by 4.1 and 3.3 mm, respectively. Nowachowicz et al. [12] reported that among 9 groups of gilts performance tested in Bydgoszcz Breeding Region, animals of Polish Large White had 5<sup>th</sup> position after pigs of Belgian Landrace, Pietrain, Hampshire and Line 990 and obtained the same result regarding average backfat thickness as Duroc animals.

Height of loin eye measured in point P<sub>4</sub>M most favorable shaped in gilts performance tested in year 2004 and amounted 49.7 mm. The worst result on the level of 46.3 mm had animals performance tested in year 1995.

Average value of this trait in analyzed years was 48.1 mm. Within the space of 10 evaluated years height of loin eye increased by 3.4 mm. Buczyński et al. [1] was analyzing results regarding the size of Longissimus dorsi muscle and stated that in gilts of Polish Large White and Pietrain performance tested loin depth increased together with age, however in pigs of Polish Landrace opposite tendency was stated.

Body meat content of tested gilts was the lowest in year 1995 and amounted 54 % and in following years improvement stated in range of this trait by 1.4 % (1996); 1.9 % (1997); 2.3 % (1998 and 1999); 2.9 % (2000); 3.3 % (2001); 3.5 % (2002); 3.6 % (2003) and 4 % (2004) and differences in this range were statistically high significant. In years 1995-2004 average meat content of tested gilts shaped on the level of 56.9 %. Within the space of 10 analyzed years body meat content of tested gilts increased by 4 %. Meat content of tested gilts in years 1995-2004 was comparable to the results obtained by gilts of Polish Large White breed performance tested in the whole country [5, 6]. In the research of Nowachowicz et al. [12] among 9 tested groups of gilts meat content of animals of Polish Large White breed performance tested in year 2001 in Bydgoszcz Breeding Region was lower from pigs of Pietrain, Belgian Landrace, Hampshire breeds and Line 990. In other own research [10] where was analyzed meat content of gilts of 6 pure breed and 1 synthetic line performance tested in Bydgoszcz Breeding Region in total comparison of the results from years 1995-2004 the best results obtained animals of Belgian landrace (59.6 %) and Pietrain (59.2 %) breeds. Following were pigs of Line 990 (57.8 %), Hampshire (57.3 %), Polish Large White (56.9 %) and Polish Landrace (56.8 %) and Duroc (65.1 %).

Performance test selection index of tested gilts in following analyzed years has been systematically increasing from 110.7 points in year 1995 up to 124.9 points in year 2004. Thus, within the space of 10 analyzed years an improvement stated in range of the most important trait showing breeding value regarding to growth and slaughter traits by 14.2 points. Performance test selection index value of gilts of Polish Large White breed produced in Bydgoszcz Breeding Region in years 1995 and 1996 was higher from the average value in the country. In years 1997-2001 results in this range were comparable but in years 2002-2004 slightly worse [5, 6].

## CONCLUSION

Summarizing results obtained in presented paper it should be stated, that within the space of 10 analyzed

years 1995-2004 favorable changes stated in range of performance test results of gilts of Polish Large White breed produced in Poland in Bydgoszcz Breeding Region. An improvement regarding to traits which are characterizing fat and meat content stated. Backfat thickness measured in P<sub>2</sub> and P<sub>4</sub> points decreased by 4.1 and 3.3 mm, respectively and the height of loin eye and body meat content of gilts increased by 3.4 mm and 4 %. Performance test selection index, showing breeding value, regarding to growth and slaughter traits increased by 14.2 points. Systematical increase in following analyzed years performance test selection index value of gilts produced in Poland in Bydgoszcz Breeding Region shows effective improvement of pigs of Polish Large White breed in this area of the country.

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