PERFORMANCE TRAITS OF PRESTICE BLACK-PIED PIG BREED AT THE EFFECT OF GENEALOGICAL LINE

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Abstract

The Prestice Black-Pied pig is a Czech autochthonous breed. The study was conducted on 2 349 pigs of Prestice Black-Pied breed, 276 boars and 2 073 gilts. In the performance test boars achieved average daily gain – 561 g, average backfat thickness – 11.4 mm and lean meat content – 59.1%. The highest average daily gain was observed after line Sudet (576 g), the lowest backfat thickness was measured after line Viskont (10.2 mm) and the highest lean meat content was observed after lines Viskont and Pirát (60.1%) in boars. Gilts achieved average daily gain – 518 g, average backfat thickness – 11.0 mm and lean meat content – 58.5%. The highest growth achieved gilts after line Akoga (527 g). The lowest backfat thickness (10.1 mm) and the highest lean meat content (59.6%) were measured after line Viskont.

Key Words: pig; Prestice Black-Pied breed; performance traits

The Prestice Black-Pied (PBP) pig is a Czech autochthonous breed from the western region of the Czech Republic. This breed is reared in a closed population which is included in the National Programme for Farm Animal Resources. The use of this local breed could provide specific and high-quality products with the regional label (Dostálová *et al.*, 2012).

Traditional pig breeds fall into a group of prolific breeds with good finishing performance (e.g. Saddlebacks and Pulawska), that are suitable for commodity organic pork production, especially when crossed with conventional white boar breeds (e.g. Large White, Landrace or Duroc) to give some extra leanness to the carcass. And into the special meat breeds kept for special meat production (e.g. Ibérico, Cinta Senese), that are unsuitable for commodity organic pork production because of their low fertility and high carcass fatness, but extra added value is obtained by their specific meat and fat quality (Leenhouwers and Merks, 2013).

Traditional breeds may be less prolific, grow slowly and have excess carcass fat at heavy slaughter weights (Kelly *et al.*, 2007).

The use of traditional breeds in commercial organic and low input pig production units is generally economically not feasible if the price/kg of pork is independent of the breed. However, in some countries local breeds have additional value for specific local products (e.g. Jamon Iberico in Spain and Mangalica ham in Hungary) which compensate the higher production costs. If conventional genetic lines are used for organic and low input production systems, the breeding goal must be adapted with focus on robustness traits such as piglet vitality, maternal abilities and sow longevity (Leenhouwers and Merks, 2013).

Reproductive and finishing performance are important for the economic sustainability of a production system, although their usefulness for evaluating breed suitability also depends on market requirements (Martins *et al.*, 2002).

For commodity organic pork production in the Netherlands, the carcass-value marketing system is based on high lean meat content, whereas for dry-cured meat production fat quality and quantity are important (Leenhouwers and Merks, 2013).

Material a Methods

The study was conducted on 2 349 pigs of Prestice Black-Pied breed, 276 boars and 2 073 gilts. In the performance test live weight was determined on the day of ultrasound measurements, i.e. in gilts between 60–145 kg and in boars between 70–170 kg (within 9 months of age) and average daily weight gain from birth was calculated. Average backfat thickness and lean meat content were measured with an ultrasound instrument (SONOMARK-100) on the basis of the established methodology.

The measurement points are positioned 70 mm lateral to the midline – backfat thickness 1, backfat thickness 2, and muscle depth m.l.l.t. Average daily gain from birth and average backfat thickness were adjusted to 90 kg live weight in gilts and to 100 kg live weight in boars. Lean meat content both in gilts and boars was adjusted to 100 kg body weight.

Results and Discussion

The values of statistical analysis aimed at the effect of line on performance traits of boars are documented in Table 1.

In the performance test boars achieved average daily gain – 561 g, average backfat thickness – 11.4 mm and lean meat content – 59.1%. The highest average daily gain was observed in the offspring after line Sudet (576 g), followed by lines Akoga and Pirátek (571 and 570 g). The lowest average daily gain was found after line Sáčko (543 g). The lowest backfat thickness was measured in boars after line Viskont (10.2 mm), the highest value was recognized after lines Sokolík (12.4 mm) and Pirátek (12.0 mm). The highest lean meat content was observed in the offspring after lines Viskont and Pirát (60.1%), followed by boars after line Sudet (59.7%). The lowest lean meat content was measured in boars after line Sokolík (58%).

Table 2 shows statistical characteristics of performance traits according to line in gilts.

In the performance test gilts achieved average daily gain – 518 g (gilts vs. boars -43 g), average backfat thickness – 11.0 mm (gilts vs. boars -0.4 mm) and lean meat content – 58.5% (gilts vs. boars -0.6%).

The highest growth achieved gilts after line Akoga (527 g), followed gilts after lines Amperor (525 g), PC-Mason (523 g) and Wiskont (522 g). The lowest average daily gain was recorded in gilts after line Sudet (507 g). The lowest backfat thickness was measured in gilts, as was the case of boars, after line Viskont (10.1 mm). Followed gilts after lines PC-Mason (10.3 mm), Wiskont (10.4 mm) and Sokolík (10.5 mm). The highest elevation was observed in gilts after line Akoga (11.7 mm). Also at lean meat content it was the highest value, as in boars, measured in gilts after line Viskont (59.6%). In the same order, after lines PC-Mason (59.3), Wiskont (59.2%) and Sokolík (59.1%). Also, in the lean meat content was found in gilts lowest value after line Akoga (57.6%). Observed differences in performance traits in gilts among monitored lines were highly statistically significant, respectively significant.

The influence of gender and line on the following parameters is graphically shown in the Figures 1–3. It is clear that at the average backfat thickness and lean meat content the line interact otherwise in boars, respectively gilts.

In North West Europe, daily gains of traditional breeds ranged between 489 and 744 g/day. In Eastern Europe, the growth rates were found for the traditional East Balkan Swine, Zlotnicka and Black Slavonian breeds (400–500 g/day). In Southern Europe, growth rates varied from 250 g/day for the traditional Italian Cinta Senese, to 700 g/day for the traditional Italian Calabrese breeds.

In North West Europe, the feed conversion ratios were achieved by traditional breeds (Angeln Saddleback: 3.3–3.6). In Eastern and Southern Europe, data on feed conversion ratios were limited. The Polish Pulawska breed had the lowest feed conversion ratio (3.2), whereas the Bulgarian East Balkan Swine had the highest (5.8) (Leenhouwers and Merks, 2013). In a progeny test (from 30 to 100 kg) Kolář and Pavlík (1989) confirmed the average daily gain of 753 g and Klusáček *et al.* (1991) reported the weight gain of 788.42 g. Improved pigs of PBP breed (75% PBP, 25% Landrace) reached higher daily gain.

Table 1. Performance traits – boars

Line		N	Average daily gain (g)		Average backfat thickness (mm)		Lean meat content (%)	
			$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
1	Akoga	31	571	48	10.9	1.5	59.5	1,7
2	Amperor	64	554	45	11.5	2.5	59.0	2,7
3	PC-Mason	33	561	47	11.3	1.6	59.1	1,6
4	Pirát	15	560	37	10.7	2.2	60.1	2,1
5	Pirátek	28	570	31	12.0	2.6	58.4	2,6
6	Sáčko	13	543	32	10.9	1.3	59.5	1,3
7	Sokolík	19	549	45	12.4	2.6	58.0	2,5
8	Sudet	17	576	43	10.9	1.8	59.7	1,8
9	Viskont	14	560	41	10.2	2.1	60.1	1,9
10	Wiskont	42	563	40	11.6	2.5	58.8	2,3
All		**276**	**561**	**43**	**11,4**	**2.2**	**59.1**	**2.3**
F-test			0.304		0.079		0.066	

In PBP pigs fattened in a conventional feeding system Dostálová *et al.* (2012) reported average daily gain of 650 g at slaughter weight of 92 kg (186 days). Szulc *et al.* (2012) recorded in Zlotnicka spotted breed average daily gain 590 g (119.3 kg, 202.5 days). Paulke (2012) reported in German Saddleback pigs weight and age at end of fattening test 110 kg (199 days), daily gain in test period 753 g and feed conversion 3.19 kg/kg live weight.

In Zlotnicka Spotted breed Szulc *et al.* (2012) recorded daily gain in barrows of 570 g (116.60 kg) and in gilts 610 g (121.80 kg). Basque Black-Pied and Large White barrows were slaughtered at 202 days of age (Alfonso *et al.,* 2005). Their weight was 86.2 and 126.6 kg and average daily gain was 488 and 763 g. Paulke (2012) found out in German Saddleback in barrows vs. gilts daily gain in test period – 784 g (111 kg), vs. 777 g (112 kg) and feed conversion – 3.25 vs. 3.27 kg/kg live weight.

Backfat thickness can be considered as the basic parameter of carcass fatness. In traditional breeds the values of backfat thickness are in general much higher than those obtained from modern breeds that are selected for leaner carcasses. In a progeny test (30–100 kg) Kolář and Pavlík (1989) and Klusáček *et al.* (1991) reported in PBP breed average backfat thickness 27.4 mm and 26.28 mm. Average backfat thickness 32.4 mm and 34.96 mm was recorded in Zlotnicka Spotted breed by Kapelanski *et al.* (2006) and by Szulc *et al.* (2012). Szulc *et al.* (2011) recorded in Zlotnicka Spotted breed high average backfat thickness, 42.2 mm. Candek-Potokar *et al.* (2003) reported backfat thickness of 29 mm (at carcass weight of 98 kg) in the Slovene local pig breed Krškopolje. Paulke (2012) reported in German Saddleback backfat thickness 32,6 mm (110 kg).Kapelanski *et al.* (2006) reported in Zlotnicka Spotted breed average backfat thickness adjusted to 100 kg weight to be 33.2 mm in barrows and 31.7 mm in gilts. Baulain *et al.* (2000) measured backfat thickness of 30.6–31.4 mm in barrows of the breeds Angeln Saddleback, Bentheimer Black-Pied and Swabian Hall Saddleback. In Angeln Saddleback and Bentheimer Black-Pied gilts backfat thickness was 31.1 and 28.6 mm at the weight of 84.1 and 85 kg, resp. Alfonso *et al.* (2005) compared Basque Black-Pied and Large White barrows when Basque Black-Pied barrows had higher backfat thickness at point B.

Paulke (2012) documented in German Saddleback breed in barrows vs. gilts backfat thickness 37.0 vs. 33.5 mm (111 vs. 112 kg).

Table 2. Performance traits – gilts

Line		N	Average daily gain (g)		Average backfat thickness (mm)		Lean meat content (%)	
			$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
1	Akoga	290	527	43	11.7	2.6	57.6	2,7
2	Amperor	378	525	47	11.3	2.7	58.2	2,9
3	PC-Mason	94	523	41	10.3	2.4	59.3	2,7
4	Pirát	124	516	40	11.4	2.7	58.1	3,0
5	Pirátek	322	516	44	10.8	2.9	58.7	2,8
6	Sáčko	260	508	41	11.4	2.8	58.0	3,0
7	Sokolík	114	508	37	10.5	2.7	59.1	2,6
8	Sudet	122	507	34	10.9	2.5	58.7	2,5
9	Viskont	95	511	37	10.1	2.4	59.6	2,4
10	Wiskont	274	522	48	10.4	2.8	59.2	2,8
All		**2 073**	**518**	**44**	**11,0**	**2.7**	**58.5**	**2.9**
F-test			0.001		0.001		0.001	
Tukey test			6:1,2^{++} 1:5,7,8^{+} 2:8^{+} 6:10^{+}		1:3,5,9,10^{++} 10:2,6^{++} 1:7^{+} 9:2,4,6^{+}		1:3,5,7,9,10^{++} 9:4,6^{++} 10:2,6^{++} 2:9^{+} 3:6^{+}	

Traditional breeds in North West Europe have lean meat content in the same range (50–55%) as conventional breeds (48–60%), but the majority of conventional breeds have lean meat content above 55%. In Eastern Europe, there is a large variation within the traditional breeds in lean meat content. The Hungarian Mangalitza achieved 28.8%, whereas the Pulawska breed achieved 55.2%. Lean meat content of the Southern European Calabrese and Ibérica breeds were around 45%) (Leenhouwers and Merks, 2013). For objective evaluation of pig carcasses or for their marketing it is necessary to measure the lean meat content. Native breeds are not selected for utility traits; therefore they do not reach the same lean meat content as breeds selected for meatiness. In older literature sources Pulkrábek *et al.* (1993) stated that in a progeny test PBP breed had the lowest lean meat content among maternal breeds, 43.25% (Pulkrábek *et al.*, 1994). In Zlotnicka Spotted breed Szulc *et al.* (2011) recorded the value of 43.99% (114 kg) and Szulc *et al.* (2012) measured 41.83% (119.20 kg). Also Candek-Potokar *et al.* (2003) reported in Krškopolje breed lower lean meat content. Final weight of 90.7, 89.7 and 87.1 kg and lean meat content of 57.4, 54.1 and 55.1% were determined in Duroc-sired progeny from three maternal breed types Camborough 12, Saddleback and Saddleback x Duroc (Kelly *et al.,* 2007).

Most authors have confirmed higher lean meat content in gilts. E.g. Pulkrábek *et al.* (1994) reported in progeny test lean meat in barrows 40.90% and 45.60% in gilts (left half weight 46.63 kg). Szulc *et al.* (2012) found out in Zlotnicka Spotted breed the lean meat content of 39.02% in barrows (116.6 kg) and 44.64% in gilts (121.8 kg) confirming higher lean meat content in gilts. Baulain *et al.* (2000) reported in Angeln Saddleback, Bentheimer Black-Pied and Swabian Hall Saddleback breeds the lean meat content of 46.3 to 48.2% in barrows (82.5–84.1 kg) while the values for Angeln Saddleback and Bentheimer Black-Pied gilts were 48.2 and 50.3% (84.1 and 85.0 kg). Paulke (2012) confirmed in German Saddleback, in barrows vs. gilts, lean meat content 39,6 vs. 44,5 % (111 vs. 112 kg).

Conclusion

Lower growth ability, early and higher adipose tissue development and lower carcass value were characteristic for Prestice Black-Pied breed.

Figure 1. Average daily gain (boars vs. gilts)

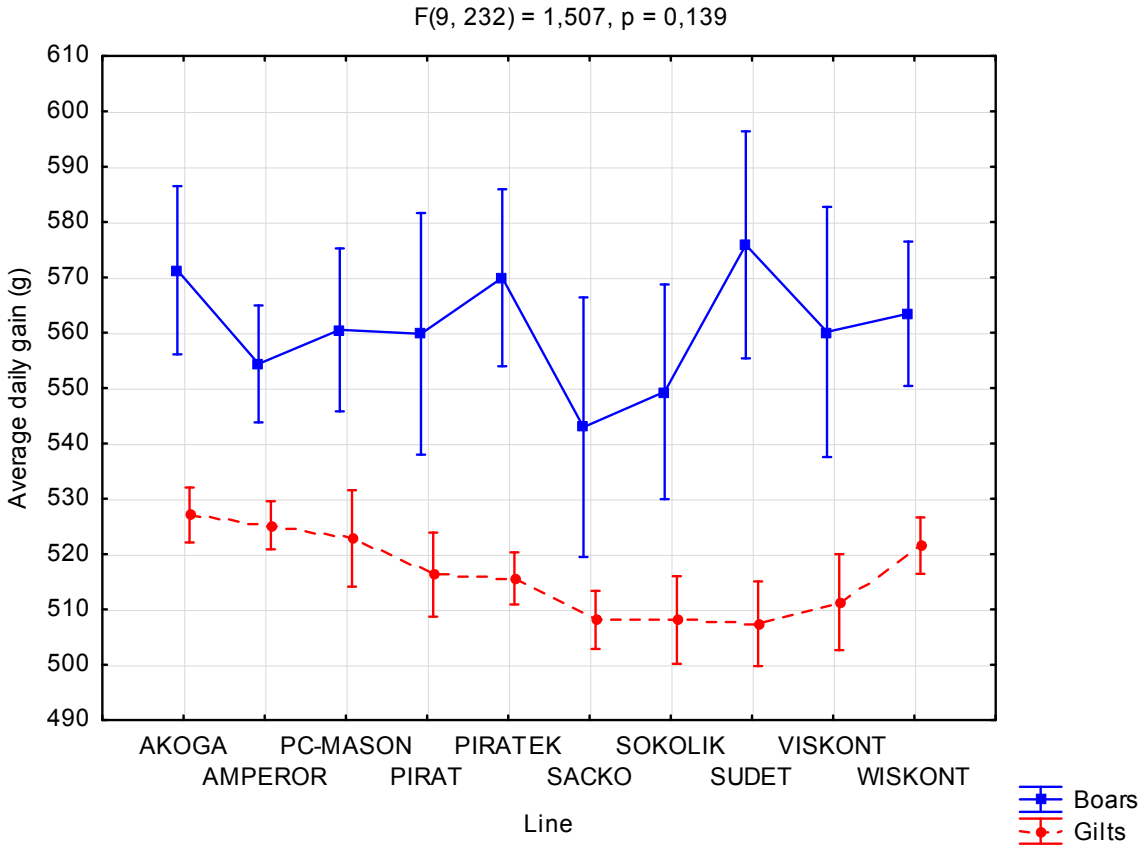


Figure 2. Average backfat thickness (boars vs. gilts)

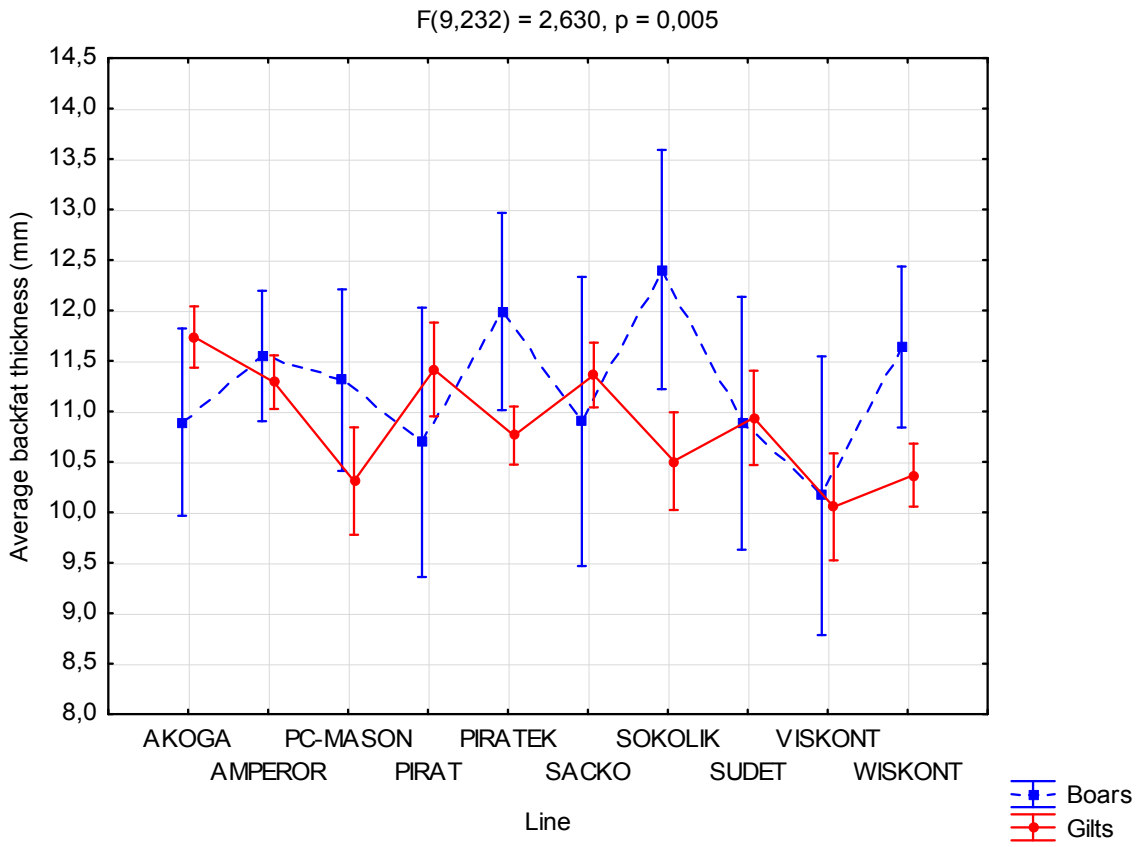
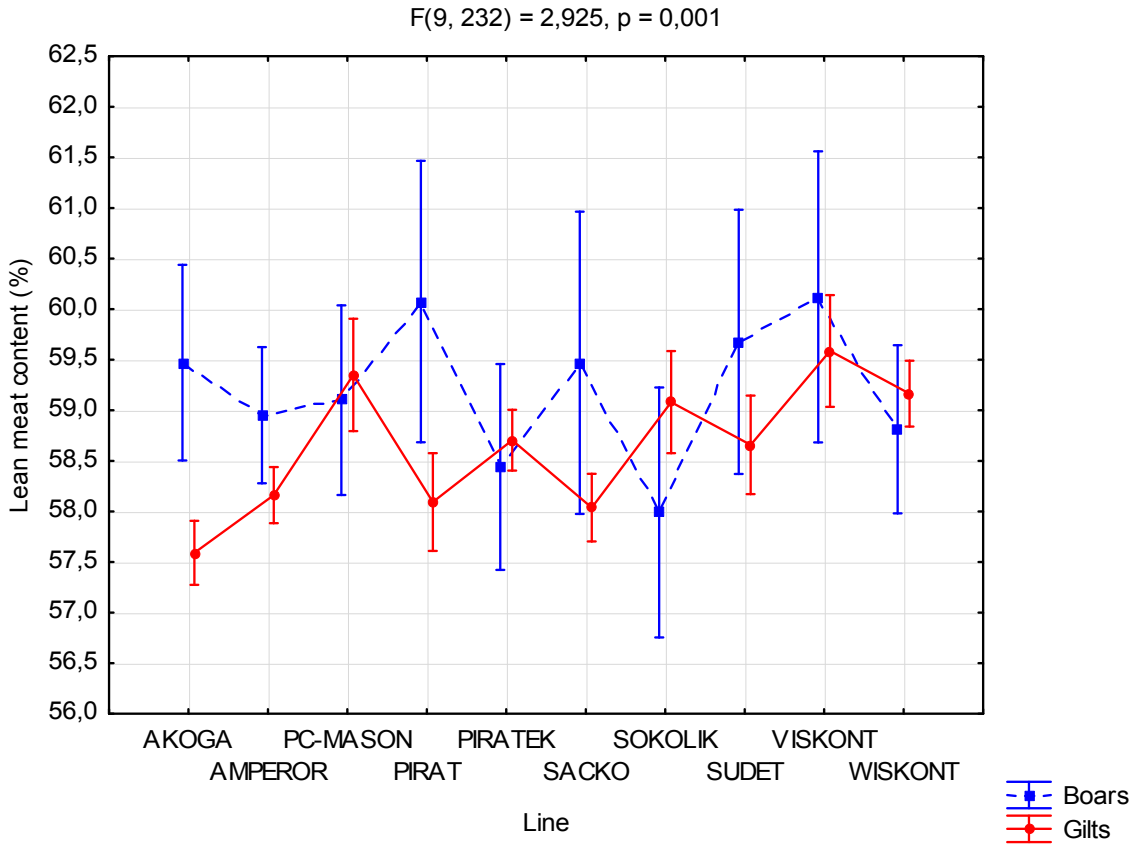


Figure 3. Lean meat content (boars vs. gilts)



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