

AN INFLUENCE OF HYBRID COMBINATION AND SEX ON GROWTH ABILITY OF CARCASS PIGS

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Abstract

The aim of the study was to determine an influence of tested hybrid combinations and sex on growth ability of carcass pigs. Two combinations of hybrid pigs were used in this study: (CLW x CL) x CLW – sire line and (CLW x CL) x (D x H). On a base of determined and mentioned values it is possible to express that better statistically highly conclusive ($P \leq 0.01$) growth ability (expressed by average daily gains from born till slaughtering) it was found in carcass pigs of hybrid combination, where hybrid boars (D x H) were used (580 g) in comparison with combination with boars CLW – sire line (561 g). Statistically significant differences in average daily gains were not found in any period of study (from born till weaning, in pre-fattening, in fattening). Hogs and gilts reached similar daily gains from born till weaning and in pre-fattening. Better growth ability of hogs was found in fattening which can be used for separate fattening and for optimalization of slaughter weight. Hogs reached for 40 g better an average daily gain in fattening in comparison with gilts.

Keywords: Carcass pig, hybrid combination, sex, growth

Using of sire breed in „C“ position it is a necessary component of every modern program of hybridization in pork meat production. Pure breed or hybrid boar, which has a positive influence on fattening ability and carcass value of final hybrid should be used on gilt (CLW x CL). An assessment of an optimal combination of multi-breed commercial hybridization it is an important presumption of profitable production.

Used hybrid combination can have an influence on growth ability and development of organism which is one of the most important manifestation of life. Changes which are characterized with quantitative marks as for example gain of weight or size they are designated as growth. Benda, Frolík (1961) characterized growth ability with time which is needed for doubling of live weight and with gain which is produced by one kilogram of live weight during growth (relative gain on 1 kg of live weight).

The most important of internal factors with an influence on growth ability are: sex, breed, age, weight, health condition.

An influence of sex on growth ability was studied by Pulkrábek et al. (2000), Adamec (1990) and Sencic et al. (2005).

Material and methods

The aim of the study was to determine an influence of tested hybrid combinations and sex on growth ability of carcass pigs. Two combinations of hybrid pigs were used in this study: (CLW x CL) x CLW – sire line and (CLW x CL) x (D x H).

Animals were stabled in the same stable to preserve the same environmental conditions.

Growth ability of tested animals was expressed by average daily gains during studied period – from born till weaning, in pre-fattening, in fattening and from born till slaughter. Average daily gains during fattening were studied for supplemental information. For these purposes control groups of carcass hybrids according to combination and sex were created in begin of fattening phase. Each combination had 36 hogs and 36 gilts. Control groups were weighted monthly to determine growth ability of tested pigs during fattening.

To determine average daily gains during studied periods, piglets had to be weighted individually after born, during weaning, during moving from pre-fattening to fattening and during slaughter.

These basic statistical characterizations were determined from measured values – an average, standard deviation, coefficient of variability, minimum and maximum. Co-gency of differences among found values was determined by t – test. Statistical program UNISTAT 5.1. was used for these purposes.

Results and discussion

An average weight of piglets of tested hybrid combinations during born, weaning and slaughtering is shown in Table 1. Statistical conclusive ($P \leq 0,001$) higher average birth weight was found in piglets of combination (CLW x CL) x CLW sire line (1.34 kg) in comparison with combination (CLW x CL) x (D x H) (1.22 kg).

Čechová et al. (1991) studied an average birth weight of hybrid pigs after different boars. In their study they determined an average birth weight of piglets in range from 1.29 kg to 1.52 kg.

A statistical conclusive difference ($P \leq 0.01$) in sex was found in our study in combination (CLW x CL) x (D x H) where boars had higher birth weight (1.29 kg) in comparison with gilts (1.16 kg).

It is paradoxical but higher weight during weaning in 28 days of age was reached by piglets of combination (CLW x CL) x (D x H) in comparison with piglets of combination (CLW x CL) x CLW sire line which had higher birth weight.

Higher weight during weaning was found in hogs in comparison with gilts among hogs and gilts of both combinations.

An average weight in a frame of each combination was measured during moving of piglets from pre-fattening to fattening. Higher weight was found in combination (CLW x CL) x CLW sire line (26.11 kg) in comparison with combination (CLW x CL) x (D x H) (25.83 kg).

Higher average slaughter weight in 193 days of age was found in carcass pigs of combination (CLW x CL) x CLW sire line (113.43 kg) in comparison with animals of combination (CLW x CL) x (D x H) (112.60 kg). Between combinations there was found a statistical conclusive difference ($P \leq 0.05$). Kusec et al. (2005) found in combination (LW x L) x (Pn x H) in 179 days of age higher slaughter weight (127.5 kg) than in our study. Neužil and Červenka (2002) mention in hybrid combination (CLW x CL) x CLW sire line in 175 days of age higher slaughter weight (118.26 kg) than we found in 193 days of age (113.43 kg).

A statistical conclusive difference among hogs and gilts was found in tested hybrid combinations in our study. The difference between the sexes was approximately 5-6 kg.

The results show better growth ability of hogs in comparison with gilts which can be used for separated fattening and optimization of slaughter weight. Pulkrábek et al. (2000) found the same conclusions during evaluation of growth ability of hybrid pigs. They found big differences in slaughter weights between gilts (110.7 kg) and hogs (115.9 kg) in their study. In day of slaughtering hogs were heavier for 5.2 kg than gilts.

Average daily gains from born till weaning, in pre-fattening and in fattening in studied combinations are shown in Table 2.

There were not found significant differences in average daily gains between tested combinations in periods from born till weaning, in pre-fattening and in fattening. Hogs and gilts reached similar daily gains from born till weaning and during pre-fattening. Better growth ability of hogs in comparison with gilts was shown in fattening. Hogs had for approximately 40 g better daily gain in comparison to gilts. Čechová et al. (2001) determined higher difference in average daily gains in fattening between sexes in breed combination (CLW x CL) x (CLW sire line x Pn) when hogs reached 710 g and gilts 642 g.

Basic statistical characterizations of an average daily gain from born till slaughter in tested combinations are shown in Table 3.

On a base of determined and mentioned values it is possible to say that combination with hybrid boars (D x H) had statistically highly conclusive ($P \leq 0.01$) better growth ability (580 g) in comparison with combination with boars CLW sire line (561 g).

Table 1. Basic statistical characterizations for traits: birth weight of piglets, weight during weaning and slaughter weight of carcass pigs

Combination	Sex	n	Birth weight (kg)		Weaning weight (kg)		Slaughter weight (kg)	
			\bar{X}	S_x	\bar{X}	S_x	\bar{X}	S_x
(CLW x CL) x CLW sire line	Boars/Hogs	114	1.37	0.35	7.30	1.80	116.21 ^a	12.73
	Gilts	78	1.30	0.40	7.22	1.71	110.65 ^a	10.23
	Total	192	1.34 ^b	0.37	7.26 ^a	1.76	113.43	12.02
(CLW x CL) x (D x H)	Boars/Hogs	141	1.29 ^a	0.34	7.80	1.79	115.10 ^b	14.49
	Gilts	134	1.16 ^a	0.29	7.49	1.85	110.09 ^b	12.63
	Total	275	1.22 ^b	0.32	7.65 ^a	1.83	112.60	13.83

a: $P \leq 0.01$ b: $P \leq 0.001$ a: $P \leq 0.05$

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Table 2. Average daily gains (g) from born till weaning, in pre-fattening and in fattening in tested combinations

Combination	Sex	Average daily gain from born till weaning (28 days)	Average daily gain in pre-fattening (45 days)	Average daily gain in fattening (120 days)
(CLW x CL) x CLW sire line	Hogs	212	418	751
	Gilts	211	420	705
	Total	212	419	728
(CLW x CL) x (D x H)	Hogs	233	401	744
	Gilts	226	408	702
	Total	230	405	723

Table 3. Basic statistical characterizations for trait an average daily gain from born till slaughter (g) in tested combinations

Combination	Sex	n	\bar{X}	S_x	$V_x(\%)$	X_{min}	X_{max}
(CLW x CL) x CLW sire line	Hogs	103	575 ^c	67.26	11.71	445	706
	Gilts	76	546 ^c	51.57	9.44	454	688
	Total	179	561 ^b	62.51	11.11	445	706
(CLW x CL) x (D x H)	Hogs	129	590 ^a	72.39	12.27	422	770
	Gilts	120	570 ^a	65.25	11.46	419	715
	Total	249	580 ^b	69.66	12.01	419	770

a: $P \leq 0.05$ b: $P \leq 0.01$ c: $P \leq 0.001$

A better growth ability of hogs in comparison with gilts was confirmed in tested multi-breed combinations in our study which corresponds with findings of many authors. The difference between hogs and gilts was statistically conclusive in both combinations which is evident from Table 3. Matoušek et al. (1991) evaluated the growth intensity in four-breed hybrid combination (CLW x CL) x (BL x D) and they found higher growth ability in hogs with an average daily gain (573 g) from born till 180 day of age in comparison with gilts which reached 538 g of daily gain.

Values of average daily gains from studied periods during fattening of tested animals are shown in Table 4 and graphs 1-3. The highest average gain was found in both combination in period between 107 – 135 day of age.

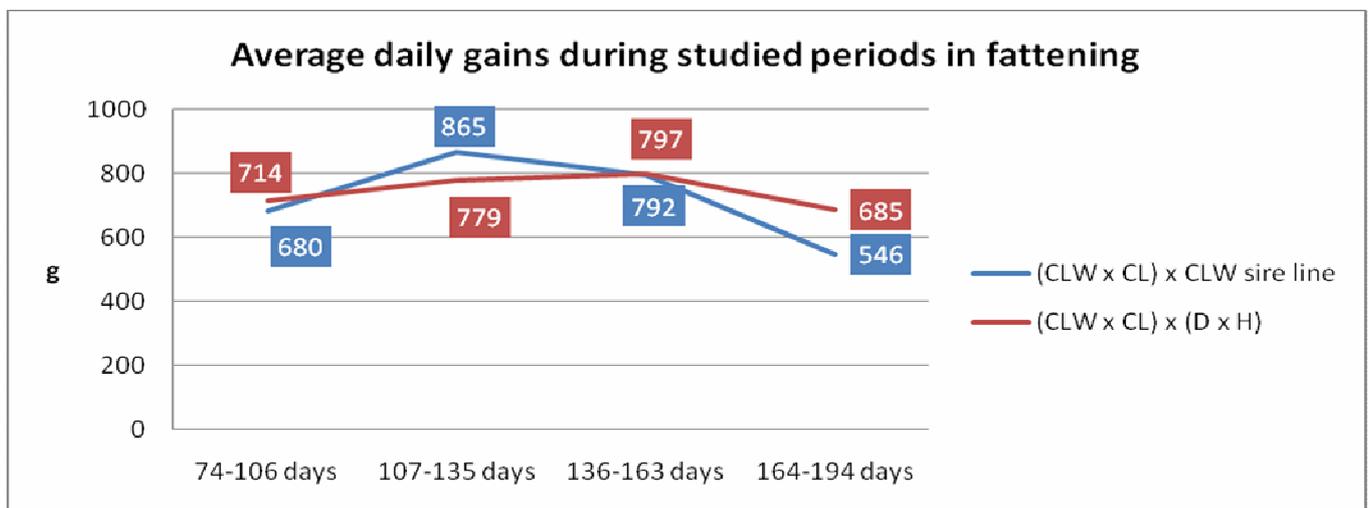
According to results of Václavovský et al. (1999) pigs in fattening are reaching the highest gains in age of 170 days (up to 912 g per animal per day).

In consequence of high temperature gains of tested animals strongly decreased during the last studied period from 164 till 194 day of age. Albar et al. (1990) found conclusions that with increasing of slaughter weight for 10 kg in pigs slaughtered in weight over 105 kg and more an average daily gain is decreasing for approximately 10 g and food consumption is growing for 0.10-0.15 kg per each kg of gain. Between sexes in our study better growth ability of hogs during fattening (except few samples) was found in comparison with gilts.

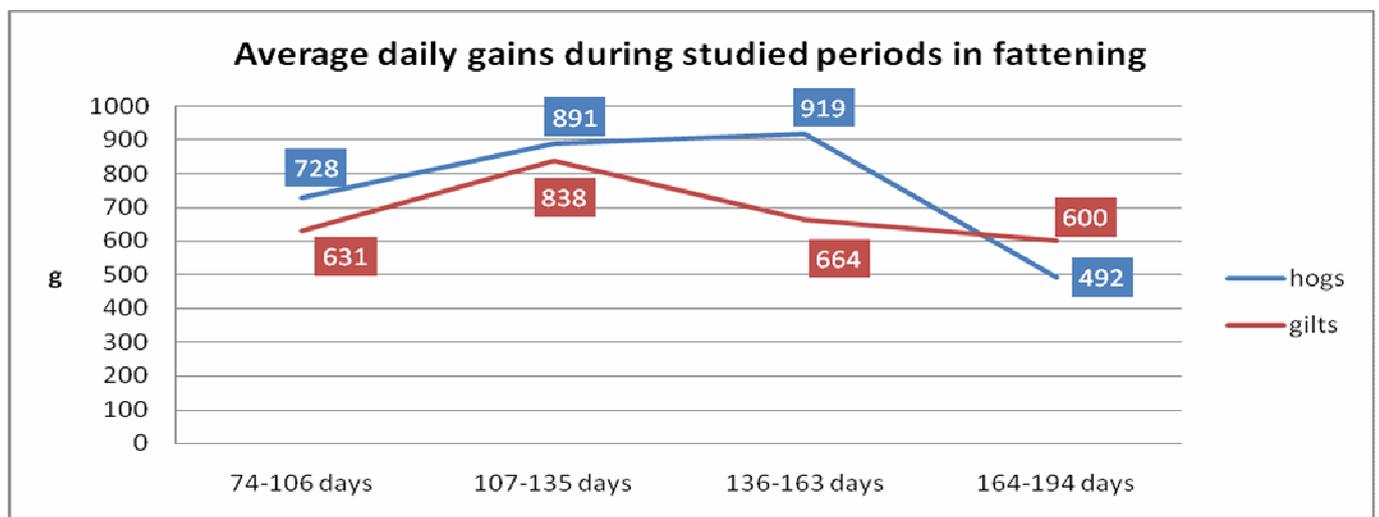
Table 4. Average daily gains during studied periods in fattening

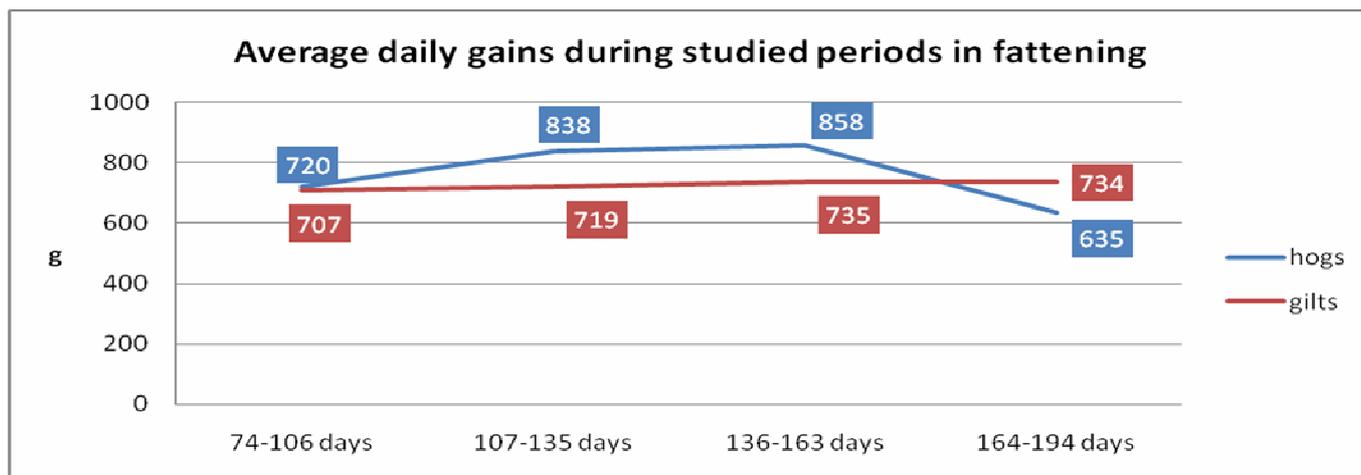
Combination	Sex	n	Average daily gain in g (74-106 days)	Average daily gain in g (107-135 days)	Average daily gain in g (136-163 days)	Average daily gain in g (164-194 days)
(CLW x CL) x CLW sire line	Hogs	36	728	891	919	492
	Gilts	36	631	838	664	600
	Total	72	680	865	792	546
(CLW x CL) x (D x H)	Hogs	36	720	838	858	635
	Gilts	36	707	719	735	734
	Total	72	714	779	797	685

Graph 1. Average daily gains during studied periods in fattening in tested combinations



Graph 2: Average daily gains during studied periods in fattening in combination (CLW x CL) x CLW sire line



Graph 3. Average daily gains during studied periods in fattening in combination (CLW x CL) x (D x H)

Conclusion

On a base of found results it is possible to say, that carcass hybrid pigs of combination (CLW x CL) x (D x H) had statistically highly conclusive ($P \leq 0.01$) better growth ability (expressed by average daily gains from born till slaughter) in comparison to combination (CLW x CL) x CLW sire line. Statistically significant differences in average daily gains were not found in any period of study (from born till weaning, in pre-fattening, in fattening).

Hogs and gilts reached similar daily gains from born till weaning and in pre-fattening. Better growth ability of hogs was found in fattening which can be used for separate fattening and for optimization of slaughter weight. Hogs reached for 40 g better an average daily gain in fattening in comparison with gilts.

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