

Optimum slaughter weight of Estonian pig breeds

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Introduction

The optimum slaughter weight for pigs depends on the point of view. It is usually assumed, that producers would like to market lighter animals, as the last pound of muscle gain is extremely expensive. On the other hand meat producers are interested in optimum level of lean mass, but also prefer a heavier animal to lower the cost per kilogram of processed meat. Hog manure – its components i.e. nitrogen and phosphorus – is unwanted on environmental aspect in large quantities. Thus, preferred is lighter slaughter weight. Younger (lighter) animals produce smaller quantity of manure during their lifetime.

Efficient pig meat production includes a combination of fast lean growth and low fat deposition. (Wood and Cameron, 1994; Kolstad et al., 1996; Schinckel et al., 1996). Moreover, there is also genetic variation within breeds (De Vries and Van der Wal, 1993; Schwörer et al., 1999). Most of the existing knowledge about meat quality of live pigs is mainly provided through studies using ultrasound, which have limited possibilities of quantifying tissue growth, but is informative as selection criteria for fat and lean growth (Cameron and Curran, 1994).

The aim of this work is to find out meat traits growth curve according to weight classes in different breed combinations and sexes.

Material and Methods

Data analysed comprised 18756 sows and 3226 boars from 39 farms throughout Estonia; obtained from database of Animal Recording Centre in 1999...2002. Completed dataset included breed, sex, birth and testing date weight, backfat thickness, area of loin eye and lean meat percentage, which was collected by PC program DB-Planer.

Table 1. Characterization of analyzed dataset (n = 21982)

Traits	Average	Std. Dev	Minimum	Maximum
X1, mm	13.68	2.85	6.00	27.00
X2, mm	51.38	5.64	34.00	69.00
X3, mm	13.80	2.71	6.00	25.00
Y, %	60.16	2.43	49.66	68.24
Age at test, days	178.12	14.62	150.00	210.00
Growth rate, g/day	562	59.02	400	786

Meat traits were measured by ultrasonic equipment Piglog 105. Meat traits recorded were: backfat thickness at last (X1) and 11...12th (X3) rib, 7 cm from midline (mm), and diameter of loin eye (X2), 7 cm from midline (mm). Lean meat percentage (Y) was calculated using the formula (Piglog 105, 1991). Age at test and growth rate was calculated according to recorded data. Testing weight was divided into seven groups: lighter or equal than 79, 80...89, 90...99, 100...109, 110...119, 120...129, 130...139 kg.

The following breed combinations were investigated: Estonian Landrace (EL), Estonian Large White (ELW), Hampshire (H), Pietrain (Pi), EL♂xELW♀, ELW♂xEL♀ and Pi♂xH♀.

SORT procedure (SAS, 1991) was used to analyze the dataset.

Results and Discussion

All pigs spend more and more days to grow 10 kg on each weight group up to 110...119 kg, while growth time begin to decrease (Figure 1). Webster (1985) found, that during unrestricted growth, the proportion of fat in the body increases as an animal approaches

maturity. Figure 2 shows that higher fat deposition will begin at 110...119 kg in sows, however being more equal through the groups in boars.

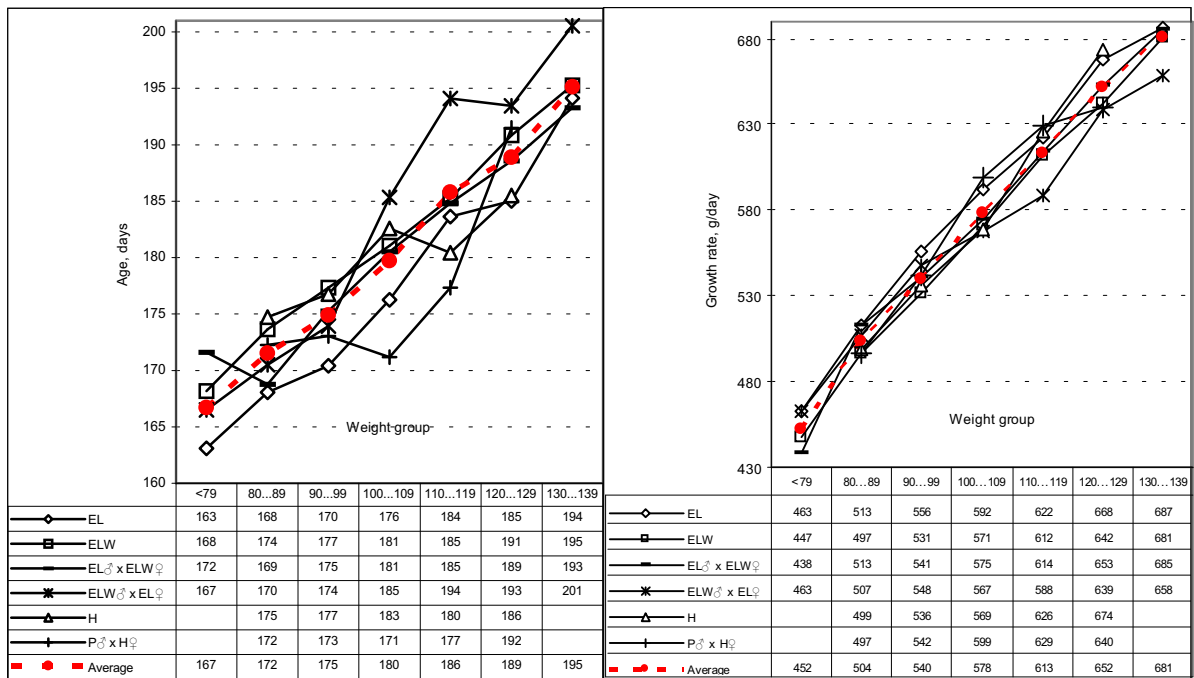


Figure 1. Breed effect on meatiness traits of different weight scale of pigs

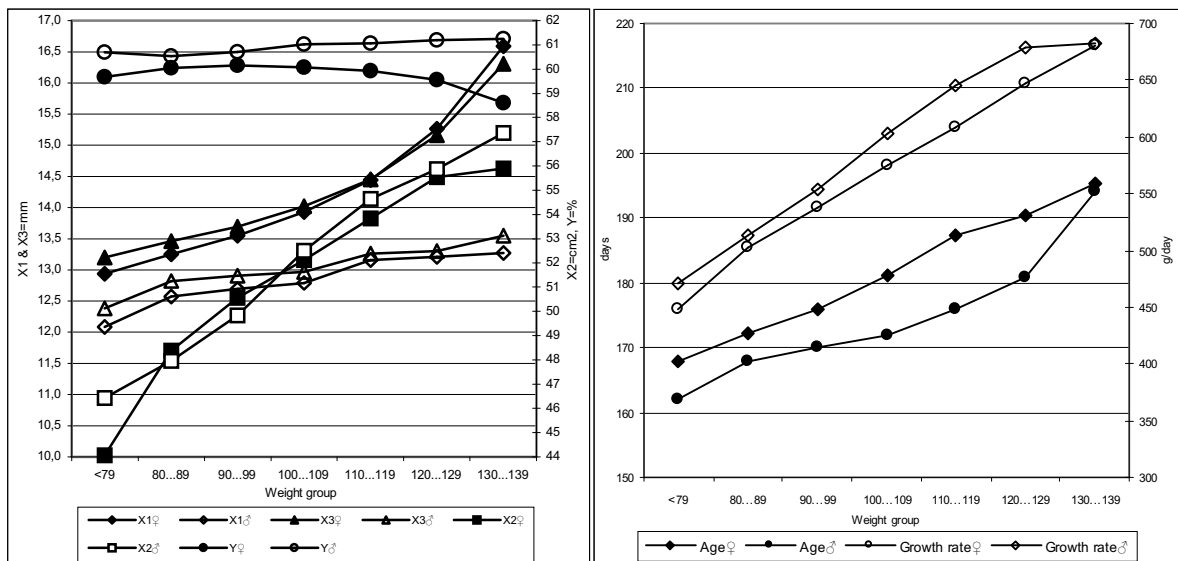


Figure 2. Sex effect on meatiness traits of different weight scale of pigs

Purebred EL grows much faster and steadily than ELW or their crosses, whereby ELW x EL pigs begin to grow much slower at 90...99 kg. “Colour” breeds develop very unevenly; therefore farmers should take under consideration the feeding and keeping conditions of pigs. As growth rate was calculated on the basis of weight and age, the results are distributed more equally between breeds. Sows, investigated, were much fatter and intensive fat gain began at 110...119 kg (Figure 2), compared with boars, as boars’ fat deposition was much equal and slower in all weight classes. However, development of the loin eye was quite equal between both sexes. Sows achieved maximum lean meat content at 90...99 kg, after what leanness began to decrease, but boars’ lean % started to increase little at this point.

Breed and sex differences in meatiness traits are shown in Tables 2 and 3. Lean meat % increased slowly through the all weight groups in EL sows, but optimal slaughter weight was between 90...99 kg, as effect of increase of leanness was not worth to keep pigs longer.

Table 2. Breed and sex effect on meatiness traits of different weight scale of “white” pigs

Traits	Weight group						
	...79	80...89	90...99	100...109	110...119	120...129	130...139
Estonian Landracesows							
n	32	667	1705	2110	958	159	27
X1, mm	13.03	13.62	13.60	13.65	13,89	14,13	14,22
X2, mm	45.19	48.26	50.57	51.57	53,50	56,06	58,04
X3, mm	13.34	13.59	13.41	13.67	13,92	14,22	14,11
Y, %	59.73	59.86	60.29	60.27	60,34	60,46	60,77
Age at test, days	164.00	169.41	172.03	178.09	186,13	187,67	194,00
Growth rate, g/day	461	510	552	586	614	659	687
Estonian Landrace boars							
n	12	159	428	409	182	56	3
X1, mm	13.00	12.94	12.85	12.93	13,18	13,55	13,00
X2, mm	46.08	47.70	50.19	52.97	54,93	55,48	57,00
X3, mm	13.08	13.03	13.05	13.07	13,36	13,57	13,33
Y, %	60.01	60.28	60.64	61.00	61,04	60,90	61,40
Age at test, days	160.67	162.38	164.00	166.79	170,41	177,52	195,33
Growth rate, g/day	471	528	575	622	666	693	681
Estonian Large Whitesows							
n	63	1502	3198	2516	903	187	43
X1, mm	13.22	13.07	13.59	14.26	15,11	15,79	17,16
X2, mm	42.87	48.06	50.06	52.44	54,49	55,37	57,26
X3, mm	13.56	13.43	13.86	14.35	14,98	15,46	16,93
Y, %	59.23	60.07	59.97	59.85	59,55	59,22	58,29
Age at test, days	169.13	174.25	178.27	182.39	186,17	192,30	195,58
Growth rate, g/day	443	496	529	567	608	637	681
Estonian Large White boars							
n	12	292	756	585	198	44	8
X1, mm	11.17	12.57	12.66	12.73	13,22	12,77	13,38
X2, mm	46.75	47.85	49.51	52.05	54,29	56,32	57,50
X3, mm	11.67	12.85	12.90	12.96	13,22	12,77	13,63
Y, %	61.39	60.50	60.68	60.99	61,02	61,67	61,20
Age at test, days	163.08	170.50	173.35	175.29	181,05	184,68	193,63
Growth rate, g/day	470	505	541	591	627	662	682
EL♂ x ELW♀ sows							
n	10	343	984	986	461	143	41
X1, mm	11.20	13.55	13.54	14.31	15,49	16,59	18,17
X2, mm	48.10	50.17	51.93	53.26	54,45	55,17	54,88
X3, mm	10.80	13.59	13.85	14.49	15,64	16,67	17,76
Y, %	62.05	60.15	60.25	59.87	59,08	58,30	57,22
Age at test, days	171.60	168.78	175.26	180.53	184,83	188,56	193,27
Growth rate, g/day	438	513	541	575	614	653	685
ELW♂ x EL♀ sows							
n	2	86	320	699	439	93	18
X1, mm	11.50	12.69	12.90	13.04	13,17	14,10	15,17
X2, mm	43.00	47.77	50.92	50.91	52,47	55,55	51,78
X3, mm	11.50	12.81	13.07	13.25	13,31	13,82	14,83
Y, %	60.87	60.48	60.72	60.58	60,73	60,62	59,23
Age at test, days	166.50	170.49	173.92	185.32	194,10	193,46	200,56
Growth rate, g/day	463	507	548	567	588	639	658

However, ELW sows obtain their optimum slaughter weight earlier (at 80...89 kg), where average lean meat percentage is 60.07%. Although, highest lean meat % in “white breed” crosses was in group up to 79 kg, it is not recommended to slaughter so light animals.

Table 3. Breed and sex effect on meatiness traits of different weight scale of “colour” pigs

Traits	Weight group						
	...79	80...89	90...99	100...109	110...119	120...129	130...139
Hampshire sows							
n		14	17	19	11	-	-
X1, mm	-	11.36	12.41	13.63	13.91	-	-
X2, mm	-	49.21	55.12	54.68	58.73	-	-
X3, mm	-	11.64	12.12	13.53	13.91	-	-
Y, %	-	61.70	61.97	60.79	61.07	-	-
Age at test, days	-	175.86	180.88	185.21	180.45	-	-
Growth rate, g/day	-	495	524	561	629	-	-
Hampshire boars							
n	-	5	9	3	3	2	-
X1, mm	-	9.60	12.33	11.33	12.67	14,50	-
X2, mm	-	50.60	50.33	55.67	55.00	56,50	-
X3, mm	-	9.00	11.44	10.67	12.33	16,00	-
Y, %	-	63.84	61.69	63.14	61.76	59,44	-
Age at test, days	-	171.60	169.00	166.00	180.33	185,50	-
Growth rate, g/day	-	509	559	619	617	674	-
Pietrain♂ x H♀ boars							
n	-	12	22	18	6	2	-
X1, mm	-	9.00	10.64	11.72	10.50	12,00	-
X2, mm	-	52.83	53.36	56.17	57.17	56,00	-
X3, mm	-	10.83	11.32	11.44	11.83	14,50	-
Y, %	-	63.31	62.66	62.68	62.95	60,90	-
Age at test, days	-	172.25	173.05	171.17	177.33	191,50	-
Growth rate, g/day	-	497	542	599	629	640	-

As “colour” breeds are used mainly as breeding animals, modest results of these animals should raise the question about their effectiveness in our conditions.

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