Chapter

Analytical Review of Productive Performance of Local Pig Breeds

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Abstract

Traits of interest concerning reproductive performance, growth performance, carcass and meat quality of local pig breeds involved in H2020 project TREASURE were collected from the available literature, unpublished data available to partners or results recorded in the experiments within the project. The survey revealed great variability in the availability and quality of information. Reproductive performance of local pig breeds is lower than in conventional modern pig breeds, not only due to their genetic background but also due to the management. Data on growth rates reflect the heterogeneity of different production systems and feeding regimes used. The growth potential of the majority of local pig breeds is not well exploited, and their nutritional requirements are not known. Generally, local pig breeds show low muscular development and high potential for fat tissue deposition and are slaughtered at older age and weight, which results in higher intramuscular fat and more intense colour of meat. However, considerable differences exist between them and their potentials, not only in their production systems. For many local pig breeds studied in the project, the collected information provides the first in-depth overview of their productive performance in their preserved, present-day phenotype.

Keywords: local pig breeds, reproductive traits, growth rate, carcass traits, meat quality

1. Introduction

Data on phenotypic traits of local pig breeds involved in the project TREASURE were collected to perform multi-criteria evaluation and comparative analysis of the breeds. As the aim was to assess the present-day phenotype, not the historical data existing on the breed, only the recent studies (up to 20 years) were considered. Selected traits of reproduction and growth performance, as well as carcass and meat quality traits, were analysed. The individual data considered in the analysis and the list of references from which the data were extracted are documented in the individual chapter of each breed.

2. Material and methods

Data on productive traits (see Chapters 2–20) were collected either from the available literature (articles, theses, congress proceedings), unpublished data available to project partners or breed associations, or recorded in the experiments of TREASURE. In rare cases, when data were not available, Domestic Animal Diversity Information System (DAD-IS) database of Food and Agriculture Organisation of United Nations (FAO) organisation was also consulted (http://www.fao.org/dad-is/en/). The goal was to acquire and summarise the information on productive traits for all the breeds in the project. This task revealed the difficulties related to the availability of the information (i.e. the number of available studies and variability of conditions in which the data were acquired) as well as the big variability in the quality of the collected data with respect to the circumstances in which the results/data on productive performance were obtained. This aspect represents a major obstacle for the analysis and puts limits to the possible analytical approaches, comparisons and conclusions, as it was difficult to find the common denominators among studies. Furthermore, presented analysis is thus mainly descriptive and based on basic statistical parameters.

In the current analysis, the experimental unit was a study, experiment or part of the experiment (e.g., treatment group, growth stage and diet), depending on the experimental design of the study; therefore, in some cases, several experimental units could be derived from one single publication. Pooled breed averages were calculated from the values derived for each record (experimental unit), which were all given an equal weight, regardless of the number of pigs behind and if they had been recorded in practical or experimental conditions. Basic statistical parameters are provided in the Appendices 1–27. When only one source of data per trait was available, this was taken as representative of the breed. For data analyses, the procedure UNIVARIATE of SAS® software was used, calculating basic statistical parameters, mean, minimum and maximum together with 'n' which denotes the number of records per trait. Due to the well-established effect of body weight (BW) on carcass traits and the fact that body/carcass weight varied strongly between studies, in the case of carcass traits, means were additionally adjusted for the final live body weight, that is, LSMEANS were calculated using GLM procedure of SAS® with breed as main effect and carcass weight as covariate in the model (for **Figure 3**). **Figures 2–6** represent an attempt to illustrate the positioning of the breeds with respect to some traits of interest (e.g., daily gain) which is based on standardised values using feature scaling of values between 0 and 1 (quadrants are split at the middle point of the scale, i.e., 0.5).

3. Reproductive performance

Reproductive performance shows great variability among breeds, whether in terms of data availability or the reported results (cf. Appendices 1–8). Local pig breeds are mostly characterised (if compared to modern breeds) by less intensive use, as demonstrated by an older age of sows at first parturition, less litters per sow yearly and longer lactation periods. They also exhibit, for the most part, smaller litter size and higher piglet mortality. This can be related to breed genetic or intrinsic characteristics, but also to the management conditions, particularly nutrition, associated to the extensive or semi-extensive production systems in which these sows are reared. It has been shown for some local breeds, like the Spanish Iberian [1] or the Hungarian Mangalitsa pigs [2], that they exhibit lower prolificacy due to smaller uterine capacity. It has also been demonstrated that the nutrition of sows during gestation can affect the weight of newly born piglets which further affects their vitality [3, 4]. The undernutrition of sows affects piglets' birth weight and exhibits long-term consequences for post-natal performance of pigs [4]. It is noteworthy that despite the considerably smaller number of live-born piglets at farrowing than in modern, and more prolific breeds, the reported birth weight of piglets was also lower for the majority of local pig breeds than the usually reported for conventional breeds [5]. This contradicts the common view that a higher litter size is associated with lower litter birth weight [6, 7]. The reproductive performance can also be negatively affected by inbreeding [8], which is likely critical in the case of breeds with critically small population size. Although the litter size is, for the majority of breeds, considerably smaller than in modern breeds, there seem to be some breeds with higher prolificacy, in particular, the Schwäbisch-Hällisches (with a pooled average of reported studies of 11.0 live-born piglets per litter, cf. Appendix 4). On the other hand, some breeds are characterised by extremely small litter size, like the Swallow Bellied Mangalitsa or Turopolje pig (with a pooled average of 5.3 live-born piglets per litter; cf. Appendix 4). If we consider the number of litters per sow per year as an indicator of a higher reproductive efficiency, we can observe the highest one (2.2 litter/year, cf. Appendix 2) in Iberian and Schwäbisch-Hällisches, two of the breeds which have the most economically important use and developed pork value chains. These data are indicative of more intensive or technified systems of these breeds, consistent with the observed negative correlation ($r = -0.59$, $P < 0.01$; data not shown) between the age at culling and number of litters per sow per year. Other indicators such as the percentage of piglets lost during lactation and piglet weight at weaning can also be indicative of how well the sows are nursed in individual breeds. Moreover, the scarcity and reliability of the data are also an issue as in many of these untapped breeds, the economic incentive and data recording are very often not in primary focus.

Overall, it can be concluded that, despite the efforts invested into data collection, the information remains limited for a better evaluation of breeds' potentials. However, it can be speculated that in many cases breeds are not optimally managed.

4. Growth performance

For a better illustration, growth performance was evaluated for every phase of production. We defined production phases very approximately due to big differences between studies with regard to weight range covered. Growth rate of piglets during lactation was taken as it was reported, regardless of its duration. For the post-weaning (i.e., growing) phase, the studies considered were those that reported live body weight or daily gain between weaning and approximately 30 kg live weight, for the early fattening phase between approximately 30 and 60 kg (fattening I), for the phase of fattening between approximately 60 and 100 kg (fattening II), and for the last phase of fattening, the studies that reported growth rate above 100 kg live weight (fattening III). Sometimes, the data source provided only the overall growth rate for the whole studied period or this could be calculated from the data provided on weight. Concerning the feeding level associated with growth results, the information provided was very variable. Feed intake and feed nutritional value were often not provided which limits the comparisons of growth potential among different breeds. It should also be noted that a big part of the collected studies simulated practical conditions of the production systems. Accumulated data show great variability, let it be in terms of data availability among breeds or in the results reported. The studies were made in different conditions of feeding and management, with only a small number of studies indicating the breed potential for growth; many of the studies just reflect their practical use. For these reasons, it was very difficult to establish a harmonised approach in data analysis and evaluation and comparisons between studies or breeds. Despite these strong limitations, some interesting conclusions could be drawn showing knowledge gaps and needs for further investigation in order to better characterise and consequently better optimise the use of local pig breeds.

4.1 Feed intake

Information on daily feed intake is important for the assessment of growth performance which is, besides the genetic potential, directly related to energy and nutrient supply. Based on the literature survey made per breed (see Chapters 2–20), it is evident that the data on the capacity for feed consumption in local pig breeds is relatively scarce or limited (exception being the Iberian breed). For the post-weaning period (until ≈30 kg of piglet live weight), a small number of studies reported data for daily feed intake, and the gathered information is available only for few breeds (five of them). For the growing period, the reported feed intake was between 0.5 and 1.8 kg/pig/day with a pooled average of 1.2 kg/pig/day. The lowest value reported was 0.5 kg/pig/day (Razmaite, personal communication), which is very low and challenges the reliability of the recorded information, considering that in this early stage of growth, pigs are normally fed *ad libitum*. The highest figures reported (1.6–1.8 kg/pig/day for Iberian [9] and Sarda breed [10]) could be indicative of the capacity of intake in this stage of growth. For the early fattening phase (up to ≈60 kg live weight), the average feed intake was reported for 10 breeds and it was situated between 1.0 and 2.5 kg/pig/day (**Figure 1**). For the latter fattening stages, average feed intakes reported were between 0.9 and 3.5 kg/pig/day (phase II) or 1.3–6.3 (phase III) with average feed intake of 2.5 and 3.2 kg, for phase II and III, respectively (**Figure 1**). Based on these figures, it can be speculated that feed allowance was often limited in the referred studies, as shown in **Figure 1** presenting the comparison with the estimated theoretical intake at a certain body weight (BW) based on the assumption that voluntary feed intake equals approximately 3–4 times the metabolisable energy (ME) needs for maintenance (106 kcal ME per kg $BW^{0.75}$ per day) [11]. The range of the actually reported feed intakes agrees with the expected ones in growing and early fattening phase denoting *ad libitum* feed allowance in these stages. In contrast, it is below the expected intake in the case of late fattening phases, suggesting the use of restricted feed allowance in the majority of the studies. It is of interest to look at the extreme values reported, where we can detect that high intake can be observed in the case of *ad libitum* feed allowance. In this sense, it has been shown that selection for

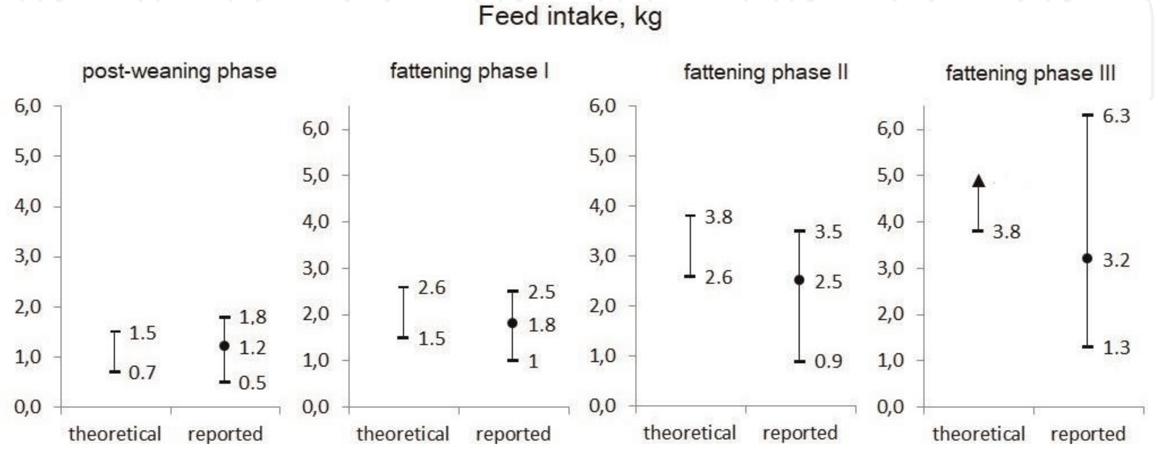

Figure 1.
Estimated theoretical voluntary feed intake in comparison with empirical (reported) values according to production phase. Breeds that were included in empirical values are: for post-weaning (growing) phase (KRP, IBR, LVI, LBA, SAR), for fattening I phase (ACL, ALT, BAS, GAS, KRP, IBR, MAN, MOR, SAR SWH), for fattening II phase (ACL, ALT, BAS, BIS, GAS, KRP, IBR, MAN, MOR, NSC, SAR), for fattening III phase (ACL, ALT, BAS, CAS, CSE, KRP, IBR, MAN, MOR, PNM, SAR).

feed efficiency and lean growth is associated with lower feed intake capacity [12]. In experiments involving both Iberian and conventional pigs in similar experimental conditions, the higher intake capacity of the autochthonous breed has been shown [13]. The few available data in the present study corroborate that these non-selected breeds (e.g. feed intake of 6.3 and 5.6 kg daily per pig in Sarda [14] and Iberian breed [15, 16], respectively) show high intake capacity compared to modern genetically improved breeds. However, it should be noted that the value of 6.3 kg of feed per pig described in the study indicates the quantity of distributed feed [14], while the value of 5.6 kg of feed per pig per day corresponds to feeding with acorns [15]. The highest consumption of feed mixture fed *ad libitum* was 4.7 kg in the case of Iberian pig [16]. Overall, despite limited information on capacity of feed ingestion, this general picture on feeding is important for the consequent assessment of growth performance.

4.2 Growth rate

4.2.1 Lactation

The pooled average value obtained for daily gain of piglets in the lactation period was 206 $\pm$ 48 g/day (cf. Appendix 9). Despite the longer lactation period in local pig breeds (47.2 days in average, cf. Appendix 3), the reported values are in general somewhat lower than the values reported for modern leaner breeds in intensive management system [17]. Pre-weaning growth is associated with sow milk production and producers' management of sows during lactation [18], so it may be speculated that the results observed could reflect the management and the nutrition of sows (likely suboptimal in many cases). In spite of that, studies in Iberian suckling pigs suggest that lower performance of lactating piglets in comparison to piglets of conventional breeds may be related to a lower efficiency of milk nutrient utilisation, rather than a lower milk yield or milk nutrient intake, when appropriate corrections for litter size are performed [19].

4.2.2 Post-weaning (growing)

The comparison between the empirical and estimated theoretical feed intake for the growing phase (**Figure 1**) suggests that in this period pigs are mainly fed *ad libitum*, and consequently, the recorded daily gain would indicate their growth potential. However, the pooled average daily gain for all breeds was 354 $\pm$ 94 g/day (cf. Appendix 10) which is somewhat lower than the values reported for modern breeds and management systems [20, 21]. The observed maximal values indicate that the growth potential of local pig breeds at this stage is likely higher, and therefore, performance in this period could be improved beyond these observations. In this context, it is also of interest to consider the data on Iberian pig whose growth potential has been established in controlled and optimal experimental conditions. The pooled average for the studies for the growing period on Iberian pig was 404 g/day, which is similar to achieved growth rate in controlled conditions of 416 g/day [22], but even at these early stages, a higher pre-disposition to fat gain is found. Overall, these data demonstrate a big knowledge gap for the majority of breeds (Iberian breed being an exception) about their potential for growth in that stage and open also the issue of need for future research in nutritional requirements for optimal feeding and improved productivity of growing pigs of autochthonous breeds.

4.2.3 Fattening

If local pigs do not exhibit considerably different growth rate from modern breeds during the early growing phases (lactation, post-weaning), a different

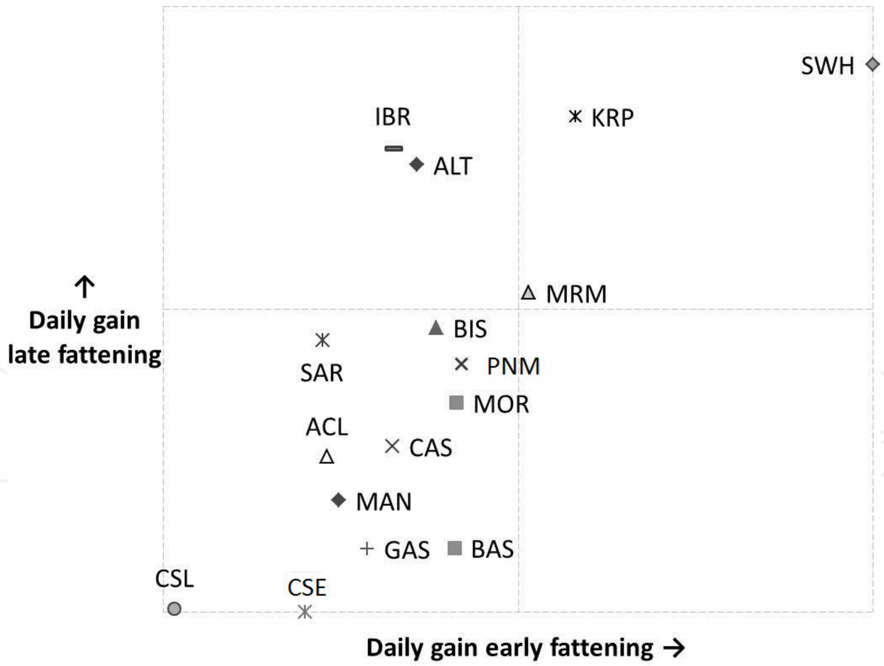

Figure 2.
Positioning of breeds with regard to daily gain in early and late fattening phase using standardised values (0–1).

situation is observed in the fattening phase, characterised by substantially slower growth rate than in genetically improved breeds, which are well known to reach daily gains above 1000 g in optimal conditions of intensive systems. Moreover, the collected data (cf. Appendices 11–14) show enormous heterogeneity not only among breeds but also in studies within the same breed, which relates to the fact that this overview includes the studies where management systems and feeding levels practised were extremely different. Here as well, it is of interest to look at the extreme values as they could (in some cases) indicate the growth potential of the breed. Indeed, if we look at the example of Iberian pig for which the studies assessing growth potential in nearly *ad libitum* conditions are available [16, 23, 24], higher growth rates can be observed (559, 854 and 918 g/day for the fattening periods 25–50, 50–100 and 100–150 kg, respectively) than what shows the literature in average. Other observations that can be extracted from this set of data refer to the special case of Iberian and Alentejano breeds which are characterised by smaller daily gains in early than late fattening stage (**Figure 2**). This observation agrees with their typical sylvo-pastoral production system (Spanish 'montanera' or Portuguese 'montado'), that is, restricted feed allowance in early fattening phase and *ad libitum* allowance in late fattening phase [25]. In contrast, for the other breeds, it is more usual to observe reduced growth rate during late fattening or in both early and late fattening (**Figure 2**). These results agree with the summarised data on feed intake (**Figure 1**), which demonstrates that in average, the reported values for feed intake are below the expected values for this production stage.

5. Slaughter age, body weight and carcass traits

Data survey showed that local pig breeds are, with few exceptions (e.g., Schwäbisch-Hällisches and old-type Lithuanian white pig), slaughtered at higher age and weight than the conventional pigs (cf. Appendices 14 and 15). Consequently, even though growth rates are below those found in conventional pigs along the productive cycle, the live weight of these pigs at slaughter is higher, and a big

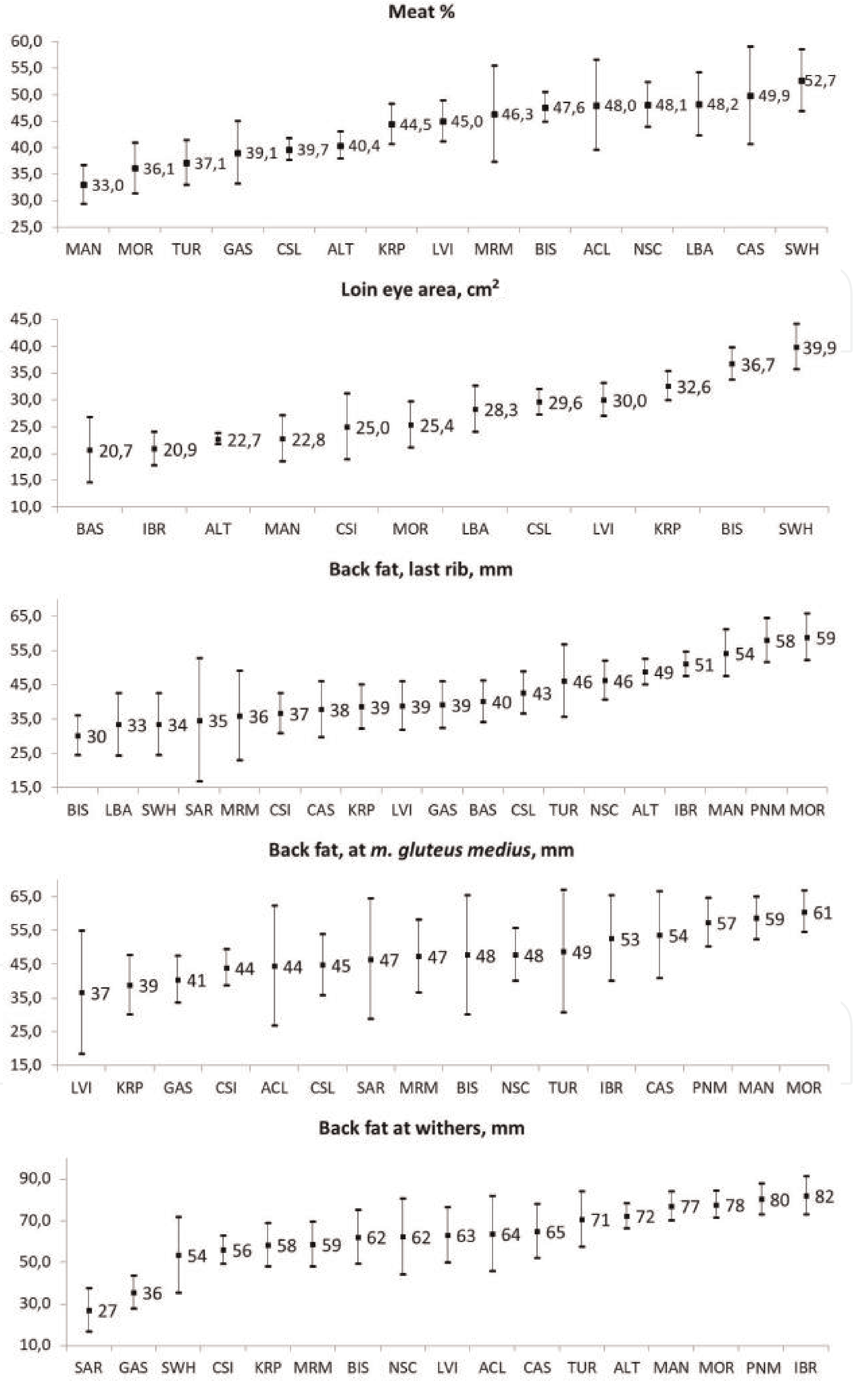

Figure 3.
Adjusted means (LSMEANS) and 95% confidence interval for carcass traits according to breed.

heterogeneity exists between and within breeds. It should be noted that some of the recorded cases of lower slaughter weight (and age), due to study objectives, correspond to experimental observations that do not follow the usual practices and slaughter weights.

For this overview and comparison, we considered only the studies where the final live body weight was above 70 kg and dealt only with some of the most commonly encountered traits, i.e. back fat thickness at withers, last rib, above the *m. gluteus medius*, lean meat percentage assessed according to SEUROP classification system or by dissection, or loin eye area (cf. Appendices 20 and 21).

Consistent with the diversity of fattening conditions and final body weights (breed averages between 96 and 163 kg), the reported values for carcass traits show high variability. Average muscularity (measured as lean meat %) varied between breeds from 32.9 to 52.3% and the loin eye area (average) from 18.1 to 40.3 cm^2. The back-fat thickness values spanned (breed averages) on the withers from 46 to 85 mm, at the level of last rib from 24 to 61 mm and at the level of *m. gluteus medius* from 28 to 61 mm.

Due to the wide range of final live weights within and between the breeds, we performed additional statistical comparison of breeds by adjusting the data to a common final live weight. The adjusted means (LSMEANS) and their 95% confidence interval are graphically presented in **Figure 3**.

Data on the backfat thickness confirm that pigs of these breeds are eligibly called fatty pigs. Low average lean meat percentage and loin eye area demonstrate limited muscular development. However, although these breeds are fatter and less muscled than genetically improved modern pig breeds, important variability in body composition, and consequently, carcass traits exist between them. Due to the big differences in rearing and feeding systems of studies from which the data derive, the comparisons between breeds are difficult and limited. Moreover so, since for some breeds few studies were available, which creates even more uncertainty to draw the conclusions. Nevertheless, we tried to position the breeds with regard to lean content indicators (meat percentage or loin eye area) and back-fat thickness adjusted for the final body weight (**Figure 4**). Based on this rough positioning, there seem to

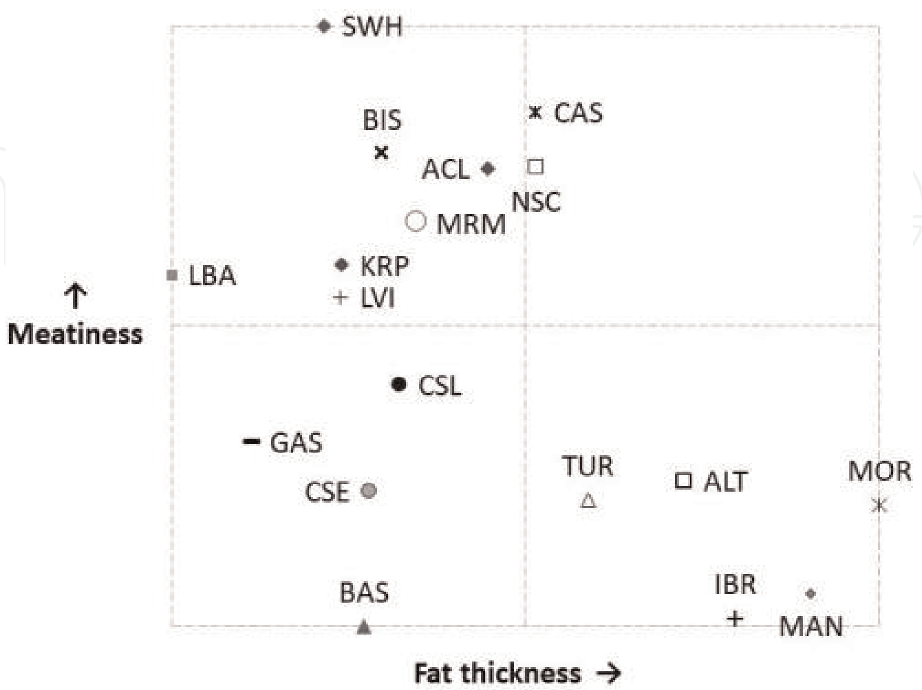

Figure 4.
Positioning of breeds with regard to lean content indicators (meat % or loin eye area) and back fat thickness using standardised values (0–1).

be three clusters; the upper left quadrant comprises the most muscular and least fatty breeds and the lower right quadrant the least muscular and most fatty breeds. The lower left quadrant is represented by breeds with both below-average fatness and muscularity.

6. Meat and fat quality

The summary on main descriptive statistics (cf. Appendices 22–27) was possible for *longissimus dorsi* intramuscular fat, meat pH values and colour, whereas it was not possible for water-holding capacity due to the big variety of methods used between studies and breeds. By far, the most interesting is the information on the intramuscular fat content of the *longissimus dorsi* muscle, which is important for sensory quality of meat and dry-cured products. In agreement with a higher capacity for subcutaneous fat deposition, most of local pig breeds stand out also with high levels of intramuscular fat. The average pooled values for breeds spanned from 2.1 to 10.2%. Based on the positioning of breeds with regard to fat deposition indicators (**Figure 5**), it could be observed that intramuscular fat content is particularly high in Swallow bellied Mangalitsa, while in some of the breeds, it was comparable to the conventional breeds. In certain breeds, the level of intramuscular fat was even below or near the benchmark (<2.5%) for sensory appreciation.

With regard to pH values of *longissimus dorsi* muscle, the pooled average per breed for 45 min post-mortem (pH 45) spanned from 6.07 to 6.57. The lowest pooled averages of pH 45 (<6.10) were observed in Krškopolje, Swallow bellied Mangalitsa and Sarda pigs (cf. Appendix 23). For Krškopolje pig, the result may be due to the incidence of RYR1 gene mutation which is relatively high in this population, i.e. 0.24 [26]. The pooled breed averages for 24 h post-mortem (pH 24) spanned from 5.35 to 5.98, and in several breeds, it was somewhat higher than what is reported in modern breeds, which could be indicative of lower glycogen stores prior to slaughter. It is difficult to know if higher pH 24 is due to higher stress

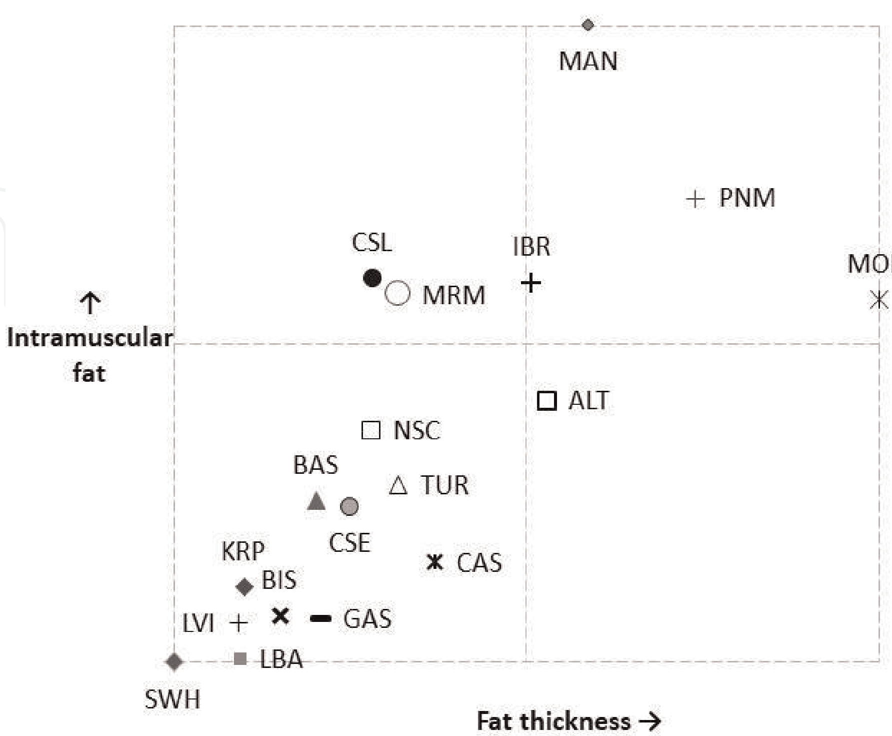

Figure 5.
Positioning of breeds with regard to fat thickness and intramuscular fat content using standardised values (0–1).

susceptibility, depleting glycogen stores prior to slaughter or to more oxidative muscle metabolism. It can also be related to the measurement uncertainty associated with the studies. Anyhow, the breeds with high intramuscular fat content exhibit also high pH 24 which could be indicative of more oxidative muscle metabolism. In this sense, in comparative studies with young pigs of Iberian and conventional breed, the former shows higher intramuscular fat and oxidative metabolism in the longissimus muscle under identical nutrition and management conditions [13]. Colour measurements (Minolta L, a and b values) corroborate with pH 24 values and show more intensive (darker, redder) colour of meat in many cases, in agreement with their higher age at slaughter.

For what regards fatty acid composition, the interpretation of the collected information is again difficult due to the important differences among studies with respect to diet and feeding, final body weight and age, and fatness, all these factors affecting fatty acid composition of tissues. Although it is difficult to make comparisons due to the differences in rearing and management conditions, the collected data indicate that local pig breeds in general exhibit higher proportion of monounsaturated fatty acids (MUFA) and lower proportion of polyunsaturated fatty acids (PUFA) as compared to the fatty acid profiles generally reported in conventional pig breeds [27–29]. The proportion of MUFA is mainly above 50% and PUFA below 12–13% in fatty acid profiles of intramuscular and back fat for the breeds considered, although in that respect, some of the breeds are closer to the conventional ones (**Figure 6**). The high proportion of MUFA and low proportion of PUFA are due to their high synthesis of MUFA (in particular, oleic acid (C18:1) produced from synthesis *de novo*) and SFA which increases with age [30]. It agrees with their higher genetic potential for lipid deposition. While PUFA are mainly related to nutrition as they cannot be synthesised *de novo* in pigs and come from exogenous supplies [31], their relative quantities in pig tissues can be altered by oxidation processes and other fatty acids synthesised *de novo*. In the context of the variability between studies in terms of nutrition and final body weight and age, it is difficult to evaluate to which degree the collected data and the differences observed were influenced by genetic or production system factors, but the importance of the genetic control of fatty acid composition and potential for selective breeding has been emphasised in different pig genotypes [32–35]. Regarding the nutritional value of pork which has generally high n-6/n-3 ratio, much above the recommended one (<5), studies on local pig breeds show huge variability; however, in some breeds, in

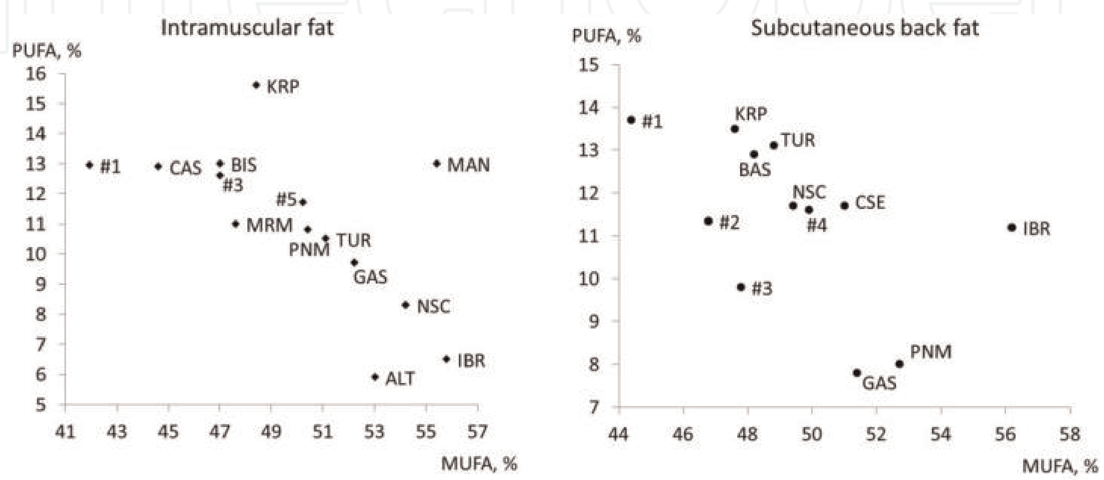

Figure 6.
Positioning of breeds with regard to fatty acid composition (MUFA and PUFA) of M. longissimus dorsi *intramuscular fat and subcutaneous back fat. Studies on modern breeds are indicated with #1–#5).*

particular, Iberian in 'montanera' production, the observed values approach the mentioned recommendation [15, 36, 37].

7. Conclusions

The information presented, even if limited, is very valuable since it may represent the only available data for some of the most representative autochthonous pig breeds in Europe, and provide a unique opportunity to analyse the considered traits in a common frame. Despite the limitations and drawbacks of the information gathered, the following conclusions can be drawn based on the analyses:

- Reproductive performance is considerably lower than in conventional pig breeds, in part, due to genetic limitations but also due to a less intensive use, adapted to local conditions, which could be improved in many breeds, with more adequate management and nutrition.

- Early postnatal growth in local pig breeds is comparable with values found in conventional breeds when pigs are allowed to eat *ad libitum*.

- Fattening phase is mostly characterised by low growth rates and big heterogeneity, in agreement with the diversity of the production systems and feeding levels encountered. In the majority of local pig breeds, limited feed allowance is practised in fattening to avoid excessive fat deposition.

- Iberian pigs (here comprising the Alentejana breed) are a particular case; they are characterised by limited growth rate in early fattening phase and voluntary feed allowance, with high daily gains in the late fattening, due to the typical and seasonal outdoor production system.

- Extreme values for daily gain observed in some local pig breeds are indicative of their maximal growth potential.

- Extreme values on feed intake indicate a high intake capacity of local pig breeds and higher appetite compared to conventional pigs.

- Even though, in general, local pig breeds show low muscular development and high potential for fat tissue deposition, important differences exist between the breeds.

- Local pig breeds are usually slaughtered at older age and weight which results in higher intramuscular fat and more intense colour of meat.

- Local pig breeds differ in fatty acid profiles from those reported for modern pig breeds.

Data on growth rate (especially fattening phase) reflect the heterogeneity of management systems and feeding regimes used. The growth potential of the majority of local pig breeds is likely not well exploited and their nutritional requirements remain to be investigated. In the project, the studies aiming to evaluate nutritional requirements have only been performed in few breeds (Iberian and Cinta senese). Muscularity and fat tissue characteristics observed in this review indicate that the differences between breeds are important, and studies on one breed cannot be directly extrapolated to another. Hence, there is a need for more studies on nutritional requirements in a controlled environment as a prerequisite for the optimisation of management practices and production systems, and thus enhance sustainability through optimal efficiency and minimal environmental impact.

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Conflict of interest

The authors declare no conflict of interest.

Nomenclature

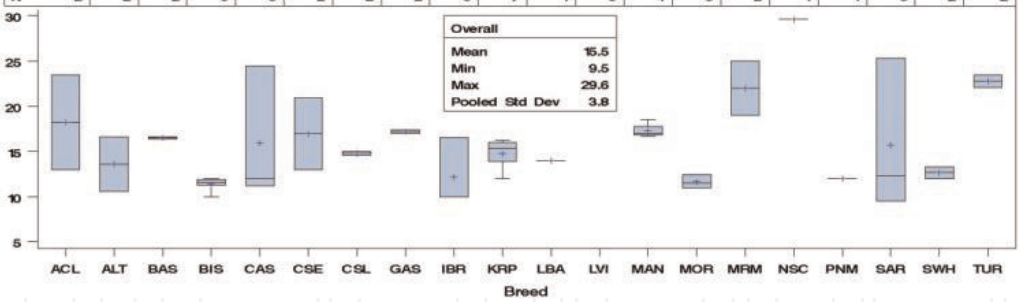
The following abbreviations are used for the breeds:

ACL	Apulo Calabrese
ALT	Alentejana
BIS	Bísara
BAS	Basque
CAS	Casertana
CSE	Cinta Senese
CSL	Crna slavonska (Black Slavonian)
GAS	Gascon
IBR	Iberíco (Iberian)
KRP	Krškopoljski prašič (Krškopolje pig)
LBA	Senojo tipo Lietuvos baltosios (old-type Lithuanian white)
LVI	Lithuanian indigenous wattle
MAN	Mangulica (Swallow bellied Mangalitsa)
MOR	Moravka
MRM	Mora romagnola
NSC	Nero siciliano
PNM	Porc negre mallorquí (Majorcan black pig)
SAR	Sarda
SWH	Schwäbisch-Hällisches
TUR	Turopoljska svinja (Turopolje pig)

A. Appendices—figures

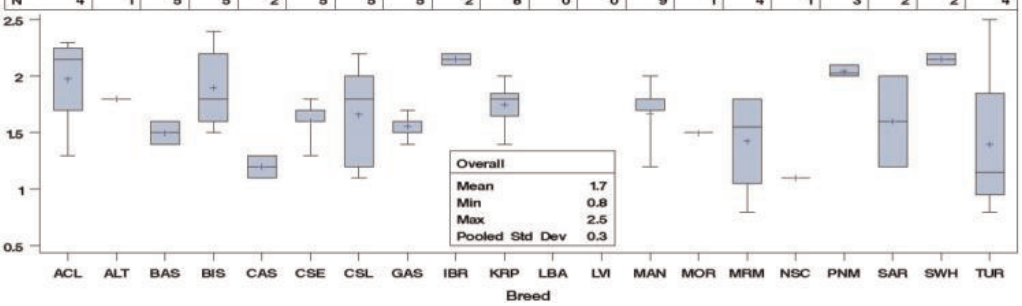
Basic statistical parameters are provided in the following figures (Appendices 1–27). Individual data and references used to build the figures in Appendices 1–27 are provided in the respective chapters (per breed).

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	18.3	13.6	16.5	11.4	15.9	17.0	14.8	17.2	12.2	14.7	14.0	.	17.3	11.6	22.0	29.6	12.0	15.7	12.7	22.8
Q2	18.3	13.6	16.5	11.6	12.0	17.0	14.8	17.2	10.0	15.3	14.0	.	17.0	11.5	22.0	29.6	12.0	12.3	12.7	22.8
Min	13.0	10.6	16.4	10.0	11.2	13.0	14.6	17.0	10.0	12.0	14.0	.	16.7	11.0	19.0	29.6	12.0	9.5	12.0	22.1
Max	23.5	16.6	16.6	12.0	24.5	20.9	15.0	17.4	16.5	16.2	14.0	.	18.5	12.4	25.0	29.6	12.0	25.3	13.3	23.5
N	2	2	2	5	3	2	2	2	3	7	1	0	4	3	2	1	1	3	2	2



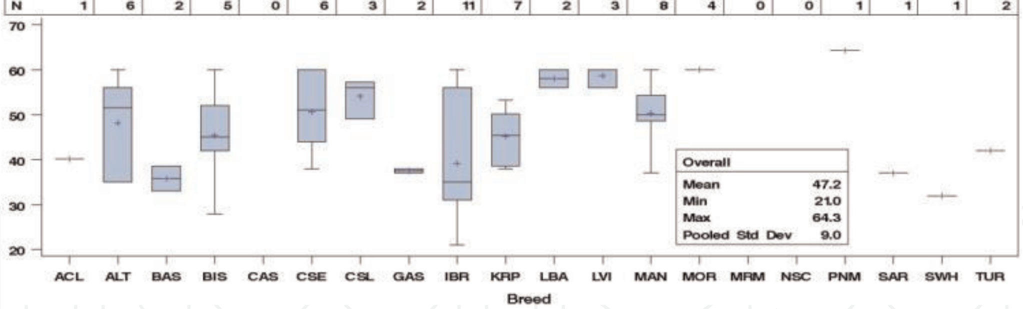
Appendix 1. Reproductive performance (age of sows at first parturition, months) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	2.0	1.8	1.5	1.9	1.2	1.6	1.7	1.6	2.2	1.8	.	.	1.7	1.5	1.4	1.1	2.0	1.6	2.2	1.4
Q2	2.2	1.8	1.5	1.8	1.2	1.6	1.8	1.6	2.2	1.8	.	.	1.8	1.5	1.6	1.1	2.0	1.6	2.2	1.2
Min	1.3	1.8	1.4	1.5	1.1	1.3	1.1	1.4	2.1	1.4	.	.	1.2	1.5	0.8	1.1	2.0	1.2	2.1	0.8
Max	2.3	1.8	1.6	2.4	1.3	1.8	2.2	1.7	2.2	2.0	.	.	2.0	1.5	1.8	1.1	2.1	2.0	2.2	2.5
N	4	1	5	5	2	5	5	5	2	8	0	0	9	1	4	1	3	2	2	4



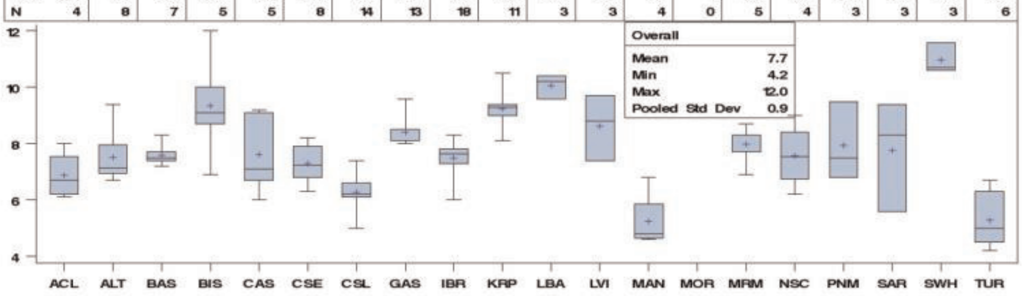
Appendix 2. Reproductive performance (number of litters per sow per year) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	40.1	48.2	35.8	45.4	.	50.7	54.1	37.5	39.2	45.2	58.0	58.7	50.3	60.0	.	.	64.3	37.0	32.0	42.0
Q2	40.1	51.5	35.8	45.0	.	51.0	56.0	37.5	35.0	45.4	58.0	60.0	50.0	60.0	.	.	64.3	37.0	32.0	42.0
Min	40.1	35.0	33.0	28.0	.	37.9	49.0	37.0	21.0	38.0	56.0	56.0	37.0	60.0	.	.	64.3	37.0	32.0	42.0
Max	40.1	60.0	38.5	60.0	.	60.0	57.3	38.0	60.0	53.2	60.0	60.0	60.0	60.0	.	.	64.3	37.0	32.0	42.0
N	1	6	2	5	0	6	3	2	11	7	2	3	8	4	0	0	1	1	1	2



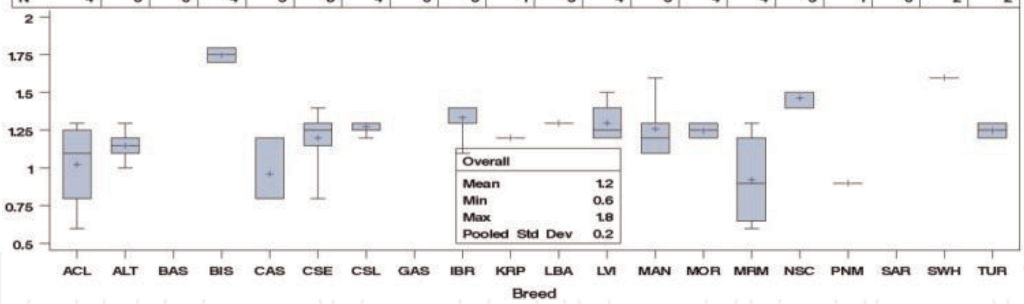
Appendix 3. Reproductive performance (lactation, days) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	6.9	7.5	7.6	9.3	7.6	7.3	6.3	8.4	7.5	9.2	10.1	8.6	5.3	.	8.0	7.6	7.9	7.8	11.0	5.3
Q2	6.7	7.2	7.5	9.1	7.1	7.3	6.2	8.1	7.7	9.3	10.2	8.8	4.8	.	8.3	7.6	7.5	8.3	10.7	5.0
Min	6.1	6.7	7.2	6.9	6.0	6.3	5.0	8.0	6.0	8.1	9.6	7.4	4.6	.	6.9	6.2	6.8	5.6	10.6	4.2
Max	8.0	9.4	8.3	12.0	9.2	8.2	7.4	9.6	8.3	10.5	10.4	9.7	6.8	.	8.7	9.0	9.5	9.4	11.6	6.7
N	4	8	7	5	5	8	14	13	18	11	3	3	4	0	5	4	3	3	3	6



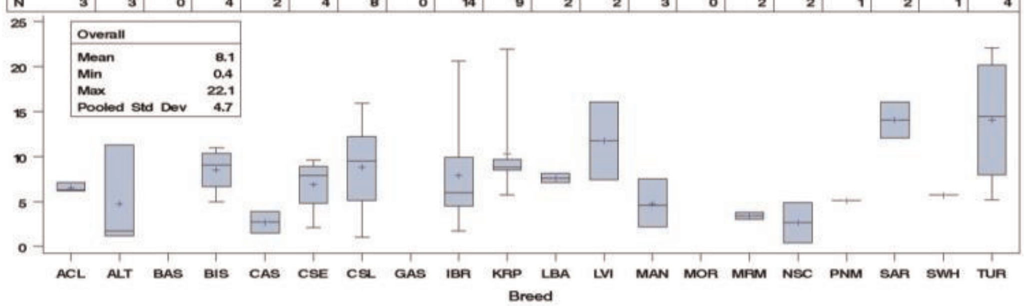
Appendix 4. Reproductive performance (number of live-born piglets per litter) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	1.03	1.15	.	1.75	0.96	1.20	1.28	.	1.33	1.20	1.30	1.30	1.26	1.25	0.93	1.47	0.90	.	1.60	1.25
Q2	1.10	1.15	.	1.75	0.80	1.25	1.30	.	1.40	1.20	1.30	1.25	1.20	1.25	0.90	1.50	0.90	.	1.60	1.25
Min	0.60	1.00	.	1.70	0.80	0.80	1.20	.	1.10	1.20	1.30	1.20	1.10	1.20	0.60	1.40	0.90	.	1.60	1.20
Max	1.30	1.30	.	1.80	1.20	1.40	1.30	.	1.40	1.20	1.30	1.50	1.60	1.30	1.30	1.50	0.90	.	1.60	1.30
N	4	6	0	4	5	8	4	0	6	1	3	4	5	4	4	3	1	0	2	2



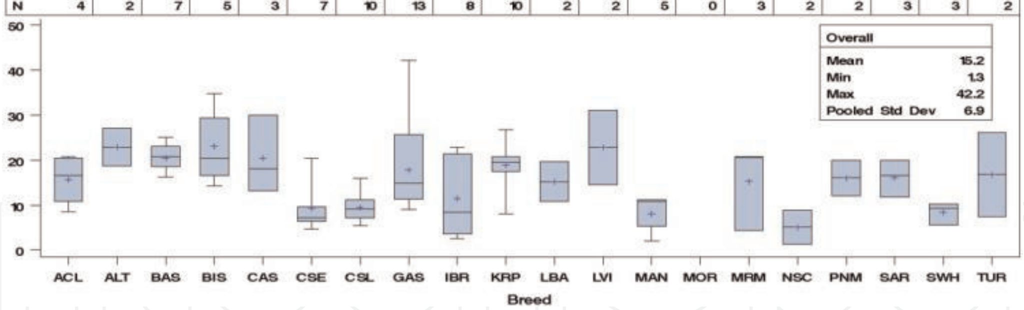
Appendix 5. Reproductive performance (piglet birth weight, kg) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	6.5	4.7	.	8.5	2.7	6.9	8.8	.	7.9	10.3	7.6	11.8	4.8	.	3.4	2.7	5.1	14.1	5.7	14.1
Q2	6.3	1.7	.	9.1	2.7	7.9	9.5	.	6.0	8.8	7.6	11.8	4.6	.	3.4	2.7	5.1	14.1	5.7	14.5
Min	6.2	1.2	.	5.0	1.5	2.1	1.0	.	1.7	5.7	7.1	7.4	2.2	.	3.0	0.4	5.1	12.1	5.7	5.2
Max	7.1	11.3	.	11.0	3.9	9.6	15.9	.	20.6	21.9	8.1	16.1	7.5	.	3.8	4.9	5.1	16.1	5.7	22.1
N	3	3	0	4	2	4	8	0	14	9	2	2	3	0	2	2	1	2	1	4



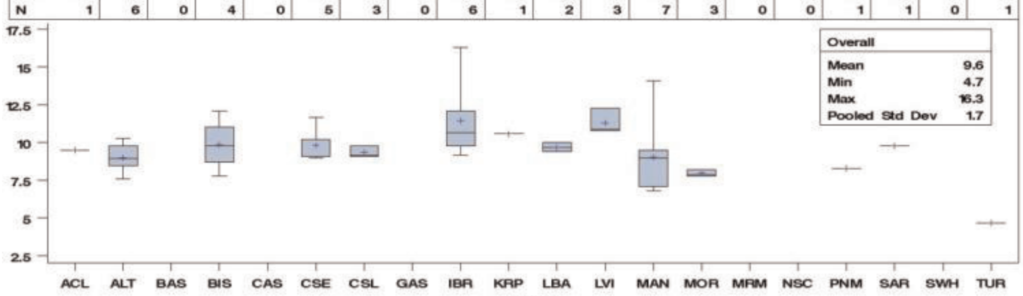
Appendix 6. Reproductive performance (% of stillborn piglets) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	15.6	22.9	20.5	23.1	20.4	9.3	9.5	17.8	11.5	18.9	15.3	22.9	8.1	.	15.3	5.1	16.1	16.1	8.4	16.8
Q2	16.6	22.9	20.8	20.5	18.1	7.1	9.2	14.8	8.4	19.5	15.3	22.9	10.9	.	20.6	5.1	16.1	16.5	9.3	16.8
Min	8.6	18.8	16.2	14.3	13.2	4.7	5.4	9.0	2.5	8.1	10.8	14.6	2.0	.	4.4	1.3	12.1	11.8	5.6	7.4
Max	20.8	27.0	25.0	34.8	30.0	20.4	15.9	42.2	22.9	26.7	19.7	31.1	11.1	.	20.8	8.9	20.0	20.0	10.3	26.2
N	4	2	7	5	3	7	10	13	8	10	2	2	5	0	3	2	2	3	3	2



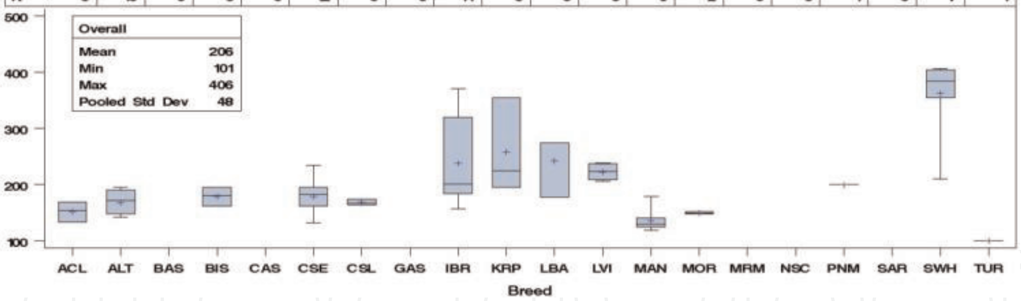
Appendix 7. Reproductive performance (% mortality at weaning,) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	9.5	9.0	.	9.9	.	9.8	9.4	.	11.5	10.6	9.7	11.3	9.1	8.0	.	.	8.3	9.8	.	4.7
Q2	9.5	9.0	.	9.8	.	9.1	9.2	.	10.7	10.6	9.7	10.9	9.0	7.9	.	.	8.3	9.8	.	4.7
Min	9.5	7.6	.	7.8	.	9.0	9.1	.	9.2	10.6	9.4	10.8	6.8	7.8	.	.	8.3	9.8	.	4.7
Max	9.5	10.3	.	12.1	.	11.7	9.8	.	16.3	10.6	10.0	12.3	14.1	8.2	.	.	8.3	9.8	.	4.7
N	1	6	0	4	0	5	3	0	6	1	2	3	7	3	0	0	1	1	0	1



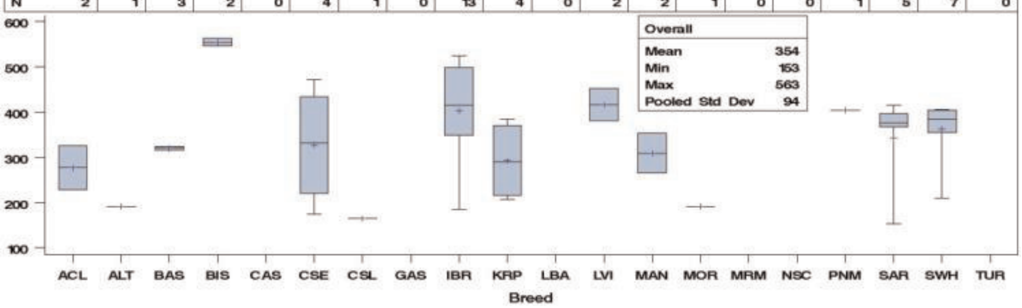
Appendix 8. Reproductive performance (piglet weight, kg at 47 days of lactation) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	153	169	.	179	.	180	169	.	238	258	243	223	137	150	.	.	200	.	363	101
Q2	155	172	.	181	.	183	167	.	202	225	275	224	130	150	.	.	200	.	384	101
Min	134	142	.	162	.	133	165	.	157	195	179	207	119	148	.	.	200	.	210	101
Max	170	196	.	196	.	235	175	.	371	355	275	239	180	153	.	.	200	.	406	101
N	3	10	0	3	0	12	3	0	14	3	3	5	9	2	0	0	1	0	7	1



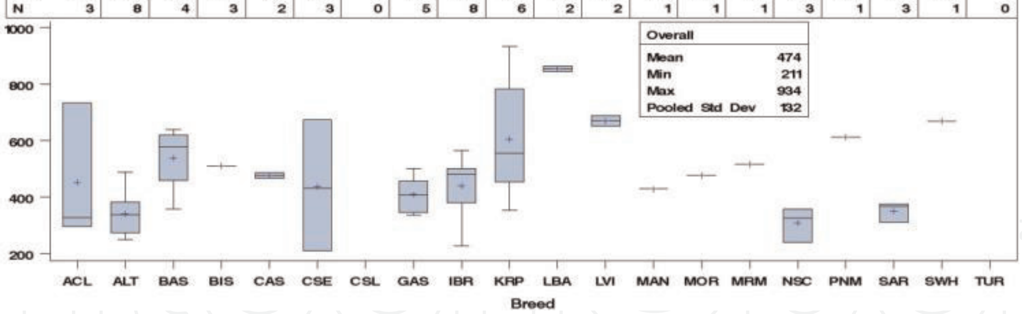
Appendix 9. Growth performance (in lactation, g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	278	192	321	555	.	327	165	.	404	293	.	417	310	192	.	.	405	342	363	.
Q2	278	192	321	555	.	332	165	.	415	290	.	417	310	192	.	.	405	377	384	.
Min	229	192	316	546	.	174	165	.	185	207	.	381	266	192	.	.	405	153	210	.
Max	326	192	325	563	.	473	165	.	524	385	.	452	353	192	.	.	405	416	406	.
N	2	1	3	2	0	4	1	0	13	4	0	2	2	1	0	0	1	5	7	0



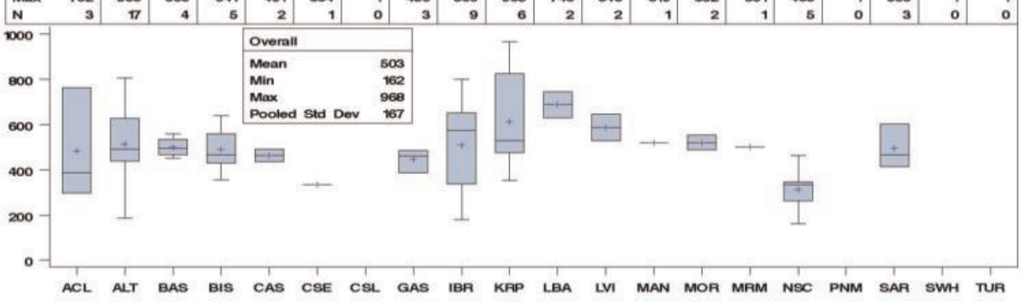
Appendix 10. Growth performance in post-weaning phase (g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	453	342	539	513	477	439	.	410	441	606	855	672	430	477	517	310	613	352	671	.
Q2	329	339	580	513	477	432	.	408	482	556	855	672	430	477	517	328	613	368	671	.
Min	297	251	358	513	467	211	.	336	228	355	846	653	430	477	517	241	613	312	671	.
Max	733	489	640	513	487	674	.	502	566	934	864	690	430	477	517	360	613	377	671	.
N	3	8	4	3	2	3	0	5	8	6	2	2	1	1	1	3	1	3	1	0



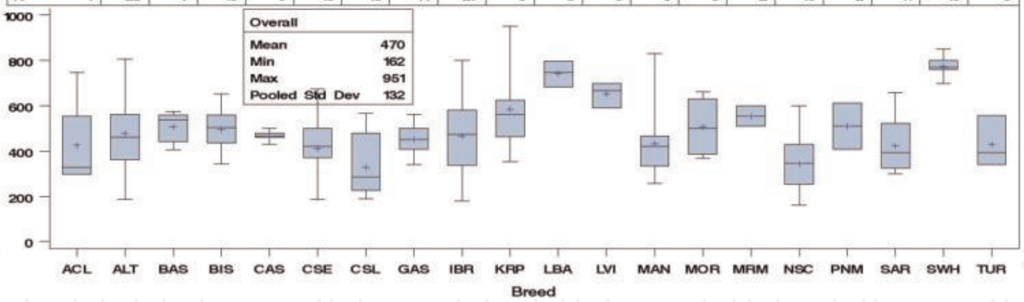
Appendix 11. Growth performance in fattening phase I (approximately 30–60 kg live weight; g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	483	514	500	491	464	334	.	445	509	614	689	588	519	521	501	314	.	494	.	.
Q2	388	491	495	467	464	334	.	462	576	530	689	588	519	521	501	333	.	466	.	.
Min	298	187	452	356	437	334	.	387	181	352	632	530	519	490	501	162	.	414	.	.
Max	762	805	560	641	491	334	.	486	800	968	746	646	519	552	501	465	.	603	.	.
N	3	17	4	5	2	1	0	3	9	6	2	2	1	2	1	5	0	3	0	0



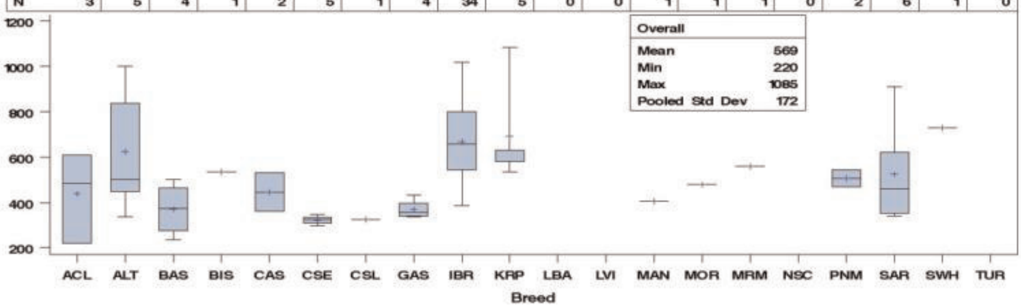
Appendix 12. Growth performance in fattening phase II (approximately 60–100 kg live weight; g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	426	479	507	495	468	412	329	452	468	584	742	653	434	508	555	346	512	423	773	429
Q2	330	462	539	505	468	419	285	451	473	562	748	668	422	503	555	346	512	392	768	392
Min	297	187	405	343	430	185	189	342	181	352	683	592	257	369	509	162	410	300	700	340
Max	748	805	574	653	500	674	567	563	800	951	796	698	830	660	600	600	613	657	850	556
N	4	28	7	13	5	15	19	14	27	9	3	3	9	8	2	15	2	11	10	3



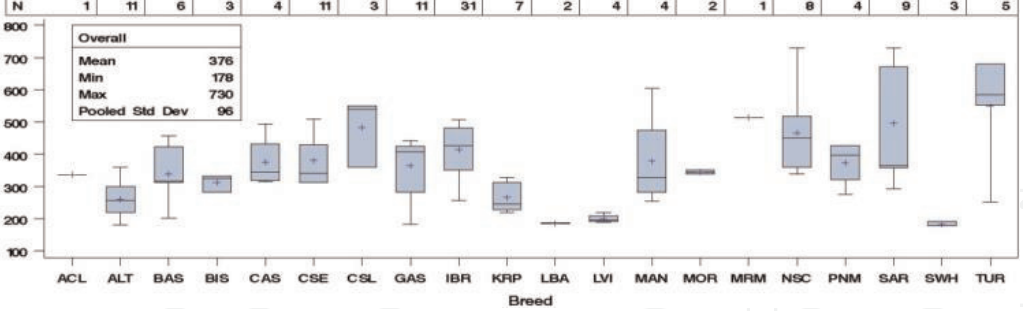
Appendix 13. Growth performance in fattening phase I and II (30–100 kg live weight; g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	438	625	370	534	446	322	325	369	668	691	.	.	405	478	560	.	507	525	730	.
Q2	486	502	373	534	446	323	325	354	657	629	.	.	405	478	560	.	507	462	730	.
Min	220	336	236	534	361	297	325	337	387	533	.	.	405	478	560	.	471	341	730	.
Max	608	1000	499	534	530	346	325	432	1018	1085	.	.	405	478	560	.	543	910	730	.
N	3	5	4	1	2	5	1	4	34	5	0	0	1	1	1	0	2	6	1	0



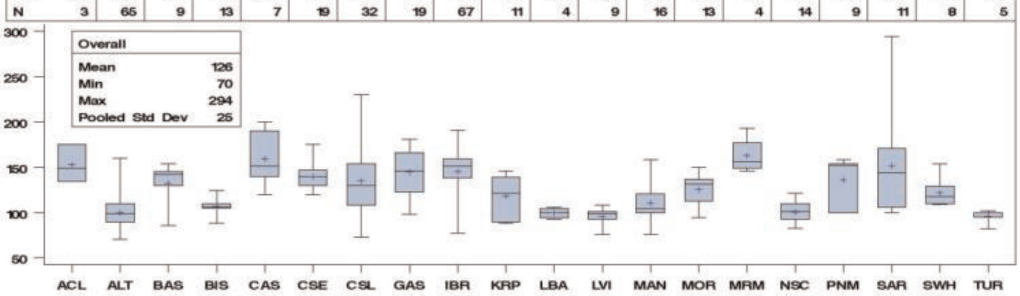
Appendix 14. Growth performance in fattening phase III (above 10o kg live weight; g/day) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	336	261	338	313	375	381	483	365	414	266	186	201	379	346	514	466	374	496	183	549
Q2	336	256	318	325	345	340	540	407	427	245	186	197	328	346	514	450	397	365	178	584
Min	336	180	202	282	315	312	359	183	256	220	184	190	255	339	514	339	275	294	178	253
Max	336	360	458	333	494	510	550	442	508	328	188	220	604	352	514	730	427	730	192	679
N	1	11	6	3	4	11	3	11	31	7	2	4	4	2	1	8	4	9	3	5



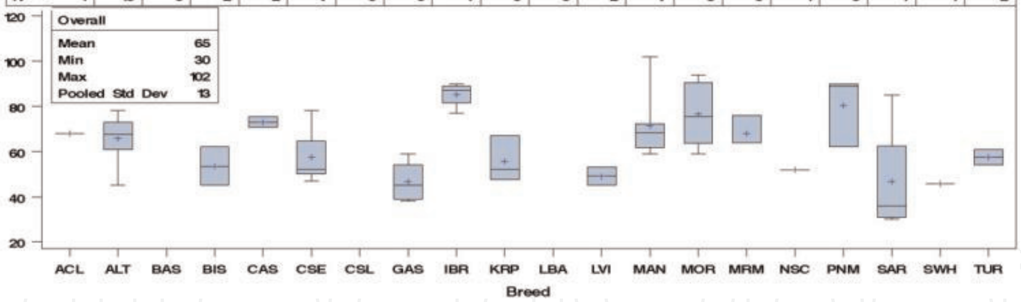
Appendix 15. Age at slaughter (days) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	153	100	132	107	159	140	135	145	145	118	100	96	110	126	163	101	136	152	122	96
Q2	149	99	142	106	151	140	130	146	151	121	100	99	104	131	156	101	152	144	118	100
Min	134	70	86	88	120	120	73	98	77	88	93	76	76	94	146	83	100	100	109	82
Max	175	160	154	124	200	175	230	181	191	146	106	108	158	150	193	121	158	294	154	102
N	3	65	9	13	7	19	32	19	67	11	4	9	16	13	4	14	9	11	8	5



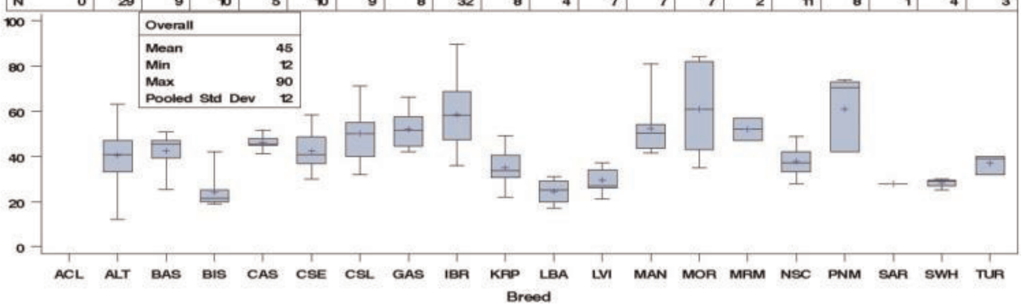
Appendix 16. Weight at slaughter (kg) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	68	66	.	54	73	57	.	47	85	56	.	49	71	77	68	52	80	47	46	58
Q2	68	68	.	54	73	52	.	45	87	52	.	49	68	76	64	52	89	36	46	58
Min	68	45	.	45	71	47	.	38	77	48	.	45	59	59	64	52	62	30	46	54
Max	68	78	.	62	75	78	.	59	90	67	.	53	102	94	76	52	90	85	46	61
N	1	10	0	2	2	7	0	6	4	3	0	2	7	8	3	1	6	4	1	2



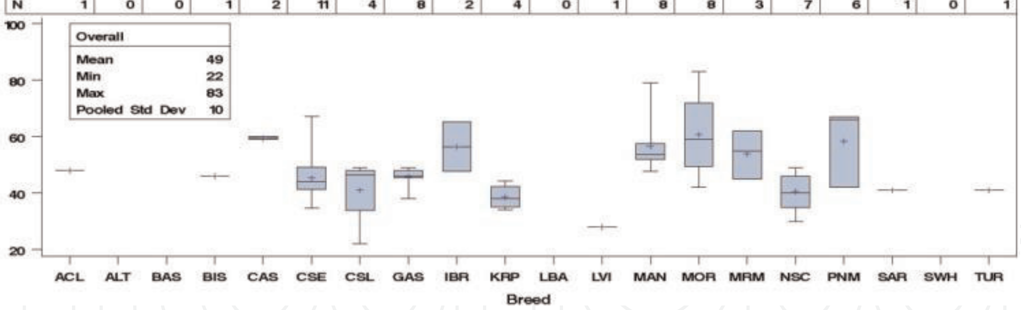
Appendix 17. Subcutaneous fat thickness (mm, at withers) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	41	42	24	46	42	50	52	58	35	25	29	52	61	52	38	61	28	28	37
Q2	.	41	45	22	46	41	50	52	58	34	25	27	51	61	52	37	71	28	29	39
Min	.	12	26	19	41	30	32	42	36	22	17	21	42	35	47	28	42	28	25	32
Max	.	63	51	42	52	58	71	66	90	49	31	37	81	84	57	49	74	28	30	40
N	0	29	9	10	5	10	9	8	32	8	4	7	7	7	2	11	8	1	4	3



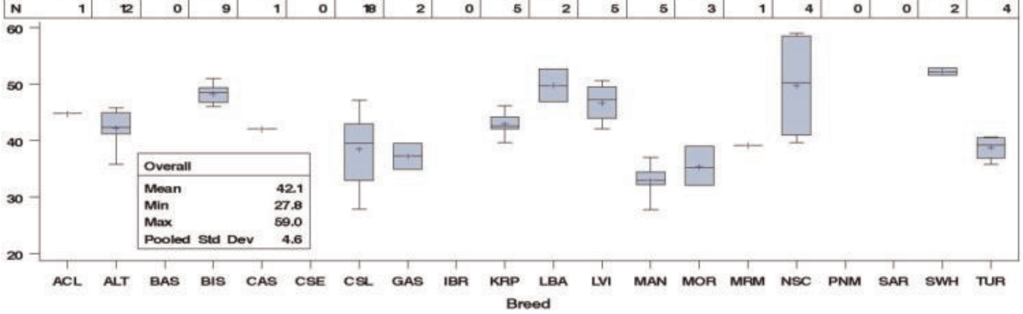
Appendix 18. Subcutaneous fat thickness (mm, at last rib) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	48	.	.	46	60	45	41	46	56	39	.	28	57	61	54	41	58	41	.	41
Q2	48	.	.	46	60	44	47	46	56	38	.	28	54	59	55	40	66	41	.	41
Min	48	.	.	46	59	35	22	38	48	34	.	28	48	42	45	30	42	41	.	41
Max	48	.	.	46	60	67	49	49	65	44	.	28	79	83	62	49	67	41	.	41
N	1	0	0	1	2	11	4	8	2	4	0	1	8	8	3	7	6	1	0	1



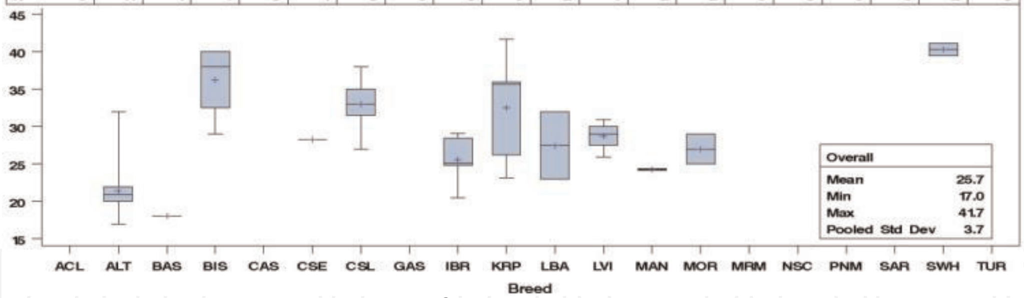
Appendix 19. Subcutaneous fat thickness (mm, at m. *gluteus medius*) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	44.8	42.2	.	48.4	42.1	.	38.5	37.3	.	43.0	49.9	46.7	32.9	35.4	39.2	49.8	.	.	52.3	38.8
Q2	44.8	42.4	.	48.6	42.1	.	39.6	37.3	.	42.6	49.9	47.3	33.0	35.2	39.2	50.3	.	.	52.3	39.4
Min	44.8	35.9	.	46.1	42.1	.	27.9	35.0	.	39.7	46.9	42.2	27.8	32.1	39.2	39.7	.	.	51.7	35.8
Max	44.8	45.9	.	51.0	42.1	.	47.2	39.6	.	46.2	52.8	50.7	37.1	39.0	39.2	59.0	.	.	52.9	40.6
N	1	12	0	9	1	0	18	2	0	5	2	5	5	3	1	4	0	0	2	4



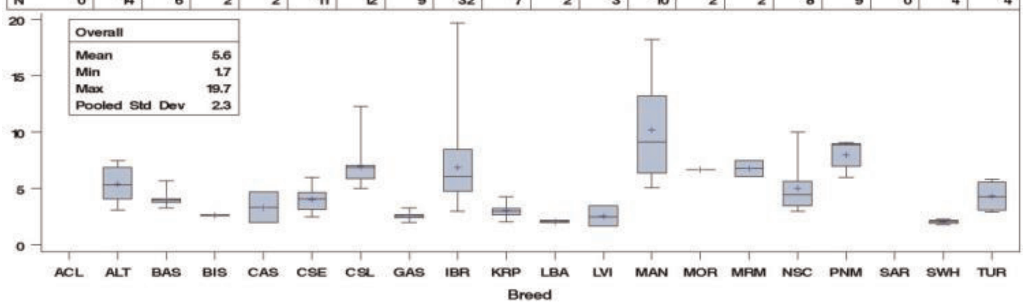
Appendix 20. Lean meat content (%) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	21.5	18.1	36.3	.	28.3	33.0	.	25.6	32.6	27.5	28.8	24.3	27.0	.	.	.	.	40.3	.
Q2	.	21.0	18.1	38.0	.	28.3	33.0	.	25.2	35.7	27.5	29.0	24.3	27.0	.	.	.	.	40.3	.
Min	.	17.0	18.1	29.0	.	28.3	27.0	.	20.5	23.2	23.0	26.0	24.2	25.0	.	.	.	.	39.5	.
Max	.	32.0	18.1	40.0	.	28.3	38.0	.	29.1	41.7	32.0	31.0	24.4	29.0	.	.	.	.	41.1	.
N	0	41	1	4	0	1	8	0	5	5	2	4	2	2	0	0	0	0	2	0



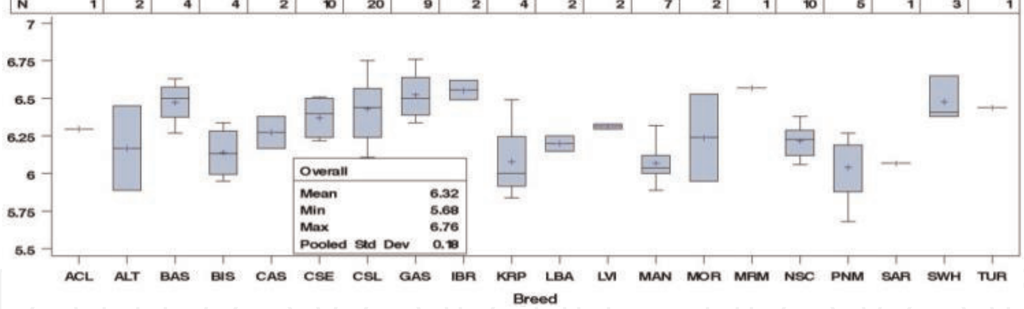
Appendix 21. Loin eye area (cm^2) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	5.4	4.1	2.7	3.3	4.1	7.0	2.6	6.9	3.0	2.1	2.6	10.2	6.7	6.8	5.0	8.0	.	2.1	4.3
Q2	.	5.4	3.9	2.7	3.3	4.1	6.9	2.6	6.1	3.0	2.1	2.5	9.1	6.7	6.8	4.5	8.9	.	2.1	4.3
Min	.	3.1	3.3	2.6	2.0	2.5	5.0	2.0	3.0	2.1	2.0	1.7	5.1	6.7	6.1	3.0	6.0	.	1.8	2.9
Max	.	7.5	5.7	2.7	4.7	6.0	12.3	3.3	19.7	4.3	2.2	3.5	18.2	6.7	7.5	10.0	9.1	.	2.3	5.8
N	0	14	6	2	2	11	12	9	32	7	2	3	10	2	2	8	9	0	4	4



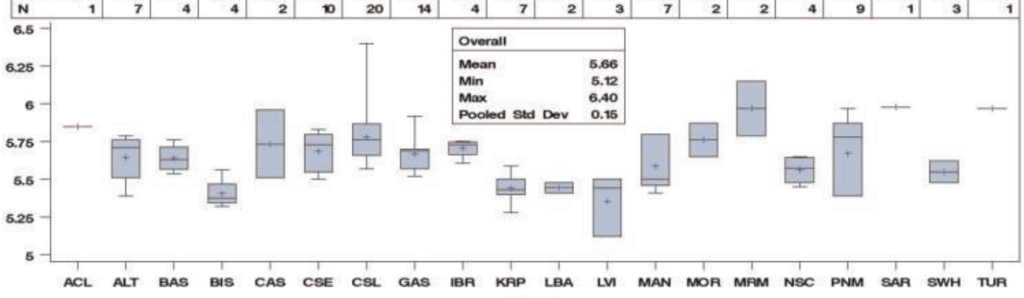
Appendix 22. Intramuscular fat content (%) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	6.30	6.17	6.48	6.14	6.28	6.37	6.43	6.52	6.56	6.08	6.20	6.32	6.07	6.24	6.57	6.22	6.04	6.07	6.48	6.44
Q2	6.30	6.17	6.50	6.14	6.28	6.40	6.44	6.50	6.56	6.00	6.20	6.32	6.04	6.24	6.57	6.23	6.19	6.07	6.41	6.44
Min	6.30	5.89	6.27	5.95	6.17	6.22	6.11	6.34	6.49	5.84	6.15	6.30	5.89	5.95	6.57	6.06	5.68	6.07	6.38	6.44
Max	6.30	6.45	6.63	6.34	6.38	6.51	6.75	6.76	6.62	6.49	6.25	6.33	6.32	6.53	6.57	6.38	6.27	6.07	6.65	6.44
N	1	2	4	4	2	10	20	9	2	4	2	2	7	2	1	10	5	1	3	1



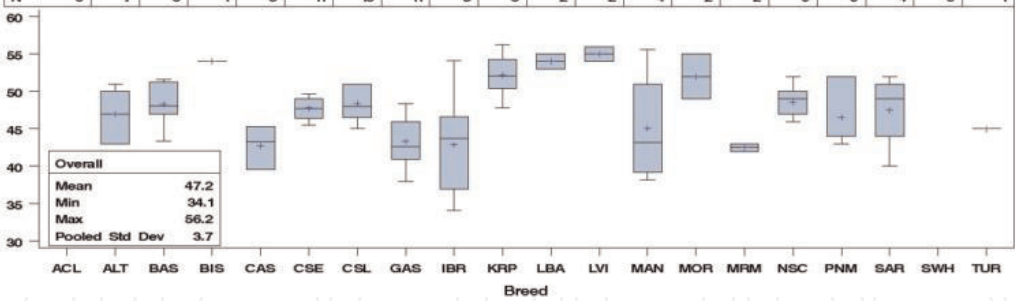
Appendix 23. pH value ≈45 min post-mortem (*M. longissimus* dorsi) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	5.85	5.64	5.64	5.41	5.74	5.69	5.78	5.67	5.71	5.44	5.45	5.35	5.59	5.76	5.97	5.56	5.67	5.98	5.55	5.97
Q2	5.85	5.71	5.63	5.38	5.74	5.73	5.76	5.69	5.73	5.43	5.45	5.44	5.50	5.76	5.97	5.58	5.78	5.98	5.55	5.97
Min	5.85	5.39	5.54	5.32	5.51	5.50	5.57	5.52	5.61	5.28	5.41	5.12	5.41	5.65	5.79	5.45	5.39	5.98	5.48	5.97
Max	5.85	5.79	5.76	5.56	5.96	5.83	6.40	5.92	5.75	5.59	5.48	5.50	5.80	5.87	6.15	5.65	5.97	5.98	5.62	5.97
N	1	7	4	4	2	10	20	14	4	7	2	3	7	2	2	4	9	1	3	1



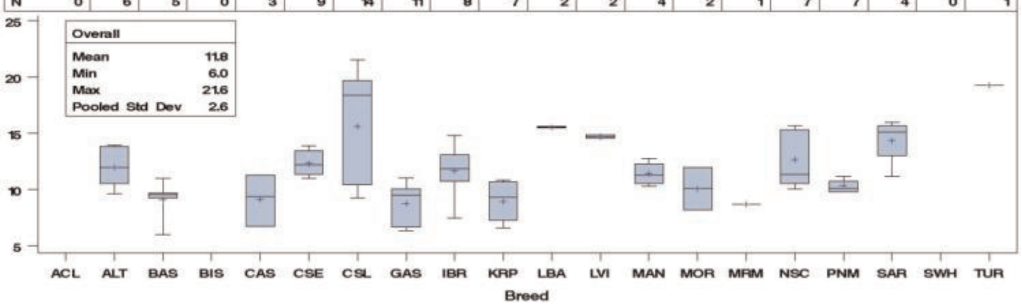
Appendix 24. pH value ≈24 h post-mortem (*M. longissimus* dorsi) according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	47.0	48.3	54.0	42.7	47.8	48.4	43.3	42.9	52.2	54.0	55.0	45.1	52.0	42.5	48.6	46.6	47.5	.	45.0
Q2	.	47.0	48.1	54.0	43.3	47.8	48.0	42.6	43.8	52.1	54.0	55.0	43.2	52.0	42.5	49.0	44.0	49.0	.	45.0
Min	.	43.0	43.4	54.0	39.6	45.5	45.0	38.0	34.1	47.8	53.0	54.0	38.2	49.0	42.0	46.0	43.0	40.0	.	45.0
Max	.	51.0	51.6	54.0	45.4	49.7	51.0	48.4	54.1	56.2	55.0	56.0	55.6	55.0	43.0	52.0	52.0	52.0	.	45.0
N	0	7	5	1	3	11	16	11	8	5	2	2	4	2	2	9	9	4	0	1



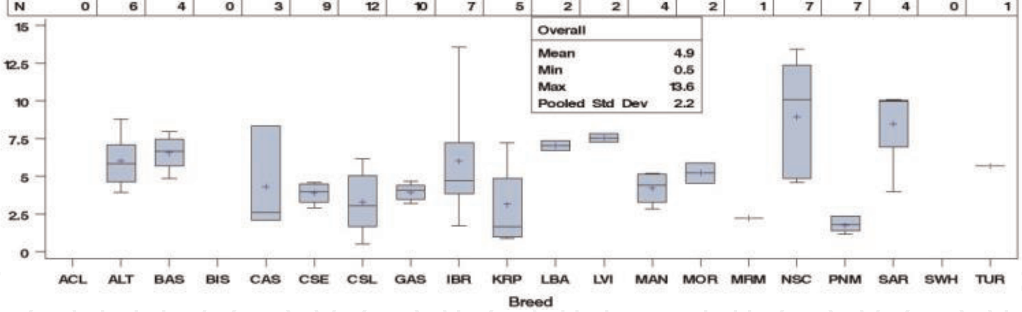
Appendix 25. Meat colour—Minolta L—according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	12.0	9.1	.	9.1	12.3	15.6	8.8	11.7	9.0	15.6	14.7	11.4	10.1	8.7	12.7	10.4	14.4	.	19.3
Q2	.	12.0	9.6	.	9.4	12.3	18.4	9.5	11.9	9.3	15.6	14.7	11.3	10.1	8.7	11.4	10.2	15.2	.	19.3
Min	.	9.7	6.0	.	6.8	11.0	9.3	6.4	7.5	6.6	15.5	14.6	10.3	8.3	8.7	10.1	9.8	11.2	.	19.3
Max	.	14.0	11.0	.	11.3	13.9	21.6	11.1	14.8	10.9	15.6	14.9	12.8	12.0	8.7	15.7	11.2	16.0	.	19.3
N	0	6	5	0	3	9	14	11	8	7	2	2	4	2	1	7	7	4	0	1



Appendix 26. Meat colour—Minolta a—according to breed.

Breed	ACL	ALT	BAS	BIS	CAS	CSE	CSL	GAS	IBR	KRP	LBA	LVI	MAN	MOR	MRM	NSC	PNM	SAR	SWH	TUR
Mean	.	6.0	6.6	.	4.3	3.9	3.3	3.9	6.0	3.1	7.1	7.6	4.2	5.2	2.2	9.0	1.8	8.5	.	5.7
Q2	.	5.9	6.7	.	2.6	4.0	3.1	4.1	4.7	1.7	7.1	7.6	4.4	5.2	2.2	10.1	1.8	10.0	.	5.7
Min	.	3.9	4.9	.	2.1	2.9	0.5	3.2	1.7	0.9	6.8	7.3	2.9	4.6	2.2	4.6	1.2	4.0	.	5.7
Max	.	8.8	8.0	.	8.3	4.6	6.2	4.7	13.6	7.3	7.4	7.8	5.2	5.9	2.2	13.4	2.4	10.1	.	5.7
N	0	6	4	0	3	9	12	10	7	5	2	2	4	2	1	7	7	4	0	1



Appendix 27. Meat colour—Minolta b—according to breed.

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