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IMPACT OF THE NON CASTRATION OF MALE PIGS ON GROWTH PERFORMANCE AND BEHAVIOUR- COMPARISON WITH BARROWS AND GILTS

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ABSTRACT

Growth performance, carcass quality, behaviour and general condition of crossbred (Pietrain x Large White) x (Large White x Landrace) boars, barrows and gilts fed ad libitum and group-housed were compared from weaning until slaughter. During the post-weaning and the fattening periods, pigs were group-housed (8-9 or 6 pigs/pen, respectively). Pigs were all slaughtered on the same day. Between 28 and 63 d of age (post-weaning period), growth performance was not significantly influenced by the gender. Between 63 and 152 days of age (fattening period), daily feed intake of boars was lower than that of barrows (2.41 and 2.70 kg/d, respectively). Their average daily gain was similar and not significantly different (1032 and 1069 g/d, respectively), even if barrows presented a higher growth rate at the beginning of the fattening period. Consequently, castration was associated with an increase of feed conversion ratio (2.62 vs. 2.26) and carcass fatness. Gilt feed conversion ratio (2.48) was intermediate between those of boars and barrows. According to simulations performed with the InraPorc software over the 25-116 kg body weight range, the digestible lysine requirement per unit of net energy intake was on average 0.1 g/MJ higher for boars than for gilts and barrows. Barrows were less active than gilts and boars and had more leg problems at the end of the fattening period (lameness, bursitis). Boars presented higher lesion scores (wounds/scratches) during the first six weeks of fattening and more social behaviour. Gilts were more interested by pen features than by other pigs. Economic context needs to be considered in order to decide if dietary nutritional values have to be adapted on the basis of boar requirements or if specific diets have to be provided to boars and gilts. More knowledge is required to characterise the boar behaviour and general condition under restricted feeding conditions or when slaughtering occurs in different conditions (older pigs, many departures to the slaughter house).

INTRODUCTION

Over the last years, the surgical castration of males without anaesthesia was more and more questioned in Europe with regard to animal welfare considerations (Fredriksen et al., 2008). An alternative to castration could consist in the production of intact males, as provided that the boar taint problem can be solved. In such context, questions arise, especially in countries where only gilts and barrows were bred traditionally, about their performance, nutrient requirements, behaviour, and body condition in comparison with the two other genders.

Differences between boars and barrows or between boars and gilts (Hansen and Lewis, 1993; Labroue et al., 1994; Noblet et al., 1994; Xue et al., 1995; Quiniou et al., 1996) have been extensively investigated in the 90's. Over the last decades, the average level of growth performance has dramatically changed in response to the genetic selection for leaner pigs. Subsequently, new data are required to update the effect of the gender on the dynamic of growth and feed intake. Some recent studies were carried out on different genders but they only focused on two genders or presented only average growth performance. In addition, the antagonistic behaviour and mounts seem to be more frequently observed in males than in barrows or gilts (Cronin et *al*., 2003), which can result in a deteriorated body condition.

In such a context, the present experimental program was carried out to characterize the growth performance, the behaviour and body condition of boars in comparison with barrows and gilts, when group-housed and fed ad libitum.

1. MATERIALS AND METHODS

1.1. Experimental design

The experiment was carried out in the experimental unit of IFIP (Romillé, 35, France) on crossbred pigs, progeny of Large White x Landrace sows inseminated with semen of crossbred Large White x Pietrain sires. The pigs were studied from 63 d of age until slaughter, above 110 kg BW. The performances of growing boars were compared to those of barrows and gilts when fed ad libitum during the post-weaning and the fattening periods. Behaviour and body condition were characterised during the fattening period. Pigs of different genders were group-housed separately both during the post-weaning period (from 28 to 62 d of age) and during the fattening period. Care and use of animals were performed according to the certificate of Authorization to Experiment on Living Animals, n°35-07 (delivered by the Ministry of Agriculture to N. Quiniou).

1.2. Management of pigs

At 5 days of age, only one third of males were castrated within each litter. Boars were allocated to the castrated group or to the non-castrated group on the basis of their birth weight. At weaning, all animals were moved to a post-weaning unit and group-housed separately (8 or 9 pigs/pen). Animals were allotted in the pens on the basis of their sex, their dam, and their BW at weaning. At 62 d of age, 30 pigs per gender were moved to one fattening room and group-housed separately (6 pigs/pen). Five replications of three pens were prepared. Within each replication, pigs were chosen in order to get

littermates, or half- brothers/sisters according to the sire, of the three genders in the pens and an average initial BW per pen similar for the three genders. The pigs were fed ad libitum until slaughter. All pigs were slaughtered on the same day.

1.3. Housing and feeding conditions

All pigs were bred in dynamic ventilated fattening rooms on total slatted, concrete floor. The space allowance was 0.35 and 0.65 m²/pig during post-weaning and fattening periods, respectively. Pigs had a free access to water and to a pelleted dry diet in a double space feed dispenser. During the post-weaning period, pigs were fed with a commercial diet. During the fattening period, a single diet was used, which net energy (**NE**) content was 9.7 MJ/kg. Its standardized digestible lysine (**LYSd**) content to NE ratio was fixed at 0.89 g/MJ and other digestible amino acids to LYSd ratio were adjusted according to the ideal protein concept, i.e. 30% for methionine, 60% for methionine + cystine, 65% for threonine and 19% for tryptophan (Table 1).

1.4. Measurements

The pigs were individually weighed at weaning (28 d of age), the day before the end of the post-weaning period (62 d) after a 16-h feed deprivation, at 21-d intervals until 100 kg and thereafter at 7-d intervals until slaughter after 6-h fasting to calculate the average daily gain (**ADG**) over different periods. The feed intake per pen was recorded between each weighing and used to calculate the average daily feed intake (ADFI) and the feed conversion ratio (**FCR**). In case of death or any other problem, the pig removed from a pen was weighed. When the expected slaughter weight (minimum 110 kg BW) was achieved, the pigs were fasted at 8:00, weighed at 14:00 and transported 87 km to a commercial slaughter house at 17:00. They were all slaughtered at 8:00 on the next day after 24-h without any access to diet but an ad libitum access to water and a 15-h rest period before slaughter. Pigs were stunned with CO_2, exsanguinated and eviscerated. The hot carcass was weighed; it corresponded to both half-carcasses with feet and head but without the kidney fat and the tongue. The carcass lean meat content was estimated from the backfat depth measured between the 3rd and 4th last ribs (**F34**) and the *Longissimus dorsi* muscle depth between the 3rd and 4th last ribs (**M34**) obtained with a CGM invasive probe (Sydel, Lorient, France).

Pig behaviour was recorded during the fattening period using a simplified and instantaneous scan sampling technique. When the observer arrived in the room at 15:00, pigs were encouraged to stand and move. Observations started ten minutes later. Each pig inside each pen was observed 5 times, every 2-min. A first scan was performed on each pen and thereafter a second scan was performed again on each pen. The ethogram consisted of agonistic/positive behaviour, mounting, investigation and resting. No distinction was made between other behaviours. On the day following these observations, the pigs were inspected for lesions using a protocol similar to that developed in the welfare assessment tool Welfare Quality ® (2009). Lameness and lesions were categorised as described in Table 2. The skin lesions were counted for each animal on different body areas: ear, front, flanks, hind-quarters and legs, on both sides of the pig. The cumulated score corresponded to the sum of skin lesions observed pondered with a coefficient (Table 2). The observation sessions were repeated four times: 3, 6, 9 and 11 weeks after the arrival in the fattening room.

Table 1. Dietary characteristics (as fed).

Ingredients, g/kg		Calculated nutrient composition	
Wheat	586	Moisture, g	133
Barley	150	Crude protein, g	162
Wheat bran	30	Crude lysine, g	9.6
Soybean meal 48	175	Digestible lysine (LYSd), g[1]	8.6
Rapeseed oil	9.8	Crude fiber, g	33
Cane molasses	20	Ash, g	39
Lysine (50% content)	4.5	Calcium, g	7.3
MHA	0.6	Phosphorus, g	4.8
Threonine	0.9	Digestible phosphorus, g[2]	2.5
Salt	4	Ether extract, g	26
Calcium carbonate	10	Digestible energy, MJ	13.54
Bi calcium phosphate	5.1	Net energy (NE), MJ	9.71
Phytases	0.1	LYSd / NE, g/MJ	0.89
Vitamin and trace mineral mixture	4		

1. Standardised ideal digestibility.
2. Without endogenous phytases (INRA-AFZ tables, 2004).

Table 2: Lesion types and associated severity scores

Score	Meaning
Lameness	
0	Normal gait
1	Abnormal gait but still using all legs
2	Minimum weight bearing on one leg
3	Serious lameness
Lesion score	
1	Scratch or small wound (size under 2 cm)
5	Wound between 2 and 5 cm
16	Opened wound, size above 5 cm

1.5. Calculations and statistical analyses.

Growth performance were calculated over the whole period, i.e., post-weaning or fattening, and over the growing and the finishing periods (before/after 67 kg BW). Individual data were submitted to a multifactorial analysis of variance with the gender (**G**) and the replication (**R**) as the main effects and the pen as the experimental unit using the proc MIXED procedure of SAS (1998). A multifactorial analysis of variance was also performed in order to test the effect of the stage of growth and its interaction with the gender on the growth performance. Carcass traits were analysed with the hot carcass weight included in the statistical model as a covariate. Data recorded on a pen scale were analysed with G and R as main effects.

Data were used to assess the chronological increase of the average body weight (BW) and of the average cumulated feed intake from the beginning of the fattening period with age. These data were curve-fitted to characterise each gender in terms of BW and feed intake and used to model nutrient requirements using InraPorc software. In this growth model, ADG is described through a modified Gompertz function (van Milgen et al., 2008), of which parameters are the expected BW

at 63 days of age (BW63d), the age at which pigs reach 110 kg (age110) and a shape parameter (BGompertz) that describes the precocity of pigs (Brossard et al., 2009) (Equation below). The feed intake was described as a power function of BW. A calibration procedure was used that estimated statistically the model parameters of both growth and intake curves using algorithms provided by TPMath software.

BW(Age)=

$$110\times\left(\frac{110}{BW63}\right)^{\left\langle\frac{-\left\{e^{(-BGompertz\times(Age110-63))}-e^{(-BGompert\times(AGE-63))}\right\}}{(-1+e^{(-BGompertz\times(Age110-63))})}\right\rangle}$$

The variables used to describe the different components of the behaviour were expressed as a percentage of the observations performed per pen and per stage, after a log-transformation. An analysis of variance was performed with the sex and the stage of measurement as main effects and the pen as random effect (proc MIXED, SAS 1998). , Variables that were not normally distributed and lesion scores were analysed using a Kruskall-Wallis test. As far as seldom behaviour was concerned, all the observations performed at the four stages of observation were gathered in order to quantify the sex effect.

Within each stage, bursitis, tail status and lameness frequencies were analysed using a Fisher's test. For tail status, the classes 1 and 2 were combined. Similarly for lameness, the classes 2 and 3 were combined.

Table 3: Effect of the gender on growth performance in Exp. 1 and Exp. 2.

Physiological stage	Post-weaning					Growing-finishing				
Gender[1]	Barrow	Male	Gilt	RSD	Statistics[1]	Barrow	Male	Gilt	RSD	Statistics[1]
Individual data[2]										
Observations, No.	63	63	62			30	30	30		
Body weight, kg										
At28 d of age	9.3	9.3	9.3	0.5		-	-	-		
At 43 d of age	14.3	14.4	14.3	0.6		-	-	-		
At 63 d of age	25.4	25.2	25.2	1.0		25	25	25	1	
At 105 d of age	-	-	-			71^{a}	68^{b}	67^{b}	2	G***
At 152 d of age	-	-	-			117.3^{a}	120.5^{b}	113.3^{b}	7.4	G***
ADG, g/d[3]	459	454	453	25		1032^{a}	1069^{a}	988^{b}	75	G***
First half	330	338	333	31		1086^{a}	1002^{b}	979^{b}	99	G***
Second half	556	541	544	40		984^{a}	1128^{b}	995^{a}		G×P***
Results on a pen basis										
Observations, No.	7	7	7			5	5	5		
ADFI, kg/d[4]	0.76	0.72	0.74	0.03		2.70^{a}	2.41^{b}	2.45^{b}	0.07	G***
First half	0.35	0.34	0.36	0.02		2.29^{a}	1.95^{a}	2.03^{b}	0.07	G**
Second half	1.05	1.00	1.01	0.04		3.07^{a}	2.83^{b}	2.82^{b}		P***
FCR, kg/kg[4]	1.61	1.55	1.61	0.07		2.62^{a}	2.26^{b}	2.48^{c}	0.03	G***
First half	0.99	0.94	1.02	0.04	$G^{0.08}$	2.11^{a}	1.94^{b}	2.07^{a}	0.08	G**
Second half	1.90	1.85	1.90	0.12		3.12^{a}	2.51^{b}	2.84^{c}		P***, G×P$^{0.07}$

1. Gender: B= barrows, M= males or boars, G= gilts.

2. Model 1: variance analysis with the gender (G) and the replication (R) as the main effects, and the pen as the experimental unit. Within a row, means without a common superscript differ (P < 0.05).

3. During the post-weaning period: first half =28-42 d, second half=43-63 d; during the fattening period: first half= 63-104 d, second half= 105-152 d.

4. Model 2: split plot analysis of variance with the gender, the replication, the physiological status and interactions as the main effects and the pen considered as the experimental unit.

2. RESULTS

2.1. Post-weaning period

The ADG was not significantly influenced by the gender, whichever the period considered (). Despite lower values of ADFI and G:F obtained in boars, the difference was not significant with those obtained in barrows and gilts.

2.2. Fattening period

Growth performance. The ADG was significantly influenced by the gender. The lowest growth rate was observed in gilts all along the fattening period. At slaughter, they were subsequently lighter (113 kg) than other genders (119 kg on average). No difference on ADG was induced by castration over the total fattening period. Yet, a significant interaction between the gender and the stage of growth was observed (P<0.001). Indeed, barrow ADG was significantly higher during the growing period, whereas the opposite was observed during the fattening period. The ADFI was 11% lower in males when compared to barrows, whereas no difference was observed between boars and gilts (2.43 kg/d on average). The G:F ratio was significantly affected by the gender. Taking into account differences observed on both ADG and ADFI, the G:F of gilts was intermediate between those of castrated or entire males.

Carcass traits. A lower carcass yield was obtained in boars (78.6%) than in barrows and gilts (79.9% on average). Even if the BW of boars was 4 kg heavier at slaughter, the difference between their carcass weight and those of gilts and barrows was only 1 kg. The backfat thickness measured at slaughter was lower in boars and gilts than in barrows (Table 3), whereas the muscle thickness was not significantly influenced by the gender. Such results would be consistent with a reduced carcass fatness in entire males when compared to castrated ones.

Table 4: Effect of the gender on carcass characteristics

Gender[1]	B	M	G	RSD	Statistics[1]
Observations, No.	30	30	30		
Carcass weight, kg	94[a]	95[a]	90[b]	6	G*[2]
Carcass yield, %[2]	80.1	78.6[b]	79.6[a]	1.2	G***, W***
G34, mm[2]	19[a]	14[b]	15[b]	3	G***, W***
M34, mm[2]	61	59	60	4	$G^{0.07}$, W*
Lean content, %	57.0	60.5	60.1		

1. See Table 3.
2. The warm carcass weight was introduced in Model 1 as a covariate.

Growth profile. Average BW and cumulated feed intake from the beginning of the trial were used to characterise the growth and feed intake curves for each gender. From data indicated in Table 5, were used to calibrate a Gompertz function and a power functions, respectively. The corresponding parameters (Table 6) were used in the InraPorc software in order to assess the nutritional requirements for the three genders. The evolution of the LYSd requirement per MJ NE with BW is illustrated in Figure 1.

Table 5: Evolution of BW and feed intake with age.

			Feed intake, g	
Gender	Age (d)	BW (kg)	ADFI, g/d	cumulated, g
Boars	62.3	25.4		0
	83.3	44.6	1619	34006
	104.3	67.5	2275	81776
	126.3	91.9	2650	140079
	140.3	109.0	3059	182903
	145.3	114.7	2850	197155
	151.3	120.5	2943	214813
Gilts	62.5	25.4		0
	83.5	44.0	1689	35476
	104.5	66.5	2369	85218
	126.5	89.0	2713	144895
	140.5	103.8	3036	187393
	145.5	108.2	2619	200486
	151.5	113.3	2905	217918
Barrows	62.4	25.5		0
	83.4	47.7	1897	39846
	104.4	71.1	2690	96333
	126.4	94.8	3045	163333
	140.4	109.1	3239	208683
	145.4	113.5	2844	222902
	151.4	117.3	2947	240584

Behaviour. Whatever the stage of growth considered, the barrows had a lower level of activity than boars and gilts. Even if boars exhibited more social behaviour and gilts more exploration, no significant difference between genders was obtained on this type of activity. No mounting behaviour was observed in barrows. This behaviour was mainly observed in boars but also in gilts (P<0.05). Mounting behaviour was observed during the four observation sessions but its frequency was rather variable (1.4, 0.6, 1.4 and 0.8% during sessions performed on week 3, 6, 9 and 11, P>0.10).

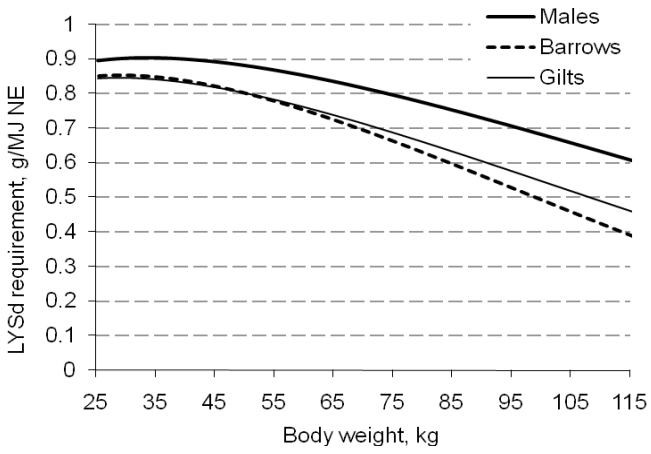

Figure 1: Evolution of the digestible lysine requirement (g/MJ NE) with BW for the three genders, using InraPorc software.

Table 6: Growth curve parameters.

Gender	B	M	G
Growth curve[1]			
Initial age, d	62	62	63
BW at initial age, kg	25.5	25.4	25.4
Age at 110 kg, d	142	141	148
Bgompertz	0.0206	0.0149	0.0166
Protein deposition, g/d[2]	157	174	154
Intake curve: a.PV[b]			
a, g	445	284	332
b	0.43	0.51	0.48

1. Gompertz model.
2. Average value over the BW range considered.

Table 7: Frequency of the different behaviours (%).

Gender	B	M	G	RSD	Stat.
Observations, No.	30	30	30		
Pens, No.	5	5	5		
Social behaviour[1]	16.6	21.1	19.6	6.8	$G^{0.08}$ $S^{0.06}$
Positive[2]	14.1	17.1	18.1		$G^{0.07}$ S*
Negative[2]	3.2	4.9	2.3		-
Mount[2]	0[a]	0.8[b]	0.2[ab]		G*
Investigation[1]	18.0[a]	22.9[b]	27.0[b]	7.0	G** S**
Resting[2]	37.8[a]	30.8[b]	25.0[b]		G**
Others[2]	25.2	22.7	26.8		

1. Variance analysis with the gender (G) and the observation session S as main effects.
2. Kruskal Wallis test.

Body condition. Lesions were scored at a higher level in boars than in barrows and gilts (31.5 vs. 23.2 and 24.1, respectively). The difference between genders was significant on weeks 3 and 6, but not on weeks 9 and 11 (Figure 2). During the trial, the variation of lesion scores with time depended on the gender. It was significantly higher in barrows on week 3 than afterwards. In contrast, lesion scores remained relatively constant in gilts. In boars, lesions were more frequent (P<0.05) on weeks 3 and 6 (40 and 36, respectively) than on weeks 9 and 11 (26 and 24, respectively).

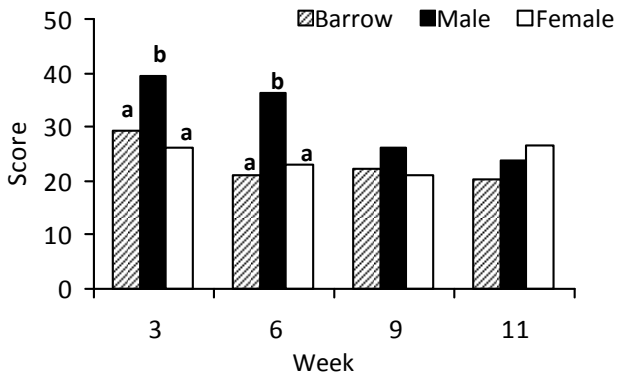

Figure 2 : Evolution of the average skin lesion score during the fattening period in the three genders.

Table 8**:** Effect of the gender on body condition scored (% pigs per score).

Gender	B		M		G		Stat.[1]
Observations, No.	30		30		30		
Bursitis, %[2]							
Score 0	38		57		42		
Score 1	46		35		53		ns
Score 2	16		8		5		
Tail biting, %[2]							
Score 0	84		85		93		$S^{0.10}$
Scores 1 and 2	16		15		7		
Lameness, % (week 11)							
Score 0	70	a	97	b	90	ab	
Score 1	20		3		7		S*
Scores 2 and 3	10		0		3		

1. Fisher's test.
2. Frequencies calculated from all observations performed.

The frequency of social behaviour increased over time from 17% on week 3 to 22% on weeks 6, 9 and 11 (P<0.05). Simultaneously, less exploration of the pen was observed during the second half of the fattening period (27% on weeks 3 and 6 vs 21% on weeks 9 and 11, P<0.01).

The average score obtained for bursitis was not significantly different between genders, even if the score 1 was more frequently obtained in barrows, whatever the week considered. The scores 1 and 2 used for tail biting were gathered as this later notation occurred only for one boar. Intact tails were more often observed in gilts than in entire and castrated males, but the difference was not significant. No effect of the gender was observed on the lameness frequency on weeks 3, 6 and 9. On the opposite, at the end of the fattening period (week 11), more leg weakness (score 1 and 2) were observed in barrows than in boars, frequency in gilts being intermediate (P<0.05).

3. DISCUSSION

Castration induced an increase of both ADFI and FCR, which is in agreement with literature data. In our study, the ADFI and the FCR were 12 and 16% higher, respectively, in barrows than in boars. Such values are intermediate between the strongest and the weakest consequences of castration reported in literature either from different breeds or over different BW ranges. When only data obtained over a similar BW are considered, it appears that the ADFI increment in barrows is less important whereas the FCR increment is more important in our study (Figure 3). Indeed, according to Xue et al. (1995), Zeng et al. (2002) and Pauly et al. (2008), castration was associated with an increased ADFI and with an increased ADG, while no difference of ADG was observed in our trial.

An increased difference of FCR in our study would be consistent with a much more important difference of body fatness in the present trial when compared to literature. Yet, it is difficult to compare the effect of castration on carcass leanness obtained in the previous studies as lean content was not measured but assessed from indirect calculations. However, everyone agreed about the higher body fatness of barrows.

The ADFI of males was close to that of gilts, in agreement with Hansen and Lewis (1993) and Noblet et al. (1994). In contrast, the gilts presented a slightly lower ADG, hence a higher FCR. With regard to these differences, gilt carcass leanness should be intermediate between barrows and boars (Hansen and Lewis, 1993; Noblet et al., 1994). Indeed, according to our data, the backfat thickness was numerically higher in gilts than in boars, but the difference was not significant.

A lower carcass yield in boars was already reported by Hansen and Lewis (1993), Noblet et al. (1994), Quiniou et al. (1996) and Zeng et al. (2002). This result was explained by the contribution of offals, especially the reproductive tract, to BW at slaughter (Quiniou and Noblet, 1995).

Different LYSd requirement were estimated for the three genders, in agreement with Noblet and Quiniou (1999). Over the fattening period, the LYSd requirement per unit of NE intake decreases with increased BW, but it remains higher all over the BW range (25-115 kg) for males than for barrows and gilts. During the growing period, similar LYSd was simulated for barrows and gilts, which is consistent with the similar FCR obtained for these genders. On the opposite, during the finishing period, the LYSd requirement decreased more rapidly for barrows than for gilts, resulting from the increased fatness of body gain and FCR in barrows over this BW range (Noblet et al., 1994). As illustrated in Figure 1, the boar LYSd requirement would be higher than the LYSd/NE content in the diet supplied during the trial (0.89 g/MJ). According to Quiniou et al. (2009), a shortage of amino acid over a short period of time at the beginning of the growing period, followed by amino acid supplies in excess, did not influence the overall performance obtained until slaughter. Yet, this deficiency might explain the significant interaction between the gender and the physiological stage (Table 3).

Results obtained with the instantaneous and simplified method to describe the behaviours performed by the pigs when they are active are consistent with those obtained through continuous observations over a longer period (Courboulay et al., 2008). A lower frequency was obtained for resting behaviour than in literature, due to the method used; however it differed significantly amongst genders. After the disturbance that occurred before the beginning of the observation sessions, the level of activity remained high over a longer duration for males and gilts than for barrows. It was associated with more frequent social behaviour performed by these two genders, especially toward negative behaviour for males. Giersing et al. (2006) reported a much more marked agonistic behaviour in males than in barrows and gilts.

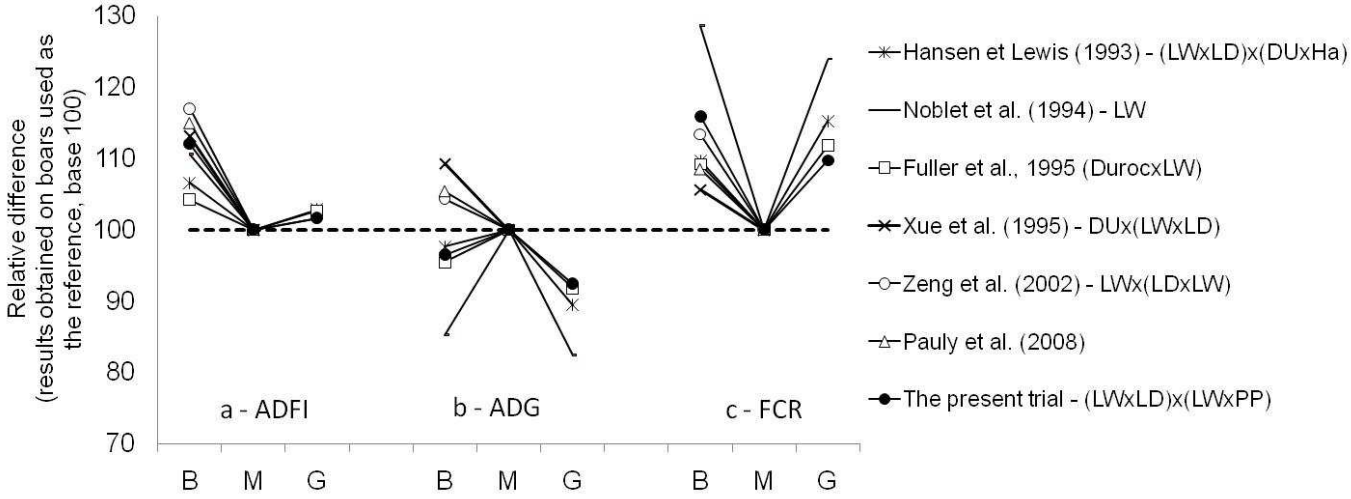

Figure 3 : A review of difference of growth performance between genders (base 100: male) from literature data obtained over a BW range close to BW range in the present study (●).

Mounting behaviour was mainly observed on males, but also sometimes in gilts. Mount was performed by group-housed males through out the fattening period, in agreement with Boyle and Björklund (2007). When males were mixed with gilts, these authors observed a decreased frequency of mounting behaviour.

The higher frequency of social behaviour was associated with a higher lesion score in males than in other genders, at least at the beginning of the fattening period. Aggressiveness decreased with age according to Rydhmer et al. (2006). It took probably more time for males to organise the hierarchy between pen-mates than for barrows and gilts. But, as soon as the hierarchy was established, the lesion score remained stable, in agreement with previous observations performed on gilts and barrows by Courboulay (2005).

Tail lesions were twice more frequent in barrows and males than in gilts. This result is in agreement with EFSA (2007a), who reported a significant effect of the gender on tail biting. No effect of castration was observed on this lesion.

More frequent agonistic and mounting behaviours were expected to be associated with increased leg weakness (Rydhmer et al., 2006). However, from weeks 3 to 9, no significant effect of the gender was observed on lameness occurrence. During the last observation session, no problem was observed in males, whereas 10% of barrows exhibited lameness. Lameness is often associated with high ADG and high carcass leanness (EFSA, 2007b). Yet, even if the AGD was similar over all the growth period, higher ADG were observed for barrows during the growing phase. An intensive growth at the beginning of the fattening period may have contributed to alter leg quality. Then, it would explain the leg weakness in barrows at the end of the fattening period, even when they performed no mounting activity. More leg problems were also associated with more bursitis scored 2 in barrows.

CONCLUSION

The present study was carried out in order to bring up-to-date data on growth performance of barrows, males and gilts and to obtain new information about their behaviour and body condition when group-housed in small pens and fed ad libitum. Additional experiments need to be run in order to get information under other housing and feeding conditions, in other words in the various on field breeding conditions.

According to differences observed on growth performance, the dietary amino acid level should be increased in order to meet the male requirement. The digestible lysine by MJ of net energy intake should increase by around +0.1 g, but other amino acids as well in agreement with the ideal protein concept. However, a higher dietary nutrient content will result in more expensive feed cost per pig, and it will be performed only under a context of cheap feedstuffs and of good payment of carcasses.

No major effect of castration was observed on the behaviour and body condition. However, solutions have to be proposed in order to reduce agonistic behaviours and lesions after mixing at the beginning of the fattening period. Further experiments are necessary to explore the behaviour of male pigs when they are older at slaughter or when males from one given pen are not slaughtered on the same day.

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