

A comparison of lactating performance of Creole and Large White sows in a tropical humid climate: preliminary results.

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Abstract: A total of one hundred and twenty seven lactations were used to study the effect of genotype (Creole vs. Large White) on lactating performance. This experiment was conducted in Guadeloupe (F.W.I., 16° Lat. N., 61° Long. W) between June 2001 and April 2003. Over a 28-d lactation length, average daily feed intake was significantly lower ($P < 0.01$) in Creole (CR) than in Large White (LW) sows when it was expressed in kilogram or in gram per kilogram of metabolic body weight (3.1 vs. 4.3 kg.d⁻¹ and 73 vs. 80 g. d⁻¹. kg^{0.75}). After farrowing, first parity CR sows were 26 kg lighter compared to primiparous LW sows. This difference was accentuated in multiparous sows (i.e., -95 kg). On average, body weight (BW) loss during lactation was not affected by the genotype. However, the backfat thickness loss was significantly higher ($P < 0.001$) in CR than in LW sows (16 vs. 30 mm). Litter size at birth and at weaning were significantly reduced ($P < 0.01$) in CR than in LW sows (8.7 vs. 10.3 and 7.7 vs. 9.1, respectively). The piglet BW gain and mean BW at weaning were significantly lower ($P < 0.01$) in CR compared to LW sows (190 vs. 208 g/d, and 6.35 vs. 7.06 kg respectively). Daily feed intake pattern during lactation differed between LW and CR sows. CR daily feed intake increased constantly whereas LW daily consumption increased rapidly during the 1st wk and remained around 4.8 kg over the last 3 wk of lactation. In conclusion, LW sows have better lactating performance than CR sows.

Key words : Large White; Creole; Sow; Lactation; Tropical climate;

Introduction: The pig livestock in Guadeloupe (F.W.I., 16° Lat. N., 61° Long. W) is constituted of two mains populations. The exotic breeds (Large White and Large-White × Landrace) imported from France are reared in commercial farms and represents about 60 to 70 % of the total population size. The Creole pig (CR), the indigenous breed of Guadeloupe, generally reared in family farms using natural resources and is described as resulting from a cross between Iberian stocks introduced into West Indies as early the 16th century and French, English, and American breeds introduced throughout centuries (Canope et Raynaud, 1981). As a result, CR is today a highly polymorphic pigs population with a high variation of color patterns, size and production level (Canope, 1982; Canope et Raynaud, 1981). According to these latter studies, CR sows were characterized by an early sexual maturity and a lower prolificacy. However, the CR pig is known for its hardiness and adaptation to harsh environment. Little information is available on Creole sow performance during the lactation period.

The objective of this study was to evaluate the effect of breed (CR vs. LW) and parity on performance and feeding behavior of lactating sows and their litters. The present paper will focus on performance of sows.

Materials and methods: This study was conducted at the experimental facilities of INRA in Guadeloupe (West French Indies, lat 16°N, long 61°W) and involved a total of 57 sows (22 and 37 CR and LW sows, respectively). Sows were reared in mixed contemporary groups of eight to ten animals. The data covered the period between June 2001 and April 2003; a total of 143 lactations was studied. Fourteen to ten days before farrowing, sows were moved to an open front farrowing room equipped with pens on a metal slatted floor and infrared lights to provide supplemental heat for the piglets. During the first wk of lactation, the feed allowance was progressively increased until d 5. The lactation diet was based on corn, wheat middling, soybean and contained 17.5% crude protein and 14.2 MJ of DE/kg. Lactating sows had free access to water via low-pressure nipple drinker. Litter size was standardized within breed by cross-fostering within 48 h after birth. Creep feed (15.3 MJ of DE/kg, 20 % crude protein) was provided to the piglets after d 21 of lactation. The piglets were weaned at 4 weeks of age.

At farrowing and at weaning, sows backfat thickness and body weight (BW) were measured. Sow's daily feed intake was determined as the difference between feed allowance and refusals collected on the next morning. Piglets were individually weighed every 7 days from birth to weaning. Every week, one sample of feed was taken for DM and successive samples were pooled for each replicate for further analysis.

The effects of breed (CR vs. LW), parity (primiparous vs. multiparous), their interaction, and the effect of group were tested according to an analysis of variance (GLM procedure, SAS Inst. Inc., Cary., NC, 1990).

Results: As presented in Table 1, average daily feed intake (ADFI) was lower ($P < 0.001$) in CR than in LW sows when it was expressed in kilogram (3.1 vs. 4.3 $\text{kg}\cdot\text{d}^{-1}$) or in gram per kilogram of metabolic BW (73 vs. 80 $\text{g}\cdot\text{d}^{-1}\cdot\text{kg}^{0.75}$). The patterns of daily feed intake of LW and CR sows over a 28-d lactation are presented in the Figure 1. At the beginning of lactation period, the sows were restrictively fed, so that ADFI increased similarly for both breeds until d 3. In CR sows, ADFI remained constant between d 3 and d 6 and increased progressively between d 6 and d 25 ($+ 76$ g/d , $P < 0.05$). In contrast, ADFI increased between d 3 and d 8 ($+ 380$ g/d , $P < 0.05$) and plateaued from d 8 around 4.8 kg/d in LW sows.

The BW at farrowing was significantly higher ($P < 0.001$) and backfat thickness at farrowing was lower ($P < 0.001$) in LW than CR sows (218 vs. 157 kg and 16 vs. 29 mm , respectively). At farrowing, the BW difference between breeds was accentuated in multiparous sows than primiparous sows (95 vs. 26 kg). Breed did not affect the BW during lactation. However the breed to parity interaction was significant: the primiparous Creole sows lost more BW than multiparous sows (9.9 vs. 4.5% of BW at farrowing; $P < 0.01$). The backfat thickness loss was higher ($P < 0.001$) in CR than in LW sows (3.7 vs. 1.8 mm).

Litter size at birth, at day 1 (i.e. after cross-fostering) and at weaning were significantly reduced ($P < 0.01$) in CR than in LW sows (8.8 vs. 10.2 , and 7.7 vs. 9.1 piglets, respectively). An interaction between breed and parity was found for litter size at weaning ($P < 0.05$); the litter size at weaning was reduced in primiparous than in multiparous CR sows ($- 1.6$ piglets, $P < 0.05$) whereas the effect of parity in LW sows was not significant. The average piglet BW at birth and at weaning were significantly lower ($P < 0.01$) in CR sows than in LW sows (1.03 vs. 1.38 and 6.34 vs. 7.06 kg , respectively). Moreover, irrespective to the parity number, the piglet BW gain was higher ($P < 0.05$) in LW sows than in CR sows (210 vs. 190 g/d).

Discussion: The voluntary feed intake was lower in CR than LW sows especially at the beginning of the lactation period. This reduced ADFI could be related to the lower energy

requirements for maintenance and production in CR sows. Moreover, as reviewed by O'Grady et al. (1985), the lactation feed intake was related to the condition score of sows at farrowing. Dourmad (1991) found a negative relationship between backfat thickness at farrowing and feed intake especially in the beginning of lactation. These results suggest that the decrease of ADFI in CR sows was related to their high adiposity at farrowing.

According to Canope (1982), the CR sows was less prolific than LW ones. However, this genotype difference between both breeds is accentuated in our study in relation to genetic improvement of prolificity of LW sows. In addition, the reduction daily BW gain in CR piglets is similar to the value reported by Canope (1982) (-15 vs. -25 g.d⁻¹.piglet⁻¹). According to Noblet and Etienne (1989), milk production can be estimated from piglet BW gain and litter size. From our results, it can be calculated that milk production is reduced of about 1.4 kg/d in CR sows compared to LW sows. The decrease in the ability of sows to produce milk and (or) the decrease of suckling demand could explain the reduction of milk yield in CR sows. On the one hand, as milk production depends on litter size (Esley, 1971), the lower milk production in CR sows could be primarily attributed to a lower number of nursing piglets. On the other hand, as reported by King et al. (1997), piglet BW affects the milk yield: the heavier piglets are more efficient for obtaining milk during suckling. Consequently, the lower milk production in CR sows could be also related to their smaller piglets.

Conclusion: The present study demonstrates the lower lactating performance when CR sows are compared to LW sows. Further studies are required to know whatever the difference in milk production observed between CR and LW sows is the results of maternal and / or piglet influences.

Reference List

- Canope, I. and Y. Raynaud.** 1981. Etude comparative des performances de reproduction, d'engraissement et de carcasse des porcs Créoles et large White en Guadeloupe. Journée des Recherches Porcines en France 13:307-316.
- Canope, I.** 1982. Etude des interactions entre le type génétique et le régime alimentaire chez le porc en milieu tropical humide. PhD Institut National Polytechnique de Toulouse.
- Ourmad, J. Y.** 1991. Effect of feeding level in the gilt during pregnancy on voluntary feed intake during lactation and changes in body composition during gestation and lactation. 1991. Livest.Prod.Sci. 27:309-319.
- Esley F.W.H.** 1971. Nutrition and lactation in the sow. In IR. Falconer Ed., Lactation, 393-411. Butterworths, London.
- King, R.H., B.P. Mullan, F.R. Dunshea, and H. Dove.** 1997. The influence of piglet body weight on milk production of sows. Livest.Prod.Sci. 47:169-174.
- Noblet, J. and M. Etienne.** 1989. Estimation of sow milk nutrient output. J. Anim. Sci. 67:3352-3359.
- O'Grady, J.F, Lynch, P.B. and Kearney, P.A.** 1985. Voluntary feed intake by lactating sows. Livset.Prod.Sci. 12:355-365.
- SAS.** 1990. SAS/STAT User's Guide (version 6.4th Ed.). SAS Inst. Cary, NC.

Table 1 Effect of breed and parity on sow performance over a 28-d lactation (Least squares means).

Item	Breed				RSD ^a	Statistical analysis ^b
	Creole		Large White			
	Primiparous	Multiparous	Primiparous	Multiparous		
No. of sows	19	41	14	53		
Parity	1.0	3.0	1.0	4.6		
Lactation length	27.8	28.2	26.9	27.9	1.9	
Daily feed intake						
kg/d	3.16	3.01	4.29	4.39	0.63	B**, G**
gk ^{0.75}	76.8	69.1	92.1	68.7	14.8	B**, P**, B×P*
Body weight						
After farrowing, kg	147	167	173	262	27	B**, P**, B×P**, G**
Loss, kg	5	17	11	11	10	P**, B×P*, G**
Loss, %	4.5	9.8	5.8	4.0	5.3	
Backfat thickness,						
After farrowing	27.0	31.2	14.0	18.2	5.1	B**, P**
Loss	3.4	4.1	1.8	1.9	2.5	B**, G**
Litter size						
At birth	8.1	9.3	9.8	10.8	2.5	B**, P*, G*
At d 1 ^d	8.2	9.5	9.7	10.7	1.9	B**, P**, G**
At weaning	6.9	8.5	9.5	8.7	1.9	B**, B×P*, G**
Piglet BW, kg						
At Birth	1.01	1.04	1.43	1.33	0.20	B**
At weaning	6.35	6.34	7.03	7.09	1.08	B**
Piglet BW gain ^e , g/d	192	187	209	206	33	B*

^aRSD : Residual standard deviation.

^bFrom an Generalised Linear Model analysis including the effect of breed (B), parity (P), breed - parity interaction (B×P) and effect of contemporary group of sows (G), as fixed effects. Statistical significance: * $P < 0.05$, ** $P < 0.01$.

^cAverage Daily Feed Intake over a 28-d lactation.

^dAfter cross-fostering.

^eAdjusted by litter size at weaning

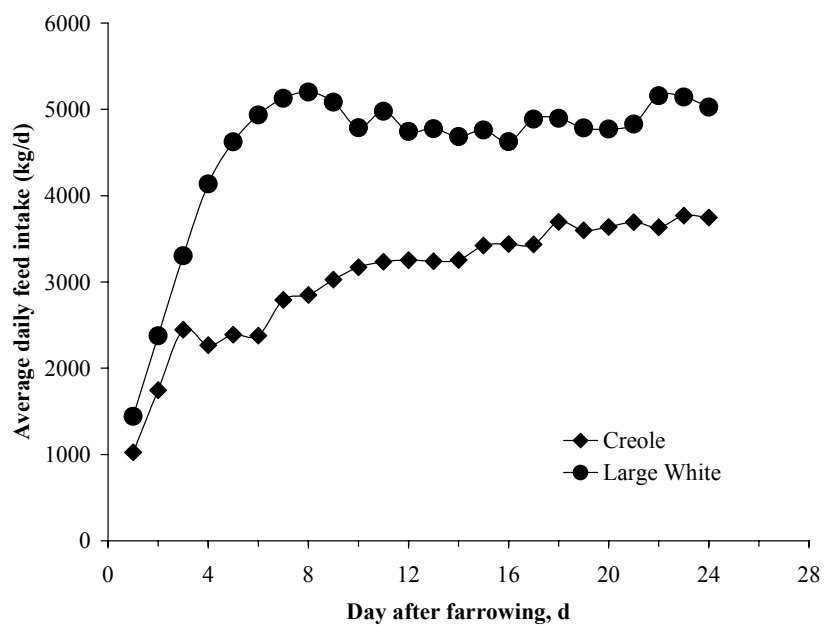


Figure 1: Effect of breed (Large White ●, Creole ◆) on daily feed intake during the lactation period.