

BREED AND SEX BIAS IN PIG CARCASS LEAN AND FAT CONTENT
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SUMMARY: At equal backfat thickness in the sacral region of the carcass, Yorkshire-Landrace x Hampshire and Yorkshire-Duroc x Yorkshire pigs showed leaner carcasses than the other crossbreeds used in commercial pig production in Cuba. Gilts had higher quality carcasses than barrows irrespective of fat thickness. Bias due to breed and sex is an important aspect to consider in pig carcass grading.

INTRODUCTION: There is information available concerning the effects of breed and sex on carcass composition in Cuba (Diéguez et al., 1987; Trujillo et al., 1987; Santana et al., 1989) and in other countries (Christian, 1980; Bereskin and Steele, 1986). Nevertheless, breed and sex bias related to commercial carcass composition has only been studied recently (Busk, 1989; Branscheid et al, 1989; Diestre et al, 1989). Kempster (1981) demonstrated that in pig carcass grading, lean yield is overestimated in some breeds and underestimated in others. In Cuba, there are five commercial crossbreeds used in pig production. At present, a pig carcass grading system is being elaborated in order to be introduced in the near future. It was, therefore, necessary to study the bias due to breed and sex in our pig population in order to know its further implication in carcass grading.

MATERIALS AND METHODS: Four-hundred and seventy pig carcasses, dressed and cut-out in standardized conditions were used. The sample included the five crossbreeds (YLxCC21, YxLxD, YLxH, YDxY and YLxD where Y=Yorkshire, L=Landrace, H=Hampshire, D=Duroc and CC21=new type of Cuban pig) used in Cuban commercial pig production and two sexes (barrows and gilts). Percentages lean, fat and bone in industrial cuts (ham, loin and shoulder) were adjusted to the population mean of backfat thickness in the sacral region of the carcass (SP=25mm) using the least-squares method (Harvey, 1987).

RESULTS AND DISCUSSION: Significant differences were found between crosses for percentage lean and fat in industrial cuts, whereas, percentage bone did not vary at the same value of backfat thickness (Table 1).

Table 1. Breed effect on carcass composition* (adjusted backfat thickness SP=25mm)

Crossbreed	n	Lean %		Fat %		Bone %	
		LSM	SE	LSM	SE	LSM	SE
YL x CC21	100	59.1b	0.2	25.3a	0.3	15.6bc	0.1
Y x L x D	85	58.6b	0.3	25.4a	0.3	15.9ac	0.2
YL x H	100	61.2a	0.3	23.2b	0.3	15.5b	0.1
YD x Y	84	60.4a	0.3	23.4b	0.3	16.2a	0.2
YL x D	101	58.6b	0.2	25.5a	0.3	15.7ab	0.1
Overall	470	59.6	0.1	24.6	0.1	15.8	0.1
PROB.		.0000		.0000		.0099	

* % in commercial cuts

A difference of 2.6% lean and 2.3% fat between extreme crosses (YLxH versus YxLxD and YLxD) was found. Sex effect was less important with female carcasses resulting in slightly higher quality than barrows (Table 2).

Table 2. Sex effect on carcass composition* (adjusted backfat thickness SP=25mm)

Carcass composition	Sexes			Probability
	Barrows	Gilts	Overall	
n	222	248	470	
Lean, %				
LSM	59.2	59.9	59.6	.0190
S.E.	0.2	0.2	0.1	
Fat, %				
LSM	24.9	24.3	24.6	.0366
S.E.	0.2	0.2	0.1	
Bone, %				
LSM	15.8	15.8	15.8	.8087
S.E.	0.1	0.1	0.1	

* Lean, fat and bone, % in industrial cuts (loin, ham and shoulder)

Biases due to breed and sex in the prediction of fat and lean yield from sacral backfat thickness are shown in Table 3. It is evident that there exists an underestimation of 1.6% carcass lean in the YLxH cross and an overestimation of 1.0% in both the rotational and the YLxD crosses. The contrary takes place when analyzing percentage fat prediction.

Table 3. Biases due to breed and sex in carcass lean and fat yield

	Lean	Fat
Population mean, %	59.6	24.5
Bias due to breed, %		
Leanest cross (YL x H)	+1.6	-1.4
Fattest cross (YxLxD and YLxD)	-1.0	+0.9
Bias due to sex, %		
Barrows	-0.4	+0.3
Gilts	+0.3	-0.3

Kempster (1981) reported a range of 2 to 3% units between the pigs from different breeding companies in Great Britain. Wood and Robinson (1989) found a significant breed effect in the prediction of percentage lean in the side from fat and muscle thickness so that using the pooled prediction equation would cause an underestimation of lean yield in very lean breeds (Pietrain). Pedersen (1988) reported that it is not possible to use the same prediction equation for genetically very different carcasses and that equations must be developed per breed. On the other side, the Canadian grading system (Anon., 1986) is based on a unique grading grid applied to a multibreed population. It is important to note that Cuban crossbreeds are not so extreme as is the case of other countries, for example Pietrains versus Large Whites in Great Britain.

CONCLUSIONS: Important differences between crosses were found for carcass composition at equal backfat thickness. Lean is underestimated for the leaner YLxH while it is overestimated for the fatter rotational and YLxD crosses when predicted from sacral backfat thickness. It is necessary to study how this finding can influence the prediction of lean yield from backfat thickness measured in the sacral region of the carcass in Cuban multibreed pig population.

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