

Testicular Characteristics of Purebred and Two-Breed Cross Boars of Duroc, Yorkshire, Landrace and Spot Breeding

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Story in Brief

One-hundred thirty-six purebred and two-breed cross boars of Duroc, Yorkshire, Landrace, and Spot breeding were evaluated during four seasons to determine the effect of breed on testicular characteristics. Boars were castrated at 218 ± 6 days of age and weighed 248.6 ± 28.6 lb. Crossbred boars were 14.7 lb heavier than the purebred boars. The right testes were separated into testes parenchymae, capita-corpora epididymides (C-C) and caude epididymides (C). The tissues were weighed, homogenized and total sperm numbers were determined microscopically using a hemocytometer. Testis, C-C and C weights were heavier for crossbred boars (291.5, 31.7 and 36.0 g, respectively) than for purebred boars (245.1, 27.9 and 31.2 g, respectively.) Total testicular sperm numbers were greater for crossbred than purebred boars (33.7×10^9 vs 25.4×10^9), and crossbred boars had more C-C sperm (28.9×10^9 vs 20.8×10^9) and more C sperm (53.6×10^9 vs 43.8×10^9) than purebred boars. These results indicate that breed influences testicular development and, at 7 months of age, crossbred boars have greater testicular and epididymidal weights and sperm numbers than purebred boars.

Introduction

Age at puberty determines when a boar can first be used in a breeding program. Numerous factors influence sexual development and libido of boars. Several studies have indicated that breed of boar influences pubertal development.

It is well documented that reproductive efficiency is increased in crossbred sows as compared to purebred sows. However, limited information is available on the influence of crossbreeding on reproductive performance of boars. The objectives of this study were to evaluate the influence of breed and crossbreeding on testicular development of boars.

Experimental Procedures

One-hundred thirty-six boars farrowed during the fall 1976, spring 1977, spring 1978 and fall 1978 seasons at the Stillwater Experimental Swine Farm were castrated at 218 ± 6 days of age. Purebred and two-breed cross boars were of Duroc, Yorkshire, Landrace and Spot breeding. The right testis from each boar was identified and placed on ice immediately following castration and dissected into parts within 36 hours after removal. The epididymides were separated from the testes and further divided into capita-corpora (head and body) and cauda (tail) epididymides. The two parts of the epididymides were weighed and homogenized in physiological saline with 0.05 percent Triton X-100 and 100 ppm merthiolate added (STM). The testes were weighed and 20-g samples of testicular parenchyma were also homogenized in STM. Sperm numbers were determined microscopically using a hemocytometer.

Results and Discussion

The two-breed crossbred boars were heavier than their purebred counterparts (Table 1). Over all breeds, the crossbred boars were 14.7 lb heavier than the purebreds (252.6 vs 237.9 lb, respectively). Similarly, testicular and epididymidal weights were also greater for crossbred than for purebred boars. Testes weights averaged 291.5 g for crossbred and 245.1 g for purebred boars. In general, the breed groups with heavier body weights tended to have heavier testes. Capita-corpora and caudal epididymidal weights were heavier for crossbred boars (31.7 and 36.0 g, respectively) when compared to purebred boars (27.9 and 31.2 g, respectively). The larger testes of the crossbred boars might, in part, be related to the increased growth rate of crossbred pigs and, hence, a larger total body size than purebred pigs at a given age.

Table 1: Testicular and epididymidal weights for purebred and crossbred boars of Duroc, Yorkshire, Landrace and Spot breeding.

Breed group	Number of boars	Body wt (lb)	Testis wt (g)	Caput-corporus wt (g)	Cauda wt (g)
Duroc (D)	13	248	229.5	28.8	33.4
Yorkshire (Y)	10	226	235.5	26.3	29.9
Landrace (L)	9	233	284.4	29.0	34.6
Spot (S)	12	239	240.4	27.4	27.3
LXS	14	248	269.9	27.9	32.7
DXL	17	250	272.3	29.5	36.2
YXL	14	240	293.4	30.3	32.8
DXS	16	254	287.2	31.7	36.6
YXS	16	266	319.4	33.7	35.6
DXY	15	258	306.4	36.8	41.4
Crossbred	92	252.6	291.5	31.7	36.0
Purebred	44	237.9	245.1	27.9	31.2
Crossbred-purebred		14.7*	46.4**	3.8**	4.8**

*P<.05

**P<.01

Crossbred boars had more testicular, capita-corpora and caudal epididymidal sperm than purebred boars (Table 2). In general, those breed groups with greater testicular sperm numbers tended to have greater epididymidal sperm numbers. Total caudal sperm ranged from 30.2 to 64.0 billion. Although caudal sperm numbers are affected by ejaculation frequency, this wide range in caudal sperm suggests that these boars differ in the rate of sperm cell formation and indicates possible differences in age at puberty.

This study suggests that breed of boar influences testicular development near the time of puberty, and at 7 months of age crossbred boars have greater testicular and epididymidal weights and sperm numbers than purebred boars. Although these breed differences exist in boars near the time of puberty, the influence of breed on testes function in mature boars is not known.

Table 2. Testicular and epididymidal sperm numbers for purebred and crossbred boars of Duroc, Yorkshire, Landrace and Spot breeding.

Breed group	Total testicular sperm(x10 ⁹)	Total caput-corpora sperm(x10 ⁹)	Total caudal sperm(x10 ⁹)
Duroc (D)	21.9	19.4	49.9
Yorkshire (Y)	23.9	15.7	30.2
Landrace (L)	29.8	25.1	56.3
Spot (S)	27.2	23.1	39.0
LXS	28.5	27.0	46.6
DXL	32.4	22.1	47.7
YXL	35.2	30.4	48.6
DXS	31.8	30.6	55.8
YXS	34.5	32.5	58.7
DXY	39.9	31.6	64.0
Crossbred	33.7	28.9	53.6
Purebred	25.4	20.8	43.8
Crossbred-purebred	8.3**	8.1*	9.8*

*P<.05

**P<.01