

Scrotal circumference, body weight, puberty and seminal characteristics in 1/2 Brahman x 1/4 Brown Swiss x 1/4 native crossbred young bulls.⁽¹⁾

Circunferencia scrotal, peso corporal, pubertad y características seminales de toretes 1/2 Brahman x 1/4 Pardo Suizo x 1/4 mestizo indefinido.

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Abstract

Scrotal circumference (SC), body weight (BW), age of puberty (P) and seminal characteristics were investigated in 19 1/2 Brahman x 1/4 Brown Swiss x 1/4 native crossbred young bulls. All bulls were evaluated at monthly intervals from 8 through 24 months of age. P, BW, and SC were 16.2±1.39 mo, 218.5±30.3 Kg and 23.5± 1.93 cm respectively. As age and BW increased SC increased (P<.01). The incidence of sperm abnormalities decreased (P<.01) as SC increased. The SC was correlated positively with age (r= .92; P< .01), BW (r= .94; P<.01) ejaculated volume (r=.55; (r=.69; P<.01), sperm concentration (r=.54; P<.01), progressive motility (r= .69; P<.01) and % normal sperm (r= -.65; P<.01) and negatively with % abnormal sperm (r= .65; P<.01).

Key words: Crossbred bulls, puberty, testicular development.

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Resumen

En 19 toretes mestizos 1/2 Brahman x 1/4 Pardo Suizo x 1/4 mestizo indefinido se determinó la edad (E), peso corporal (PC), y circunferencia escrotal (SC) a la pubertad. Se evaluó la influencia de la edad y el peso corporal sobre la SC y el efecto del SC sobre las características seminales y el % de espermios anormales después de la pubertad. Los animales fueron evaluados a intervalos mensuales y las muestras de semen colectadas por electroeyaculación desde los 8 hasta los 24 meses de edad. La E, PC, y SC a la pubertad fue de $16,2 \pm 1.39$ meses, $218,5 \pm 30,3$ kg y $23,5 \pm 1,93$ cm respectivamente. La SC incrementó al aumentar el PC y E ($P < .01$). La incidencia de espermios anormales disminuyó al incrementar el PC (E). La SC se correlacionó positivamente con E ($r=0,92$; $P < .01$), PC ($r=0,94$ $P < .01$), volume eyaculado ($r=0,55$; $P < .01$), concentración espermática ($r=0,54$; $P < .01$), motilidad individual ($r=0,69$; $P < .01$) y % de espermios normales ($r=0,65$; $P < .01$) y negativamente con % de espermios anormales ($r=-0,65$; $P < .01$).

Palabras claves: toros mestizos, pubertad circunferencia escrotal.

Introduction

In Venezuela, crossbreeding to optimize average genetic merit and hybrid vigor, became a widely adopted practice to increase milk and beef production. The use of *Bos taurus* and *Bos indicus* bulls for breeding our native crossbred cows (animals with varying levels of inheritance from *Bos indicus*) had greatly increased the genetics base available to the producers. The use of a number of sire breed in the cattle industry emphasize the importance of defining the characteristics of reproductive potential of young sires. Selection of superior sires is desired for natural mating and artificial insemination.

Considerable research have been done on the potential, and semen production of young dairy and beef bulls (1,2,3,4,5,6, 7,10) and crossbred bulls (8,9,11,12) however, similar information on pubertal traits in young Zebu bulls and their crosses in tropical countries is scarce.

The objectives of this study were to characterize the changes associated with the onset of puberty including the relationship between age, body weight, scrotal circumference and seminal characteristics in 1/2 Brahman x 1/4 Brow Swiss x 1/4 Native crossbred young bulls under tropical grazing condition.

Materials and Methods

The 19 1/2 Brahman x 1/4 Brown Swiss x 1/4 Native crossbred (BRxBsxNC) young bulls used in this study belong to the government experimental station "El Guayabo", located in a dry tropical forest area, 27.8 °C mean temperature, bi-modal annual rainfall of 1798 mm and relative humidity of 79%. The males were evaluated at monthly intervals from 8 through 24 months of age. Body weight (BW) and scrotal circumference (SC) were measured before semen collection. Semen samples were obtained by electroejaculation. The volume ejaculate was recorded directly from the graduated collecting tube. Sperm concentration was determined with a hemacytometer. Total and individual progressive sperm motility was recorded.

Sperm abnormalities were evaluated by counting 200 sperms in smears stained with the Theriogenology Society morphology stain. The percentage of normal sperm was also recorded. Puberty was defined as the age at which a bull produced an ejaculate containing a minimum of 50×10^6 total spermatozoa with at least 10% progressive motility (13). The young bulls daily grazed on alemán grass (*Echinochloa polystachya*) and were given mineral licks. The data were analyzed using ANOVA and correlations among different traits were computed using standard procedures.

Results and Discussion

Puberal characteristics of BR x BS x NC young bulls are shown in Table 1

Table 1. Age, body weight, scrotal circumference (SC) and seminal characteristics at puberty in 19 1/2 BR x 1/4 BS x 1/4 NC young bulls.

	Mean	Range
Age (months)	16.6 ± 1.4	15 - 18
Body weight (kg)	218.5 ± 30.3	188 - 248
SC cm	23.6 ± 1.2	22 - 27
Semen vol (ml)	3.0 ± 0.2	2.8 - 3.2
Progressive motility (%)	27.0 ± 2.2	25 - 55
Sperm concent (10^6)	70.0 ± 11.0	59 - 117
Sperm abnormal (%)	70.0 ± 2.0	68 - 72

The age of puberty in this study compared with other reports (3,4,8); however, BW, SC and seminal characteristics were different. Postpubertal changes in age, BW, SC and seminal characteristics of BR x BS x NC young bulls are presented in Table 2.

Table 2. Age, body weight, scrotal circumference (SC) and seminal characteristics after puberty in 1/2 BR x 1/4 BS x 1/4 NC young bulls.

Age (mo)	No	Weight (kg)	SC (cm)	Vol (ml)	Seminal characteristics.		
					Concent (10 ⁶)	IM (%)	Abnormal (%)
18	19	260.0	26.5	3.0	280.2	35.8	30.0
		±16.9	±0.8	±1.2	±98.2	±10.0	±2.5
24	12	369.0	29.8	5.0	670.3	56.0	13.0
		±13.7	±2.2	±1.6	±90.0	±08.8	±1.5

Volume (vol), sperm concentration (Concent), individual progressive motility (IM) and % (Abnormal spermatozoa of the ejaculates collected through all the experiment indicated great variability between and within bulls. The interplay of genetics, nutritional and environmental factors as contributors to this variations, should be taken in considerations. SC and BW increased linearly ($P < 0.01$) as age increased. As age and SC increased the seminal characteristics improved ($P < 0.01$). These results agree with those previously reported for beef, dairy and crossbred growing bulls (1, 2, 5, 6, 7, 8, 10, 11, 12). Correlation coefficients between SC, BW and seminal characteristics were evaluated. SC was correlated positively with age ($r = .92$; $P < .01$), BW ($r = .94$; $P < .01$), IM ($r = .69$; $P < 0.01$) and, % normal sperm ($r = .65$; $P < .01$), and negatively with % abnormal sperm ($r = -.65$; $P < .01$).

The great variation of SC observed in bulls with similar body weight and age, suggest an opportunity for selection on the basis of testicular size. Additional investigations are needed to define the pattern of pubertal development through sexual maturity in this type of crossbred bulls under tropical grazing condition. A careful evaluation of the stage of pubertal development in individual bulls is recommended before its selection for natural and artificial breeding.

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