PHYSICAL CONFORMATION AND ULTRASONOGRAPHIC APPROACHES FOR BREEDING SOUNDNESS EVALUATION OF HIGH AND LOW LIBIDO CROSSBRED BULLS

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ABSTRACT

Physical conformation, scrotal circumference, testicular volume, rump fat thickness, testicular echogenecity and accessory sex glands diameter in relation to libido (poor or high) in crossbred breeding bulls (n=22) was evaluated. Internal pelvic area (1121.60±42.19 *vs* 959.14±75.20 cm^2) and testicular volume (454.30±21.51 cm^3 vs 393.65±27.06 cm^3) were higher ($p<0.05$) in high libido bulls. Rump fat thickness was lower (3.90±0.47 *vs* 6.03±1.17 mm) in high libido bulls ($p<0.05$). The scrotal circumference, hock joint angulation, diameter of prostate and diameter of seminal vesicles were similar in both groups ($p>0.05$). Thus, internal pelvic area, testicular volume and ultrasound based rump fat thickness are associated with problem of poor libido in breeding crossbred bulls.

Key words: Breeding soundness, Crossbred bulls, Libido, Rump fat thickness, Ultrasonography

INTRODUCTION

Libido in bulls is a very important trait related to breeding performance. The high libido bulls produce more ejaculates, have lesser reaction time and refractory period and better semen quality (Ellis *et al.,* 2005 and Bury *et al.,* 2011). Hence, the identification of high libido bulls is imperative for cost effective production of frozen semen. Physical conformation, ultrasonographic evaluation of rump fat thickness and reproductive organs can differentiate high and low libido bulls (Singh *et al.,* 2015). Pelvic area is a desirable and highly heritable trait (Donkersgoed *et al.,* 1990) and its association with libido is very important for effective screening of bulls. Hock joint angulation is a major factor affecting libido as it can lead to difficult mounting. Scrotal circumference and testicular volume reflects sperm production capacity of bulls (Viu *et al.,* 2006). Increased rump fat can cause decreased libido as well as semen quality in bulls. Ultrasonographic evaluation of reproductive system is a reliable and effective method of differentiating potential bulls (Gnemmi and Lefebvre, 2009) Hence, the present work was planned to assess the internal pelvic area, hock joint angulation, scrotal circumference, testicular volume, rump fat thickness and internal reproductive organs in high and low libido breeding crossbred bulls.

MATERIALS AND METHODS

Twenty-two breeding crossbred (Holstein Friesian x Sahiwal) bulls between (age 8-10 yr) maintained at university bull station under similar feeding and management were included in the present study. These bulls were divided into two groups on the basis of reaction time as good libido (<3 min, n=12) and poor libido (>3 min, n=10) bulls. The physical examination of bulls was carried out for structural soundness, eye problems, skin diseases and testicular abnormalities. Internal pelvic area was measured as described earlier (Singh *et al.,* 2010). Hock joint angulation was measured by an instrument consisting of two measuring scales, connected with each other by a screw (to be positioned in front of the centre of the hock joint) in such a way that both scales could be

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opened at desired angles. Scrotal circumference and testicular volume was measured as described earlier (Kumar *et al.,* 2008). The procedure for rump fat thickness calculation was also described earlier (Singh *et al.,* 2015). Ultrasonography of external and internal genitalia was conducted using linear array transducer (5.0 MHz). Transducer was placed longitudinally and transversally on lateral face of testis. Probe was placed diagonally on the ventral aspect of testis to examine epididymis. Pelvic urethra was followed and prostate gland was found as a fluid filled structure and diameter was measured. Bilateral seminal vesicles were confirmed by its lobulated appearance on the lateral sides of pelvic urethra and diameter was measured. The data analysis was performed using 't' test with SPSS program (vol 20). Normality of data was determined using Shapiro-Wilk test.

RESULTS AND DISCUSSION

The physical examination revealed that poor libido bulls had lameness (3 bulls), interdigital fibromas (2 bulls), severely affected planter surface of feet around the frog region (1 bull), unilateral corneal opacity (1 bull) and wound on nose (1 bull), excessive pendulous testis (1 bull, Figure 1). Lameness causes intense pain at the time of mounting or during fore play, thus, inducing psychological fear and ultimately reduced libido (Kumar *et al.,* 2008).

The internal pelvic area was higher in high libido bulls as compared to low libido bulls (1121.60±42.19 *vs.* 959.14±75.20 cm^2, $p<0.05$). The bulls with larger pelvic area produce female progenies with bigger pelvis leading to decreased incidence of dystocia (Bures *et al.*, 2008). The hock joint angulation and scrotal circumference was similar in high and poor libido bulls ($p>0.05$). The testicular volume was higher in high libido bulls as compared to low libido bulls (454.30±21.51 cm^3 *vs* 393.65±27.06 cm^3, $p<0.05$). Usually, the testicular volume depends upon age, testicular abnormalities like hypoplasia, orchitis or testicular degeneration (Scott and Haskell, 2011). However, in present study, the bulls were of similar age group, thus

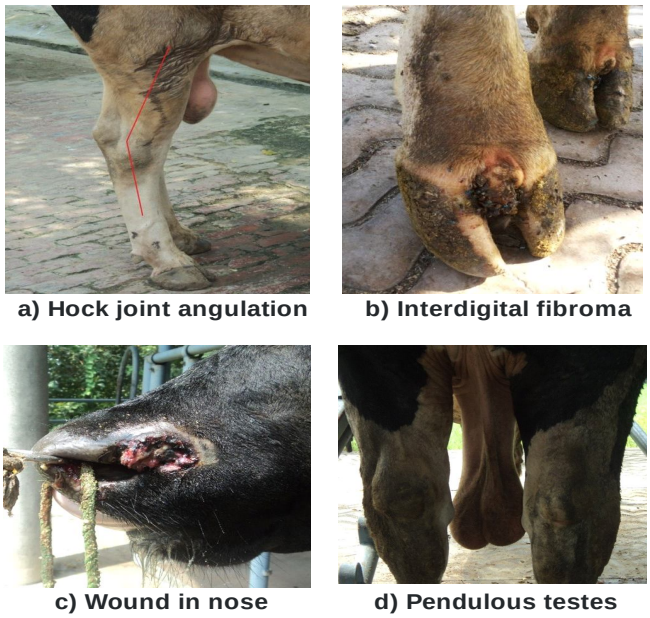


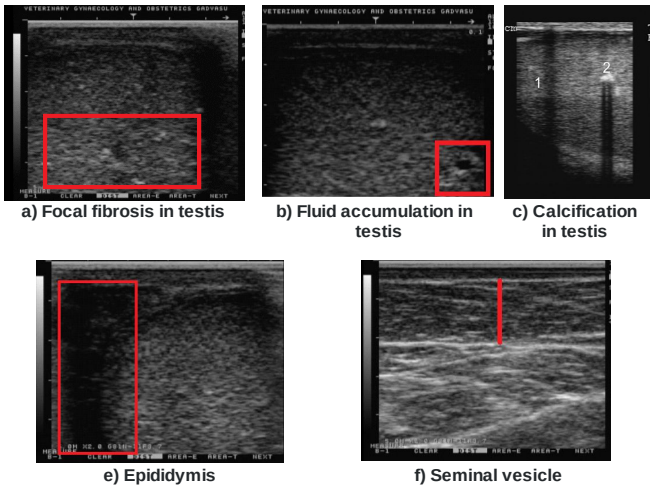
Figure 1: Abnormal physical conformation in low libido crossbred bulls

the variation in testicular volume was not due to age. Also, the physical and ultrasonographic examination failed to reveal any testicular pathological conditions.

The rump fat thickness differed in high and in low libido bulls (3.90±0.47 vs 6.03±1.17 mm, $p<0.05$), which was also reported earlier in buffalo bulls (Singh *et al.,* 2015). The high plane of nutrition increases rump fat accumulation, though in the bulls of present study no overfeeding was practiced. The selection of sires with low back fat thickness have good fertility (Coulter and Kozub, 1989). An increase in rump fat thickness could be responsible for poor libido due to peripheral aromatization of testosterone to estrogen in adipose tissue (Ellem and Risbridger, 2010).

In poor libido bulls, ultrasonography of external genitalia revealed focal testicular fibrosis, fluid accumulation, hydrocoel, and calcification in poor libido bulls (Figure). Similar findings were also observed recently (Singh *et al.,* 2015). The ultrasonography of internal genitalia revealed that diameter of prostate and seminal vesicle was similar ($p>0.05$). The seminal vesicles present lateral to the ampulla, above the neck of bladder appeared

as irregular shaped isoechoic lobes of glandular tissue separated by hypoechoic regions (Figure 2) as reported in another study (Manda *et al.,* 2012). In poor libido bulls, increased diameter and echogenicity in seminal vesicles is an indicator of seminal vesiculitis and is responsible for loss of libido in breeding buffalo bulls (Singh *et al.,* 2015). Epididymis was seen as a fluid filled structure lateral to testicular parenchyma. No abnormality in the lumen and or echogenicity of epididymis was noticed.



a) Focal fibrosis in testis b) Fluid accumulation in testis c) Calcification in testis

e) Epididymis f) Seminal vesicle

Figure 2: Abnormal ultrasonographic findings in low libido crossbred bulls

It can be concluded that physical examination, internal pelvic area, testicular volume and ultrasound based rump fat thickness are associated with the problem of poor libido in breeding crossbred bulls.

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