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**Short Communication**

# SEX CHROMOSOMAL ANEUPLOIDY (61,XXY) IN HOLSTEIN FRIESIAN AND KANKREJ CROSSBRED CALF: A CASE REPORT

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## SUMMARY

A blood sample was collected from a phenotypically normal Holstein Friesian and Kankrej crossbred calf for routine chromosomal screening. Cytogenetic investigation revealed 61, XXY chromosomal complement in the entire metaphase fields. Effect of such a chromosomal abnormality on reproduction performance of a calf could not be studied because of age.

**Key words:** Metaphase, chromosome, abnormality, aneuploidy

Reproductive problems such as late puberty, repeat breeding, stillbirths, loss of embryos, infertility and sterility may be due to poor feeding, breeding and management. The chromosomal aberrations, either numerical, structural or both, are also one of the reasons for reproductive failure almost in all mammals. Reduced fertility/ infertility is also major problem in Indian cattle and buffaloes which results in significant economical losses to the organized farms, semen collection centres and farmers. The commonly observed sex chromosome abnormalities are chimerism (XX/XY) (Patel *et al.,* 1997a), mosaicism (XY/XYY or XX/XXX) (Patel and Patel, 1999, Patel, 2003), monosomy (XO) (Yadav *et al.*, 1990, Prakash *et al.*, 1992), trisomy-X (Prakash *et al.*, 1994), sex chromosome aneuploidy (XXY) (Patel, 2002). There are many other abnormalities related to autosomes reported in cattle and buffaloes which influenced reproductive performance (Patel *et al.*, 1997b, Patel, 1999a, 1999b, Sharmila *et al.*, 2004). However, sex chromosome aneuploidy occurring due to non-disjunction during meiosis or early cleavage is not so common in cattle and buffaloes. This paper presents a case of XXY in 6 months old Holstein Friesian (HF) and Kankrej crossbred calf, observed during routine cytogentic screening of bulls / bull calves.

Heparinized blood was collected on 14th June 2004 in a vaccutainer blood collecting tube from a Holstein Friesian and Kankrej crossbred calf for routine chromosomal screening. The calf born on 20th December, 2003 through artificial insemination was phenotypically normal. Chromosomal preparation was made by using standard whole blood culture technique as described by Patel *et al.* (1997 a). Geimsa stained fifty metaphase fields were screened under light microscope to detect possible chromosomal abnormalities. In *Bos taurus,* all autosomes are acrocentric and sex chromosomes (XY) are submetacentric whereas Y chromosome in *Bos indicus* is acrocentric. The sex chromosomes in crossbred (*Bos taurus* X *Bos indicus*) calf were submetacentric (Fig. 1). It was therefore, possible to identify the sex chromosomes without GTG-banding. This was the 3rd case of XXY out of 1600 cattle screened so far during last 13 years, where in all metaphase field exhibited 61,XXY because of an additional X chromosome. The bull calf had normal phenotype at the time of blood collection. As the calf was young, it was not possible to observe the effect of aneuploidy on its fertility. However, such cases have been reported earlier with fertility problems. Patel and Patel (2000) reported subfertility in a Jersey crossbred bull with 61,XXY. Similarly, Dunn *et al.* (1977) reported testicular hypoplasia in a bull exhibited 61,XXY. In many cases, the effect of chromosomal abnormalities on reproductive performance are not available as animals with

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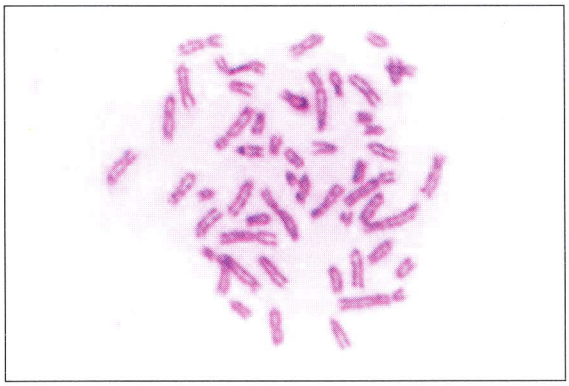

Fig.1. Partial metaphase field (61,XXY) from a Holstein Friesian x Kankrej crossbred calf. Arrows indicate sex chromosomes.

reproductive problems are generally culled at the early age and also screening of breeding animals for cytogentic analysis is not performed in routine. Supporting data on such abnormality has been well studied in human where lot of information is available. Considering the association of various chromosomal aberrations with reproductive failure, the breeding bulls before they enter in AI programme, should be screened in order to reduce the incidence of chromosomal defect in cattle and buffalo populations and to minimize the economical losses to the organized farms, sperm stations, embryo transfer centers etc.

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