



Karyotype analysis of mithun (*Bos frontalis*) and mithun bull x Brahman cow hybrids

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ABSTRACT. We examined the cytogenetics of mithun (*Bos frontalis*), a domesticated version of the Asian gaur, and hybrids (F_1 generation) produced by artificial insemination of Brahman cows (*Bos indicus*) with mithun semen. Reproductive potential was also examined in the F_1 generation and a backcrossed heifer for utilization of heterosis. Metaphase chromosome spreads were examined by conventional staining and fluorescence *in situ* hybridization hybridized with the entire chromosome 1 of mithun as a specific

probe. Chromosome 1 of mithun was found to be equivalent to *Bos taurus* chromosomes 2 and 28. The karyotype of the female mithun ($N = 4$) comprised 58 chromosomes, including 54 acrocentric and four large submetacentric chromosomes, without the four acrocentric chromosomes found in the domesticated species *B. indicus*. However, one of the four female mithuns with a normal mithun phenotype had an abnormal karyotype ($2n = 59$), indicating introgression from *B. taurus* or *B. indicus*. The F_1 karyotypes ($N = 6$, 3♂3♀) of the mithun bull \times Brahman cow cross had $2n = 59$, intermediate between their parents; they were consistent heterozygous carriers with a centric fusion involving rob(2;28), as expected. Two pronounced red signals were seen in the mithun karyotypes, three red signals in the mithun \times Brahman hybrids, and four red signals in the Brahman cattle, in good agreement with centric fusion of bovine rob(2;28). The female backcross hybrid ($N = 1$) with $2n = 59$ had a similar chromosome configuration to the F_1 karyotypes and had rob(2;28). Such female backcross hybrids normally reproduce; however, the F_1 bulls ($N = 3$) had not yet generated normal sperm at 24 months.

Key words: Karyotype; Mithun (*Bos frontalis*); Rob(2;28); Brahman cow (*Bos indicus*); Hybrids of mithun \times Brahman