



FIG 1: Two metaphases from the female buffalo calf. The left cell has two X chromosomes while the right has an X and a Y. Giemsa $\times 1030$

Sex chromosome chimaerism in heterosexual Murrah buffalo triplets

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TWINNING and multiple births in cattle are reported to vary in frequency between 0.2 and 3 per cent (Hendy and Bowman 1970). In water buffaloes they are even rarer, twinning ranging between 0.015 and 0.63 per cent (Tantawy and Ahmed 1957, Ferrara 1960, Fadzil 1968, Goswami and Nair 1968). In cattle, multiple births are of interest because of the research value of monozygotic twins and the occurrence of freemartinism.

A freemartin is a sexually imperfect, usually sterile female partner of heterosexual twins (Swett and others 1940). Freemartins and their co-twins usually exhibit sex chromosome chimaerism as a result of choriovascular anastomosis leading to exchange of haemopoietic tissues (Marcum 1974).

The present authors have not seen any reported cases of multiple births or freemartinism in buffaloes. This report records for the first time sex chromosome chimaerism in two calves (a male and a female) of triplets (two males and one female) born to a Murrah buffalo (*Bubalis bubalis*) in the village of Muklan, Haryana, India.

The Murrah buffalo, in its fifth lactation, was reported to have given birth to triplets on February 3, 1980. A male calf was born around 14.00 hours followed by the second male at 14.30. The second calf was a breech presentation and died 30 minutes later. The placentae were expelled at 16.00, followed by the birth of the female. The third placenta was expelled at 22.30.

Rectal palpation of the dam on February 20 revealed that the left uterine horn was larger than the right, indicating that the former had been gravid during gestation (unilateral pregnancy). The left ovary was of normal size and appeared functional whereas the right ovary was of subnormal size and gave no indication of having been active. The cervix was found to be partly open and abnormally fibrous, presenting evidence of chronic cervicitis. The male and female calves appeared normal despite low birthweights.

Lymphocyte cultures were set up from blood samples

Balakrishnan and others (1979). Slides were prepared and stained with 2 per cent Giemsa. Chromosomes were observed and counted in 111 metaphases from the male calf and 145 metaphases from the female calf, using a Leitz Orthoplan microscope.

The diploid number in both calves and the dam was 50, consisting of 10 submetacentric and 38 acrocentric autosomes as well as XX or XY sex chromosomes, as is normal in the Murrah buffalo (Fischer and Ulbrich 1968). However, it was found that 38.7 per cent of metaphases in the male calf and 42.07 per cent of metaphases in the female calf were of XY type. Chromosomes from two metaphases of the female, one XX and one XY, observed in the same microscopic field are shown in Fig 1.

The findings indicate that choriovascular anastomosis had been established between the male and female calves during embryonic development, leading to exchange of lymphopoietic tissues. Whether this has resulted in sterility of the female calf will only be known when it reaches maturity.

In cattle it is estimated that 92 per cent of females born as heterosexual twins are freemartins (Marcum 1974). Eldridge and Blazak (1979) examining chromosomes of 15 fertile females of heterosexual bovine twins, found that 14 had only XX cells and one had 26 per cent XY cells. They could not establish whether the chimaerism was due to chorionic fusion as the male twin was not available for study.

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