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RESEARCH ARTICLE

CYTOGENITIC STUDY OF RIVER AND SWAMP BUFFALO (*Bubalus bubalus*) IN IRAQ

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ABSTRACT

The water buffalo is vital to the lives of small farmers and to the economy of many countries worldwide. Not only are they draught animals, but they are also a source of meat, horns, skin and particularly the rich and precious milk that may be converted to creams, butter, yogurt and many cheeses. A total of thirty buffalo (fifteen were river buffalo and fifteen swamp buffalo) from south Iraq (Basrah city) were used in this study. Depending on the feature , morphology and location the animals were classified to do the genetic study. The karyotype of river buffalo 2n = 48 represented by 2 pairs of metacentric chromosomes,4 pairs submetacentric, 17 pairs acrocentric and 1 pair telocentric chromosomes (Figures.3 & 4). While the karyotype of swamp buffalo 2n=50 represented by 1 pair of metacentric chromosomes, 4 pairs submetacentric, 19 pairs acrocentric and 1 pair telocentric chromosomes. These subspecies differ by one chromosome; a fusion between river buffalo (BBU) chromosome 4 and 9 is comparable to swamp buffalo chromosome 1, and all chromosomes and chromosome arms are preserved between these two subspecies.

INTRODUCTION

Buffalo were domesticated 3000-6000 years ago; they had economic value as dairy, meat, and draught animals, in many populated countries. The animals are naturally found in tropical and subtropical forests, wet grasslands, marshes and swamps. Even if they are earthly animals, they use a good portion of time wallowing in mud holes or rivers in order to keep cool. Their habitats typically contain rivers, streams, mud holes, tall grasses, *and* trees which provide sufficient drinking and wallowing water, food, and coverage (Kierstein *et al.,* 2004; *Bubalus bubalis*, 2004 and Yindee, *et al.,* 2010). Buffalo belong to the Bovidae family and there are two main species of buffalo: the Asiatic buffalo *(Bubalus bubalus***)** and the African Buffalo (*Syncerus caffer***)**. The Asiatic buffalo originated in India where domestication likely took place in the third millennium BC, and China where domestication occurred in the fifth millennium BC (Iannuzzi, *et al.,* 2009a; Cockrill, 1981 and Chen and Li, 1989). The Asiatic water buffalo can be divided into two subspecies: the river buffalo and the swamp buffalo. The exact phylogenetic relationship between swamp and river buffalo is still in question. Divergence of these two subspecies occurred approximately 10,000 to 1.7 million years ago, long before domestication. Therefore, it is likely that that there were separate domestication events for river buffalo in India and for swamp buffalo in China. As for the African buffalo, there are two subspecies: the cape buffalo (*Syncerus caffer caffer***)** and the forest buffalo (*Syncerus caffer nanus*) (Kumar *et al.,* 2007*;* Kumar, *et al.,* 2007 and Buchholz, 1990).

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MATERIALS AND METHODS

A total of thirty buffalo (fifteen were river buffalo and fifteen swamp buffalo) from south Iraq (Basrah city) were used in this study. Depending on the feature, morphology and location the animals were classified to do the genetic study according to (Sugiyana, 1971). (Fig. 1& 2).

Figure.1: River buffalo

Figure 2: Swamp buffalo

Figure 3: Metaphase spread of river of buffalo (2n =48)

RESULTS AND DISCUSSION

The water buffalo is vital to the lives of small farmers and to the economy of many countries worldwide. Not only are they draught animals, but they are also a source of meat, horns, skin and particularly the rich and precious milk that may be converted to creams, butter, yogurt and many cheeses. River buffalo distinguish from the swamp buffalo in many morphological points, grossly the river buffalo has big mass body with long legs ,the skin is dark black massive hairy located only in face and along the vertebrate column and the eyes brown to black color almost. Swamp buffalo less weight and shorter than river buffalo, generally hairy body, and the eyes appear in grayish to light bluish. According to RBG-banding technique stained with Giemsa stain the results shows there were differences in karyotype of river buffalo and swamp buffalo. The karyotype of river buffalo 2n =48 represented by 2 pairs of metacentric chromosomes, 4 pairs submetacentric ,17 pairs acrocentric and 1 pair telocentric chromosomes (Figures 3&4). While the karyotype of swamp buffalo 2n=50 represented by 1 pair of metacentric chromosomes, 4 pairs submetacentric, 19 pairs acrocentric and 1 pair telocentric chromosomes (Figures 5 & 6). These subspecies differ by one chromosome; a fusion between river buffalo (BBU) chromosome 4 and 9 is comparable to swamp buffalo chromosome 1, and all chromosomes and chromosome arms are preserved between these two subspecies. Crosses between the two subspecies are fertile but hybrids possess 49 chromosomes, which is thought to lead to lower reproductive values in subsequent matings. River buffalo have 5 biarmed chromosome pairs and all others, including the sex chromosomes are acrocentric. Several studies have shown that river buffalo and domestic cattle, both members of the Bovidae family, are closely related (Iannuzzi, *et al.,* 2009a). Several studies have discovered high degrees of homology among autosomal chromosomes of bovids with similar banding patterns and gene order among the chromosome arms of cattle, river buffalo, sheep, and goats (Iannuzzi *et al.,* 2001 and Iannuzzi e*t al.,* 2009b).

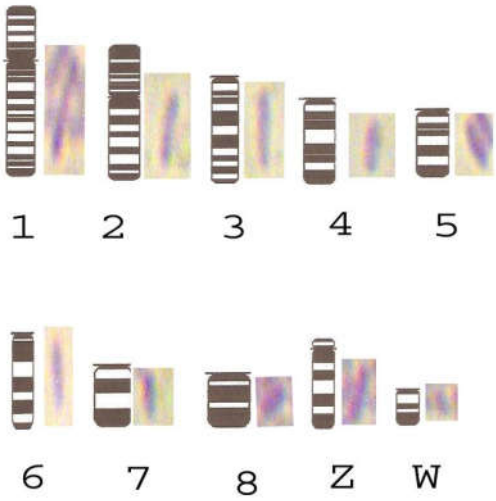

Figure 4: Idogram and karyogram of metaphase chromosomes of river of buffalo.

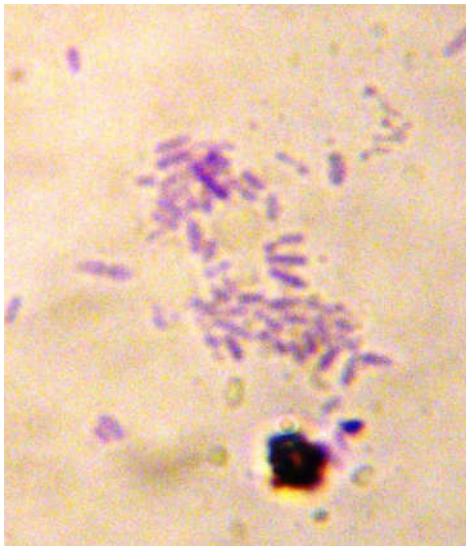

Figure 5: Metaphase spread of swamp buffalo (2n = 50)

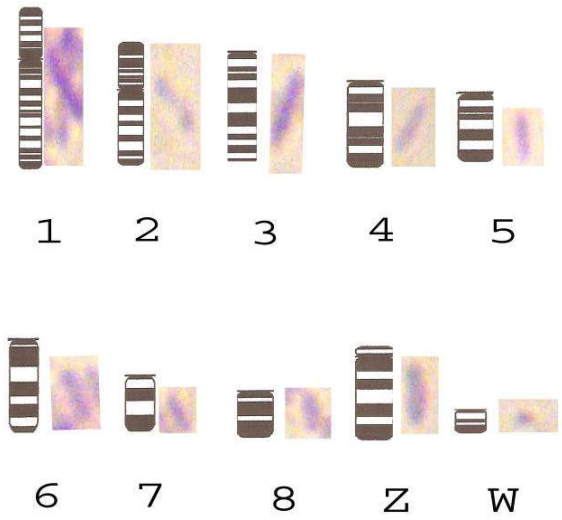

Figure 6: Idogram and karyogram of metaphase chromosomes of swamp buffalo

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