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A Study of Chromosomes of *Channa micropeltes* (Ophiocephalidae: Ophiocephaliphormes) A Species Becoming Endangered.

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Abstract: Cytogenetic analysis has been carried out on a Snake-head *Channa micropeltes,* which seems to have reached the status of a highly vulnerable species as indicated by its only occasional presence in catches. During the present study, the karyotype of this species has been analyzed for C-banding and NOR banding. Both male and female karyotypes of this form are similar being composed of 44 chromosomes which can be stored out into 1 pair metacentric and 21 pairs of acrocentric nature. Only the third pair which is acrocentric in nature has been found to carry the NORs at the terminal position. C- heterochromatin has been observed restricted only to the centromeres.

Keywords: NORs, karyotype, *Channa*

Introduction: Family Ophiocephalidae comprises a small group of commercially significant freshwater fishes and includes only two genera *Channa* and *Parachanna* with 29 and 3 species, distributed in Asia and Africa, respectively (Gold *et. al.,* 1990). They are important food fishes (Chattopadhyay, 1975; Jhingran, 1982) also have medicinal and pharmaceutical values (Michelle *et. al.,* 2004). The snakeheads are carnivorous, airbreathing fish (Froese and Pauly, 2019), therefore, can survive for a longer time without water. To date, cytogenetic data on 16 species of this family have been reported by different workers (Musikasinthorn, 2000; Singh *et. al*., 2013, Ravindra Kumar *et. al*., 2019). During the present study, cytogenetic analysis based on various banding techniques has been carried out on one species of *Channa micropeltes* of this family. This fish become almost endangered in its natural habitats.

Materials and Methods: 7 Male and 8 female specimens of *C. micropeltes* were collected from natural habitats, Pechipara Reservoir in Tamil Nadu state. These were brought alive to the laboratory and kept in a well-aerated aquarium. The specimens were treated intramuscularly with 0.05% colchicine at a dose of 1ml 100g-1 body weight by means of an insulin syringe to suppress the mitotic division at the metaphase stage and kept alive in a well-aerated plastic container for 2 hours. Then the specimens were sacrificed by an overdose of ethylene glycol. Chromosome preparations were obtained from kidney tissue using well-known – hypotonic treatment in 0.56% KCl solution – fixation using fresh chilled Carnoy's fixative (Methanol: Acetic acid in 3:1 ratio) - air drying method. First, the chromosome slides were stained with 6% Giemsa to locate the good metaphase stages. C-banding was obtained by the method of Sumner (1972) and silver staining was performed by the method of Howell and Black (1980).

Results: The karyotype of *C. micropeltes* comprises 44 chromosomes, 2 of which are metacentric and 42 acrocentric in nature. C-heterochromatin was found on the centromeric position on most of the chromosomes. However, some pairs showed dark C-bands while other homologous pairs revealed slightly faint C-bands. (Fig. 1, 2, 3 and 4). NORs were found on a single pair of chromosomes, localized on the telomer of the acrocentric pair classified as pair number 3 in the karyogram (Fig. 5, 6, 7 and 8).

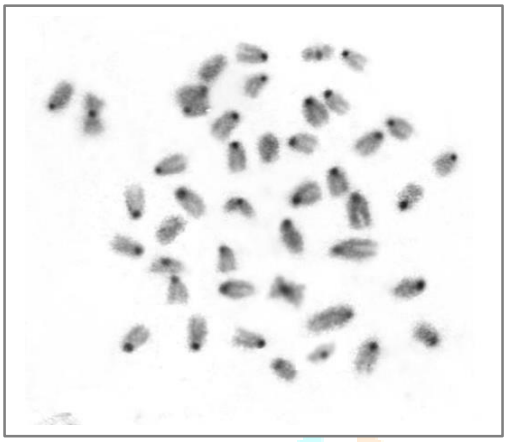

Fig 1: C-banded metaphase chromosome plate of male *Channa micropeltes.*

Fig 2: C-banded metaphase chromosome plate of *fe*male *Channa micropeltes*

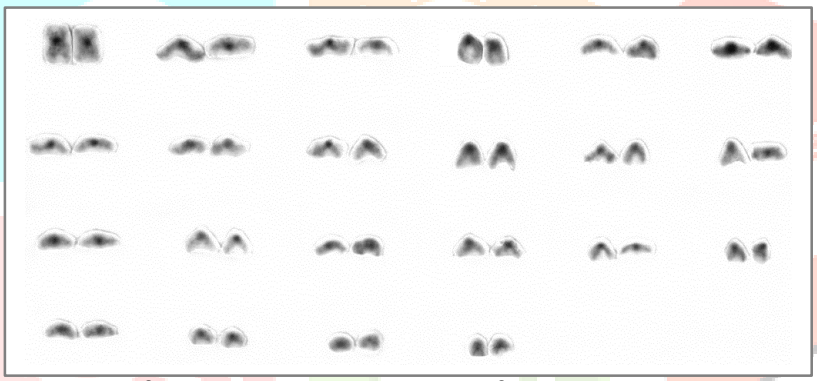

Fig 3: Karyotype of C-banded chromosomes of male *Channa micropeltes*

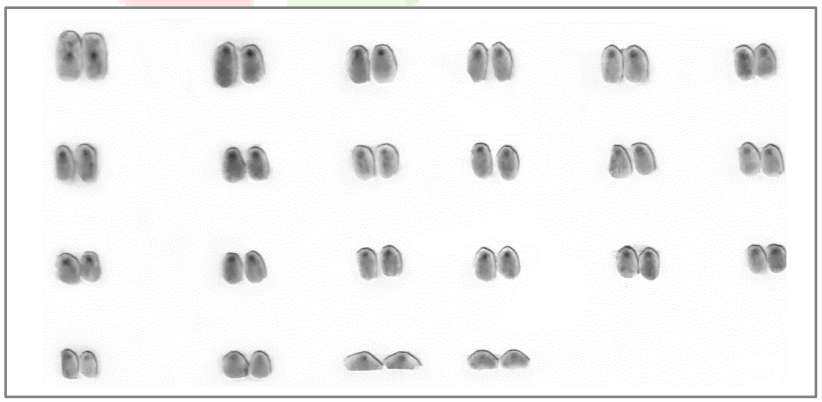

Fig 4: Karyotype of C-banded chromosomes of female *Channa micropeltes*

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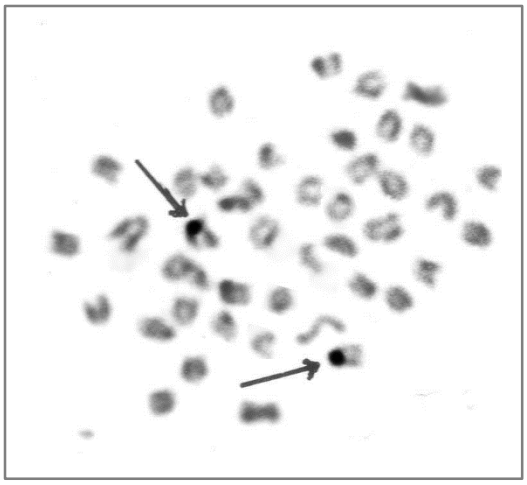

Fig 5: Ag-stained metaphase chromosome plate of male *Channa micropeltes.*

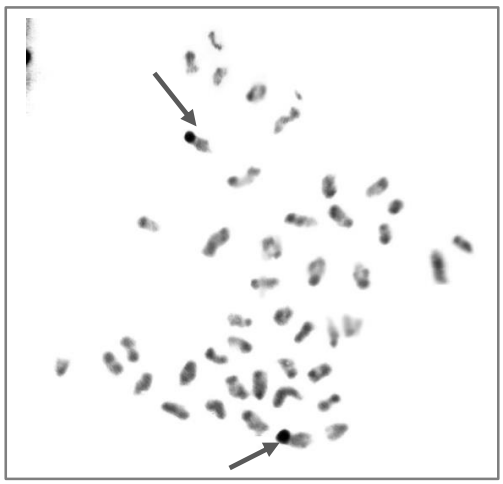

Fig 2: Ag-stained metaphase chromosome Plate of *f*emale *Channa micropeltes*

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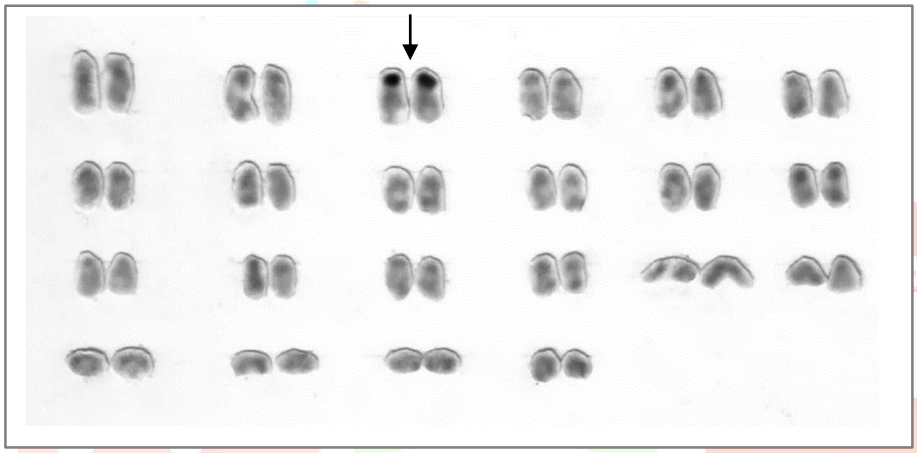

Fig 3: Karyotype of Ag-stained chromosomes of male *Channa micropeltes*

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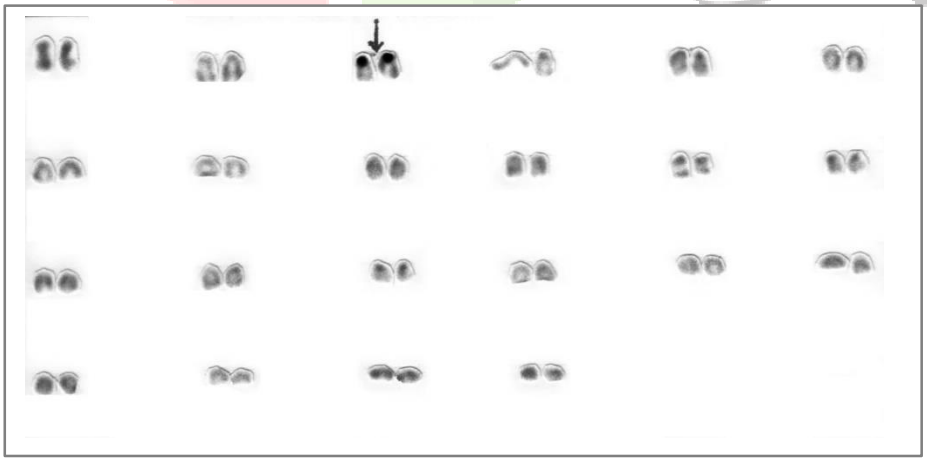

Fig 3: Karyotype of Ag-stained chromosomes of female *Channa micropeltes.*

Discussion: To date, cytogenetic data is available on 16 species of the genus Channa. presently worked out species *C. micropeltes* has shown 2n = 44 (FN 46). C-banding has been found to be restricted only to the centromeric position in this fish. Earlier, other Channa species from abroad were found to have C-heterochromatin located on whole arms of chromosomes (Kang *et. al*., 1985). These species, *C. argus*, *C. asiatica*, *C. maculata*. Same is the case in *C. punctatus* (Rishi *et. al*., 1993). Since the centromeric type occurrence of the C- heterochromatin is characteristic of higher vertebrates, the fish species which possess

this location of C- heterochromatin can be considered advanced ones. On this basis, *C. micropeltes* can be regarded as an advanced species. Moreover, some of the pairs do not possess much C- heterochromatin, this condition again leads to the same conclusion as loss of heterochromatin is considered to have played a significant role in the evolution of karyotype in fishes (Kornfield *et. al.*, 1979). The condition of single pair of NORs in this fish is of typical of the fish species which is considered to be plesiomorphic or a primitive condition.

Conclusion: Cytogenetic and genomic studies in recent years play a vital role in clarifying the species characterization, evolution and systemic studies. The information of chromosome morphology, the presence of C-bands and the position, as well as the number of NORs, is an important tool as these cytotaxonomic markers could be used in illustrating the karyotypic evolution and phylogenetic relationships in this group. Moreover, this data contributes the basic information for chromosome manipulation and hybridization techniques.

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