

SUPERNUMERARY CHROMOSOMES ON MARINE FISH *UPENEUS PARVUS* (POEY 1853, MULLIDAE) FROM ATLANTIC OCEAN

CROMOSOMAS SUPERNUMERARIOS EN EL PEZ *UPENEUS PARVUS* (POEY 1853, MULLIDAE) DEL OCÉANO ATLÁNTICO

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Palabras clave adicionales

Citogenética. Peces.

SUMMARY

Cytogenetic study on specimens of *Upeneus parvus* (Mullidae) from the Atlantic Ocean coast, state Rio de Janeiro (Brazil), is reported both males and females have a diploid number of $2n=44$. However all specimens studied had 1-4 minute accessory chromosomes. The unstable behavior of these chromosomes during mitosis are characteristics that emphasize their supernumerary nature.

RESUMEN

Se presenta el estudio citogenético de especímenes de *Upeneus parvus* (Mullidae), pez de la costa atlántica del estado de Río de Janeiro (Brasil). Tanto machos como hembras poseen un número diploide $2n=44$. Sin embargo, todos los especímenes estudiados tienen de 1 a 4 diminutos cromosomas accesorios. El comportamiento inestable de estos cromosomas durante la mitosis, son características que subrayan su naturaleza supernumeraria.

INTRODUCTION

Fishes present one of the most favourable groups for cytogenetic and

evolution studies owing to the presence of several peculiar biological characteristics besides belonging to a central position in vertebrate evolution. An other aspect on fish cytogenetic studies is concerning to karyotypic diversity and chromosomal polymorphism. Genetic variability, which highly establishes biological and evolution significances, constitutes a basic condition in the appearance of new phenotypes. This variability has been permitting a better exploration and adaptation in different environments to any form of animal and plant life. The incidence of supernumerary or additional chromosomes in animals, specially in vertebrates, are not so high like in plants. The first account of supernumerary chromosomes among the bony fishes was related by Pauls (1981) in fresh water fish *Prochilodus scrofa*, Prochilodontidae.

In the present study we have reported the karyotypic characteristics and the presence of supernumerary chromosomes in marine fish *Upeneus parvus*.

MATERIALS AND METHODS

Specimens of *Upeneus parvus*, usually called as *goatfish*, were collected from the Atlantic Ocean Coast, Rio de Janeiro state, Brazil. The karyotypic study was carried out on 18 specimens of *U. parvus* but only from 10 specimens were obtained results for cytogenetic studies. All animals were injected interperitonally 0.05 p. cent colchicine at the proportion of 1 ml/100 g body weight and sacrificed about 60 minutes later. Mitotic chromosome preparations were obtained from renal cells by the standard air drying procedure (Bertollo, 1978), slightly modified in our laboratory for marine fishes.

Table I. Diploid numbers found in *Upeneus parvus*. (Números diploides encontrados en *Upeneus parvus*).

Number and sex of fish	Diploid number						total of cells
	40	41	42	43	44	45	
3f	-	-	1	1	2	-	4
18f	-	-	2	-	5	-	7
20m	2	-	2	2	8	-	14
21-	-	-	-	1	3	-	4
22f	-	1	6	1	15	-	23
39f	3	-	1	4	17	-	25
76f	1	-	3	8	6	1	19
92m	-	-	2	4	8	1	15
96f	1	1	-	2	4	1	9
232m	-	1	1	-	2	-	4
Total	7	3	18	23	70	3	124

f= female; m= male

RESULTS AND DISCUSSION

Starting from the preestablished that the ancestral chromosomal complement of Perciformes was constitute of 48 acrocentric chromosomes (Ohno, 1970),

the diploid number of 44 chromosomes encountered in *U. parvus* (**table I** and **figure 1**), could be originated starting from Robertsonian translocations and

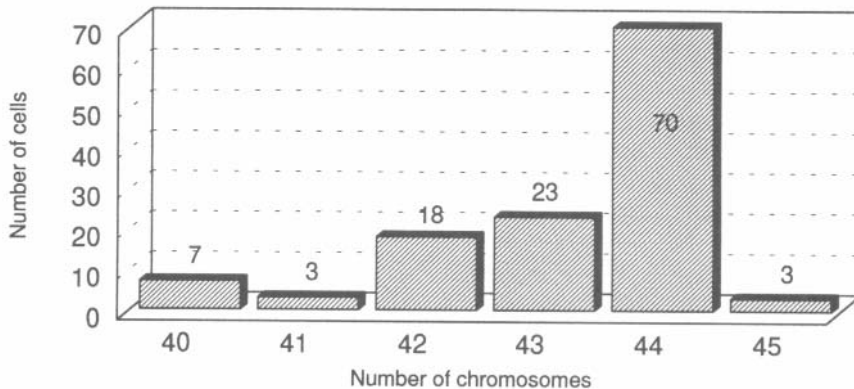


Figure 1. Diploid number frequencies observed in mitotic metaphase from *Upeneus parvus*. (Frecuencia de los números diploides observados en la metafase mitótica de *Upeneus parvus*).

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fusions among acrocentric chromosomes. Robertsonian polymorphisms are considered a common chromosomal rearrangement among fishes (Denton, 1983).

Apart from the regular 44 largest chromosomes (**figure 2**), very small chromosomes were frequent in our preparations. We have characterized these chromosomes as supernumerary or Bs.

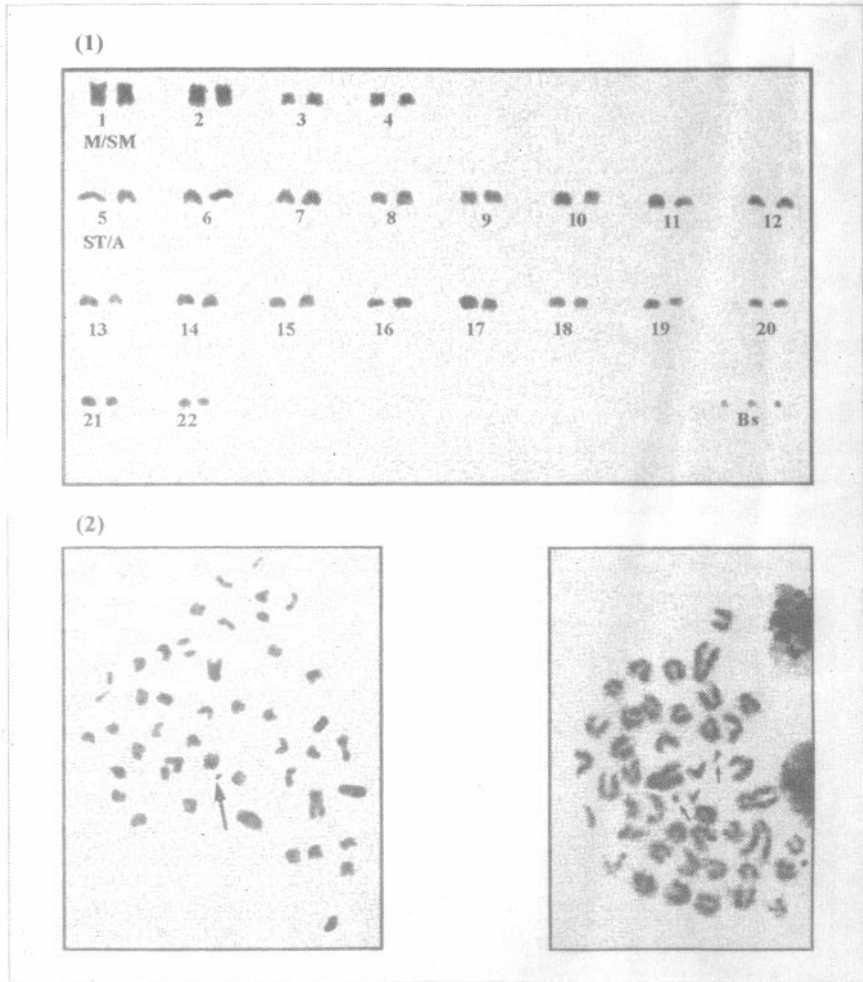


Figure 2. (1) Karyotype of *Upeneus parvus* presenting supernumerary chromosomes (Bs). (2) Metaphase cells show different patterns of chromosome condensation. The arrows indicate supernumerary chromosomes. ((1) Cariotipo de *Upeneus parvus* presentando cromosomas supernumerarios (Bs). (2) Células en metafase mostrando diferentes modelos de condensación cromosómica. Las flechas indican los cromosomas supernumerarios).

Table II. Frequency of chromosome B/cell, related to different diploid numbers in males and females of *Upeneus parvus*. (Frecuencia del cromosoma B/célula, en relación con diferentes números diploides en machos y hembras de *Upeneus parvus*).

Number of fish	2n=42					2n=43					2n=44					Number of cells
	0B	1B	2B	3B	4B	0B	1B	2B	3B	4B	0B	1B	2B	3B	4B	
3	1	-	-	-	-	-	-	1	-	-	-	1	-	3	-	6
18	1	1	-	-	-	-	-	-	-	-	3	-	1	-	1	7
20	-	1	1	-	-	1	1	-	-	-	2	1	4	1	-	12
21	-	-	-	-	-	-	-	-	1	-	1	-	1	1	-	4
22	3	2	-	1	-	1	-	-	-	-	6	3	3	3	-	22
39	-	1	-	-	-	1	-	-	-	-	3	2	3	6	3	19
76	-	1	2	-	-	1	2	2	2	1	-	2	-	3	1	17
92	1	-	1	-	-	2	1	1	-	-	1	-	2	3	2	14
96	-	-	-	-	-	-	1	1	-	-	1	1	-	2	-	6
232	-	-	-	1	-	-	-	-	-	-	1	-	-	1	-	3
Total	6	6	4	2	-	6	5	5	3	1	18	10	14	23	7	110

Their size, is smaller than the smallest chromosomes in the standard complement. We have distinguished these chromosomes in both sexes of *U. parvus*

and they have presented a very characteristic inter and intra individual variation (**table II** and **figure 3**).

Very similar reports have been

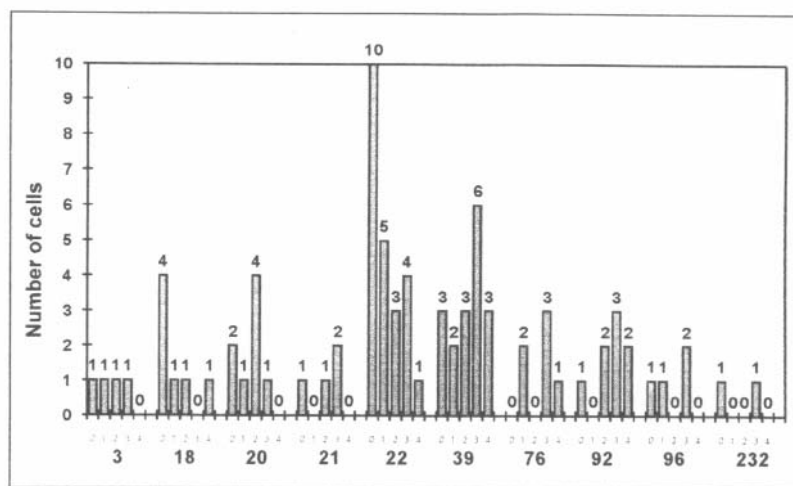


Figure 3. Frequency of chromosome B/cells (inter and intra individual variation) in mitotic metaphase from *Upeneus parvus*. (Frecuencia del cromosoma B/células (inter e intra individual variación) en la metafase mitótica de *Upeneus parvus*).

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published among teleosts for *Prochilodus scrofa* (Pauls and Bertollo, 1983); *Moenkhausia sanctaefilomenae* (Foresti et al., 1984); *Bergiaria westerrnani* (Dias, 1987); *P. cearensis* (Pauls and Bertollo, 1990) and others.

The numerical variability of the chromosomes B observed in *U. parvus* among and within individuals, may reflect the occurrence of a mosaicism. Never-

theless, further studies will be necessary to clarify the supernumerary chromosomes in *Upeneus parvus*.

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