Reprinted from the *Indian Journal of Experimental Biology* Vol 18 No. 3 March 1980 pp. 268-270

Some Observations on the Chromosomes of Certain Teleosts Using a Simple Method

A. P. KRISHNAJA, & M. S. REGE,

Department of Zoology, Institute of Science
Bombay 400 032

Manuscript received 25 *May* 1979; *revised manucript received* 22 *October* 1979

A simple and quick method for chromosome preparations (mitotic as well as meiotic) from various tissues such as scale, fin, gill, intestine, kidney and gonad of fishes is described. This method was employed in a screening programme to detect a species with a suitable karyotype to be used in a study on the mutagenic effects of industrial effluents released in water. *Boleophthalmus dussumieri, Gymnocorymbus ternetzi, Puntius tetrazona, Colisa fasciata* **and** *Tilapia mossambica* **showed a modal diploid No. of 2n=46, 2n=50, 2n=50, 2n=48 and 2n=44 respectively. This is perhaps the first report on the shromosome complements of the former three species. In view of the fairly large sized all acrocentric chromosomes,** *Boleophthalmus dussumieri* **could be a good material for mutagenic studies in fishes.**

FISH as an *in vivo* model can be quite a promising system for screening the mutagenic effects of environmental pollutants, specially the various constituents of industrial effluents that are being dumped into our water bodies. In order to detect a species with a suitable karyotype for such studies, a number of fishes were analysed for their chromosome complements using a simple method. Their suitability for laboratory toxicity bioassays was also taken into consideration. The fishes studied included *Boleophthalmus dussumieri* (Family : *Gobiidae*), *Gymnocorymbus ternetzi* (Family : *Characidae*) *Puntius tetrazona* (Family: *Cyprinide*) *Colisa fasciata* (Family : *Anabantidae*) and *Tilapia mossambica* (Family : *Cichlidae*).

The method followed was that of Kligerman and Bloom[1] with a few modifications. The fishes were given an intramuscular injection of 0.02% colchicine (1 ml–100 g body weight). After 5-6 hr, scale fin, gill kidney, intestine and gonad were removed and placed separately in 0.56% KCl and cut into small pieces. After 25-30 min hypotonic solution was removed and tissues were fixed in 3:1 methanol-acetic acid. After 2 changes in the fixative of 30 min each, the tissues were stored in vials at 4°C and the slides subsequently prepared at convenience. A small piece of tissue was placed in a cavity slide and 2–3 drops of 50% acetic acid were added. The tissue was then trituratcd gently, for not more than one minute, to form a fine cell suspension. Using a pasteur pipette the cell suspension was expelled on to a clean slide, preheated to 50°C and quickly withdrawn back into the pipette, leaving a ring of cells approximately one cm diameter on the slide. In this way 2 or 3 rings were made on each.slide When dry, the slides were stained with Giemsa's stain (diluted with buffered distilled water 1:10) for 20–30 min, washed in tap water and air dried. Dried slides were cleared in xylene and mounted in DPX.

Metaphase spreads obtained by the method from various tissues of different fish species along with a meiotic stage are shown in Fig. 1. Unlike as in the conventional technique where the haemopioetic tissues like kidney or spleen are used, the present method is simpler and fairly good metaphases can be easily obtained from a number of tissues as can be noticed from the figure. Moreover the scanning of the slides beome easier since the spreads can be located on the periphery of the rings. As mentioned in our earlier paper[2], techniques employing scale and fin epithelium will have wider scope in systematic hybridisation studies, since that would not entail sacrificing of the experimental animal. In mutagenicity testing this method offers the possibility of cytogenetic monitoring in a number of different tissues after *in vivo* exposure.

Boleophthalmus dussumieri, Gymnocorymbus ternetzi, Puntius tetrazona, Colisa fasciata and *Tilapia mossambica* showed a modal diploid chromosome number of $2n = 46$, $2n = 50$, $2n = 50$, $2n = 48$ and $2n = 44$ respectively. To our knowledge chromosome numbers of the former three species are being reported for the first time. The two large metacentrics that characterise many of the family characidae[3] are present in *Gymnocorymbus ternetzi* as well. Our observations on *Tilapia mossambica* and *Colisa fasciata* are in agreement with those reported earlier[4]. *Boleophthalmus dussumieri* could be a good material for *in vivo* studies, for the detection of chromosome aberrations after exposure to various pollutants, in view of its fairly long all acrocentric chromosomes with a $2n = 46$.

References

1. KLIGERMAN, A. D. & BLOOM, S. E., *J. Fish. Res. Bd Can.*, **34** (1977), 266.
2. KRISHNAJA, A. P. & REGE, M. S., *Indian J. exp. Biol.*, **17** (1979), 253.
3. KIRBY, R. F., THOMPSON, K. W. & HUBBS, C., *Copeia*, **3** (1977), 578.
4. MANNA, G. K. & PRASAD, R., in *Proc. 1st all India Congr. Cytology and Genetics*, 1975, 235.

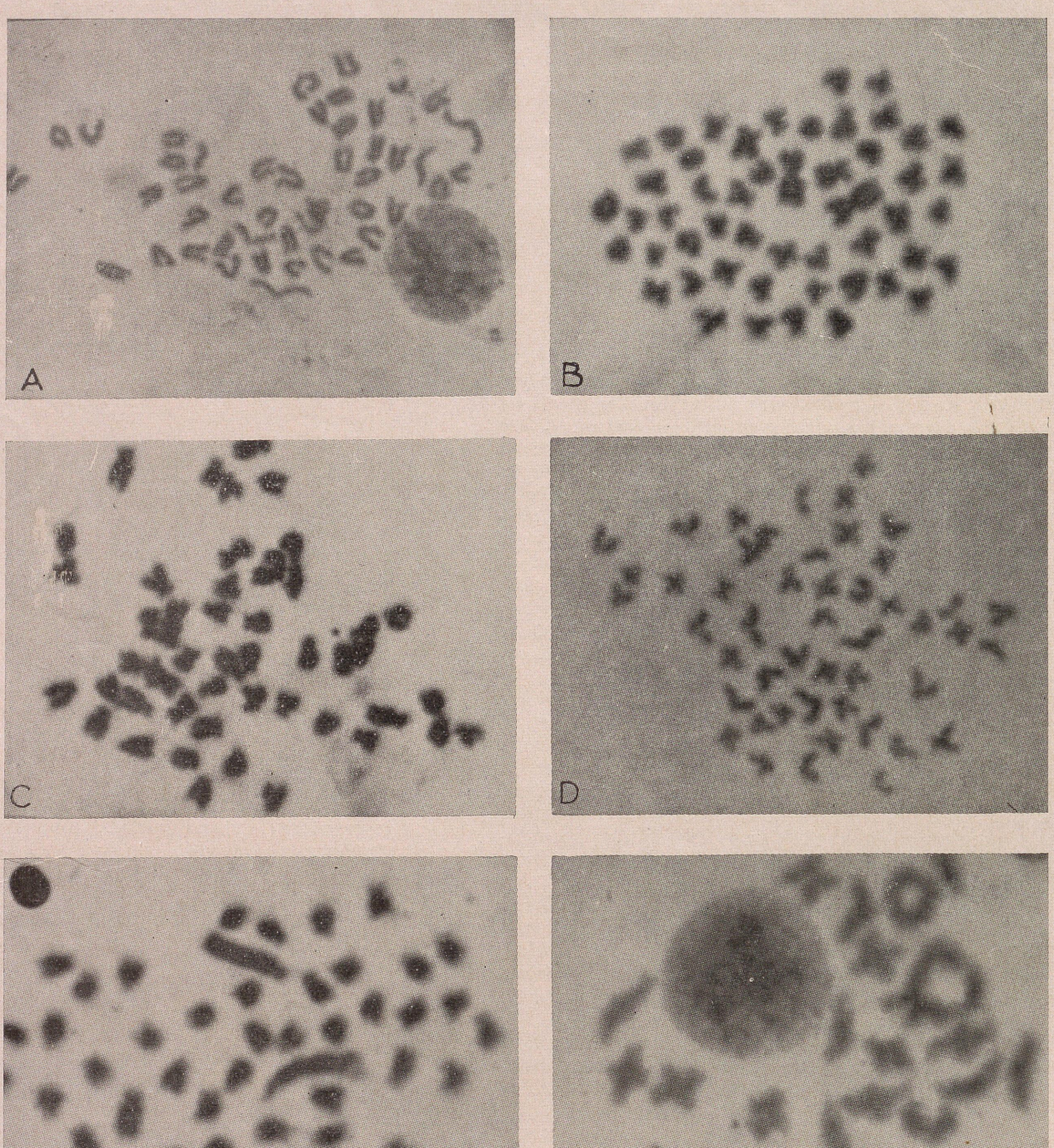

Fig. 1 — Metaphase spreads from [A, *Boleophthalmus dussumieri* 2n=46 tissue — fin, × 2130; B, *Gymnocorymbus ternetzi* 2n=50 tissue—gill, × 3100; C, *Puntius tetrazona* 2n=50 tissue-scale, × 2950; D, *Colisa fasciata,* tissue-kidney, × 3050; E, *Tilapia mossambica* tissue-intestine, ×2210; and F, The diakinesis stage- *Tilapia mossambica,*—testis, × 2460]