

of swim-bladder for a respiratory function have been reported in *Arapima*, *Gymnarchus*, *Erythrinus*, *Umbra*, *Notopterus* and *Phractolaemus*<sup>8</sup>. *P. pangasius* is an addition to this list.

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#### COPTARCA PUNCTARIA (WALKER), AN UNIQUE INDIAN ACRIDID WITH CHROMOSOMAL POLYMORPHISM (ORDER: ORTHOPTERA, CLASS: INSECTA)

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THE family Acrididae forms a group well exploited for karyological studies. Though chromosomal investigations on this group were started by Asana<sup>1</sup> in India as early as 1928, many of the karyological details of several species are not yet known. Hence a systematic chromosomal analysis was carried out on some Acridid species. The present study deals with the structural variations in chromosomes of *Coptarca punctaria*.

Six individuals of *C. punctaria* (2 males and 4 females) were collected from Ranganathittu near Mysore. The chromosomal analysis was made using testes and hepatic caecae after 3 hr treatment with 0.1 ml of 0.025% colchicine and processed for chromosomal preparations by air-dry-Giemsa method.

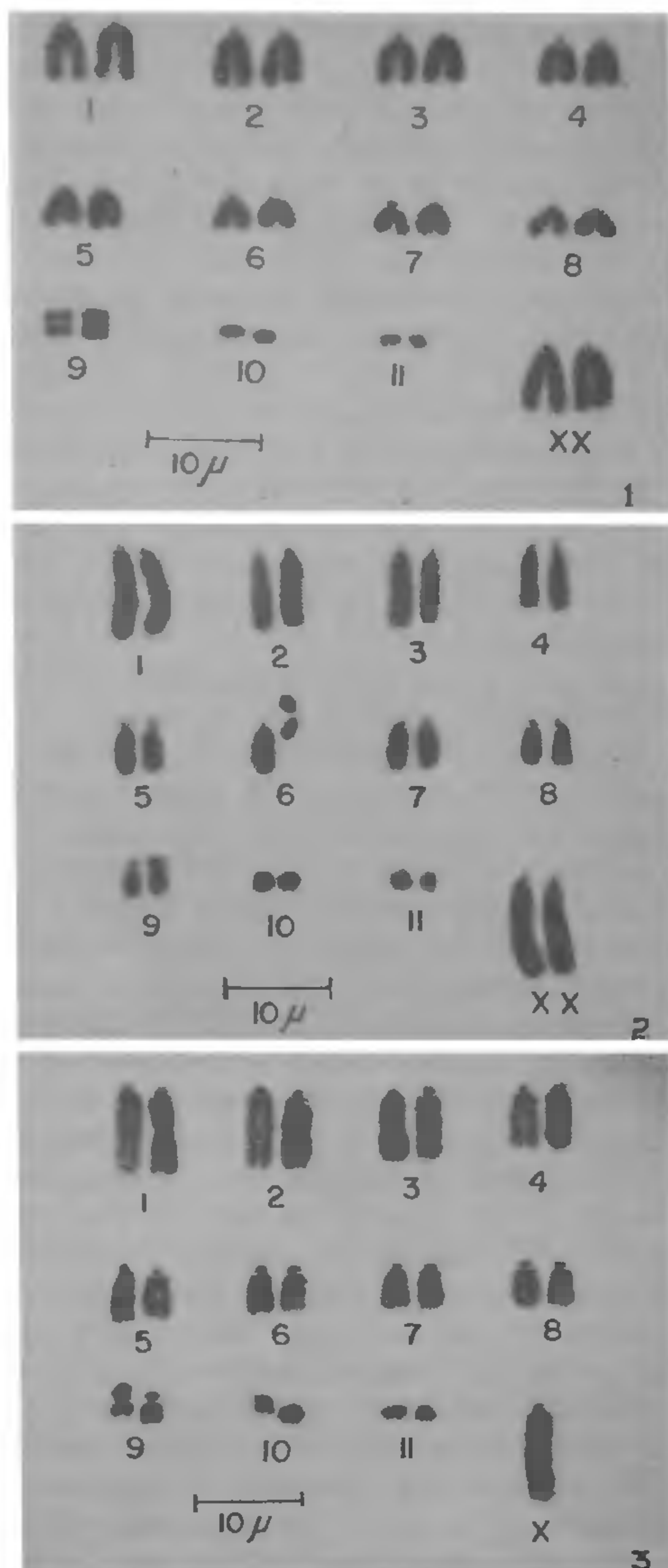
All individuals showed a somatic count of 23

(22A + XO) in males and 24 (22A + XX) chromosomes in females. No individual sample had all the acrocentric chromosomes as some chromosome pairs exhibit different morphology. The structural changes were the same in all the tissues of an individual. Based on the chromosomal composition, the karyotype is categorized into 3 types.

(i) Karyotype consisting of almost all acrocentric chromosomes, the 9th pair being metacentric (figure 1); ii) Karyotype with most of the acrocentric chromosomes, the 9th pair being submetacentric. The 6th pair is heteromorphic with meta-/acrocentric (figure 2); iii) The karyotype with almost all acrocentric chromosomes. The 9th pair is heteromorphic with meta-/submetacentric chromosomes and the heteromorphic 10th pair having meta-/acrocentric chromosomes (figure 3).

Acrididae is a huge family in which approximately 90% of the species belonging to Cryptosacci show the typical 23 chromosomes in males with all acrocentrics<sup>2</sup>. Though almost all Indian species of Acridids are reported to have only acrocentric chromosomes, there are instances of the occurrence of subacrocentric chromosomes in most of the populations as in *Poikilocerus pictus*<sup>3</sup> ( $2n=19$ , XX:XO) and metacentric chromosomes in *Gastri-margus africanus orientalis*<sup>4</sup> ( $2n=23$ ; XX:XO). In the present study, a definite change in the morphology of the 9th pair was noticed in all the individuals and this change is represented by meta-/meta-, submetacentric/submetacentric and meta-/submetacentric chromosomes. Changes are also seen in the 6th and 10th pairs (figures 1, 2 and 3). The structural variations observed in the present study are due to pericentric inversions as confirmed by the morphometric data. The pericentric inversion polymorphism is not uncommon in Acridids of other geographical regions. It is reported in the Trimerotropine grasshoppers of North America and Morabine grasshoppers of Australia and also in an Australian species *Chryptobothrus chrysophorus*<sup>2</sup>.

The presence of distinct metacentric chromosomes in *G. a. orientalis*<sup>4</sup> and the present observation annul the earlier reports that the chromosomes of Indian Acridids are all acrocentric. The present findings of structural polymorphism in a few particular pairs of autosomes (eg. 6th, 9th and 10th) appear to be amenable for further changes, more so of the 9th pair, which in course of time, could fix a karyotype of particular architecture. Hence this feature is of utmost importance and significance in karyotypic evolution.



**Figures 1-3.** 1. Female karyotype showing the metacentric chromosomes of the 9th pair; 2. Female karyotype with heteromorphic 6th (meta-/acro-) and homomorphic 9th (submeta-/submeta-) pairs of chromosomes; and 3. Male karyotype with heteromorphic 9th (meta-/submeta-) and 10th (meta-/acro-) pairs.

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#### COMPARATIVE STUDIES ON THE TOXICITY OF ENDOSULPHAN IN SOME FRESHWATER FISHES UNDER DIFFERENT pH AND HARDNESS OF WATER

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ENDOSULPHAN [Hildan 35 EC, LB-1,2,3,4,7, 7-hexachlorobicyclo (2,2,1)-heptene-(2)-bis-hydroxymethylene(5,6) sulphite] is a registered fish toxicant<sup>1</sup>. It is used extensively to control undesirable organisms. In the present study, an attempt has been made to study the toxicity of endosulphan by determining the LC<sub>50</sub> values in 3 species of exotic carps viz *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix* and *Puntius javanicus* and 2 species of Indian major carps viz *Catla catla* and *Labeo rohita* under 3 different pH and hardness of water.

Fish (fingerling) specimens were obtained from Naihati Fish Farm, West Bengal. The experiments were conducted following the methods suggested earlier<sup>2-4</sup>.

Fishes exposed to endosulphan were excited and swam around erratically and rapidly. Subsequently the fishes lay several hours on their sides on the bottom of the container. When such fishes attempted swimming they moved erratically often making somersaults. The bottom surface of fishes after some hours of exposure specially at higher concentration became very soft to the touch. Fishes that were about