The Metaphase Chromosomes of *Crocodilus niloticus*

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Introduction

Alligator mississippiensis (Matthey 1947) and *Caiman sclerops* (Matthey and van Brink 1957) are the only Crocodilia to have been studied cytologically previous to this investigation. These two crocodilians have different karyotypes. A study of *Crocodilus niloticus* was therefore of interest because it would increase our knowledge of the chromosome morphology of this ancient groups of reptiles.

Materials and methods

A young male, about 1.5 meters long, which had been kept in captivity for about three years, was shot. The testes were removed as quickly as possible, cut up into small pieces and treated in two ways. Some was immediately fixed in Champy, embedded in paraffin, sectioned at 24μ , and stained according to Newton's crystal violet technique. This method gave results by far superior to the second treatment and well repaid the extra labour involved. The rest of the testis was pretreated with water for about 20 minutes at room temperature (about 30°C) and then fixed in aceto-carmine. The fixed material was stained in bulk with Feulgen's reagent. The material was transferred to running water where it was washed until no more colour came away. Staining is more intense using this method than after washing in sulphurous acid. Small pieces were squashed on to an albuminised slide using a piece of cellophane between the coverglass and the material. The squashes were dehydrated and mounted in Euparal. This second treatment is a modification of the water pretreatment technique of Makino and Nishimura (1952).

The second treatment caused swelling of the chromosomes, note particularly Fig. 6. It is thought that this may be due to the water pretreatment being carried out at a high temperature. The effect of water pretreatment at different temperatures is being investigated.

All observations were made with Zeiss apochromatic objectives. The drawings were made with the aid of a camera lucida.

Observations

The mitotic metaphase chromosomes, Figs. 1 and 2

There were seen in all metaphase plates examined one large pair of metacentric chromosomes, two pairs of dissimilar small metacentric chromosomes, and a series of thirteen acrocentric chromosomes. There is no distinction between macro and microchromosomes.

Figs. 1-7

The first meiotic metaphase, Figs. 3, 4, 6 and 7

Sixteen bivalents were found in all metaphases examined. There were in many cases at least eight bivalents with two chiasmata. That is, five of the acrocentric chromosomes had chiasmata in their smaller second arm. The stage in meiosis figured, pro-metaphase, is one in which chromosome movement is slow for it was very abundant in the material.

The second meiotic metaphase, Fig 5

Sixteen chromosomes were visible. Some of these could be recognised as metacentric chromosomes,

There are no heterochromosomes in *Crocodilus niloticus*. This is in agreement with the observations of Matthey (1947) on *Alligator mississippiensis* and Matthey and van Brink (1957) on *Caiman sclerops*, who found no heterochromosomes in these Crocodilia. It would appear that differentiated sex chromosomes are absent in the Crocodilia.

The nombre fondamental

According to the system of Matthey (1945) the *nombre fondamental* of *Crocodilus niloticus* is 38, counting each metacentric chromosome as two and each acrocentric chromosome as one. This is satisfactory if the smaller second arm of the acrocentric chromosomes is ignored. Whether this rule is generally valid is questionable. In *Crocodilus niloticus* some of the second arms are not genetically inert because they form chiasmata.

In *Alligator mississippiensis* there are five pairs of metacentric chromosomes and six pairs of acrocentric chromosomes, a *nombre fondamental* of 42. This is the same as in *Caiman sclerops* which has 21 pairs of acrocentric chromosomes. It is obvious that observations on other Crocodilia are wanted before a general picture of the chromosome morphology of this group of reptiles is formed.

Literature cited

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