Journal of Biosphere, 8: 21-23, 2019 ISSN 2278 – 3342

Karyology of two boids of Jammu, J&K, India

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Abstract: Cytogenetics studies were carried out on two species of Indian Boids *viz. Eryx conicus* and *Eryx johnii* collected from Nagrota and Environmental Park of Jammu region (J&K). Both *E. conicus* and *E. johnii* show deviation from typical Ophidian Karyotype i.e. having 2n=34 (instead of typical 2n=36) with 16 macro and 18 microchromosomes. No heteromorphic pair is observed. NF is 42 in both the species so speciation in this genus/family might have occurred because of translocation between macro and microchromosomes.

Keywords: Boidae, Cytogenetics, Ophidian, Karyotype, Heteromorphic

1. Introduction

Snakes and Lizards are the most flourished Reptiles of the day. Karyological and biochemical data act as a supplement to morphological approach. Moreover data collected from gross anatomical, karyological and biochemical analysis when combined help in relieving valuable insight into the evolution of snakes. Amily Boidae consist of the most primitive family of snakes including two subfamilies.

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Received 19.01.2019; Revised 27.03.2019; Accepted 27.03.2019; Published 01.05.2019.

These snakes are found throughout the tropics in both the hemispheres consisting of 25 genera with almost 100 species (Smith 1943; Sahi, 1979; Sharma, 1998). However, cytological data is available for only 20 species of which most species exhibits 2n=36 having typical ophidian karyotype (Becak and Becak, 1969; Sharma and Kour, 2004, 2005) consisting of eight metacentric and eight acrocentric macrochromosomes, and 20 microchromosomes with NF=44.

2. Material and Methods

Live specimens of *Eryx conicus* and *Eryx johnii* of family Boidae were collected from natural population of Jammu i.e. Nagrota and Environmental park of J&K with the help of hand net in the month of March to September. In the laboratory, they were injected intraperitoneally with 0.9% colchicines (1ml/100gm body weight) for 24 hrs prior to dissection. An additional dose of 0.9% colchicines was given for 3hrs after first dose. Both gonadal and somatic tissues (bone marrow aspired from ribs were extracted and treated with hypotonic (0.9%) sodium citrate for 50 minutes. Hypotenised tissues were then fixed in Carnoys fixative (3 methnol :1 acetic acid) for 30 minutes. Slides were then prepared by dabbing, air dried and stained in Giemsa stain.

Results

Eryx conicus:- An analysis of 60 well spread metaphase complements from different somatic tissues of one male and two female specimens revealed a diploid count of 34 chromosomes comprising 16 macro- and 18 micro-

chromosomes include 8 metacentric, 2 subtelocentrics and 6 telocentrics. There exists a sharp distinction in size between macro and microchromosomes and all the micro-chromosomes are small, dot like with size ranging from 0.9µ to 0.3µ. Among meiotic stages, diakinesis exhibited 8 macro and 9 microbivalents. The largest macro bivalents possessed 2 chiasmata each (Fig. 1; Table 1). Due to great condensation and minute size, number of chiasmata in microbivalent was not discernible. The sex chromosomes could not be distinguished in either sex.

Table 1: Morphometric data of somatic karyotype of *Eryx conicus*

Chromosome Pair No.	Mean Length of Short arm (p) in µ	Mean length of long arm (q) in µ	RL % $\frac{p+q}{h} \times 100$ (h= Mean haploid length)	Arm ratio = p/q	Centromeric Index (CI) $\frac{P}{p+q}$	Nomenclature
1.	1.80	1.80	18.40	1.00	0.50	m
2.	1.35	1.80	16.10	1.29	0.50	m
3.	1.26	1.26	12.90	1.00	0.44	m
4.	0.90	0.90	9.28	1.00	0.48	m
5.	0.39	1.20	8.14	1.00	0.47	st
6.	--	0.99	5.60	--	--	t
7.	--	0.99	5.00	--	--	t
8.	--	0.99	5.00	--	--	t

Total length of haploid macrocomplement is 15.63µ; Total Length of microcomplement is 3.9µ; Total length of haploid set (h) is 19.53µ, and Relative percentage (RL%) of haploid macro-complement and microcomplement is 80.05 and 19.9%, respectively.

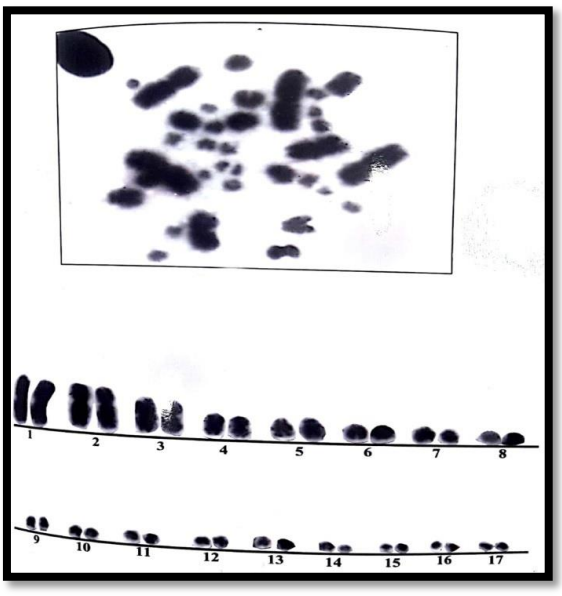

Fig. 1: Chromosomal complement of *Eryx conicus*

Eryx johnii: An analysis of 70 good metaphase plate from different somatic and gonadial tissues of 2 male and 1 female specimens revealed 34 as the diploid chromosome number in the species (2n=340 consisting of 16 macro- and 18 microchromosomes (Fig. 2; Table 2).

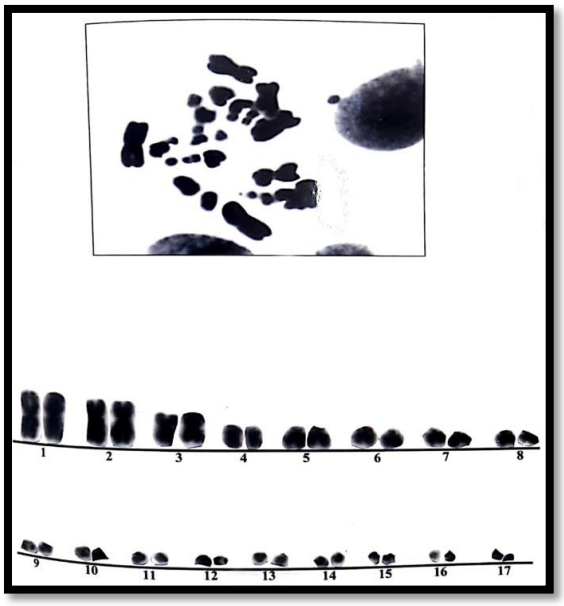

Fig. 2: Chromosomal complement of *Eryx johnii*.

The first 4 pairs of macrochromosomes have their centromere in the median position, while the remaining four pairs have subterminal centromere. The sex chromosomes are morphologically undistinguishable in both male and female. There exists sharp distinction in size between macro and microchromosomes and later appears to have terminal centromere except 2nd pair which have median centromere. The relative length percentage of mirochromosomes ranges from 0.66µ to 0.45µ with NF=42.

Table2: Morphometric data of somatic karyotype of *Eryx johnii*

Chromosome Pair No:	Mean Length of Short arm (p) in µ	Mean length of long arm (q) in µ	RL % $\frac{p+q}{h} \times 100$ (h= Mean haploid length)	Arm ratio p/q	Centromeric Index (CI) $\frac{P}{p+q}$	Nomenclature
1.	1.86	1.86	16.84	1.00	0.50	m
2.	1.56	1.92	15.76	1.23	0.55	m
3.	1.20	1.2	10.86	1.00	0.50	m
4.	0.9	0.9	8.15	1.00	0.50	m
5.	0.30	1.26	7.06	4.2	0.19	st
6.	0.30	1.20	6.79	4.0	0.2	st
7.	0.24	1.14	6.25	4.75	0.21	st
8.	0.18	1.14	5.97	6.3	0.15	st

Total length of haploid macrocomplement is 17.16µ; Total Length of microcomplement is 4.92µ (22.2%); Total length of haploid set (h) is 22.08µ, relative percentage of haploid macrocomplement is 77.8% of haploid length, and relative percentage (RL%) of haploid micro complement is 22% of total haploid length.

Discussion

This is the primitive family of non-poisonous snakes. Underwood (1967) recognized 3 subfamilies of Boidae viz. Coxoceminae, Pythoniae and Boinae. So far only 22 species of this family have been worked out cytologically of which most species possess 2n=36 i.e. typical Ophidian karyotype except genera *Corallus* and *Eryx*.

Genus *Eryx* is different from other Boids in the sense that there are 2 chromosomes less in this Genus i.e. 2n=34 which is substantiated from present study and this reduction in chromosome number is explained by the fact that there has been convergent karyotypic evolution within the genus (Singh, 1972).

Both the species presently investigated has earlies been worked out by Singh *et al* (1970) and Singh (1972) and the present results co-accords with the previous report except that in *E. conicus* pair 5^{th} is subtelocentric last 2 pairs appear as subtelocentric but were reported reported to be telocentric by Singh *et al*. (1970) these variations are attributed to pericentric inversions resulted in different geographical location.

No heteromorphic sex chromosome has been observed in either of 2 species studied during present investigation which substantiate the previous report indicating absence of well defined sex chromosomes in Boids.

Both the species of *Eryx* under study possess similar diploid no. 2n=34 and NF = 42 but show variation in the %age relative length of macro- and microchromosomes, therefore, it is believed that speciation in this genus might have occurred by translocation involving macro and microchromosomes

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