

## 18. EVOLUTION AND SEX CHROMOSOMES IN *SERPENTES*

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A basic karyotype consisting of eight pairs of macrochromosomes and ten pairs of microchromosomes appeared to be possessed by the majority of snakes. Most of the species were studied by utilization of short term culture techniques (Beçak *et al.*, 1963, 1964). The diploid number of 38 chromosomes was found in the family BOIDAE, species *Boa constrictor amarali*, *Boa constrictor constrictor*, *Eunectes murinus* and *Epicrates cenchria crassus*; in the family COLUBRIDAE, species *Spilotes pullatus anomalepis*, *Spilotes pullatus maculatus*, *Drymarchon corais corais*, *Dryadophis bifossatus bifossatus*, *Chironius bicarinatus*, *Chironius quadricarinatus*, *Philodryas olfersii olfersii* and *Philodryas aestivus*, and in the family CROTALIDAE, species *Lachesis muta*, *Bothrops jararaca*, *Bothrops atrox*, *Bothrops alternatus*, *Bothrops jararacussu*, *Bothrops pradoi*, *Bothrops insularis* and *Crotalus durissus terrificus*. Deviations from this were encountered in the species *Corallus caninus* ( $2n = 44$ ) of the family BOIDAE, *Micrurus lemniscatus* ( $2n = 42$ ) of the family ELAPIDAE, and in the species *Clelia occipitolutea* ( $2n = 50$ ), *Oxyrhopus petola* ( $2n = 46$ ), *Phrynonax* sp. ( $2n = 38$ ), *Thamnodynastes strigatus* ( $2n = 32$ ), *Tomodon dorsatus* ( $2n = 32$ ), *Xenodon merremii* ( $2n = 30$ ), *Erithrolampus aesculapii venustissimus* ( $2n = 28$ ), *Liophis miliaris* ( $2n = 28$ ), *Tropidodryas serra* ( $2n = 28$ ), *Hydrodinastes bicinctus* ( $2n = 24$ ) and *Lejosophis gigas* ( $2n = 24$ ) of the family COLUBRIDAE (Beçak *et al.*, 1962; Beçak, 1965). The analysis of the diploid number and of the karyotypes of these snakes of the family COLUBRIDAE, indicates that, the more evolved the species, according to systematic criteria, the smaller the diploid number. In those species the reductions in number are mainly due to reduction in the number of microchromosomes (Beçak *et al.*, 1965).

Uniformity of the suborder SERPENTES with regard to the total genetic content was established not only for those species possessing the basic karyotype but also for those with deviating numbers (Beçak *et al.*, 1964; Atkin *et al.*, 1965).

In the ophidians the fourth largest pair of the basic karyotype is generally the sex pair regardless of family. In the primitive BOIDAE the Z and W are still homomorphic to each other. Among the COLUBRIDAE initial steps towards the development of the heteromorphism between the male determining Z chromosome and the female determining W chromosome could be seen. The fourth pair is still represented by homomorphic chromosomes, in *Pseustes sulphureus*. Both members of the fourth largest pair in the female were still the same in absolute size, but a pericentric inversion appeared to have occurred in the W chromosome

which is a subterminal element in the species *Spilotes pullatus*, *Drymarchon corais*, *Dryadophis bifossatus*, *Chironius bicarinatus*, *Chironius quadricarinatus*, *Philodryas olfersii*, *Philodryas aestivus* and *Tropidodryas serra*. Another approach toward heteromorphism was taken in *Clelia occipitolutea* in which the W is twice as large as the Z. In *Tomodon dorsatus* ( $2n = 32$ ), *Thamnodynastes strigatus* ( $2n = 32$ ), *Xenodon merremii* ( $2n = 30$ ) and *Liophis miliaris* ( $2n = 28$ ) of the family COLUBRIDAE and all species of the family CROTALIDAE the highly advanced poisonous snakes of the New World the W has become a distinctly smaller element comparable in degree of specialization to the minute W of birds (Beçak *et al.*, 1964).

#### LITERATURE

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