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Short Communication

The karyotype of the critically endangered Lear's macaw, *Anodorhynchus leari* Bonaparte 1856 (Aves, Psittaciformes)

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Abstract

We used conventional chromosomal staining to describe the karyotype of the critically endangered Lear's macaw, *Anodorhynchus leari* Bonaparte 1856. A diploid number of 2n = 70 and a karyotype similar to that of its congener *Anodorhynchus hyacinthinus* suggests that chromosomal rearrangements were not the main evolutionary mechanism in the genus.

Key words: birds, karyotype, chromosomes, Psittaciformes, endangered species.

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The Lear's macaw (*Anodorhynchus leari* Bonaparte 1856) is endemic to Brazil and is one of the most endangered bird species in the world as cited in Appendix I of the Convention for the International Trade of Endangered Species (CITES). According to the 2004 census carried out by the Brazilian Institute of the Environment and Renewed Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA) there are 500 free Lear's macaw living in a restricted area in the Northeastern Brazilian state of Bahia.

Lear's macaw is one of the three species of the genus *Anodorhynchus*, the other two being the Glaucous macaw (*Anodorhynchus glaucus* Vieillot 1816), which is considered extinct (Sick, 1997), and the Hyacinth macaw (*Anodorhynchus hyacinthinus* Latham 1790), which although comprising nearly 5000 specimens (Collar and Juniper, 1992) is also included in Appendix I of CITES. The greatest threats to the survival of the Lear's macaw are illegal trapping and habitat destruction.

The home range of Lear's macaw was unknown for over a century but some live bird collections assigned its origin to Brazil. Finally at the end of 1978 the home of the Lear's macaw was found to be the Raso da Catarina area in Northeastern Bahia. Most of the area is covered by deep loose sand and dense 'caatinga', a low, frequently thorny vegetation, adapted to the extremely dry climate (Sick *et al*., 1979).

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Continued research into the general biology of this critically endangered species is clearly of enormous importance for the valid management of Lear's macaw but although studies on its breeding behavior as well as nest monitoring, habitat management and censuses have been undertaken (Yamashita, 1987; Brandt & Machado, 1990) there was till now no information on its chromosome constitution.

In this paper we describe for the first time the karyotype of Lear's macaw and compare this karyotype with that recently published for *A. hyacinthinus* (Lunardi *et al.*, 2003).

Two female and two male *A. leari* maintained by RIOZOO Foundation were analyzed using mitotic chromosomes obtained by the direct culture of young feather pulp (Sandness, 1954), with modifications. The chromosomes were stained with 3% Giemsa in phosphate buffer, pH 6.8 and examined at a 100x magnification. The description of chromosome morphology was based on Levan *et al.* (1964).

The diploid chromosome number for *A. leari* was 2n = 70, comprising 22 macrochromosomes and 48 microchromosomes. Chromosome pairs 1, 7 and 10 were metacentric, pairs 2, 3, 4, 5, 6 and 9 were subtelocentric and pair 8 was submetacentric. The Z chromosome was a metacentric comparable in size with the fifth chromosome pair. The W chromosome was submetacentric and about the same size as chromosome 9 (Figure 1).

The karyotype of *A. leari* was similar to that of *A. hyacinthinus* described by Lunardi *et al.* (2003), divergence being related to chromosome pairs 5, 6 and 9 which were classified as submetacentric in *A. hyacinthinus* by Lunardi *et al.* (2003) while in *A. leari* they are classified as subtelocentric. These divergencies are probably related to the methodology used to classify the chromosomes, because, visually, they have the same morphology on both species.

The karyotypes of these two *Anodorhynchus* species are similar to those described for members of the genera *Cyanopsitta*, *Propyrrhura*, *Aratinga*, *Pionites*, *Pionopsitta*, *Nandayus* and *Guaruba*, distinguished by a conserved metacentric pair 1, pairs 2, 3, 4, 5, 6 varying from submetacentric to subtelocentric, pairs 7 and 8 varying from metacentric to submetacentric, and pairs 9, 10 and 11 varying from metacentric to telocentric (De Lucca, 1984; Van Dongen and De Boer, 1984; De Lucca *et al.*, 1991; Duarte and Giannoni, 1990; Goldschmidt *et al.*, 1997; Francisco *et al.*, 2001; Francisco and Galetti Jr., 2001; Lunardi *et al.*, 2003). The maintenance of the diploid number among these genera and the occurrence of variation of the centromeric position of the macrochromosomes suggests that in this group the main evolutionary mechanisms for karyotypic differentiation were inversions and/or translocations (De Lucca *et al.*, 1991).

Figure 1 - Metaphase and karyotype of a female *Anodorhynchus leari.*

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