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Chromosome Painting in Neotropical Long-Tailed Psittacidae (Aves, Psittaciformes): Phylogeny and Proposal of a Putative Ancestral Karyotype for Tribe Arini


Programa de Pós-Graduação em Genética e Biologia Molecular, PPGBM, Universidade Federal do Pará, Belém, Brazil; Programa de Pós-Graduação em Ciências Biológicas, Universidade Federal do Pampa, São Gabriel, Brazil; Programa de Pós-Graduação em Ciências Exatas e Naturais, Universidade Federal do Pará, Belém, Brazil

Department of Veterinary Medicine, University of Cambridge, UK; Instituto de Ciências Exatas e Naturais, Universidade Federal do Pará, Belém, Brazil

Most neotropical Psittacidae show a 2n = 70 and a dichotomy in the chromosome patterns. Long-tailed species have biarmed macrochromosomes, while short-tailed ones have telo/acrocentric macrochromosomes. However, the use of chromosome painting with chicken and white hawk probes has demonstrated that the karyotype evolution in Psittacidae included a high number of inter/intrachromosomal rearrangements. Hence, in order to infer about the phylogeny of long-tailed species as well as to propose a putative ancestral karyotype for this group, we analyzed the homology map of *Pyrrhura frontalis* (PFR), comparing it to other previously analyzed long-tailed species. Chromosome preparations were obtained from fibroblast cultures from skin biopsy of a female kept at Parque Zoológico do Rio Grande do Sul. Chromosomes were analyzed by conventional staining and FISH, using whole chromosome paints of *G. gallus* (GGA) and *L. albicollis* (LAL). Conventional staining showed a karyotype with 2n = 70, with biarmed macrochromosomes. The comparison of the results with the putative avian ancestral karyotype (PAK) showed the following correspondence: PAK1 (GGA1) = PFR1q and PFR4, PAK2 (GGA2) = PFR2, PAK3 (GGA3) = PFR3, PAK4 (GGA4q) = PFR1p, PAK5 (GGA5) = PFR5q, PAK6 (GGA6) = PFR6q, PAK7 (GGA7) = PFR6p, PAK8 (GGA8) = PFR7, PAK9 (GGA9) = PFR8, PAK10 (GGA10) = PFR9, and PAK11 (GGA4p) = PFR10. Fusion PAK6/PAK7 (PFR6) showed a paracentric inversion. LAL probes confirmed these results. The results indicate that PFR retained a more basal karyotype when compared to *Anodorhynchus hyacinthinus*, *Ara macao*, and *Ara chloropterus* because these 3 species show the fusion PAK8/PAK9, not observed in PFR. Hence, we suggest the ancestral karyotype for long-tailed species presented the fusions PAK1q/PAK4 and PAK6/PAK7, and additionally, a pericentric inversion in PAK6/PAK7, while fusion PAK8/PAK9 would have appeared in the common ancestor of *A. hyacinthinus*, *A. macao*, and *A. chloropterus*.

E-Mail: ehco@ufpa.br