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Cytogenetic research in wild animals at FCAVJ, Brazil. II. Birds

ML Giannoni, JMB Duarte, MEG Moro, J Boer

Faculdade de Ciencias Agrarias e Veterinárias (FCAVJ), UNESP 14870 Jaboticabal, São Paulo, Brazil

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In order to study chromosomal polymorphism in natural populations, to evaluate karyotype evolution and to sex birds that do not have morphological sexual dimorphism, the short-time technique of culturing the feather pulp was improved (Giannoni *et al*, 1986) by minor modifications of the method described by Schoffner (1985). Several techniques have used feather pulps as material for cytogenetic studies. The first description of the use of this material was given by Sandnes (1954). Shoffner propagated and improved the method using feather pulps (Schoffner and Krishan, 1965; Schoffner *et al*, 1967; Schoffner, 1985). The main advantage of these assays is that they provide the possibility of studying rare, wild living birds and/or birds from zoos, without any trauma for the animal. The material can be obtained from young birds, but also from adult animals having no growing feathers. In the latter case, 6–10 feathers are removed. The removed feathers are replaced by new ones, 10–20 days later, and these can also be used. Feathers from recently deceased birds can also be used. The gelatinous material from 7–10 growing feathers was macerated in a Petri dish with 8 ml of complete medium (medium + 0.4 ml phytohemagglutinin + 20% serum) and placed in an incubator at 39°C. After 4 h of incubation, 5–6 drops of a 0.0016% colchicine solution was added, the Petri dish containing the material was returned to the incubator for an additional 2 h before hypotonization (0.075 M KCl), fixation (acetic acid:methanol, 1:3), and staining with Giemsa in the usual manner. The C- and NOR (nucleolar organizer region)-bands were obtained according to the techniques of Sumner, (1972) and Howell and Black (1980), respectively, after analysis of the Giemsa-stained slides, without previous destaining. The results have been satisfactory for materials from various birds (such as partridge, shore-birds, parrot, macaw, toucan, Florida gallinule).

RESULTS AND DISCUSSION

Chromosomal polymorphism

Studies of chromosomal polymorphism were carried out in Rallidae species. An inversion was detected in *Porzana albicollis* in chromosome pair 5 (fig 1.1). The animals were reared in captivity for analysis of meiotic pairing in heterozygotes.

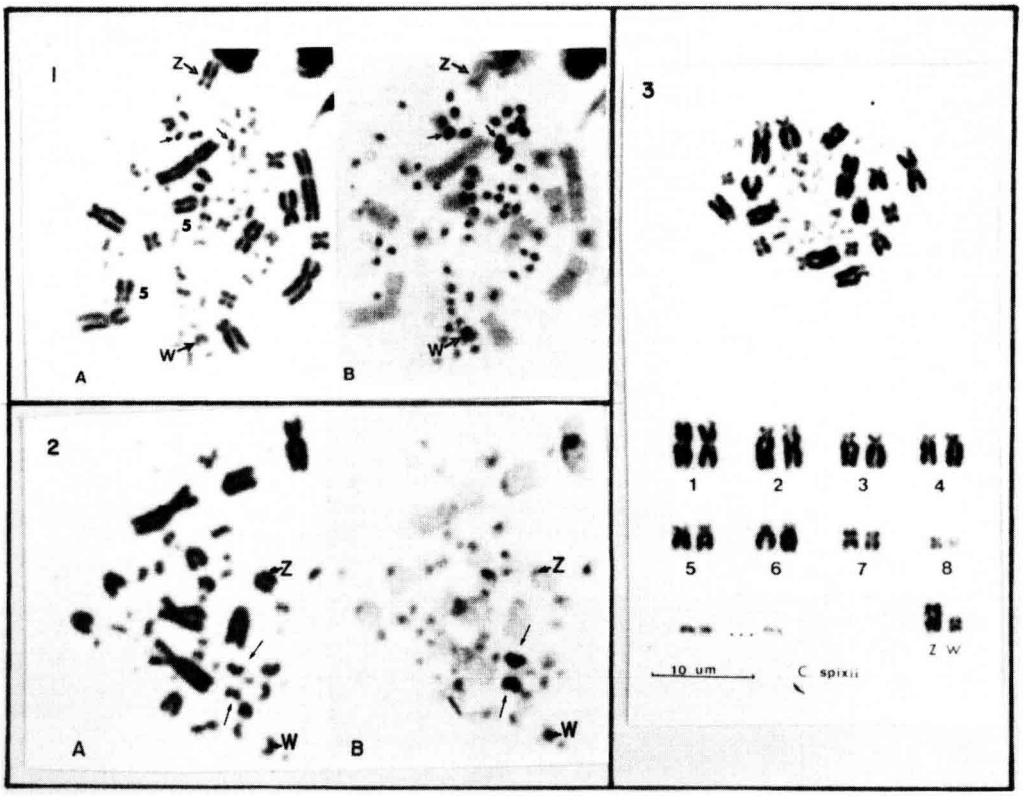

Fig 1.1. Metaphase of a female *Porzana albicollis:* Giemsa-stained (**A**) and C-banded (**B**). **2.** Metaphase of *Rhynchotus rufescens:* Giemsa-stained (**A**) and C-banded (**B**). **3.** Metaphase and karyotype of the blue macaw, obtained from the pulp of the feather and Giemsa-stained.

Description of the basic karyotype

Partridges (*Rynchotus rufescens*) are reared at the Center of Study and Research on Wild Animals 'Prof Dr Marcos Antonio Giannoni' in order to explore their importance in animal production and are being cytogenetically analyzed in order to establish their basic karyotype and chromosome band patterns (fig 1.2).

Sexing

Material from Psittacidae, Ramphastidae and Cathartidae, provided by zoos and breeders, has been used for sex determination. An atlas of the karyotypes of Brazilian birds that do not express sexual dimorphism will be prepared to help advance the sexing program by better recognition of the sex chromosomes. Figure 1.3 shows the karyotype of the little blue macaw (*Cyanopssita spixii*) that is no longer found in nature (Roth, 1987). The 'Spixii Macaw Committee' requested that the last specimens kept in captivity be sexed so that pairs could be established for mating.

C-bands

Sequential banding analyses of materials from *Porzana albicollis* (Rallidae) and from *Rhynchotus rufescens* are presented in figure 1.1 and 1.2, respectively, which clearly demonstrate the absence of characteristic C-banding patterns in the W chromosome. Thus, this banding technique is not efficient for sexing these birds. In figure 1.1 and 1.2 (*P albicollis* and *R rufescens*, respectively), a small autosomal pair is seen (small arrow) that is being considered as a microchromosome in metaphases stained with Giemsa; its size is similar to that of chromosome 9 in the same metaphase with C-banding (fig 1.1B). The reason for the heterochromatization of this pair is still unknown to us.

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