Chromosome Patterns of 7 Species of Leaf-Nosed Bats of Venezuela (Chiroptera-Phyllostomidae)

The chromosomes of various members of the family Phyllostomidae have recently been studied by BAKER[1], and HSU et al.[2] on specimens from Mexico, in the northern limit of the Neotropical region. BAKER[1] did not find any karyotypic variation, interpopulational or geographical, in the Mexican material he studied. This confirms the fact that chromosomes of bats are in general highly conservative. The authors also found an unusual sex mechanism in some species, with a male XY_1Y_2 system. It seems useful, therefore, to see how bats of the same species studied by the above mentioned authors, but from far distant localities, behave in chromosome structure.

We studied the chromosomes in specimens of *Phyllostomus discolor discolor, Artibeus jamaicensis jamaicensis, Artibeus lituratus palmarum, Carollia perspicillata, Sturnira lilium* and *Sturnira ludovici* from Venezuela to compare with the specimens of the same species reported by the above-mentioned authors. We also describe here for the first time the chromosomes of *Phyllostomus hastatus*. Chromosome preparations were obtained from bone marrow, using the FORD and WOOLAND[3] technique with some modifications. Chromosome nomenclature follows LEVAN et al.[4]. The chromosomes of *Phyllostomus discolor discolor* were studied in 3 males and 1 female from Rancho Grande, Aragua. These specimens bear catalogue numbers MBUCV 1–1594, 1–1672, 1–1673 and 1–1674 (Museo de Biologia, Universidad Central de Venezuela). Chromosomes of *Phyllostomus hastatus* were investigated in 3 males and 1 female from Rancho Grande, Aragua (the males bear the catalogue numbers ROM 9967, 9968 and 9969, Royal Ontario Museum, and the female is MBUCV 1–1592), 1 female from San Cristobal, Tachira (MBUCV 1–1757) and 2 males from El Dividive, Trujillo (MBUCV 1–1754 and 1–1755). We studied 2 males and 1 female specimens of *Artibeus lituratus palmarum* from Rancho Grande, Aragua (ROM 9978, 9979 and 9980). *Artibeus jamaicensis jamaicensis* was studied in 1 male specimen taken 59 km south-east of Maturin, Monagas (MBUCV 1–1593) and 1 female from Las Horquetas, Aragua (MBUCV 1–1751). 1 male of *Carollia perspicillata* from Rancho Grande, Aragua (MBUCV 1–1758) and 1 male and 1 female from Las Horquetas, Aragua (MBUCV 1–1752, 1–1753) were studied. Also we studied 1 female of *Sturnira lilium* from Guamitas, Aragua (MBUCV 1–1747) and 1 female and 1 male from Las Horquetas, Aragua (MBUCV 1–1749, 1–1750). 1 male specimen of *Sturnira ludovici* was studied, from Las Horquetas, Aragua (MBUCV 1–1748).

We studied 50 metaphase spreads of *Ph. hastatus* and 27 of *Ph. discolor*. Both species have the diploid number of 32 chromosomes. All autosomes are metacentric or submetacentric, and they grade smoothly in size from large to small. The sexual pair is formed by a medium sized metacentric X and a small acrocentric Y. The chromosomes of *Ph. hastatus* (Figure 1) are quite similar to those of *Ph. discolor* in all the autosomes and the allosomes, except for the last pair of autosomes. In *Ph. hastatus* this pair is formed by small acrocentric chromosomes, whereas in *Ph. discolor* this pair is formed by metacentric ones. This is one of the few known cases of chromosome diversity at the intrageneric levels in bats, as both in Vespertilionids[5] and Phyllostomids[1,2], the condition generally found is that undifferentiated karyotypes among different species of the same genus. The cells investigated of *Artibeus lituratus* (Figure 2) and *Artibeus jamaicensis* (30 metaphases of the former and 28 of the latter) give 31 chromosomes in the male and 30 chromosomes in the female with a male XY_1Y_2 sexual system. The autosomal complement is identical in the 2 species. The chromosomes of *Carollia perspicillata* (Figure 3) were studied in 37 metaphases which afforded a number of $2N = 20$ in females and $2N = 21$ in males, representing another example of the male XY_1Y_2 sexual system and with well marked secondary constrictions in the X. With respect to *Sturnira lilium* (Figure 4) and *Sturnira ludovici*, 26 and 6 metaphases were studied respectively, affording a diploid number of 30 chromosomes.

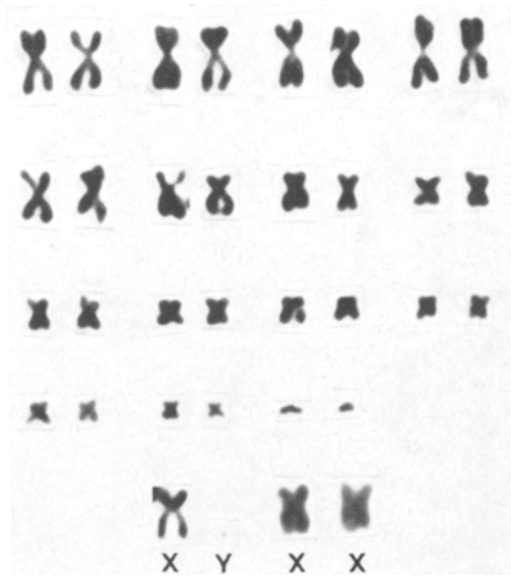

Fig. 1. Karyotype of *Phyllostomus hastatus*.

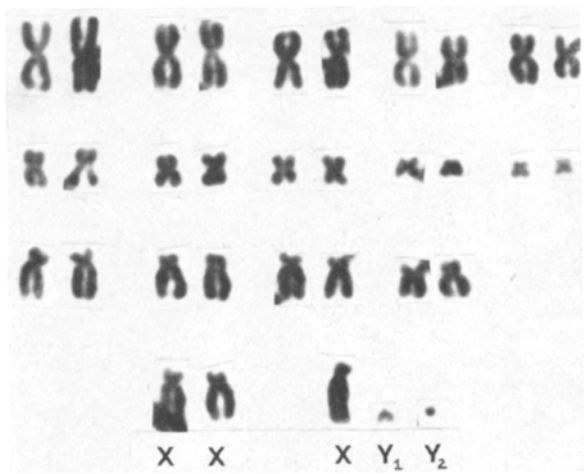

Fig. 2. Karyotype of *Artibeus lituratus palmarum*.

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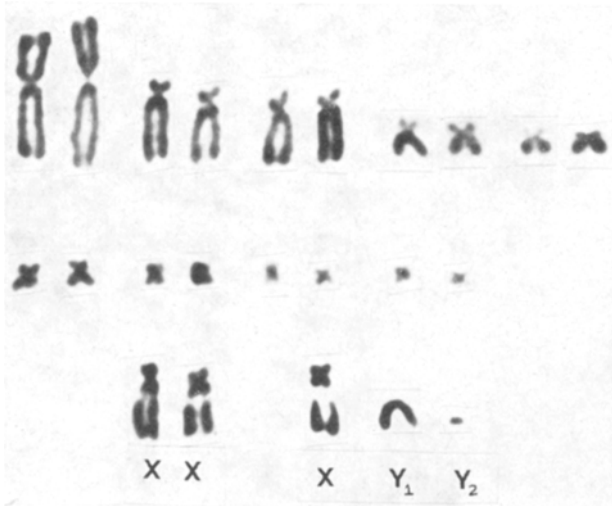

Fig. 3. Karyotype of *Carollia perspicillata*.

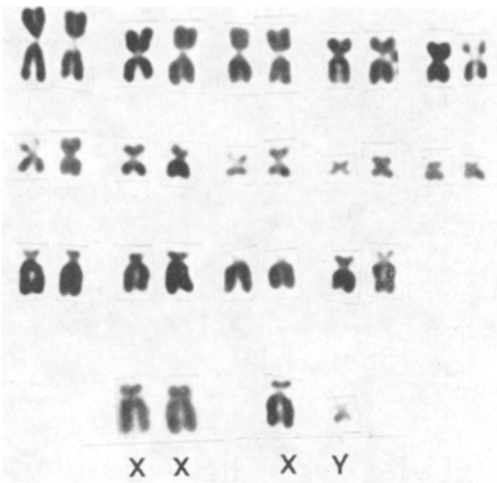

Fig. 4. Karyotype of *Sturnira lilium*.

The results of our investigations do not show any significant difference with the karyotypes described for the same species from various localities of Mexico, as reported by BAKER[1] and by HSU et al.[2], separated by more than 3000 km. The same is true for *A. lituratus* as compared with the information afforded by BEÇAK et al.[6] from specimens of São Paulo, Brazil.

The double *Y* sexual system in males, found in very few mammalian species, would seem to be a peculiar characteristic of some species of leaf-nosed bats, and it is found in at least 2 different subfamilies (Phyllostominae and Carolliinae). The origin of these allosomes is apparently different, since their shapes are markedly different in the 2 subfamilies. At any rate, phylogeny of these allosomes is still doubtful and new information will be needed to shed light on this problem and to determine its true extension and significance within the group.

Resumen. Se estudiaron los cromosomas de 7 especies de murciélagos filostómidos de Venezuela. Se compararon con los estudios realizados en México, no encontrándose diferencias significativas y confirmando el sistema XY_1Y_2 en algunas especies. En *Ph. hastatus* se observó una diferencia en un par autosómico; un caso de variación intragenérica.

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Nucleolonema in Lemon Fruit Nucleoli (*Citrus limon* L.)

The heterogeneous nature of the nucleolus has been demonstrated in plant and animal organisms. Opinions differ, however, concerning the structural components of the nucleolus, especially with respect to the nucleolonema-nucleoloplasm concept of ESTABLE and SOTELO[1–5]. Optical confirmation of the presence of the nucleolonemata in nucleoli of various plant species has been obtained recently[6,7]. This communication presents evidence of the presence of a nucleolonema in interphase nuclei of lemon fruit tissue, a structure which has previously been referred to as 'strand-like' and 'linear' components[8–11].

Materials and methods. Stalks from juice vesicles of mature lemon fruits (*Citrus limon* L.) were inoculated aseptically onto mineral-sucrose solution (pH 5.0–6.0) in 'Pyrex' Petri dishes lined with Whatman No. 40 or 42 'Ashless' filter paper or Whatman GF/A glass filter paper and kept in the dark at 25 °C[12]. 1–3-day-old explants were fixed in Randolph's CRAF solution[13] and unstained paraffin sections (12 μ thick) and unstained squash preparations made as described previously[10,11,14]. Squash preparations dehydrated with isopropanol were cleared with xylene and mounted in 'Sira' mountant instead of 'Euparal'.

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