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Short Communication

A new cytotype for the El Carrizo deer mouse *Peromyscus ochraventer*

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Abstract

Peromyscus ochraventer is a rodent species endemic of Mexico. In 1981, Robbins and Baker described its karyotype from one single female which presented 2n = 48 and FN = 60. In this paper we describe the Y chromosome of the male and a new cytotype for the species, 2n=48, FN= 58, that was identified in all of the collected specimens. The FN = 58 is due to one pericentric inversion in chromosome 6, as shown by G-banding pattern.

Abbreviations

2n: Diploid number; FN: Fundamental Number; m: meters; A: Acrocentric; B: Biarmed; B´: Biarmed with deletion

Introduction

El Carrizo deer mouse is a rodent endemic to the Sierra Madre Oriental, Mexico, which inhabits in humid forests between 400 and 1500 m, in three discontinuous areas of Tamaulipas and San Luis Potosí states [1]. *P. ochraventer* has been assigned to the mexican group of the genus *Peromyscus* based on morphological, anatomical and ecological traits [2-4]. In 1981, Robbins and Baker [5] described the karyotype of *P. ochraventer* from a female specimen collected in southern San Luis Potosí at the limit of its distribution, which had a diploid chromosome number 2n = 48 and a fundamental number FN = 60. The purpose of this paper is to describe a new cytotype found in specimens from three populations located in the north, center and south of the species distribution.

Methods

Thirty-five specimens were collected in 3 different localities: Tamaulipas, Rancho El Cielo, 5 ♂ and 4 ♀; San Luis Potosí, Maguey de Oriente 10 ♂ and 10 ♂, Copalillo 3 ♀ and 3 ♀ (Figure 1). Somatic metaphases were prepared according to Baker, et al. 2003 [6]. The diploid number, 2n, was determined by examining an average of 50 mitotic metaphases from each individual. Karyotypes were prepared with 5 mitoses of excellent quality from each organism, photographed with an Olympus 7.5X zoom digital camera and a Zeiss 100X microscope objective. The chromosomes were arranged according to the *Peromyscus* Chromosome Standardization Committee [7] and described following Patton's classification criteria [8]. G-bands were obtained following the procedure of Wang and Federof [9]. The karyotype of this species was compared with that described by Robbins and Baker [5] and with those of some species that are part of the groups to which this rodent has been assigned.

Results and discussion

The 175 metaphases analyzed revealed that *P. ochraventer* showed a conservative karyotype along its distribution. The chromosomal and fundamental numbers found are *2n* = 48 and *FN* = 58, respectively. Pairs 1, 2, 3, 9 were submetacentric, 4-8, 10-21 acrocentric and pairs 22, 23 were metacentric; the X chromosome was a large submetacentric. The Y chromosome resulted to be a small acrocentric one with two heterochromatic bands, one close to the centromere and the other in the distal part (Figure 2A). All of the specimens from the 3 populations examined in this study shared the same G-banding pattern (Figure 2B and 2C).

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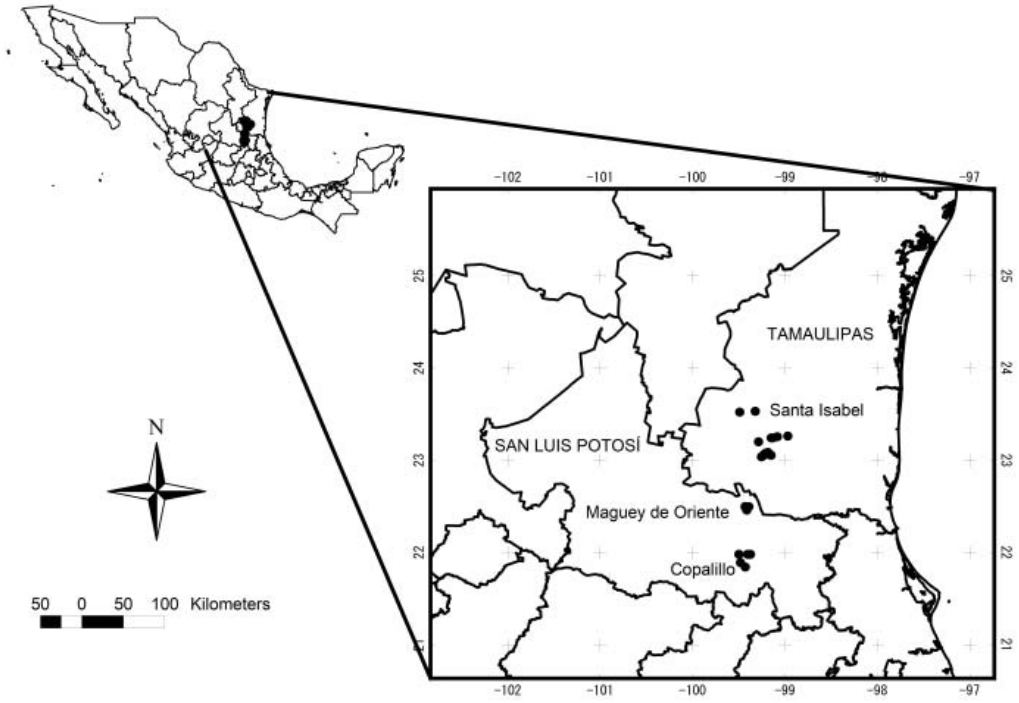

Figure 1: Distribution map of *Peromyscus ochraventer* and locations where specimens were collected to prepare the karyotype.

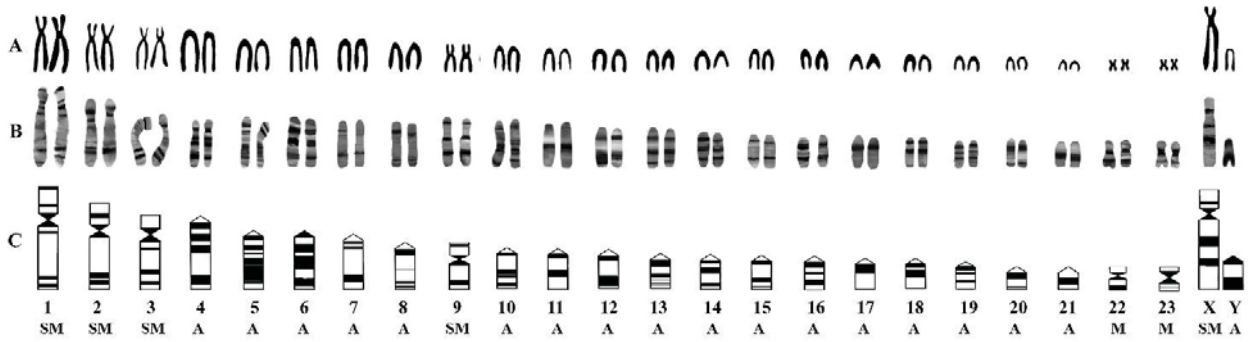

Figure 2: New cytotype of *P. ochraventer*. 2A Karyotype of *P.* ochraventer with conventional staining. 2B G-Banding pattern of the new cytotype of *P. ochraventer*. 2C Ideogram with G bands.

The karyotype reported here, like that of Robbins and Baker [5] presented the primitive condition of the *Peromyscus* genus with chromosomes 1, 22 and 23 biarmed but differs in the condition of par 6, resulting in the presence of 2 cytotypes for this species. Of the 36 specimens studied so far, pair 6 is acrocentric in 35 of them (this paper) and only in one it is submetacentric [2]. Based on the G-bands of pair 6, the difference between the two cytotypes can be explained by the occurrence of one pericentric inversion. In both karyotypes this chromosome has 4 bands but with different distribution. In that of Robbins and Baker [5], there is 1 band in the short arm and 3 more in the long arm. In the cytotype here described, the same 4 bands are in the long arm. Our results agree with Rogers, et al. [10] who reported that pericentric inversions are the most frequently chromosomal rearrangement found among the species of genus *Peromyscus.*

The common form of pair 6 is the Acrocentric one (AA) reported in *P. guatemalensis*, *P. gymnotis*, *P. mexicanus*, *P. yucatanicus*, *P. zahrynchus*, *P. furvus*, *P. megalops*, *P. melanurus*, *P. nudipes*, *P. perfulvus*, *P. melanophrys*, *P. gratus*, *P. difficilis*, *P. pectoralis*, *P. beatae*, *P. crinitus*, *P. polionotus* and *P. boylii* [1,10-21].

A second homomorphic form has been described: the submetacentric one (BB). In the cytotype of *P. ochraventer* described by Robbins and Baker [5] pair 6 shows this condition which is also found in *P. maniculatus* [14-16,22,23].

One heteromorphic condition of chromosome 6 (AB) is observed in *P. levipes* [18] and *P. maniculatus* [14-16, 22,23].

It has also been observed that chromosome 6 is prone to suffer other kind of rearrangements. In addition to pericentric

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inversions, several authors have reported that in some species deletions (B´) in the same pair have occurred giving rise to two more conditions: AB´ and B´B´. *P. maniculatus* [14-16,22-23]. *P. oreas* and *P. sitkensis* [1,10,19], show the first form (AB´); the second one has been registered in *P. melanotis* [14-16].

Greenbaum and Baker [14] reported that the centromere position in the Y chromosome is variable. In *P. ochraventer* this chromosome is acrocentric like in other species of the mexicanus group: *P. mexicanus*, *P. guatemalensis* and *P. zarhynchus* [19]. The G-banding pattern showed two bands, one in distal position and the other close to the centromere.

Along its taxonomical history, *P. ochraventer* was related most frequently to the mexicanus species group until this species was assigned to the incertae sedis position by Musser and Carleton [24].

Bradley, et al. [25] based on the mitochondrial cytochrome-b sequences analysis found that *P. ochraventer* is related to the group truei, more closely to the clade truei which include *P. gratus* and *P. truei* species. However, the taxonomic position of *P. ochraventer* remained uncertain.

The karyotype of the species of the truei group shows variation in the number of chromosomes with two arms ranging from 5 to 8. The cytotype of *P. ochraventer* described in this paper is similar to that of *P. gratus*, except for the biarmed pair 4 of this species [26]. Another similitude is the occurrence of more than one cytotype in *P. ochraventer* as it is reported for *P. nasutus*, *P. truei* [27] and *P. difficilis* [28]. Nevertheless, the karyotype of *P. ochraventer* here described is similar to the one found in the mexicanus group which is the same in all of the species included in this group [19].

We propose that the characteristic karyotype of *P. ochraventer* is the one described in this paper, whereas that reported by Robbins and Baker [5] based on a single female specimen can be considered as a polymorphism due to the variability of chromosome 6.

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