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Cytogenetics of *Graomys griseoflavus* (Rodentia: Sigmodontinae) in central Argentina

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Abstract

The distribution of karyomorphs of the *Graomys griseoflavus* species complex (2 n = 42 and 2 n = 36–38) is described for six localities from central Argentina, providing additional information for Córdoba, La Pampa and La Rioja provinces. Comments regarding the biogeography and systematics of this species complex are provided.

Key words: *Graomys griseoflavus*, Rodentia, karyology, distribution, central Argentina

Introduction

Graomys griseoflavus, commonly known as pericote común or pericote de vientre blanco, has been reported to possess widely variable diploid chromosome numbers of 34, 35, 36, 37, 38, 41, and 42 (Wainberg and Fronza 1974; Pearson and Patton 1976; Theiler and Gardenal 1994; Zambelli et al. 1994; Theiler and Blanco 1996 a, b). Despite being a widespread species (Hershkovitz 1962), no data are available on the cytogenetics of this species in La Pampa Province. Additionally, the extent of chromosomal variation remains to be assessed in vast portions of the distribution of the species.

According to Siegenthaler et al. (1990 a, b) *Graomys griseoflavus* is widespread in the La Pampa Province. It occurs in habitats generally associated with wooded or shrubbed areas, in almost all the western part of the Province, being absent in the eastern Pampean grasslands portion. *Graomys griseoflavus* has been collected along roadside rights-of-ways associated with woody cover, rock outcroppings and in human dwellings. In Mendoza Province, the species occupies a variety of habitats including orchards, badlands, Monte Desert and Precordillera up to an altitude of 1950 m (Rosi 1983).

The focus of this study is to further document the extent of chromosomal variation in *Graomys griseoflavus*, providing additional information for Córdoba, La Pampa and La Rioja provinces.

Material and methods

A total of 19 *Graomys griseoflavus* specimens were live-trapped using a variety of Sherman, Davis, and wire mesh traps. The standard procedure of in vivo colchicine mitotic arrest was used for obtaining chromosomes from bone marrow. In most cases, the yeast stress method (Lee and Elder 1980) was used to obtain an increased mitotic index. Slides were prepared by dropping the cell suspension from a 50–60 cm height into a large drop of distilled water on the surface of the slide (Baker et al. 1982). Chromosome slides were observed and photographed and the diploid number and chromosomal morphology

was determined for each specimen. All voucher specimens were prepared as standard study skins and skulls and are housed in the collections of Texas Tech University Museum (TTU), TK numbers identify slides and cell suspensions referenced to voucher specimens; of La Pampa Vertebrate Survey (RVP, Plan de Relevamiento de los Vertebrados de la Provincia de La Pampa), deposited in the Museo Provincial de Historia Natural, Santa Rosa, La Pampa; and in the Colección Mastozoológica Orientación Anatomía Comparada of the Universidad Nacional de Rio Cuarto (UNRC), Rio Cuarto, Córdoba, Argentina.

Localities sampled and specimens examined:

La Rioja Province: 1. General San Martin Department, Ulapes, 2 km N (n = 2), one male (TK 49047), one female (TK 49048).

Córdoba Province: 2. Cruz del Eje Department, Palo Parado, 30 km NW Cruz del Eje (n = 2), two females (TK 40655–40656).

La Pampa Province: 3. Toay Department, 10 km SW Santa Rosa, Chacra La Lomita (n = 8), three males (TK 49171–49173), five females (TK 49169–49170, 49174–49175, 49177). 4. 12 km NNE Naicó, Estancia Los Toros (n = 3), two females (TK 27891–27892), one male (TK 27893). 5. Puelén Department, 25 km SE Puelén, NE border of Salitral de La Perra, Puesto Rogueira (n = 1), one male (TK 47611). 6. Caleu Caleu Department, 40 km N Anzoategui, Almacén El 52 (n = 3), three females (TK 27894–27895, 40634).

Results and discussion

The four specimens from La Rioja and Córdoba provinces possessed a 2 n = 42 karyotype consisting of a pair of large submetacentric chromosomes, two smaller pairs of submetacentrics and the remainder of the autosomes being acrocentrics grading in size from large to small. The X chromosome is a medium sized submetacentric and the Y an acrocentric chromosome. This karyotype has been previously recorded for localities in La Rioja, Córdoba and Catamarca provinces (Theiler and Gardenal 1994; Zambelli et al. 1994). From La Pampa Province, the karyotypic data show the pattern that includes 36, 37, and 38 chromosome diploid numbers. The 2 n = 36 karyotype consists of a pair of large metacentrics, four pairs of medium sized and small submetacentrics and the rest of the autosomes are acrocentric (Fig. 1). In the case of the 2 n = 37 variant, the first pair of autosomes is heteromorphic consisting of a large metacentric and two small acrocentrics as its homologues (Zambelli et al. 1994). In the case of the 2 n = 38 there exist two extra pairs of acrocentrics instead of the large metacentric pair as in the 2 n = 36 form. The pre-

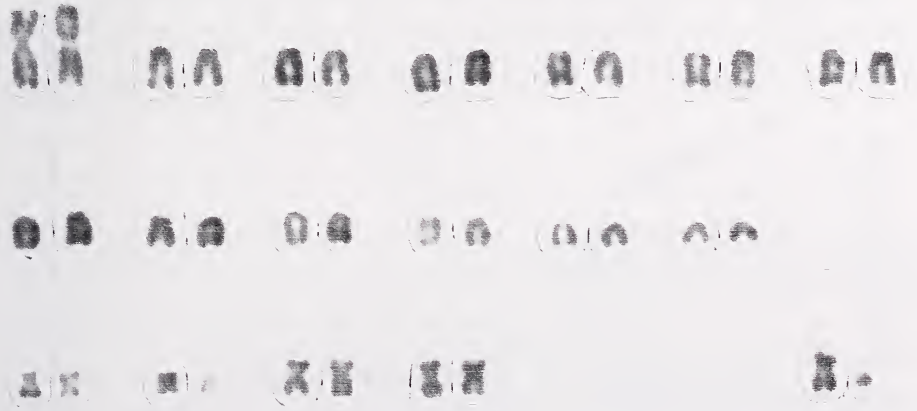

Fig. 1. 2 n = 36 *Graomys griseoflavus* karyotype (TK 47611, male) from Salitral de La Perra, 25 km SE Puelén, La Pampa.

sent distributional data are in concordance with data for the neighboring Buenos Aires Province (Chasicó, Medanos), and the central-western area of Argentina, which include portions of Mendoza and Catamarca provinces (Theiler and Gardenal 1994; Theiler and Blanco 1996 a, b). The 2 n = 36–38 and 2 n = 42 forms are interrelated through a number of chromosomal rearrangements that include pericentric inversions and Robertsonian fusions (Zambelli et al. 1994). Interbreeding between these forms under laboratory conditions only occurs between 2 n = 36–38 females and 2 n = 42 males. The hybrids, are sterile (100% of males) or have diminished fertility (23% of females), and have 2 n = 39 or 40 (Theiler and Gardenal 1994; Theiler and Blanco 1996 b). Individual females in estrus are capable of recognizing odors of compatible homomorphic mating partners. Avoidance of heteromorphic mating partners by these females, allows for premating isolation to occur (Theiler and Blanco 1996 b). Protein electrophoresis studies comparing both sets of cytotypes showed genetic identity values (0.911 and 0.915) that would correspond to the same species (Theiler and Gardenal 1994).

Regarding the geographic distribution (Fig. 2), the 2 n = 36, 37, and 38 forms have been attributed to the Monte Desert, and the 2 n = 42 forms to the Espinal, with both forms overlapping in transition areas (Theiler and Blanco 1996 a, b). In this report, the 2 n = 36, 37, and 38 karyotypes were found at localities belonging to the Caldén (*Prosopis caldenia*) District of the Espinal (Los Toros, Almacén El 52 and La Lomita), and at one locality belonging to the Monte Desert (Puelén) (Cabrera 1976). Thus, in a biogeographic interpretation, the 2 n = 42 complex seems to have more defined Chacoan affinities. In the case of the 36–38 complex, it would appear to be restricted to the Monte Desert and the southern portion of the Espinal. Nevertheless, limits between these biogeographical areas are not precise, generally forming vast ecotones and mosaics (Cabrera 1976). The Espinal is considered as an impoverished Chaco, and allows for the southward expansion of several species representative of the Chacoan fauna.

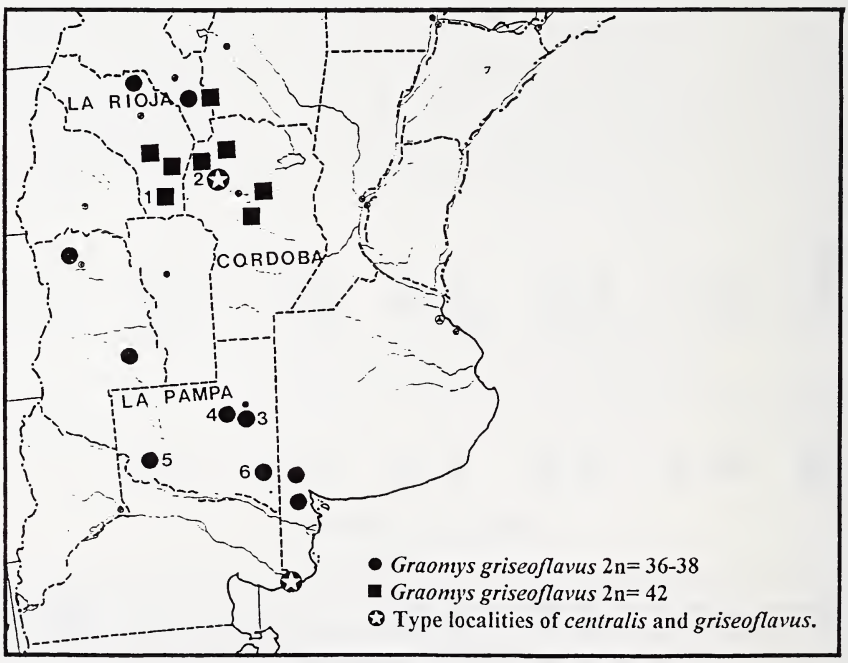

Fig. 2. Map of central Argentina showing the distribution of karyomorphs of *Graomys griseoflavus* (pooled from the literature and this report).

Despite the growing evidence that the 42 and 36–38 forms represent different species (Theiler and Blanco 1996 a), the nomenclatorial situation that is involved has not been addressed. In the particular case of available names for these taxa in central Argentina, it would be possible to assign the 2 n = 42 forms to *centralis*, type locality Cruz del Eje, Córdoba Province, described as a subspecies of *griseoflavus* (under the genus *Eligmodontia*) by Thomas (1902). The present locality of Palo Parado (30 km NW of Cruz del Eje) is the nearest with a documented 2 n = 42 specimen of *Graomys*. For the 2 n = 36–38 forms the name *griseoflavus* Waterhouse, 1837 (type locality, Rio Negro) could be applied. Nevertheless, before invoking these changes, the status of other named putative taxa inhabiting central Argentina, such as *edithae* Thomas, 1919 (Otro Cerro, NE La Rioja), and *medius* Thomas, 1919 (Chumbicha, Catamarca) should be assessed. The taxon *edithae* has been considered valid by Redford and Eisenberg (1992); valid, but of uncertain status by Musser and Carleton (1993); and also valid, but considering that it could be "a high-elevation smaller-bodied offshoot of *G. griseoflavus*" by Braun (1993). The taxon *medius* is generally referred to as a synonym of *griseoflavus* (Musser and Carleton 1993). Additionally, other species of *Graomys* for which there is available cytogenetical information is *domorum*, with a 2 n = 28 (Pearson and Patton 1976). The resolution of these problems coupled with the assessment of the geographic distribution of *Graomys* karyomorphs should include cytogenetics in the type localities. This information will shed more light on the systematic status of this species complex.

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Zusammenfassung

Zytogenetik von Graomys griseoflavus (Rodentia: Sigmodontinae) in Mittelargentinien

Die Verteilung der Karyomorphen des *Graomys griseoflavus*-Artkomplexes (2 n = 42 und 2 n = 36–38) wird für sechs Gebiete aus Mittelargentinien beschrieben. Damit liegen neue Daten für die Provinzen Córdoba, La Pampa und La Rioja vor. Die Ergebnisse werden im Zusammenhang mit der Biogeographie und der Systematik des Artkomplexes diskutiert.

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