POLYMORPHISMS IN CHROMOSOME 5 OF THE WHITE-FOOTED MOUSE, *PEROMYSCUS LEUCOPUS* (RODENTIA: CRICETIDAE)

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Within the white-footed mouse, *Peromyscus leucopus*, there are three marker chromosomes (pairs 5, 11, and 20—see Committee, 1977) that distinguish two widely distributed and biochemically differentiated chromosomal races (Baker et al., 1983; Nelson et al., 1987; Stangl and Baker, 1984a). The chromosomal variation that characterizes the two races is presumed to be two pericentric inversions (Baker et al., 1983), with an acrocentric morph (5 and 11 in the northeastern race, and 20 in the southwestern race) and a biarmed morph (5 and 11 in the southwestern race, and 20 in the northeastern race). This report is concerned with the frequency and types of chromosomal rearrangements in these three marker pairs of chromosomes that distinguish the two races.

Frequency and types of chromosomal rearrangements from the vicinity where these two races interface in Oklahoma (Stangl, 1986) is significant because of the hypothesis by Shaw et al. (1983) that hybrid zones are a primary source of new genetic information, including chromosomal rearrangements, and because any new rearrangement might lead to a misidentification of the status of individuals as to this hybrid origin.

We examined in detail the G- and C-banded morphology of chromosomes 5, 11, and 20 in the 269 individuals reported by Stangl (1986). Of the five to 10 different spreads examined for each specimen, no variation other than that which distinguishes the races was found in pairs 11 and 20. An euchromatic rearrangement and heterochromatic variation were noted in chromosome 5 (Fig. 1). The situation associated with these rearrangements is discussed below.

**Euchromatic variation.**—Four specimens were heterozygous for a condition where a block of euchromatin has been inserted proximal to the centromere of the acrocentric morph (Fig. 1C). Specimens with this rearrangement (TK voucher number, sex, condition of homolog, and collection locality) are as follows: TK 20741, female, acrocentric, 1.6 mi. E Vivian, in McIntosh Co., Oklahoma; TK 20819, male, acrocentric, 4.5 mi. E Wetumka, in Hughes Co., Oklahoma; TK 20902, female, biarmed, 7.7 mi. E County Courthouse in Chickasha, Grady Co., Oklahoma; TK 20943, female, acrocentric, 2.1 mi. E Dustin, in Hughes Co., Oklahoma. This euchromatic rearrangement is unique for any thus far described for *Peromyscus* (for recent summaries, see Rogers et al., 1984; Smith et al., 1986; Stangl and Baker, 1984b), where some 30 species have been G- and C-banded. This rearrangement could have arisen by a reciprocal translocation or by an amplified chromosomal region.

**Heterochromatic variation.**—The acrocentric morph of chromosome 5 exhibited considerable quantitative variation in the amount of heterochromatin comprising short arms, from the apparent absence (Fig. 1A) to about 20 percent of the total length of the euchromatic arm (Fig. 1D). Such variation is difficult to quantify, as the ability to detect short arms depends, in many instances, on the degree of contraction of the chromosomes. Such a continuum of a character state, plus the problems associated with the stage of contraction, makes cytosystematic use of the presence or relative amounts of heterochromatin in chromosome 5 in *Peromyscus leucopus* difficult.

If a high number of new arrangements arise among individuals in the chromosomal hybrid zone, then we might expect to see several different types of rearrangements.
Figure 1.—Variation in chromosome 5 in Peromyscus leucopus, as determined by Q-banding studies: A, biarmed (characteristic of southwestern cytotype); B, acrocentric (characteristic of northeastern cytotype); C, acrocentric with inserted euchromatin (brackets); D, acrocentric morph with heterochromatic short arms (brackets). Arrows indicate location of centromere.

However, our sample did not contain variations in cells from within an individual, and the unusual euchromatic insertion exhibited by the four specimens appeared to represent identical conditions. Therefore, the possibility that this observed chromosomal rearrangement arose in a single ancestral individual cannot be eliminated. However, it is clear that specific euchromatic rearrangements do arise repeatedly in the same species as documented by the reciprocal translocation of chromosomes 11 and 22 in unrelated human families (Fraccaro et al., 1980). It is also of interest to note that the four individuals with the euchromatic rearrangement were otherwise pure parental cytotypes.

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Literature Cited


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**THE TEXAS MOUSE, *PEROMYSCUS ATTWATERI* (RODENTIA: CRICETIDAE), IN HOOD AND JOHNSON COUNTIES, TEXAS**

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The Texas Mouse, *Peromyscus attwateri* J. A. Allen, 1895, ranges from southeastern Kansas and southwestern Missouri southward through northern Arkansas and eastern Oklahoma to southern Texas (Schmidly, 1973, 1974; Hall, 1981). In Texas, the species reaches the southern limit of its known distribution along the extreme southern edge of the Balcones Escarpment in Uvalde County (Schmidly, 1973). Based on three specimens examined by Schmidly (1973), the easternmost localities of record for *P. attwateri* in the state (from north to south) are 2 mi. S Marysville, Cooke County, 7 mi. N Iredell, Bosque County, and 20 mi. NW Austin, Travis County.

Between 27 March and 19 May 1988, six adult (two males and four females) *P. attwateri* were collected 17.5 km. SE Granbury, off FM 2174, at Fort Spunky, Hood County. The trap site was an abandoned gravel pit (elevation, 244 meters) in the Cross Timbers-Grand Prairie (oak-hickory forest community) of north-central Texas. Habitat of the area includes disturbed upland prairie grasslands and juniper-covered limestone hills (cedar-glade), with stony and gravelly soils dominated by *Schizachyrium scoparium*, *Andropogon gerardii*, *Panicum virgatum*, *Bouteloua curtipendula*, *Stipa leucotricha*, *Juniperus virginiana*, *Prosopis glandulosa*, *Quercus fusiformis*, *Q. texana*, *Opuntia raifensis*, and *Yucca* sp. Unfortunately, the landowner completely cleared the area for cattle grazing, and, thus far, no additional *P. attwateri* have been collected there. As reinterred by Jones et al. (1987), land-use practices continue to impact the distribution of terrestrial mammals in the state.

On 12 March 1989, a single adult female Texas mouse was trapped 3.5 km. ENE Nemo, off county road 406, at the Ken Fry Ranch, Johnson County (elevation, 259 meters). This site is 7.3 km. south-southeast of the first locality along a limestone escarpment characterized by similar vegetation. These two localities represent new county records for *P. attwateri* and are 37 kilometers north-northeast and 31 kilometers northeast, respectively, of the nearest previous locality of record in Bosque County (Schmidly, 1973). Most importantly, these records help to partially fill a distributional hiatus between extreme north-central populations and those from the western Cross Timbers (see Schmidly, 1973).