

Student Review by Rick Orozco, WFSC Undergraduate 2017

Allard, M.W. and I.F. Greenbaum. 1988. Morphological variation and taxonomy of chromosomally differentiated *Peromyscus* from the Pacific Northwest. *Can. J. Zool.* **66**: 2734 – 2739

The rodent genus *Peromyscus*, otherwise known as deer mice, is considered to be one of the most diverse and widespread group of native North American small mammals (Witmer and Moulton 2012). With an estimated number of 40–53 distinct species (Chirhart et al. 2005) along with the extensive research done on them, their taxonomy is constantly changing. One particular previous study conducted on deer mice, specifically on *Peromyscus maniculatus*, was by Marc W. Allard and Ira F. Greenbaum in 1988 in the geographic region of the Pacific Northwest. Allard and Greenbaum mentioned that recent studies suggested the need for synthetic revision of *P. maniculatus* in the Pacific Northwest because of variation in chromosomal fundamental number among populations (FN; the number of visible major chromosomal arms per set of chromosomes; Thomas 1973; Gunn and Greenbaum 1986; Gunn 1988). Previous studies indicated that there were two karyotypic (number and appearance of chromosomes in the nucleus) forms corresponding to *P. oreas* and *P. m. austerus*. However, assessment using additional data was necessary to verify the existence of these forms. Allard and Greenbaum (1988) performed an analysis of morphological variation in external, cranial, and mandibular (jaws) characteristics on these two karyotypic forms of deer mice from the Pacific Northwest (specifically Vancouver Island and some of the associated islands).

The study began with the collection of 314 adult deer mice (subadults were excluded) from 16 localities ranging from the Islands of Vancouver to mainland British Columbia and Washington. Karyotypic data was obtained from the studies of Gunn and Greenbaum (1986) and Gunn (1988). From those data, the localities were subdivided into low and high FN samples. For the physical features, specimens housed at the Texas Cooperative Wildlife Collection at Texas A & M University, College Station, Texas, were measured for 5 external, 17 cranial, and 6 mandibular characters used for the analysis of mainland *P. maniculatus* and *P. oreas*. Out of all the methods used in the study to analyze the mice, the method that I found most interesting was the discriminant function analysis, which was developed by Ronald Fisher in 1936. This is a statistical analysis that predicts a categorical dependent variable (called a grouping variable) by one or more continuous or binary independent variables (called predictor variables). Allard and Greenbaum used this analysis to determine how populations of the high and low FN groups on Vancouver Island and the smaller islands could be distinguished from one another.

After analyzing the data, it was clear that the two karyotypic forms of *Peromyscus* distributed across the sampling area are morphologically distinct. The data supported previous work on fundamental numbers and how the low FN mice grouped morphologically with *P. maniculatus* and the high FN mice grouped with *P. oreas* (Gunn et al. 1986). These results are important because they emphasized that the taxonomy of certain species of *Peromyscus* in the Pacific Northwest needed to be revised. Allard and Greenbaum (1988) stated that there are 13 taxa that have yet to be examined in the same manner, which could potentially open the doors for further research. One recent study that referenced their work was Steffen (2016) in her research of body-size trends in *Peromyscus* on Vancouver Island and serves as an indication that there are still vast amounts of data to be collected. In terms of taxonomy, the study was also referenced in

2001 by Chirhart et al. where they analyzed mitochondrial DNA sequence variation to determine the specific identification of deer mice from the Triangle Island, British Columbia, and Canada.

Some questions that I had when reading the study included: has anyone ever replicated this study and, if so, were the results different? As far as trapping goes, were certain species trap-happy or trap-shy? Also, the time in which the study was conducted peaked my curiosity as well. In my opinion, I am unsure if the taxonomy of the deer mouse is “correct.” Even if it is claimed to be in the right order, taxonomy does not necessarily stay the same over time.

LITERATURE CITED:

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