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Poster Presentation

Gray Fox Research to Support Oral Rabies Vaccination Programs in Texas: An Overview

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ABSTRACT: A study was initiated in 2005 to examine the ecology of gray fox in Texas, to assist the oral rabies vaccination program. The study's objectives are to examine space use and long-distance movements of radio-collared foxes, and to provide landscape-level ecological assessment of fox dispersal and the factors that influence it. Concurrently, GIS habitat layers being built will assist in understanding fox movement and gene flow.

KEY WORDS: disease, genetics, gray fox, oral rabies vaccination, rabies, telemetry, Texas, *Urocyon cinereoargenteus*

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A study examining the ecology of the gray fox (*Urocyon cinereoargenteus*) to assist the oral rabies vaccination (ORV) program in Texas (Sidwa *et al*. 2005) was initiated in 2005 by U.S. Department of Agriculture, Animal and Plant Health Inspection Service, National Wildlife Research Center scientists in cooperation with Texas Wildlife Services and Texas Department of State Health Services personnel. The Texas gray fox ORV program is designed to eventually eliminate the Texas fox variant of rabies from Texas. This program was initiated in 1996 and involves distributing over 1 million oral rabies vaccine-laden baits over thousands of square miles in west-central Texas each year. This study is aimed at assisting ORV strategies in Texas. Overall, the study has many diverse objectives; however, two major objectives involve the assessment of gray fox movements and population genetics.

To monitor gray fox movements, VHF and GPS collars have been deployed on 40 gray fox at 3 study sites (Sutton/Edwards, Kerr, and Gillespie Counties). One of these study sites is associated with a recent ORV zone break (a rabid fox located outside the baited zone), which occurred in 2004. Attempts are being made to monitor each collared fox weekly as logistics permit to monitor movements and the potential of long-distance movements at these 3 study sites. To date, we have documented one male gray fox that has moved over 13 km in a straight-line distance, and other long-distance movements have also been noted. Of interest, relatively long-distance movements have been noted for both adult and sub-adult gray fox. These data may be important for ORV strategies, as exceptional movements of gray fox of up to 83.7 km have been recorded in other regions (Sheldon 1953).

An additional objective of this study involves a landscape-genetics approach (e.g., Manel *et al*. 2003) to assist gray fox ORV strategies in Texas. Specific objectives include: 1) identification of landscape features influencing dispersal and gene flow, 2) estimation of dispersal rates, and 3) examination of sex bias in dispersal. This study will be of great complimentary value to the telemetry study described above. To date, in cooperation with the aforementioned collaborators, we have collected over 300 DNA samples from gray fox, which may represent the largest DNA collection from this species ever acquired. At present, we are genotyping gray foxes at 6 microsatellite loci using the marker panel developed by Weston *et al*. (2004). Preliminary data indicate a high degree of genetic variation (observed heterozygosity ~0.75; >5 alleles/locus). Therefore, genetic analysis of population structure and gene flow should be informative.

A third major objective, which compliments both genetic and telemetry studies, is the development of GIS habitat layers. These layers will be used to identify potential hindrances and corridors to gray fox movement and gene flow. Habitat layers are presently being built and will be used to enhance the genetic and telemetry analyses listed above.

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