

Conservation genetics of disjunct populations of cotton rats (*Sigmodon*) along the Lower Colorado River

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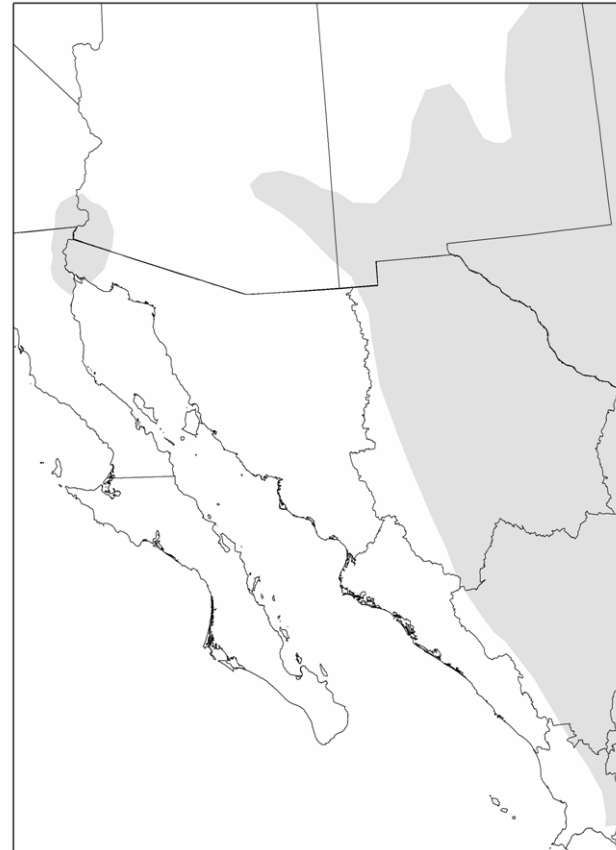


Introduction

- *Sigmodon arizonae*



- *Sigmodon hispidus*



Introduction

- *S. hispidus*
 - McClenaghan 1979
 - Kessler and Avise 1985
 - Pfau et al. 2001
 - Phillips et al. 2007
- *S. arizonae*

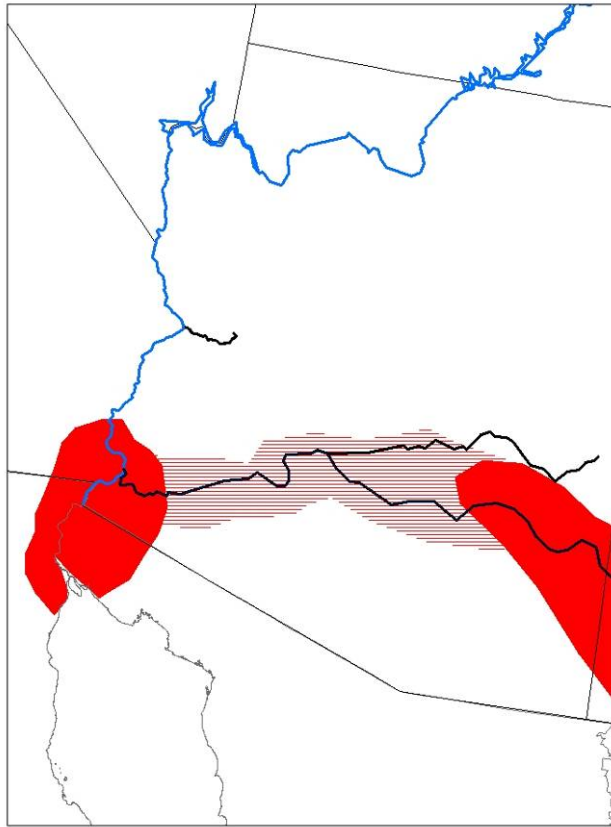


Introduction

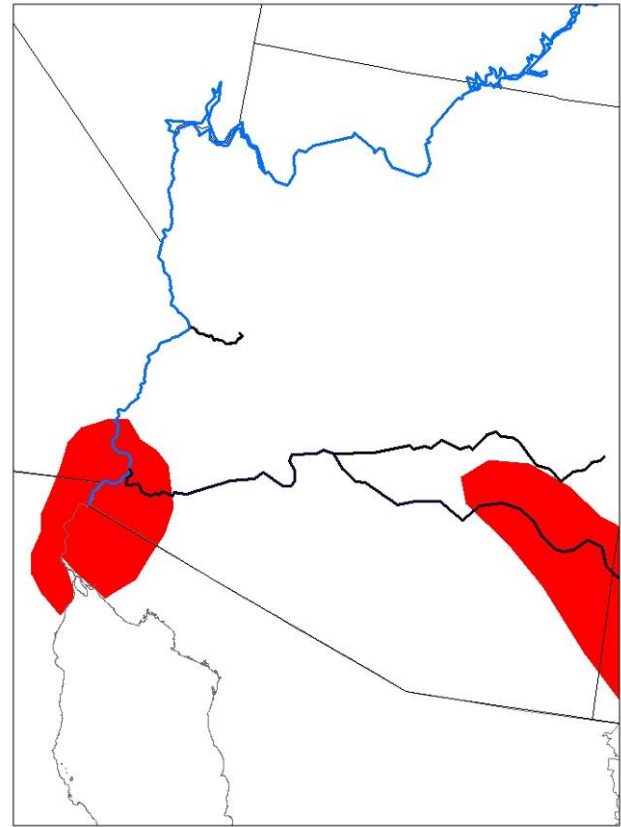
- Objectives
 - Identify populations of *Sigmodon* along the LCR
 - Determine genetic structure of populations along the LCR
 - Determine how unique the populations are compared to the rest of the range



Pleistocene Connection

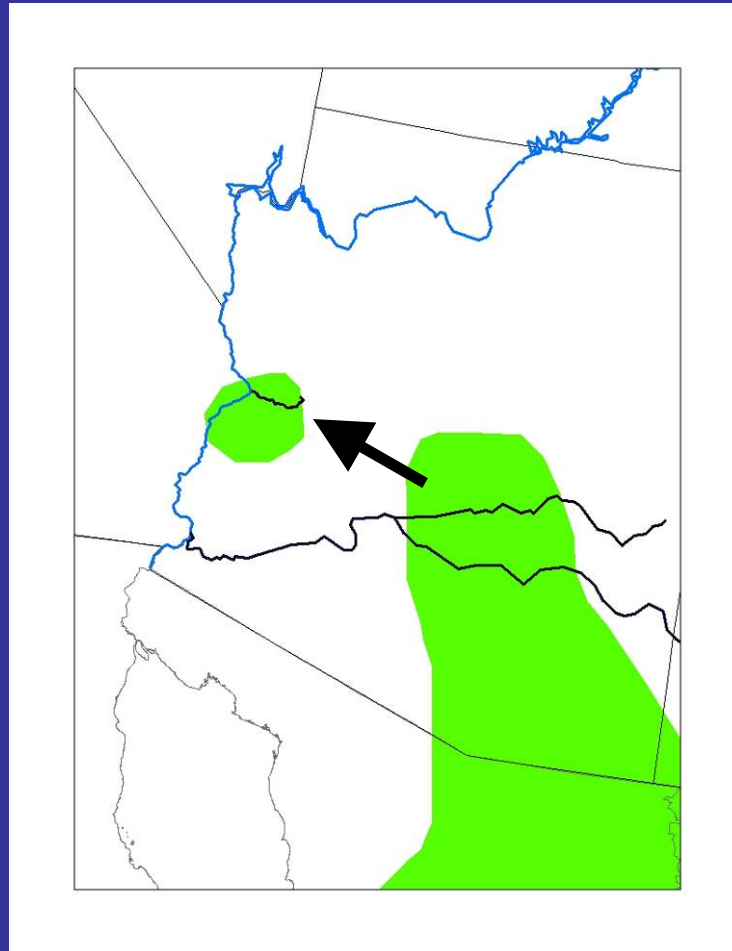


S. hispidus during LGM



S. hispidus today

Recent Dispersal



Directional dispersal of *S. arizonae* through agricultural matrix to Bill Williams River

Between LCR and rest of species

- Pleistocene connection
 - During cooler/wetter periods the two disjunct ranges were once continuous
- Recent dispersal
 - Recent agricultural practices may allow for connectivity
 - “good years” may lead to population explosions
- Expectations:
 - >18,000ybp
 - Some genetic differentiation
 - Little to no dispersal
- Expectations:
 - <100ybp
 - No genetic differentiation
 - Some to considerable dispersal

Materials and Methods

- Trapping
 - Known localities
 - Suitable habitat
- Goal
 - Maximize number of localities sampled
 - Up to 15 individuals per locality
- Museum samples



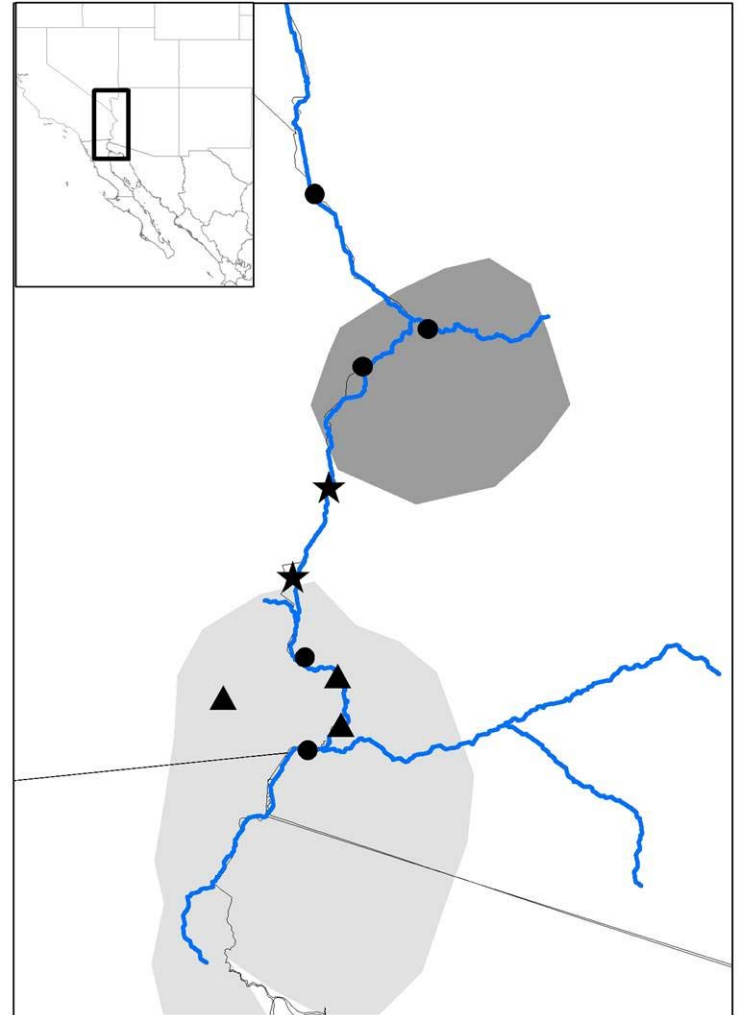
Materials and Methods

- Sequenced portion of control region
 - noncoding region of mitochondrial (mt)DNA
- Phylogenetic and Population genetic analyses
 - Phylogenetic trees
 - Haplotype Networks
 - AMOVA
 - Bayesian relaxed molecular clock
 - Coalescent analyses



Results

- 19 localities sampled
 - 29 *S. arizonae*★
 - From 2 localities
 - 18 *S. hispidus*▲
 - From 3 localities



Habitat

- *S. hispidus*
 - *Phragmites*



Habitat

- Both species
 - └ Johnson grass



Habitat

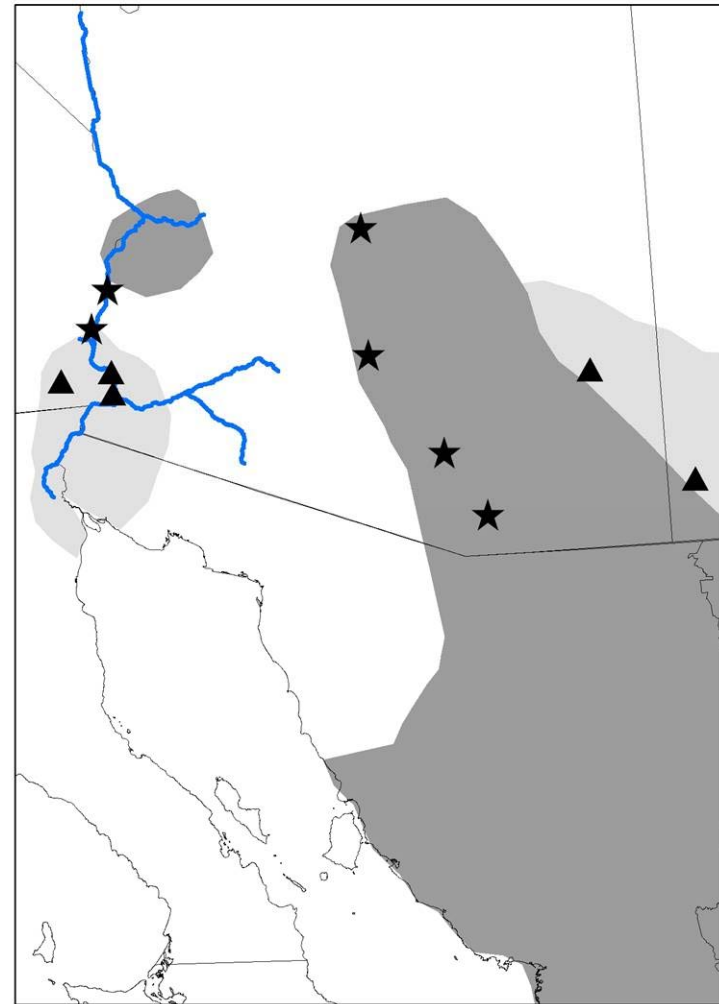
- *S. arizonae*
 - Natural?





Sequencing Results

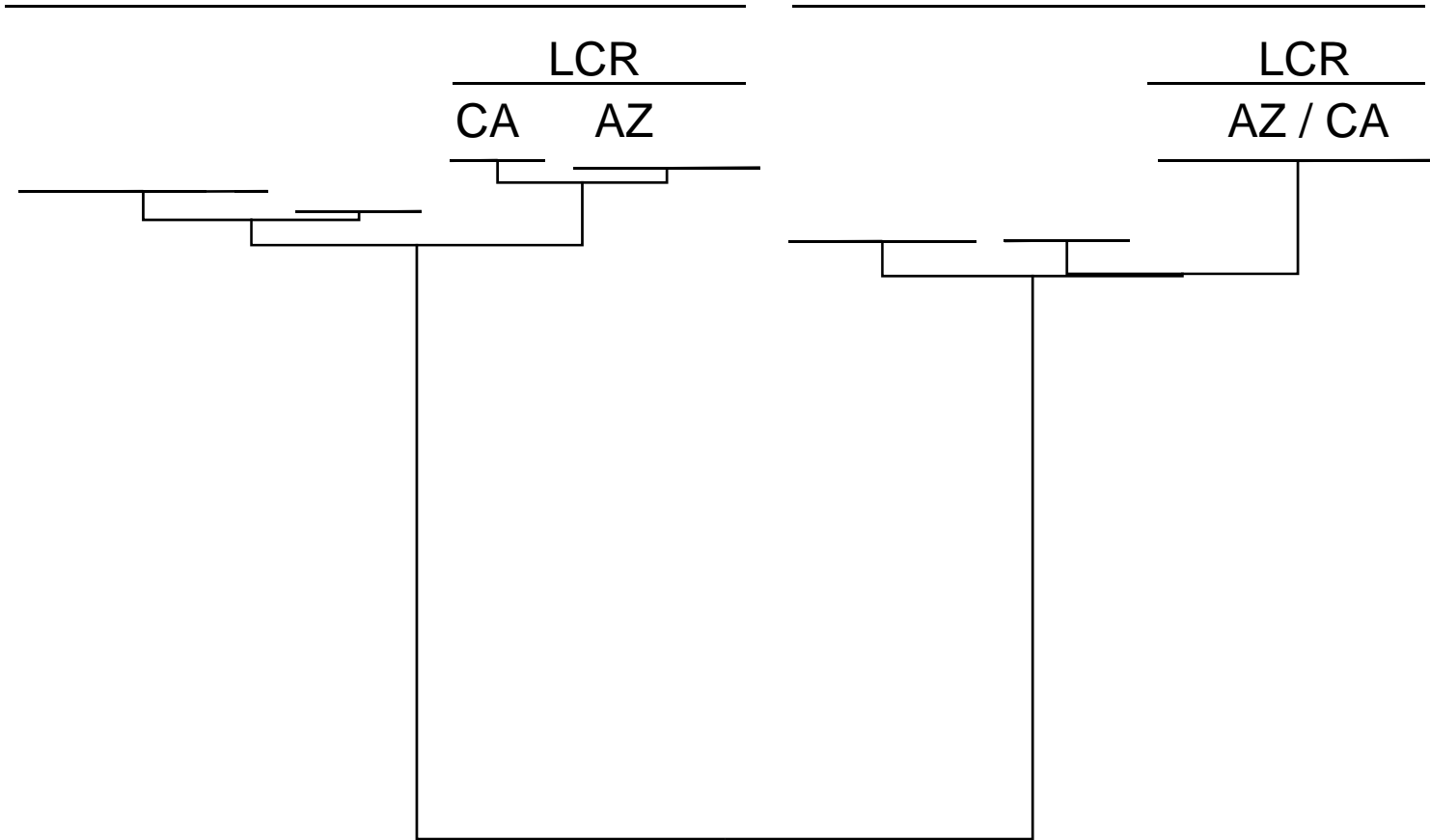
- 54 individuals
 - sequenced so far
- 7 haplotypes
 - 3 *S. hispidus*
 - 4 *S. arizonae*



Sequencing Results

Sigmodon arizonae

Sigmodon hispidus



Discussion

- LCR Populations
 - Fixed for unique haplotypes
- Low variability
 - Each locality = single haplotype
 - Likely due to small founder populations
 - Natural history
- Compares to previous study



Discussion

- What does this mean for conservation efforts?
 - Support sub-specific status of populations
 - Recent divergence
 - If habitat is available they appear to be good at colonizing
 - Reintroduction efforts might not be necessary
 - CA vs AZ for *S. arizonae*



