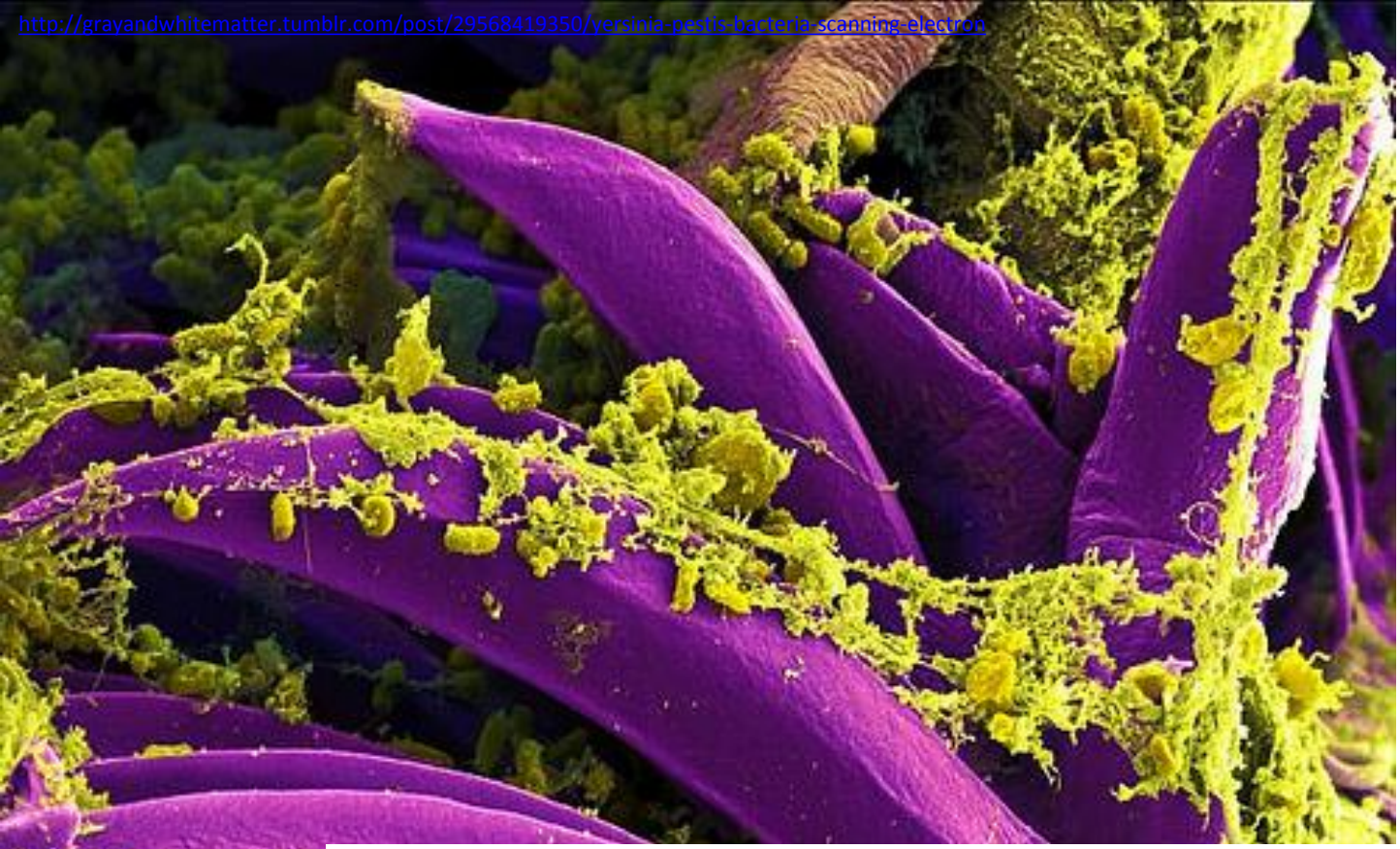



# Plague Dynamics in Small Mammal Communities of Northern New Mexico

**By Shantini Ramakrishnan**

**Research Day 2014**

New Mexico Highlands University

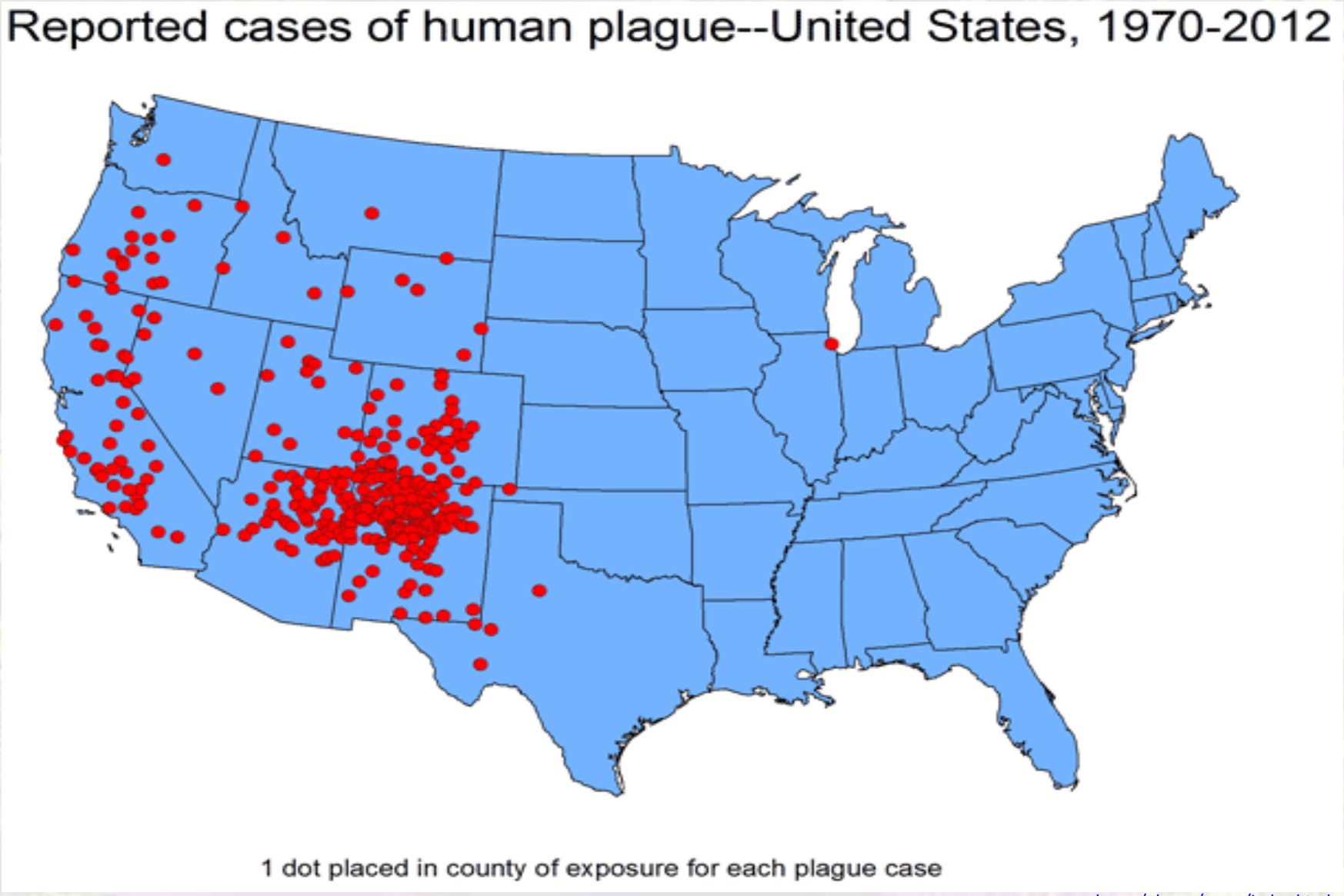
USGS

DENVER ZOO

# Plague in N. America

- Introduced ~ 1900
  - 1st epizootic 1908
- 200+ mammals worldwide
  - ~79 mammals in North America
  - ~ 80 flea spp. worldwide

# Human Plague in U.S.




www.cdc.gov/plague/maps/index.html

# Epizootic Plague in N.A.

- Dramatic, massive die-offs in sciurids
- ~ 100% extirpation events in prairie dogs
- Variability in susceptibility
- Resistance in North American rodents

www.nps.gov/grsa/naturescience/mammals.htm

# Enzootic Plague

Low-level plague

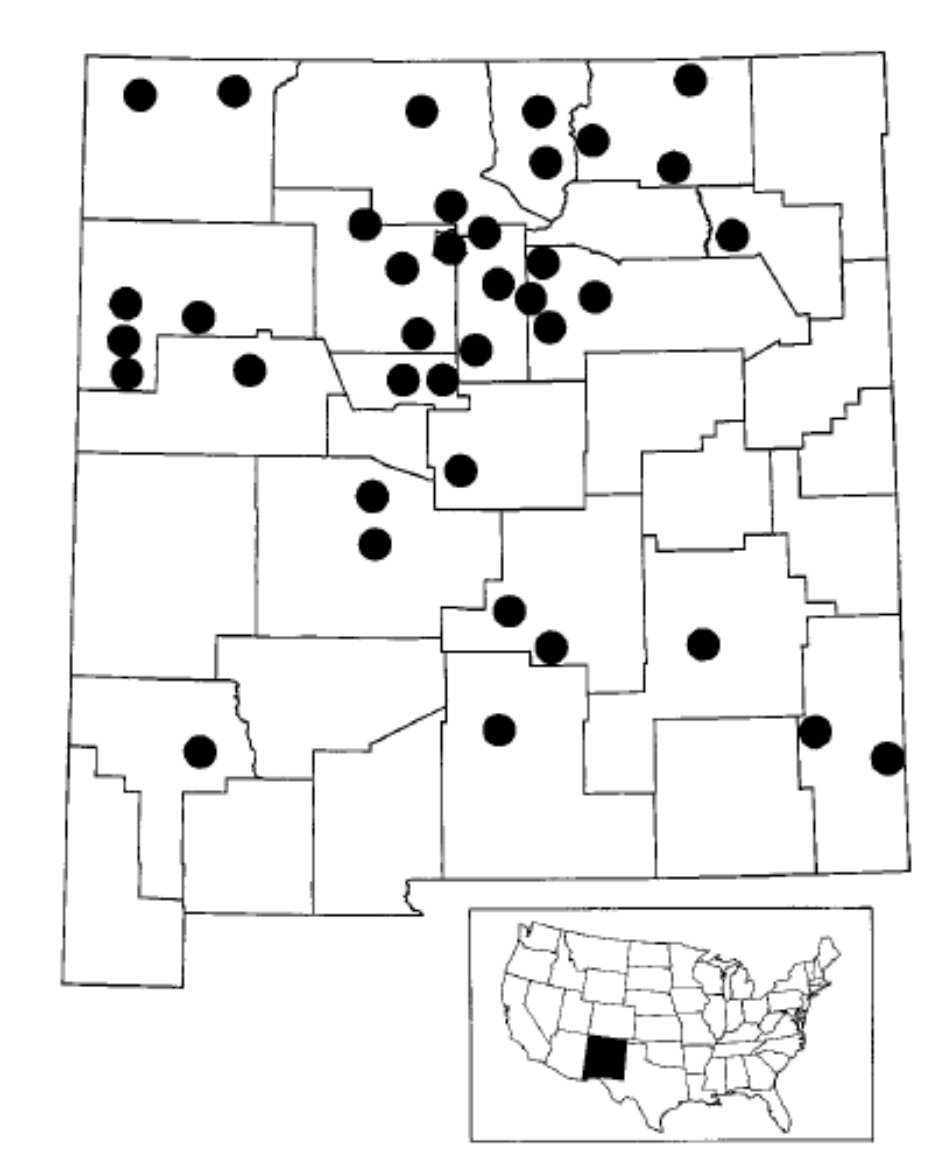
- Cryptic, nocturnal spp.
- Low detection rate

http://www.ocregister.com/articles/typhus-75056-county-fleas.html

# Plague in NM

- Geographic epicenter
  - > 80% human plague in SW
- Colonial ground squirrels
  - Gunnison PDs
  - Rock squirrels

# Plague in NM, 1949-1996



38 locations with documented human plague in NM

Parmenter et al. 1999

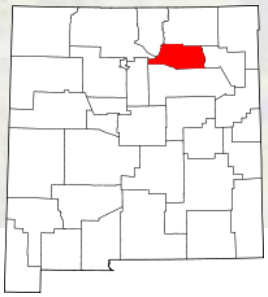
# Study Objectives

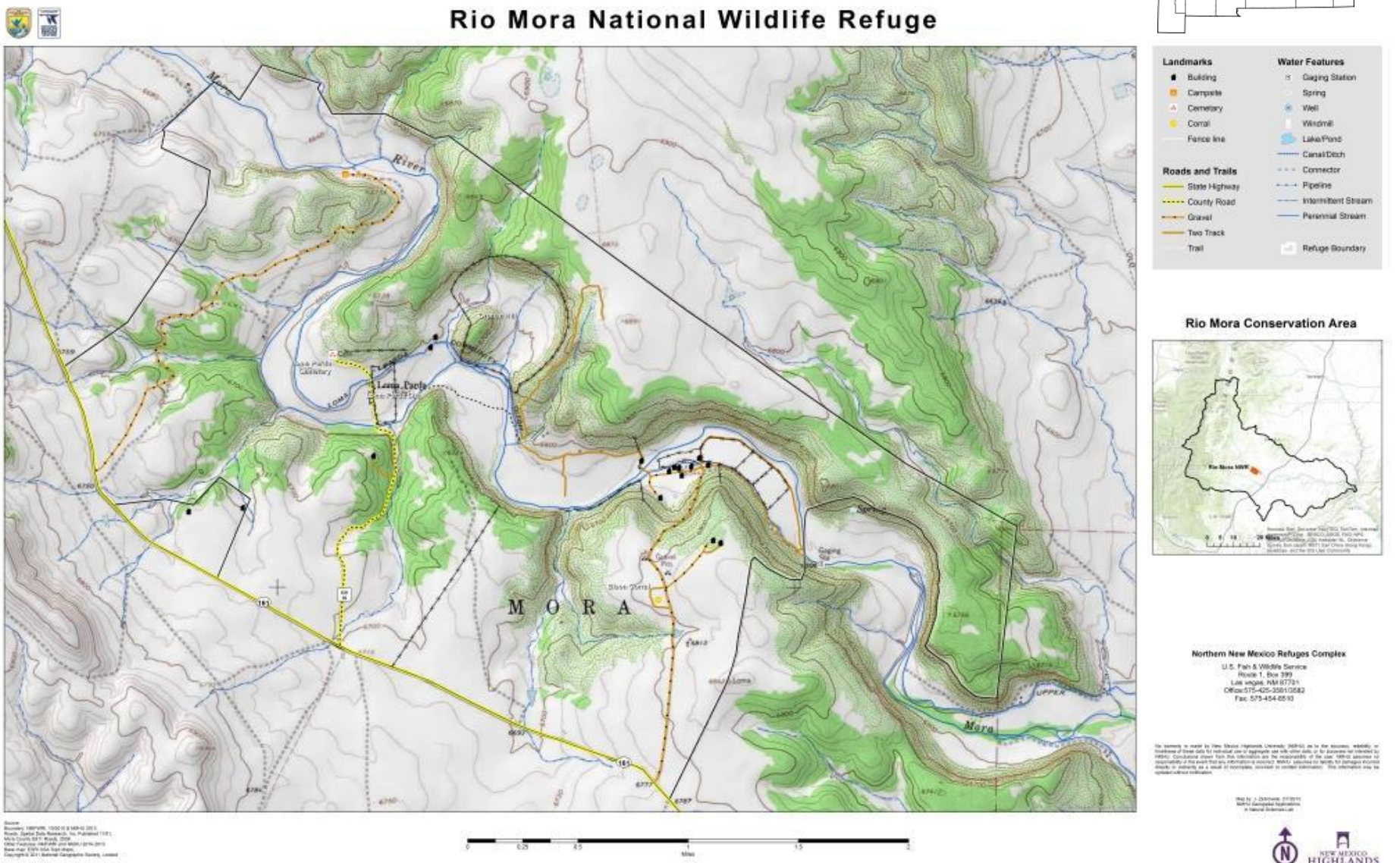
(1) Measure survival rates of rodents protected from plague (F1 antigen vaccine)

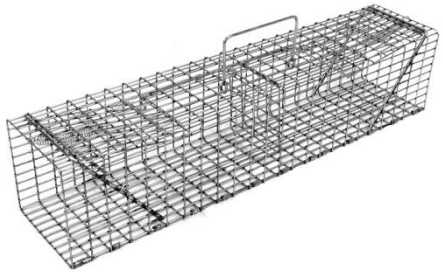
(2) Measure survival of rodents protected from flea vectors (DeltaDust)

(3) Testing the efficacy and longevity of DeltaDust (flea abundance)

# Study Site




Rio Mora National Wildlife Refuge
Landmarks
Building
Campsite
Cemetery
Corral
Fence line
Roads and Trails
State Highway
County Road
Gravel
Two Track
Trail
Water Features
Gaging Station
Spring
Well
Windmill
Lake/Pond
Canal/Ditch
Connector
Pipeline
Intermittent Stream
Perennial Stream
Refuge Boundary
Rio Mora Conservation Area
Rio Mora NWR
Northern New Mexico Refuges Complex
U.S. Fish & Wildlife Service
Route 1, Box 399
Los Vegas, NM 87701
Office:575-425-3581/3582
Fax: 575-454-8510
MORA
Mora
NEW MEXICO HIGHLANDS UNIVERSITY



# Field Methods

D V C

4-ha plots: 50 traps
0.5-ha plots: 30 traps

Mora River

3 Treatments
2 Replicates

D V C

April/May – October
4 trap sessions p/season

≥250-meter buffer between 4-ha plots

# Preliminary Results:

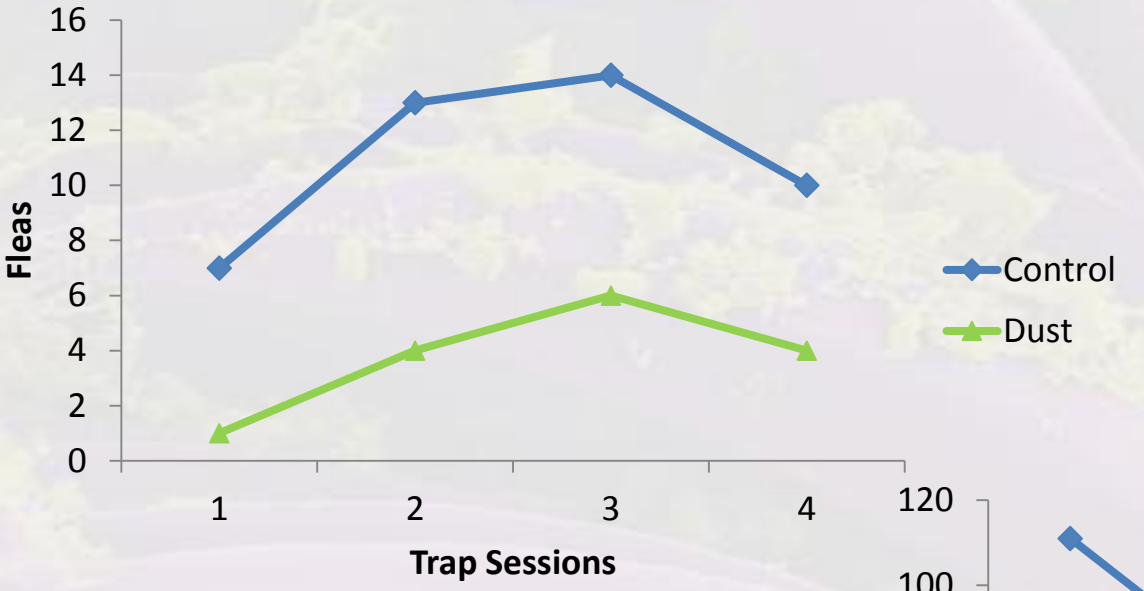
| 2012 New Mexico Season | | |
|---|---|---|
| **Species** | **# Individuals** | **# Fleas** |
| *Neotoma leucodon* | 61 | 32 |
| *Neotoma mexicana* | 407 | 469 |
| Long-tailed *Peromyscus* | 557 | 401 |
| Short-tailed *Peromyscus* | 120 | 65 |
| *Spermophilus variegatus* | 29 | 338 |
| *Tamias quadrivitattus* | 11 | 0 |
| *Reithrodontomys megalotis* | 24 | 5 |
| | 1209 | 1310 |

# Preliminary Results: Mexican woodrats

**North Plots**

$t(5) = 3.84$

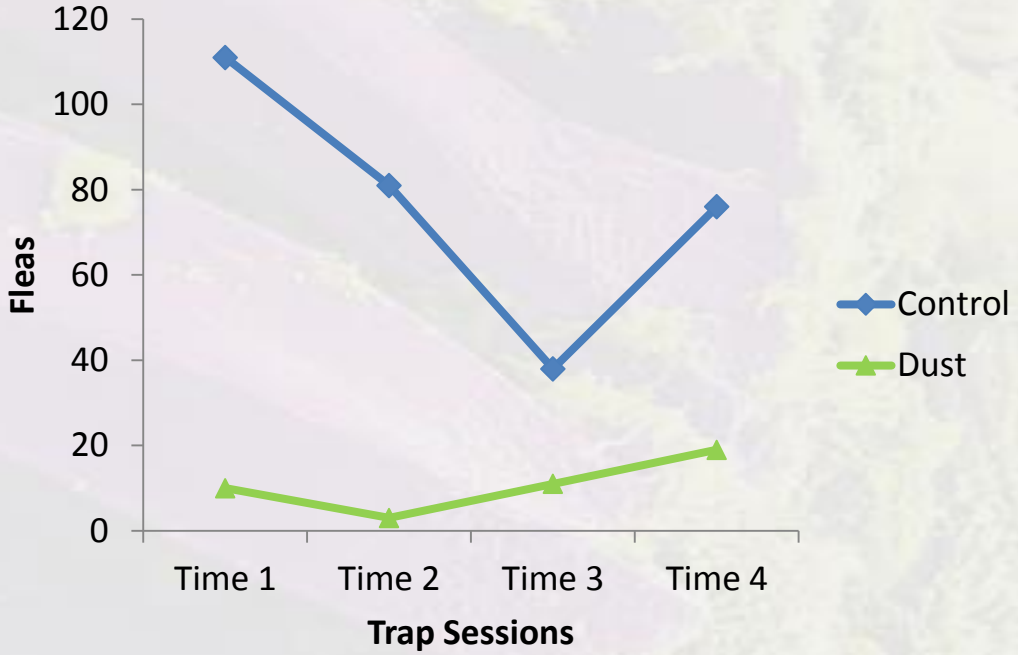
$p = 0.006$



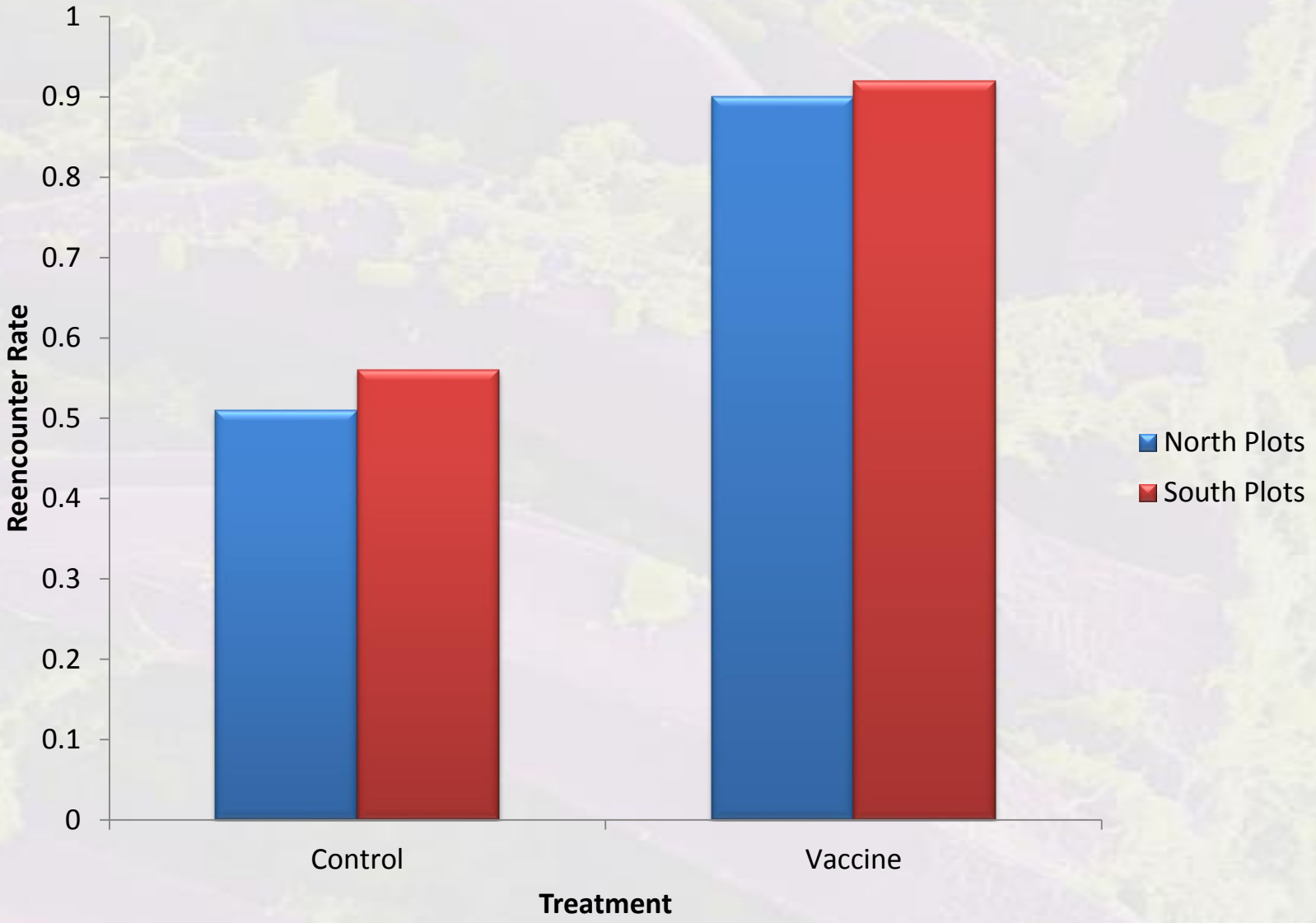

**South Plots**

$t(3) = 4.29$

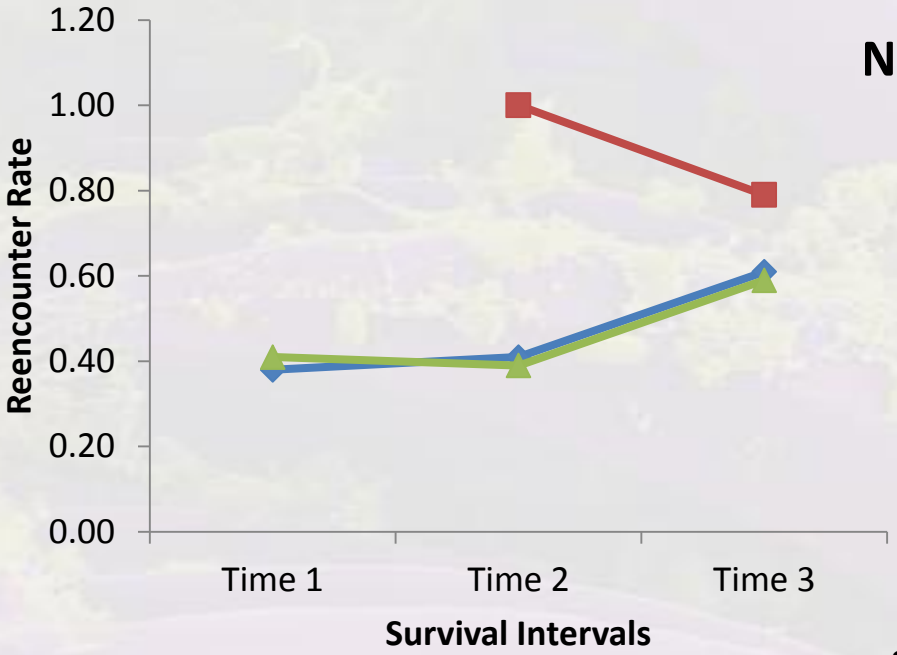
$p = 0.01$

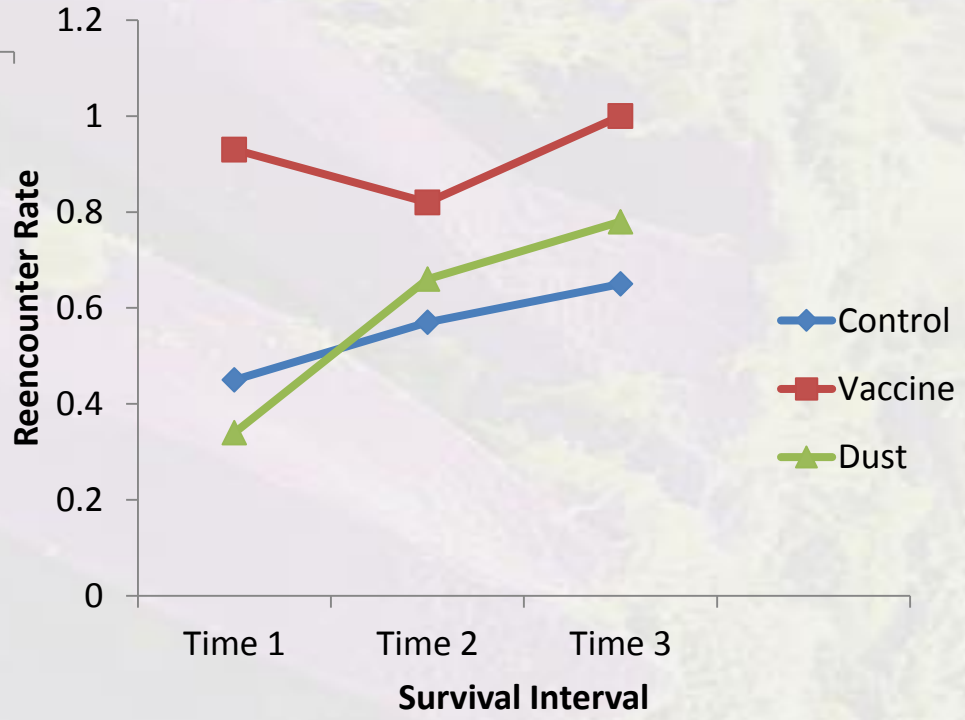


# Preliminary Results: Mexican woodrats



# Preliminary Results: Mexican woodrats



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- E. Martinez, J. Zebrowski, R. Ortega
- MAD, OSA


Questions?