

Geography of an emerging disease in North America: *Trypanosoma cruzi* infection in New Mexico

QuickTime™ and a
decompressor
are needed to see this picture.

a



b



c

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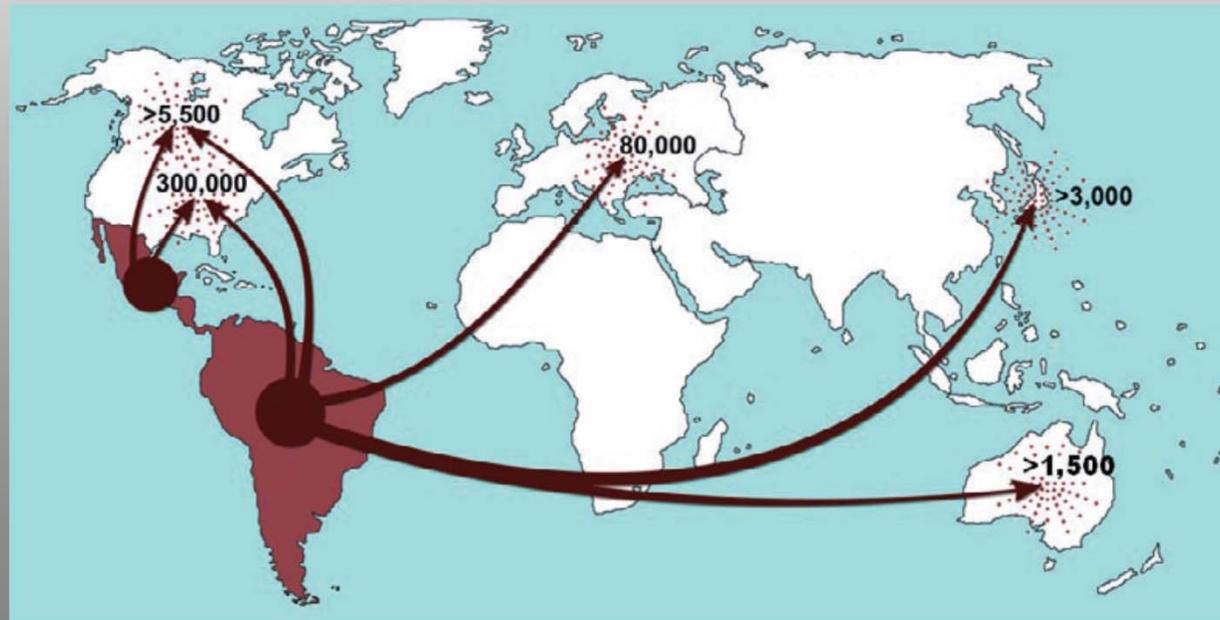
a. Neotoma (<http://www.fs.fed.us/database/feis/>); b. *T. protracta* (www.cdc.gov/parasites/chagas); c. *T. cruzi* (<http://www.med.uni-marburg.de/stpg/ukm/lt/hygiene/schwarz/projects.html>)

- Introduction
 - Chagas Disease & *T. cruzi*
- Methods
 - New Mexico surveys
 - Geography
- Challenges
 - Weather
 - Fire
- Results
 - Trap nights & Specimens
- What's next
 - More questions!
- Acknowledgements

Introduction

- Chagas Disease: Incurable, chronic illness
- Can go undetected for decades
- Can cause late stage complications
 - heart failure,
 - sudden cardiac death,
 - digestive problems

- Chagas may spread to & through the United States by:
 - Human migration (~300K cases)
 - Potential movement of the triatomine bugs



- Caused by flagellated parasite
 - *Trypanosoma cruzi*
- Vector
 - Triatomine bugs
- Transmission
 - Bug to human host:
 - Vector bite
 - Subsequent bug defecation
 - Scratching of bite wound



<http://www.med.uni-marburg.de/stpg/ukm/lt/hygiene/schwarz/projects.html>



www.cdc.gov/parasites/chagas 9/10/11

New Mexico Triatoma Species

1959

Triatoma protracta protracta (a)

Triatoma protracta woodi (a)

Triatoma rubida (b)

Triatoma sanguisuga (c)*

Triatoma gerstaeckeri (d)

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b

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d

All located in Sylvan locations

T.p. protracta and *T.p. gerstaeckeri* also in human habitation areas

2011

Triatoma lecticularia: Placitas, NM

QuickTime™ and a decompressor are needed to see this picture.

*CDC shows range may not be in NM

Triatomine bugs are known to cohabitate with:

- Neotoma

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- That live in middens



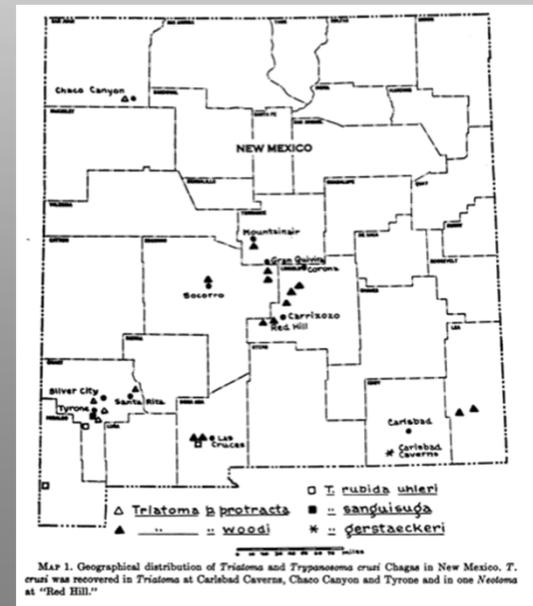
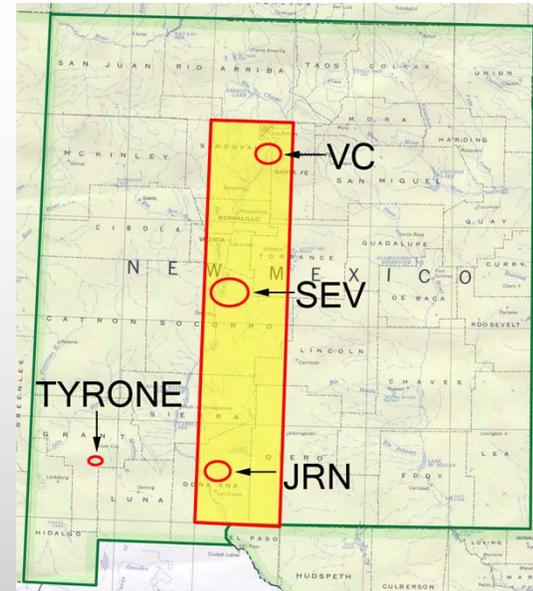
Photo by: Beth Ann Lopez

- Texas and Arizona regularly monitor
 - Human populations
 - Wildlife
- New Mexico: Last surveyed for sylvatic triatomine bugs in 1959 (Wood & Wood 1961)
- Work on presence and behavioral ecology of triatomine bugs and *T. cruzi* urgently needed to understand potential human health threat

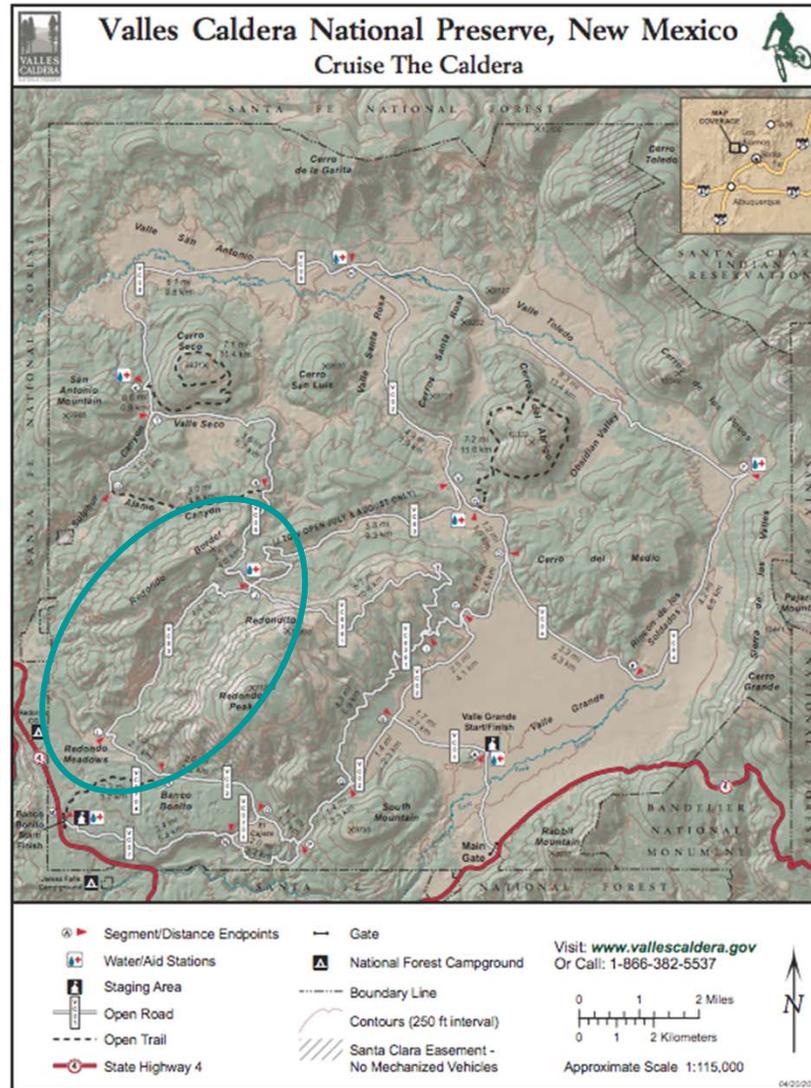
Methods

- Primary collection points
 - Valles Caldera National Preserve
 - Sevilleta LTER
 - Jornada LTER
 - Tyrone

- Also:
 - Springtime Canyon
 - Placitas, NM
 - Ruidoso, NM
 - On-going collection efforts

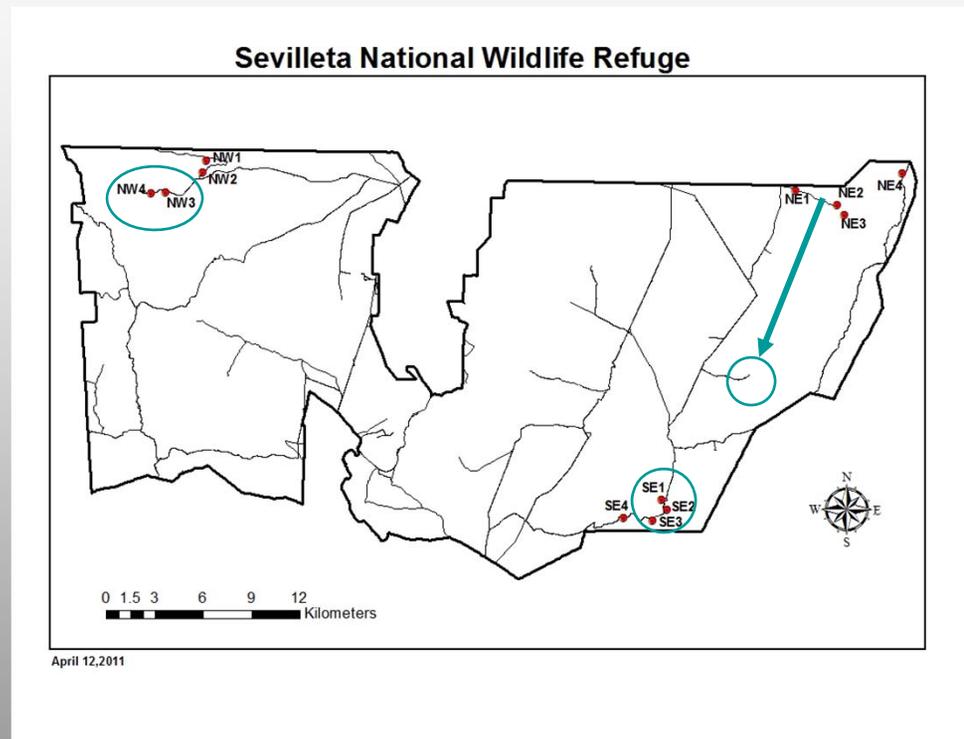


Survey Locations



Survey Locations

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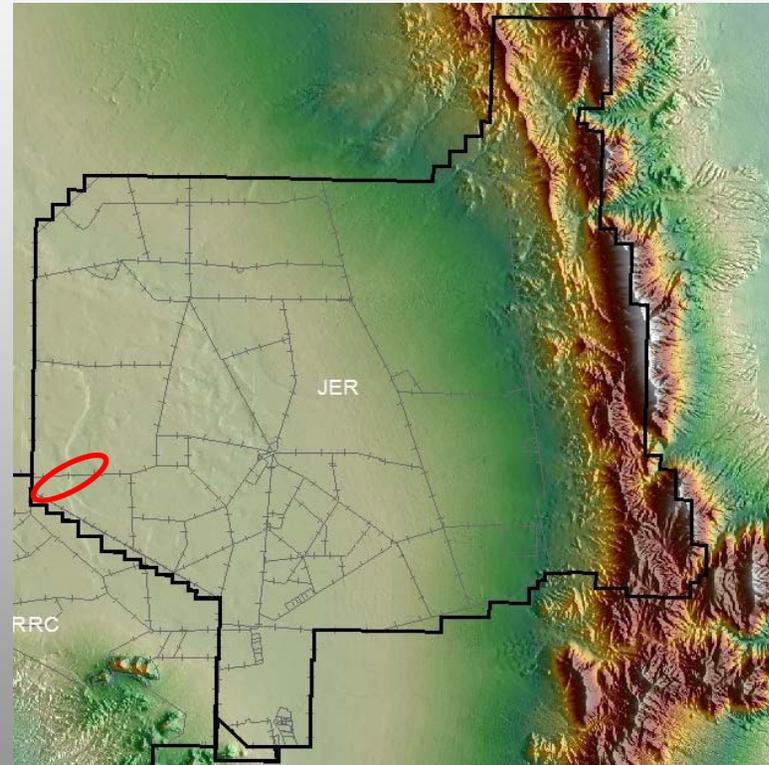


<http://sev.lternet.edu>

Survey Locations

Jornada Experimental Range

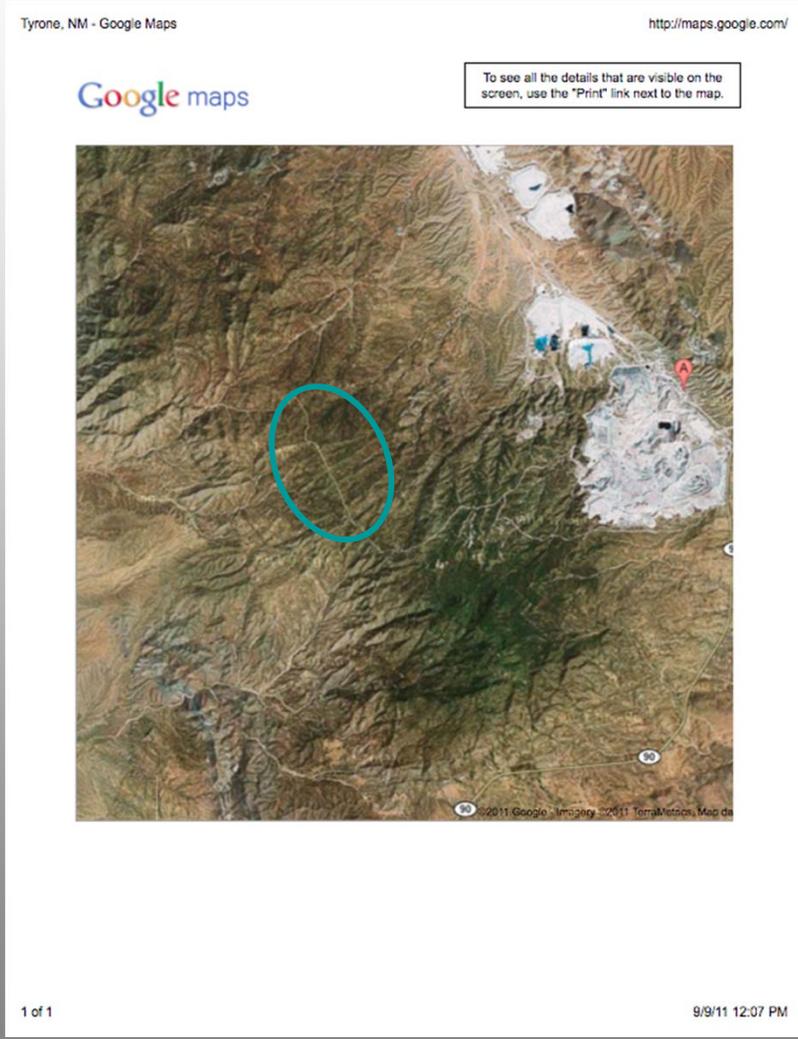
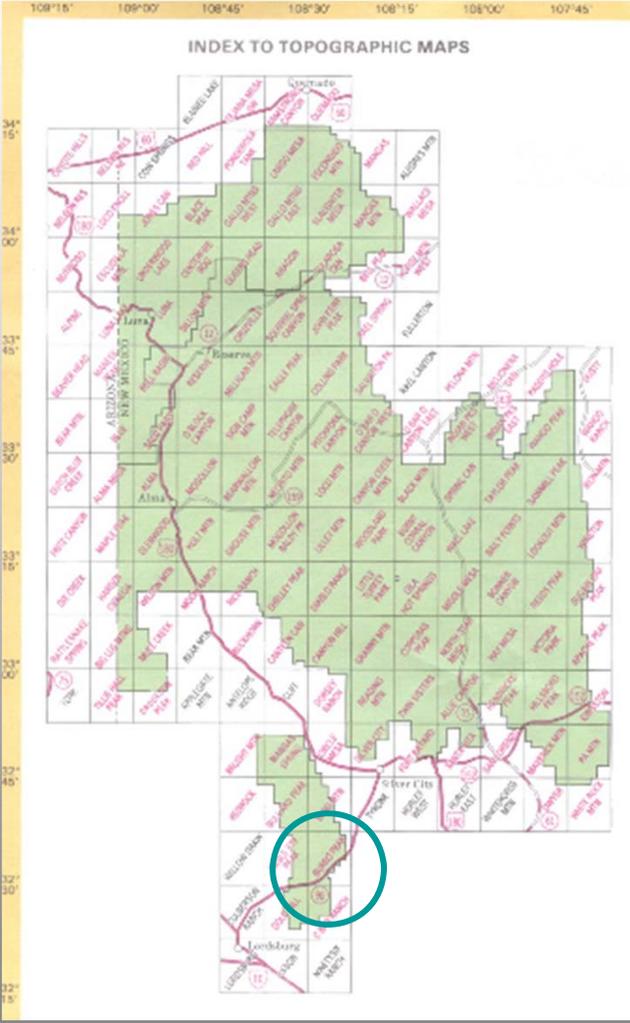
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<http://jornada-www.nmsu.edu>

Survey Locations

Tyrone/Burro Mountain



Challenges

- Weather: Dry or Wet or Dry?
 - La Niña: drought in New Mexico
 - Monsoon: late arrival, small
 - La Niña: repeat 2011-2012?



- Fire
 - VCNP: Las Conchas Fire



Photo: Brian Kliesen, USFS/ June 26, 2011

Neotoma: Springtime Canyon

QuickTime™ and a
Motion JPEG OpenDML decompressor
are needed to see this picture.

Video courtesy of Jerry Dragoo

Results

General Location	# Sites	Trap nights	Dates	Collected	Insects	% Trapping
Sevilleta	3	270	July 7-9, Aug 19-20, 2011	*9	0	3.33%
Jornada	1	84	Aug 6-7, 2011	0	0	0%
Valles Caldera	4	134	Aug 12-14, 2011	*19	0	14.18%
Springtime Canyon	3	128	Aug 24-25, 2011	6	0	4.69%
Gila National Forest: Tyrone	2	112	Aug 26-28, 2011	23	14	20.5% (m) 12.5% (b)
6 LOCATIONS	13 SITES	728	15 DAYS	57	14	

*Does not includes released animals

Specimens

	VCNP	SEV	JRN	Tyrone	Springtime Canyon	Placitas
<u>Mammals</u>						
<i>N. albigula</i>	0	8	0	12	6	0
<i>T. minimus</i>	2	0	0	0	0	0
<i>T. quadrivittatus</i>	8	0	0	0	0	0
<i>P. maniculatus</i>	14	0	0	0	0	0
<i>P. boylii</i>	0	0	0	2	8	0
<i>P. truei</i>	0	1	0	0	0	0
<u>Triatoma</u>						
<i>T. protracta</i>	0	0	0	14	0	0
<i>T. lecticularia</i>	0	0	0	0	0	1

What's next

- PCR analysis forthcoming
- Further distribution analysis
- Niche modeling
 - ClimbDB
 - GIS
 - Other environmental factors
 - Niche modeling
- Human health outreach
 - Burro Mountain RV park
 - Knowledge & Behavior surveys

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 - Permit # LTER Study 357
- Sevilleta LTER/U.S. Fish & Wildlife Service
 - Permit # 22522; 011-030N
- Valles Caldera National Preserve
 - Permit # VCT-2011-RIM-005
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Photo by Sandy Sacher