



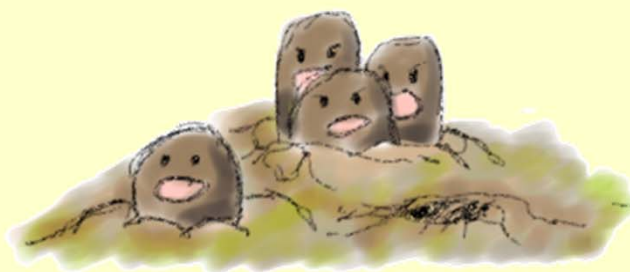
# Why is pest management important?

Information for

*Board Members*

*Community Managers*

*Landscape Committee Members*



Niamh Quinn

Area Vertebrate Pest Advisor

**University of California**

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*Ola! Je suis Jaque.  
I make ladies go crazy and dance on chairs.*

*Ik ben that goed!*



# Rodents

Did you know that.....

- In some cities, the sewer rat population outnumbers the people population.
- In Australia, one farmer recorded 28,000 dead mice on his porch after one night's effort to poison them and 70,000 in a wheat field in one afternoon.
- Each year, rodents cause more than one billion dollars in damage in the United States alone.



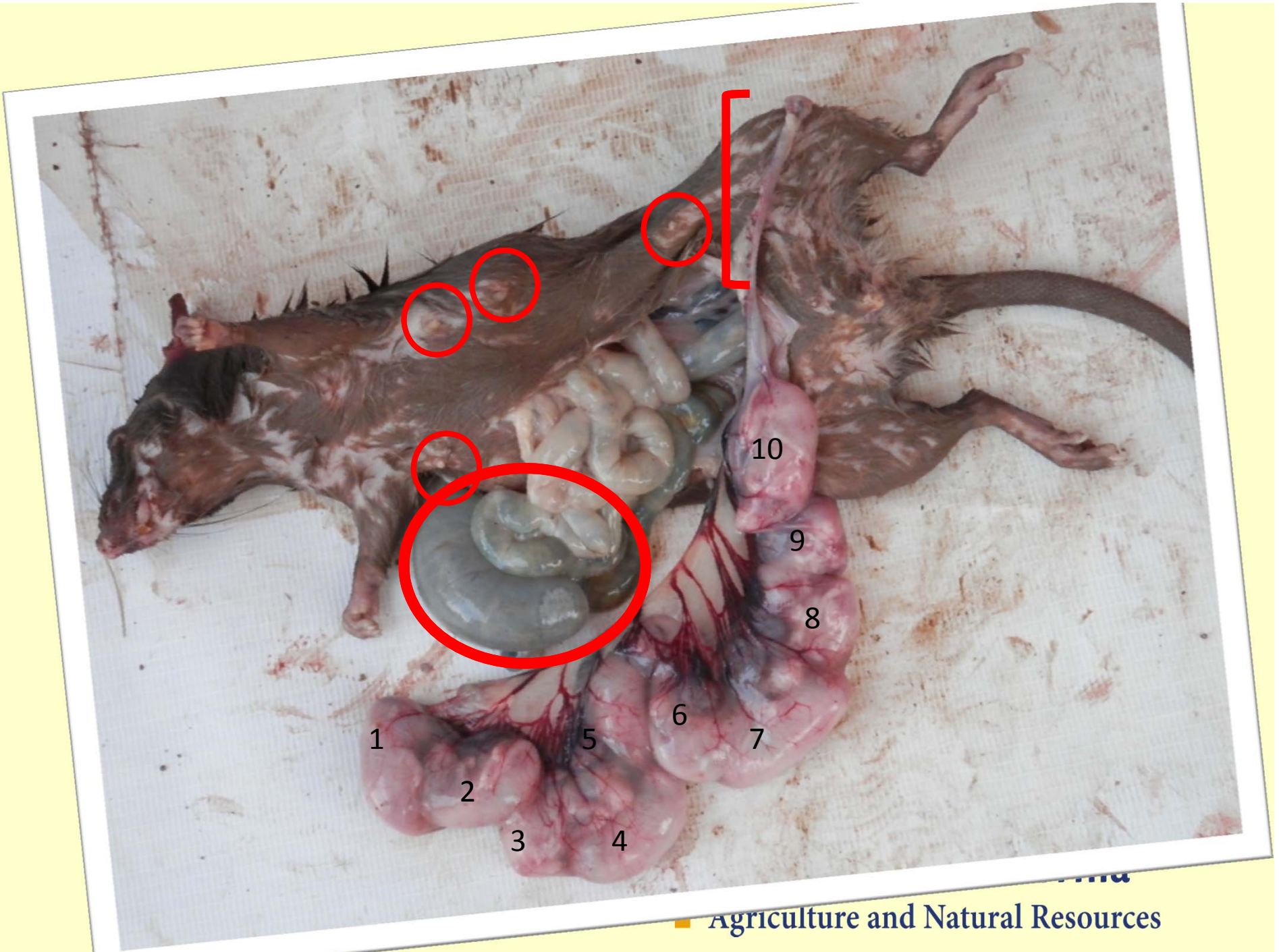


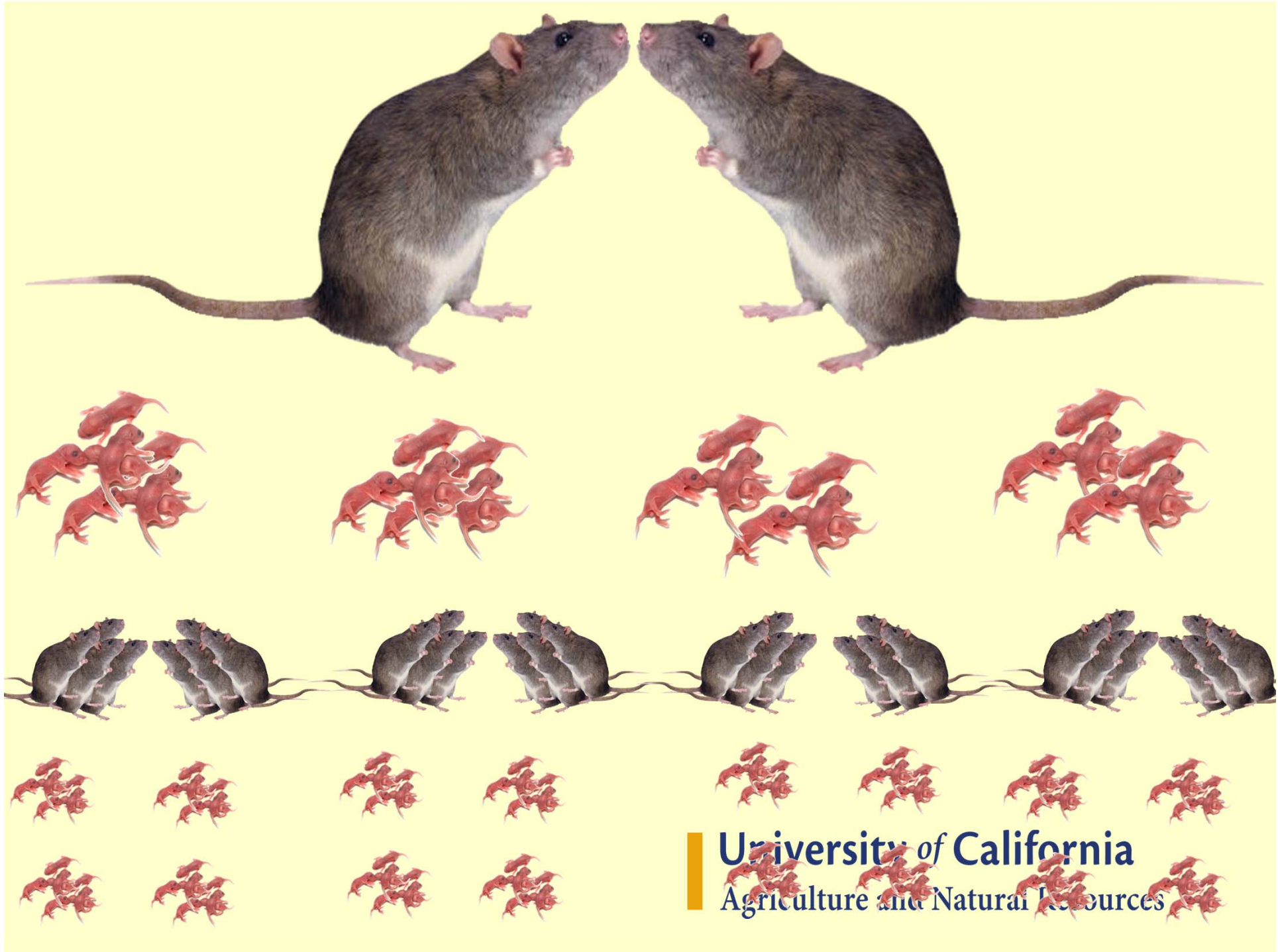
- Mice can also scale rough vertical surfaces and walk along thin ropes and wires.
- Rats can fit through openings that are as small as  $\frac{1}{2}$  inch in diameter, and mice fit through openings as small as  $\frac{1}{4}$  inch

## Reproduction- Why are rodents so successful?



- Roof rat is slightly less prolific than the Norway rat
- Sexually mature at 12 weeks
- 5-8 young
- Adults live for 5-18 months





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- One rat
  - Breeds 4 times in a year having about 8 pups per litter
    - $4 \times 8 = 32$ 
      - 50% are female and breed only once a year
        - » 8 pups by four females/litter
          - $8 \times 4 \times 4$ 
            - Plus the original 32 rats

160 rats!



Pa Tajar Burrows F

18/2/13



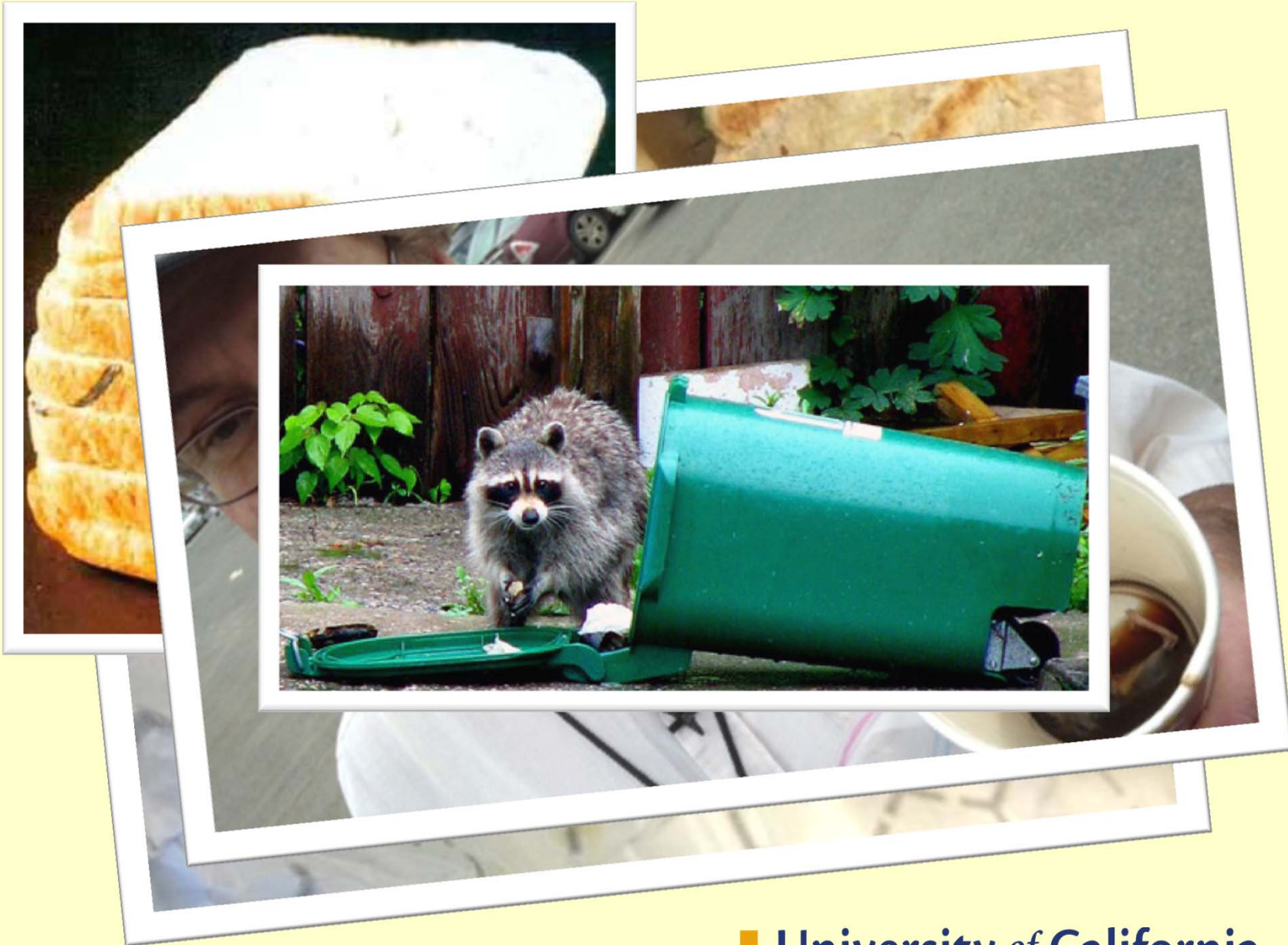
Why do we  
control  
vertebrate  
pests?



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# Wildlife damage to households

- 1000 household randomly selected from the 100 largest metro centers in the US
  - 57% reported that their household had problems with wildlife
- Potentially more human-wildlife interactions occurring outside these large urban centers
  - Almost 100 million households



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- It is estimated that rodents cause 128000 house fires a year!



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# Disease

Photograph courtesy of Rex Baker



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Table. Prevalence of zoonotic pathogens in Norway rats from Baltimore, Maryland, USA 2005–2006

Zoonotic pathogen	Prevalence	Number of rats positive	Total no. of rats*
<i>Calodium hepatica</i> †	87·9	176	201
Hepatitis E virus‡	73·5	144	196
<i>Leptospira interrogans</i> ‡	65·3	124	190
Seoul virus‡	57·7	116	201
<i>Bartonella elizabethae</i> §	34·1	63	197
<i>Hymenolepis</i> sp.†	34·0	55	162
<i>Rickettsia typhi</i> §	7·0	14	201
Lymphocytic choriomeningitis virus‡§	0	0	48

\* Unequal sample sizes due to sample availability.

† Pathogen prevalence determined by microscope evaluation.

‡ Seroprevalence determined by ELISA.

§ Seroprevalence determined by IFA.

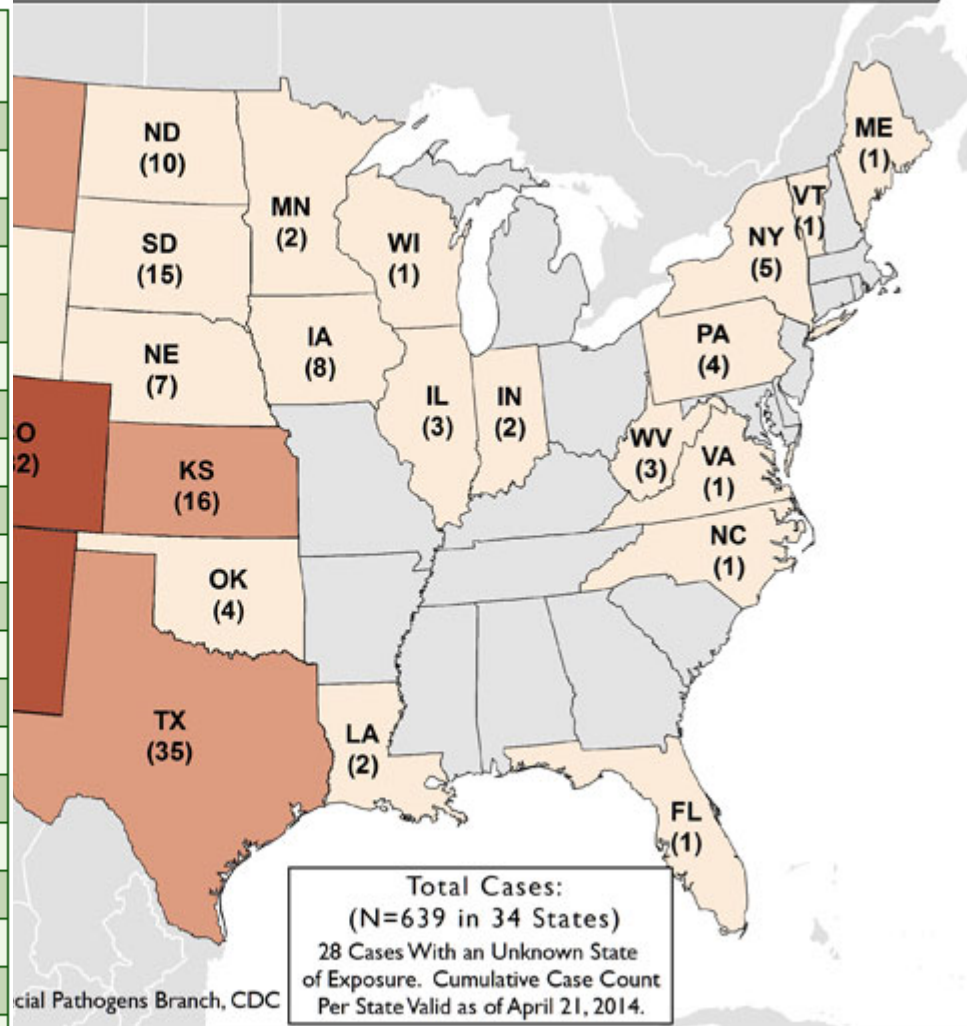
- A wide variety of non viral vector-borne zoonoses exist in the US
  - Tick
  - Flea
  - Louse

Disease	Disease causing agent	Animal vector	Prevention and control
Plague	<i>Yersinia pestis</i>	Rodents	Rodent proofing homes
Tularemia	<i>Francisella tularensis</i>	Microtus	Avoid working in tick infested areas
Lyme disease	<i>Borrelia burgdorferi</i>	Small mammals, birds, lizards	Cover arms and legs in tick infested areas
Flea-borne typhus	<i>Rickettsia typhi</i>	Opossums, feral cats, other flea carrying animals	Don't maintain feral cat colonies, keep pet food inside, control opossum populations, control fleas

Total Cases: 639 (Cumulative case count per state valid as of April 21, 2014)\*

### Hemorrhagic Fever with Renal Syndrome (HPS) Cases, by State of Exposure

State	Cases
Arizona	72
California	60
Colorado	82
Florida	1
Idaho	26
Illinois	3
Indiana	2
Iowa	8
Kansas	16
Louisiana	2
Maine	1
Minnesota	2
Montana	35
Nebraska	7
Nevada	20
New Mexico	93
New York	5
North Carolina	1
North Dakota	10
Oklahoma	4
Oregon	17
Pennsylvania	4
South Dakota	15
Texas	35
Utah	26



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## Mouse allergen. II. The relationship of mouse allergen exposure to mouse sensitization and asthma morbidity in inner-city children with asthma

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*Boston and Watertown, Mass., and Baltimore, Md*

**Background:** Although mouse allergen is known to cause occupational asthma in laboratory workers, its potential significance in home environments has never been studied.

**Objective:** This study was designed to define the prevalence of mouse sensitivity and its relationship to mouse allergen exposure and disease activity in inner-city children with asthma.

**Methods:** A subset of 499 subjects from the National Cooperative Inner-City Asthma Study had dust samples adequate for mouse allergen analysis, as well as valid puncture skin test (PST) results. Data were analyzed to relate mouse allergen exposure and other risk factors to mouse sensitization and asthma morbidity.

**Results:** Eighty-nine (18%) of the 499 children had a positive mouse skin test response. Children whose homes had mouse allergen levels above the median (1.60 µg/g) in the kitchen had a significantly higher rate of mouse sensitization (23% vs 11%,  $P = .007$ ). Atopy was also significantly related to mouse sensitization, with 40% of those with more than 4 positive PST responses having mouse sensitivity compared with 4% of those with no other positive PST responses ( $P < .0001$ ). When atopy and exposure were considered together, 53% of those with more than 4 positive PST responses and allergen levels above the median had a positive PST response to mouse allergen compared with 22% of those with more than 4 positive PST responses and allergen levels below the median ( $P < .0001$ ). The relationship among mouse allergen exposure, sensitization, and any measures of asthma morbidity was not statistically significant.

**Conclusions:** Mouse allergen may be an important indoor allergen in inner-city children with asthma, with exposure and atopy contributing to mouse sensitization. (*J Allergy Clin Immunol* 2000;106:1075-80.)

**Key words:** Mouse allergen, indoor allergens, inner-city asthma, sensitization, asthma morbidity

The identification of major indoor allergens and the ability to measure these allergens in home environments have shed considerable light on the relationships among allergen exposure, allergic sensitization, and disease activity for dust mite, cat, and cockroach allergens in patients with asthma.<sup>1-10</sup> It is also clear from these studies that different allergens may be more important than others in certain environments. A striking example of this was the recent demonstration of the particular importance of cockroach allergen in children from the inner city with asthma, a group in which asthma morbidity is exceptionally high.

We have now had the opportunity to analyze dust samples from the National Cooperative Inner-City Asthma Study (NCICAS) for mouse allergen and have reported a high prevalence of mouse allergen in the homes of inner-city children with asthma.<sup>11</sup> Although mouse allergen is known to be a potent sensitizer in occupational settings, its potential importance in home environments has never been studied. The purpose of this study was therefore to evaluate the clinical significance of mouse allergen in this unique inner-city asthma population, including the prevalence of mouse sensitization, the relationships between mouse exposure and sensitization, and the potential contribution of mouse allergen to asthma morbidity. Furthermore, because previous studies have suggested that atopy<sup>5</sup> and other variables, such as smoking,<sup>12</sup> sex,<sup>13</sup> cockroach sensitization and exposure,<sup>8</sup> and psychosocial<sup>14,15</sup> and socioeconomic<sup>16</sup> factors, may also play a part in sensitization and asthma morbidity, the roles of these potential covariates were also analyzed.

### METHODS

The NCICAS study population consisted of 1528 children aged 4 to 9 years from 8 major inner-city areas (Bronx, NY; East Harlem, NY; St Louis, Mo; Washington, DC; Baltimore, Md; Chicago, Ill; Cleveland, Ohio; and Detroit, Mich). As previously described, these

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<b>Yersinia enterocolitica</b>	Rodents, rabbits, pigs, sheep, cattle, horses	No apparent disease	Enterocolitis, reactive polyarthritis
<b>Campylobacter jejuni</b>	Birds, cattle, sheep, pigs, goats	No apparent disease; death	Gastroenteritis
<b>Pseudomonas pseudomallei</b>	Rats, mice, rabbits, ruminants, dogs, cats, nonhuman primates	No apparent disease; death	Pulmonary abscesses, septicemia
<b>Streptococcus moniliformis</b>	Rats, squirrels, weasels, turkeys	No apparent disease	Fever, rash
<b>Listeria monocytogenes</b>	Wild mammals, birds	No apparent disease; death	Meningitis, abortion, septicemia
<b>Borrelia burgdorferi</b>	Deer, mice, raccoons (ticks)	No known apparent disease	Lyme disease
<b>Spirillum minor</b>	Rats, mice, cats	No apparent disease	Fever, rash
<b>Cryptosporidium spp</b>	Rodents, snakes, birds	No apparent disease; enteritis, respiratory disease	Enteritis, dysentery
<b>Blastocystis hominis</b>	Pigs, guinea pigs, fowl, nonhuman primates	No apparent disease; diarrhea	Diarrhea
<b>Leishmania spp</b>	Rodents, canines, rodents, other carnivores (sandflies)	No apparent disease; skin ulcers	Chronic skin ulcerations, mucocutaneous lesions, kalaazar syndrome
<b>Trypanosoma cruzi</b>	Armadillos, bats, rodents, opossums, nonhuman primates, dogs, cats (triatomes)	No known apparent disease; neurologic dysfunctions	Skin rash, myocarditis, conjunctivitis, myositis (Chagas disease)
<b>Trypanosoma brucei var. gambiense and var.</b>	Wild ungulates (tsetse flies)	No apparent disease; death in coma	Meningoencephalitis

<b>Hymenolepis nana and diminuta</b>	Mice, rats	Tapeworm infection	Tapeworm infection
<b>Trichinella spiralis</b>	Wild carnivores, wild pigs	No known apparent disease	No apparent disease; muscle invasion death
<b>Fasciola hepatica</b>	Snails, fish, cattle, sheep, goats, camel, deer, rabbits	No apparent disease; death	Acute hepatitis, cholecystitis, cirrhosis
<b>Schistosoma spp</b>	Snails, rodents, baboons	No apparent disease; death	Colitis, hepatitis, cystitis
<b>Dracunculus medinensis</b>	Wild carnivores, nonhuman primates (water fleas)	No known apparent disease	Skin ulcers
<b>Brugia spp</b>	Nonhuman primates, wild carnivores, rodents (mosquitoes)	No known apparent disease	Lymphadenopathy, lymphedema

\* Table extracted from County of LA - Department of Health Services, Public Health Programs and Services - Disease Control Programs, Veterinary Public Health and Rabies Control "Overview of Zoonoses."  
URL: <http://phs.dhs.ca.la.us/vet/guides/velosoman.htm>.

- Colorado virus
- Chlamydia
- Rickettsia
- Rickettsia
- Rickettsia
- Coxsackie B
- Brucella s
- Francisella tularensis
- Yersinia p

A beaver is sitting upright on a rectangular wooden block. It is holding a long, thin stick vertically in its mouth. The beaver has brown fur and prominent incisors. The scene is outdoors, with green plants in the background and a wooden fence. In the foreground, there is a concrete surface with some metal tools and a brown leather strap. A white speech bubble with a black outline is positioned above the beaver, containing the text "Questions?".

Questions?