Health and Economic Significances of Rodents

Janet Hurley, ACE

Senior Extension Program Specialist

Texas A&M AgriLife Extension

Dallas, TX

Rodents are health hazards

- Carry infectious diseases
- May cause asthma attacks
- Bite
- Damage food and property
- Can attract other pests
- Are repulsive

- Gnaw constantly to create holes and pathways (can cut wood, plastics, hoses, sheetrock, copper, wires, etc.)
- Are most active during the first two hours after dusk
- Make lots of babies fast
- Travel the same paths nightly, staying close to walls, or any items that give them cover (shadows, ledges, nooks).

California woman got typhus from a neighborhood rat

By Rachael Rettner published August 06, 2021

The woman initially thought her symptoms were due to COVID-19.

(Image credit: Shutterstock)

A California woman who thought she had COVID-19 turned out to have typhus.

Rodent nightmare: Residents frustrated over 'rat infestation' at north Houston apartment complex

There are three major reasons why rats and mice are considered pests:

- They consume and damage human foods in the field and in stores.
  - In addition, they spoil it in stores by urine and droppings reducing the sales value.
- Through their gnawing and burrowing habit, they destroy many articles (packaging, clothes and furniture) and structures (floors, buildings, bridges, etc.).
  - By gnawing through electrical cables, they can cause fires.
- They are responsible for transmitting diseases dangerous to man.

What makes rodents good agents to transmit disease to humans?

- Diversity of species (~2000)
- Opportunistic nature
- High reproductive potential
- High population densities
- Peridomestic affinities

- Rodents are the largest group of mammals, comprising approximately 40% of all species.
- Humans and rats are two of the most adaptable and geographically diverse mammals.
- Humans and rodents have coexisted for tens of thousands of years.
- An estimated 10.7% of rodents are known hosts of zoonotic diseases, such as cat scratch disease, bartonella, hantavirus, Lyme disease, leishmaniasis, leptospirosis, and the plague

Diseases Directly Transmitted by Rodents

- Hantavirus pulmonary syndrome (new world hantaviruses)
- Hemorrhagic fever with renal syndrome (old world hantaviruses)
- Lassa fever
- Leptospirosis
- Lymphocytic chorio-meningitis
- Omsk hemorrhagic fever
- Plague
- Rat-bite fever
- Salmonellosis
- Argentine hemorrhagic fever, Bolivian hemorrhagic fever, Venezuelan hemorrhagic fever, Sabia-associated hemorrhagic fever
- Tularemia
- Monkeypox

www.cdc.gov/rodents/diseases/direct.html

Diseases Indirectly Spread by Rodents

- Babesiosis
- Colorado tick fever
- Cutaneous leishmaniasis
- Human granulocytic anaplasmosis
- Lyme disease
- Murine Typhus
- Omsk Hemorrhagic fever
- Powassan virus
- Scrub Typhus
- Rickettsialpox
- Relapsing fever
- Rocky Mountain Spotted fever
- Sylvatic typhus
- West Nile virus
- Lungworm

https://www.cdc.gov/rodents/diseases/indirect.html

NATURE WORLD NEWS Natureworldnews.com

TRENDING SNOW COVID-19 WINTER US UK

Rat Bite Fever: Deadly Rat-Borne Disease is Spreading Quickly in the US

By Rain Jordan Sep 16, 2021 04:54 AM EDT

Health officials from many states (including Texas) want to warn citizens about a dangerous bacterium strain carried by rats across the country.

The mortality rate without medical care might be Symptoms usually develop 3 to 10 days after coming into contact with the bacterium that causes RBF in most people. Fever, joint discomfort, vomiting, headache, muscular soreness, and a rash are common symptoms. However, if the illness worsens, problems such as pneumonia, liver infection, and meningitis are possible.

Scientific investigations show that "Historically, laboratory personnel and the impoverished have been the victims of rat-bite fever. However, as rats have grown more popular as pets, this has altered to the point that youngsters now account for more than half of all cases in the US, followed by laboratory staff and pet store employees as high as 13%.

The New York Times

Second U.S. Case of Monkeypox This Year Is Discovered in Maryland

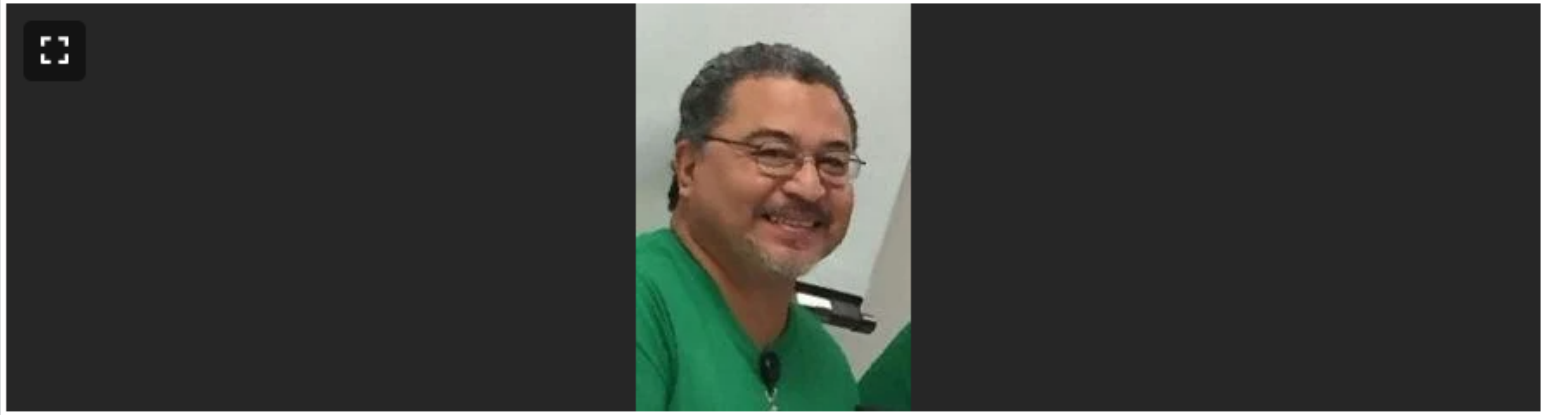
Health officials said there was little risk that the virus, which causes a rare but potentially serious illness, would spread. Both cases this year were identified in travelers who had returned from Nigeria.

VICTORIA VA ADVOCATE

Health Corner

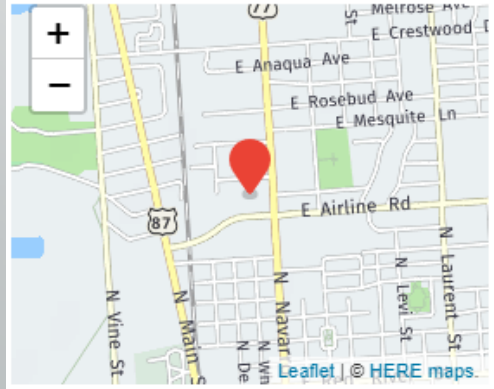
Three primary rodents in South Texas cause damage, disease

By Eddie Ramirez Dec 2, 2019 Updated Jan 6, 2021 0



Eddie Ramirez

Contributed Photo



In South Texas, there are three principal rodents that create problems: the house mouse, Norway rat and roof rat. They are referred to as commensal rodents, meaning they live in close contact with humans.

Not only are they annoying, but they also cause damages to homes and buildings, causing losses of billions of dollars annually. Most importantly, they harbor and transmit disease-causing pathogens to

New York City Investigating Three Cases of Leptospirosis

The rodent-related disease is believed to be responsible for three cases — one of them fatal — in the Bronx, according to the New York City Department of Health and Mental Hygiene (DOHMH).

February 16, 2017

SUBSCRIBE

Public Health Pests Rodents

New York City is investigating three recent cases — one of them fatal — of a rare disease transmitted through rat urine that have occurred in the Grand Concourse neighborhood of the Bronx, according to the Department of Health and Mental Hygiene.

As reported by the New York Times, the three most recent cases occurred in the past two months. All the patients became severely sick and were hospitalized with acute kidney and liver failure, the health department said. One died as a result of an infection. The two who survived have been released from the hospital.

The sexes and ages of those infected were not availab
location of the cluster.

The NYC Department of Health and Mental Hygiene cr
available at http://www1.nyc.gov/site/doh/health/healt

Source: New York Times

Oct 22, 2021, 02:05am EDT | 11,709 views

Leptospirosis Outbreak In NYC Spread By Rat Urine, 13 Hospitalized, One Dead

Bruce Y. Lee Senior Contributor

August/September 2012 Yosemeti National Park

- Approximately 12,000 people were at risk of hantavirus pulmonary syndrome.
- Curry Village Camping area (cabins) and High Sierra Camps
- 7 people ill, 3 deaths

Bruce Barcott

Dec 18, 2012

The Story Behind the Hantavirus Outbreak at Yosemite

The outbreak, which killed three, didn't only attack the lungs of its victims. It messed with the psyche of the rest of us, too.

"CDC estimates that each year 48 million people get sick from a foodborne illness, 128,000 are hospitalized, and 3,000 die."

Foodborne Germs and Illnesses https://www.cdc.gov/foodsafety/foodborne-germs.html

Researchers have identified more than 250 foodborne diseases.

Most of them are infections, caused by a variety of bacteria, viruses, and parasites.

Harmful toxins and chemicals also can contaminate foods and cause foodborne illness.

According to the indictment, when Food and Drug Administration inspectors visited the Blakely plant in 2009 in the middle of the outbreak, they "asked specific questions about the plant, its operations, and its history, and, in several instances, Stewart Parnell, Lightsey and Wilkerson gave untrue or misleading answers to these questions."

Four indicted in peanut deaths linked to Ga. plant

Shortly after the salmonella outbreak spread across the country in early 2009, an Atlanta Journal-Constitution investigation revealed that as far back as 2007, the plant had shipped tainted products, even after tests showed contamination.

The AJC also uncovered that the plant had a history of sanitation problems that included grease and dirt buildup, unmarked chemical containers and gaps in doors large enough for rodents.

The south Georgia plant was macabre by food-safety standards. Inspectors and investigators found roaches, rats, mildew, and dirt and grease built up under a leaking roof. A work force of about 50 was pressured to turn up the production volume, turning out thousands of gallons of peanut paste a day.

SALMONELLOSIS

- Generally associated with food poisoning through human contact
- Acute gastroenteritis produced by Salmonella bacteria.
- Can be spread through food contaminated with rat and mouse feces containing Salmonella organisms
  - Can live in rodent droppings for up to 90 days

Food Safety and Pest Prevention

About 48 million people in the U.S. (1 in 6) get sick each year with a foodborne illness

- 128,000 are hospitalized, and 3,000 die each year from foodborne diseases (Recent data from the Centers for Disease Control and Prevention)
- CDC also discovered that nearly 70 percent of foodborne illnesses and more than 50 percent of foodborne illness deaths come from two categories of food which is the most common food groups prepared in restaurants and homes
  - Produce
  - Meat/poultry

Congress thru FSMA shifted the focus of the FDA from responding to foodborne illness to preventing it.

FDA has seven major rules to implement FSMA at every level of food production.

- These new rules ensure the safety of the food supply is a shared responsibility among many different points in the global supply chain for both human and animal food.
- The FSMA rules are designed to make clear specific actions that must be taken at each of these points to prevent contamination.

Rodents transmit the following: salmonellosis, leptospirosis, tularemia, listeriosis, & Rat-Bite Fever

Food Safety Modernization Act (FSMA)

The Act was passed in 2011 to address the fact that there are over 48 million illnesses per year in the U.S. caused by food that could largely have been prevented with better manufacturing, packaging, distribution, and holding practices.

The most significant component for most food processors is the Preventive Controls for Human Food Rule.

Prevention

A key feature of FSMA was the legislative mandate to require comprehensive, science-based preventive controls across the food supply.

The act overhauled regulations regarding food production and gave the Food and Drug Administration (FDA) more authority to oversee and enforce supply chains.

FSMA shifts the focus from responding to foodborne illnesses to preventing them and affects almost every business that must register with the FDA.

There are seven rules that address different aspects of the food supply.

1. Preventive Controls for Human Food – Human food facilities registered with the FDA must implement a written plan that identifies hazards and outlines appropriate preventive controls
2. Preventive Controls for Animal Food – Animal food facilities registered with the FDA must implement a written plan that identifies hazards and outlines appropriate preventive controls
3. Produce Safety – Establishes minimum standards for growing, harvesting, packing, and storing produce
4. Foreign Supplier Verification Program – Importers must verify that their global suppliers comply with FDA regulations
5. Third-Party Certification – Accredits third-party certification bodies to administer voluntary consultative and regulatory audits to help companies prepare for regulatory audits or achieve certifications
6. Food Defense (intentional adulteration) – Food facilities registered with the FDA must develop a plan that assesses contamination vulnerabilities and document a mitigation strategy for each vulnerability
7. Sanitary Transportation – New requirements for companies that transport food, including shippers, receivers, loaders, and carriers

Food Safety Modernazation Act

General Approach to Preventive Controls

FDA

FDA FOOD SAFETY MODERNIZATION ACT

FDA's Top 5 Most Cited Food Safety Violations (2018)

Sanitation Monitoring: The facility does not monitor sanitation conditions and practices frequently enough to conform to current good manufacturing practices. Some factors that should be monitored include the safety of water encountering food and food contact surfaces, the condition and cleanliness of food contact surfaces, and the measures used to prevent cross-contamination from unsanitary objects.

Pest Control: The facility does not take effective measures to protect food against contamination from pests or exclude pests from food production areas. Facilities were cited by the FDA for not properly excluding pests from potentially contaminating food.

Manufacturing, Processing, Packing, and Holding Controls: The facility does not implement proper controls to mitigate the risk of food hazards, such as growth of microorganisms, allergen cross-contact, and contamination of food. This includes protecting consumers from labeling errors more likely to cause adverse health consequences.

Sanitary Operations and Plant Maintenance: A number of foodborne outbreaks have been directly attributed to failure to properly maintain equipment under sanitary conditions. The FDA cited facilities for either not maintaining cleanliness of their facilities or not keeping them in good repair.

Personnel: The facility does not take reasonable precautions related to personnel, include the failure to address the hygiene of staff working directly with food.

FDA's data for 2020 shows top five violation categories at food facilities

1. Foreign supplier compliance programs
    - FDA requires most food importers to develop and maintain Foreign Supplier Verification Programs (FSVPs) for their suppliers. The requirement is designed to help ensure that suppliers are FDA compliant and are producing food in a safe manner.
2. Hazard analysis
    - FDA requires most food facilities to identify potential biological, chemical, or physical hazards that may occur at the facility as well as establish preventive controls for those hazards. This is another way the FDA ensures that facilities are maintaining food safety protocols.
3. Pest Control
    - During facility inspections, the FDA inspectors search for signs of potential pest infestations. The FDA cited 98 facilities for failure to prevent pests within their food facility or for misusing pesticides in a way that could cause potential food contamination.
4. Manufacturing controls
    - Manufacturing, processing, packing, and holding controls account for 95 of 2020's food facility citations. This citation indicates that a facility did not conduct operations under conditions that would minimize the chances for potential microorganism growth, allergen cross-contamination, or contamination and deterioration of food.
5. Personnel
    - The fifth most cited violation during food inspections in FY 2020 were personnel issues. These can include failing to address hygiene issues or other good manufacturing practices in relation to employees' handling of food products. The FDA issued 87 citations for this violation.

Rethink your rodent business model

Think like detective and use all your senses

Shadows

Lines

Corners

Warmth

Holes

Sebum Trails

Odors

Site Assessment from outside pressure and entrance

- Ground level openings (utility access points, missing mortar, etc.)
- Development of surrounding areas – who are the neighbors
- Accumulations of rubbish and clutter piles adjacent to the facility
- Trees and shrubs close to the building – 18-inch gap
- Frequency of movement into and out of the facility
- Proximity to open fields, streams or highways

Facility assessment internal factors that influence pest levels

- Unused areas and general clutter – storage rooms, boiler rooms
- Type of material being held in the facility
- Number of exterior facing doors – how many dock doors stay open all the time
- Frequency of movement into and out of the facility
- Employee break rooms or where personal food is stored/consumed
- Ram material and processing sites
- Finished good storage
- How often is trash collected and disposed of inside facility and removed off site