Rodent Management Series part 3 of 6

Beware of Rodent-Borne Diseases

Protect your technicians and customers from exposure and illness

Dr. Stuart Mitchell Contributor

Rodents have competed with human endeavors for thousands of years as one of the most successful life forms on the planet. The success and diversity of rodents has much to do with their unique biology, sexual reproduction and mating, breeding systems, gestation and birth, and resilient nutritional requirements. Their complex behavior, especially, is significant to their success.

Mice and rats are inquisitive, social mammals. Because they can adapt to environmental conditions quickly, novel situations always interest them. Curiosity is indicated by their movement toward a novel stimulus: Rats and mice will rear up, pushing their noses high to sample air for cues.

Mice and rats are naturally tidy and spend hours grooming to themselves and one another. Areas of defecation and urination are present throughout their territories, but communal sleeping areas are rarely soiled. Mice and rats practice coprophagy, and scats may be eaten even as they come out of the anus.

Mice and rats are basically nocturnal, but mice usually display more diurnal activity. Activity is exhibited in cycles of activity and rest throughout the day and night. Mice and rats tend to sleep 5 to 10 minutes, wake up, adjust posture, and drift back to sleep. In groups, they sleep in communal piles, with individuals gradually exchanging positions throughout time. Mice and rats prefer a clean area to sleep.

In conflict, mice usually inflict bite wounds from behind, on the tail or over the rump area. Death sometimes occurs, but more likely, lower-ranking mice will lose weight because ongoing attacks make feeding difficult. Rats usually face each other when settling disputes, and the bite wounds tend to be around the head and shoulders. Fights between rats are rare, although more likely between males. Post-parturient females in communal arrangements may fight.

Healthy mice and rats spend time each day keeping their coats clean and shiny. As they become ill, their coats become ruffled and unkempt, and they lose weight. Activity gradually decreases until they become reluctant to move, and finally assume a characteristic posture: Their back is

hunched-up, fur ruffled, the head is lowered, and the eyes are squinting or closed. Breathing becomes more pronounced and rapid.

The complex behavior of mice and rats potentially can place them within numerous human endeavors. Healthy and sick or diseased animals can vector diseases biologically or mechanically to, in many cases, unsuspecting structural human inhabitants. In other words, they can make you sick.

Types of disease

Globally, mice and rats potentially can vector 55 pathogens. They include 17 viruses, nine Rickettsia, 20 bacterial, three protozoan, three cestodes, three nematodes and one trematode. Pathogenesis to humans can result from handling rodents, contact with rodent feces, urine or saliva, or even rodent bites. Indirect spreading of disease can result from rodents through fleas, mites

or ticks.

Diseases can result from direct rodent contact. Diseases that favor direct contact include:

- **Hantavirus Pulmonary Syndrome (HPS):** Spread by deer mice, white-footed mice, cotton rats and rice rats, this virus occurs throughout most of the U.S. It's spread by dust contaminated with urine or droppings, direct contact with rodent urine or droppings, and rarely, a bite.
- **Hemorrhagic fever:** Spread by striped field mice, yellow-necked field mice, Norway rats and bank voles, this virus is found primarily in Eastern Asia, Russia, Korea, Scandinavia, Western Europe and the Balkans. It's spread by breathing in dust that's contaminated with rodent urine or droppings, direct contact with rodent urine or droppings, a rare bite, and equally as rare, person to person.
- **Lassa fever:** Spread by multimammate rats, this virus is found in West Africa. It's spread through breathing in dust that's contaminated with rodent urine or droppings, or direct contact with rodents or their urine and droppings. Consuming contaminated food, a rare bite, or person-to-person contact also may spread the disease.
- **Leptospirosis (also known as Weil's disease):** Many rodent species spread these bacteria. It results from eating food or drinking water contaminated with urine from infected animals.
- **Lymphocytic choriomeningitis (LCM):** This virus is spread by the house mouse worldwide. It's spread by breathing dust that's contaminated with rodent urine or droppings, direct contact with rodent urine or droppings, or from a rare bite wound.
- **Plague:** This bacteria is spread by feral rodents that include wood rats, chipmunks, ground squirrels, fox squirrels, rock squirrels, prairie dogs and other species. It's found in the Western U.S., South America and Asia. Plague results from infected flea bites and direct contact with an infected animal.
- **Rat bite fever:** This bacterium is spread by rats, and possibly mice, worldwide. Infection results from a bite or scratch from an infected rodent, contact with dead rodents, or eating food or drinking water that's contaminated with rat feces.
- **Salmonellosis:** Spread by mice and rats, the bacteria are found globally. The disease is spread by eating food or drinking water contaminated by rat feces.
- **Arenavirus:** Spread by the Drylands vesper mouse, large vesper mouse and cane rat, this virus is found in Argentina, Bolivia, Venezuela and Brazil. The disease is spread by breathing in dust that's contaminated with rodent urine or droppings, direct contact with rodents or their urine and droppings, rare bite wounds, and direct contact or from person to person.
- **Tularemia:** These bacteria are spread by feral rodents, including muskrats, ground squirrels and beavers worldwide. Infection results from animal carcasses, being bitten by a carrier tick or deer fly, or eating food or drinking contaminated water.

Diseases that favor indirect contact include:

- Babesiosis;
- serotype viruses;
- leishmaniasis;
- human granulocytic;
- anaplasmosis;
- Lyme disease;
- murine typhus;
- Omsk fever;
- Encephalitis;
- scrub typhus;
- Rickettsialpox;
- relapsing fever;
- Rocky Mountain spotted fever; and
- sylvatic typhus.

Protect yourself

Pest management professionals (PMPs) must use appropriate personal protective equipment (PPE) when in confined areas of known rodent activity or handling rodent carcasses. When handling rodent carcasses, use rubber gloves, long tongs and newspaper. Bury or incinerate dead rodents.

Global rodent control is estimated to run in the billions of dollars; but keep in mind mice and rats are beneficial to humans, as an essential research animal in medicine. Additionally, rodents are an essential part of ecosystem balance. **pmp**

Dr. Mitchell is principal technical specialist for PestWest Environmental. You can contact him at doc.mitchell@pestwest.com. Dr. Mitchell, Ph.D., is a Doctor of Osteopathic Medicine (D.O.), Master of Public Health (M.P.H.), Certified Medical Investigator (C.M.I.) in forensics, and a Board Certified Entomologist (B.C.E.)