



## DISEASE AND PARASITE OF MULE DEER

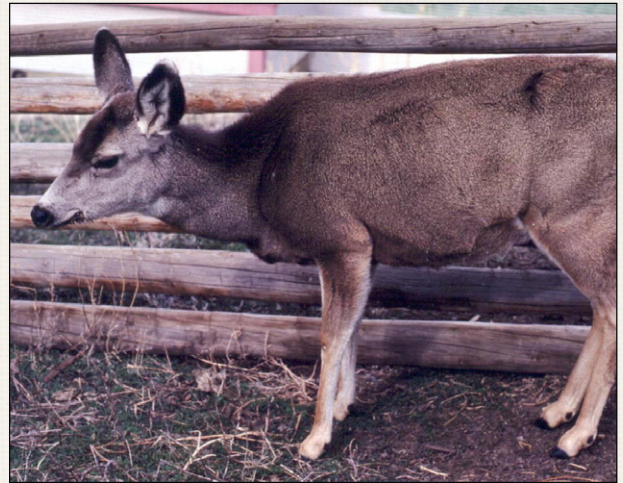
### Fact Sheet #11

#### OVERVIEW

Long-term declines in mule deer populations have been largely attributed to changes in habitat, loss of migration corridors, and predator-prey relationships; however disease places additional pressure on waning populations. Disease and parasites influence overall population health, numbers, distribution, and sex and age composition. This fact sheet discusses several important diseases and parasites of mule deer and their control, treatment, and management in free-ranging populations.

#### BACKGROUND

Disease and parasites in wildlife may influence the individual or population. Pathogens such as bacteria, viruses, fungi or parasitic species can be transmitted among mule deer populations, to other wildlife species, domestic animals, or humans. Diseases affecting deer can lead to substantial economic impacts to state wildlife agencies and communities that depend on hunters and other wildlife enthusiasts.



Pathogens may be naturally occurring or introduced by moving wildlife. Factors affecting disease transmission and emergence include weather conditions, changes in pathogen virulence, deer distribution and population fluctuations, environmental changes affecting habitat, land-use change, increasing urban deer interactions with humans and domestic animals, deer farming, and feeding and baiting of wild deer.

#### DISEASES IN MULE DEER

Disease by itself generally does not determine mule deer abundance. However, when a disease occurs with other stressors on populations, wildlife managers must consider its significance for developing management strategies. An example of this relationship includes physiological stress from nutritional or mineral imbalances which may lead to increased herd susceptibility to disease. Monitoring an established disease documents its effect on a population, its spread, and how it relates to other factors that may be limiting populations. Rarely do disease outbreaks cause rapid or large-scale mortality in mule deer; most occur as smaller-scale die-offs or reduce productivity.

#### Chronic Wasting Disease (CWD)

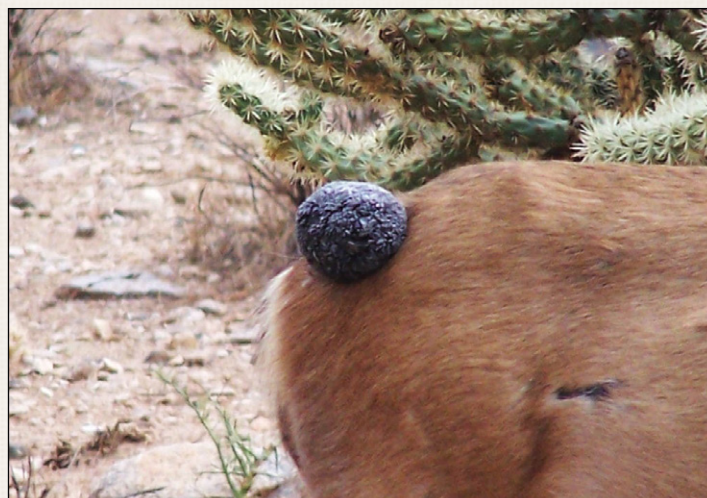
Over the last decade, CWD has been a leading cause for concern among mule deer managers. This infectious protein or prion causes fatal neurological disease in deer, elk and moose. Currently, CWD occurs in mule deer populations in Colorado, Wyoming, Utah, Nebraska, North and South Dakota, New Mexico, Texas, Alberta, and Saskatchewan. Infected local populations can experience high prevalence with up to 50% of the deer carrying the deadly prion. Population declines may occur in some regions over time; however, many affected areas have exhibited limited or no population effects due to CWD.

#### Bacterial Diseases

Bacterial diseases tend to be sporadic and rare throughout mule deer range. Rain Rot, often spread by ticks and flies, results in a skin infection with thick scabs on the head and back of infected mule deer. Other bacteria occurring in the environment can enter through wounds in the skin or mouth and cause a disease called necrobacillosis, or foot rot or lumpy jaw. Infections may spread systemically or stay localized in oral or hoof lesions. Clostridium bacteria occur in the environment and the gastrointestinal tract of healthy mule deer. Environmental Clostridium spores can enter wounds causing gas gangrene or blackleg. When mule deer are provided supplemental feed such as grains/corn in winter, an overgrowth of intestinal bacteria can lead to severe illness and death. Mule deer are also afflicted with infectious keratoconjunctivitis, spread by flies, which affects the tissues surrounding the eye. Less common bacterial infections of free-ranging mule deer include plague, leptospirosis, John's disease, and bacterial pneumonia.

### Viral Diseases

Two important late summer and early fall viruses, blue-tongue virus (BTV) and epizootic hemorrhagic disease viruses (EHD), are transmitted by midges and cause similar hemorrhagic disease in mule deer. Acute infection results in swelling of the head and neck, respiratory disease, or sudden death. Deer may recover with resulting lameness due to viral damaged blood vessels of the hooves. Cervid adenoviral hemorrhagic disease (AHD) is transmitted by direct contact between mule deer and can cause illness similar to BTV and EHD with symptoms of respiratory distress and internal hemorrhaging. Mule deer can also be seen with fibroma tumors caused by a relatively common papillomavirus, transmitted from direct contact between deer or through biting insects. The warty growths, though unsightly, are usually self-limiting and rarely cause death.



### Ectoparasites

An exotic chewing louse of western Eurasian fallow deer occurs in mule deer populations in several western states. Infestations cause irritation and excessive grooming leading to barbering and declining body condition. Various native ticks, lice, fleas, and keds occur on mule deer but do not cause population declines. However, tick-carried blood parasites and pathogens can be carried by deer and cause disease in humans and other host animal species.



### Endoparasites

Nose and throat bots occur when adult female bot flies deposit larvae in the nose of deer. The larvae migrate to the sinuses to mature and cause the animal discomfort but are rarely more than a nuisance. Other internal parasites such as adult lungworms can cause respiratory disease in mule deer. On the eastern edge of mule deer range, the meningeal worm occurs naturally in unaffected white-tailed deer; however, mule deer develop neurological signs due to migrating worms in the brain and spinal cord. The arterial worm, transmitted by horse flies, occurs in the carotid arteries of unaffected mule deer, its definitive host. In other ungulate species it can lead to blindness and death. Many other round worms, tapeworms, flat worms and protozoan parasites can occur in mule deer.

### CONTROL, TREATMENT, AND MANAGEMENT OF DISEASE IN FREE-RANGING POPULATIONS

Nearly all diseases occurring in mule deer are not transmissible to humans and those that can be transmitted, such as plague, are very rare. However, diseases in wildlife populations are difficult to manage. Broad disease management goals include no management action, some level of disease control, or attempted eradication. Economic and social values must also be considered with disease management alternatives. Preventing disease introduction into susceptible populations is the most efficient and cost effective method of disease management. Preventative management actions in mule deer include import and transport restrictions, disease surveillance programs, decontamination and sanitation protocols, development of physical barriers, and restrictions on baiting and feeding. Medical treatments or population interventions are costly, difficult, and unlikely to be effective.

**More information on mule deer can be found at [www.muledeerworkinggroup.com](http://www.muledeerworkinggroup.com)**

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