



# DEER PARASITES:

## *It's what's on the inside that counts*

*Out of sight, out of mind. The small critters that live on, or inside, our deer are not often spoke of except as a curiosity when deer are handled. Deer can be afflicted with many different kinds of diseases and parasites that may shorten their lifespan or at least cause them additional stress. Although both internal and external parasites are common in most deer populations, they only become a problem when the deer are under stress for other reasons. At such times, parasite loads may increase and affect reproduction or survival or even kill the host animals (deer in this case).*

*White-tailed and mule deer have been known to harbor more than 100 types of internal and external parasites. We more often see the external forms such as ticks and fleas, but it is the internal parasites that cause hunters' concern as they worry about whether their venison is safe to eat. Most parasites do not affect the quality of the meat, but hunters are still interested in learning what those little "things" are.*

— By Jim Heffelfinger —

### MEET THE PARASITES

#### Nasal Bot Fly Larvae

*Nasal bot fly larvae (Cephenemyia sp.) are one of the most commonly encountered parasites in deer, with infection rates varying widely from 25-95%. Adult bot flies lay eggs on the wet skin around the nose or mouth of deer. The eggs hatch and small larvae migrate into the moist nasal passages and molt into a fully developed tan or yellowish grub nearly one inch long. The larvae drop out of the nose or mouth and complete their development into adult flies on the ground. The presence of nasal bots generally does not affect the survival of the deer, but can be a source of irritation if they are present in high numbers. These nasal bots are harmless to humans, but usually cause concern among hunters when they are discovered in the nasal passages or throat of harvested deer.*

Photo: Ben Brochu/AZGFD



*Mites can cause several ailments including mange which results in hair loss and crusty gray skin in extreme cases.*

#### Mites

Although rarely reported in deer, several varieties of mites cause related, but different, illnesses. Some types of mites infest the ears of deer and produce a waxy crust in the ear canal, called "scabies." Most deer do not appear sick, but a secondary bacterial infection of the inner ear can accompany heavy infestations, causing uncoordinated body movements. Heavy accumulations of crust in the ear canal may also affect the animal's ability to hear predators or approaching vehicles.

Other mites cause mange by burrowing into, or feeding on, the skin or hair follicles, causing intense irritation and excessive scratching. The intense scratching causes large areas of hair to fall out and the underlying skin becomes thick

and crusty (dermatitis). Mange and ear mites may reduce survival of individual deer, but neither plays a major role in population fluctuations. Although extensive mange is unsightly, there are no health risks reported to humans. Each host species usually carries a different type of mite that is host-specific and seldom infests a different species. Since the mites reside in the skin, the underlying meat is not affected.

Photo: B Roger Drummond.



Ticks are widespread and recognizable, but don't cause outright mortality in normal circumstances (Male: left; Female: right)

### Ticks

Ticks are recognized by most people because they are so common. Some ticks complete their life cycle with only one host, while others may require three years and three different host animals. For example, the winter tick develops from the larval stage to adulthood on the same host. Then the adult female mates, takes a large blood meal, drops off, lays her eggs, and dies. The larval ticks then lie dormant through the summer and find a host of their own in the fall. Other species use small mammals or reptiles as hosts when they are developing through three life stages (larvae, nymph, adult).

Ticks usually attach themselves in or behind the ears, along the neck, back, chest, and the anal area. Infestations are typically light and rarely cause significant problems. Severe tick infestations, can reduce the survival of individual deer by causing weakness or even paralysis and further complications due to bacterial infection at tick attachment sites. There is no human health hazard in consuming deer with ticks, however,

tick bites in some parts of the country can transmit diseases to humans (Lyme disease, tick paralysis, Rocky Mountain spotted fever).

### Louse Flies

Louse flies, sometimes called "Keds," are harmless to deer and humans. They are noticed by deer hunters and mistaken for ticks. But, louse flies differ from ticks in that they have only six legs rather than eight. Adult forms of louse fly hatch on the ground and the winged hatchlings fly off in search of a host. When a suitable host is located, the louse fly lands on it and shortly thereafter its wings fall off(!). This parasite lives and breeds on the deer producing a single egg at a time, which matures within the female. The female then pushes the egg out and it falls to the ground and hatches.

### Fleas and Lice

Fleas are sometimes noticed on deer, but they do not cause outright mortality. Native lice are normally merely a source of minor irritation to deer. Like most parasites, the species of lice that occur on deer will not readily survive on humans.

Photo: Oregon Department of Fish and Wildlife.



### -Exotic Lice-

*(Damalinia sp. and Bovicola tibialis)* infestations can grow to unnatural densities when they infect our native black-tailed and mule deer that are not the natural host.

Exotic lice (*Damalinia sp.*) seriously affected blacktails beginning in the mid-1990s and another type (*Bovicola tibialis*) first affected mule deer in the early 2000s in Washington and Oregon. Hunters and biologists started noticing an unusually high number of deer that were missing large areas of hair.

Since the ultimate cause was originally unknown, it was named "hair loss syndrome." The loss of hair was caused by deer rubbing, chewing, and scratching because of the irritation by lice.

As many as half of the deer in some areas showed signs of hair loss. When researchers investigated affected deer, they found many also had high levels of internal parasites such as lung worms and most were in poor condition. There was evidence of reduced fawn recruitment and higher mortality in the most-affected areas. The loss of hair is at its worst January through April with yellow or white discoloration on the flanks, rump, and neck. By mid-summer through autumn, deer that survived the winter regrew their hair and recovered some body weight.

In recent years, the incidence of this syndrome seems to be less with fewer deer along the mid-coast of Oregon having clinical signs according to Doug Cottam, District Biologist for Oregon Department of Fish and Wildlife. Some blacktail populations now seem to be on the rebound with increasing numbers of fawns seen on surveys. Overall, fawn recruitment is increasing, but still not up to the level it was before hair loss syndrome was detected. A more recent survey of parasites has now detected *Bovicola tibialis* in several areas throughout the West (South Dakota, California, Idaho, Nebraska, Wyoming, and Vancouver Island). It remains to be seen how serious this issue will be for deer managers. For hunters, there are no known health risks from eating the meat, but as always, you want to cook your venison completely.

### Arterial Worm

A disease sometimes called "sorehead" or "clear-eyed blindness" is caused by *Elaeophora schneideri*, a small, white, round, blood worm about two to five inches long that is usually found inside the carotid arteries of the neck. Adult worms residing there produce microscopic offspring called microfilariae that are carried in the blood to the small blood vessels in the forehead skin. When a horsefly bites a mule deer, they



In Washington and Oregon, hunters and biologists started noticing an unusually high number of deer missing large areas of hair due to exotic lice infestations beginning in the mid-1990s.

pick up some of the microfilariae, which then develop into larvae while in the fly. The larvae then find their way to the fly's mouth and, with the next fly bite, are transferred to another deer.

Mule deer are the natural host and are not affected, but whitetails have been reported to suffer from blockage of the arteries and food impactions. Like many diseases and parasites, *Elaeophora* infections seem to only kill or debilitate animals that are not the natural host, such as domestic sheep, bighorn sheep, elk, and some exotic deer species. When unnatural hosts are infected, the worms block main arteries in the neck and head, causing malformed ears, muzzle, antlers, and sometimes blindness. *Elaeophora* has been documented in mule deer throughout the West, but most common in the Southwest with a prevalence as high as 90-100%.

#### Stomach Worms

Most deer are parasitized by at least one of several species of round worms inside the digestive tract, but alone do not cause sickness or death. Sickness due to a heavy infestation is most frequent in young deer (<1 year) which show a loss of body condition, rough fur, and diarrhea. The adult worms produce eggs in the stomach that are deposited on the ground when the deer defecates. The eggs hatch into larvae that molt a few times before being accidentally eaten by another deer and the cycle begins again. This parasite is not a significant source of mortality except in conjunction with malnutrition in over-populated deer ranges.

#### Abdominal Worm

The adult abdominal worm (*Setaria yehi*) is a relatively long (five to 10 inches), white, thread-like worm that is sometimes noticed when hunters field dress their deer. This worm differs from stomach worms because these are found on the *outside* of the stomach and not attached to any organs. Adult worms produce tiny larvae that enter the blood stream and circulate through the deer's body. Worms are spread to other animals when an insect bites infected deer and takes in these larvae along with a blood meal. Deer are most likely to average one to five adult worms. It presents no serious harm to the deer and poses no health hazard to humans handling or consuming the meat.

#### Lungworm

Lungworms are white or reddish brown round worms less than two and a half inches long that infect the windpipe and lungs of deer. Heavy worm infestations can block airways and cause patchy pneumonia that shows up as dark red or grayish firm areas in the lungs. Adult worms produce eggs that hatch in the lungs; the larvae make their way up the windpipe and are swallowed and passed in the deer's feces. With sufficient moisture, they molt on the ground into an infectious stage and are then consumed accidentally by other deer. The larvae then migrate to the lungs and develop into adults in the new deer host. With this kind of life cycle it is easy to see why concentrating deer will result in higher levels of parasites.



Tapeworm larvae are visible as cysts on the surface of a deer liver.

#### Tapeworm

Deer are intermediate hosts, or "middle men" for several different types of larval and adult tapeworms. Deer accidentally eat tapeworm eggs, which hatch in the small intestine and either develop into an adult tapeworm or remain larval and migrate through the intestine wall and into the body cavity. The tapeworm larvae appear as fluid-filled sacs in the liver or other internal organs. These cysts do not develop into tapeworms in deer, but instead reside in the deer until it is eaten by a carnivore, such as a coyote. The cysts then develop into adult tapeworms in the coyotes' small intestine and may reach 13 feet in length. Larval and adult tapeworms are not harmful to their host, nor is it a human health hazard for those eating properly cooked venison.

#### Meningeal worm

The meningeal worm (*Parelaphostrongylus tenuis*) is a common parasite in whitetails in the eastern U.S. This parasite does not seriously affect its normal host, but when it infects different members of the deer family it is often fatal. This is not a serious disease of mule deer throughout the West because to infect other animals it must pass through slugs or snails as intermediate hosts and the arid West and Great Plains seem to act as a barrier to its westward spread. It has been found in western Nebraska, but does not appear to be moving farther west than that state. It may be a concern anywhere whitetails are expanding along the eastern range of mule deer.

### Foot, Leg and Eye Worm

The foot or leg worm (*Onchocerca cervipedis*) is a very common, but apparently harmless round worm. This parasite is long (2-10 inches) and thread-like, residing mostly under the skin of the lower legs, but can be found elsewhere such as the brisket, neck, and shoulder. It is sometimes noticed coiled or extended in connective tissue by hunters while skinning deer. Like *Elaeophora*, foot worms produce tiny microfilariae larvae that are found under the skin (especially of the ears) and are spread by biting flies. Although common, they often go unnoticed because they are mostly found in the skin of the legs.

Eye worms (*Thelazia californiensis*) are commonly found in many different species including mule deer. These parasites are small round worms that live in the eye or associated tissue and feed on eye fluid. As irritating as they may sound, they seem to cause no apparent problems for deer.

### Liver Flukes

The giant liver fluke (*Fascioloides magna*) is an internal parasite that is only common in wetter parts of the country. The liver fluke has a very complex life cycle, but basically the adult flukes reside in the liver encapsulated in a cyst. They mature and lay eggs that then travel into the bile ducts of the host animal and are shed in feces. The eggs then infect a particular species of snail where they develop further and are eventually deposited onto vegetation where a new deer host picks them up to complete the cycle. Research in captive deer showed liver flukes can be fatal to mule deer within five months of infection. They do not affect the quality of the venison and may not even be noticed by hunters.

## PARASITES AND DEER POPULATION MANAGEMENT

Parasites are little guys that stay out of sight and out of mind until they periodically rear up and cause trouble. The public mostly notices parasites when they are cleaning a harvested animal and are concerned about the odd-looking worm or insect they discovered. These cases are nearly always a normal deer parasite that is simply noticed for the first time.

Parasite problems at the deer population level are usually due to a complex interaction between the animals and their environment. Contributing factors can trigger problems, such as harsh weather, poor habitat quality, nutritional stress, exposure to domestic livestock, high deer density, and artificial crowding through captivity or feeding. When parasite loads get out of hand, they can cause declining physical condition, hair loss leading to exposure, susceptibility to predation, and a variety of other secondary infections and complications.

There are very few parasites that can affect deer abundance or distribution. In recent decades, Hair Loss Syndrome seems to have affected fawn recruitment and abundance in some Washington and Oregon deer populations, but this was due to an exotic lice that our deer have not evolved with.

The concern by the public for their own health due to contact with deer parasites is mostly unfounded. Parasites, as a rule, are very fine-tuned to their particular host species and do not jump to new species very easily. The only concern for human health would be some of the parasites and pathogens



Photo: Oregon Department of Fish and Wildlife.

*"Hair Loss Syndrome" is the loss of hair caused by deer rubbing, chewing, and scratching themselves because of irritation by exotic lice.*

carried by ticks that can cause disease in humans, such as Rocky Mountain spotted fever in the West and Lyme disease in the East.

Parasites are rarely appreciated for their complex and bizarre life cycles. Science fiction writers could not conceive the convoluted steps some parasites go through to make a living off other animals. These little critters may be lazy free-loaders in some respects, but it is hard to not admire their ingenuity for making a living as passengers in the animal world.



**Editors Note:**  
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