

Exotic diseases: take the risks seriously

Keep your eyes open!

This *Deer Fact* features two diseases we have never had in New Zealand. Both would have a major economic impact if they entered the country.

Chronic wasting disease (CWD) would be devastating for the deer industry. Foot and mouth disease (FMD) could be catastrophic for the whole economy.

Surveillance to stop these diseases from spreading, should they enter New Zealand, is the responsibility of everyone in the deer industry. Everyone who works with deer needs to know what to look for and what to do if they have any suspicion that these diseases may be present in a herd.

Contact your veterinarian or the Ministry for Primary Industries (MPI) immediately if you have any concerns. The MPI exotic diseases hot line is manned 24 hours a day, 7 days a week. Tel 0800 80 99 66.

Protecting your farm

Effective farm biosecurity is important for farm profitability, but is easy to neglect until a preventable disease strikes. As a memory jogger, put biosecurity actions on your 'to do' list and/or include them when you review your animal health plan.

Prevention may cause some inconvenience, but this is trivial when compared with the massive costs of an outbreak.

People who have visited regions where CWD or FMD are present pose a real risk to your farm. Family members or farm staff who have been overseas, trophy hunters, farm stay visitors, wwoofers or backpackers may be accidentally carrying disease organisms on their footwear, clothing, camping and hunting equipment and other gear.

Don't assume that visitors will be aware of the risks or care very much. In regions overseas where CWD has taken hold, hunting has continued despite the collapse of deer farming as an economic activity.

Advise visitors about your biosecurity precautions before they arrive so they are not taken by surprise or become a point of conflict. If they are coming from overseas, advise them that to avoid hassle and delay at the airport they should not bring risk products with them. Also they should clean any outdoor gear thoroughly before departing for New Zealand.

When visitors who have been in FMD or CWD-infected regions arrive on your farm or trophy block, inspect their footwear, clothing or other gear and only allow its use if it is clean.

Do not let visitors use products that may have been derived from FMD- or CWD-infected deer, such as urine-based hunting lures. Even if these have been purchased through legitimate channels overseas or here, such as on TradeMe, they will have been unlawfully imported. Their presence should be reported to MPI through the exotic diseases hotline number. MPI will act to identify and remove similar products from circulation.

CWD risk regions are the USA, Canada, Norway and South Korea. FMD risk regions include all of Africa, continental Asia,

Key points

- Chronic wasting disease (CWD) and foot and mouth disease (FMD) have never occurred in New Zealand. Both would have a severe impact if they were found here.
- Preventing these diseases from arriving on farms is critically important.
- The impact of CWD would be largely limited to deer-farming and hunting, where it could be devastating. FMD could be devastating for all livestock farmers and catastrophic for the economy.
- If you have any suspicion that one of these diseases may be present in a herd you must notify your veterinarian or MPI immediately.

Russia, Central America and South America. For details >> bit.ly/FMD_WorldMap

General biosecurity precautions

More generally, it makes sense to take practical measures to prevent weeds, pests and diseases that are already present in New Zealand from being established on your property. These measures will also help to protect your farm from exotic diseases.

- Quarantine new animals when they arrive on your farm
- Exclude wild animals and eradicate vermin
- Keep yards, vehicles and equipment clean
- Keep a close watch on animal health and call the vet to diagnose unexplained deaths or illness
- Bury or burn dead animals
- Never feed animal by-products (like meat meal) to ruminants
- Limit the unnecessary movement of people, pets and vehicles onto and around your property

For more information on biosecurity on drystock farms >> bit.ly/DEER_BIOSEC



Freedom from exotic diseases is a hugely valuable asset. Don't put it at risk. Tell family, staff and visitors that clothing and gear that has been used overseas in CWD or FMD-infected areas pose major risks for your farm and/or trophy operation

CHRONIC WASTING DISEASE

Chronic wasting disease (CWD) was first discovered in a Colorado research facility in 1967 and has since spread to farmed and/or wild deer populations in more than 20 US states and two Canadian provinces. Wapiti, moose, mule deer and white tailed deer have been infected.

In 2001 and 2011 there were outbreaks of CWD among wapiti imported to South Korea from North America. South Korea has since banned live deer and deer velvet imports from Canada and the United States.

In early 2016 CWD was discovered in Norway in reindeer and moose. Its ongoing spread is a major threat to wild deer populations.

CWD is part of a family of diseases known as Transmissible Spongiform Encephalopathies (TSEs). Other members of the family include BSE ('mad cow disease') in cattle and scrapie in sheep.

All TSE diseases are caused by abnormal prion proteins. Unlike viruses, bacteria, fungi or parasites, these proteins contain no DNA or RNA, but are still able to replicate themselves.

If even an isolated and contained outbreak of CWD occurred

in New Zealand it would result in the loss of export markets for all deer products for some time. If the disease became widespread, or established in the wild, export restrictions would become entrenched, threatening the long-term viability of the deer industry.

How it spreads between animals

The abnormal CWD prion is transmitted in deer body fluids and body parts including blood, urine, faeces, saliva and several tissues in infected carcasses. This can be by direct contact between animals, by deer coming in contact with body fluids left in the environment by an infected deer, or by contact with contaminated soil.

Following infection, deer take 18-24 months to exhibit clinical signs of CWD. During this period they shed infectious prions into the environment, becoming increasingly infectious over time. Shedding continues when animals develop clinical signs, until their death.

Prions can remain infectious in the environment. They bind to the surface of soil particles for up to 20 years and to stainless steel for several years. They can survive cleaning,

CWD risk pathways

With the exception of Norway, where the source of CWD is still under investigation, deer-to-deer contact poses the greatest risk of CWD spread.

This risk does not apply to New Zealand because we have never had a case of CWD. Regulations enforced by MPI prohibit the entry of live deer and most deer products. Border surveillance of passengers and imported goods picks up the vast majority of things unlawfully brought here.

However, some regions overseas where CWD is established are popular with hikers, skiers and

trophy hunters. This means CWD could be accidentally introduced to New Zealand on outdoor gear that has been used overseas. Also sometimes things slip undetected through the border, such as deer urine hunting lures, untreated hides or untreated trophies.

Clothing and equipment used for hunting in infected regions, particularly if it has been in contact with deer carcasses, poses a particular risk if it is used on deer farms or for hunting in New Zealand.

This risk is real, as illustrated by the introduction of didymo, which probably arrived on fishing gear used overseas.

Photos: Copyright Dr Terry Kreeger, Wyoming Game and Fish Department, and the Chronic Wasting Disease Alliance



Elk with classic signs of CWD in North America

Signs of CWD are rarely seen on North American deer farms, because it takes several years after infection for signs to develop. Most cases are picked up in slaughter plant surveillance

disinfection and exposure to sunlight, and have been found in the groundwater of infected regions.

Clinical signs

CWD is progressive and always fatal. Most cases occur in older adult animals and are rarely seen on farms.

The most obvious and consistent clinical sign is chronic weight loss leading to death. Behavioural changes are also likely. These include decreased interactions with herd-mates, listlessness, lowering of the head, blank facial expression, and repetitively walking in set patterns.

In wapiti, behavioural changes also include over-excitement and nervousness. Some affected deer grind their teeth excessively, and may drink and urinate more.

Diagnosis

The CWD prion infects deer through the gut. It then spreads through the digestive tract and associated lymph nodes, before entering the brain and spinal cord.

Diagnosis is confirmed by post mortem testing of the brain or the medial retropharyngeal lymph nodes (deep in the neck) to confirm the presence of the abnormal prion that causes the disease.

Affected animals at post mortem are usually emaciated. Because some of them lose the ability to swallow, they inhale food and water. This leads to aspirational pneumonia that is often detected on post mortem.

Vets in New Zealand are encouraged, when they encounter cases of unexplained deer wasting or neurological disease, to submit brains for testing as part of our national CWD surveillance scheme. In addition, the brains of a random selection of mature stags are post mortem checked at deer slaughter plants for signs of the disease.

Surveillance and response

CWD surveillance and response programmes in North America vary with the state or province.

As yet, there are no efficient diagnostic tests for CWD in live animals. Nor is there a vaccine or cure for CWD.

These factors make CWD in live animals extremely difficult to detect and control, especially in wild populations. In some US states, extended hunting seasons and government cullers are being used to reduce deer populations in an attempt to reduce interactions between animals.

When a case is confirmed in a farmed herd, authorities have to treat all animals in the herd as infected. Typically the herd is then humanely slaughtered, burnt and buried.

In the event of an outbreak of CWD in New Zealand, the control measures would be similar to those deployed in a FMD outbreak (see below). However, owing to long-term environmental contamination by the disease agent, it is likely that farms where CWD was detected would be depopulated for an extended period.

Don't delay!

If you suspect FMD or CWD may be present in an animal, contact your veterinarian or the MPI exotic diseases hot line immediately. The hot line is manned 24 hours a day, 7 days a week, Tel **0800 80 99 66**.

MPI maintains a network of vets specifically trained in exotic disease examination.

FOOT AND MOUTH DISEASE

There are seven distinct strains of the FMD virus.

It affects all cloven-hoofed animals (with hooves split into two toes) such as cattle, sheep, pigs, goats and deer. It does not affect horses, dogs, cats or poultry. It very rarely infects humans and is not considered a threat to human health.

If FMD was discovered in one animal on just one New Zealand farm, the direct costs are likely to be in the region of \$24 million, according to an MPI economic model. The wider economic impact would likely be approximately \$1.6 billion to the meat and dairy sectors, with an estimated total loss of \$6 billion to the country.

The disease is endemic in several parts of Asia, most of Africa and the Middle East. Most countries of Latin and South America have used vaccination programmes to eliminate FMD from farms, though it is still present in the region. FMD has recurred from time to time in countries that have been cleared of the disease.

Australia, New Zealand, Indonesia, Central and North America and continental Western Europe are currently free of FMD. Indeed, New Zealand is one of only a few countries where it has never occurred.

How it spreads among animals

FMD is mostly commonly spread when susceptible animals have direct contact with infected animals or animal products. The disease is extremely contagious, and is easily transferred through secretions such as milk, aerosols, saliva, urine and faeces. Infected animals can be contagious for several days before showing any signs of having FMD.

The virus can survive and remain infectious outside a host animal (for example, on wool, hair and in soil) for several months in ideal (cool and damp) conditions.

Red and fallow deer may become infected with FMD in an outbreak. Although most infected reds and fallow will not show clinical signs, they are capable of infecting other deer as well as other livestock.

Clinical signs

The incubation period for FMD varies with the route of infection and viral strain, and ranges from 2-14 days depending on which host species is infected.

Typically, animals experience a fever, followed by development of vesicles (blisters) of varying severity.

Vesicles typically form in some or all of the following places: tongue, roof of mouth, lips, gums, muzzle, coronary band, interdigital cleft (between toes), and on the teats of lactating animals.

Signs may be mild in reds and fallow

Susceptibility to FMD varies between deer species.

When red and fallow deer have been experimentally infected overseas, only a few of the animals developed

FMD risk pathways

Illegally imported goods, in particular animal products, are the highest risk pathway by which FMD virus could enter New Zealand.

The FMD virus can also be spread on equipment, vehicles and clothes. Thorough washing in hot soapy water, followed by drying in the sun will remove the virus from clothing, footwear and gear that has been exposed to FMD-infected animals.

Photos: National Centre for Foreign Animal Diseases, Winnipeg, Canada. License <http://bit.ly/CC-BY-NC-ND>



Signs of FMD in red and fallow deer are easy to miss, even though infected animals will be spreading the FMD virus
The signs shown here were seen in a few red deer in a herd that was experimentally infected overseas. Most of the herd showed no signs of infection

clinical signs. Those that did develop them remained alert, did not drool and were not lame – making the signs easy to miss.

In contrast, sika deer developed severe signs, with drooling, depression, lameness, and severe ulceration in the mouth – more in line with how the disease appears in cattle.

The behaviour of red and fallow deer infected with FMD is similar to sheep. Unlike cattle they are not very susceptible to the disease and unlike pigs are not great excretors of the virus.

Diagnosis and control

Diagnosis is usually based on clinical signs, and confirmed by virus isolation and serological testing.

In the face of an outbreak, one or more of these control measures may be implemented by MPI:

- Quarantine and controls on movement of livestock, equipment and vehicles
- Surveillance and tracing of potentially infected or exposed livestock
- Humane destruction of infected and nearby stock
- Disposal of carcasses and all animal products, usually by burning and burial
- Thorough disinfection of premises and all infected material (implements, cars clothes, etc).

Vaccination can be used to control FMD but this is likely to be seen as a last resort, because countries designated FMD-free without vaccination have the greatest access to export markets.

An outbreak of FMD in New Zealand would result in the immediate suspension of all international trade in animal products. There would be major disruption to primary industry businesses (such as farms, animal product processing, rural contractors and transport).

The impact of an outbreak would largely depend on how fast trade could be resumed. It is expected that our major markets would stop the trade in meat for at least four months.

Prevention is definitely better than cure when it comes to FMD. The response of the United Kingdom to an outbreak on a pig farm in February 2001 is an indication of how NZ authorities are likely to respond to an outbreak here.

By the time the situation was resolved in September 2001, there had been 2030 outbreaks affecting sheep, cattle, goats and pigs and more than 4 million animals had been slaughtered.

More >>

- British Deer Society CWD information >> bit.ly/UK_CWD
- CWD Alliance website >> <http://cwd-info.org>
- Drystock Biosecurity Guidelines >> bit.ly/DEER_BIOSEC
- OIE Food & Mouth brochure >> bit.ly/OIE_FMD
- OIE world map of FMD regions >> bit.ly/FMD_WorldMap
- US Geological Service CWD fact sheet >> bit.ly/CWD_Facts



Deer Industry New Zealand

PO Box 10702, Wellington 6143 / Level 5, Wellington Chambers
 154 Featherston Street / Wellington 6011 / New Zealand
 Telephone: +64 4 473 4500 / Email: info@deernz.org

This **Deer Fact** was produced by Deer Industry New Zealand (DINZ) as part of the Passion2Profit (P2P) strategy. P2P is a Primary Growth Partnership joint venture between DINZ and the Ministry for Primary Industries.

Each **Deer Fact** sheet has been checked for technical accuracy, but DINZ cannot take responsibility for decisions based on their content. If in doubt, seek professional advice.