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Johne's was discovered in Germany, so is pronounced "Yonees".

It is an incurable disease that affects the intestines of mostly ruminants. It is caused by a hardy bacteria called *Mycobacterium paratuberculosis*. Johne's most commonly occurs in dairy cows, possibly because of their more intensive farming and/or possible stress factors such as over crowding in confinement and because they are usually in a damper high rainfall or irrigated areas. However, it also affects beef cattle, sheep, and goats. The strain that affects sheep is different from the one that affects cows, though there is an intermediate strain that sheep are susceptible to. While cattle experience diarrhoea, in sheep, Johne's tends to be a wasting disease.

Johne's is a serious problem in some countries (not New Zealand) and has been reported to be increasing in some countries. It has been found in cattle, sheep, goats (not much), deer, elk, llamas, bison, and zoo animals.

It is a notifiable disease and control is important for export trade, for example Korea and the Philippines returned New Zealand dairy heifers, whilst at sea, because they tested positive for Johne's antibodies. Don't buy an animal with it.

It is common and costly, affecting cattle farmers mostly, so the more we learn about it the better, so keep up to date by re-reading [GrazingInfo](http://GrazingInfo.com) after each update which get new dates, and also Google every six months for Johne's.

Animals can be infected before birth or in the first few months of life by ingesting infected colostrum or manure contaminated milk, water or feed at anytime. The symptoms don't usually show until years after infection which can be brought on by another stressful event (double whammy) or event such as calving. There is no effective treatment for the disease. After damage to the intestinal lining the disease causes severe diarrhoea and rapid weight loss.

Once Johne's is on a farm it'll be there for a long time, because it is a slow growing bacteria surviving up to a year in manure pits and anaerobic manure slurry, and up to two years in damp soils and water. One infected animal can shed enough bacteria in its manure to infect many calves. Cows and heifers used as embryo transfer recipients can give Johne's to the calf. A bought infected animal can bring it to your farm.

Severe diarrhoea occurs, dreadful loss of weight, followed by death in weeks, months or years. Some animals will develop a low-grade fever and oedema (swelling) under the jaw. In other cattle, symptoms may be seen only as a general unthriftiness, less than expected milk production or increased susceptibility to problems such as infertility. Animals can be infected, but appear normal until later in life.

Some animals might never show diarrhoea or weight loss during their normal productive life. These are called subclinical infections. Clinical effects have occurred as young as 6 months and as old as 15 years. Subclinical animals sometimes don't do as well as clear ones, so watch for this.

In affected areas veterinarians should describe the disease in newsletters to clients and in farming pages of the local papers so that farmers, their families and staff become aware of the disease. There have been cases of farmers suspecting that they might have the disease, but keeping quiet in the hope that it would go away, which it won't without applying strict procedures. A pedigree goat herd I visited had about ten (3%) die or have to be disposed of every year.

Treat all unknown sicknesses as contagious, and isolate affected animals in a quarantine area fenced for the purpose. A small stop bank may be necessary on all four sides, to prevent rain washing manure from it.

In Scotland it was found that rabbits around infected farms carried it, so netting should be placed around the quarantine area to keep out carriers, including dogs.

Never graze affected animals with other ruminants. Horses can be used, or mow it.

How quickly the disease is controlled depends on how effectively manure contact and milk consumption from infected dams is prevented, and the speed with which infected animals are



identified and culled.

Isolation is essential and starts by removing new borns from thin cows **immediately** and feeding them colostrum from clean animals, not from the infected dam, which is obviously not always easy, so all infected animals should be culled as soon as identified.

If you see any animal scour and lose weight, isolate it immediately, and get it checked.

### **Spreading**

The bacteria doesn't multiply outside animals bodies, but is able to survive in acid damp soil and water for up to one year, thus representing a danger to other animals that might ingest the organism.

The Institute of Animal Science in Victoria, Australia, predict that, if nothing is done to control an epidemic, about 50% of a herd will eventually become infected. How quickly the disease is controlled depends on how effectively cow manure contact with calves is prevented, and how effectively infected cows are identified by testing, and culled. It can take up to two years for infected heifers to be identified. They claim that three to eight years are generally needed to control the disease in a herd.

Recent research indicated that the disease is more frequent in higher rainfall areas **and on farms where soils are more acid and lacking in essential minerals.**

Confirming the above, a New Zealand organic dairy farmer client since 1998, for whom I take pasture tissue tests and recommend LimeMagPlus when needed, and fertilising with Gafsa and deficient elements, had to cull one skinny cow whose milk showed she had it, has improved to no Johne's cases. In 2014, the farm is still free of it after doing nothing else other than the above, and farming well, and do known preventive controls extremely conscientiously.

Some of the veterinary profession could dispute that correcting lime and minerals will help control a disease such as Johne's, just like some vets, including those at Ruakura, disputed that zinc controlled facial eczema. My LimeMagPlus has done a better and cheaper job since 1960. See Facial eczema and that liming (provided everything else is correct), can stop the occurrence of warts, but it has done on many of my clients' farms. When I see warts in animals I know that the farm is low in calcium, which always cures and stops them.

In the Japanese 2010 Foot & Mouth outbreak, which was eliminated within months. As seen on TV, lime was used extensively to stop it spreading.

LimeMagPlus at four tonnes per hectare twice six months apart has sweetened soils so that heavy metals becomes unavailable. Applying superphosphate acidifies soils which makes heavy metals available. Don't question this, do trials and measure pasture levels of manganese and other

### **USA**

Total estimated costs in one US State exceeded US\$100 million a year with more than a third of herds infected.

Educating producers about Johne's disease and its control is a priority of the Indiana State Board of Animal Health, said Thomas Conner, director of the board's Cattle and Ruminant Division. For many years, the agency has required reporting of the disease and has handled recording testing results and maintained herd records.

"Although a vaccine exists that will reduce the symptoms and prolong an animal's life, it does not prevent infection," Conner said.

The vaccine is only available for cattle under a special agreement between the state veterinarian, the producer and the producer's local veterinarian. Management strategy based on the number of infected animals is the best way to prevent, control and eliminate Johne's disease while minimising the economic impact, he said. "Diagnosis is one of the biggest problems. The findings of Dr. Wu and her group will help to advance Johne's disease control in dairy and beef herds alike" Conner said.

Wu and her team of researchers do much of the Johne's testing for Indiana in the Animal Disease Diagnostic Laboratory on the Purdue campus. Their main focus however, is studying the disease process, especially the mechanisms involved with the bacteria.

Johne's disease can be spread to animals from infected feed, flood and drain, water and colostrum, and females with high infection can spread it in utero to foetuses. Animals can become infected before six months old and not show symptoms for two or more years. Besides dairy cattle, other types of cattle, deer, elk, sheep, goats, antelope and bison can become infected.

It is more prevalent in animals that are kept in confined conditions and relatively unusual in wildlife, Conner said. According to the USDA, some reports exist of the same bacteria infecting horses, pigs, chickens, rabbits, fox and non-human primates.

Johne's and Foot & Mouth diseases can be reduced, controlled or eliminated with alkali conditions. They spread more in low calcium acid conditions.

A Michigan study found that farms that applied lime were less likely to suffer Johne's and that those with it had a 72% reduction in the number of cases after lime was applied.

This is understandable because Johne's, Foot and Mouth, Warts and Foot Rot bacteria can be killed with alkali products such as agricultural lime.

## **Vaccination**

Most Johne's investigators recommend the vaccine only after all else has failed to control the disease. Vaccination affects tuberculosis testing, so is not popular, but could be better than doing nothing in herds with high infection rates.

The live-vaccine is forbidden in many countries because it is then not possible to differentiate by tests between infected and vaccinated animals, so vaccinated animals need to be recorded.

Vaccination has not been widely available or accepted mainly because vaccinated animals would confuse efforts to detect and remove animals with bovine tuberculosis in the eradication campaigns. Vaccination does not provide complete immunity, and cattle may still develop the disease and shed disease organisms. Vaccination does suppress symptoms and reduce shedding of organisms. As with testing and culling, it is not known whether vaccination can eventually eradicate the disease. Vaccination site reactions can be severe.

The Institute of Animal Science in Victoria, predicts that, if nothing is done to control an epidemic, about 50% of a herd will eventually become infected. They say that three to eight years are needed to eliminate the disease from a herd. USA information indicates it could take a decade. Vaccination can be used to lower the incidence of infection and eventually to rid the disease from a herd. Here is how -

1. Vaccination of the first generation may not lower the incidence of infection, but it does lower the number that go clinical. It probably does this by keeping the bacteria at low levels.
2. Researchers feel that there is a relationship between level of shedding and the ability to spread the disease. Animals that are clinical or near clinical are the biggest threat in the herd because of increased shedding. Positive vaccinated animals apparently shed fewer bacteria.
3. Second generation calves are exposed to lower levels of bacteria. There may be some effect of immunity passed in the colostrum. Incidence of infection should decrease because of less exposure.
4. Vaccine is only permitted to be used in herds where Johne's disease has been a problem and not able to be controlled by other management techniques. The primary advantage is to reduce the occurrence of clinical cases as described by the veterinarian from Wisconsin. Over time the use of vaccine should reduce the bacterial load and thus the number of infected cattle especially if the management changes are being made.

Vaccination would usually be used in conjunction with the calf rearing practices described earlier, with calves being vaccinated within 30 days of birth. Vaccination is most effective if used over a number of years for young stock destined to become replacement cows. After five to seven years of regular vaccination, the milking herd would consist entirely of vaccinated animals, and the decision to continue vaccinating would be a matter of judgement against the risks and conditions applying in each herd. The number of clinical cases seen will fall as the herd becomes fully vaccinated.

A vaccine for Johne's disease is available for sheep, however, its use is not always recommended. It doesn't give total protection against infection and subsequent testing of Johne's vaccinated animals may result in a positive test, however annual vaccinations of each year's lambs at tailing when in a cradle is the easiest to get at the high neck and safest for the person doing it. Accidental self-vaccination can cause long term pain at the injection site.

Vaccination lasts the animal's lifetime and has given a major decrease in infections and deaths. If infection rates and/or deaths are high, vaccination seems to pay, but it could be three years before the

improvement is significant.

When vaccinated animals go to slaughter the abattoir has to be notified in advance in some countries. This applies to vaccinations over the whole of the animal's life.

USDA reports state that the same bacteria can infect horses, pigs, chickens, rabbits, fox and non-human primates, but not cause Johne's.

### **Symptoms**

Symptoms are, lowered milk production, weight loss (even with a normal appetite) scours (can be green and bubbly) off and on, becoming chronic and unresponsive (it may stop, but recur) to treatment, swellings under the jaw or anywhere on the body. Both can suddenly increase in older animals after stress. The lower small intestine wall of ruminants becomes thickened and unable to absorb nutrients. Bacteria grow slowly in the wall of the intestine causing it to thicken and be inflamed.

### **Causes**

Infection can occur before birth or when young from milk or manure, but symptoms seldom show until a few years old. Bacteria can be shed profusely in animal manure.

Infection from infected animals via milk and/or manure. Infected calves, cows and bulls can all shed the bacteria in their manure at any time, but the risk increases as the animal becomes older or clinically sick. Primarily calves, but animals of all ages ingest the bacteria through feed or water contaminated with manure from infected animals. Feed troughs, hay bunks, water tanks, ponds, stagnant water, maternity pens, group pens, etc., can be contaminated directly from an infected animal or indirectly from equipment used to feed or spread manure. Newborns and young animals can ingest the organism located on manure-laden teats or directly from colostrum or milk from infected cows. This means feeding calves colostrum or milk from a herd where there is even one with Johne's is a problem. Calves can also become infected while in the uterus of a positive cow (natural or embryo transfer recipient).

Newborn calves or young animals are the most susceptible to infection. While animals may develop some resistance with age, individual animals of any age can be infected if there are enough bacteria in the environment, feed or water.

### **Prevention**

Eliminating Johne's is extremely difficult. Animals should be tested and farmed on different parts of the farm with no manure going on the clean area that should be upstream of the infected mob. Infected animals upstream can infect those downstream.

If an animal scours and loses weight quickly, get it checked.

There is no treatment, however, it is possible to control its spread. The bacteria can be spread in manure, feed and water. So once Johne's disease is identified in a herd, you can be sure that other animals are also infected. If one cow with it is in a herd and nothing is done to stop the spread to calves, up to 50% of the herd will eventually be infected.

With the increase in Johne's in most countries a closed herd is recommended and if buying animals make certain they are from a veterinarian-guaranteed free herd. See a veterinary certificate showing that there has been no Johne's in the herd or on the farm, or at least for five years. Remember that some farmers can suspect they have Johne's so don't tell their vet, who may sign a certificate without knowing that the disease has occurred on the farm. There have been cases of farmers suspecting that they might have the disease, but keeping quiet in the hope that it would go away, and to avoid quarantine.

Isolate and cull immediately any animal with diarrhoea of unknown cause that is unresponsive to treatment. Don't allow her dung to be dropped in yards that is then spread on pasture.

Calves out of infected dams are at greater risk of being infected before birth and then through colostrum, milk, or manure contamination. Cull her and her calves.

Prevent manure contamination of troughs. Do not walk in feed unless your boots are clean. Do not use the same loader or equipment to handle animal manure and then load feed.

Reduce manure run-off to ponds and water sources. Eliminate or fence out animals from ponds or

water logged areas. After animals cattle clean the vehicles thoroughly. If possible, spread manure on crop-land, not on pasture that will be grazed within a year.

Exposure to direct sunlight, heat and specific disinfectants can kill the organism.

If you have areas that flood, check with neighbours and vets about Johne's infections upstream of your farm. If there is a problem, after flooding aim to harvest the area which floods, for as long as possible, rather than graze it, and don't cut or graze it short. If this is not possible, keep pasture short to allow sunshine to reduce the organisms. Farm for plenty of earthworms by applying adequate lime regularly, correct fertilisers, trace elements as required from pasture tissue tests and use fast release reactive phosphate where possible i.e., where pH is below 6.3 and there is adequate rain or irrigation.

Early separation of calves from their mothers and subsequent isolation from the adult herd is widely used to control Johne's in Victoria, Australia, however, immediate separation of calves from their mothers remains difficult, and offspring can be infected before birth. The researchers believe that improved calf rearing can provide a large measure of protection, but not complete prevention.

### **Testing**

These have been unreliable, but are improving which should reduce the prevalence of the disease.

Repeated testing advances control and elimination of the disease by enabling you to monitor progress and continually identify infected animals. Infected animals may otherwise be in your herd spreading the bacteria for years.

### **Further Reading**

Every country that has tested their domestic agriculture species for Johne's disease has found many cases of infection. In the USA it is estimated that 8% of the beef herds and 68% of the dairy herds contain at least one animal infected with MAP. Infection rates in cattle in other countries are generally similar, although with significant effort some countries, notably Australia, have reduced the prevalence. Commonly reported in sheep and goats as well as cattle, cases have also been seen in captive elk, deer, bison, and llamas. The infection is more prevalent in captive ruminants than in grazing and free-range ones such as deer or elk.

#### [Bottle jaw can be a sign of Johne's disease](#)

Due to low levels of serum albumin caused by Johne's disease some cattle develop this lump under the jaw called "Bottle jaw".

Photos courtesy of Johne's Testing Centre.

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