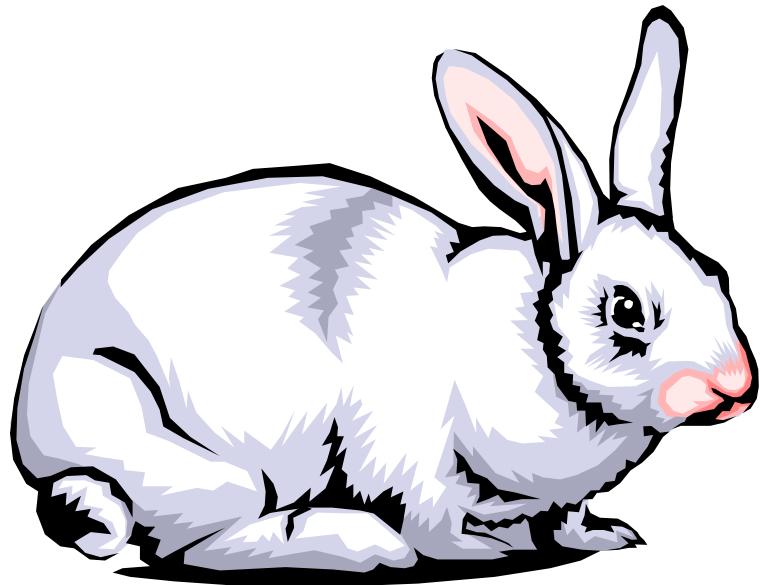




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Enteric Diseases in Rabbits



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Enteric Diseases in Rabbits

Enteritis, an infection of the intestinal tract, is caused by a group of very common and often devastating diseases affecting rabbits. It is considered to be the major cause of disease, mortality, and economic loss in domestic rabbits, particularly young rabbits. Diarrhea is the most prevalent symptom of enteritis. Initially it was thought that all instances of diarrhea in rabbits were caused by one disease, known as mucoid enteritis. Today we know that there are separate diseases that cause diarrhea in rabbits, which include coccidiosis (see the Nutrifax “Coccidiosis in Rabbits” November 2005), enterotoxemia, colibacillosis, mucoid enteritis, proliferative enteropathy and Tyzzer’s disease.

Enterotoxemia

Enterotoxemia was first described by the Rabbit Research Centre at Oregon State University in 1978. This disease is caused by gram positive bacteria, such as *Clostridium perfringens* Type E, *Clostridium spiroforme* and *Escherichi coli*, which produce powerful enterotoxins. In a healthy rabbit, these bacteria normally reside in the gut in a dormant state, but under ideal conditions, they will rapidly multiply and cause enterotoxemia. Studies have shown that rabbits given *E. coli* or *C. perfringens* orally do not develop the disease. However, rabbits exhibit the typical signs of enterotoxemia when given *C. spiroforme* orally, which supports other evidence that it is the main organism involved. Clinical signs include acute diarrhea, lethargy, reduced feed intake, rough hair coat, fecal soiling of the perineum, watery diarrhea, collapse and sudden death. Rabbits usually die within 24 to 48 hours after the first symptoms are noticed. Death is usually the result of toxemia, dehydration and electrolyte loss. Mortality rates are high in affected rabbitries due to the prevalence of the bacterial pathogens in the environment. Post mortem examination shows an enlarged caecum and sometimes small intestine and an empty colon. Seventy percent of affected rabbits have a reddish caecum that is due to hemorrhaging of the caecal wall.

Enterotoxemia can affect any age, but it is most common in recently weaned fryers (4 to 8 weeks of age). Starch digestion in young rabbits is not as effective as in adult rabbits, thus there is a greater risk of carrying undigested starch to the caecum, where it is made available for bacteria to flourish on. Bacterial overgrowth can lead to fluid accumulation in the large intestine, diarrhea, enterotoxin production and death. Thus, enterotoxemia is thought to be associated with high energy, high carbohydrate (high starch) and low fibre diets. The method of feeding grains to fryers to push them to market weight at eight weeks of age is partly responsible for the increased number of cases seen. The disease can also occur in adults, although it is not associated with carbohydrate overload. It usually occurs after a disruption of the intestinal microflora that is caused by antibiotics, other pathogens, toxins or stress. It can also occur in does that were fed a restricted diet during pregnancy and then fed *ad libitum* at kindling.

Successful treatment of enterotoxemia is difficult. Broad spectrum antibiotics, such as oxytetracycline, provide temporary relief, but the disease often comes back when the medications are discontinued. Restricting high energy feed has somewhat helped in severe outbreaks, but there is a fine line between this and either feeding too little energy and thus affecting weight gain or feeding too much energy which can cause the disease. The most successful treatment is a change in diet to a low energy, high fibre feed.

However, the dietary change may only benefit affected rabbits for a short period of time. Feeding hay helps prevent the disease, but outbreaks do occur in rabbitries that routinely feed hay. Alfalfa is not a suggested hay source, as rabbits often only consume the leaves, which are lower in fibre. Grass hay, such as timothy, is preferred.

Enterotoxemia seems to be cyclic. It is more common in large herds, overcrowded rabbitries and those with poor sanitation. Unfortunately there is no effective vaccine available and it would not be economical for routine use in fryers. Certain medications, such as lincomycin, can induce Clostridium related enterotoxemia by disrupting the normal intestinal microflora and allowing pathogenic bacteria to flourish. The best treatment options include good management practices, frequent cage cleaning, a change in diet and restocking with resistant rabbit stock.

Colibacillosis

Colibacillosis, a common bacterial disease in young rabbits and other species, is caused by the colonization of enteropathogenic strains of *Escherichia coli* (Figure 1) in the small intestine and caecum. *E. coli* is usually present in the digestive tract of healthy rabbits, and does not normally cause diarrhea. However, enteropathogenic strains can be transferred from the doe to her kits through faecal contact. Proliferation of pathogenic *E. coli* strains is triggered by factors such as concurrent diseases, stress, and low fibre diets. For example, rabbits with clinical evidence of coccidiosis will frequently have a several-fold increase in intestinal coliform (bacterial) counts.

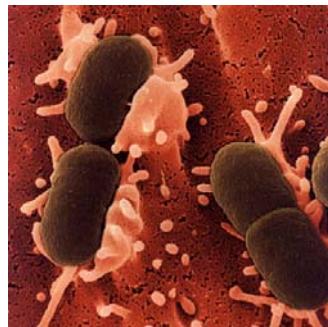


Figure 1. Electron microscopic image of *Escherichia coli* (Source: www.kimicontrol.com/microorg/escherichia.coli.jpg).

Dependent on the age of the rabbits, there are two types of colibacillosis. Nursing kits one to two weeks of age have severe yellowish diarrhea. There is a high mortality rate at this age, and it is not uncommon for entire litters to succumb to this disease. Newly weaned kits (4 to 6 weeks of age) develop diarrhea symptoms similar to enterotoxemia. The intestines are fluid filled and hemorrhaging is present. The majority affected will die within five to 14 days, and those that survive are stunted and unthrifty.

Treating severe cases have not been successful, but mild cases can be successfully treated with antibiotics. Culling severely affected rabbits and completely sanitizing the rabbitry can control the disease. High fibre diets appear to help prevent the disease in weaned rabbits. Treatment often involves the culling of severely affected rabbits and the complete sanitization of the rabbitry.

Mucoid Enteritis

Mucoid enteritis, also known as mucoid enteropathy, is a devastating disease with unknown causes. Symptoms vary, but the most significant symptom is a bloated abdomen due to excess water in the stomach. These rabbits exhibit a “water bottle” sound if they are picked up and shaken. Sick rabbits will stop eating and waste away over a period of several days. Death occurs within a week after symptoms are first seen. Affected rabbits will often grind their teeth, making a unique noise, which is a sign of discomfort. Other symptoms include subnormal temperatures, mucous covered feces (jelly-like feces), anorexia, lethargy, a rough coat and the perineal is covered in mucous and feces. Post mortem findings include an impacted intestinal tract, usually at the ileocaecal junction where the caecum joins the small intestine.

The causes of mucoid enteritis is largely unknown, but are thought to include a poorly functioning digestive tract, too little or too much water consumption, sudden dietary changes, low fibre diets, antibiotic treatments, environmental stress and bacterial challenges that allow caecal material to form an impaction in the caecum.

Unfortunately there is no treatment available. Once an animal is observed with the symptoms of mucoid enteritis, the disease is often in its terminal state and it is only a matter of days before the animal dies. It has been observed that changing to a new batch of feed will often eliminate the disease in large rabbitries with large incidences of the disease. The reason for the effectiveness is unknown.

Proliferative Enteropathy

Proliferative enteropathy is caused by the organism *Lawsonia intracellularis* (Figure 2), a curved, rod-shaped bacterium. This bacterial infection affects a wide variety of species, including rabbits, pigs, horses, dogs, rats, ferrets, guinea pigs and hamsters. Most animals will develop a subclinical infection and will exhibit no symptoms. These animals contribute to the environmental contamination through the shedding of *L. intracellularis* within their faeces. Acutely infected rabbits are lethargic, anorexic, and have watery diarrhea and a matted hair coat. Dehydration is a common sequel to the diarrhea, which can lead to reduced blood flow and sometimes cardiac arrest. Death usually only occurs if proliferative enteropathy is present during an infection with another enteropathogenic agent. Pathology results include a thickened and corrugated small intestine with the rod-shaped organisms present.



Figure 2: Microscopic stained image of *Lawsonia intracellulari*, showing its characteristic curved, rod shaped form (Source: www.addl.purdue.edu/newsletters/2004/spring/rabbits.htm).

Several stressors, such as overcrowding, transportation and dietary changes have been identified as predisposing factors for infection. Treatment has been successful in most cases. The administration of fluids and supplemental heat has been used for rabbits that become hypothermic and treating the symptoms is helpful. Antibiotics are commonly used to fight the bacterial infection. Isolating any sick animals also reduces the spread of infection. However, symptoms usually resolve by themselves over a period of one to two weeks.

Tyzzer's Disease

Tyzzer's disease was named after the man who discovered the disease in mice in 1917. It also occurs in rabbits, hamsters, gerbils, cats and rhesus monkeys. *Clostridium piliforme* (formerly *Bacillus piliformis*) is the bacterium responsible for the disease (Figure 3). Clinical signs include acute diarrhea, lethargy, anorexia, fecal soiling of the perineum and dehydration. Death usually occurs within 12 to 72 hours in fryers 6 to 12 weeks old. These symptoms are very similar to other enteric diseases in rabbits. Acute outbreaks of Tyzzer's disease are associated with more than 90% mortality.

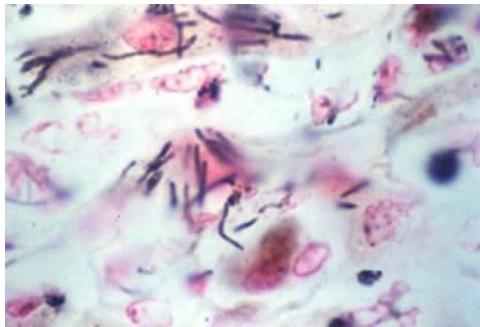


Figure 3. Microscopic stained image of *Clostridium piliforme*. Note its characteristic long slender rod shaped form (source: <http://merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/171319.htm>).

Post mortem findings include inflammation and necrosis of the caecum, intestine, liver and heart. The distinguishing characteristic of the disease is the salt grain size white spots on the liver. These white spots are the long, slender rods of the bacterium *C. piliforme*.

Predisposing factors include poor husbandry, overcrowding, immunosuppression, low fibre diets, stress and existing diseases. The disease is spread through the oral ingestion of bacterial spores that are shed in the feces of infected rabbits. These spores can remain viable in the environment for more than one year. No treatment has been effective as the administration of antibiotics yield poor results. The presence of antibodies in "apparently healthy" animals suggests that *C. piliforme* can reside in a dormant state in the digestive system. As a result, it is not recommended to treat affected herds, as it prolongs the disease and produces carriers of the disease. The best treatment is the complete elimination of the herd and thorough cleaning and disinfection of the rabbitry. Prevention measures include good management practices, avoiding overcrowding, and dust control to reduce exposure to the bacterial spores.

Conclusion

Enteric diseases in rabbits are still poorly understood and are very hard to treat. Thus prevention is the key. Suggestions for prevention are summarized below.

1. Maintain good management practices, such as frequent cage and facility cleaning and dust control.
2. Avoid overcrowding as overpopulation can cause stress and allows for easier disease transfer within the rabbitry.
3. Avoid stressful situations, such as feed changes and relocating newly weaned rabbits. Feed changes can cause a disruption in the intestinal microflora and allow pathogenic bacteria to flourish. Transporting young, newly weaned kits to a different cage brings several different causes of stress, including the new environment, unfamiliar noises and new caretakers or animals. It is best to remove the doe from the nest during the post-weaning period instead of the kits.
4. Cull or isolate any sick rabbits to reduce the spread of disease.
5. Feed a high fibre, low carbohydrate/starch diet to young rabbits. Shur-Gain 16% Rabbit Pelleted Plain and Medicated rations contain high fibre levels and have low starch content.

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