

administered in the drinking water at 0.04 percent. However, it can be mixed in the feed at 0.025 percent. If it is used in the water, it is recommended that it be given continuously for at least two weeks. If it is used in the feed, it is given for three weeks. There are many different schemes for giving this drug, and some are more effective than others. Other sulfa drugs at various dosages and some of the newer coccidiostats, such as amprolium and monensin sulfate, have been used occasionally but have not been approved in the United States for addition to rabbit food. Feed-grade sulfaquinoxaline is not readily available. Most drug companies have discontinued its production. Therefore, the water treatment is most commonly used. Lasalocid, one of the newer coccidiostats, has recently been approved for use in rabbits at 75–125 mg/ton of feed and has been proven to be quite effective in treating hepatic coccidiosis.

A very effective method of controlling some types of coccidiosis is the daily removal of fecal material from the cages with a wire brush. The term “self-cleaning cages” is a misnomer, as very few cages are completely self-cleaning. High fiber diets result in large fecal pellets that do not drop through the wire. These fecal pellets are the major source of coccidiosis infection. The fecal pellets contain the oocysts (eggs) of the protozoan parasite. The oocysts are not infective until they have sporulated. The period of sporulation, which must take place outside the rabbit, is at least 24 hours. Therefore, daily removal of the fecal pellets eliminates this source of infection. Rabbitries using this method of control can prevent the liver form of the disease, but the intestinal form seems to persist.

### *Mucoid enteropathy*

Scientists have changed the traditional name of mucoid enteritis to mucoid enteropathy. The reason for this is that the suffix “itis” means “inflammation.” There is no redness or inflammation of the intestines with this condition, so the suffix “opathy,” which means “illness,” has been substituted.

The classic symptoms of mucoid enteropathy are jelly-like stools coming from a sick rabbit. The rabbit drinks large quantities of water,

will not eat, and wastes away over a period of several days. The sick rabbit often grinds its teeth, making a unique noise. It also exhibits the “water bottle” sound if picked up and shaken. The temperature is usually subnormal.

Post-mortem examination generally shows an impaction in the digestive tract. The most common site is at the ileocecal junction (where the cecum joins the small intestine), but it also can occur in the cecum or anywhere along the small intestine (Fig. 10.11). Several studies have demonstrated the role of impaction in causing mucoid enteropathy. The cause of impaction is not known, but most likely is due to a lack of fiber in the diet.

Unfortunately, the exact cause of the disease has not been determined. It appears that the digestive tract ceases to function properly. The impaction might be a result of too little water consumption or something happening to the intestine that allows too much water to be absorbed out of it, allowing cecal material to be formed into an impaction. The digestive tract of the rabbit has two sets of waves of muscle contraction that move material through the digestive tract. One is the major peristaltic contraction that propels material, especially large fiber particles, toward the rectum. The other set is an antiperistaltic wave or contraction that moves smaller particles backwards from the large intestine toward the cecum. This material is collected in the cecum and then periodically released as cecotropes (night feces) for reingestion (cecotrophy). When a rabbit becomes constipated (impacted), the normal intestinal motility is depressed. It is not known whether the impaction causes the malfunction or the malfunction causes the impaction. Rabbits that are supplied with inadequate water seem to have a higher incidence of mucoid enteropathy. However, the disease cannot be reproduced by simply restricting water intake.

Another theory involves the amount and size of the fiber particles in the diet. French scientists are convinced that feed that has finely ground fiber particles causes more mucoid enteropathy than feed that has large fiber particles. Their reasoning is that finely ground fiber is taken back to the cecum by antiperistaltic waves and sets up conditions for constipation, while large fiber particles pass down the colon by the peristaltic waves and are excreted



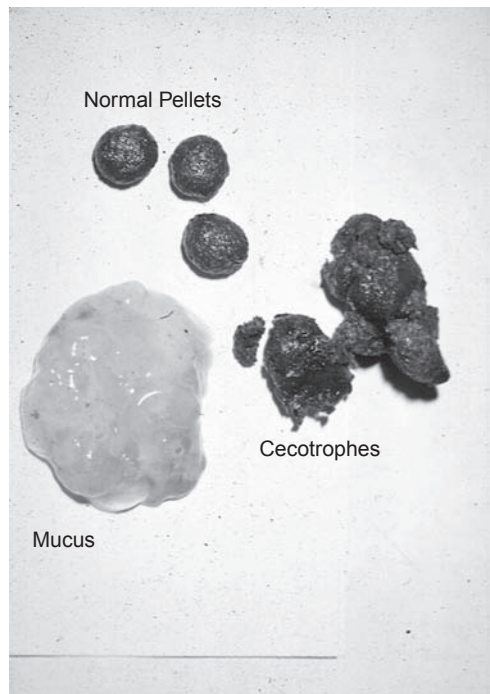
**Fig. 10.11.** Intestines from a rabbit with mucoid enteropathy. Note the swollen, mucus-filled intestine (arrow). (Courtesy of N.M. Patton)

as “day” feces (Fig. 10.12). Although the size of the fiber particle is still in question, an increase in fiber does seem to prevent mucoid enteropathy. In fact, alfalfa hay that is more stem and less leaf seems to be better for rabbits than the reverse. The addition of grass hay with its high fiber content may also be beneficial in preventing mucoid enteropathy.

There is no effective treatment for mucoid enteropathy. By the time the animal is observed to be affected, the disease has generally progressed to a terminal state. In herds where the incidence of mucoid enteropathy is high, changing to a new batch of feed with a higher fiber content will usually eliminate the disease. Subcutaneous and oral fluids (electrolytes) seem to be beneficial in the treatment of pet rabbits.

### Mastitis

Mastitis is an infection of the mammary glands of the doe. It is sometimes called blue bag. It must be differentiated from full mammary glands (caked breast or caked udder), which occur when a litter is weaned, dies, or stops



**Fig. 10.12.** Three types of feces seen in rabbits: normal, cecotrophes, and mucus. (Courtesy of N.M. Patton)