

## Rabbit Hemorrhagic Disease (Calicivirus) in the U.S., 2000–2001

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The investigation and confirmation of rabbit hemorrhagic disease in the U.S. is an example of how well the system in place can work to quickly identify and respond to the introduction of a foreign animal disease. This episode also illustrates the importance of remaining vigilant for unusual clinical presentations in all animals.

In March 2000, a colony of Palomino and California White rabbits housed on a farm in Crawford County, Iowa developed an unusual and highly fatal disease. The first rabbit, one allowed to roam near the house, died on March 9, 2000. Rabbits housed in hutches started dying on March 16. A veterinarian in Denison, Iowa submitted tissue samples from one of the rabbits in the colony to the Iowa State University (ISU) Veterinary Diagnostic Laboratory on March 22, 2000. On March 24, tissues from a second rabbit were submitted. Dr. Pat Halbur, a pathologist at the ISU Veterinary Diagnostic Laboratory, examined the tissues. Because of the unusual nature of the lesions, another pathologist, Dr. Ron Myers, reviewed the tissue samples. Based on the clinical history and microscopic lesions in the liver, the two pathologists diagnosed rabbit hemorrhagic disease or toxic hepatopathy. Additional testing was done to rule out other possible diseases. Cultures for *Pasteurella multocida* and other bacteria were negative. A mycotoxin screen of the feed was also negative.

State and federal officials were notified on March 27, and a foreign animal disease investigation began immediately. Epidemiological information was collected and samples were sent to the USDA's Foreign Animal Disease Diagnostic Laboratory (FADDL) at Plum Island, NY. At FADDL, rabbit hemorrhagic disease was diagnosed based on the characteristic microscopic lesions, a positive hemagglutination test, and electron microscopy. Virus alert notices were transmitted by APHIS and samples were sent to Spain for further confirmation. The laboratory in Spain confirmed the diagnosis by polymerase chain reaction assay.

The farm had been quarantined as soon as rabbit hemorrhagic disease was suspected. By April 6, 25 of the 27 rabbits had died. As a control measure, the remaining two rabbits were euthanized and the carcasses incinerated. On April 21, the rabbit hutches and the building housing the hutches were burned and the ashes buried. The source of this infection has not been determined. There apparently had been no introductions of rabbits onto the premises in the last two years. August 1999 was the last time rabbits left the farm and returned. In January 2000, six rabbits, all healthy and greater than two months old, were sold to slaughter. After an extensive epidemiological investigation, the USDA and the Iowa Department of Agriculture consider the investigation closed; however, rabbit owners, veterinarians, and diagnosticians are encouraged to report cases of high morbidity and mortality to state and federal veterinarians.

### ***What is rabbit hemorrhagic disease?***

Rabbit hemorrhagic disease (also known as rabbit calicivirus disease or viral hemorrhagic disease of rabbits) is a viral infection transmitted by contact with infected animals, carcasses, or fomites. The rabbit hemorrhagic disease virus is extremely resistant to inactivation and can survive for months under some conditions. Clinical disease is seen only in the European rabbit, *Oryctolagus cuniculus* – the species from which all U.S. domestic and commercial rabbits are derived. Susceptible rabbits typically develop a fever and die suddenly, within 12 to 36 hours. Some animals may have neurologic signs, respiratory symptoms, or constitutional signs such as dullness or anorexia. In other cases, the only symptoms are terminal squeals followed rapidly by collapse and death. A small percentage of infected animals have a more chronic course with severe jaundice, lethargy, weight loss, and death within one to two weeks. Rabbits native to North America, including cottontail rabbits and jackrabbits, reportedly do not develop clinical disease and are not susceptible to infection.

Rabbit hemorrhagic disease has only been described during the last 20 years. This disease was first reported in 1984 in the People's Republic of China. From 1985 to 1986 it spread through the domestic and wild rabbit populations in continental Europe. The first report of rabbit hemorrhagic disease in the Western Hemisphere was in Mexico City in 1988; however, Mexico eradicated the virus by 1992. A severe outbreak of rabbit hemorrhagic disease also occurred in Australia in 1995. It has also occurred in Cuba in 2000 and 2001.

### ***The 2001 outbreak***

On August 17, 2001, FADDL diagnosed another outbreak of rabbit hemorrhagic disease, on a farm with 900 rabbits in Utah County, Utah. The farm had shipped rabbits to three locations: three rabbits had been sent to another site in Utah, three rabbits to a premises in Yellowstone County, Montana, and 72 rabbits to a location in Mercer County, Illinois. These premises were also placed under quarantine. No rabbit movements occurred from the Illinois site before the quarantine was issued. However, two other rabbits (not the Utah origin rabbits) from the Montana premises, while in route to a truck for slaughter, had been co-mingled with rabbits that were on their way to the Montana State Fair. These two Montana rabbits were then placed on a truck carrying 3,600 rabbits in route to California through Idaho.

No clinical disease was seen on the second Utah premises; however, both Utah herds and the Illinois premises were depopulated. Test results at the Illinois site were positive on the rabbits that had been received from Utah. The Utah State Veterinarian cancelled all rabbit shows until the outbreak concluded. At the Montana site, the rabbits brought from the Utah farm were euthanized and samples taken. The euthanized rabbits were buried on the property. The remaining rabbits were placed under quarantine until the

final test results on the three euthanized rabbits were negative. As a result of possible exposure at the Montana State Fair, the State Veterinarian placed 15 premises under quarantine. Movement restrictions were also placed on the truck that was carrying the rabbits to California. The 3,600 rabbits on the truck, considered to be contacts, were euthanized and disposed of appropriately.

In December 2001, RHD was diagnosed in the Bronx Zoo in New York City. Two rabbits died, one was positive for RHD. Seven other rabbits were euthanized and the disease did not spread.

### ***Sources of Information***

<http://www.aphis.usda.gov/vs/ceah/cei/rabbitcal.htm>

<http://www.nmia.com/~arba/health/vhd/vhd.htm>

ISU College of Veterinary Medicine, Gentle Doctor Newsletter, Spring 2001

[http://www.aphis.usda.gov/vs/ceah/cei/vhdr\\_utah0801.htm](http://www.aphis.usda.gov/vs/ceah/cei/vhdr_utah0801.htm)

<http://www.oie.int>