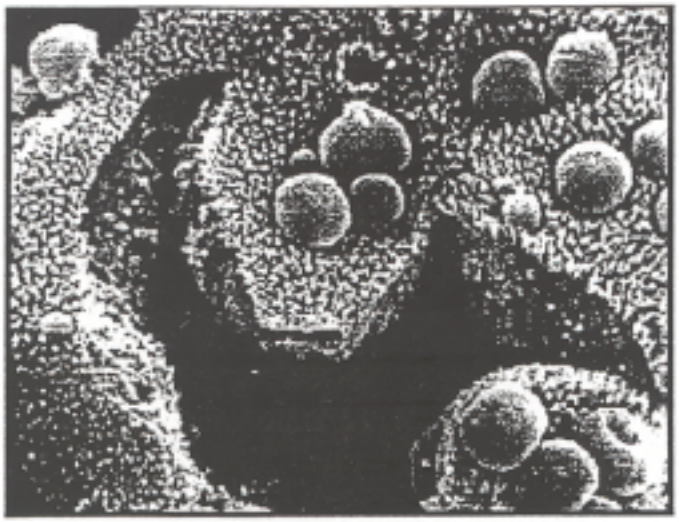
ALABAMA COOPERATIVE Extension SYSTEM

TIMELY INFORMATION

Agriculture & Natural Resources

AGRONOMY AND SOILS, AUBURN UNIVERSITY, AL 36849-5633

WQ-09-98 **September, 1998**



Microscope slide of *Cryptosporidium* lining the intestinal tract.

CRYPTOSPORIDIUM: A POTENTIAL KILLER

James E. Hairston, Extension Water Quality Scientist,
and Professor of Agronomy and Soils, and
Laura Booth, Extension Associate in Water Quality

A parasitic protozoan called *Cryptosporidium parvum* that was first discovered in 1907 but not identified as a disease-causing organism in humans until 1976, is now considered by many scientists to be an emerging killer. Although other species of this organism have been discovered and named, only *C. parvum* has been identified as being infectious to humans as well as a large number of domestic and wild animals.

Because of its small size and the difficulty of detecting it, *C. parvum* remained relatively unknown for a long time, even though it appears to be widespread throughout our environment. It was first identified as an infectious agent in people with weak or impaired immune systems. Since then, we have learned that *C. parvum* may account for thousands of undiagnosed diarrhea diseases in both humans and domestic animals. Even some of the undiagnosed diarrhea outbreaks in day care centers have now been attributed to *C. parvum*.

Those hosts most susceptible to the disease, called Cryptosporidiosis, include the malnourished, those with other diseases, the very young, the very old, AIDS victims, those undergoing radiation or chemotherapy treatment, organ transplant patients, or those suffering from other stresses caused by weather or other factors. The disease can take a toll on farm animals too, especially newborns under stress. It can result in death as well as temporary or permanently arrested growth.

Once infected, susceptible persons and animals exhibit flue-like symptoms which may include diarrhea, accompanied at times by less severe symptoms such as nausea, vomiting, abdominal discomfort, mild fever and possibly dehydration. The body is trying to flush organisms from the digestive track where they have selectively infected the inside surface-layer epithelial cells of the small intestine. A large loss of fluids and electrolytes can cause severe dehydration and weakness, thus allowing other organisms to invade the body.

Cryptosporidium parvum is extremely troublesome for a number of reasons. It can exist outside its host in a tough egg-type structure called an oocyst. It is this stage that causes infection when ingested by host species. We do not know how well these oocysts can survive under a wide range of environmental conditions. We do know however, that they are very resistant to most common personal hygiene procedures and recommended sanitary procedures will not always prevent their spread.

Chlorination, the most conventional method of drinking water disinfection, will not kill these oocysts either. This means our public drinking water industry must adopt special techniques to insure the safety of our drinking water supplies. Research has shown that *C. parvum* occysts can survive in pure laundry bleach for up to two hours, but both hot and cold temperatures will kill them. A temperature of 164 degrees fahrenheit for 5 seconds, the same temperature used to pasteurize milk, will easily kill the parasite.

Cryptosporidiosis has been reported in humans in 91 countries world wide and has been reported in patients from 3 days to 95 years of age. American travelers frequently pick up this organism in foreign countries, usually from drinking water or eating foods washed with water containing the oocysts. Local residents are usually unaffected by the organism, because like other mammals, humans who have had this disease seem to build up an immunity to reinfection. Americans tend to have low tolerance to this disease because the quality of our water supplies are generally good and we have not been exposed to the organism.

Symptoms of infection are normally seen within a week or less from the time of ingestion of oocysts. An infected host is capable of infecting other hosts by releasing the tough-celled oocysts in its feces within four days. Normal hosts can excrete the oocysts for several weeks, but immune-suppressed hosts can excrete the oocysts for months. Some animals, such as oysters for example, have been known to filter the oocysts from water without becoming infected themselves. This means they can serve as a non- infected carrier, and persons eating the raw oysters may become infected.

There are now over 80 identified species of domestic and wild animals

that can serve as hosts for transporting and spreading *C. parvum* throughout the environment. Wild animals, especially mammals and birds that share the same territory as domestic farm animals can pass the organism back and forth among their species. Persons handling infected farm or wild animals or their waste products are at greater risk of infection themselves.

Geese and other birds that harvest seed or other food products from domestic animal manures in pastures or from wastewater or other sites, may also ingest oocysts and carry them many miles to contaminate distant water supplies. Regular rainfall may also transport the oocysts from contaminated pastures to surface water supplies. One contamination problem occurred where people drank cider made from apples, some of which were harvested from the ground surface just down slope from a pasture. The oocysts apparently were on the apples, which were not adequately washed. Oocysts are so mobile that even some susceptible groundwater supplies have also been contaminated.

Because this organism and the disease caused by it can affect both our food and water supplies and it can proliferate throughout the environment, the U.S. Department of Agriculture, U.S. Environmental Protection Agency and the Centers for Disease Control (CDCs) have teamed up to form a special task force to study this organism and the disease caused by it.

In September of 1998, USDA released an updated video on this organism and its epidemiology. This video has been provided to state health departments, state environmental agencies and veterinary colleges. Copies have also been provided to state Land-grant University Extension system libraries, where it may be requested for viewing from any county Extension office. Additional information may also be obtained directly from USDA headquarters in Washington DC by calling (301) 205-5853, or by visiting USDA Agriculture Research Service's website at: http://www.usda.gov.