

Can Parasitic Worms Get Into Drinking Water Tanks?

On August 26, 2013 a small Oklahoma town was advised not to use the tap water for cooking or drinking, because red worms had been found in the town's drinking water supply. The Oklahoma Department of Environmental Quality (DEQ) conducted an investigation and determined that midge flies entered the system through sand filters at the water treatment plant. The flies laid their eggs in the filters and when the eggs hatched the red worms simply swam into the water supply. Fortunately, these worms were not parasitic, but several parasitic worms could get into drinking water systems: Roundworms, flukes, and tapeworms.

These parasitic worms are transmitted by direct contact with their eggs, consuming a host that has the parasitic eggs, or consuming the feces of hosts that contain their parasitic eggs. Once consumed, the parasitic eggs hatch and attach themselves to the intestines. Some stay in the intestines, but others travel to various organs and parts of the body to cause damage, while they continue to grow and multiply!

Hosts and their environments

Hosts can include aquatic life, insects, birds, rodents and other animals. They can gain access to drinking water through openings on tanks. Aquatic hosts can travel through the inlet or outlet pipes depending on the tank's source of water. Aquatic life is often found in tanks that receive their water from lakes, streams, rivers or other waterways. A few years ago, more than 50,000 gallons of mud and aquatic life were removed from a two-million gallon tank in New York, and in Georgia, a fish swam past the camera during an inspection. These are all potential parasitic worm hosts!

Other hosts can gain access by holes in the roof, shell, or floor. Gaps between the roof and shell, vents or overflows with torn or missing screens can allow insects, birds, and other small animals into the tank. If birds and insects are in the tank, then their feces and the possibility of parasitic eggs

are also in the tank. Another disturbing fact is that these openings often go unnoticed until an inspection is performed which means the potential risk could go unnoticed for years!

Stagnant water also contributes to contaminated water. The stagnant water creates a list of microscopic organisms and bacteria that lures potential hosts into the tanks. Stagnation occurs when water is separated into layers arranged by density; the least dense and warmer water sitting above the denser cooler layers of water coming in. The layers are caused by differences in temperature, pressure, and pH. These unmixed layers cause water quality to deteriorate and age, increasing bacterial growth. Flies, mosquitoes, water fleas and other insects and crustaceans are attracted to the bacterium and birds are attracted to the insects.

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Meet the parasites

Roundworms: Water fleas are possible hosts to the *Dracunculus* larva, a type of roundworm that causes a horrific disease known as guinea worm disease (GWD). This problem still exists in several African countries. Once the infected water fleas are ingested, stomach acid dissolves the water flea, but not the *Dracunculus* larva that hatches and travels to connective tissues. Often, no symptoms are noticed until approximately one year later, when the disease and worm presents itself with a painful, burning sensation, as a blister on the skin forms.

Other parasitic roundworms include pinworms, hookworms, *Ascaris*, *Baylisascaris*, and *Strongyloides Stercoralis*. Pinworms are said to be the number one parasite in North America.

Flatworms: The Trematodes (flukes) are found worldwide, and their common hosts are fish, snails, water plants and fish eating animals. These potential hosts are found and removed from water tanks yearly!

Tapeworms: The Cestodes (tapeworms) include: *Taenia Solium* (pork tapeworm), *Taenia Saginata* (beef tapeworm), *Diphyllobothrium Latum* (fish tapeworm), *Hymenolpis*

Diminuta (rat tapeworm), and Hymenolepis Nana (dwarf tapeworm). The pork tapeworm can cause Neurocysticercosis (NCC), an infection of the brain or spinal cord.

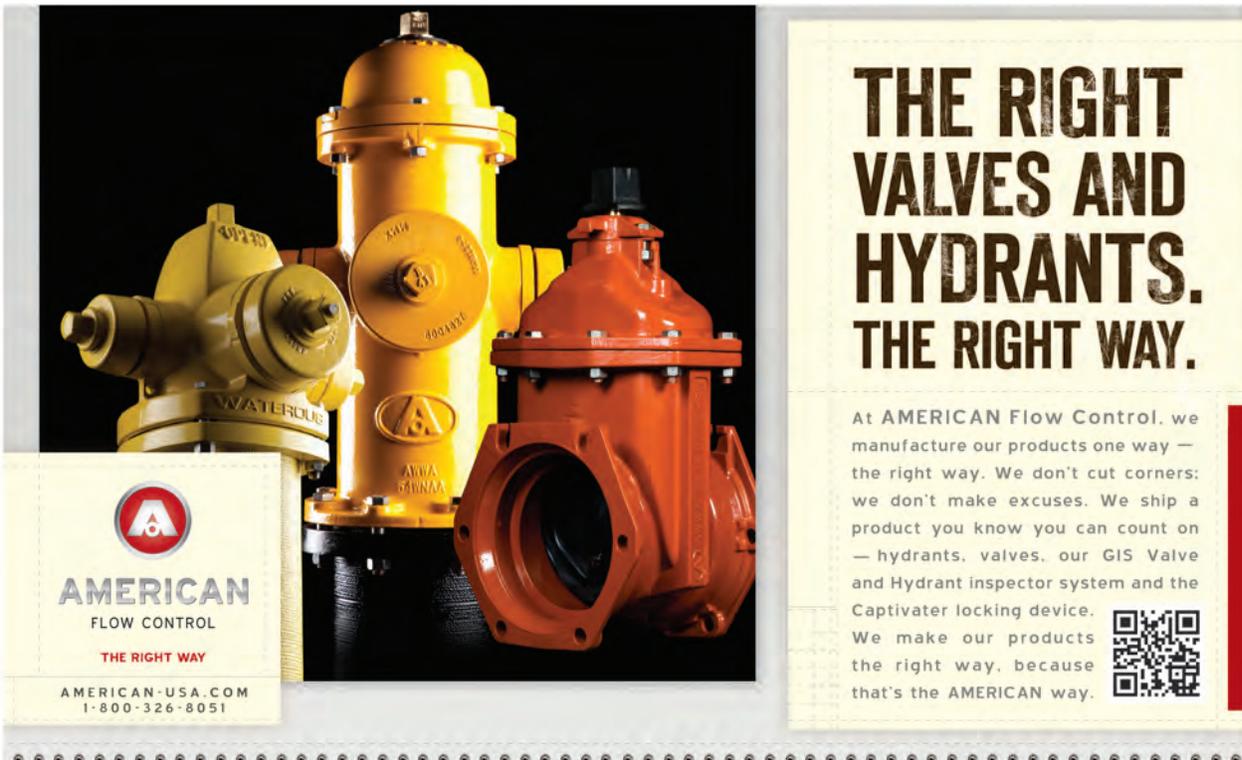
Prevention

1. Prevent the potential hosts from entering the tank by having it inspected for openings that could lead to unauthorized access. Screens, free from rips or tears, should cover all pipe openings. Holes and gaps should be sealed or welded. Roof manways and hatches should seal tightly and a lock should be placed on them. Ladders should have appropriate ladder guards and locks to prevent people from entering the tank or placing potential hosts into the tank.
2. Clean and disinfect water tanks regularly. The America Water Works Association (AWWA) states: “Tanks should be washed out and inspected at least once every three years, and where water supplies have sediment problems, annual washouts are recommended.” (AWWA M42-92). Biannual inspections and cleanouts are probably more desirable. Water tanks can be taken out of service and a trained professional can physically enter the tanks to inspect and clean them, or a robotic inspection and cleanout can be performed. A robotic inspection does not require draining the tank and there is no downtime, liability, or water loss. Lockout/tag out procedures and confined space permits are not needed, because no one enters the tank.
3. After an inspection has been performed and the condition of the tank has been determined, please

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address the issues. If the tank needs to be cleaned, then please clean it. If the water temperature during the inspection indicated possible stratification, then please take necessary steps to eliminate it. A mixing system may need to be installed to prevent the stratified water, and the water may need to be tested and treated more often.

Everyone deserves clean and healthy drinking water free from parasitic worms. Please take all necessary precaution to prevent potential hosts from getting into drinking water tanks and spreading these horrific diseases that result from the infections. Keep in mind- this article only discussed multi-celled parasitic worms that could potential get into drinking water tanks. Another list of various single-cell parasites, viruses, and bacteria could also be lurking in drinking water tanks waiting to attack human cells!



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