

1.0 Purpose and Scope

Raccoons will leave their droppings (scat) in one communal area called a latrine. These latrines may be harmful to humans as many of the droppings contain raccoon roundworm eggs. Raccoons are the primary host of *Baylisascaris procyonis* infection as the roundworms live in the raccoon intestines. Humans and other animals may become infected. Humans can become infected in a couple of ways: one, by accidentally swallowing eggs from raccoon feces-contaminated hands, soil or objects; two, the microscopic eggs in dry raccoon feces can become airborne and could be inhaled. Although infection in humans is rare, it can be serious if the parasites invade the eyes or the brain. Following safe procedures while cleaning a latrine area, removing raccoon attractants and implementing exclusion methods will all aid in the prevention of *Baylisascaris* infection.



2.0 Definitions

- **Baylisascaris procyonis** (common name Raccoon Roundworm): is an intestinal roundworm nematode found primarily in raccoons and other small mammals e.g. dogs, rabbits, woodchucks. Human *Baylisascaris* is an infection caused by larvae of *Baylisascaris procyonis* an intestinal nematode found in raccoons.
- **Confined Space:** is large enough for an employee to enter fully and perform assigned work; is not designed for continuous occupancy by the employee; and has a limited or restricted means of entry or exit. These spaces may include underground vaults, tanks, storage bins, pits and diked areas, vessels, silos and other similar areas.
- **Disinfectant:** an antimicrobial intended to destroy or irreversibly inactivate infectious or other undesirable bacteria, pathogenic fungi, or viruses on surfaces or inanimate objects.
- **Feces** (droppings/scat): waste matter discharged from the bowels after food has been digested. Raccoon feces tend to be dark and tubular with a pungent odor.
- **Latrine:** communal sites where raccoons repeatedly deposit fresh feces on top of old feces in a particular area in their environment.
- **NIOSH:** National Institute for Occupational Safety and Health.
- **NIOSH Approved N100 Particulate Filtering Facepiece Respirator:** this air-purifying respirator protects by filtering particles out of the air the user is breathing. It filters at least 99.97% of airborne particles but is not resistant to oil.
- **NIOSH Approved P100 Particulate Filtering Facepiece Respirator:** an air-purifying respirator that filters at least 99.97% of airborne particles and is strongly resistant to oil.
- **Raccoon:** a small North American animal with grayish-brown fur that has black fur around its eyes and black rings around its tail.



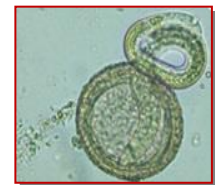
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- **Personal Protective Equipment (PPE):** Clothing and accessories such as goggles, rubber boots and gloves worn for protection from exposure to or injury from chemicals and feces during handling activities or from using equipment.
- **SDS:** "Safety Data Sheet" an OSHA mandated collection of information provided by the manufacturer for the proper storage and use of a chemical, including toxicity and safety information.

3.0 Raccoon Latrines: Identification and Dangers

- **Identification:** by the fresh and aged raccoon feces in one common area. Fresh feces will be dark in color, have a bad odor and are tubular with blunt ends. Older feces will be dryer and lighter due to decomposing and weathering. The feces may contain undigested seeds, nut shells and other foods.
- **Locations:** can be found on raised from the ground flat surfaces such as attics, roofs, haylofts, garages, decks, fallen logs, base and forks of trees, woodpiles, stumps and large rocks.
- **Dangers:**
 - anyone, especially children, can be at risk if exposed to areas where raccoons are commonly found due to the roundworm egg in their feces
 - fresh feces with eggs when first deposited are not infectious, it takes two to four weeks to become infective depending on environmental conditions (temperature and moisture)
 - the eggs of *Baylisascaris procyonis* are resistant to degradation in the environment and can survive for years under appropriate conditions. One raccoon roundworm can produce more than 100,000 eggs a day
 - if feces with roundworms are accidentally swallowed or inhaled by humans, infection can occur causing serious illness. These rare infections can lead to heart, brain and eye damage and ultimately can lead to death. Treatment is most effective within the first three days after exposure. If you think you have been exposed see your health care provider immediately
 - other wildlife, pets and livestock can be infected with and harbor raccoon roundworms that can become fatal
 - throughout the United States, raccoons carrying *Baylisascaris* roundworms have been found



4.0 General Responsibilities and Frequencies

- **Responsibilities:**
 - promptly cleaning a newly found raccoon latrine may prevent possible roundworm infection; if you are unsure of your job responsibility in cleaning a raccoon latrine discuss it with your supervisor/manager or contact CALS OEH (see 10.0 Resources) before you proceed
 - if there are problems with raccoons in your work area report it to your supervisor/manager or contact CALS OEH
- **Frequencies:**
 - routine assessment of your areas for raccoons and raccoon latrines should occur



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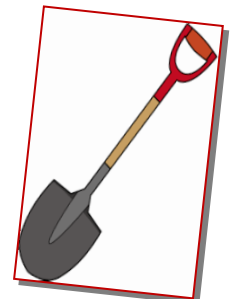
5.0 Prevention and Precautions

- Prevention: discouraging raccoons from hanging around and living near humans, pets and livestock reduces the possibility of raccoon latrine establishment and health hazards from raccoon roundworms
 - avoid contact with raccoons and do not feed or adopt wild animals
 - cut back branches that overhang roofs
 - remove attractants:
 - keep areas free from attractants or keep contained i.e. garbage, pet food, eggs, sweets, berries
 - exclusion:
 - be sure they are out and don't trap them in
 - use bright lights, loud noises, and unpleasant smells as deterrents
 - cover all openings by using wire mesh, sheet metal or metal flashing
- Precautions:
 - donning PPE, using precautions and following the procedures when cleaning raccoon latrines will lessen the possibility of ingesting or inhaling the raccoon roundworm eggs; this will also decrease the risk of contaminating other surfaces and/or objects



6.0 Personal Protective Equipment (PPE) and Clean-up Equipment

- PPE:
 - disposable rubber gloves
 - disposable suit or coveralls
 - rubber boots
 - PPE on labeling of disinfectant being used
 - Respiratory Protection (*see 10.0 Resources*)
 - Indoors: minimum required is a P100 or N100 disposable respirator
 - Outdoors: based on disinfectant label
- Clean-up Equipment:
 - NEVER use a vacuum or leaf-blower when cleaning a raccoon latrine! This will cause the raccoon roundworm eggs to become airborne and increase the risk of inhalation
 - spray bottle of water
 - heavy-duty plastic garbage bags
 - shovel
 - sponge, mop, paper towels, disposable wipes
 - bucket of hot, soapy water
 - bleach/disinfectant



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7.0 Procedures for Clean-Up

Raccoon Roundworm eggs have a sticky proteinaceous coating that allows them to adhere to surfaces. Bleach will loosen the sticky coating so it will be easier to wash them from surfaces but will not kill the roundworm eggs.

- Indoor Latrine Clean-up
 1. wear PPE listed in section 6.0, if the latrine is in a small/confined, poorly ventilated space (i.e. attic, crawl space) wear the respirator described in 6.0
 2. avoid stirring up dust and debris
 3. lightly mist the latrine area with water from a spray bottle, this will reduce raising dust
 4. gently shovel feces and material contaminated with raccoon feces into heavy-duty (or double bagged) garbage bags, then place in routine garbage containers for disposal in a landfill or by an incinerator
 5. fill a bucket with very hot soapy water (boiling water if possible)
 6. use a damp (but not wet) sponge, mop and or disposable wipes to clean-up residual fecal material
 7. rinse sponge, mop or wipes frequently in the bucket
 8. when clean-up is complete, flush dirty water down the toilet
 9. place sponge, mop head and all disposable clean-up materials in a plastic bag
 10. close bag with a twist tie and then put that bag inside another bag
 11. dispose of the bags in the trash to be sent to the landfill
 12. disinfect and wash the bucket, mop handle, shovel, boots and all other non-disposable clean-up materials with boiling water containing bleach
 13. follow post clean-up procedures listed below

- Outdoor Latrine Clean-up
 1. wear PPE listed in section 6.0
 2. avoid stirring up dust and debris
 3. lightly mist the latrine area with water from a spray bottle, this will reduce raising dust
 4. feces and materials contaminated with raccoon feces should be removed and burned, buried or bagged and placed in the trash to be sent to a landfill
 5. gently shovel feces and material contaminated with raccoon feces into heavy-duty (or double bagged) garbage bags, then place in routine garbage containers for disposal in a landfill or by an incinerator



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6. if the latrine is on a pile of wood, dispose of the wood as described in #4
7. if the latrine is on the ground, remove 2-4 inches (5-7.5cm) of immediately under-lying soil under the feces and place in heavy-duty (or double bagged) garbage bags; large quantities of removed soil are best discarded in a landfill disposal site
8. close bag with a twist tie/tape and then put that bag inside another bag
9. dispose of the bags in the trash to be sent to a landfill
10. most chemicals do not kill raccoon roundworm eggs, but heat will kill the eggs instantly; treat feces-soiled surfaces with boiling water
11. disinfect hard, smooth surfaces (including shovel, boots and all other non-disposable clean-up materials) with boiling water containing bleach
12. follow post clean-up procedures listed below



- Post Clean-up:
 1. rinse gloves with hot water and disinfectant (bleach) before removing
 2. wash your skin with soap and water, be sure to clean under your nails with a brush
 3. wash clothes and rubber boots separately in hot, soapy water with bleach
- Exclusion:
 - once the raccoons have been removed and the latrine has been cleaned, put exclusion methods into place to prevent raccoons from returning



8.0 Record Requirements

- maintain records of raccoon latrines and clean-up, include dates and locations, add to documentation with photographs
- maintain records of exclusion methods, include dates and locations, add to documentation with photographs
- maintain training records, including dates and signatures



9.0 Training

- this "Raccoon Latrines: Safe Procedures for Clean-up" should be used for training
- document training with dates, description of training, training tools/documents used, names and signatures



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10.0 References and Resources

- Center for Disease Control, CS222686 *Raccoon Latrines: Identification and Clean-up*, <http://www.cdc.gov/parasites/baylisascaris/> ; CS257663-A *Baylisascaris Infection*, https://www.cdc.gov/parasites/baylisascaris/resources/baylisascaris_fact_sheet_2015.pdf
- Seattle and King County Public Health, *How to clean up a raccoon latrine*, <http://kingcounty.gov/depts/health/communicable-diseases/zoonotic/facts-resources/diseases-by-animal/raccoons/latrine.aspx>
- California Department of Public Health, Veterinary Public Health Section, July 2016, *What You Need To Know About Raccoon Roundworms*, <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/RaccoonRoundwormRaccoonLatrineBrochure.pdf#search=raccoon%20latrines>
- Raccoon Roundworm Eggs near Homes and Risk for Larva Migrans Disease, California Communities, Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 9, No. 12, December 2003 https://wwwnc.cdc.gov/eid/article/9/12/03-0039_article
- The Humane Society of the United States, *Getting Raccoons Out (and Keeping Them Out)*, http://www.humanesociety.org/animals/raccoons/tips/raccoon_eviction_exclusion.html
- NIOSH-Approved Particulate Filtering Facepiece Respirators https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html
- [Cornell College of Agriculture and Life Sciences \(CALS\) Occupational and Environmental Health \(OEH\)](#); Eric Harrington, Director, eh22@cornell.edu, 255-0485; Aimee Andersen, SHEM Coordinator, abr6@cornell.edu, 255-6978
- Cornell Environmental Health and Safety, <https://sp.ehs.cornell.edu>, 607-255-8200

11.0 Attachments

- Center for Disease Control Raccoon Roundworm Life Cycle



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