RESEARCH UPDATE

PennVet University of Pennsylvania | Wildlife Futures Program

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The Wildlife Futures Program, a wildlife health partnership between the Pennsylvania Game Commission and the University of Pennsylvania School of Veterinary Medicine, **is able to conduct vital wildlife health research thanks to hunters and trappers like you!** If you have ever donated samples for research, know that your contribution helps Pennsylvania's native species thrive for generations to come.

Assessing the Impact of Rat Poison on Wildlife

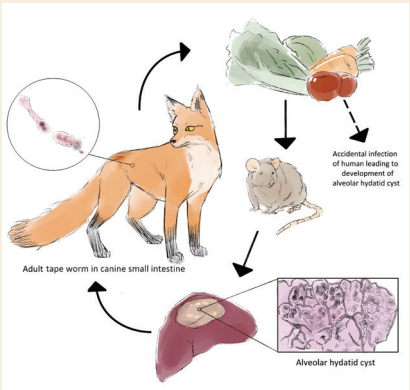
Anticoagulant Rodenticides in Pennsylvania Carnivores

A recent study by **the Pennsylvania Game Commission and the University of Pennsylvania** revealed that bobcats, fishers, and river otters across the state are exposed to anticoagulant rodenticides (ARs), or rat poison. This potent toxin, causing fatal internal bleeding, poses a threat beyond rodents. When predators consume contaminated prey, the poison enters their system, and this accumulation of toxins over time is known as biomagnification. We detected ARs in all three species. Fishers showed the highest exposure rates, and this study marks the first documented evidence of this threat in North American river otters. We tested a total of 265 livers – 105 from river otters, 97 from fishers, and 63 from bobcats – revealing that overall, 44.2% of these animals showed traces of ARs. Specifically, exposure was detected in 49.21% of bobcats, 70.10% of fishers, and 17.14% of river otters. Additionally, we found that exposure increases in areas of land development and agriculture. **This research gives wildlife management agencies a better understanding of the species affected by ARs, the prevalence and baseline AR exposure levels in Pennsylvania mesocarnivores, and areas of higher AR exposure.**

Protecting Coyote Hunters and Trappers

Echinococcus Study

From June 2021 to March 2025, the Wildlife Futures Program contributed samples from over 1,230 wild canids (foxes and coyotes) to two multi-state surveillance efforts, with nearly all of the samples coming from hunters and trappers. Samples were examined for *Echinococcus*, a ribbon-shaped tapeworm that enters the GI tracts of carnivores and lays eggs there. The eggs, excreted in the carnivore's feces, are then ingested by herbivores (rabbits, groundhogs, etc.), hatching inside where the larvae migrate into other organs. When a carnivore predates or scavenges an infected herbivore, it ingests these cysts, and the cycle continues.



^^*E. multilocularis life-cycle drawing (Dr. Vickie Zhou)*

Echinococcus are zoonotic, so they can infect humans and pets if ingested. *Echinococcus canadensis* was detected in a red fox from Lancaster County and in two coyotes from Lackawanna and Susquehanna counties. *Echinococcus multilocularis*, a European strain, was detected in four coyotes from Bradford, Potter, and Wayne counties. **This research provides more information on a parasite that can impact humans, hunting dogs, and other domestic animals. With this new information, better educational materials can be produced to help protect coyote hunters and trappers in the future.**

This project was funded by the Southeastern Cooperative Wildlife Disease Study.

Other Studies

The Wildlife Futures Program uses its statewide wildlife health surveillance network, which includes hunters and trappers, to support as many research projects as possible. These samples, collected opportunistically, further our understanding of the disease threats faced by Pennsylvania's wild game species.

Chagas Disease

The Wildlife Futures Program supplied samples for a study conducted by Campbell University investigating the prevalence of Chagas disease in American opossums, **shedding more light on the potential pathogens and diseases that may impact both wildlife and human health**. Chagas disease is a parasitic infection caused by the parasite *Trypanosoma cruzi*. Opossums can contract the parasite by consuming infected kissing bugs as part of their insect-heavy diet, and infections from this parasite can cause lesions on the hearts of opossums. Wildlife Futures provided 117 opossum hearts for the study. While approximately 30% of the hearts showed lesions, most of these were caused by a different parasite, *Besnoitia darlingi*, which does not affect humans. Only one heart was positive for *Trypanosoma cruzi*. This project was funded by Campbell University.

Eye Muscles

The Wildlife Futures Program provided 44 samples for a study, published in *The Anatomical Record*, that **gives researchers a better understanding of carnivore eye anatomy and physiology.** These muscles, located behind the eye, are responsible for eye movement and vision adjustment and focus. There are two sets of oblique extraocular muscles, one above and below the eye. Research found that carnivores with front facing eyes for strong forward vision often have split tendons in these muscles. Findings showed that felines, like bobcats, have split tendons in both oblique muscles, while most canids only have them in the inferior oblique below the eye. The red fox was an exception, having split tendons in both sets of muscles, like felines. These muscles and tendons may be visual adaptations that help predators find, pursue, and capture prey. This study was funded the by Henry M. Jackson Foundation for the Advancement of Military Medicine.

Parasites in Mustelids

Wildlife Futures Program conducted a study on the diversity of parasites in mustelids, which **increased the knowledge of potential zoonotic pathogens carried by wildlife that may impact human and domestic animal health.** We collected samples from weasels, mink, and fishers. Of the 68 animals sampled, over half were infected with at least one parasite. Most commonly found were *Aonchotheca putorii*, a long, thin worm in the stomach and small intestines, and *Metorchis conjunctis*. Also found were four species of lungworms: *Crenosoma vulpis, Eucoleus boehmi, E. aerophilus*, and *Filaroides sp.* **These findings were significant, as these lungworms can all cause severe respiratory infections in domestic dogs, and both** *M. conjunctus* **and** *E. aerophilus* **are known to be zoonotic, presenting a potential health risk to humans.** This project was funded through a pilot grant from Penn Vet's Institute for Infectious and Zoonotic Diseases.

Learn more about the Wildlife Futures Program by visiting our website:
www.vet.upenn.edu/wildlife-futures