

The Lancet Liver Fluke, Invasive Parasite

By Zack Dempsey

▶ 25
March, 2021

7:30pm-9:00pm

RDRN Virtual Series

Join the meeting here:

Meeting ID: 844 5333 5776

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Zach Dempsey

Zach Dempsey completed his MSc in Biological Sciences at the University of Lethbridge, specializing in phylogeography and parasitology of terrestrial land snails. Zach currently teaches biology at Red Deer College.



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SEASONAL SIGHTS AND SOUNDS OF ALBERTA: HOW WOOD FROGS SURVIVE OUR ALBERTA WINTERS

By Dr. Sally Stuart

Head down to avoid the wind chill, trudging around our land in early February, with temperatures of -23 C, the words of a poem by T.S. Eliot spring to mind. In this tragic poem *The Waste Land*, Eliot describes April as the cruellest month. Thinking of the wildlife struggling to survive these extreme temperatures, I am tempted to describe February in Alberta as our cruellest month. Continuing to walk through the woods, I cannot help but wonder if we are walking over the frozen bodies of amphibians, lying beneath the leaf litter, in the upper layer of soil.

According to the book *Vertebrate Life* (Pough and Janis, 2017) there are 7,642 amphibian species worldwide, most of them belonging to the order Anura, which include frogs and toads. Only 10 species are found in Alberta, presumably because amphibians are ectotherms. Ectotherms remain pretty much at the mercy of the environment because they have limited ability to control body temperature. An advantage of being an ectotherm is that their energy requirements are less and therefore they do not need as much food. Since they cannot remain active during extreme cold, they have developed overwintering strategies, including complicated physiological processes that begins with their integument (skin).

The outer layer (epidermis) of amphibians consists of a thin cornfield layer, enriched with a tough protein, keratin. The lower layer of the epidermis has an excellent supply of capillaries. Below the epidermis, the dermis contains an abundance of glands, some of which produce a protein rich mucus. The integument also have sensory receptors that respond to temperature. Amphibians are unusual tetrapods. The lungs are poorly developed in most species, so gas exchange is supplemented by using the skin as a respiratory organ. The mucous glands help keep the skin moist to facilitate respiration and the thin epidermis allows gases to diffuse into the capillaries. The thin moist skin is also permeable to water, having special protein channels, which help regulate water balance. Despite these benefits, this integument structure puts them at significant risk. In recent years amphibians worldwide have been devastated by fungal and viral infections (e.g., chytrid fungus and ranavirus).

While amphibian skin is limited in terms of controlling temperature, the sensory receptors in the skin are key to their winter survival because a few species are able to undergo “freeze tolerance,” a process whereby much of the body water is frozen, but NOT the water inside the cells. This is a dangerous process, during both freezing and thawing, as cells could rupture (think frozen pipes)!

When ice is encountered, the skin receptors send messages to the brain and a rapid chain reaction is triggered. Ice starts to form in the fluid outside the cells (extracellular fluid) and in the process draws water from the fluid inside the cells

(intracellular fluid), shrinking them in the process. Some research suggests that amphibians may consume minerals and bacteria from the environment which can act as nucleating agents to help trigger the formation of ice. The cells must remain ice-free and functioning for the individuals to survive, so if the cells freeze, the resulting rupture will result in cell death and organ damage. There is also the risk that that shards of extracellular ice might puncture cell membranes.

To mitigate damage, the liver releases large amounts of stored glucose (apparently in concentrations which would rapidly kill a diabetic person) once the extracellular fluid begins to freeze. This glucose enters the cells, acting as a cryoprotectant (antifreeze) and to elevate cellular osmotic pressure, thus preventing too much water from leaving. When the frogs start to thaw out in the spring, this glucose will be a valuable cellular energy source.

Researchers Costanzo and Lee (2005) discovered that urea—a waste product of nitrogen metabolism—is also used as a cryoprotectant. Unlike glucose, cells accumulate urea in the fall, so it is present when freezing begins. Some evidence suggests it may be an even more effective cryoprotectant than glucose.

A frog can survive approximately 65% of its body water freezing. At this point, it appears to be completely frozen, resembling a somewhat flattened, frog-shaped ice cube. The heart has stopped beating, blood is no longer circulating and there is no evidence of respiration. But it is still alive! Amazingly, as the environmental temperature increases in the spring, they recover quickly as the process reverses from the inside out. Physiological parameters are quickly restored. The heart starts pumping, blood circulates and respiration recommences. Incredibly, within a few hours the frog is able to start moving.

As we look forward to spring, I remember the first April we lived on our acreage, 22 years ago. Each night I would fall asleep to a frog symphony—the breeding chorus of dozens of Wood Frogs.

Breeding requires huge amounts of energy. Calling is energetically expensive. And yet, all this is achieved just a few weeks or even days after they have awoken from a cryogenically frozen state. In Alberta, the chorus of the frogs signifies another year of renewal has begun.



CHRISTMAS BIRD COUNT (CBC) 2020 BY JUDY BOYD

We didn't have room to include all of the 2020 CBC information in the February newsletter, so it is included here. Our thanks to Judy Boyd for her tireless efforts to promote the CBC and summarize the data. You are appreciated, Judy!

We also had 2 Count Week Birds (seen 3 days before or after the Count Day but not seen on the Day): Great Gray Owl, and Red-winged Blackbird. The highest number of species recorded since 1986 happened in 2004 with 61 species and the highest number of individual birds recorded was in 2005 with 14,540 birds counted. Interesting birds this year included a Common Loon at Dickson Dam, a Killdeer at River Bend Golf Course and two American Coots, which have been seen only twice since 1986 (1 in 1994 and 2 in 2011).

PARTICIPANTS: Our thanks to all 116 observers! Colleen Anderson, Phillip Anderson, Karin Bjorge, Myron Bjorge, Ron Bjorge, Judy Boyd, Larry Boyd, Terry Brauner, Connie Brooks, Richard Brooks, Lois Burkinshaw, Phil Burkinshaw, Colleen Caddy, Jerry Caddy, John Caddy, Casey Callihoo, Emma Callihoo, Logan Callihoo, Melanie Callihoo, Ed Cameron, Sandra Cameron, June Campbell, Angela Charles, Brian Charles, Mitchell Charles, Wyatt Charles, Vern Connelly, Brad Coyston, Aaron Cyr, Anto Davis, Ted Davis, Leo de Groot, Sonja Dreger, Sharon Faszler, Morris Flewwelling, Marie Flexhaug, Mary Flexhaug, Eileen Ford, Stewart Ford, Estelle Froese, Blake Gervais, Evan Gervais, Jan Gervais, Karen Gervais, Megan Gervais, Chester Goetzinger, Betty Ann Golly, Stuart Golly, Tyler Golly, Connie Hausteine, Bill Heinsen, Colin Hill, Allison Ireland, Marlene Ironside, Mary Joensen, Gordon Johnson, Pat Johnson, Wayne Johnson, Carol Kelly, Keith Kline, Ted Korpiniski, Wendy Korpiniski, Linda Kullman, Andrea Lash, Jim Leslie, Claudia Lipski, Addy Long, Cliff Long, Carol Lynass, Henry Lynass, Ron MacDonald, Vi MacDonald, Tim McJunkin, Mark Meunier, Ruby Meunier, Sandy Murray, Dorothy Murray, Sharon Nielson, Tanya O'Donoghue, Athena O'Donoghue, Chris Olsen, Sheryl Paquette, Chester Payne, George Payne, Marie Payne, Myrna Pearman, Doug Pedersen, Vicki Peterson, Bonnie Potter, Jim Potter, Linda Prockiwi, Valerie Redston, Darlene Reimche, Anna Robertson, Jim Robertson, Tanis Rode, Danny Saunders, Heather Saunders, Aly Seymour, Harley Siebold, Kim Siebold, Sherrill Smith, Jared Steblin, Harvey Sutherland, Rick Tallas, Kate Tucker, Carl Tully, Sandy van Dijk, Sid van Dijk, Colleen Vincent, Mitch Vincent, Althea Williams, Diane Wilton, Richard Wingerak

RED DEER RIVER NATURALISTS STATEMENT REGARDING DOMESTIC CATS: FEBRUARY 25, 2021

The RDRN drafted the following statement and submitted it to the City of Red Deer in response to their call for public input into animal bylaw updates.

Scientists with the Smithsonian Conservation Biology Institute and the U.S. Fish and Wildlife Service have recently declared that cat predation is the most serious of all human-caused bird mortalities world-wide. More birds die from domestic cat predation than from all other human impacts combined (e.g., window collisions, buildings, communication towers, vehicle collisions and pesticide poisoning).

Unlike natural predator-prey interactions, where the species have co-evolved, feral and free-ranging domestic cats pose a new and additive threat to native species. Domestic cats are very adept at killing adult, nestling and fledgling birds (especially ground-dwelling species), as well as a wide range of reptiles, amphibians and small mammals.

It is estimated that 100 to 350 million birds are killed annually in Canada by five to 10 million outdoor cats. Unfortunately, native birds make up the majority of cat prey species.

Research has shown that bells and declawing are ineffective, and that cats kill whether or not they are hungry, because their hunting instinct is always active. Birds rescued after being caught by a cat are still likely to die since the resulting skin punctures allow the transfer of harmful bacteria.

Studies conclude that both cats and wildlife will be protected if cats are kept indoors, or outdoors on a tether or in a cat run. Not only will these practices save local wildlife, but they also allow cats to live longer, happier and healthier lives.

In consideration of the foregoing, the Red Deer River Naturalists Society urges the City of Red Deer and cat owners to adopt appropriate measures to control free-roaming domestic cats.

References:

American Bird Conservancy, *Outdoor Cats: Single Greatest Source Of Human-Caused Mortality For Birds And Mammals, Says New Study* [Available: <https://abcbirds.org/article/outdoor-cats-single-greatest-source-of-human-caused-mortality-for-birds-and-mammals-says-new-study/>]

Blancher, Peter, (2013) *Estimated Number of Birds Killed by House Cats (Felis catus) in Canada*, *Avian Conservation and Ecology* 8(2): 3. <http://dx.doi.org/10.5751/ACE-00557-080203> [Available: <http://www.ace-eco.org/vol8/iss2/art3/>]

Cats Indoors Program of the American Bird Conservancy [Available: <http://abcbirds.org/cats-indoors/>]

Loss, Scott R. *et al*, (2013) *The impact of free-ranging domestic cats on wildlife of the United States*, *NATURE COMMUNICATIONS* | 4:1396 | DOI: 10.1038/ncomms2380 | www.nature.com/naturecommunications. [available: https://abcbirds.org/wp-content/uploads/2015/09/Loss_et_al_2013-Impacts_Outdoor_Cats.pdf]

Pearman, Myrna. 2015. *Backyard Bird Feeding: An Alberta Guide*. Ellis Bird Farm.

FLOWER FOCUS: Don Wales will be conducting Flower Focus by Zoom for the next two months, on **March 17** and **April 21**. Feel free to contact him at don@hexapod.ca for Zoom/meeting details. The May and June meetings will be held outdoors.

The March 17th talk will be about the **Flowers of Southern California**.

Photo: Ghost Flower (*Mohavea confertiflora*) by Don Wales



JOIN THE CITY NATURE CHALLENGE APRIL 30 THRU MAY 3

The City Nature Challenge is an international bioblitz-style competition where cities compete with each other to see who can make the most observations of nature, find the most species and can engage the most people. Anyone can participate! For more information, visit: citynaturechallenge.org

March 20, 2021—Annual ANPC Workshop “Northern Native Plants and Ecosystems” <https://anpc.ab.ca/>

RDRN COAL LETTER TO THE ALBERTA GOVERNMENT: <https://rdn.ca/wp-content/uploads/2021/02/RDRN-Coal-Development-Letter-and-Resolution.pdf>

DID YOU KNOW?

By Susan van der Hoek

A group of nuthatches are collectively known as a "jar" of nuthatches. In Central Alberta, the nuthatches we see are Red-breasted and White-breasted Nuthatches. In winter, White-breasted Nuthatches will often forage together with other birds such as chickadees and Downy Woodpeckers in a group known as a foraging guild. Nuthatches recognize the alarm calls of these species and can therefore reduce their own level of alertness by relying on vigilance of these other species. This leaves them with more time to concentrate on finding food.



Photo by Rick Tallas

The Red Deer River Naturalists, the first natural history organization to be established in Alberta, was incorporated as a society in 1906. The objectives of the society are to foster an increased knowledge, understanding and appreciation of natural history, and to support conservation measures dealing with our environment, wildlife and natural resources.

Annual membership is \$15.00 for individuals and \$20.00 for families.

Regular meetings are held at 7:30 PM on the fourth Thursday of most months by Zoom. Non-members are welcome.

Members are encouraged to contribute to this newsletter. The deadline is the last Friday of the month.

Box 785 Red Deer, AB T4N 5H2
Phone/Fax: 403.347.8200

Board Notes

Reminder: 2021 memberships are due!

Greetings from the Board: Tony, Myrna, Rick, Bob, Don, Rod, Daryl, Anto, Travis, Kirstin, Christine and Dean

We have 477 Facebook members, 261 Twitter members and 177 Instagram followers.

RDRN has been busy over the last month, meeting with new board members to orient them to the organization, get their input and ideas for a long-term plan, and to set up various board committees. The board and several RDRN members also met with Shari Hanson of Alberta Community Development to finalize our Strategic Plan. We are grateful for Shari's expertise and guidance (this very valuable service is provided by the Alberta government, free-of-charge, to non-profit societies in the province).

We have finalized the details for the Nature 2021 program and will soon be hiring a new Administrative Manager.

Thanks to Tony Blake and Dean Baayens, we submitted a letter to the Alberta government about the coal issue (see website link to left) and in late February, we submitted a statement to the City of Red Deer about cats (see page 3).

RDRN is still looking for a secretary. If you are interested, please email us at rdn.nature@gmail.com

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