

Lyme Disease in Newfoundland



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Introduction

Lyme disease (LD), spread by ticks, is an illness affecting humans and domestic animals. The presence of the bacteria causing this illness was reported for the first time in this province in 2001. The first infection in a domestic animal was confirmed in 2004. This pamphlet provides details on the disease and how it is spread.

Background

LD was first identified in Lyme, Connecticut (USA), in the mid-1970's. Since then, it has been located in most Canadian provinces and US States (primarily northeast). It is caused by a bacteria (*Borrelia burgdorferi*) spread by ticks. Infections in humans are rarely fatal but can be very painful and may result in long term medical problems. Illness in domestic animals, such as cattle, horses, dogs and cats, can occur though they are most common in dogs. It is not thought that wild animals can become sick.

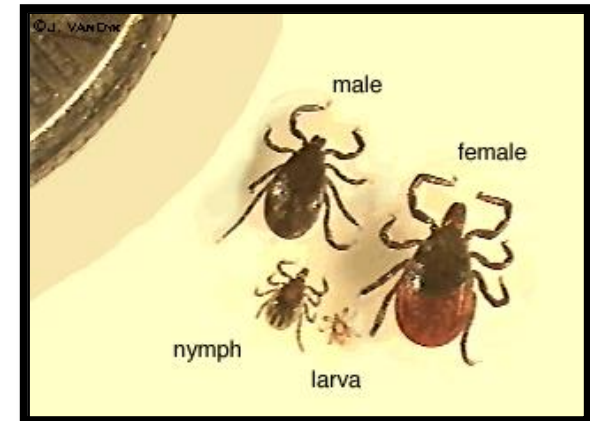
Ticks

Ticks are small, wingless relatives of spiders, mites and scorpions that feed on the blood of mammals and birds. The most important tick for LD is *Ixodes scapularis*, or the black-legged tick. For a more complete description of the ticks in this province, please see "The Ticks of Newfoundland" pamphlet.

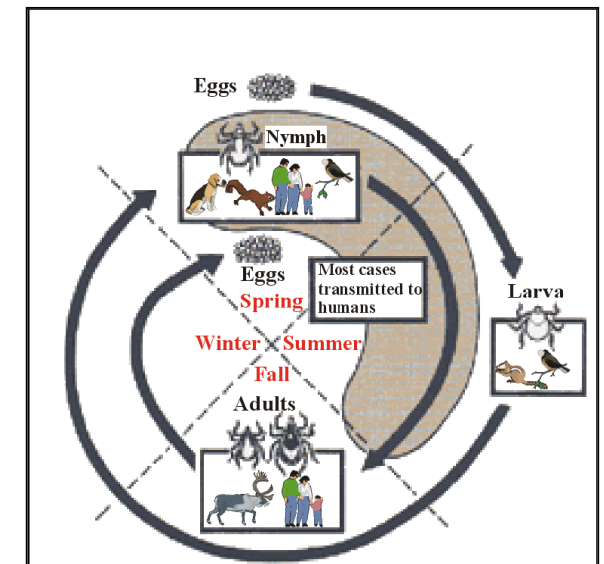
The Tick Life Cycle

There are four different stages in a tick's life: egg, larva, nymph and adult. The larva, nymph and adult must have a blood meal before progressing to the next stage (or before laying eggs). The life cycle, from eggs to adults then back to eggs, takes at least two years depending on the weather.

These stages feed on a variety of animals, usually smaller for the larva (mice, voles, birds), through medium sized for the nymph (squirrels, chipmunks, birds) and larger for the adults (deer, humans). However, host variability may occur.



Stages of the black-legged tick, beside a dime (source: University of Iowa).



Life cycle of the black-legged tick (source: US Center for Disease Control)

The tick waits for a host while resting in bushes or tall grass. It senses an animal's presence by increased levels of carbon dioxide, prompting it to attach to the animal when it brushes by (ticks cannot jump or fly).

A female that has had a blood meal is called engorged and is much larger than one that has not fed. The male dies after mating and the female dies after laying eggs.

As the female does not pass LD to her eggs, it must be picked up from a wild animal during a blood meal. Usually the larvae or nymphs pick up the bacteria from a small mammal (such as the white-footed mouse), while the nymph or adult spread the infection to humans or animals through a blood meal.

The Disease in Humans and Domestic Animals

When a tick finds a new host, attachment can take hours. Once feeding has started, the bacteria are not transmitted to the host right away. It is stated that infection usually does not occur until 24-36 hours after attachment.

A bull's-eye rash at the spot of the attachment is a common symptom, yet is not present in all LD cases. The rash may be followed by fever, headache, muscle and joint aches and fatigue. If untreated, it can lead to longer term health problems.



Bull's-eye rash

Dogs are 50% more likely to become sick than humans. The disease is more difficult to diagnose in dogs as there is no characteristic rash. The common signs are fever, loss of appetite, acute lameness (without any other explanation) and sore joints.

Prevention of LD

The risks of contracting LD in Newfoundland are low but do exist. The normal precautions for resisting bites are wearing long sleeved shirts and long pants tucked in to socks with closed toe-shoes, and the use of an insect repellent such as DEET or Icaridin. People should examine themselves after walking or hiking through potentially infested areas to see if any ticks are roaming or have attached themselves. To remove an attached tick, position tweezers as close to the skin as possible, then slowly and gently pull the mouthparts out of the skin.

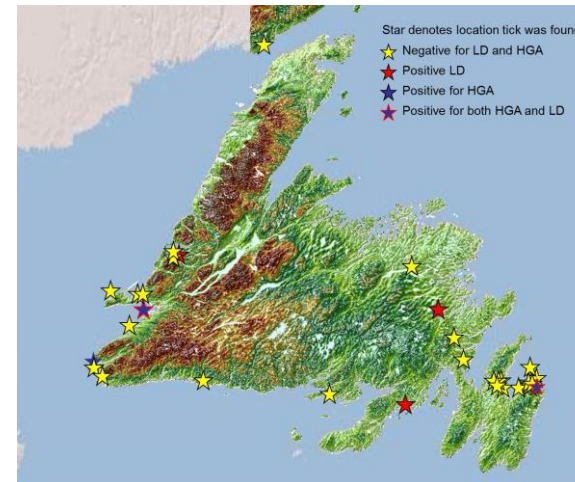
Geographic Distribution of LD

In Canada, known endemic areas for LD are in southern British Columbia, Manitoba, Ontario, Quebec, Nova Scotia and New Brunswick where the necessary conditions for tick survival and population sustainability appear to be the most predictable. Nova Scotia and New Brunswick have only developed permanent populations of the black-legged tick in recent years, suggesting that the tick's range is expanding. With a warming climate, we can assume that the tick's range will continue to expand northwards. In Newfoundland, with the assistance of the Public Health Agency of Canada and Memorial University, infected ticks have been found in almost all parts of the island. There have been no reports of *Ixodes scapularis* from Labrador.

A dog was diagnosed with LD for the first time in this province in 2004. The dog lived on the Port-au-Port peninsula, had not left the province and a tick had been removed from it a few months earlier.

Annual maps showing where ticks have been found are available at:

www.nr.gov.nl.ca/nr/agrifoods/animal/animal_health/vetinfo/surveillance/location_of_ixodes.html



Lyme disease surveillance map for 2013

Further Research

It is not known whether permanent populations of the black-legged tick live in the province or just transient ones, as the tick falls off of migratory birds coming in from further south. The current belief is that only transient populations live here that do not last through the winter. Of the ticks that have been collected, approximately 20% are carrying the infection. Though the maps indicate that ticks are found across the island, the total number found per year is low (25-35), suggesting that the risk is also relatively low.

It is also not known which animals are important in maintaining the tick population on the island. White-tailed deer and white-footed mice, which are considered important host species elsewhere, do not live in this province. It is not known whether the existence of other members of the deer family (moose and caribou) and other mouse species are also acceptable hosts.

Submissions

Anyone finding a tick is asked to submit it directly to the Animal Health Laboratory or through public health, a veterinarian or a Conservation Officer, for identification and analysis. The tick should be put in a small container with moist cotton.

Questions

Any questions on human illness should be addressed to a family doctor or local community health office. Any questions regarding the health of domestic animals should be addressed to a local veterinarian. Other questions can be directed to the Animal Health Division.

Additional Information on LD Research:

Ogden, N. H. *et al.* (2009). The emergence of Lyme disease in Canada. *Canadian Medical Association Journal*. 180(12), 1221-1224.

Leighton, P. A. *et al.* (2012). Predicting the speed of tick invasion: an empirical model of range expansion for the Lyme disease vector *Ixodes scapularis* in Canada. *Journal of Applied Ecology*, 49, 457-464.

Website:

www.phac-aspc.gc.ca/id-mi/lyme-eng.php

For more information, please contact the Animal Health Division.

www.nr.gov.nl.ca/agric/

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