Saskatchewan Ticks

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Tick families: Soft (Argasidae) & Hard (Ixodidae)

Argasidae

Both male & female engorge

Nest associates mainly

- multiple blood meals & egg batches

.

Ixodidae

Only females engorge

Free-ranging or in nests

- single blood meal & batch of eggs, then die

Distribution of tick species in Canada

All Argasidae are in the west (BC & AB)

<u>Ixodidae</u>

I. Primarily western: *D. andersoni* & 14 *Ixodes* spp. (e.g., *I. pacificus*)

II. Primarily eastern: *D. variabilis, R. sanguineus* & 10 *Ixodes* spp. (e.g., *I. cookei & I. scapularis*)

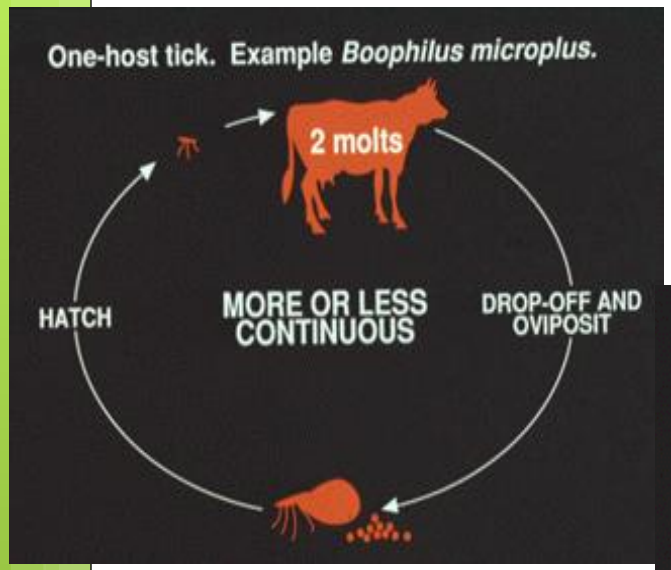
III. Wide range: *D. albipictus*, 2 *Haemaphysalis* spp., *I. angustus, I. texanus, & I. uriae*

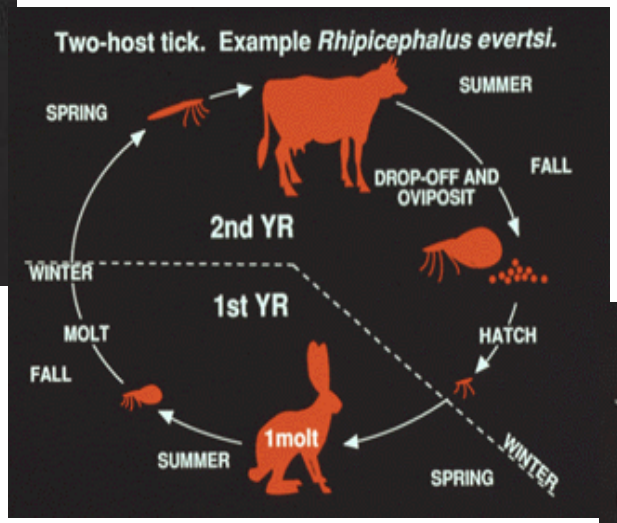
Host acquisition strategies

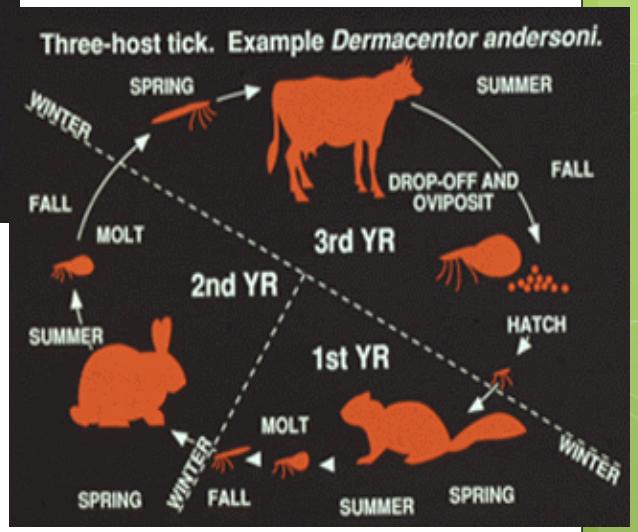
1) Nest associates (Most Argasidae & some Ixodidae)
2) Quest or host-seek - Ixodidae
3) Actively hunt for hosts - rare

NB: Strategies may vary among life stages

Life cycles for hard ticks







Life Cycles of Ticks in Saskatchewan

- Nine species identified in SK surveys (2010-18)

- *Dermancentor variabilis* (American Dog Tick) and *D. andersoni* (Rocky Mountain Wood Tick) have a 3-host life cycle. They acquire a blood meal before molting to the next stage. Adult females lay >5000 eggs

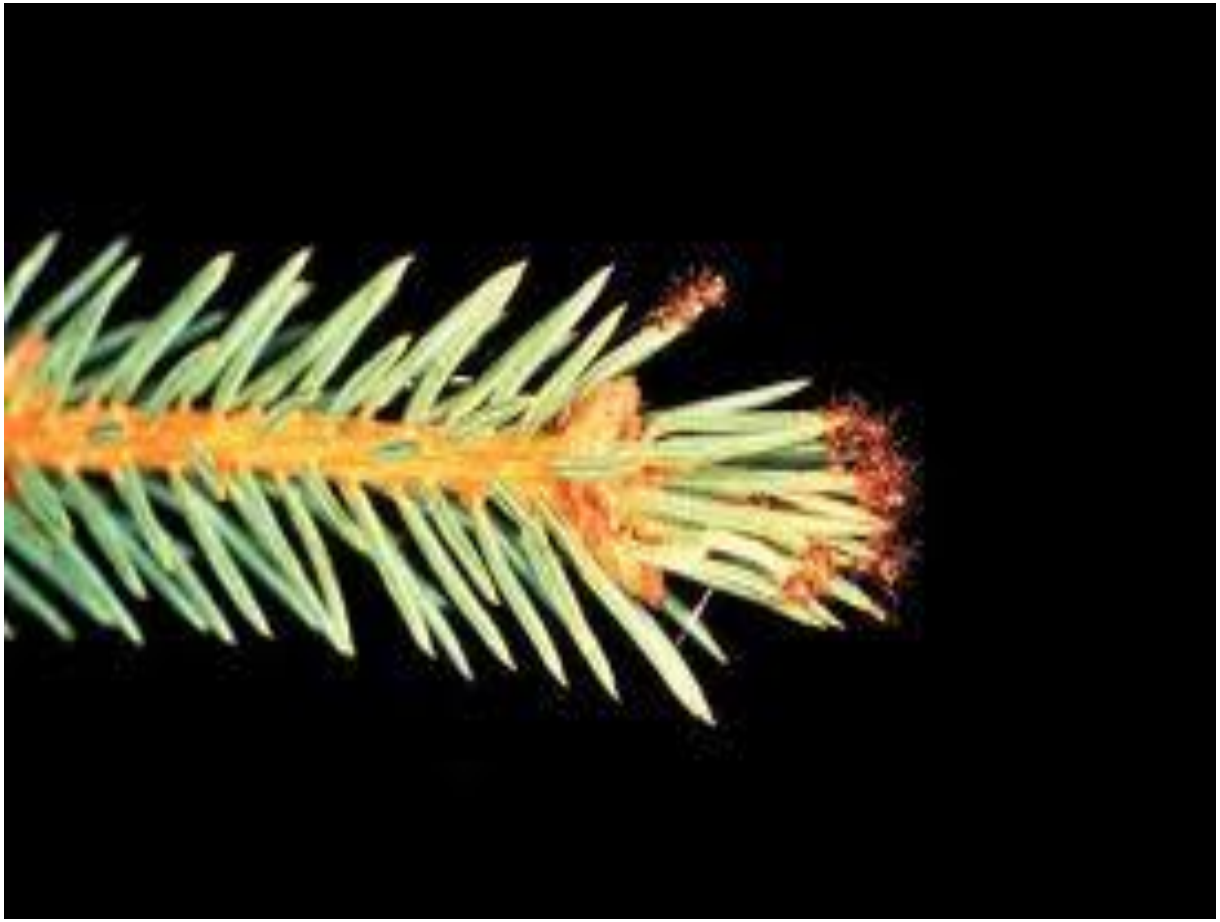
- Both ticks parasitize a wide range of hosts (mice, squirrels, skunks, raccoons, livestock, deer and humans)

- *D. albipictus* is a 1-host tick of large ungulates

Dermacentor albipictus (winter tick)

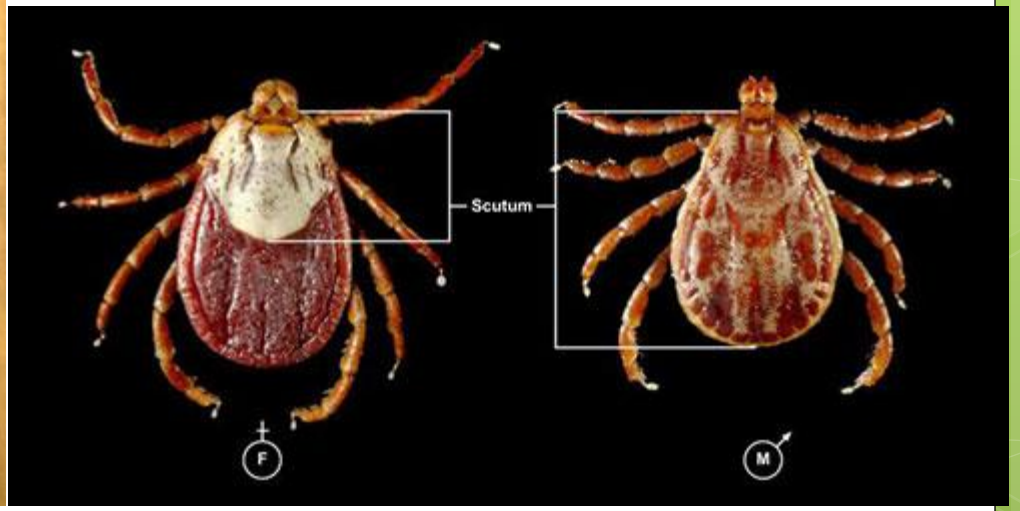
***Dermacentor albipictus* (Packard)**
[female, dorsal view]

CANADA, Alberta, Peace River, March 10, 2011
UASM#327980, U. of Alberta, Strickland Museum (image by S. Leo)

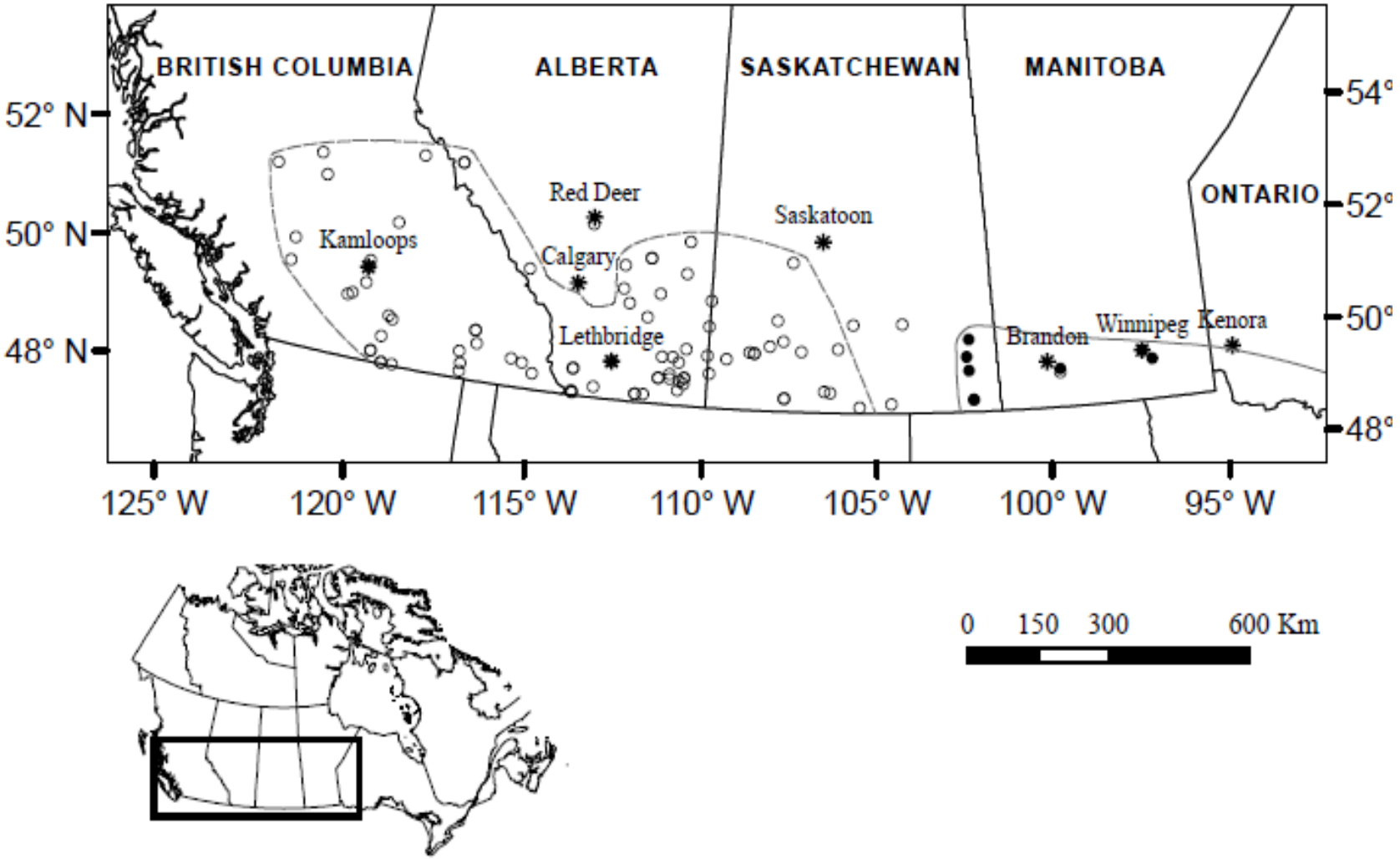


Black legged tick M/F (top)
American dog tick M/F (bottom)

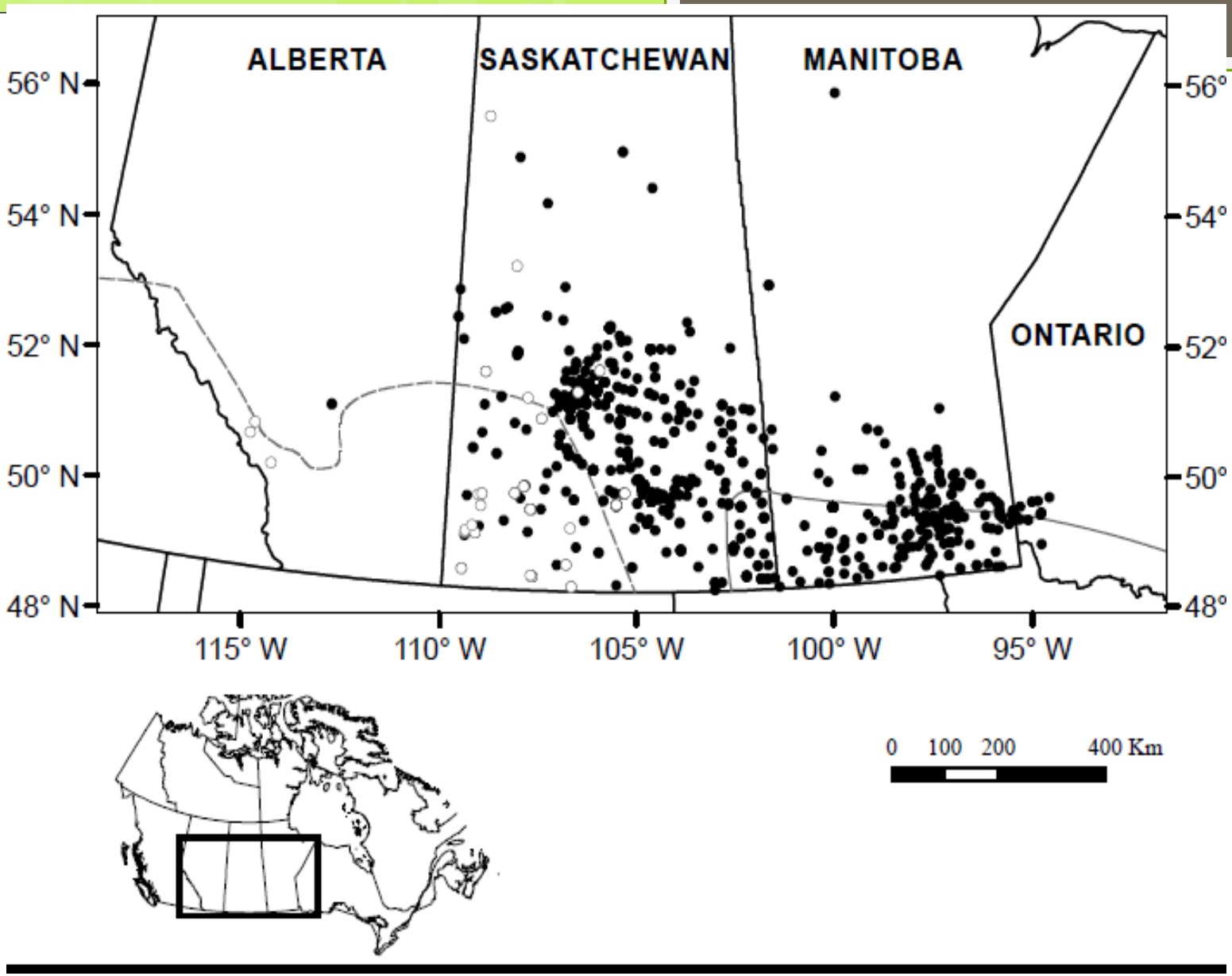
Rocky mountain wood tick F/M



Source: Public Health Agency of Canada and U.S. Centers for Disease Control



Source: Dergousoff et al. Range expansion of Dermacentor variabilis and Dermacentor andersoni near their northern distributional limits. 2013. J. Med. Entomology, vol. 50



Source: Dergousoff et al, 2013

Ticks have high vector potential

1) Persistent and slow feeders
2) Wide host range
3) Longevity
4) Frequent transovarial transmission
5) Relative freedom from natural enemies
6) Highly sclerotized/resistant to environmental stresses

Disorders associated with tick infestation

I. Dermatosis

II. Exsanguination

III. Otoacariasis

IV. Tick paralysis

V. Transmission of pathogens

Principal tick-borne diseases

Disease	Tick Vector
Lyme borreliosis	Blacklegged tick (BLT) & Western BLT (WBLT)
Anaplasmosis	
Rocky Mountain Spotted fever	American dog tick (ADT) & Rocky Mountain Wood tick (RMWT)
Relapsing fever	Soft tick, Ornithodoros
Powassan encephalitis	Groundhog tick
Colorado tick fever	RMWT

Other tick-borne diseases

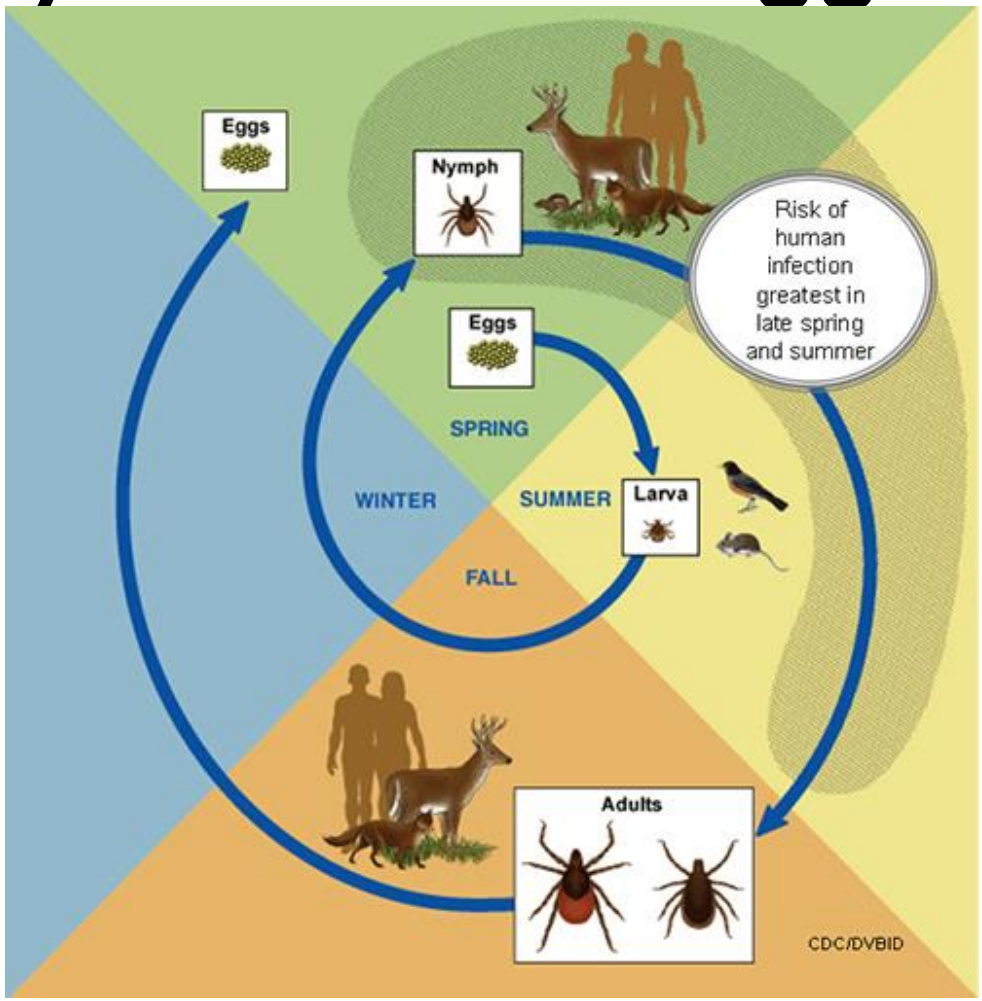
Other possible diseases	Tick Vector
Q fever	10 genera of hard & soft ticks
Tularemia	RMWT, ADT & rabbit ticks
Human granulocytic ehrlichiosis	BLT & WBLT
Babesiosis	BLT & WBLT?
Human monocytic ehrlichiosis	Lone Star tick & ADT
Bartonellosis (Cat scratch disease)	WBLT & BLT?

Blacklegged tick, *Ixodes scapularis*

Source: Public Health Agency of Canada

Source: Public Health Agency of Canada

Life Cycle of Black-legged Ticks

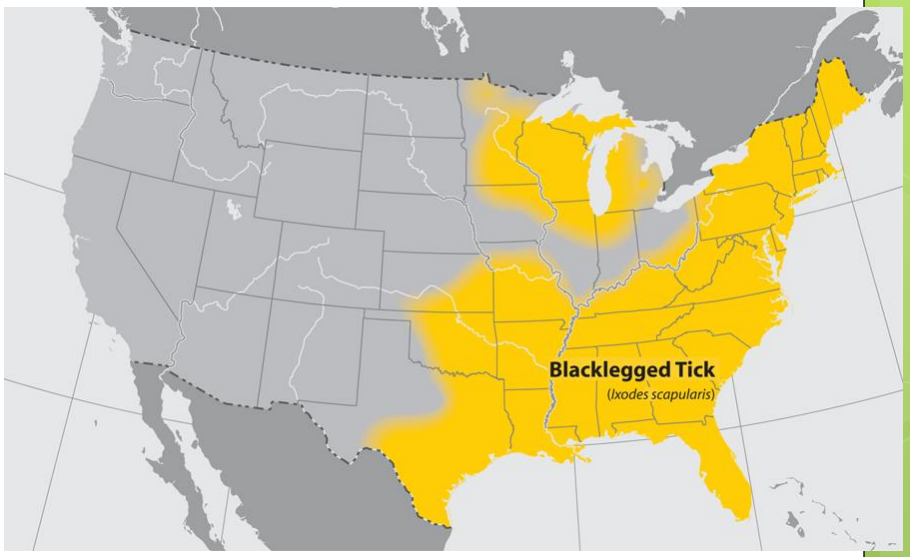


Source: Centers for Disease Control and Prevention. Life cycle of Hard Ticks that Spread Disease. Available at: http://www.cdc.gov/ticks/life_cycle_and_hosts.html

Implications for Human Health

- Black-legged ticks are not likely established in the province yet
- Hundreds of thousands (perhaps millions) of blacklegged ticks are potentially introduced into the province along the major flyways annually by migrating birds
- Approximately 13% of these "bird-borne" ticks carry the agent of Lyme disease so there is a low but persistent risk for domestic animals or humans to pick up the agents for Lyme disease or Anaplasmosis
- Risks can be 30X greater where blacklegged ticks are established. Infection rates can be quite high (>45%)

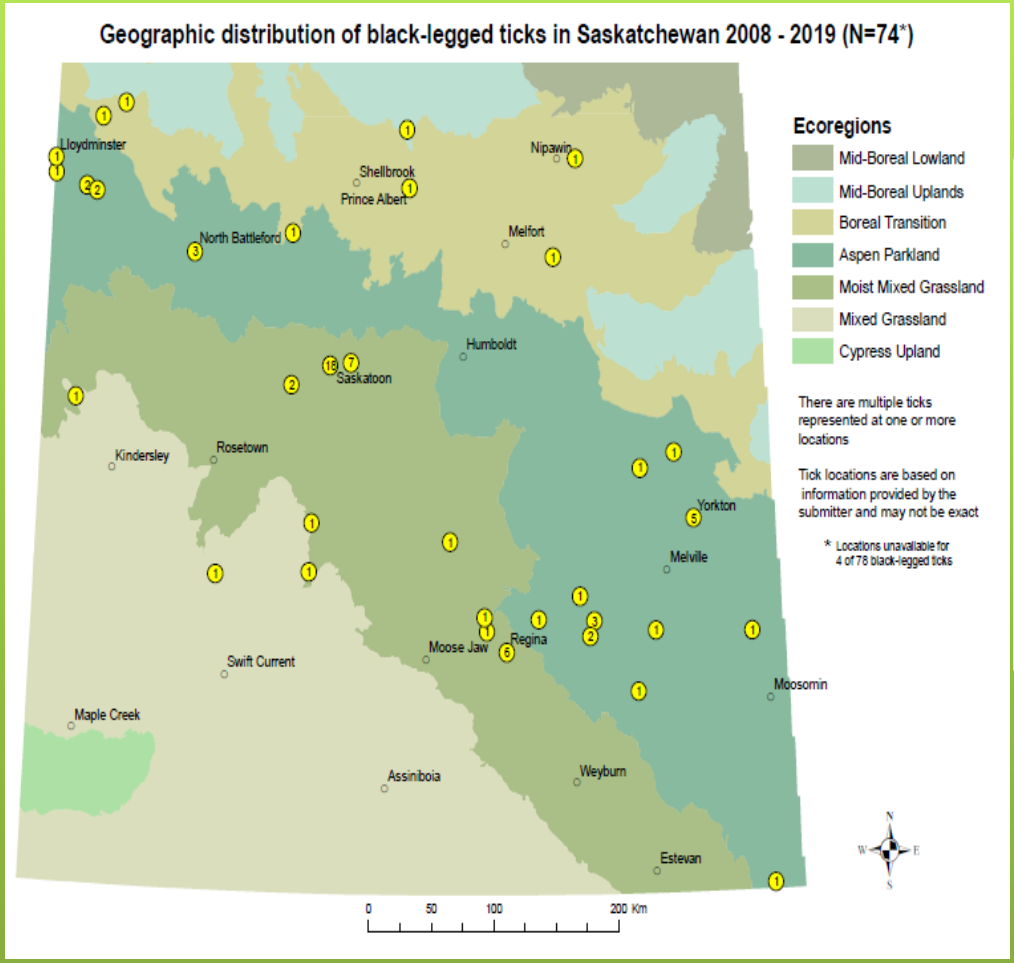
North American Bird Migration Flyways and Distribution of Black-legged Ticks, United States

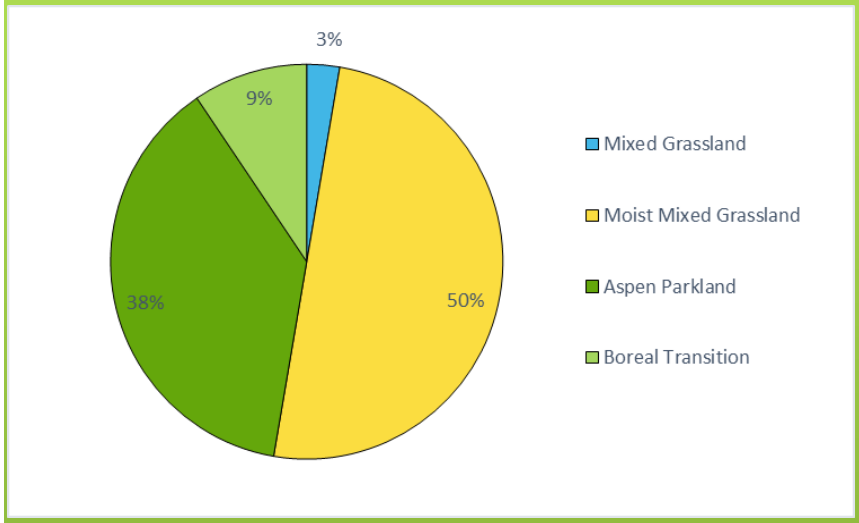


https://www.cdc.gov/ticks/geographic_distribution.html

Source: http://birding.about.com/od/birdingbasics/ss/North-America-Migration-Flyways.htm

Geographic distribution of black-legged ticks Saskatchewan 2008–2019 (N=74*)





* Geographic location unavailable for 4/78 black-legged ticks

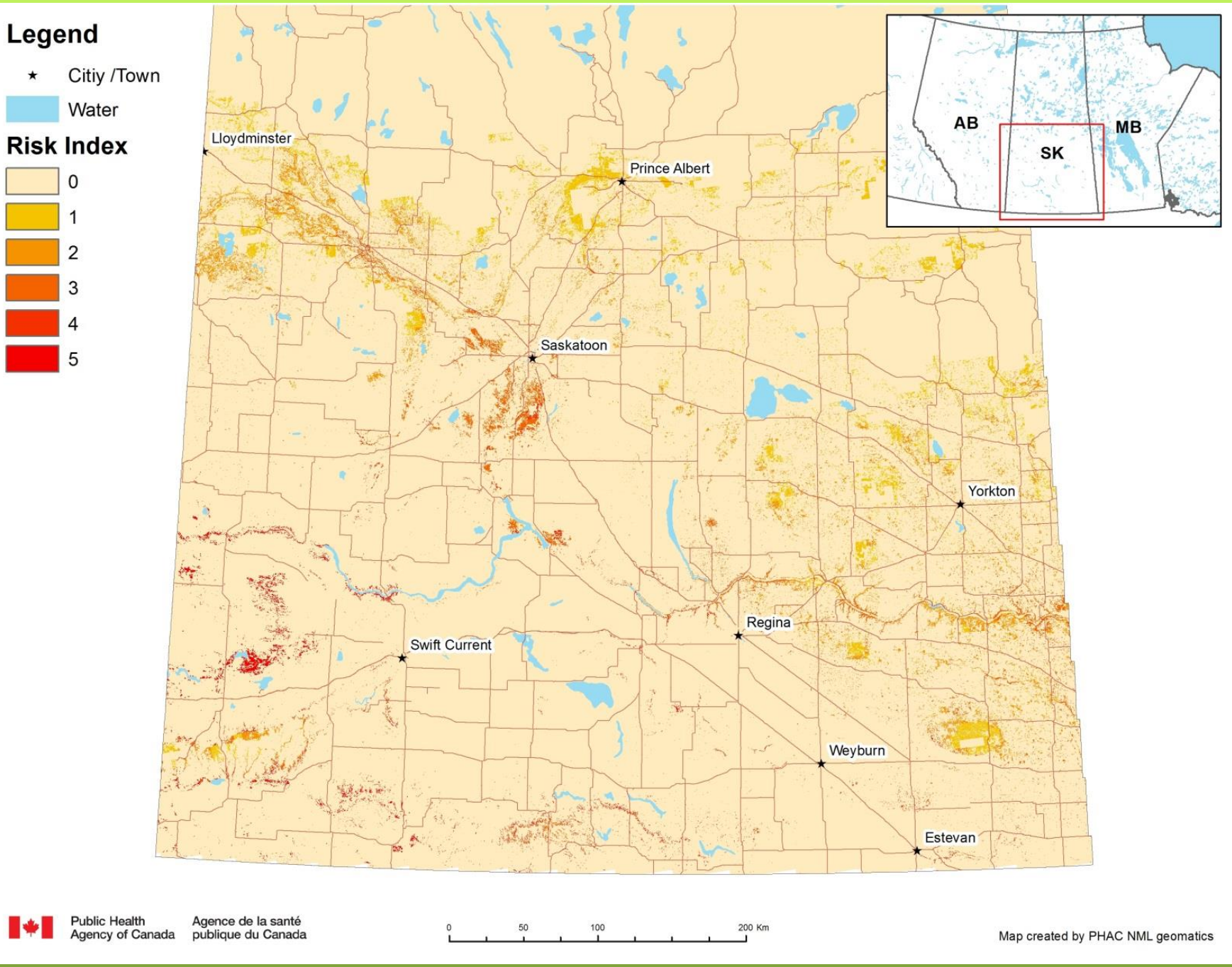
A continued presence and risk….

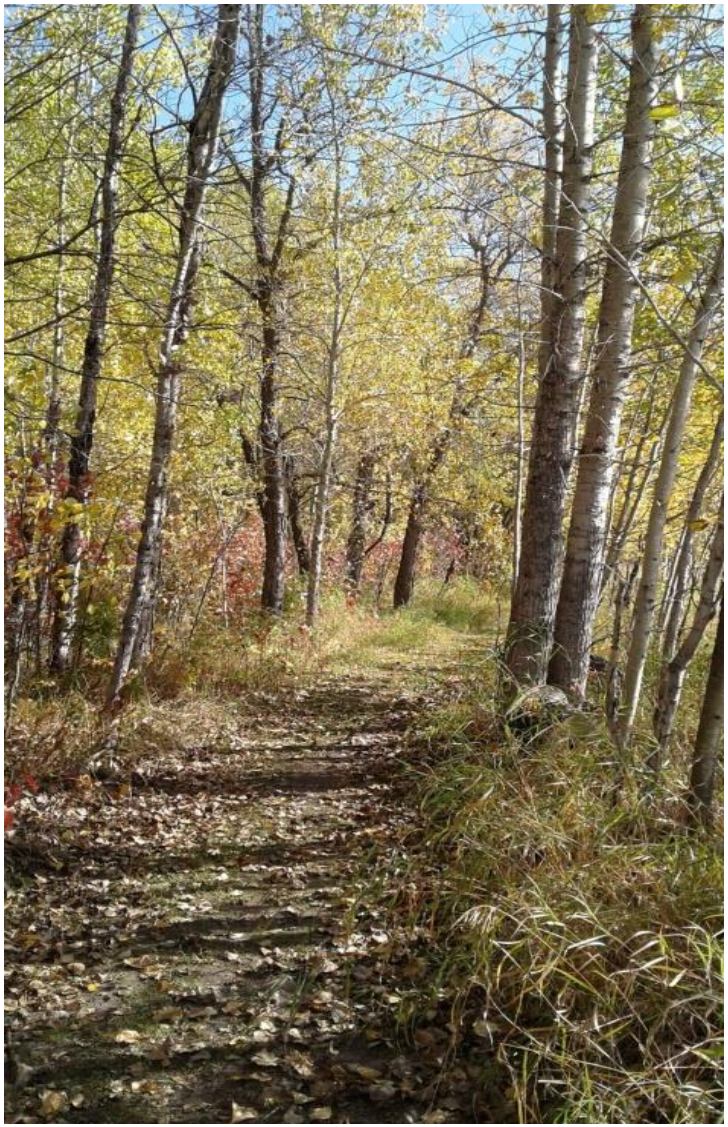
- 2018 – 6 blacklegged ticks – 2 positive
- 2019 - 7 BLTs – 0 positive
- 2020 – 11 BLTs – results pending

- Key message is that although blacklegged tick numbers are still relatively low, the risk of getting Lyme disease in Saskatchewan is low but not zero.

Climate and Habitat Suitability Mapping

- Joint project with Ministry of Health and Public Health Agency of Canada
- Variables such as temperature, relative humidity, woodland habitat and deer density to produce a risk map for the southern prairies.
- This work will guide tick surveillance efforts


Legend
Citiy /Town
Water
Risk Index
0
1
2
3
4
5
Lloydminster
Prince Albert
Saskatoon
Yorkton
Regina
Swift Current
Weyburn
Estevan
AB
SK
MB
Public Health Agency of Canada
Agence de la santé publique du Canada
0
50
100
200 Km
Map created by PHAC NML geomatics



Personal protective strategies

- Avoid tick-infested habitat, whenever
- possible
- Consider using DEET-based repellents on skin and clothing
- Check for and remove any attached ticks daily
- Launder and tumble-dry clothes (20 min. dry heat)
- Seek prompt medical attention for signs

& symptoms of Lyme or other diseases

Landscape Management

- Open up heavily shaded damp areas
- Higher risk areas are along rock walls, woodpiles or brush piles. Push back these areas by mulching borders and expanding edges.
- Fencing out deer or hay storage areas
- Keeping mice out by having more open areas in the lawn, along walls and borders to remove cover

- Mowed trail Logan Green Parkway - Yorkton

Landscape Management

- Pruning off lower branches of shrubs and trees
- Light mulches (1-2 in. deep) or bare soil around shrubbery will reduce habitat for mice and ticks
- Remove grasses clippings or direct discharge into shrubbery
- Clean up storage areas, woodpiles and junk piles
- Position bird feeders away from rodent habitat, clean up loose seed, reduce feeding in summer

Other Management Options

- Targeted acaricides (high use areas)
  - A number of products are registered for barrier/residual treatments
- Acaricide delivery systems for deer and rodents
- Deer exclusion fences
- Controlled burning

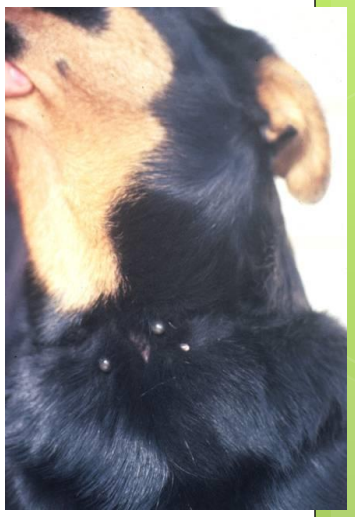
Acaricide options

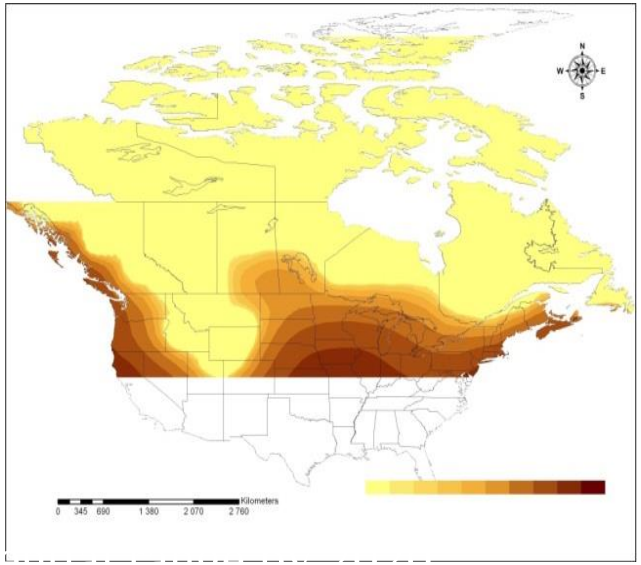
- A number of products are registered for tick control in Canada for barrier/residual treatments
- Typically applied around structures such as dog houses, kennels, sidewalks, pathways or patios where ticks are a problem.
  - Dragnet FT®, Poulins Super Strength II®, Doktor Doom Residual®, Prelude 240®, DeltaGard SC® ,among others are registered.
- Products containing pyrethrins, pyrethroids and synergists (i.e. piperonyl butoxide) are under review by PMRA. Their registrations and current uses are subject to change.


IMPORTANT!

Climate and Landscape Change

- Ticks and Lyme disease will continue to spread due to:
  - climate change (warmer temps, shorter winters)
  - landscape change (increasing shrub and woody growth=>higher humidity=>more favourable habitat)
  - Increased host numbers and movement (i.e. deer, migratory birds, dogs)





eTick

- You can now submit photographs of ticks to eTick(www.etick.ca) an image-based tick identification on-line platform.
- You will receive timely information about the type of tick that bit you (or your pets and livestock animals) and your risk of exposure to tick-borne diseases.
- For more information on ticks and Lyme disease, including how to submit a tick for identification visit: www.saskatchewan.ca/lyme or https://research-groups.usask.ca/ticks/#Passivesurveillance.

Acknowledgements:

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5 Saskatchewan Ministry of Health, Population Health Branch

6 Saskatchewan Health Authority , Regina Area