

Endnotes – credits, references, additional detail

[1] Photo, Poster and Chart Credits used for Hanover Biodiversity Deer Tick Webpage:

- Credit for map showing tick diseases in US: CDC
- Credit for deer tick on grass: CDC
- Credit for deer tick on thumb image: <http://parasitesandworms.com/deer-ticks-and-lyme-disease>
- Credit for chart comparing various ticks and sizes: CDC
- Credit for deer tick life cycle and seasonal activity: the CT Tick Management Handbook - see [5] below
- 'Protect Yourself' poster: www.LymeDiseaseGuide.org
- 'Target Deer Tick' poster: Westport/Weston (CT) Health District
- 'Please Don't Feed the Ticks' Deer Tick sign from www.BayPets.com
- Deer Mice: <http://www.onthespotpestcontrol.com/deer-mice/>
- Bird photo: Ecological Society of America <http://www.esa.org/esablog/research/> (Dec 16 2009)
- Red Fox and deer mouse: <http://animel-information.blogspot.com>
- Photo of White Tailed Deer: US Fish and Wildlife Service
- Lyme Disease spirochete: <http://www.wadsworth.org/databank/borrelia.htm>

[2] *Phylogeography of *Borrelia burgdorferi* in the eastern United States reflects multiple independent Lyme disease emergence events* (2009) AG Hoen, et al. Proc Natl Acad Sci U S A. 2009 September 1; 106(35): 15013–15018.

"We show that *B. burgdorferi* populations from the Northeast and Midwest are genetically distinct, but phylogenetically related. Our findings provide strong evidence of prehistoric population size expansion and east-to-west radiation of descendant clones from founding sequence types in the Northeast. Estimates of the time scale of divergence of northeastern and midwestern populations suggest that *B. burgdorferi* was present in these regions of North America many thousands of years before European settlements. We conclude that *B. burgdorferi* populations have recently reemerged independently out of separate relict foci, where they have persisted since precolonial times."

Website: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2727481/?report=classic>

[3] The Center for Disease Control collects Lyme Disease data. This disease is the most commonly reported vector-borne disease in the nation. See <http://www.cdc.gov/lyme/> for more information.

[4] On September 11, 2013, UNH entomologist Alan Eaton presented a program titled 'Ticked Off' held at the Howe Library and sponsored by the Hanover Conservation Commission.

[5] *Tick Management Handbook: An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease*. Bulletin 1010. (2007) Kirby Stafford, Chief Entomologist Connecticut Agricultural Experiment Station, New Haven. <http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>

[6] *Deer density and the abundance of *Ixodes scapularis* (Acari: Ixodidae)*. (2003) Rand PW, Lubelczyk C, Lavigne GR, Elias S, Holman MS, Lacombe EH, Smith RP Jr. *J Med Entomol*. 2003 Mar;40(2):179-84. Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/12693846>

[7] *Abundance of Ixodes scapularis (Acari: Ixodidae) after the complete removal of deer from an isolated offshore island, endemic for Lyme Disease.* (2004) Rand PW, Lubelczyk C, Holman MS, Lacombe EH, Smith RP Jr. *Source J Med Entomol.* 2004 Jul;41(4):779-84.

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/12693846>

[8] *Density of Ixodes scapularis ticks on Monhegan Island after complete deer removal: a question of avian importation?* (2011) Elias SP, Smith RP Jr, Morris SR, Rand PW, Lubelczyk C, Lacombe EH. *Source: J Vector Ecol.* 2011 Jun;36(1):11-23

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/12693846>

[9] *Managing Urban Deer in CT : A guide for Residents and Communities* (2007) outlines many possible measures to help reduce the density of a deer herd. Connecticut Bureau of Natural Resources / Wildlife

http://www.ct.gov/deep/lib/deep/wildlife/pdf_files/game/urbandeer07.pdf

[10]. *Case studies of successful community-managed deer control.* Fairfield County (CT) Deer Management Alliance (2008) <http://www.deeralliance.com/node/77>

[11] *Community-Based Deer Management* (2004) Daniel J. Decker, Daniela B. Raik, and William F. Siemer Cornell University.

<http://wildlifecontrol.info/pubs/Documents/Deer/DeerGuide.pdf>

[12] *Deer browse resistant exotic-invasive understory: an indicator of elevated human risk of exposure to Ixodes scapularis (Acari: Ixodidae) in southern coastal Maine woodlands.* (2009) Elias SP, Lubelczyk CB, Rand PW, Lacombe EH, Holman MS, Smith RP Jr. *Source: Environmental Entomology* 38(4):977-984. 2009

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/17162946>

This study of deer ticks in 438 sample plots, with 4 types of vegetative groundcover, found that woody invasive plants were associated with highest tick (both nymph and adult) counts, and had consistently higher tick counts than other types of ground cover such as native plants, grasses and ferns. Barberry was just one of the invasives grouped together, and there was no breakout for the various invasive plants in the understory. This habitat fosters increased deer mouse populations and a decrease in other small mammals.

[13] *Managing Japanese Barberry (Ranunculales: Berberidaceae) Infestations Reduces Blacklegged Tick (Acari: Ixodidae) Abundance and Infection Prevalence with Borrelia burgdorferi (Spirochaetales: Spirochaetaceae)* (2009) Scott C. Williams, Jeffrey S. Ward, Thomas E. Worthley, and Kirby C. Stafford *Source: Environmental Entomology* 38(4):977-984 Abstract: <http://www.bioone.org/doi/abs/10.1603/022.038.0404>

[14] *Japanese Barberry Control Methods Reference Guide for Foresters and Professional Woodland Managers* Special Bulletin – February 2013. JS Ward, SC Williams, TE Worthley of the CT Agricultural Experimental Station and the University of CT.

Article: <http://onlinelibrary.wiley.com/doi/10.1111/j.1708-8305.2007.00176.x/full>

[15] *Climate, Deer, Rodents, and Acorns as Determinants of Variation in Lyme-Disease Risk* RS. Ostfeld. CD Canham, K Oggenfuss, RJ Winchcombe, F Keesing. PLoS Biology June 2006 4: 1058-1068. to download:

http://www.caryinstitute.org/sites/default/files/public/reprints/Ostfeld_PLOS_2006.pdf

[16] *Are Deer the Culprit in Lyme Disease?* Room for Debate. NY Times July 29 2009. Discussion with Richard Ostfeld and Felicia Keesing.

http://roomfordebate.blogs.nytimes.com/2009/07/29/are-deer-the-culprit-in-lyme-disease/?_r=1

[17] *Effect of Forest Fragmentation on Lyme Disease Risk*, BF Allan, F Keesing, F. and RS Ostfeld, (2003), *Conservation Biology*, 17: 267–272.

Abstract : <http://onlinelibrary.wiley.com/doi/10.1046/j.1523-1739.2003.01260.x/abstract>

[18] *Effects of Climate on Variability in Lyme Disease Incidence in the Northeastern United States* (2003) Susan Subak *American Journal of Epidemiology* Vol. 157, No. 6

[19] *What Makes Ticks Tick? Climate Change, Ticks, and Tick-Borne Diseases* (2008) J Süss, C Klaus, FW Gerstengarbe, and PC Werner. *International Society of Travel Medicine*, 1195-1982 *Journal of Travel Medicine*, Volume 15, Issue 1, 2008, 39–45

[20] *Lyme Disease: The Ecology of a Complex System*. RS Ostfeld (2011) In several chapters of this text, sub-titled Embracing Complexity, Ostfield observes deer ticks almost always obtain the Lyme spirochete by feeding on deer mice, chipmunks or shrews. Other vertebrates are not good vectors for passing the disease. He also notes that reduced biodiversity is a major factor in the increase of ticks and associated Lyme Disease.

[21] Do birds affect Lyme disease risk? Range expansion of the vector-borne pathogen *Borrelia burgdorferi*. (2011) R Jory Brinkerhoff, Corrine M Folsom-O'Keefe, Kimberly Tsao, and Maria A Diuk-Wasser. *Frontiers in Ecology and the Environment* 9: 103–110.

<http://dx.doi.org/10.1890/090062>

Links used in the All About Lyme Disease Section

Clicking on the links in this section of this website should cause a separate website to pop up. In case that fails, here are the links listed in the order they appear in this section:

- Center for Disease Control and Prevention – Lyme Disease statistics
<http://www.cdc.gov/lyme/stats/index.html>
- The American Lyme Disease Foundation -- <http://www.aldf.com/>
- The Vermont Department of Health booklet --
http://healthvermont.gov/prevent/lyme/documents/ticks_are_out_booklet.pdf
- The New Hampshire Department of Health Lyme Disease factsheet:
<http://www.dhhs.nh.gov/dphs/cdcs/lyme/index.htm>
- The New Yorker story, *The Lyme Wars*
http://www.newyorker.com/reporting/2013/07/01/130701fa_fact_specter?currentPage=all
- Amazon summary of the Richard Ostfield book , *Lyme Disease: The Ecology of a Complex System*. <http://www.amazon.com/Lyme-Disease-Ecology-Complex-System/dp/0199928479>
- Amazon summary of Jonathan Edlow's book *Bull's Eye; Unravelling the Medical Mystery of Lyme Disease* <http://www.amazon.com/Bulls-Eye-Unraveling-Medical-Mystery/dp/0300103700>
- 'Ticked Off' program held in Hanover Sept 2013: <http://vimeo.com/75506523>
- UNH video on how to protect yourself from ticks: <http://extension.unh.edu/articles/Tick-Time>
- *Biology and Management of Deer Ticks in NH and Their Management*.
http://extension.unh.edu/resources/resource/528/Biology_and_Management_of_Ticks_in_New_Hampshire
- UNH report on tick repellants:
http://extension.unh.edu/resources/representation/Resource000963_Rep1073.pdf
- Connecticut's *Tick Management Handbook*:
<http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>

- David Mance *Tale of the Tick and How Lyme Disease is Spreading North*,
http://northernwoodlands.org/articles/article/tale_of_the_tick_how_lyme_disease_is_spreading_northward
- NY Times video on how a tick does its dirty work:
<http://www.nytimes.com/2013/10/30/science/earth/how-does-a-tick-do-its-dirty-work-research-video-offers-a-clue.html?src=me&ref=general>

Links Used in the *Why is Lyme Disease Increasing* Section

- Managing the Deer Herd in Connecticut:
http://www.ct.gov/deep/lib/deep/wildlife/pdf_files/game/urbandeer07.pdf
- Community Based Deer Management:
<http://wildlifecontrol.info/pubs/Documents/Deer/DeerGuide.pdf>
- Wildlife Harvest Summary for 2012 in New Hampshire:
http://www.wildlife.state.nh.us/Hunting/harvest_summary/Wildlife_Harvest_2012.pdf
- Vermont Invasives information about Japanese Barberry
<http://www.vtinvasives.org/invaders/japanese-barberry-0>