Three Ticks; Many Diseases

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Rutgers NJAES Cooperative Extension

- NJAES is NJ Agricultural Experiment Station
- Extension mission is to bring research based information to the public
  - Informal education such as publications or this lecture
- Cooperative Extension includes:
  - 4-H Youth Development
  - Marine—Commercial Fisheries and Aquaculture
  - Agriculture and Horticulture, Rutgers Master Gardeners
  - Natural Resources & Water Management
  - Family and Community Health Sciences
  - Nutrition education
  - Master Gardener Helpline 732-349-1245 9 – noon

http://ocean.njaes.rutgers.edu/
Tick Trivia

True or False?

- Ticks jump.  
  False

- The only disease ticks can transmit is Lyme.  
  False

- All ticks can transmit disease.  
  True

- Here at the Rutgers Cooperative Extension we test ticks.  
  False

- Best recommendation for tick removal is to use Vaseline.  
  False

- Rocky Mountain Spotted Fever can be contracted in NJ.  
  True
Outline

• Part 1 - AboutTicks

• Part 2 - Ticks in NJ

• Part 3 - Tick-borne Diseases
About Ticks

• **What purpose do ticks serve?**
  – They are a food source for birds, reptiles and amphibians: especially, wild turkeys, western fence lizards and Guinea fowl.

• **Why do they ‘bite’?**
  – They need blood to molt into their different stages and to reproduce.
What do ticks do?

- Climb/ crawl - don’t fall out of trees, jump or fly
- Feed off host animals and humans
- Questing
Unfed adult hard ticks, based on a species of Ixodes. Illustration by: Scott Charlesworth, Purdue University
Tick Anatomy

Mouthparts- ticks do not have a head.

Shield
Body(abdomen)
Am. Dog Tick
Life Stages and Cycles of Ticks

Four Stages

Egg, larva, nymph and adult

- **Larva** feeds on a host, drops off to the ground, and molts into a nymph.

- **Nymph** seeks out and feeds on a second host, drops off to the ground, and molts to an adult.
Four Stages

Egg, larva, nymph and adult

- Male and female **adults** seek out a third host, feed, mate, and drop off to the ground.

- Males die soon thereafter, while females eventually lay **eggs** on the soil. Egg laying may last several days to a few weeks. 1,500-5,000 eggs

**Life cycle** can take up to two years to complete
(a) The tick, *Ixodes scapularis*, has a two-year life cycle in which it requires three blood meals. The tick is infected by its first blood meal, and can pass on the infection to a human in its second.
Tick Stages

Blacklegged Tick (Ixodes scapularis)
- Adult female
- Adult male
- Nymph
- Larva

Lone Star Tick (Amblyomma americanum)

American Dog Tick (Dermacentor variabilis)
What ticks need for survival:

- Moisture, humidity
- Shady areas
- Edges of woods with vegetation and leaf litter
  - Not usually in middle of open areas
- Areas where deer and mice live
- Black-legged Ticks can be active when ground temperatures are above 45°F and air temperatures above freezing
- A host
- Brown Dog Ticks can live indoors
Tick Habitat and Control

Tick tubes contain tick-killing permethrin treated cotton that mice like to steal for their nests.

TickSmart Action!
Click on red dots for advice on how to Get TickSmart and help stay TickSafe in your yard all year long!

Overgrown shrubs
Paths
Leaf litter
Deer
Ornamental plantings
Woodsy areas
Stone wall
Perimeter
Shed
Bird feeder
Wood pile
Pets
Clothing

TickSmart™ Backyard Breakdown
(Adapted from The Boston Globe • A minuscule foe, a massive public health challenge)
By Beth Daley | Globe Staff July 14, 2013 | IMAGE CREDIT: David Butler/Globe Staff
SOURCE: TickEncounter Resource Center

http://www.tickencounter.org/prevention/identify_and_eliminate_tick_habitat
Tick Bite Prevention

• Be extra precautious in May, June and July
• Wear light-colored clothing with long pants tucked into socks
• Use DEET, picaridin or other tick repellent
• Treat clothing with the permethrin-based clothing tick repellents
• Keep to the center of trails to minimize contact with adjacent vegetation.
• Inspect the entire body carefully and remove any attached ticks
• Pets can bring ticks into the home
Tick Repellents/ Outdoor Sprays

Follow all label instructions
Any product mentioned is not an endorsement or efficacy

**Repellents** - on skin
- DEET
- Picaridin
- IR3535
- Oil of Lemon Eucalyptus
- Permethrin - treatment on clothing only

**IF necessary and after harboring habitats are corrected**

**Outdoor Perimeter sprays** - limited efficacy
- Permethrin
- Bifenthrin
- Cyfluthrin
- Deltamethrin - only licensed applicator

Tick Removal

Do not use:

– Matches
– Grease
– Vaseline
– Alcohol
– Your fingers

Why?

Can cause tick to regurgitate

Do use:

Needle-nosed Tweezer or tick removing device
Proper Tick Removal

Using Tweezers- grasp close to skin

Pull tick slowly up and away from the skin

Hypostome
Barbs

Tweezers
Proper Tick Removal

Using Tick Key

1. Place the hole in the key over the tick. Stamped side up.

2. Slide the tapered slot toward the tick.

3. Pull key away from skin. Tick is removed easily.
What to do with tick now?

Tick ID
• Bring to Agricultural Center in a sealed container: baggie or clean medicine bottle, with moist paper towel
• Don’t place on tape or store in alcohol

Tick Testing
• Client mails tick out to lab- Note: just because tick is positive for disease does not mean disease transmission occurred.
• Also, if it tests negative, and you experience flu like symptoms, consult your physician! You may have been bitten by different tick.
Questions?

Part 2: Ticks in NJ
Ticks in New Jersey

- There are three main tick species in NJ that impact humans
  - American Dog Tick (*Dermacentor variabilis*)
  - Lone Star Tick (*Amblyomma americanum*)
  - Black-legged Tick (Deer tick) (*Ixodes scapularis*)

A fourth species
- Brown Dog Tick (*Rhipicephalus sanguincus*) (usually more on pets)
Tick Distribution Maps

American Dog Tick

Lone Star Tick

Brown Dog Tick

Blacklegged Tick

https://www.cdc.gov/ticks/geographic_distribution.html
Tick Distribution Map

The Point?

We have them all!

Tick Presence by Species

- Brown Dog Tick
- Brown Dog Tick and American Dog Tick
- Brown Dog Tick and Deer Tick
- Brown Dog Tick, American Dog Tick, and Deer Tick
- Brown Dog Tick, American Dog Tick, Deer Tick, and Lone Star Tick
Types of Ticks

American Dog Tick - *Dermacentor variabilis*

In our Tick Lab, we don’t ever see larva or nymph stages of Am. Dog Ticks

http://www.tickencounter.org/tick_identification/tick_species
Types of Ticks

American Dog Tick

Engorged female laying eggs
Types of Ticks
Lone Star Tick - *Amblyomma americanum*

http://www.tickencounter.org/tick_identification/tick_species
Types of Ticks

Black-legged Tick- (Deer Tick)

_Ixodes scapularis_

http://www.tickencounter.org/tick_identification/tick_species
Types of Ticks

Black-legged Tick

Female Adults engorged

Female

Male
Types of Ticks

Brown Dog Tick - *Rhipicephalus sanguineus*

[Larva](#), [Nymph](#), [Adult Male](#), [Adult Female](#)

http://www.tickencounter.org/tick_identification/tick_species
Types of Ticks

NEW  Longhorned Tick

• **November 2017** Found on farm in Hunterdon County
• **Spring 2018** Found ticks had overwintered on farm
• **April 24, 2018** Confirmed found in Union County Watchung Reservation
• **May 15, 2018** Confirmed found in Middlesex County at Rutgers Cook Campus on May 10th’s Tick Blitz
• **May 16, 2018** Confirmed in Virginia on livestock
Longhorned Tick cont..

• Usually only on livestock and animals
• So far, all found ticks tested have been negative for diseases
• Why concerned? It could vector diseases already here but could also introduce Spotted Fever found in Asia

• Unusual ticks detected in livestock animals, contact the state veterinarian at (609) 671-6400.

• Unusual ticks detected in wildlife should be immediately reported to the New Jersey Division of Fish and Wildlife, Bureau of Wildlife Management at (908) 637-4173 ext. 120.
Questions?

Part 3: Tick-borne Diseases and Statistics
Engorged?
What does the term engorged mean?

A tick feeds and fills (engorges) with blood (Females and nymphs only)

Importance- disease-causing organisms may be expelled during feeding.

Disease transmission depends on how long tick has been feeding.

Exceptions:
Meat allergy- can be transmitted through insertion on mouthparts
Engorged

Not engorged

Longhorned Ticks on sheep’s ear
Tick-borne Diseases

- Lyme disease
- Babesiosis
- Anaplasmosis (HGA)
- Ehrlichiosis
- Rocky Mountain Spotted Fever (RMSF)
- Tularemia
- Powassan Virus (POW)

Non-disease
- Tick Paralysis
- Meat Allergy
At the Rutgers Cooperative Extension, we are not medical personnel.

Consult your physician
Tick-borne Diseases

American Dog Tick
Rocky Mountain Spotted Fever
Tularemia
Tick paralysis

Blacklegged Tick
(Deer Tick)
Lyme Disease
Anaplasmosis
Babesiosis
Powassan (POW)

Lone Star Tick
Ehrlichiosis
Tularemia
Meat allergy (Alpha-gal)
STARI
Heartland Virus
## Tick-borne Disease Transmission

<table>
<thead>
<tr>
<th>Disease</th>
<th>Species</th>
<th>Stage that Can Transmit Diseases to People</th>
<th>Minimum Feeding Time for Disease Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaplasmosis</td>
<td>Blacklegged Tick</td>
<td>Nymph &amp; Adult</td>
<td>24 hours</td>
</tr>
<tr>
<td>Babesiosis</td>
<td>Blacklegged Tick</td>
<td>Nymph &amp; Adult</td>
<td>36 hours</td>
</tr>
<tr>
<td>Ehrlichiosis</td>
<td>Lone Star Tick</td>
<td>Nymph &amp; Adult</td>
<td>24 hours</td>
</tr>
<tr>
<td>Lyme Disease</td>
<td>Blacklegged Tick</td>
<td>Nymph &amp; Adult</td>
<td>36 hours</td>
</tr>
<tr>
<td>Rocky Mountain Spotted Fever</td>
<td>American Dog Tick</td>
<td>Adult Only</td>
<td>10-20 hours</td>
</tr>
<tr>
<td>Tularemia</td>
<td>Lone Star Tick</td>
<td>Nymph &amp; Adult</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>American Dog Tick</td>
<td>Adult Only</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Tick-borne Diseases

Black-legged Tick

Lyme Disease
-2015 in NJ 4,855 cases reported, 290 in Ocean County
-2016 in NJ 4,350 cases reported, 274 in Ocean County, 492 in Monmouth

Babesiosis
-2015- 297 cases in NJ, 19 in Ocean County, 46 in Monmouth
-2016- 174 cases in NJ, 25 in Ocean County, 24 in Monmouth

Anaplasmosis
-2015 in NJ 125 reported cases, 7 in Ocean County, 4 in Monmouth
-2016 in NJ 109 reported cases, 6 in Ocean County, 10 in Monmouth

Powassan Virus
-2015 in NJ 1 case reported, not in Ocean County
-2016 in NJ no cases reported

Lone Star Tick

Ehrlichiosis (HME)
-2015 in NJ 61 reported cases, 9 in Ocean County, 6 in Monmouth Co.
-2016 in NJ 75 reported cases, 13 in Ocean County, 6 in Monmouth Co.

Tularemia (Rabbit Fever)
-2015 in NJ 1 case reported, not in Ocean County
-2016 in NJ 5 cases reported, not in Ocean County, 1 in Monmouth Co.

Meat Allergy (Alpha-gal syndrome)

Meat Allergy- Alpha-gal

A map showing self-reported cases of Alpha-Gal syndrome or Mammalian Meat Allergy across the US as of November 2017. (Screenshot via ZeeMaps)
Other Tick Issues

American Dog Tick

Rocky Mountain Spotted Fever (RMSF)
- 2015 in NJ 63 cases reported, 9 in Ocean County, 8 in Monmouth Co.
- 2016 in NJ 64 cases reported, 11 in Ocean County, 6 in Monmouth Co.

Tularemia (Rabbit Fever)
- 2015 in NJ 1 case reported, not in Ocean County
- 2016 in NJ 5 cases reported, not in Ocean County, 1 in Monmouth Co.

Tick Paralysis

Rutgers Master Gardeners’ Tick Stats

Tick Counts 2011 to 2017

Jan  5  13  9  2  2  11  12
Feb  6  13  4  5  0  6  22
Mar  33  57  9  7  6  42  38
Apr  128 131 107 115 133 130 271
May  118 383 321 369 373 305 574
Jun  445 407 445 448 404 579 600
Jul  138 145 147 151 134 131 270
Aug  98 107 70 62 65 89 442
Sep  100 57 26 23 66 58 1402
Oct  52 20 26 25 25 18 15
Nov  104 20 26 25 18 35 33
Dec  28 29 22 25 42 10 14

08-One Resident Brought in 249 Ticks
09-One Resident Brought in 1371 Ticks
2017 Tick Count Breaking all Records
Sources

ticks:
- www.tickencounter.org
- www.cdc.gov

Tick disease information:
- www.extension.entm.purdue.edu/publichealth/insects/tick.html
- www.state.nj.us/health/cd/reportable_disease_stats.shtml
- www.steadyhealth.com
- www.ncbi.nlm.nih.gov/pmc/articles/PMC4313755/
- www.cdc.gov