

# TICK MANAGEMENT OPTIONS

There are several options for tick reduction and the tactics used depend on local factors. Currently, there is ongoing research into management programs that use a combination of strategies, called Integrated Tick Management. The below information focuses on current practices and research for the North Central and North Eastern regions of the United States. Always follow label directions for all pesticide products.

TREATMENT	BEST USE	TARGET AND GUIDELINES	COST
Spray application: Pyrethroids (bifenthrin, cyfluthrin, pyrethrin, permethrin); Met52 ( <i>Metarhizium            anisopliae</i> ); EcoVia (plant oils)	The most effective way to reduce blacklegged (deer) ticks in a yard is by insecticide applications to the perimeter, shady perennial beds or along trails and paths in woods. Treatment is usually <b>NOT</b> needed on open/sunny lawns.	Target: Kills ticks that are not attached <ul style="list-style-type: none"> <li>Based on limited research and practitioner experience, one spray with a pyrethroid in early spring may be effective. It may be helpful to add one fall treatment in the first year, timed to coincide with the emergence of adult-stage ticks.</li> <li>Pyrethroid products should <b>NOT</b> be applied near standing water, rivers or streams.</li> <li>Apply acaricides with high pressure close to the ground.</li> <li>Protect pollinators by avoiding spraying flowers and applying early or later in the day when pollinators are less active.</li> <li>Do not apply when raining or within a few hours of rain.</li> </ul> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5788731/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5788731/</a> <a href="http://www.tickcounter.org/prevention/perimeter_spray">http://www.tickcounter.org/prevention/perimeter_spray</a>	Spray applications can be the most effective and least expensive management option. Cost of application will vary depending on the material sprayed, the professional service provider and the region.
ThermoCell® Tick Control Tubes or Damminix® Tick Tubes (permethrin)	Kills ticks feeding on mice, the primary source of the most common infections (Babesiosis, Anaplasmosis, Lyme, Powassan virus) for immature blacklegged ticks.	Target: Kills ticks attached to nest-building small rodents (mainly mice) <ul style="list-style-type: none"> <li>Tick Control Tubes contain cotton material treated with permethrin. Mice collect this material for their nests and rub the insecticide on their fur. Ticks die when exposed to permethrin-treated rodents.</li> <li>Apply tubes twice a year, ideally in April and July prior to immature black-legged tick emergence. Place tubes every ten yards in places mice frequent such as flowerbeds, bushes, woodpiles, stone walls and sheds. Replace tubes when empty.</li> <li>If a tube hasn't been touched, move to an area where mice have already removed cotton.</li> <li>Tick tubes don't treat chipmunks, which are important disease reservoirs in some regions of the United States.</li> <li><b>Permethrin is not labeled for homeowner construction of tick tubes and it is illegal to use the product in this manner.</b></li> </ul> <a href="https://tickcounter.org/prevention/mouse_targeted_devices">https://tickcounter.org/prevention/mouse_targeted_devices</a> <a href="http://www.ticktubes.com/">http://www.ticktubes.com/</a> <a href="https://www.thermacell.com/products/tick-control-tubes">https://www.thermacell.com/products/tick-control-tubes</a>	A typical 1/4-acre yard (assuming half the area is taken up by the house footprint and lawn) will require 6 tick tubes twice a year. A 12 pack of Tick Control Tubes costs approximately \$45.

TREATMENT	BEST USE	TARGET AND GUIDELINES	COST
Tick Box® Tick Control System (fipronil)	The Tick Box® Tick Control System should be set out mid-spring through early-fall. An additional Tick Box® Tick Control System should be set out in late summer. Units attract rodents and apply fipronil for 75-90 days, after which each unit should be replaced.	<p>Target: Kills ticks attached to small rodents</p> <ul style="list-style-type: none"> <li>• Tick Box® Tick Control Systems are placed in areas of the property inhabited by white-footed mice and chipmunks.</li> <li>• Rodents are generally most abundant in woodlots and along the edge of natural vegetation where it meets maintained lawn. Boxes are placed a minimum of 30 feet apart near the edge of maintained landscaping and woodlots and/or brush.</li> <li>• For woodlots that extend farther than 40 feet, an additional row of units should be considered for maximum control. The second row should be placed 30-40 feet from the first set of boxes.</li> <li>• Stone walls, brush piles, boulders, stumps, fallen logs and outbuildings provide excellent harborage for rodents. These structures should be considered into the pattern of application.</li> </ul> <p><a href="http://www.tickboxtcs.com/">http://www.tickboxtcs.com/</a></p>	Prices vary on property size and number of boxes. A certified installer will need to do an estimate. Placement pattern averages 10 boxes per 1/2 to 1 acre, however total # of units will vary depending on lot size and amount of natural vegetation.
4-Poster Deer Self-Treatment Device	Area-wide/neighborhood scale	<p>Target: Kills ticks attached to deer via acaricide rollers at the bait station</p> <ul style="list-style-type: none"> <li>• Single device use is unlikely to be effective. Not recommended for use within 100 yards of any home, apartment, play ground or other area where children may be present without adult supervision.</li> <li>• <b>The 4-Poster Deer Self-Treatment Device includes using bait for deer, which is illegal or requires a permit in some areas of the United States. This method should only be used after verification with local and regional governing bodies.</b></li> </ul> <p><a href="http://www.tickcounter.org/research/area_wide">http://www.tickcounter.org/research/area_wide</a>  <a href="https://www.cdc.gov/climateandhealth/docs/4PosterTickBorneDisease.pdf">https://www.cdc.gov/climateandhealth/docs/4PosterTickBorneDisease.pdf</a></p>	One station (4-poster device, corn, 10% permethrin, applicator rollers, labor) costs ~\$2350. Twenty bait stations were used to cover Fairfax County, Virginia, costing \$47,030.
U.S. Biologic, Inc. Orally Delivered Lyme Vaccine pellets distributed to wildlife (in USDA approval process)	Distributed by hand or via a LymeShield station (a small one-foot diameter) time-release application device refilled quarterly to provide year-long coverage.	<p>Target: The white-footed mouse (primary Lyme disease reservoir)</p> <ul style="list-style-type: none"> <li>• According to a study published in the Journal of Infectious Diseases, the vaccine pellet technology reduced the prevalence of infected ticks by 76% in field conditions (<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4038139/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4038139/</a>)</li> <li>• The authors concluded that the “Implementation of such a long-term public health measure could substantially reduce the risk of human exposure to Lyme disease.”</li> <li>• This vaccine pellet approach can be used on its own or as part of an Integrated Tick Management program including targeted vector-reduction techniques such as those employed by pest-management professionals.</li> </ul> <p><a href="http://usbiologic.com/lyme-disease/">http://usbiologic.com/lyme-disease/</a></p>	A cost efficient intervention for private and public land ( <b>pending regulatory approval</b> ). One LymeShield station per ½ acre, refilled quarterly, provides year-long coverage.

## OTHER TICKSMART PRACTICES TO ENCOURAGE HOMEOWNERS

<p>Landscape Modifications</p>	<p>Trimming shrubs and low branches and removing leaves reduces tick conducive conditions in your yard. Pay special attention to frequented border areas, wood piles, stone walls and sheds. Borders of wood chips, stone or other landscaping materials serve as a visual reminder where higher-risk areas are in the yard.  <a href="http://www.tickencounter.org/prevention/identify_and_eliminate_tick_habitat">http://www.tickencounter.org/prevention/identify_and_eliminate_tick_habitat</a></p>
<p>Avoid Attracting Wildlife</p>	<p>Ticks are carried by deer and become infected mainly by feeding on mice. Keep deer out by planting deer resistant plants, installing a deer fence, or by applying deer repellents. Mice like to live in stone walls, around sheds, woodpiles or any enclosed area they can get into. Clean up brush, keep stone walls clear of leaves and move woodpiles away from daily activity. Birdfeeders also attract deer and rodents that may deposit ticks on your property.  <a href="http://www.tickencounter.org/prevention/dont_attract_wildlife">http://www.tickencounter.org/prevention/dont_attract_wildlife</a></p>
<p>Use Tick Repellents</p>	<p>The EPA and CDC list DEET, picaridin, IR3535, oil of lemon eucalyptus, and 2-undecanone as effective tick-repellants. DEET can be applied directly to the skin. The United States Environmental Protection Agency (EPA) completed an extensive evaluation of DEET and concluded that “as long as consumers follow label directions and take proper precautions, insect repellants containing DEET do not present a health concern.” (<a href="http://www.epa.gov/opp00001/factsheets/chemicals/deet.ht">http://www.epa.gov/opp00001/factsheets/chemicals/deet.ht</a>). Use insect repellants that contain at least 20-50% DEET (N,N-diethyl-m-toluamide) on exposed skin. The efficacy of DEET tends to plateau at a concentration around 50% (Zielenski-Gutierrez et al., 2012). Always follow the manufacturer’s instructions on the label. DEET is only a repellent and does not provide 100% protection against tick bites. The EPA has also concluded that picaridin can be safely used on human skin or clothing to repel ticks.</p>
<p>Wear Treated Clothing</p>	<p>Wearing tick repellent treated clothing is the best, and easiest, way to prevent tick bites while outdoors. Outdoor worker clothing, gardening pants, hiking socks and even lucky golf shorts can all be professionally treated with permethrin, an invisible, odorless, EPA registered, tick repellent that remains effective through 70 washes.  <a href="https://tickencounter.org/prevention/insect_shield_your_own_clothes">https://tickencounter.org/prevention/insect_shield_your_own_clothes</a>  <a href="https://tickencounter.org/prevention/tick_repellent_clothing">https://tickencounter.org/prevention/tick_repellent_clothing</a>  <a href="https://tickencounter.org/PDF/Permethrin_FactSheet_TERC.pdf">https://tickencounter.org/PDF/Permethrin_FactSheet_TERC.pdf</a></p>
<p>Daily Tick Checks</p>	<p>The simplest way to protect yourself is to remove a tick before it has a chance to transmit disease-causing pathogens. While ticks can attach anywhere, they frequently end up attaching in places where skin folds or clothing restrict their movement, such as the back of your knee, around waistbands, underwear, under armpits or any other clothing-constricted place. Whenever you have been in a tick habitat you should thoroughly check your entire body and remove attached ticks immediately. Be aware and help raise awareness of how to do regular tick checks.  <a href="http://tickencounter.org/prevention/protect_yourself">http://tickencounter.org/prevention/protect_yourself</a></p>
<p>Use TickSpotters</p>	<p>TickSpotters is one of the nation's leading, free, crowd-sourced tick survey that serves as public health service, offering free identification of ticks from pictured along with a disease risk assessment based on type of tick, estimated duration of feeding and tick encounter location. Each customized response also describes best next actions to take and links to appropriate resources.  <a href="http://tickencounter.org/tickspotters/submit_form">http://tickencounter.org/tickspotters/submit_form</a></p>

## OTHER TICKSMART PRACTICES TO ENCOURAGE HOMEOWNERS

Shower

Bathing and showering are protective measures and can remove lingering ticks. Once attached, ticks **DO NOT** wash off in the shower. While undressed, bath and shower time is also a convenient time to perform a daily tick check.

## ADDITIONAL RESOURCES AND CITATIONS

<https://www.ncipmc.org/action/alerts/ticks.pdf>: National tick pest alert sponsored by the North Central IPM Center with information on tick life cycles, disease symptoms and prevention, tick removal and geographic distribution.

<http://tickencounter.org/>: University of Rhode Island tick resource center promoting tick-bite protection and tickborne disease prevention by engaging, educating and empowering people to take action.

<https://www.cdc.gov/lyme/prev/natural-repellents.html>: Center for Disease Control descriptions of natural products that come from plants or fungi and repel or kill ticks.

[www.mainelyticks.com](http://www.mainelyticks.com): Provides education resources and on-site tick control visits targeting high-traffic, high-priority areas of the property.

Eisen, L., and Dolan, M. C. 2016. Evidence for personal protective measures to reduce human contact with blacklegged ticks and for environmentally based control methods to suppress host-seeking blacklegged ticks and reduce infection with Lyme disease spirochetes in tick vectors and rodent reservoirs. *Journal of Medical Entomology*, 53(5), 1063-1092. doi:10.1093/jme/tjw103

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## SPONSORS

This fact sheet was prepared by the Public Tick IPM Working Group. The goal of the Public Tick IPM Working Group is to organize and expand the network working to reduce the risk of exposure to infected ticks by collaborating on Integrated Pest Management (IPM) related activities, exchanging knowledge and sharing resources effectively.

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