



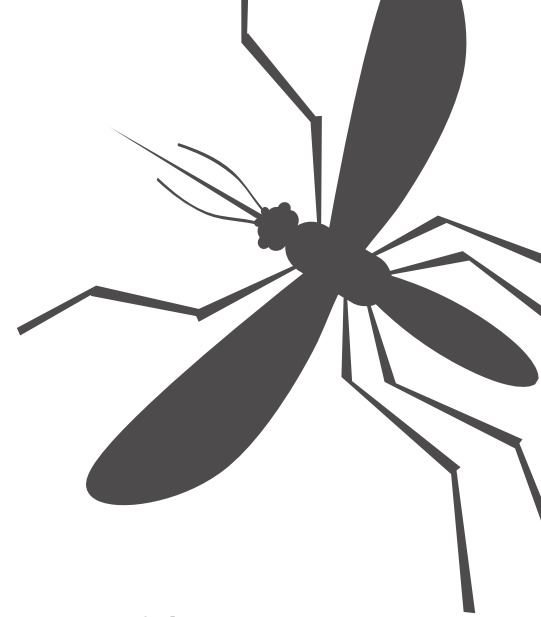
The Complete Guide to Controlling

Mosquitoes & Ticks

in Commercial Real Estate

ebook  by Modern Pest Services





If you own or manage property where there are outside common areas such as courtyards, pools, patios, walkways, playgrounds, fire pits, etc., it is important to understand the benefits of controlling **mosquitoes** and **ticks**. These are not simply “nuisance” pests. **Mosquitoes** and **ticks** are vectors for disease, and your customers will take notice if you have a plan that works to reduce and eliminate them. In this guide, we will explore the threats these pests present, habitat control and elimination, bite prevention, community education, and what to expect from a professional pest control program.



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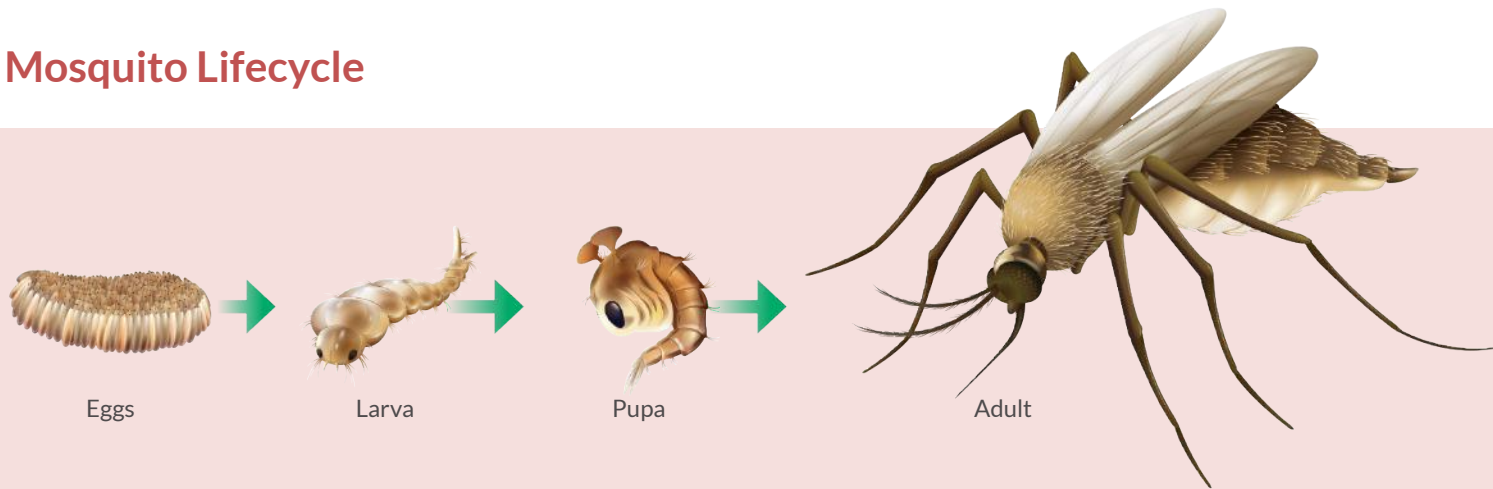
| Understanding the Mosquito Threat

The Mosquito Life Cycle



Mosquitoes have four stages of development: egg, larva, pupa, and adult.

Mosquito Lifecycle



When male mosquitoes hatch, they usually don't travel very far and only live about a week. Consequently, males do not feed on blood but will feed on nectar during their short lifespan.

When female mosquitoes hatch, they often breed quickly, but do not stay near the breeding location. In her 5 to 6-week lifecycle, a female mosquito will fly in search of blood meals, laying hundreds of eggs during her travels.

It is estimated that some mosquitoes will travel as far as 10 miles from their birth sites. This is not the case for *Aedes* mosquitoes, which are considered prime vectors for the spread of human pathogens. *Aedes aegypti* and *Aedes albopictus* only travel a few hundreds yards. For this reason, mosquito control services have a significant impact on the spread of mosquito-borne viruses.

Arboviruses

Aedes mosquitoes spread several arboviruses. An arbovirus is a group of viruses that are transmitted by arthropods. In the United States, the most noteworthy arboviruses are West Nile virus, yellow fever, dengue, and several forms of encephalitis.

Where Mosquitoes Breed in Commercial Settings



Stormwater Runoff Drains



Grates



Landscaping



Retention Ponds



Near Pools



Gutters



Playground Equipment



Courtyards & Gardens



Standing Water

What You Can Do About Mosquitoes



Eliminate sources of standing water that allow mosquitoes to breed. Clear gutters, fix leaky spigots, remove objects in pool areas that capture rainwater, alter playground equipment to prevent rainwater accumulation, and implement similar strategies to reduce stagnant water.



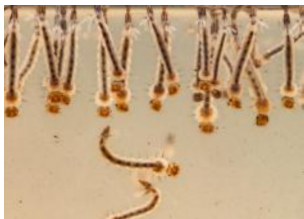
Circulate water in ornamental ponds or introduce fish to prevent mosquito breeding.



Introduce bioretention areas to absorb high water areas and reduce runoff. Knowing which plants to use in these areas is vital for mosquito resistance. The Landscaping Guidance for Stormwater BMPs (best management practices) is a valuable resource to learn more about the best management practices for stormwater bioretention basins.



When properly managed, bats and birds can be essential to effective mosquito control.



Place mosquito dunks in areas of standing water. This will introduce BTI, a naturally-occurring bacterium that is toxic only to the larvae of the mosquito, blackfly and fungus gnat.



Some plants repel mosquitoes. Consider adding the following plants to your landscape: citronella grass, lemon balm, lavender, floss flowers, peppermint, marigolds, catnip, basil, sage, rosemary, citrosum, and scented geraniums.

Community Education and Partnerships



Involving neighboring communities and educating residents on the importance of identifying and eliminating rainwater collection can have a significant and lasting effect on nearby mosquito populations. Consequently, when routinely managed, initiatives such as these can help to reduce the continuum of harmful diseases contracted through the bite of infected mosquitoes.

Providing useful information on mosquito bite prevention and general protective measures that can reduce one's exposure to arboviruses from infected mosquitoes is equally—if not critically—important to the health and safety of your residents.



*Follow product recommendations for safe usage.

Mosquito repellent is the frontline defense against mosquito bites. Use an EPA-approved repellent that contains DEET, Picaridin, IR3535, oil of lemon eucalyptus, or 2-undecanone.*



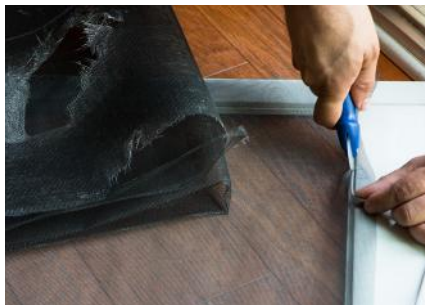
Treat clothing items with permethrin. Do not use permethrin products directly on the skin.



Wear a long-sleeved shirt and pants to reduce exposed skin.



Cover strollers with mosquito netting.



Keep window and door screens in good repair.



Keep interior areas air conditioned or use fans to keep mosquitoes off.



Reduce mosquito breeding sites by eliminating sources of still water on your property.

Community Education and Partnerships -Continued



Partnering with neighboring communities for community-wide clean up campaigns can help with the control of mosquito breeding sites. Implement the following to reduce mosquito populations:



Rake leaves and expose ground so soil can dry and address any areas of compacted ground that promote flooding.



Change conditions to prevent the capture of rainwater by poking a drainage hole in a tire swing, adjusting tarps to allow water to run off, or turning kiddie pools over when not being used by children.



Catalog locations of stagnant water that cannot be altered, such as ditches, logs, tree roots, ponds, bird baths, etc. These should be addressed by a professional.



Remove objects that hold rainwater, such as plant pots, beverage containers, tarps, toys, etc. Make sure trash can lids are not upside down.



Make sure all gutter systems are in good repair, free of obstructions, and include downspout extensions to channel rainwater away from the property—if possible directly into a storm drain.



Repair leaky spigots or hoses.

How A Qualified Pest Control Professional Can Help



A professional mosquito control program incorporates community education, mosquito surveillance, and mosquito control. This service is referred to as Integrated Vector Control. You can expect the following from a pest management professional:

- Routine inspections and consultations.
- Assistance addressing mosquito breeding sites and harborage areas.
- Routine spray treatments to control adult mosquitoes where they rest during the day.
- The application of biological larvicides in problem areas that promote mosquito production.
- Assistance with educational efforts.





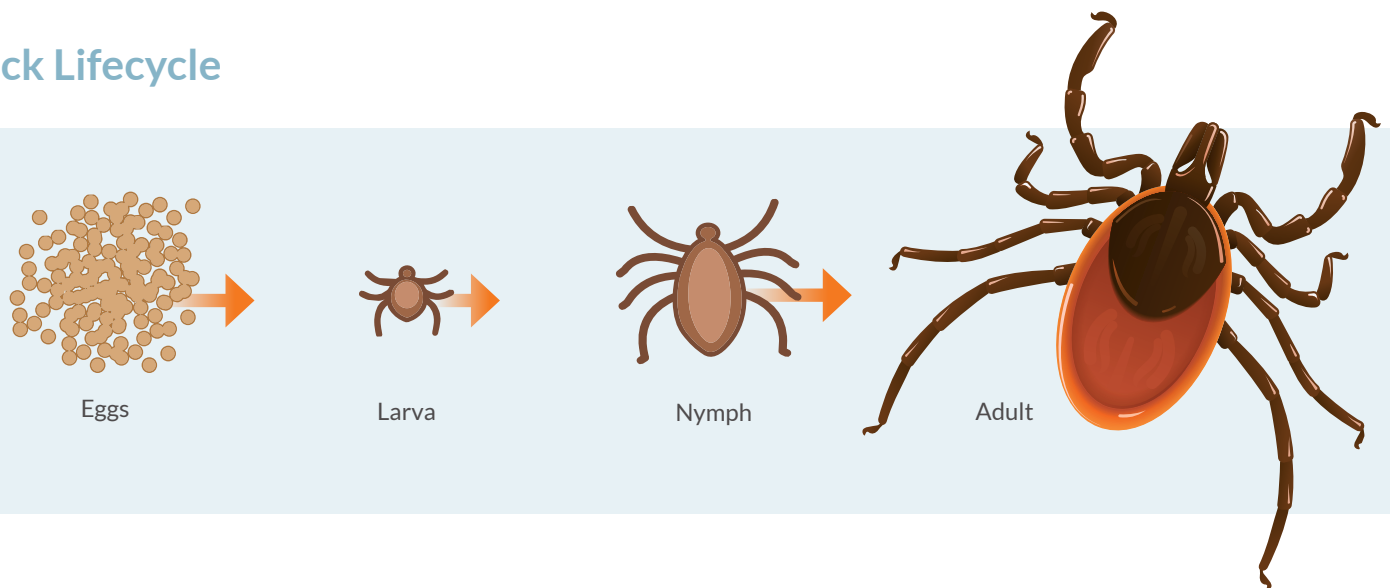
| Understanding the Tick Threat

Common Tick Species



The kind of ticks you can expect to see in New England are the American dog tick, black-legged tick (deer tick), lone star tick, and brown dog tick. All of these ticks pass through four stages of development: egg, larva (six-legged), nymph (eight-legged), and adult. Of these tick species, black-legged ticks present the greatest threat for their ability to transmit Lyme disease, and brown dog ticks present the greatest infestation concern for their ability to complete their entire lifecycle indoors.

Tick Lifecycle



Examples



American Dog Tick



Black-legged Tick
(Deer Tick)



Lone Star Tick



Brown Dog Tick

Tick-borne Diseases

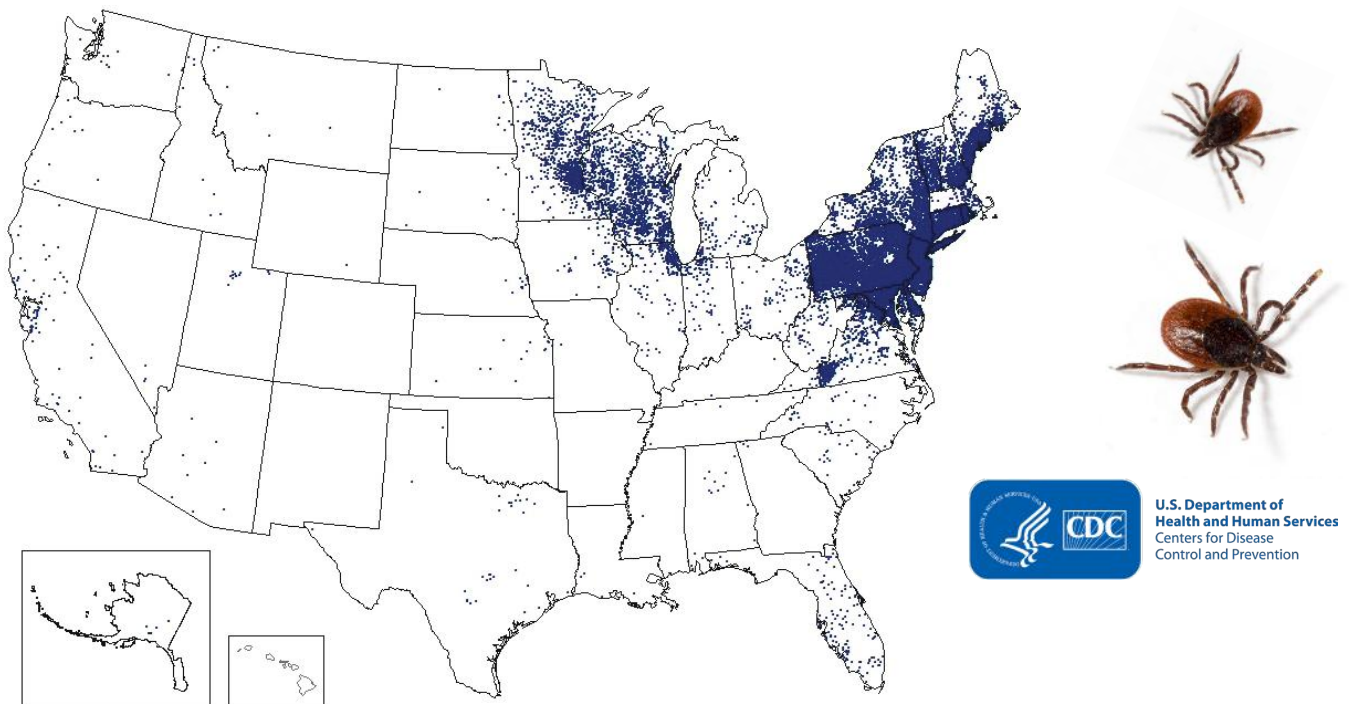


The Centers for Disease Control and Prevention link ticks to the following diseases: anaplasmosis, babesiosis, borrelia mayonii, borrelia miyamotoi, bourbon virus, Colorado tick fever, ehrlichiosis, heartland virus, Lyme disease, Powassan disease, rickettsia parkeri rickettsiosis, Rocky Mountain spotted fever (RMSF), Southern tick-associated rash illness (STARI), tick-borne relapsing fever (TBRF), tularemia, and 364D rickettsiosis.

The prevalence of Lyme disease continues its rise along the eastern seaboard, with New England states being hit the hardest.

Reported Cases of Lyme Disease–United States, 2016

Each dot represents one case of Lyme disease and is placed randomly in the patient's county of residence. The presence of a dot in a state does not necessarily mean that Lyme disease was acquired in that state. People travel between states, and the place of residence is sometimes different from the place where the patient became infected.



The Rodent Connection



Effective control of ticks requires competent control of rodent pressures. A single white-footed mouse can have as many as a hundred ticks in its fur. Rodents bring ticks onto the grounds and into man-made structures.

Non-native rodent species—including the Norway rat, the roof rat and the house mouse—are pests when they infest commercial properties, threaten public health, and destroy property.

What you can do:

- Identify resource sites (food, water, and shelter) conducive to rodent infestation, including: dumpsters, sewers, drainage creeks, outdoor storage, pet elimination areas, bird feeders and overgrown vegetation. When inspecting sites for potential rodent entry points, look for rub marks, droppings, tracks, gnawing or burrows.
- Maintain a clean, 2-foot-wide vegetation-free area around building foundations and concrete slabs to discourage rodents from burrowing as well as reduce access to food and harborage. Install a strip of 1-inch-diameter (or larger) gravel laid in a band at least 2 feet wide and 1/2 foot deep.
- Seal off entry points into buildings by addressing structural defects. Doors should fit snugly—the distance between the bottom of the door and the threshold should not exceed 1/4th inch. In some instances, it is recommended to build up the threshold rather than altering the door.
- Use only metal window screening materials where windows or doors are accessible to rodents.
- Both rats and mice use drainage pipes or sewage systems as routes to enter buildings. Equip floor drains with metal grates held firmly in place. Grate openings should not exceed 1/4th inch.



Lyme Disease Facts



- Black-legged (deer) ticks are the primary vector for Lyme disease.
- Detection is key. Removing a tick early can prevent Lyme disease. It takes 24 to 48 hours for the Lyme disease-causing bacterium to transfer from tick to human.
- Identification is key. Lyme disease is curable if caught early.
- Transmission of Lyme disease is associated with a bullseye rash but this rash is not always present.
- Lyme disease patients are most likely to have illness onset in June, July, or August and less likely to have illness onset from December through March².



Bullseye rash from a deer tick

Early symptoms of Lyme disease

- Fever
- Chills
- Fatigue
- Joint and muscle aches
- Headache
- Swollen lymph nodes

Symptoms of chronic Lyme disease (can appear days to months after a tick bite)

- Severe headaches accompanied by a stiffness in the neck
- Facial palsy
- Joint pain and swelling
- Rashes on the body
- Pain in tendons, joints, muscles, and bones
- Irregular heartbeat or palpitations
- Inflammation in the brain and spinal cord
- Dizziness
- Nerve pain
- Short-term memory issues
- Shortness of breath
- Numbness, tingling, or pain in hands or feet

Community Education



Knowledge plays a key role in the prevention of tick-borne diseases, especially in urban areas where there is a greater risk due to three factors: a lack of knowledge of disease risk, an improper perception of susceptibility to tick-borne diseases, and a lack of tick bite prevention behaviors (Bayles et al 2013). Increasing awareness of the threat, and educating communities on prevention methods can have a major impact.

Tick Bite Prevention

- Avoid areas of tall grass and brush where ticks may be questing.
- Ticks don't drop from trees or jump on us. They have to climb up. Wearing light colored clothing can help in detecting them when they do.
- Ticks can climb up under pant legs and shirts. Tucking these items in will make it harder for ticks to get to your skin.
- Mosquito repellent works to repel ticks. Spray it on your feet and legs.
- Pet owners have a higher risk of tick bites. If you have pets, make sure they have veterinarian-prescribed tick prevention products.



Controlling and Eliminating Tick Habitats



There is a growing trend toward the development of greener cities. Establishing or preserving spaces where trees and other vegetation can flourish in urban and peri-urban areas has many benefits, but greener communities also promote the spread of ticks and the wildlife that carry them. This has led to an increase in tick populations found in urban centers. Applying the following will help counteract increasing tick and wildlife pressures:

Applying the following will help counteract increasing tick and wildlife pressures:



Reduce areas of dense undergrowth or weeds, keep lawns, trees and shrubs trimmed, and remove leaf litter. This will allow sunlight into locations that become moist after it rains. Ticks don't like dry spaces and this will help to reduce the humidity they need to survive.



Remove clutter that ticks can hide in or under from lawns, terraces, courtyards, and play areas.



Establish a 3-foot barrier of gravel or wood chips along the furthestmost boundaries of your properties. This will help to prevent ticks from migrating from wooded areas.



Make sure all exterior trash is in sealed containers and construct barriers to discourage wildlife from coming near to man-made structures and leaving ticks around foundation perimeters.

Controlling and Eliminating Tick Habitats -Continued



Use fencing to protect gardens, berry bushes, fruit trees, and other sources of food or consider different plants that won't attract deer and other wildlife. This will help to resist wildlife pressures and reduce tick populations.



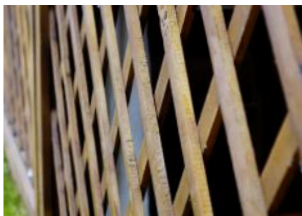
Remove overhanging vegetation to reduce contact between questing ticks and passers-by.



Remove conditions that allow the capture of rainwater such as an overturned trash can lid. These provide a drink for animals.



Keep bird feeders away from man-made structures. Furry animals are not the only creatures that can bring ticks onto your property.



Protect shaded locations under decks, porches, and other structures that can provide harborage for wild animals and shade for ticks.

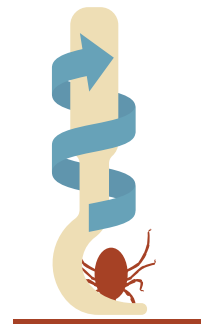
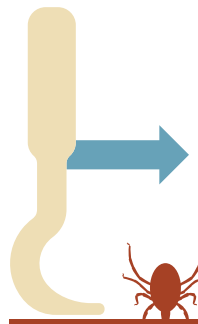


Repair leaky spigots, hoses and make sure gutters are not broken or obstructed to reduce areas of moisture.

How To Remove A Tick



Ticks attach themselves to human hosts to feed. While not every tick is carrying the bacterium that causes Lyme disease, knowing how to quickly and properly remove a tick is your defense against infection and potentially transferring disease pathogens into your body.



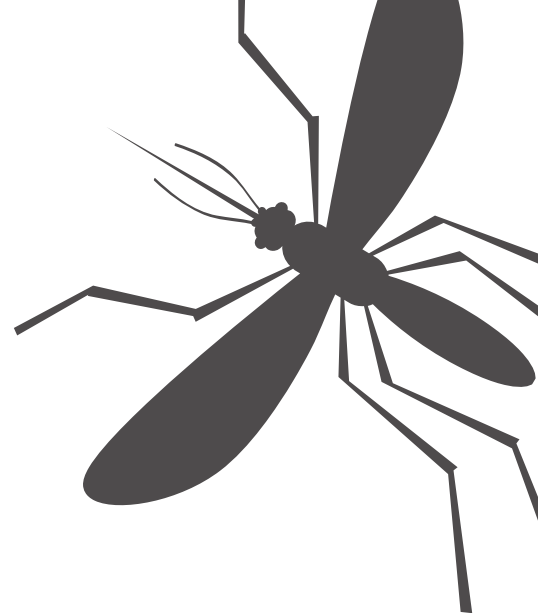
How A Qualified Pest Control Professional Can Help



A professional tick control program takes into consideration the habits and habitats of ticks and the wildlife that carry them; particularly mice and rats. You can expect the following from a pest management professional:

- Routine inspections and consultation.
- Routine spray treatments around the perimeter of structures and boundary areas to eliminate ticks in all stages of development.
- Monitoring and trapping of rodents around the exterior.
- Assistance addressing attractants and entry points.
- Assistance with educational efforts.





WANT TO MAKE YOUR COMMERCIAL PROPERTY MORE APPEALING?

Invest in a professional Mosquito
and Tick Control Program



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1 National Notifiable Infectious Diseases and Conditions: United States. TABLE 2i. Reported cases of notifiable diseases, by region and reporting area - United States and U.S. territories, 2016
<https://stacks.cdc.gov/view/cdc/49385>

2 Confirmed Lyme disease Cases by Month of Disease Onset—United States, 2001-2016 <https://www.cdc.gov/lyme/stats/graphs.html>

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