the infection and pass it on. This accounts for the much higher adult tick infection rates in the Eastern U.S.

In the East Bay Area, the dusky-footed woodrat is one of several small mammals that is infected with Lyme disease bacteria. Woodrats have their own specialized tick that feeds on them and spreads the disease among them. The western black-legged tick only occasionally "dips" into this reservoir of disease by feeding on woodrats. Woodrats play an important role in the ecology of our oak woodlands. Removing them to manage the Lyme disease bacteria would have ecological consequences for owls, snakes, other predators, and the many smaller animals that live in the nests with the woodrats. Woodrat waste is thought to be an important source of natural fertilizer in the forest! And, since the western fence lizard serves as a "sink" and reduces infection rates of adult ticks, woodrats can be tolerated here even though they harbor the Lyme disease bacteria.

Woodrat photo: CalPhotos ©2016 John G. H. Cant

A woodrat stick nest.

Precautions

Removal
If bitten, prompt removal of the tick is important, as is early treatment with antibiotics if symptoms develop. An embedded tick should be removed with forceps or fingers (protected with some tissue or gloves). Slow steady pulling straight back will detach a tick; then scrape a bit to remove any mouthparts left behind. Clean the wound with soap and water.

Walking
A much greater number of ticks occur at the margins of a trail than just a few yards beyond. Walk in the center of trails and be careful to avoid contact with uphill edges.

Leaf Litter
The riskiest habitat for hikers is leaf litter, where most nymphs are active, especially on warm days.

Timing
Early to mid-morning and late afternoon are the most dangerous times for hikers. Noon to mid-afternoon in winter months is safest for hikers. Most human cases of Lyme disease occur in spring and summer, when nymphal ticks are active.

When Hiking
- Do a tick check every hour on the trail. Be sure to check scalp, behind ears, arms, and legs.
- Light-colored clothing makes finding ticks easier.
- Tuck shirt into pants and pants into socks.
- Apply repellent to clothing or skin. Common repellents with DEET can be used, but be sure to follow instruction label on repellent carefully.

Remember: The risk of exposure to a Lyme disease-infected tick along our Regional Park trails is low. Regularly check yourself to remove those ticks that do get on you.

Be sure to check your dog for ticks as well.

East Bay Regional Park District

Healthy Parks Healthy People

2950 Peralta Oaks Court, Oakland, CA 94605
1-888-EBPARKS or 1-888-327-2757 *(TRS 711)*
ebparks.org

Visitor Centers

Ardenwood Historic Farm, Fremont
510-544-2797, awvisit@ebparks.org

Big Break Regional Shoreline, Oakley
Big Break Visitor Center at the Delta
510-544-3050, bigbreakvisit@ebparks.org

Black Diamond Mines Regional Preserve, Antioch
510-544-2750, bdvisit@ebparks.org

Coyote Hills Regional Park, Fremont
510-544-3220, chvisit@ebparks.org

Crown Memorial State Beach, Alameda
Crab Cove Visitor Center and Aquarium
510-544-3187, ccove@ebparks.org

Del Valle Regional Park, Livermore
510-544-3146, svisit@ebparks.org

Garin/Dry Creek Pioneer Regional Parks, Hayward
510-544-3220 *(Coyote Hills)*, chvisit@ebparks.org
Open summer weekends

Sunol-Ohlone Regional Wilderness, Sunol
510-544-3249, svisit@ebparks.org
Open weekends only

Tilden Regional Park, Berkeley
Botanic Garden: 510-544-3169, bgarden@ebparks.org
Tilden Nature Area/Environmental Education Center
510-544-2233, tnarea@ebparks.org

***On the cover:** A western black-legged tick waits on a grass blade, legs outstretched, to grab a passing host.*
Photo: shutterstock

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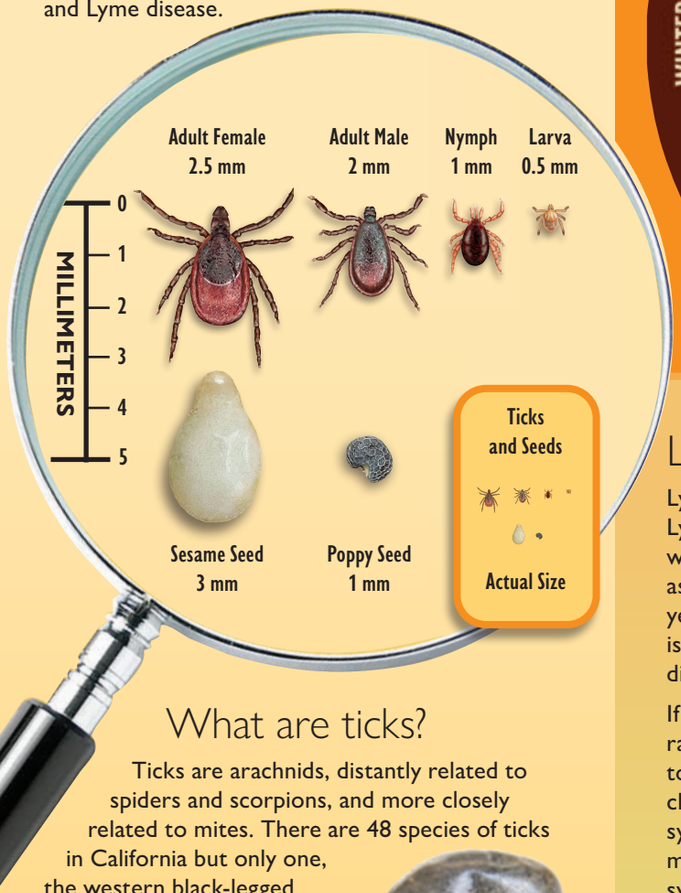
Living with Ticks
in the East Bay Regional Park District

East Bay Regional Park District

Healthy Parks Healthy People

Look – a Tick!

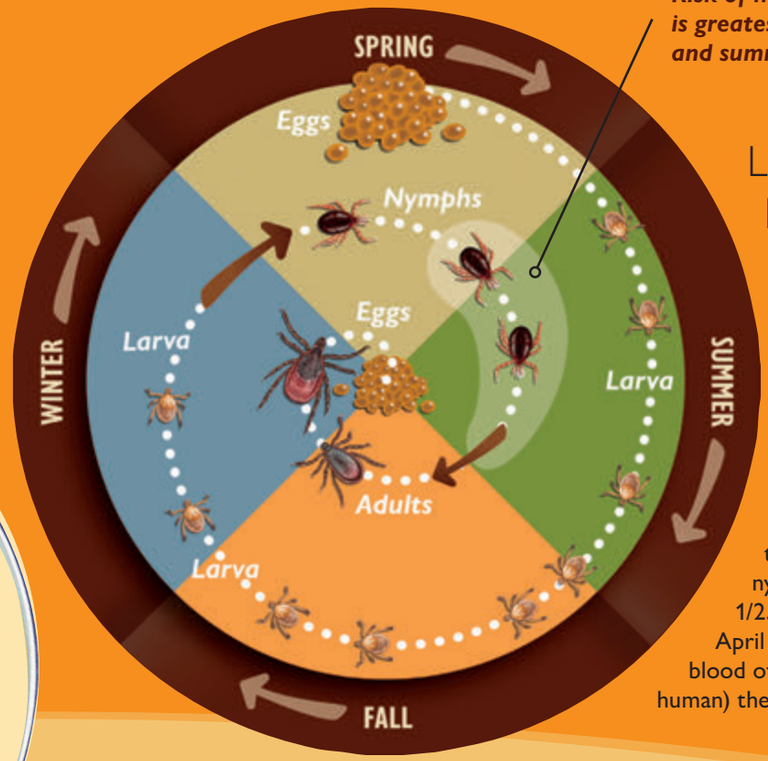
As you hike on Regional Park trails, you often see other hikers with their pants tucked into their socks or boots. They may be wearing a long-sleeved shirt on a day you consider hot. All their clothing is light-colored. As they hike, they avoid the grasses growing on the sides of the trail. You will notice that every hour or so, these hikers stop to examine their clothing and swipe at their necks and behind their ears. Why? They are being cautious about ticks and Lyme disease.



What are ticks?

Ticks are arachnids, distantly related to spiders and scorpions, and more closely related to mites. There are 48 species of ticks in California but only one, the western black-legged tick (*Ixodes pacificus*), is of importance in transmission of Lyme disease to people.

A blood-engorged tick.



Risk of human infection is greatest in late spring and summer.

Life Cycle of the Western Black-Legged Tick

Larval ticks are extremely small (pinpoint size) when they hatch from eggs. They feed on the blood of various small rodents, which may be infected with the Lyme disease bacterium. In the East Bay, the rodent host can sometimes be the dusky-footed woodrat (packrat), whose stick nests dot the forest landscape and are easy to see in fall and winter. After feeding, larval ticks molt to the nymphal stage. These nymphal ticks are very small (1 mm, or 1/25 inch in size) and are abundant and active April to mid-July. After feeding again (on the blood of lizards, birds, rodents, or the occasional human) the ticks molt into adults. Adult male ticks almost never bite people, and feed little or not at all. In late fall through winter, adult female ticks seek hosts to feed on, to provide the blood proteins needed to produce eggs.

Lyme Disease

Lyme disease is a bacterial disease named for Old Lyme, Connecticut, from where the first U.S. cases were reported. It is now determined to be the same as a condition known in Europe for more than 100 years. It was first reported in California in 1978 and is now the most commonly reported tick-borne disease in California and the rest of the U.S.

If a person is bitten by an infected tick, a bull's-eye rash may appear 7-10 days after the tick bite in 60 to 80 percent of cases, and it is the most important clue to early diagnosis. Along with it come flu-like symptoms (fever, fatigue, headache, a stiff neck, and muscle and joint pain). Sometimes, these flu-like symptoms appear without a rash. The disease at this stage can be treated with antibiotics. Consequences of untreated Lyme disease may include arthritis, heart, and neurological problems.

Lyme Disease and Western Black-Legged Ticks in the East Bay

Lyme disease is not easy to get here: only one to two percent of East Bay Area western black-legged tick adults are infected (up to six percent of nymphs are infected). Elsewhere in Northern California up to six to ten percent of adults are infected. This still compares favorably to the Eastern U.S. where 30 to 60 percent of adult ticks and 25 percent of nymphs are infected. So, chances of being bitten here by an infected tick are small. Also, a biting tick must be embedded for at least one to two days before the bacteria are transferred to the victim.

A tick reaching for a host.

What accounts for the low infection rate in our local ticks? Sometimes you can find a western fence lizard with dozens of ticks crowded around its head. Western fence lizards have a substance in their blood that kills the Lyme disease bacteria inside the ticks that feed on the lizards. Since many western black-legged tick nymphs feed on western fence lizards, the adult ticks that grow from these nymphs are no longer infected with Lyme disease bacteria. In the Eastern U.S., nymphal deer ticks (another *Ixodes*) feed on white-footed mice which can support