

What's Eating You? Turkey Mite and Lone Star Tick (*Amblyomma americanum*)

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Practice Points

- Infections acquired from ticks can occur in the larval, nymphal, or mature stages.
- Lack of an attached tick does not rule out tick-borne infections in a patient.
- Proper technique for removal of ticks is important to prevent increasing the risk for transmitting disease.

The layman's term for the larval and nymphal stages of the tick *Amblyomma americanum* is turkey mite (or turkey tick) related to its close association with the wild turkey (*Meleagris gallopavo*).¹ The term *seed tick* is more general and includes the larval stages of other tick species. In their larval stage, turkey mites are of dermatologic importance because they can transmit life-threatening diseases; the initial presentation of their infestation can easily be overlooked.

Identifying Features

Amblyomma americanum is a 3-host, hard-bodied tick of the Ixodidae family. It also is known as the Lone Star tick due to the white spot at the base of the hard dorsal plate (scutum) on the adult female.² The life cycle typically spans 2 to 3 years and includes the egg, a 6-legged larva (turkey mite), an 8-legged immature nymph, and an 8-legged mature adult.³ The male scutum covers the entire abdomen and has white inverted horseshoe markings at the base. In both sexes, festoons are prominent. Long anterior

mouthparts and a posterior anal groove also are helpful in identifying this tick (Figure 1).

After the female mates, she drops from the host to the ground where she lays an average of 5000 eggs and then dies.^{3,4} The turkey mite larvae, which are approximately 0.6 mm in size, emerge from the eggs, crawl up onto low vegetation and grasses, and await a passing host. After a blood meal lasting 3 to 12 days, the larvae fall to the ground and molt

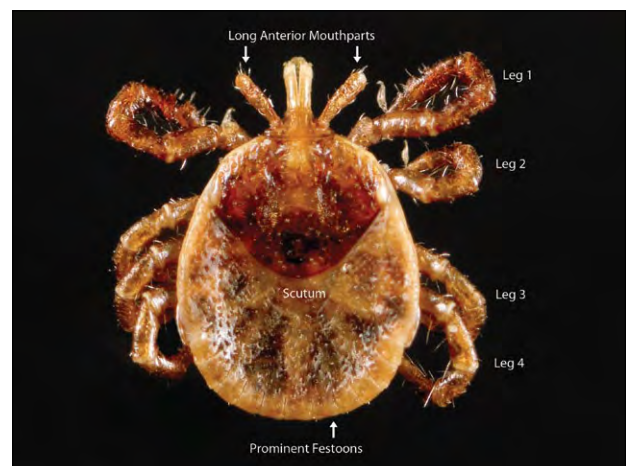


Figure 1. Dorsal view of the nymphal turkey mite (*Amblyomma americanum*). The immature form lacks the white markings seen in adults. The nymph has 4 legs per side, unlike the larva, which has 3 legs. (This image is in the public domain. Courtesy of the Centers for Disease Control and Prevention and James Gathany.)

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into nymphs (approximately 1.5 mm in size). After another blood meal, the nymphs evolve into the mature adult (Lone Star tick).^{2,5} Adult Lone Star ticks are more active in the spring to early summer, whereas the larval and nymphal turkey mites are more active in the summer and fall, respectively.⁶ The adult female mite will transmit some pathogens transovarially, which increases the possibility for the host to acquire a disease from the larval blood meal.¹

Disease Vector

The Lone Star tick is an aggressive and nonspecific feeder.⁷ Although most ixodid ticks utilize either the ambush strategy (ie, waiting on tall grasses to attack hosts) or the hunter strategy (ie, moving toward nearby hosts), *A. americanum* use both strategies.³ In all 3 life stages, the tick will bite animals, birds, and humans, and the immature forms often attack in large groups.⁷ It is not unusual to find hundreds of larval ticks attached to an individual who has spent time in the brush or has laid clothing on a bush while swimming.

Although the white-tailed deer is the preeminent host of *A. americanum*, turkey mites are largely associated with ground-feeding birds.¹ One study showed that the wild turkey is an important host for turkey mites in areas where the bird is abundant.⁸ The expanding wild turkey population over the last 50 years in the United States has contributed to the increase in range and population of the Lone Star tick.^{9,10}

Distribution

Amblyomma americanum is found mainly in thickets and second-growth woodland forests with dense underbrush.¹ It is the most common tick infesting the south central United States² and ranges as far west as Texas, as far north as Iowa, and as far east as the Atlantic Coast, including parts of New England, as well as the southeastern United States.¹¹ They also have been noted in the western and upper Midwestern states. Limitations to population growth mainly depend on the availability of suitable hosts as well as the expanding range of fire ants, a predator that consumes tick eggs.¹ Increased incidences of attachment to humans can be found in areas with recent commercial development that causes the tick's natural hosts to vacate the area.¹² A study in Missouri showed spread of *A. americanum* following controlled burns to prevent large forest fires.¹³

Clinical Presentation

Clinical presentation of turkey mite infestation can be insidious. Commonly, these small gray-brown organisms can be missed on examination and the patient

may be diagnosed with nonspecific arthropod bites or generalized pruritus with crusts. The larvae become easier to appreciate after they become engorged with blood, which may take days.¹⁴ The clinician may note hundreds of scattered or grouped erythematous papules on a single patient. On closer examination, each lesion may appear as a pinpoint brown crust surmounting a papule (Figure 2).¹⁵ Dermoscopy or skin scrapings viewed under a microscope can be useful to confirm the diagnosis.^{15,16} Pruritus may or may not be noted. Although the mature adult Lone Star tick has a predilection to attach on the lower half of the body, there is no predilection for turkey mites, but attachments often are noted in areas covered by close-fitting clothing such as underwear.^{3,16} One case even described a patient who was found to have a larval form of *A. americanum* attached to the conjunctiva.¹⁷

Disease Transmission

The most common infection transmitted by *A. americanum* is human monocytic ehrlichiosis caused by *Ehrlichia chaffeensis*. A study failed to confirm transovarial spread, but the organism has been detected in larvae.^{4,18} The Lone Star tick also is a vector for Rocky Mountain spotted fever (*Rickettsia rickettsii*) and tularemia (*Francisella tularensis*). Transovarial transmission to larvae has been observed.⁵ Other disease-causing bacteria, such as *Borrelia* (the organism implicated in southern Lyme disease), *Coxiella burnetii* (the causative agent of Q fever), and *Ehrlichia ewingii*,¹ also have been identified in adult Lone Star ticks, and transovarial transmission has not yet been ruled out. Because 50% of Rocky Mountain spotted fever patients have no identifiable tick bites, immature forms likely play a role in disease transmission.¹⁵ Attachment of the tick for 24 to 48 hours appears to be the minimum



Figure 2. Turkey mite infestation of the scrotum in a child.

time necessary for disease transmission to the host.¹⁴ Patients commonly underestimate the duration of a tick's attachment, but it can be estimated by the degree of engorgement.⁶

Treatment and Prevention

Patients may try to scrub off the organisms, which is not always successful. *Amblyomma americanum* are characterized by long mouthparts (capitulum), which allow them to maintain a strong hold within the dermis.² Although the mouthparts are firmly secured, turkey mites have fragile bodies, making it difficult to accomplish complete physical removal with tweezers.² Rupture of the larvae is potentially dangerous, as *Rickettsia* can enter through adjacent skin.¹⁷ Other methods, such as smothering the tick in petroleum or oils or burning the tick with hot matches or cigarettes, may cause injury or increase the chance of the tick regurgitating organisms into the host.³ Effective treatment may include applying topical pediculicides such as pyrethroids to the entire body.^{2,5,15} Punch and shave biopsies are an alternative approach when the ticks are few in number. It is recommended to store the tick in a -20°C freezer if there is the possibility of performing future assays for organisms. Prophylactic treatment with antibiotics to prevent rickettsiosis or tularemia generally is not recommended, but treatment with a tetracycline agent should be started at the first sign of clinical disease (eg, fever, headache, rash).³

Prevention is key to reducing the incidence of disease. The US Army has demonstrated the possibility of nearly 100% success utilizing long clothing treated with permethrin in conjunction with long-acting diethyltoluamide.^{3,14} Clearing areas of leaf debris also is important, as *A. americanum* requires leaf cover to rehydrate.⁶ The nymphs can remain on clothing and persist through the wash cycle, posing a risk to other members of the household. Many nymphs are resistant to hot-water cycles in washing machines and are only killed after a 1-hour, high-heat cycle in the dryer.¹⁹

Conclusion

Amblyomma americanum is an important vector in disease transmission, and larval infestations can be easily overlooked. Early identification is important to dermatologists for appropriate treatment and prevention of disease.

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