

What's Eating You? *Rhipicephalus* Ticks

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Rhipicephalus ticks include the common brown dog tick. Most *Rhipicephalus* ticks are brown with brown legs. They commonly have a distinct teardrop shape unless engorged, widely spaced eyes, and festoons. The scutum (hard dorsal plate) is inornate (plain brown with no markings). Relatively short mouthparts are attached at a hexagonal basis capitulum. Coxa 1 (the attachment base for the first pair of legs) is characteristically bifid. Males have ventral adanal plates adja-

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cent to the anus, and often accessory adanal shields are present.

Rhipicephalus tick bites present as erythematous pruritic papules at the site of the tick attachment. Patients often present to the dermatologist with the complaint of intractable itching at the sites of tick attachments. Tick antigens result in a type IV immune response, which can be long lasting. Persistent prurigo-like papules and pseudolymphomatous nodules may occur. Topical antipruritics such as camphor and menthol can be helpful for symptomatic relief. Over-the-counter camphor and menthol preparations include Sarna® lotion and Rhuli® gel. Potent topical corticosteroid preparations may be effective in some cases, but intralesional injection of triamcinolone is often required. Some lesions fail to respond to corticosteroid treatment and are best excised.



FIGURE 1. *Rhipicephalus* tick.

Rhipicephalus ticks carry rickettsial diseases to include Rocky Mountain spotted fever and boutonneuse fever. They may be vectors of canine ehrlichiosis. *Rhipicephalus* ticks may carry babesiosis and Congo-Crimean hemorrhagic fever virus.^{1,2} Rarely, tick paralysis may result from attachment of a *Rhipicephalus* tick (almost all human tick paralysis in North America is due to *Dermacentor* ticks).

Various methods of tick removal have been advocated. Removal using a tweezer generally gives good results.³ Petroleum jelly, fingernail polish, isopropyl alcohol, and hot matches are generally ineffective.⁴ Care should be taken not to squeeze the body of the tick. Special plastic tick tweezers (tick nippers) are available and, in my experience, work quite well. Subcutaneous injection of local anesthetics is an ineffective means of tick removal.⁵

Topical and systemic agents are now available for control of fleas and ticks on dogs. A veterinarian should be consulted. Amitraz-impregnated collars may be superior to topical fipronil in preventing *Rhipicephalus* infestation.⁶ Deltamethrin shampoos can provide some degree of protection against infestation.⁷ Dogs demonstrate cell-mediated resistance to *Rhipicephalus* infestation, as demonstrated by immunization with a gut extract.⁸ Tick saliva modulates the dog's immune response and may induce tolerance.^{9,10} Further studies of tick immunization are needed.

Protection against tick bites includes avoidance and protective clothing. Clothing and skin inspection can identify ticks and allow for removal when the risk of disease transmission is still low. Fully engorged ticks have had ample time to feed and are more likely to have spread disease. Various repellent formulations have been used, with most based on diethyltoluamide (DEET)* and newer pyridine and piperadine compounds are being studied. Most North American ticks appear to be deterred by DEET, however, toxic reactions have been reported, in-

cluding toxic encephalopathy,¹¹ as well as anaphylactic reactions.¹² "DEET dermatitis" is an irritant dermatitis of the face, neck, and flexures, and in my experience, is associated with formulations containing a high percentage of DEET, often in patients with an atopic diathesis. Bullous reactions have been reported in the antecubital fossae of military personnel using DEET,^{13,14} and subsequently long-acting DEET cream has been developed, containing only 30% DEET. This product has been available to the general public through Amway as "Hour Guard[®]" repellent cream.

Recently, the insecticide permethrin has been marketed as a tick "repellent." Permethrin spray is applied to clothing, rather than skin. It impregnates the clothing fibers and is stable through several wash cycles,^{15,16} with little staining or residual odor noted on most clothing. Published data suggest that ticks vary in their susceptibility to permethrin. Although North American ticks appear fairly susceptible to permethrin, some North African ticks are resistant. Sublethal levels of permethrin may trigger an attachment response in resistant ticks, paradoxically increasing the incidence of tick bites.¹⁷ The effect of gradually waning levels of permethrin in clothing needs further study; however, published studies suggest that permethrin can be highly effective in preventing bites by some species of ticks. In an area of Cape Cod infested with *Ixodes scapularis* (formerly *Ixodes dammini*), a 1-minute application of permethrin provided 100% protection against tick attachments. One-minute applications of 20% and 30% DEET provided 86% and 92% protection, respectively.^{18,19} Permethrin is also effective against chiggers.^{20,21} DEET and permethrin used together may be better than either agent alone.^{22,23}

Treating the environment is also helpful. Removing leaf debris and applications of insecticides such as carbaryl are helpful in control of hard ticks^{24,25}; however, permethrin-treated cotton balls (scattered as nesting material for tick-carrying rats and mice) have proved

*DEET is now also called N₁N-diethyl-3-methylbenzamide.

disappointing. Feeding deer ivermectin-treated corn can reduce the number of ticks in the area, an approach that is very promising and deserves further study.

Research continues for better agents, including stabilized sunscreen/repellent formulations. Piperadines and pyridines vary in their effectiveness for arthropods with some being acaricidal for some species of ticks. Susceptibility varies widely. Increasingly, repellents will be "custom-formulated" for local arthropods in different geographic regions.

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RHIPICEPHALUS TICKS

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