

# Deer Ked: A Lyme-Carrying Ectoparasite on the Move

Andrew Kelsey, MD; Justin Finch, MD

## PRACTICE POINTS

- There are many more disease-carrying arthropods than are routinely studied by scientists and physicians.
- Even if the insect cannot be identified, it is important to monitor patients who have experienced arthropod assault for signs of clinical diseases.

*Lipoptena cervi*, known as the deer ked, is an ectoparasite of cervids traditionally found in northern European countries such as Norway, Sweden, and Finland. Although rarely reported in the United States, this vector recently has been shown to carry *Borrelia burgdorferi* and *Anaplasma phagocytophylum* from specimens collected domestically. Importantly, it has been suggested that deer keds are one of the many disease-carrying vectors that are now found in more expansive regions of the world due to climate change. We report a rare sighting of *L cervi* in Connecticut. Additionally, we captured a high-resolution photograph of a deer ked that can be used by dermatologists to help identify this disease-carrying ectoparasite.

*Cutis*. 2018;102:121-122.

## Case Report

A 31-year-old man presented to the dermatology clinic 1 day after mountain biking in the woods in Hartford County, Connecticut. He stated that he found a tick attached to his shirt after riding (Figure). Careful examination of the patient showed no signs of a bite reaction. The insect was identified via microscopy as the deer ked *Lipoptena cervi*.

## Comment

*Lipoptena cervi*, known as the deer ked, is an ectoparasite of cervids traditionally found in Norway, Sweden, and

Finland.<sup>1</sup> The deer ked was first reported in American deer in 2 independent sightings in Pennsylvania and New Hampshire in 1907.<sup>2</sup> More recently deer keds have been reported in Massachusetts, New York, Pennsylvania, and New Hampshire.<sup>3</sup> In the United States, *L cervi* is thought to be an invasive species transported from Europe in the 1800s.<sup>4,5</sup> The main host is thought to be the white-tailed deer (*Odocoileus virginianus*). Once a suitable host is found,



*Lipoptena cervi*, known as the deer ked, from the family Hippoboscidae are obligate parasites of mammals and birds.

## RELATED VIDEO ONLINE

How to Prevent Mosquito and Tick-Borne Disease

>> <http://bit.ly/2LjKOO6>



From the Department of Dermatology, University of Connecticut, Farmington.

The authors report no conflict of interest.

Correspondence: Andrew Kelsey, MD, University of Connecticut Health Center, Department of Dermatology, 21 South Rd, 2nd Floor, Farmington, CT 06032 (akelsey@uchc.edu).

the deer ked sheds its wings and crawls into the fur. After engorging on a blood meal, it deposits prepupae that fall from the host and mature into winged adults during the late summer into the autumn. Adults may exhibit swarming behavior, and it is during this host-seeking activity that they land on humans.<sup>3</sup>

Following the bite of a deer ked, there are reports of long-lasting dermatitis in both humans and dogs.<sup>1,4,6</sup> One case series involving 19 patients following deer ked bites reported pruritic bite papules.<sup>4</sup> The reaction appeared to be treatment resistant and lasted from 2 weeks to 12 months. Histologic examination was typical for arthropod assault. Of 11 papules that were biopsied, most (7/11) showed C3 deposition in dermal vessel walls under direct immunofluorescence. Of 19 patients, 57% had elevated serum IgE levels.<sup>4</sup>

In addition to the associated dermatologic findings, the deer ked is a vector of various infectious agents. *Bartonella schoenbuchensis* has been isolated from deer ked in Massachusetts.<sup>7</sup> A recent study found a 75% prevalence of *Bartonella* species in 217 deer keds collected from red deer in Poland.<sup>5</sup> The first incidence of *Borrelia burgdorferi* and *Anaplasma phagocytophylum* in deer keds was reported in the United States in 2016. Of 48 adult deer keds collected from an unknown number of deer, 19 (40%), 14 (29%), and 3 (6%) were positive for *B burgdorferi*, *A phagocytophylum*, and both on polymerase chain reaction, respectively.<sup>3</sup>

A recent study from Europe showed deer keds are now more frequently found in regions where they had not previously been observed.<sup>8</sup> It stands to reason that with climate change, *L cervi* and other disease-carrying vectors are likely to migrate to and inhabit new regions of the country. Even in the current climate, there are more disease-carrying arthropods than are routinely studied in medicine, and all patients who experience an arthropod assault should be monitored for signs of systemic disease.

## REFERENCES

1. Mysterud A, Madslien K, Herland A, et al. Phenology of deer ked (*Lipoptena cervi*) host-seeking flight activity and its relationship with prevailing autumn weather. *Parasit Vectors*. 2016;9:95.
2. Bequaert JC. *A Monograph of the Melophaginae or Ked-flies of Sheep, Goats, Deer, and Antelopes (Diptera, Hippoboscidae)*. Brooklyn, NY: Brooklyn Entomological Society; 1942.
3. Buss M, Case L, Kearney B, et al. Detection of Lyme disease and anaplasmosis pathogens via PCR in Pennsylvania deer ked. *J Vector Ecol*. 2016;41:292-294.
4. Rantanen T, Reunala T, Vuojolahti P, et al. Persistent pruritic papules from deer ked bites. *Acta Derm Venereol*. 1982;62:307-311.
5. Szewczyk T, Werszko J, Steiner-Bogdaszewska Ż, et al. Molecular detection of *Bartonella* spp. in deer ked (*Lipoptena cervi*) in Poland. *Parasit Vectors*. 2017;10:487.
6. Hermosilla C, Pantchev N, Bachmann R, et al. *Lipoptena cervi* (deer ked) in two naturally infested dogs. *Vet Rec*. 2006;159:286-287.
7. Matsumoto K, Berrada ZL, Klingler E, et al. Molecular detection of *Bartonella schoenbuchensis* from ectoparasites of deer in Massachusetts. *Vector Borne Zoonotic Dis*. 2008;8:549-554.
8. Sokół R, Gałęcki R. Prevalence of keds on city dogs in central Poland. *Med Vet Entomol*. 2017;31:114-116.