

The oak leaf itch mite, *Pyemotes herfsi*, is a tiny mite that causes itching and painful bites on humans. Intense scratching may lead to secondary bacterial infections.

Pyemotes herfsi was responsible for widespread outbreaks of itching bites in Midwestern communities in 2004 and 2007. By late summer 2014, populations had again reached significant levels, and based on complaints from northeast Kansas, the mite's presence was confirmed by the Insect Diagnostic Lab at Kansas State University.

Pyemotes herfsi is a European mite species closely related to the straw itch mite, *Pyemotes tritici*, which occasionally pesters farmers. The tiny, 0.2 mm ($\frac{1}{25}$ inch) long mite is barely visible to the naked eye. Its bite causes a raised, red area with a small, centralized blister that is itchy and painful when scratched. Bites appear 10 to 16 hours after exposure when they start to itch.

Unlike chigger bites, which are commonly restricted to areas under tight clothing such as belts, underwear or socks, oak leaf itch mite bites appear where clothing is loose, usually at the neck, shoulder and chest. Bites are found on the upper body because itch mites drop from canopies of infested trees. Studies estimated the number of mites dropping from large pin oaks in Nebraska during the previous outbreak to exceed 300,000 mites per tree per day.

In the Midwest, oak leaf itch mites emerge in late July and continue through the summer. Bite problems intensify in the fall with increased gardening activities, mainly the handling of mite-infested leaves (Figure 1).

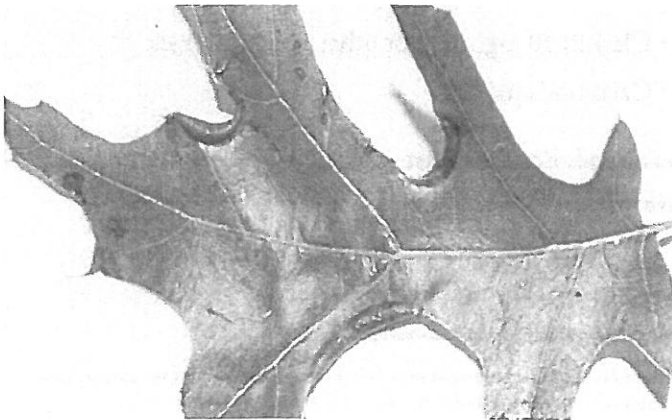


Figure 1. Infested oak leaf.

A mated female searches for hosts on which to feed, usually insect larvae living within straw, seeds, and plant galls. In recent outbreaks, itch mites were found preying on midge larvae, which are responsible for gall formation on the mar-

gins of oak leaves. Galls appear as thickened areas on leaves and occur mainly pin oaks but also on red oaks and black oaks (Figure 2).

Life Cycle

The female mite enters the gall through small openings. A potent neurotoxin in her saliva paralyzes the midge larva. Once the female starts to feed, she develops about 200 offspring. In seven days, her progeny — of which 5 to 10 percent are males — are ready to emerge as fully developed adults. Males emerge first, mate with the females, and die without feeding. Newly emerged mated females then disperse in search of new hosts. The tiny mites may be carried by the wind for hundreds of yards before landing on humans and pets on which they try to feed.

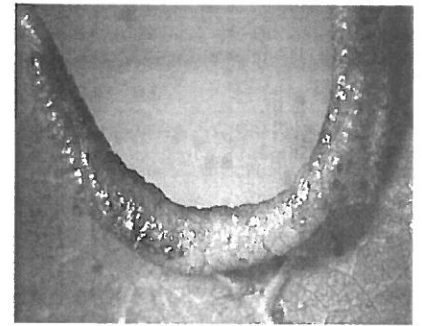


Figure 2. Close-up of gall on leaf margin.

Because of the large number of offspring and 7-day life cycle, oak leaf itch mites have one of the highest rates of population increase. On the other hand, the host gall-making midge produces only one generation per year (Figure 3). Mature midge larvae drop from the galls in late fall and appear to spend the winter protected in the ground. In spring, adult midges emerge from hibernation and form mating swarms. Mated females fly up trees where they lay eggs on developing leaves. Emerged larvae inject hormone-containing saliva into leaf margins, which causes edges to curl and form the galls where larvae develop until they drop to the ground in late fall.

Itch mites are predators, maintaining populations in a given habitat in extremely low numbers. Once significant numbers of a suitable host are found, mites multiply rapidly. The unofficial designation of *Pyemotes herfsi* as the oak leaf itch mite can be misleading. Although high populations (major outbreaks) of this mite have been associated with the midge species *Contarinia* sp. whose larvae (maggots) are responsible for producing oak leaf margin galls, *P. herfsi* appears to be more of a generalist predator. That is, these mites have been documented as subsisting on a wide variety of host species: the larvae of furniture beetles, rice and granary weevils, oriental fruit moths, pine tip moths and hackberry

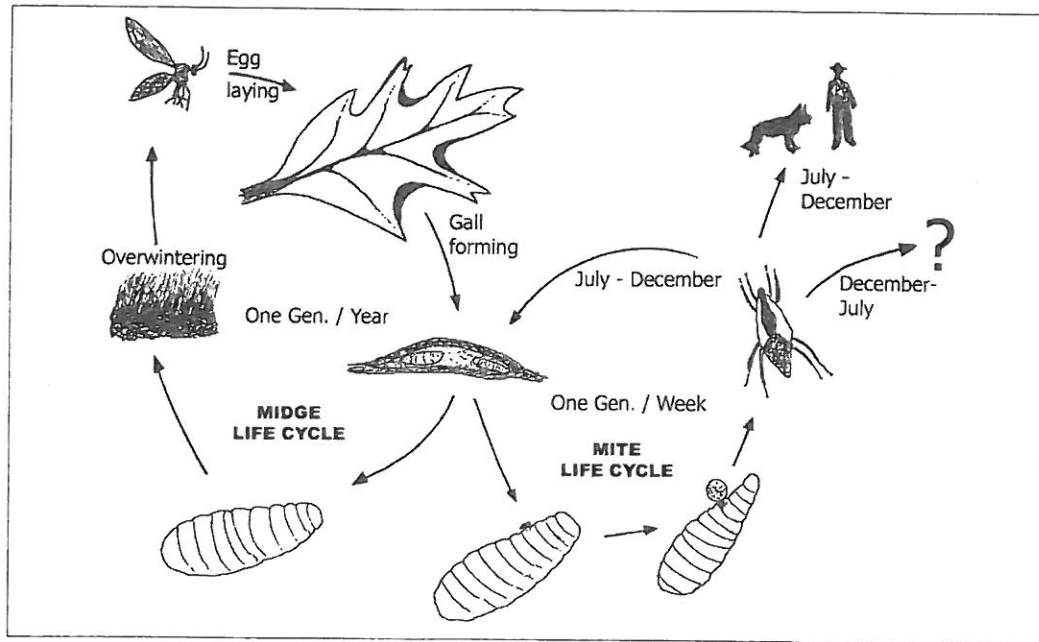


Figure 3. Comparison of gall-forming midge and oak leaf itch mite life cycles.

nipplegall psyllids. A further implication of their adaptability and opportunistic nature was documented from Illinois where in 2007, they were found feeding on the eggs of periodical cicadas.

Control

Little is known about how to control these mites or how to protect humans from their bites. Typical spray applications are not effective because mites are protected within galls. Midges feeding on tree leaves provide a better target for controlling mites. University of Nebraska researchers are exploring the use of insecticides to control midges as they overwinter in the soil or before they swarm oak trees to lay eggs.

Oak leaf itch mites bites may be confused with bites from other insects and mites, such as scabies, chiggers and bird mites, but clinical signs are different and occur on different parts of the body. In addition, oak leaf itch mite bites occur in epidemic form, whereas bites from other agents generally

are localized. Avoiding or reducing time spent under or near oak trees known to be infested with itch mites is one of the best ways to reduce bites. Bathing — and changing and washing clothes — after exposure to mite habitats is highly recommended.

DEET-based repellents provide mixed results. They may fail when relied on for complete bite protection. Repellants are more effective when used in combination with other protection practices.

Doctors recommend several remedies for relief from itching and other symptoms. Some of these medications require a physician's prescription:

- Cortisone cream
- Cortisone orally (although rarely needed)
- Claritin 10 mg, daily, or other antihistamines
- Calamine lotion

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