

Itch Mite Epidemic Hits Lincoln

A microscopic mite, *Pyemotes herfsi* — aptly called an “itch mite” — is responsible for the mysterious, itchy red bites recently reported by a number of eastern Nebraska and Kansas residents.

The microscopic itch mites prey on the small fly maggots which cause “leaf edge” galls on pin oak leaves. The galls on pin oak leaves have been unusually abundant this year. When the maggots mature, they emerge from the galls, drop to the ground and pupate for the winter.

When numbers of the gall gnat larvae decline, either through predation or by evacuation from their galls, the hungry itch mites crawl about on foliage or bail out of the trees into wind currents to find other suitable hosts.

Preliminary research indicates that 16,000 adult female itch mites (potential biters) can emerge from one infected oak leaf and fall to the ground. Entomologists estimate there are most likely

millions of mites floating down from affected oak trees.

The mites inject a highly-potent neurotoxic venom into their insect prey through their needle-like mouthparts and voraciously consume their prey.

Adult females are unique among living animals in that they deposit their eggs into a pouch, or ovisac, formed at the tip of their abdomens. A mated female attaches to an insect host and enlarges to 1/16 inch — about BB size. The female nurtures her brood directly from the egg stage to adulthood (no nymphal stages). As many as 300 mites can develop within the female’s enlarged abdomen!

With a population doubling time of two days, *Pyemotes* mites can number in the millions in a short period of time.



Microscopic itch mites highly magnified.



As many as 300 mites can develop in a female mite’s ovisac.



Pin oak leaf infested with “leaf edge” galls.



An opened “leaf edge” gall revealing dead maggots and itch mite females with enlarged abdomens.

It is also likely weather patterns contributed to greater survival of the gall-forming maggot.

Q. Will we have itch mites again next year? Should I consider cutting down my oak tree?

A. Large numbers of itch mites may occur again next fall when “leaf edge” gall maggots mature, but predictions are notoriously inaccurate. There are many natural occurrences (weather, diseases, etc.) that might reduce the maggot populations. We simply won’t know until next year. Many people have lived with oak trees in their yard for years — we don’t recommend cutting trees.

Q. Why are we seeing a problem this year?

A. This problem is related to the high populations of the “leaf edge” gall maggots. According to Mary Jane Frogge, Lancaster County extension associate, some increase in these galls was noticed in 2003, but this year, these galls were abundant. There is a typical cyclical predator-prey cycle: the increase of the prey population (the maggot) results in more food, therefore increasing the predator population (the mite).

Itch Mite Bites

Itch mite bites are usually found on a person’s upper body (neck, shoulders, arms and chest). Initially, a bite is characterized as a red patch which has a small blister in the center. Redness around the bite expands and becomes painful to the touch. More sensitive individuals have developed chills, fever, fatigue and nausea, or severe allergic skin reactions such as extreme itchiness and swelling. Itching lasts up to a week or more.

Recommendations

By the time you read this, freezing temperatures probably will have killed any *Pyemotes* mites remaining in oak leaves. If itch mites are a problem in the future, it would be in fall when gall maggots mature. During problem times:

- Avoid spending time outdoors where oak trees — especially pin oaks — are growing.
- Keep windows closed.
- Avoid scratching bites which might cause infection.
- Apply topical applications of medications like calamine lotion and benadryl to reduce itching.

Itch Mite FAQ’s

Q. What can we do to solve this problem? Shouldn’t we be spraying or treating the oak trees? How about the yard? The house? Should we treat the maggots we see on the ground?

A. The mites are completely immune to chemicals when they are inside the gall. Spraying trees is very expensive and rarely will coat all leaves, so we don’t recommend spraying trees. Spraying lawns is also not practical. It makes no sense to spray or bomb any rooms in the house. Spraying the maggots on the ground will be of little value because it is the mites that are doing the biting, but if it makes you feel better, go ahead.

Q. Will DEET repellent prevent bites?

A. Most biting pests use carbon dioxide gradients to find their warm-blooded hosts. DEET repellents interfere with the pest’s ability to detect carbon dioxide and make it hard for them to find a blood meal. Because these wingless mites are merely falling onto people, it is doubtful that DEET repellents will help prevent bites.

Q. Do the mites burrow into the skin or do they bite and fall off?

A. These mites don’t burrow into the skin, but we don’t yet know if they become enlarged after feeding on a person.

Identifying the Problem

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UNL Cooperative Extension in Lancaster County began receiving phone calls about itchy bug bites the week of Sept. 6. The calls were sporadic and did not seem too unusual for the time of year, but the description of the bites was not typical of common biting pests. By 11 a.m. the following Monday, more than half a dozen Lincoln residents called describing the same bites.

Extension followed up on this unusual pattern of calls by contacting UNL’s Entomology Department and the Lincoln-Lancaster County Health Department who confirmed they were also receiving phone calls about mysterious bites. It was apparent there was an outbreak of a biting pest that could not be readily identified.

The scenario from most victims was similar. They did not see any insects or spiders and didn’t feel being bitten. Some people complained about a few bites, but others reported dozens of bites — even hundreds of bites. When asked about the types of activities people were involved in prior to noticing the bites, most reported spending time outdoors in their backyard, at a picnic or gardening the day before the bites appeared. A few callers indicated they spent little time outdoors but slept near a window. These mystery bites were so itchy that many people were unable to sleep.

On Sept. 14, we learned several eastern Kansas counties were experiencing the same exact problem. Health officials in Kansas had contacted the Center for Disease Control (CDC) who were actively working with Kansas State University medical entomologists to solve the mystery.

Lancaster County Extension sent out a media release about the mystery bites and the *Lincoln Journal Star* published a front-page story. This publicity unleashed calls from the public not only to extension, but to the Lincoln-Lancaster County Health Department, UNL and physician’s offices.

We did not anticipate the overwhelming number of responses. Many affected people desperately wanted the most recent information. Others wanted to help discover the identity of the biting pest. Some of the suggestions were very creative. Some factual information gleaned from callers proved useful in understanding this epidemic.

First, the problem was not spread throughout Lincoln, but found in specific neighborhoods in the central part of the city. Many sufferers reported that they had oak trees near their homes. And, some people reported seeing little maggots dropping out of oak trees onto the ground. Horticulturists noticed an extraordinary increase in the number of galls on pin oak leaves this year.

University of Nebraska entomologist Jim Kalisch visited affected neighborhoods and examined pin oak galls. He cut them open to look for the maggots inside. In some galls, the maggots were shriveled and dead, and the gall was filled with hundreds of

microscopic mites. He identified the mites as belonging to the genus *Pyemotes*, and believed the mites killed some of the maggots inside the galls.

Kalisch set sticky traps under several oak trees and left them for a few hours. A later examination of the sticky traps under a microscope revealed hundreds of microscopic mites caught on the traps. This was the first time a *Pyemotes* mite has been recorded associated with gall maggots and causing dermatitis after falling onto people out of oak trees.

As THE NEBLINE went to press, a mite taxonomist identified this itch mite species as *Pyemotes herfsi*, a species previously known to exist only in Europe. UNL entomologists believe that this itch mite has probably bitten people in previous years, but the bites were so infrequent and random the microscopic mite was never identified as the source of bites.

The itch mite epidemic of 2004 will be remembered as the event which triggered discovery of a new mite species in the United States.