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# Small But Mite-y: An Often-Overlooked Aspect of Rodent Control

(Abstract)

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**ABSTRACT:** Residents often hire a pest control service to rid themselves of commensal rat issues but their accompanying ectoparasites can be overlooked. Tropical rat mites are commonly found among commensal rats within Alameda County, California. These hematophagous (i.e., blood feeding) mites are parasites of Norway rats and roof rats. Mite bites can reach an unbearable level, especially when their primary rat host is removed from a residence. They then disperse from vacant nests in search of a bloodmeal. Although these mites are not considered disease vectors, they can cause dermatitis and be a nuisance when they bite residents.

**KEY WORDS:** Alameda County, Norway rat, *Ornithonyssus bacoti*, *Rattus norvegicus*, *Rattus rattus*, roof rat, tropical rat mite

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## INTRODUCTION

### Rat Mite Biology

The tropical rat mite is primarily a nest parasite of rodents. *Rattus norvegicus* (Norway rats) and *Rattus rattus* (roof rats) are known to be the preferred hosts of tropical rat mite (Engel et al. 1998), although other rodents including pet gerbils may be hosts as well. They have also been found on many other animals including birds, cats, raccoons, and squirrels (Beck 2008). If a preferred host is not available, the mite may choose to bite a human. Tropical rat mites are thought to require a rodent bloodmeal to reproduce. The life cycle of a tropical rat mite (*Ornithonyssus bacoti*) has five stages: egg, larva, protonymph, deutonymph, and adult. Under laboratory conditions, it takes 7 to 16 days to go from egg to egg-producing female, with a single female laying as many as 140 eggs in a lifetime (Watson 2008). Larval mites have three pairs of legs and gain a fourth pair after their first molt. Tropical rat mites only feed during their protonymph and adult stages (Hetherington 1971). They have been observed to survive up to 66 days without food (Scott 1949). Tropical rat mites are arrhenotokous, meaning that unfertilized eggs yield male offspring while fertilized eggs yield female offspring (Oliver 1971). Females can also mate with their male offspring to obtain sperm and subsequently lay eggs that would yield female offspring. With this unique reproductive biology, a reproducing population of mites can result from the introduction of one unmated female or even a single female egg.

### Detecting Rat Mites

Mite bites on humans typically occur after rodents are removed from a structure but their nests remain. The most common method of mite detection is by direct observation of bites. Residents that experience mite bites typically find them near constricted clothing (e.g., waistbands, collars, underwear bands, socks) causing rat mite dermatitis. Visual appearance of the bite marks will not typically enable determination of mite species. Tropical rat mites do not appear to be attracted to heat but are attracted to carbon dioxide (Sasa et al. 1958). Mites can be seen climbing upward on walls (negative geotaxis) and around wall gaps

such as light switches, wall outlets, and vents. Sticky boards may help passively collect some specimens. If a person is experiencing bites of unknown origin and mites have been collected, the mite specimens may be identified to species by a local university, vector control district, or entomologist. The identification of a rat mite can lead to proper control measures or even identify a previously unknown rodent infestation.

### Rat Mite Control

The long-term solution to eliminating tropical rat mites is by performing proper rodent exclusion and rodent control. Rodent exclusion may include sealing off any external openings of 1/4" or larger to prevent entry by rodents. An appropriate material, such as sheet metal or hardware cloth, is preferred as it is chew resistant. Common areas that need rodent exclusion include pipes that enter the building, attic and crawl space vents and door thresholds. Traps are a preferred method for rodent control. Snap traps can be used to decrease the rodent population indoors. Poison baits can be used as well but can lead to a dead animal odor and flies, if the carcass cannot be located. Removal of abandoned rodent nests in a timely manner will decrease the chance for mites to spread and get into the living quarters. Pesticides can also be used to kill mites that remain after rodent control and exclusion efforts. Aerosol applications of pyrethrin can be used on the walls and vertical surfaces inside the home to kill or flush out mites, followed by residual applications around the edges of floors and key spots in the home. Total foggers are often used in the attics and sub areas (Shoemaker and Tanksley 2022). Alternatively, waiting for the mite infestation to be over can also be a solution, if it is certain that the rodents have been removed and excluded from the structure.

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