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Authors

Bohn, James

Regent, Alex

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Pocket Gophers (*Thomomys* spp.): Nuisance Pest or Vector? (Poster)

James Bohn and Alex Regent

Alameda County Vector Control Services District (ACVCSD), Alameda, California

ABSTRACT: Approximately one third of all calls received by ACVCSD, Alameda County Vector Control Services District, are for rodents. One overlooked rodent species commonly encountered in Alameda County is the pocket gopher. In 2022, gophers accounted for the 8th-highest amount of service requests of 32 different vertebrate species-related services offered at Alameda County Vector Control. The potential monetary loss and physical damage caused by just one or two gophers is enough to cause significant distress to homeowners. Gophers are a particularly bothersome nuisance pest to homeowners, but are they only a nuisance pest, or are they also a vector? Pocket gophers can harbor ectoparasites, which can pass on diseases to other animals and potentially to people if exposed. However, because they live almost exclusively underground, gophers are not likely to encounter people, therefore the risk is likely minimal. To best control pocket gophers, it is essential to consider Integrated Vector Management (IVM). Integrated Vector Management is a rational decision-making process that encourages optimal use of resources for efficient, cost-effective, and sustainable vector control (WHO 2024). Tactics of IVM for pocket gopher control may include trapping, carbon monoxide injection devices, baiting, habitat modification, and exclusion. It is of the utmost importance to lessen the possibility of pesticide exposure to both humans and non-target animals. Therefore, exploring several options is best when planning for a control effort. Trapping and baiting tend to be the most common elements of gopher control, but methods such as habitat modification and exclusion may have more long-term results.

KEY WORDS: control, ectoparasite, management, pocket gopher, *Thomomys* spp., trapping

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BIOLOGY

Pocket gophers (*Thomomys* spp.) are herbivorous, generally solitary, burrowing rodents. There are several species and genera found in Northern and Central America where they are endemic. They usually eat plants or roots that they encounter while tunneling. They create expansive tunnel systems and several burrow openings a day, leading to substantial property damage. Burrows can range from 200-2,000 square feet, and at depths of up to six feet underground (Baldwin 2019). Gophers generally measure 6-10 inches long and typically live for three years or less. They are active year-round and at all times of day and night. They are largely solitary, apart from the times they are mating or caring for young.

MANAGEMENT AND CONTROL

Typical gopher control consists of either trapping or baiting in professional settings. Homeowners can spend hundreds of dollars on sonic devices, which are devices placed into the gopher tunnels, and emit a noise that is meant to be repellant. They will often purchase and apply these, only to return to find that there is little or no effect, or that the gophers have simply been repelled into another section of the yard.

The use of chemical baits and burrow fumigants (i.e., aluminum phosphide, carbon monoxide injection devices, carbon dioxide injection devices) have recently been heavily restricted for safety and environmental concerns, which is in turn leading to greater demand for alternative methods of gopher control. Therefore, the most common and effective solution to gopher control in urban/residential settings is trapping.

Gopher trapping can be performed by following these steps:

- 1) Inspect the affected area to identify and confirm gopher activity.
- 2) Locate an active tunnel network, by taking a soil probe, long screwdriver, or a long nail and probe the soil 4-10 inches away from a gopher mound. Gopher tunnels typically lie 6-10 inches beneath the surface of the ground.
- 3) Remove a circular plug of soil out of the ground and locate a tunnel on either side, check for any forks in the tunnels to ensure placement of the correct number of traps.
- 4) Attach a 10–12-inch wire lead, attached to the trap on one side, and attached to a flag or nail in the ground to keep the trap from being lost.
- 5) Set the traps a few inches into the tunnel and cover the trapped tunnels with cardboard or tiles. Cover the entire trapped area with soil, as gophers will often backfill any tunnels in which they see light, rendering the traps useless.
- 6) Check the traps daily for activity. Remove any trapped gophers and reset the traps in any new burrows. (Using a colored flag as a marker, extending above the ground at the trap site is recommended, as homeowners or landscapers may not see the trapping area and may mow over it, causing a safety hazard or damaging equipment.)

Control methods such as raising plant beds, adding quarter-inch stainless steel screen beneath vegetable gardens, plants, or beneath new sod when planting a lawn can all lessen the likelihood of gophers damaging lawns, plants, or ruining gardens.

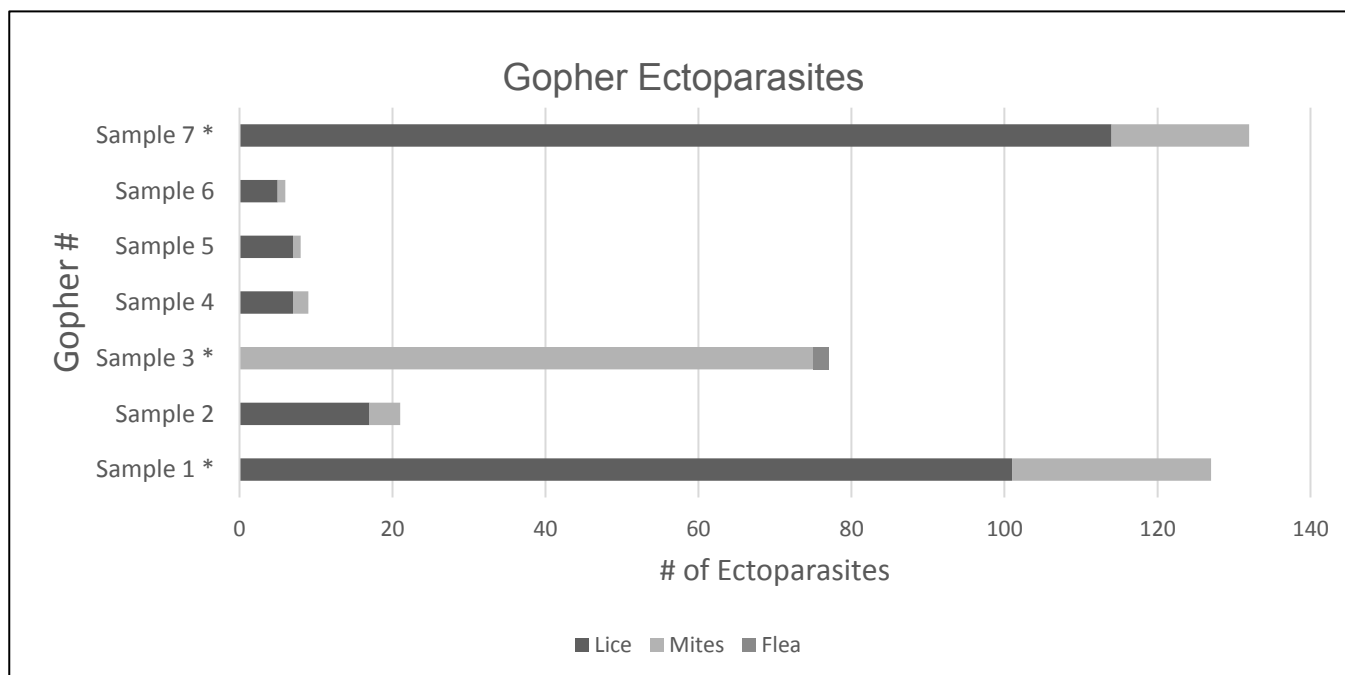


Figure 1. Gopher ectoparasites removed from gophers in Alameda County.

*live-caught gophers

METHODS

Seven gophers were caught, ear punches were taken, and their tissue was tested by our lab staff using real time PCR for the presence of *Borrelia sensu lato*, *Borrelia miyamotoi*, and *Anaplasma phagocytophilum*. Mites, lice, and fleas were also identified by lab staff.

CONCLUSIONS

All test results for *Borrelia sensu lato*, *Borrelia miyamotoi*, and *Anaplasma phagocytophilum* were negative. Mites found were identified as part of the Laelapidae family (Furman 1982). These mites are known to potentially carry rickettsiae such as *Anaplasma platys*, *Anaplasma phagocytophilum*, *Rickettsia helvetica*, and *Rickettsia felis*, “Though vector competence in pathogen transmission was not demonstrated” (Kuo 2020). Lice found on gophers were identified as part of the family Trichodectidae. These lice are part of the taxonomic section known as Mallophaga or chewing lice (University of Queensland). Chewing lice, aside from being a nuisance, are not known to transmit disease to humans (European Centre for Disease Prevention 2022). Fleas collected were identified as part of genus *Spicata* (Lewis 1988), but we were not able to find any information regarding diseases spread by fleas in this genus. Because they are mammals, gophers could be considered susceptible to the rabies virus. However, a literature search could not find any reports confirming rabies-positive gophers. It is worth noting that small rodents, aside from groundhogs, are almost never found to be rabies reservoirs (Centers for Disease Control and Prevention 2024). The results at this time lead us to the conclusion that gophers should not be considered a vector. This is because they live a majority of their life underground and will never come in contact with the public, as well as the fact that all ectoparasites tested came back negative or are not known to vector any diseases.

NEXT STEPS

In a study titled “Morphological Examination of Ticks Feeding on Northern Pocket Gophers, *Thomomys talpoides*, near Clavet (Saskatchewan, Canada)” (Anstead 2011), *Dermacentor* and *Ixodes* species ticks were found on northern pocket gophers. We are interested in the possibility of finding *Ixodes pacificus*, as well as other ectoparasites on gophers in Alameda County and testing them for the presence of pathogens. Due to the much higher yields of ectoparasites that we gathered from live gophers (Figure 1), we are engineering a user-friendly live trap for residential areas that does not require large amounts of excavation. We hope to use these traps to catch live gophers, which will allow us to extract the highest possible number of live ectoparasites.

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