

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Faculty Publications from the Harold W. Manter
Laboratory of Parasitology

Parasitology, Harold W. Manter Laboratory of

2003

Fleas and Lice of Mammals in New Mexico

Paulette L. Ford

United States Department of Agriculture, Rocky Mountain Research Station, Albuquerque Lab

Richard Fagerlund

University of New Mexico

Donald W. Duszynski

University of New Mexico, eimeria@unm.edu

Paul Polechla

University of New Mexico

Follow this and additional works at: <http://digitalcommons.unl.edu/parasitologyfacpubs>



Part of the [Parasitology Commons](#)

Ford, Paulette L.; Fagerlund, Richard; Duszynski, Donald W.; and Polechla, Paul, "Fleas and Lice of Mammals in New Mexico" (2003).
Faculty Publications from the Harold W. Manter Laboratory of Parasitology. 198.

<http://digitalcommons.unl.edu/parasitologyfacpubs/198>

This Article is brought to you for free and open access by the Parasitology, Harold W. Manter Laboratory of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Faculty Publications from the Harold W. Manter Laboratory of Parasitology by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.



United States
Department
of Agriculture

Forest Service

**Rocky Mountain
Research Station**

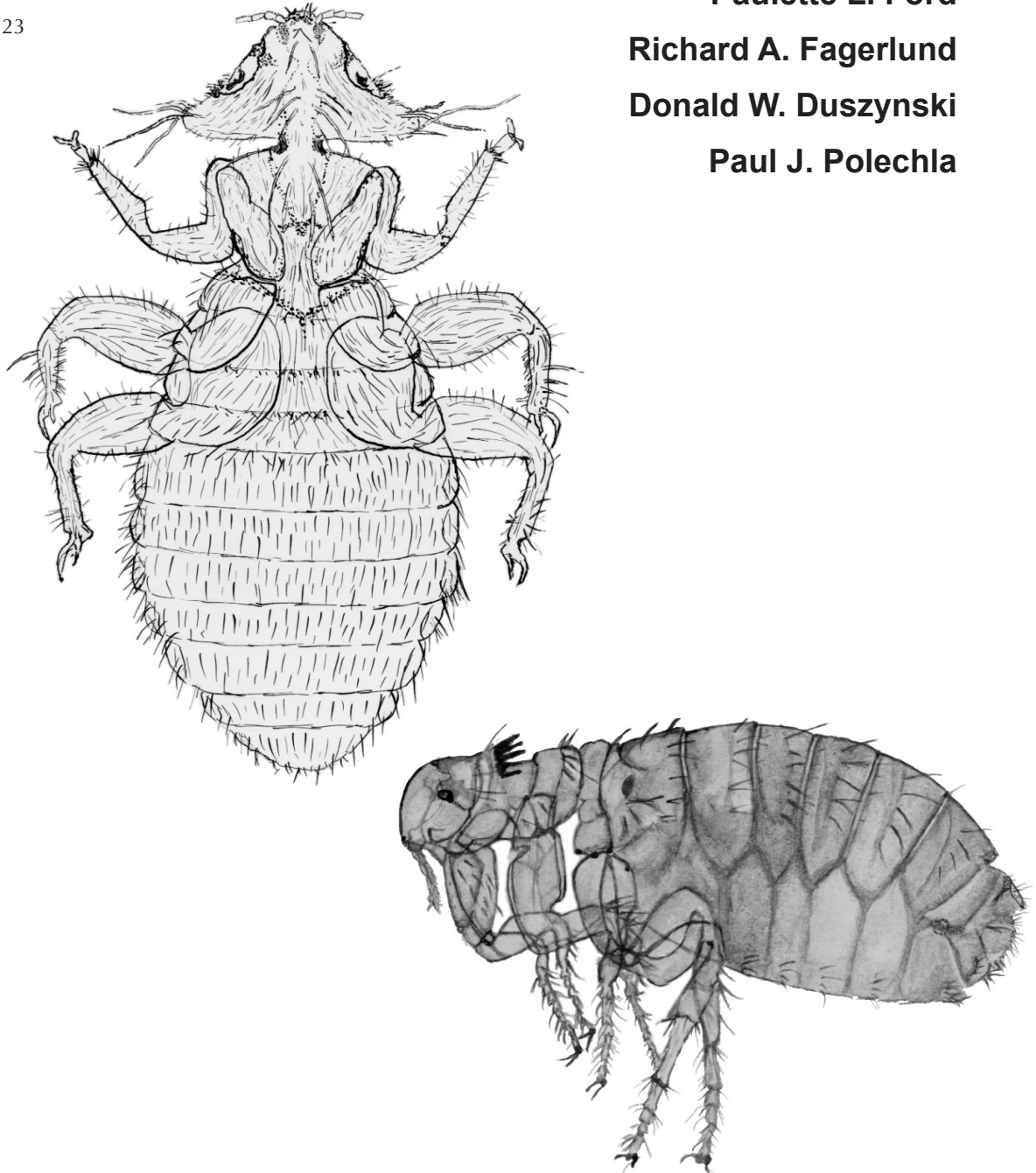
General Technical
Report RMRS-GTR-123

February 2004



Fleas and Lice of Mammals in New Mexico

Paulette L. Ford
Richard A. Fagerlund
Donald W. Duszynski
Paul J. Polechla



Ford, Paulette L.; Fagerlund, Richard A.; Duszynski, Donald W.; Polechla, Paul J. 2004. **Fleas and lice of mammals in New Mexico**. Gen. Tech. Rep. RMRS-GTR-123. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 57 p.

Abstract

All available records are compiled for three orders of ectoparasites of mammals in New Mexico: fleas (Siphonaptera), sucking lice (Anoplura), and chewing lice (Mallophaga). We have drawn from records at the University of New Mexico's Museum of Southwestern Biology, the Vector Control Program of the New Mexico Environment Department, the Environmental Health Department of the City of Albuquerque, and several private collections. We list 99 species of fleas, 27 species of sucking lice, and two species of chewing lice. Included are appendices that list recorded ectoparasite species and their hosts in New Mexico and the counties associated with host ectoparasite infestations. We report at least four new state host records for fleas.

Keywords: Anoplura, chewing lice, ectoparasite, flea, lice, louse, Mallophaga, New Mexico mammalian hosts, Siphonaptera, sucking lice

The Authors

Paulette Ford is a Research Ecologist with the USDA Forest Service, Rocky Mountain Research Station, in Albuquerque, NM. She holds an M.S. in biology from the University of New Mexico and a Ph.D. in Renewable Natural Resources from the University of Arizona. She has worked extensively in Latin America and the American Southwest on research ranging from the systematics of parasites and amphibians to small mammal and amphibian community structures in deserts, grasslands, and tropical deciduous forests. **Richard Fagerlund** is an Integrated Pest Management Coordinator with the University of New Mexico. He currently has a newspaper column in the Albuquerque Tribune on pest control and is the author of four books on insects. **Donald Duszynski** is a Professor of Biology at the University of New Mexico. He has an M.S. and Ph.D. from the Department of Zoology at Colorado State University. He has been at UNM since 1970 and specializes in endoparasites of wild mammals, especially the coccidian or parasitic protists. **Paul Polechla** is a Research Associate Professor at the University of New Mexico in the biology department's Museum of Southwestern Biology Mammal Division. He earned his M.S. at Eastern New Mexico University and his Ph.D. at the University of Arkansas. He was a member of the Southwestern Zoonotic Disease Program (1996-2000) studying hantavirus and deer mice (*Peromyscus maniculatus*) ecology. His interests are mammalian ecology with an emphasis on predator-prey and host-parasite relationships.

*cover illustrations by: Johnna Autumn Strange.
Louse (upper), flea (lower).*

You may order additional copies of this publication by sending your mailing information in label form through one of the following media. Please specify the publication title and series number.

Fort Collins Service Center

| | |
|------------------------|--|
| Telephone | (970) 498-1392 |
| FAX | (970) 498-1396 |
| E-mail | rschneider@fs.fed.us |
| Web site | http://www.fs.fed.us/rm |
| Mailing address | Publications Distribution Rocky Mountain Research Station 240 West Prospect Road Fort Collins, CO 80526 |

Rocky Mountain Research Station
Natural Resources Research Center
2150 Centre Avenue, Building A
Fort Collins, CO 80526

Contents

| | |
|--|----|
| Acknowledgments | ii |
| Introduction | 1 |
| Fleas (Order Siphonaptera). | 2 |
| General | 2 |
| Development | 2 |
| Diseases Carried/Caused/Transmitted | 2 |
| Control | 4 |
| Sucking Lice (Order Anoplura) | 4 |
| General | 4 |
| Development | 5 |
| Diseases Carried/Caused/Transmitted | 5 |
| Control | 6 |
| Chewing Lice (Order Mallophaga). | 6 |
| General | 6 |
| Development | 6 |
| Diseases Carried/Caused/Transmitted | 6 |
| Control | 7 |
| Guide to Checklist Format | 8 |
| Host List—New Mexico Mammals and Their Ectoparasites | 9 |
| Order Artiodactyla | 9 |
| Order Carnivora | 9 |
| Order Chiroptera | 12 |
| Order Insectivora | 13 |
| Order Lagomorpha | 13 |
| Order Perissodactyla | 16 |
| Order Primates | 16 |
| Order Rodentia | 17 |
| References | 39 |
| Appendix A. New Mexico Ectoparasites and Their Mammal Hosts. | 42 |
| Order Siphonaptera (Fleas). | 42 |
| Order Anoplura (Sucking Lice) | 49 |
| Order Mallophaga (Chewing Lice). | 50 |
| Appendix B. New Mexico County Records | 51 |
| Fleas (Siphonaptera). | 51 |
| Lice (Order Anoplura and Order Mallophaga) | 56 |

Acknowledgments

We wish to thank the following people and institutions: Sandra Brantley for her extensive work with the manuscript and the arthropod collections; Lee Couch for compiling the data, editing, and organizing the final manuscript; Dawn Chen Sun for reviewing the reference material used in the manuscript; Clifford Crawford, Lane Eskew, and Deborah Finch for reviewing multiple drafts of the manuscript and making many valuable suggestions; and Terrence Enk, New Mexico Department of Game and Fish, for specific consultation. Thanks to Ted Brown and Pamela Reynolds, New Mexico Environment Department; New Mexico Environment Department's Vector Control Program; Rudy Bueno, City of Albuquerque Environmental Health Department; Cheryl Parmenter and Kim Heckscher-Decker, Department of Biology, UNM and the Sevilleta Long Term Ecological Research (LTER) Program; Dwayne Salazar, DJ's Pest Control, Albuquerque, NM; and David C. Lightfoot, Sevilleta LTER, Jornada LTER, and Bandelier National Monument for supplying information, specimens, and identifications. We also thank Terry Yates, principal investigator of the small mammal hantavirus studies and Jon Dunnum, Brian Frank, W. Scott Knapp, Kimberly Leuthner, and Todd Meinecke for assistance in trapping small mammals that supplied specimens; Peggy Case for contributing ectoparasites from lagomorphs; and the Bureau of Land Management, the National Institutes of Health, Centers for Disease Control and Prevention (CDC), and the Bureau of Indian Affairs for funding mammal studies that contributed data to this document. This manuscript is dedicated to Michael J. Patrick, assistant professor of biology at Pennsylvania State University, who contributed many of the host animals and flea descriptions that are included in the checklist. Dr. Patrick died 10 March 2000.

Fleas and Lice From Mammals in New Mexico

Paulette L. Ford, Richard A. Fagerlund,
Donald W. Duszynski, and Paul J. Polechla

Introduction

The purpose of this work is to provide baseline data of what is known and can be documented about the fleas and lice of New Mexico mammals. Within that context, we summarize the publications on this topic, document the fleas and lice that are accessioned into the Arthropod Division of the University of New Mexico's Museum of Southwestern Biology (UNM-MSB), and provide some general information about the biology of fleas and lice and the potential disease agents they may transmit to other mammals in New Mexico, including humans. Since infestations of fleas, sucking lice, and chewing lice in humans, domesticated animals, and wildlife may lead to discomfort, debilitating disease, and/or death, this information has implications for, but not limited to, federal, state, and private land managers, scientists, public health officials, and the general public.

New Mexico has the distinction of having one of the highest diversities of land mammals in the United States. There are approximately 150 extant, native mammal species representing eight orders, 25 families, and 71 genera in the state (Frey and Yates 1996). The potential for flea and louse diversity is, therefore, very great. In addition, when non-native mammals are introduced into the state or increase their range(s) from adjacent states, they bring with them their ectoparasites that may be transmitted to endemic species.

In this manuscript we compile all available records for three orders of ectoparasites of mammals in New Mexico: fleas (Siphonaptera), sucking lice (Anoplura), and chewing lice (Mallophaga). There is a lack of information about these ectoparasites, due to the low numbers of the host species studied and to the fact that not all areas of the state have been sampled thoroughly for fleas. Although there is some information on fleas from certain parts of the state, such as Santa Fe County, much less is known about the lice in New Mexico. There are few records of chewing lice from this state's mammals, and most of the recent records of sucking lice have come from small mammal population studies at the Sevilleta National Wildlife Refuge (SNWR) near Socorro, New Mexico.

Of the 150 mammal species in New Mexico that potentially act as host to one or more species of fleas and lice, only 82 are documented to host these ectoparasites. These reports are widespread temporally and geographically, and most represent only one collection event from one locality. A total of 99 species of fleas, 27 species of sucking lice, and two species of chewing lice are known and documented from New Mexico mammals. However, should every mammal species be thoroughly surveyed throughout its known range, the number of flea and lice species on New Mexico mammals would clearly be much higher than this. For example, we already have documented that at least 29 New Mexico mammals have 10 or more species of fleas recorded from them. For these reasons, it is clear that the study of the mammalian fleas and lice parasitizing New Mexico mammals is in need of attention.

Vertebrate biologists, who work in the field in New Mexico, can play a pivotal role in our understanding of the diversity and distribution of ectoparasites infesting this state's mammal (and other terrestrial vertebrate) populations by properly collecting specimens from study animals. The methods for collecting and preserving ectoparasites in the field are simple yet important:

1. Collect the organism(s) from the surface of the host and place them in a vial or other container with 70 percent ethanol or similar alcohol (see Gardner 1996 and Whitaker 1982 for more specific details).
2. Using a No. 2 pencil or indelible (India) ink pen, write the following information on a small label to be placed into the collection vessel: careful and correct identity of the host animal, its precise location of collection, the sex of the animal and its approximate age (juvenile, adult), the date (mm/dd/yy), and your name and collection number (if any).
3. Send or take specimens to the Arthropod Division, UNM-MSB. If possible, the host animal (symbio-type host, see Frey and others 1992; Brooks 1993) should be collected and also taken to the Mammal Division, UNM-MSB, or placed in another accredited museum.

For each of the three orders of ectoparasites covered in this annotated list, we present information on

their general biology, their development, diseases they can carry and/or transmit, and the means of controlling them. Mammalian hosts from which we have reliable ectoparasite records are grouped alphabetically by order, and within their order, by family, genus, and species. Under each host species is a list of the specific type of ectoparasites known, the New Mexico counties in which they were collected, the UNM-MSB voucher number if available, any remarks that are appropriate to that parasite or its host, and pertinent reference material(s).

Fleas (Order Siphonaptera)

General

Fleas are small, wingless, hematophagous (blood feeding) insects that are compressed laterally and range in size from about 1 up to several millimeters in length. The head is roughly triangular in shape and usually bears a pair of conspicuous black eyes. The entire body, including legs, is covered with bristles and small spines. Approximately 2,500 species and subspecies belonging to 239 genera have been named to date (Roberts and Janovy 2000; Service 2000). They are all ectoparasites of warm-blooded (homiothermic) vertebrate hosts (birds, mammals), and both male and female adults feed on blood. About 94 percent of known species infest mammals, with the remainder infesting birds. Some fleas are highly specific, known from only one host species (Thomas 1996). However, most flea species have one or two preferred host species, others are more euryxenous (generalists) in their feeding preference and are known to parasitize hosts of a particular genus or family of hosts, and still others are cosmopolitan, feeding on virtually any vertebrate host they should chance upon (Thomas 1996). Conversely, some host species are known to harbor only one flea species while, at the other extreme, a few host species have been found to host more than 50 flea species throughout their range (Thomas 1988).

Fleas, like all insects, have three pairs of legs, but theirs are powerful and specialized for jumping, especially the longer hind legs. Some fleas can jump more than 100 times their body length and/or can execute a standing jump more than 120 times their height. In doing this, they can reach an acceleration of 140 times gravity in little more than a millisecond. How they can accomplish such extraordinary feats is not completely understood (Roberts and Janovy 2000). We do not understand yet the exact necessity of possessing such ability (e.g., avoiding predation, moving from host to host, demonstrating good genes in sexual selection).

Development

Fleas are all holometabolous, i.e., they undergo a complete metamorphosis with (usually) four distinct developmental stages between the egg and the adult. Egg laying behavior of adult fleas is almost always adapted and co-evolved to the behavior of the host upon which it lives (Kim 1985). Usually, females ready to oviposit leave the host to deposit eggs in the host's immediate or general territory (nest or burrow); in a few species, the female remains on the host, but her smooth eggs usually fall to the ground. Off the host, eggs are laid in/near cracks and crevices among dust, dirt, and debris. Generally, eggs hatch in a relatively short period of time (2-21 days), but this depends on environmental conditions (especially rodent burrow temperature and humidity) (Thomas 1996; Roberts and Janovy 2000; Service 2000). The stage that hatches from the egg is called larva (1st instar) because it does not look like the adult; it later will molt twice producing successive instars. Each of the three instars usually requires some blood in its diet, but this is not taken directly from feeding on a host. Rather, they ingest dried feces from adult fleas along with other debris from their immediate environment (fur, feathers) or, in some extreme cases, feed on fecal blood as it passes directly from the anus of their mother or another feeding adult, while they are attached to that adult's abdomen (Thomas 1996). The 3rd instar flea larva will spin a silken cocoon, or pupal case, often embedded with surrounding detritus, and enter the pupal stage. The pupa remains within its case and undergoes metamorphosis to the adult body form; it stays within the cocoon in the adult form--sometimes for weeks, months, or even up to one year--until certain host recognition factors stimulate it to leave the cocoon.

Upon hatching, the adult fleas must take a blood meal before mating and egg production occurs. In some species, certain growth hormones in the blood of the host may trigger the fleas to mate and lay eggs. Under adverse conditions (host absence), adult fleas can survive long periods without food (e.g., in nests, tunnels), especially under conditions of high humidity (Roberts and Janovy 2000). Unlike adults, however, larvae cannot tolerate extremes in relative humidity and will die if the humidity is either too high or too low (Service 2000).

Diseases Carried/Caused/Transmitted

Fleas are primarily a nuisance due to the considerable discomfort, irritation, and annoyance caused by their bites. The most common nuisance flea is the cat flea, *Ctenocephalides felis*. Other fleas of lesser importance

are the dog flea, *C. canis*, and the so-called human flea, *Pulex irritans*. Fleas of other domesticated animals may be of local importance. Fleas frequently bite humans on the ankles and legs, but at night during sleep, people may be bitten all over the body. Intense itching may result in a person becoming sensitized, and children usually experience greater discomfort than older persons (Service 2000). Some fleas of wild animals are important vectors of disease; these are summarized below.

Plague

Plague is primarily a disease of wild animals (a zoonosis), especially rodents. Over 200 mammal species have been shown to harbor plague bacteria, with some species being particularly susceptible. Prairie dogs, especially *Cynomys gunnisoni*, are uniformly susceptible to fatal infections with plague, and large proportions (99 percent) or even entire populations have been destroyed in a single epizootic event (Lechleitner and others 1962; Hubbard and Schmitt 1984).

Plague is caused by a bacterium, *Yersinia pestis* (syn. *Pasturella pestis*); it is of Old World origin and throughout history has been referred to as the “Black Death.” The profound impact of plague on humans and on human history, more than any other single infectious agent ever, is summarized by Hubbard and Schmitt (1984), Roberts and Janovy (2000), and Marquardt and others (2000).

Plague was first discovered in North America from California ground squirrels (*Spermophilus beecheyi*) in 1905 (Barnes 1982). It was first detected in native New Mexico rodents in 1938 (Laney 1950), and the first documented human case of plague in New Mexico occurred in 1949 (Rollag and others 1981). In the United States, at least 19 different flea species have been found to bite humans, but species in more than 50 genera are important globally as potential vectors of plague. As of 1982, 18 rodent species (two lagomorphs and nine carnivores) were documented to have been infected by plague in New Mexico (Brown, undated). At least 33 species of flea have tested positive as vectors of sylvatic plague in New Mexico (Fagerlund and others 2001).

The normal cycle of plague transmission is between wild rodents and their fleas in nature and is termed sylvatic, campestral, rural, or endemic plague. When plague bacteria are transmitted to rats living in close association with people, such as in rat-infested slums, fleas (particularly, *Xenopsylla cheopis*) that normally feed on rats may turn their attention to humans. Rats infected with plague bacteria may develop acute and fatal septicemia. Upon the death of the host, infected fleas will leave this host and feed on humans.

When fleas ingest bacteria along with blood from infected rodents, the bacteria multiply rapidly in the gut of the flea to the extent that their mass blocks the passage of later blood meals through the flea’s proventriculus. Thus, when the flea feeds again, the blood it takes in cannot pass the obstruction, becomes contaminated with bacteria, and is regurgitated back into the bite wound. Interestingly, the ability of various flea species to allow rapid growth of *Y. pestis* organisms that block the gut is a deciding factor of the efficacy of the flea as a good vector (Roberts and Janovy 2000).

Plague manifests itself in humans in one of three forms: bubonic, pneumonic, or septicemic. The most common, bubonic, causes swollen lymph nodes in the groin or armpits. These swellings or “buboes” can get as big as chicken eggs and occur in about 75 percent of all human cases during epidemics. Pneumonic plague occurs when the lungs are heavily involved and produces a pneumonia-like condition that is highly contagious to other humans. Septicemic plague is a generalized blood infection, often with little or no prior lymph node involvement (Roberts and Janovy 2000). Humans become infected with plague by being bitten by a *Yersinia pestis* infected flea or by handling a dead plague infected animal without gloves (NM Dept. of Health, Office of Epidemiology, pers. comm.).

Plague is most common in temperate regions during summer and autumn months and in the tropics during the cooler months. Heat and dryness negatively impact the spread of plague. Campestral plague, that seen in animals of open (rather than wooded) areas, is widespread and common in wild rodents and rabbits of the United States west of the 100th meridian. Human cases in these areas occur only sporadically, often after a person has had contact with wild rodents or rabbits and their fleas. New Mexico has had the highest case rate of human plague in the last decade (Roberts and Janovy 2000). For example, during 1988-2002, a total of 112 human cases of plague were reported from 11 western states. The majority, 97 of the 112 cases (87 percent), were exposed in the four states of Arizona, California, Colorado, and New Mexico, with 48 of the 97 (49 percent) occurring in New Mexico (CDC 2003).

Murine, Flea-Borne or Endemic Typhus

This form of typhus is caused by *Rickettsia typhi* (= *R. mooseri*), which is virtually identical to *R. prowazekii*, the typhus-causing organism transmitted to humans by body lice (see below). When ingested by the flea, the rickettsiae multiply in its gut, but unlike plague bacilli, they do not cause blockage. Rather, infection of the vertebrate host occurs when infected feces from the flea is

rubbed into abrasions or comes into contact with mucous membranes. The rickettsial organisms also can be released when fleas are crushed as they are biting, and then, inadvertently, their contaminated body juices are rubbed into wounds. Murine typhus is essentially a disease of murine rodents, especially *Rattus* species; it is common in warm climates and also infects a wide range of other small mammals. Murine typhus is transmitted by various fleas including *Xenopsylla*, *Nosopsyllus*, and *Leptopsyllus* species, as well as by the rat louse *Polyplax spinulosa* and the tropical rat mite *Ornithonyssus bacoti*. Transovarial transmission, when the rickettsial organism passes from an infected female flea to its ovaries, also occurs to transmit the infection from egg to larva to adult (Service 2000). In humans, the rickettsial organism causes a rather mild, febrile illness that lasts about two weeks, accompanied by headache, chills, body pain, and rash. The disease affects elderly people more severely than it does the young. Interestingly, the opossum (*Didelphis virginiana*), a New Mexico resident (Bermudez and others 1995), also is a reservoir host for murine typhus, and this species is proliferating in many urban and suburban areas, creating the possibility for resurgence of this disease (Roberts and Janovy 2000; Service 2000).

Myxomatosis

This is a disease of rabbits (Order: Lagomorpha) caused by a *Myxoma* virus that was native to South America, but it has spread to the USA and the UK. It is transmitted by a number of blood sucking arthropods including fleas, mites, and mosquitoes. The disease can and has caused considerable losses in the domestic rabbit (*Oryctolagus cuniculus*) industry.

Other Parasites

The flea *Nosopsyllus fasciatus* transmits the non-pathogenic kinetoplastid protist *Trypanosoma lewisi* from rat to rat. Fleas from dogs (*C. canis*), cats (*C. felis*), and humans (*P. irritans*) can serve as intermediate hosts of *Dipylidium caninum*, a tapeworm that is common in cats (*Felis catus*) and dogs (*Canis familiaris*) and can be transmitted to humans, especially children. Certain tapeworms of mice and rats also can be transmitted from host to host: *Nosopsyllus fasciatus* and *X. cheopis* for the rat tapeworm; and *Hymenolepis diminuta*, *X. cheopis*, *C. felis*, *C. canis*, and *P. irritans* for the mouse tapeworm *H. nana*. (*Hymenolepis nana* is a reasonably common parasite of children who have close contact with flea-infested cats and dogs.) These fleas consume the tapeworm eggs passed in the feces of their vertebrate host; they can act as intermediate hosts by

retaining the tapeworm larval stage, the cysticercoid, in their hemocoel until their metamorphosis to the adult form. Humans can then become infected by the inadvertent ingestion of infected fleas. A filarial nematode (*Dipetalonema reconditum*) that lives in the subcutaneous, connective, and perirenal tissues of dogs can be transmitted from host to host by *C. canis* and *C. felis*. The juvenile stage of the worm, called microfilariae, is ingested by fleas during their blood meals, develops to infective stages in the flea's fat body, migrates to the mouthparts, and then passes to the wound when the flea feeds the next time (Roberts and Janovy 2000). Fleas also may transmit *Francisella tularensis* (tularemia), *Rickettsia conori* (tick-borne typhus), *Coxiella burneti* (Q fever), *Bartonella henselae* (cat-scratch fever), and a few other minor pathogens to humans (Thomas 1996; Service 2000).

Control

For public health reasons, it is important to control fleas of rodents around our homes and on our dog and cat pets. Places that may harbor fleas within our homes, such as under carpets, floor crevices, and pet bedding materials, should be cleaned often. Various insecticidal flea powders and flea collars with slow-release vapors are effective for ridding dogs and cats of these parasites. Recently, novel, non-chemical devices such as light traps with yellow-green filters to which fleas are attracted have been shown to attract fleas from as far away as 8 m (Dryden and Broce 1993; Roberts and Janovy 2000). Finally, it is important to keep areas where livestock are maintained as free as possible from the buildup of manure, debris, and other litter.

Sucking Lice (Order Anoplura)

General

There are only about 500 described species of sucking lice and they are found only on mammals. They have small, wingless bodies that are flattened dorsoventrally. Their head, which is narrower than their prothorax, bears a pair of inconspicuous eyes. Their mouthparts consist of a flexible, sucking tube-like structure called the haustellum, which is armed on the inner surface with minute teeth; the whole structure is retracted into the head when not feeding. Because they introduce their highly modified mouthparts directly into a blood vessel when feeding, they are called true *solenophages* (Greek for pipe + eating). Several species are of considerable importance

on domestic animals, and two or three species parasitize humans and can carry disease-producing microbes.

The two species of Anoplura found on humans are *Pediculus humanus* and *Phthirus pubis*. Some authorities say there are two distinct forms (subspecies) of *P. humanus*, body lice (*P. h. humanus*) and head lice (*P. h. capitis*), while others contend they are separate species, *P. capitis* and *P. humanus* (= *P. corporis*) because of subtle structural differences (Busvine 1978; Roberts and Janovy 2000; Service 2000). In either case, it is widely accepted that body lice descended from ancestral head lice after humans began to wear clothes. People who live in tropical climates often have head lice, but because they wear few clothes, body lice are usually absent. Consequently, body lice are much more prevalent in cooler, temperate regions. Although head lice stay closely associated with head hair, especially on the back of the neck and behind the ears, human body lice are unusual among Anoplura in that they spend most of their time in their host's clothing, intimately visiting their host only to take a blood meal. Both forms are highly contagious, especially under conditions of crowding and poor sanitation where people rarely wash or change their clothes. Thus, they are common in jails, refugee camps, trenches during wartime, and after disasters (wars, floods, earthquakes, etc.) where people are forced to live in unsanitary, overcrowded conditions. In the United States, elementary school children are susceptible to head lice when sharing hats, combs, and brushes.

Phthirus pubis, the "crab" louse of humans, is so-called because its middle and hind pair of legs are larger and stouter than the front pair and have massive claws that superficially resemble crabs' pincers. This species is found primarily in the pubic area, although specimens can be found amongst axillary and facial (i.e., beard, mustache, eyebrows, eyelashes) hair. It is transmitted primarily through sexual contact (Service 2000). Infestations also can arise from discarded clothing and infested bedding. Treatment involves the use of 1 percent permethrin solution available from drugstores.

Anoplura tend to be relatively host-specific, but many exceptions occur. For example, *P. humanus* also can live and breed on pigs (*Sus scrofa*), while *Haematopinus suis* of pigs readily feeds on humans. Other *Haematopinus* species infest cattle (*Bos taurus*), water buffalo (*Bubalus bubalis*), horses (*Equus caballus*), mules (*E. caballus* x *E. asinus*), and donkeys (*E. asinus*). Different *Linognathus* species parasitize cattle, sheep (*Ovis aries*), goats (*Capra hircus*), and dogs. The latter species may specialize on different regions of their host's body (e.g., legs, head), just as *Pediculus* species do on humans. Another species, *Polyplax spinulosa*, infests *Rattus*

species and transmits *Rickettsia typhi*, the causative agent of murine typhus, also carried by fleas (see above).

Development

The eggs of sucking lice, called nits, are cemented to the hair of their host, or in the case of body lice of humans, to fibers in the clothes. A female can produce up to 10 eggs per day and may produce 50-150 (head lice), 150-200 (pubic lice), or 200-300 (body lice) eggs in her life. Each egg has an operculum, or cap, at one end, usually with holes to allow the passage of air and to facilitate hatching. Lice have a hemimetabolous life cycle, meaning that the stage hatching from the egg is called a nymph, because it resembles a small adult. Depending on ambient temperature, eggs hatch in about a week, and the three nymphal stages (instars) require one to four weeks to complete their development to the adult. Nymphal stages also take blood meals, like the adults. Body lice usually do not leave their hosts voluntarily, but they are very sensitive to changes in host body temperature. Thus, they will leave their host's body when it cools after death or when the body heats due to high fever.

Diseases Carried/Caused/Transmitted

Infestation with lice is not life threatening, unless they carry disease-causing microbes. In general, the bites cause red, itching papules which may continue to exude lymph after the bite. Thus, continued scratching may lead to dermatitis and secondary bacterial infections. Years of infestation can lead to darkened, thickened areas of the skin. Allergies that produce severe itching may be caused by repeated inoculation of louse saliva when they bite. If inhaled, louse feces that are dried and become airborne may produce symptoms resembling hay fever. Human body lice can transmit three important diseases.

Louse-Borne, Endemic, or Epidemic Typhus

Typhus is caused by an obligate, intracellular bacterium *Rickettsia prowazekii*. Endemic typhus has had a significant impact on human history (see Zinsser 1934). Typhus epidemics usually coincide with anthropogenic events (war, crowding, stress, poverty, mass migrations) that favor heavy and widespread infestations of body lice; mortality during epidemics may approach 100 percent (Roberts and Janovy 2000). The disease manifests a large suite of symptoms including high fever, back- and headache, malaise, vertigo, flushed face, and petechial rashes on the armpits, flanks, chest,

abdomen, back, and extremities. After about two weeks, the fever drops, profuse sweating begins, and patients become more aware of their condition. At this point, either convalescence results or increased involvement of the central nervous system begins, resulting in death. Interestingly, *R. prowazekii* is a pathogenic, often fatal parasite of the lice themselves. The rickettsial organism invades the louse's gut cells and reproduces to the point that in about 10 days the cells are destroyed, killing the louse. Before death, however, the louse's feces contain massive numbers of rickettsiae, and scratching the louse bite inoculates the organism from the feces into the bite wound. Also, the louse's strong preference for a normal body temperature stimulates it to leave the febrile patient to search for new hosts and, thus, further spreads the disease during epidemics. The rickettsial organisms also can remain infective in louse feces for up to 60 days at room temperature, and humans can become infected with typhus by inhaling dried louse feces. Humans who have survived an initial infection are important reservoir hosts because, although asymptomatic, they are still capable of infecting new lice for years. Both humans and other animal reservoirs could provide the source for new epidemics, here or elsewhere, in the event of invasions, war, famine, or other disasters (Roberts and Jaonvy 2000; Service 2000).

Trench Fever

This is a relatively uncommon and debilitating but non-fatal disease caused by another rickettsial organism, *Bartonella* (= *Rochalimaea*) *quintana*. It also is transmitted by the human body louse. The disease was first documented during World War I (1914-1918) among soldiers in trenches (thus, the name), and it re-appeared again in eastern Europe during World War II (1939-1945). Scattered recent foci of infections have been documented in Bolivia and Mexico, and some cases also have been reported in the United States and Europe, mostly in homeless people (Service 2000).

Relapsing Fever

This disease of humans, also transmitted by the human body louse, is caused by a spirochete, *Borrelia recurrentis*. Spirochetes are ingested during a blood meal but only a few pass from the gut of a louse into its body cavity (haemocoel), where they reproduce and reach enormous numbers. The only way humans are infected is when the louse is crushed on the skin, releasing spirochetes to enter the body through abrasions or mucus membranes (Service 2000). Louse-borne relapsing fever apparently has disappeared from the United States (Roberts and Janovy 2000).

Control

A large variety of over-the-counter products containing insecticides effective against lice are available at most drug and grocery stores. Several, containing permethrin, are incorporated into hair care products like shampoos and cream rinses. Fine-toothed nit combs, hot water washing, machine drying, and/or dry-cleaning clothes will control human body lice. Lice on pets and domestic food animals can be controlled by insecticidal dusts and dips.

Chewing Lice (Order Mallophaga)

General

Chewing lice are wingless, dorsoventrally flattened insects with reduced (or no) eyes. There are about 3,000 named species that infest many bird and mammal species. In fact, the majority of known species are parasites of birds. None, however, have any medical significance for humans or their domesticated animals other than being significant pests. They feed primarily on hair or feathers, but some eat sebaceous secretions, mucus, and sloughed epidermal cells, while others eat the eggs and nymphs of their own species, as well as ectoparasitic mites. They also will eat blood when an irritated host scratches itself to the point of causing bleeding. Most chewing lice are only a few millimeters long and have a head that is broader than their prothorax and lack ocelli. Although many fewer species infest mammals than birds, guinea pigs (*Cavia* spp.), dogs, cats, cattle, horses, mules, asses, sheep, goats, and even Indian elephants (*Elaphas maximus*) all commonly have chewing lice on them. Irritation of the skin can become severe, especially in the young host.

Development

The development of chewing lice, from egg to adult, is similar to that seen in the Anoplura.

Diseases Carried/Caused/Transmitted

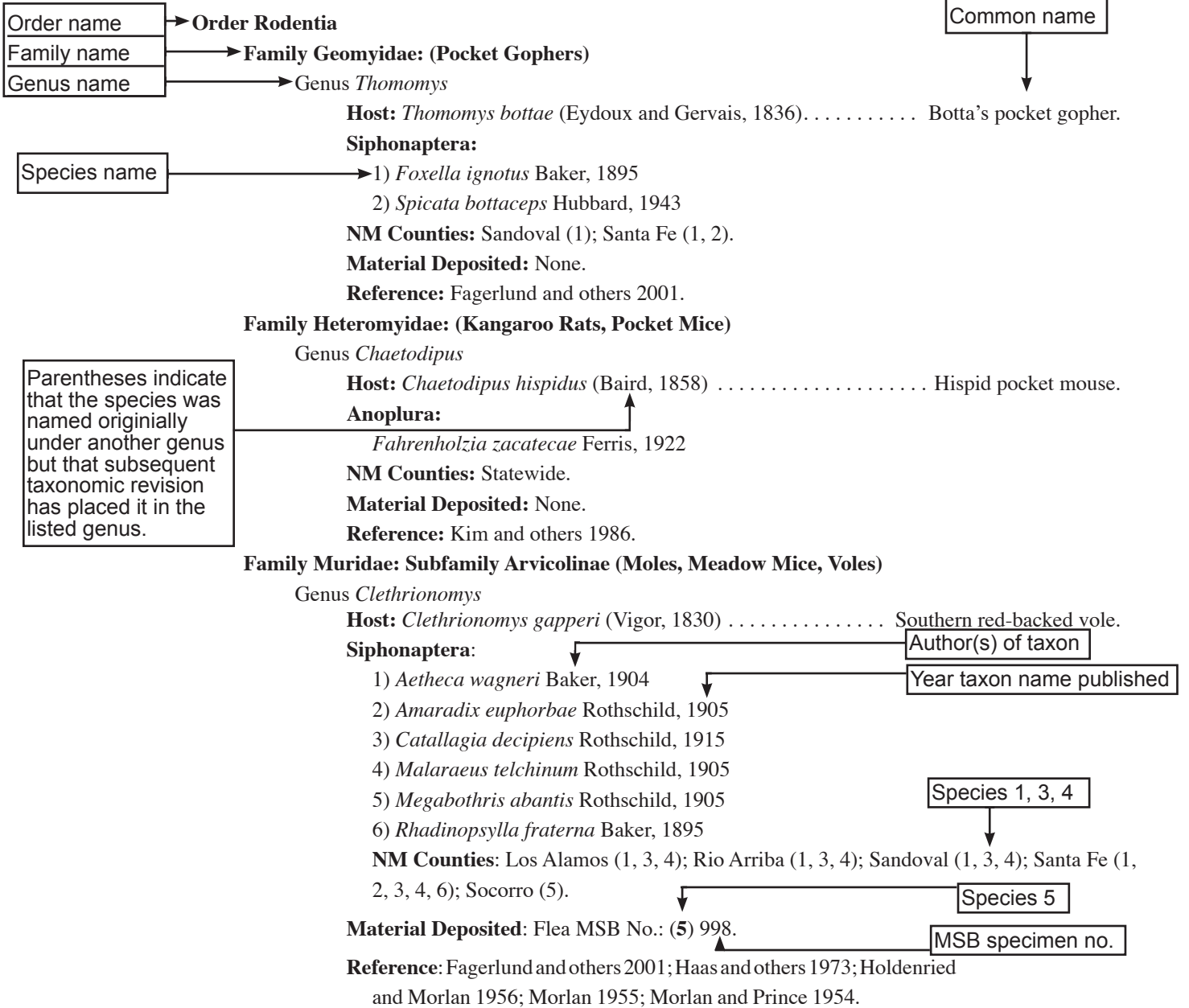
Some chewing lice can act as intermediate hosts for a number of endoparasites of mammals and birds. *Trichodectes canis*, an irritating louse of dogs that can present a severe problem to puppies, is an intermediate host for the double-pored dog tapeworm, *Dipylidium caninum*, which also can develop in people who may accidentally ingest these insects while playing with or

petting their pets. The worms are transmitted when the mallophagan picks up the microfilariae by chewing on skin and eating blood from minor wounds.

Control

Mammals help control biting and other lice by grooming themselves or others. Rodents such as kangaroo rats take dust baths, which may act as a way to rid themselves of chewing lice. Other control measures are similar to those listed above for sucking lice.

Guide to Checklist Format



Host List—New Mexico Mammals

Class Mammalia

Order Artiodactyla

Family Cervidae: (Deer and Elk)

Genus *Odocoileus*

Host: *Odocoileus hemionus* (Rafinesque, 1817) Mule deer.

Siphonaptera:

Ctenocephalides felis Bouche, 1835

NM Counties: Santa Fe.

Material Deposited: Flea MSB No.: 762.

Remarks/Observations: New state host record.

Reference: MSB Collection.

Family Bovidae: (Antelopes, Cattle, Goats, and Sheep)

Genus *Capra*

Host: *Capra hircus* Linnaeus, 1758 Domestic goat.

Anoplura:

Linognathus africanus Kellogg and Paine, 1911

NM Counties: Bernalillo.

Material Deposited: None.

Reference: Kim and others 1986.

Genus *Ovis*

Host: *Ovis aries* Linnaeus, 1758 Mouflon.

Anoplura:

Linognathus africanus Kellogg and Paine, 1911

NM Counties: Bernalillo.

Material Deposited: None.

Reference: Kim and others 1986.

Order Carnivora

Family Canidae: (Dogs)

Genus *Canis*

Host: *Canis familiaris* Linnaeus, 1758 Domestic dog.

Siphonaptera:

1) *Euhoplopyllus glacialis* Taschenberg, 1880

2) *Ctenocephalides felis* Bouche, 1835

3) *Pulex irritans* Linnaeus, 1758

4) *Spilopsyllus inaequalis* Baker, 1895

Anoplura:

5) *Linognathus setosus* (von Olfers, 1816)

NM Counties: Bernalillo (2, 5); Sandoval (1, 3, 4).

Material Deposited: Flea MSB No.: (2) 1567.

Reference: Haas and others 1973; MSB Collection.

Host: *Canis latrans* Say, 1823 Coyote.

Siphonaptera:

1) *Euhoplopsyllus glacialis* Taschenberg, 1880

2) *Spilopsyllus inaequalis* Baker, 1895

Anoplura:

3) *Linognathus setosus* (von Olfers, 1816)

NM Counties: Bernalillo (3); Sandoval (1, 2).

Material Deposited: Flea MSB No.: (1) 859.

Reference: Haas and others 1973.

Genus *Urocyon*

Host: *Urocyon cinereoargenteus* (Schreber, 1775) Gray fox.

Siphonaptera:

1) *Echidnophaga gallinaceus* Westwood, 1875

2) *Euhoplopsyllus affinis* Baker, 1904

3) *Foxella ignotus* Baker, 1895

4) *Pulex irritans* Linnaeus, 1758

5) *Pulex simulans* Baker, 1895

6) *Spilopsyllus inaequalis* Baker, 1895

NM Counties: Bernalillo (1, 2, 3, 4, 5, 6); Socorro (1, 2, 3, 4, 5, 6).

Material Deposited: Flea MSB No.: (5) 830.

Reference: Patrick and Harrison 1995.

Genus *Vulpes*

Host: *Vulpes macrotis macrotis* Merriam, 1888 Kit fox.

Siphonaptera:

1) *Euhoplopsyllus affinis* Baker, 1904

2) *Foxella apachinus* C. Fox, 1914

3) *Orchopeas agilis* Rothschild, 1905

4) *Orchopeas caedens* Jordan, 1925

5) *Oropsylla montanus* Baker, 1895

6) *Pleochaetis exilis* Jordan, 1937

7) *Pulex irritans* Linnaeus, 1758

8) *Pulex simulans* Baker, 1895

9) *Spilopsyllus inaequalis* Baker, 1895

10) *Stenistomera alpina* Baker, 1895

NM Counties: Chaves (1, 3, 4, 7, 8); DeBaca (6, 7); Eddy (4); Luna (7);

McKinley (2, 4, 5, 7, 10); San Juan (8, 9); Socorro (6); Torrance (7).

Material Deposited: None.

Reference: Harrison and others 2003.

Host: *Vulpes velox velox* (Say, 1823) Swift fox.

Siphonaptera:

1) *Echidnophaga gallinaceus* Westwood, 1875

2) *Euhoplopsyllus affinis* Baker, 1904

3) *Orchopeas agilis* Rothschild, 1905

4) *Orchopeas caedens* Jordan, 1925

5) *Pulex irritans* Linnaeus, 1758
6) *Pulex simulans* Baker, 1895
NM Counties: Chaves (5, 6); Dona Ana (3); Eddy (1); Lea (2, 3, 4, 5, 6);
McKinley (3); Roosevelt (5); Sandoval (3); Socorro (3); Union (5).
Material Deposited: Flea MSB No.: (1) 741; (5) 910; (6) 1048.
Reference: Harrison and others 2003.

Host: *Vulpes vulpes* (Linnaeus, 1758) Red fox.

Siphonaptera:

- 1) *Euhoplosyllus affinis* Baker, 1904
- 2) *Pulex simulans* Baker, 1895
- 3) *Spilopsyllus inaequalis* Baker, 1895

NM Counties: McKinley (3); Roosevelt (1, 2); San Juan (2).

Material Deposited: Flea MSB No.: (2) 916. Lice MSB No.: None accessioned.

Reference: Harrison and others 2003.

Family Felidae: (Cats)

Genus *Felis*

Host: *Felis catus* Linnaeus, 1758 House cat.

Siphonaptera:

- 1) *Echidnophaga gallinaceus* Westwood, 1875
- 2) *Euhoplosyllus glacialis* Taschenberg, 1880
- 3) *Pulex irritans* Linnaeus, 1758
- 4) *Spilopsyllus inaequalis* Baker, 1895

NM Counties: Bernalillo (4); Hidalgo (1); Sandoval (2, 3, 4).

Material Deposited: None.

Reference: Haas and others 1973; Jellison and Senger 1976.

Genus *Lynx*

Host: *Lynx rufus* (Schreber, 1777) Bobcat.

Siphonaptera:

- 1) *Euhoplosyllus glacialis* Taschenberg, 1880
- 2) *Foxella ignotus* Baker, 1985
- 3) *Spilopsyllus inaequalis* Baker, 1895
- 4) *Stenistomera alpina* Baker, 1895

NM Counties: Sandoval (1, 2, 3, 4).

Material Deposited: None.

Reference: Haas and others 1973.

Family Mephitidae: (Skunks)

Genus *Mephitis*

Host: *Mephitis* sp.

Siphonaptera:

- 1) *Echidnophaga gallinaceus* Westwood, 1875

NM Counties: Santa Fe.

Material Deposited: Flea MSB No.: None accessioned.

Reference: Morlan 1955.

Genus *Spilogale*

Host: *Spilogale gracilis* Merriam, 1890 Western spotted skunk.

Siphonaptera:

- 1) *Anomiopsyllus nudata* Baker, 1898
- 2) *Hoplopsyllus anomalus* Baker, 1904
- 3) *Oropsylla montanus* Baker, 1895

NM Counties: Santa Fe (1, 2, 3).

Material Deposited: None.

Reference: Morlan 1955.

Family Mustelidae: (Badgers and Weasels)

Genus *Mustela*

Host: *Mustela frenata* Lichtenstein, 1831 Long-tailed weasel.

Siphonaptera:

- 1) *Foxella ignotus* Baker, 1895
- 2) *Megabothris abantis* Rothschild, 1905
- 3) *Thrassis pansus* Jordan, 1925
- 4) *Thrassis stanfordi* Wagner, 1936
- 5) *Stenistomera alpina* Baker, 1895

NM Counties: Bernalillo (1); Rio Arriba (1, 3, 4); Sandoval (2).

Material Deposited: Flea MSB No.: (1) 1044.

Reference: Haas and others 1973; Link 1949; Traub and Hoff 1951.

Family Procyonidae: (Raccoons and Relatives)

Genus *Bassariscus*

Host: *Bassariscus astutus* (Lichtenstein, 1830) Ringtail.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Atyphloceras echis* Jordan and Rothschild, 1915
- 3) *Echidnophaga gallinaceus* Westwood, 1875
- 4) *Epitedia stanfordi* Traub, 1944
- 5) *Malaraeus sinomus* Jordan, 1925
- 6) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Meringis arachis* Jordan, 1929
- 8) *Orchopeas sexdentatus neotomae* Augustson, 1943
- 9) *Oropsylla montanus* Baker, 1895
- 10) *Pulex simulans* Baker, 1895
- 11) *Rhadinopsylla goodi* Hubbard, 1941
- 12) *Stenistomera alpina* Baker, 1895
- 13) *Thrassis aridis* Prince, 1944

NM Counties: Bernalillo (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13); Sandoval (3).

Material Deposited: Flea MSB No.: (3) 1464; (8) 883.

Reference: Eads and others 1979, 1987; Fagerlund and others 2001; Haas and others 1973; Jellison and Senger 1976.

Order Chiroptera

Family Molossidae: (Molossid Bats)

Genus *Tadarida*

Host: *Tadarida brasiliensis* I. Geoffroy, 1824 Brazilian free-tailed bat.

Siphonaptera:

Sternopsylla texanus Fox, 1914

NM Counties: Eddy.

Material Deposited: None.

Reference: Jellison and Senger 1976.

Family Vespertilionidae: (Vesper Bats)

Genus *Myotis*

Host: *Myotis thysanoides* Miller, 1897..... Fringed myotis.

Siphonaptera:

Myodopsylla nordina Traub and Hall, 1951

NM Counties: Bernalillo.

Material Deposited: None.

Reference: Traub and Hoff 1951.

Host: *Myotis yumanensis* (H. Allen, 1864) Yuma myotis.

Siphonaptera:

Myodopsylla gentilis Jordan and Rothschild, 1921

NM Counties: Santa Fe.

Material Deposited: None.

Reference: Haas and others 1973.

Order Insectivora

Family Soricidae: (Shrews)

Genus *Sorex*

Host: *Sorex cinereus* Kerr, 1792..... Cinereus shrew.

Siphonaptera:

Corrodopsylla curvata Rothschild, 1915

NM Counties: Sandoval.

Material Deposited: Flea MSB No.: 1560.

Remarks/Observations: New state host record.

Reference: Haas and others 1973; MSB Collection.

Host: *Sorex preblei* Jackson, 1922..... Preble's shrew.

Siphonaptera:

Orchopeas agilis Rothschild, 1905

NM Counties: Sandoval.

Material Deposited: Flea MSB No.: 865.

Remarks/Observations: New state host record.

Reference: MSB Collection.

Order Lagomorpha

Family Leporidae: (Hares)

Genus *Lepus*

Host: *Lepus californicus* Gray, 1837..... Black-tailed jackrabbit.

Siphonaptera:

- 1) *Echidnophaga gallinaceus* Westwood, 1875
- 2) *Euhoplopsyllus affinis* Baker, 1904
- 3) *Euhoplopsyllus glacialis* Taschenberg, 1880
- 4) *Hoplopsyllus anomalus* Baker, 1904
- 5) *Pleochaetis exilis* Jordan, 1937
- 6) *Spilopsyllus inaequalis* Baker, 1895

Anoplura:

- 7) *Haemodipsus setoni* Ewing, 1924

NM Counties: Bernalillo (2, 4); Chaves (3); Curry (3, 7); Dona Ana (2); Grant (1, 2); Santa Fe (2, 4, 5); Torrance (2).

Material Deposited: None.

Reference: Fagerlund and others 2001; Holdenried and Morlan 1956; Jellison and Senger 1976; Kartman 1960; Kohls 1940; Morlan 1955; Pfaffenberger and Valencia 1988; Rodriguez 1977.

Genus *Sylvilagus*

Host: *Sylvilagus audubonii* (Baird, 1858) Desert cottontail.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Echidnophaga gallinaceus* Westwood, 1875
- 4) *Euhoplopsyllus affinis* Baker, 1904
- 5) *Euhoplopsyllus glacialis* Taschenberg, 1880
- 6) *Megarhthroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Meringis bilsingi* Eads and Menzies, 1949
- 8) *Meringis dipodomys* Kohls, 1938
- 9) *Meringis nidi* Williams and Hoff, 1951
- 10) *Meringis rectus* Morlan, 1953
- 11) *Odontopsyllus dentatus* Baker, 1904
- 12) *Orchopeas sexdentatus* Baker, 1904
- 13) *Oropsylla hirsutus* Baker, 1895
- 14) *Polygenis gwynii* C. Fox, 1914
- 15) *Pulex irritans* Linnaeus, 1758
- 16) *Pulex simulans* Baker, 1895
- 17) *Rhadinopsylla fraterna* Baker, 1895
- 18) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 19) *Spilopsyllus inaequalis* Baker, 1895
- 20) *Thrassis campestris* Prince, 1944
- 21) *Thrassis fatus* Jordan, 1925

Anoplura:

- 22) *Haemodipsus setoni* Ewing, 1924
- 23) *Hoplopleura hirsuta* Ferris, 1916

NM Counties: Bernalillo (9); Catron (4); Chaves (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19, 20, 21); Curry (3, 5, 22); Grant (3, 4, 8, 19); Lea (3, 5); Otero (4); Rio Arriba (4, 19); Roosevelt (3, 4, 13, 16, 23); Santa Fe (1, 4, 9, 10, 11, 12, 19).

Material Deposited: Flea MSB No.: (5) 723; (7) 792; (19) 748.

Reference: Clark and others 1971; Eads and others 1987; Graves and others 1974; Holdenried and Morlan 1956; Kartman 1960; Kohls 1940; Link 1949; Miller and others 1970; Morlan 1955;

Pfaffenberger and Valencia 1988; Pfaffenberger and Wilson 1985;
Rail and others 1969; Rodriguez 1977.

Host: *Sylvilagus floridanus* (J.A. Allen, 1890) Eastern cottontail.

Siphonaptera:

- 1) *Euhoplopyllus affinis* Baker, 1904

NM Counties: Sandoval.

Material Deposited: Flea MSB No.: 749.

Reference: MSB Collection.

Host: *Sylvilagus nuttalli* (Bachman, 1837) Mountain cottontail.

Siphonaptera:

- 1) *Euhoplopyllus affinis* Baker, 1904
- 2) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 3) *Odontopsyllus dentatus* Baker, 1904
- 4) *Spilopsyllus inaequalis* Baker, 1895
- 5) *Stenistomera alpina* Baker, 1895

NM Counties: Rio Arriba (1, 4); Sandoval (1, 2, 3, 5).

Material Deposited: None.

Reference: Haas and others 1973; Link 1949; Mendez and Haas 1973.

Host: *Sylvilagus* sp.

Siphonaptera:

- 1) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 2) *Echidnophaga gallinaceus* Westwood, 1875
- 3) *Euhoplopyllus affinis* Baker, 1904
- 4) *Eumolpianus eumolpi* Rothschild, 1905
- 5) *Hoplopyllus anomalus* Baker, 1904
- 6) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Meringis bilsingi* Eads and Menzies, 1949
- 8) *Meringis dipodomys* Kohls, 1938
- 9) *Meringis nidi* Williams and Hoff, 1951
- 10) *Meringis rectus* Morlan, 1953
- 11) *Oropsylla montanus* Baker, 1895
- 12) *Polygenis gwyni* Fox, 1914
- 13) *Pulex irritans* Linnaeus, 1758
- 14) *Rhadinopsylla fraterna* Baker, 1895
- 15) *Thrassis fatus* Jordan, 1925

NM Counties: Bernalillo (3, 4, 5); Chaves (1, 2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15); Sandoval (11).

Material Deposited: None.

Reference: Forcum and others 1969; Jellison and Senger 1976; Kohls 1940.

Family Ochotonidae: (Pikas)

Genus *Ochotona*

Host: *Ochotona princeps* (Richardson, 1828) American pika.

Siphonaptera:

- 1) *Amphalius necopinus* Jordan, 1925
- 2) *Ctenophyllus armatus* Wagner, 1901
- 3) *Megabothris abantis* Rothschild, 1905
- 4) *Megarhroglossus bisetis* Jordan and Rothschild, 1915

- 5) *Megarthroglossus divisus* Baker, 1898
 - 6) *Phalacropsylla morlani* Eads and Campos, 1982
 - 7) *Spilopsyllus inaequalis* Baker, 1895
 - 8) *Stenistomera alpina* Baker, 1895
- NM Counties:** Sandoval (4, 8); Santa Fe (1, 2, 3, 5, 6, 7, 8).

Material Deposited: None.

Reference: Haas and others 1973; Holdenried and Morlan 1956; Mendez and Haas 1973; Morlan 1955.

Order Perissodactyla

Family Equidae: (Equine)

Genus *Equus*

Host: *Equus asinus* Linnaeus, 1758 Ass.

Anoplura:

- 1) *Haematopinus asini* Linnaeus, 1758

Mallophaga:

- 2) *Werneckiella (Bovicola) equi* (Denny, 1842)

NM Counties: Otero (1, 2).

Material Deposited: None.

Reference: Kim and others 1986.

Host: *Equus caballus* Linnaeus, 1758 Horse.

Anoplura:

- 1) *Haematopinus asini* Linnaeus, 1758

Mallophaga:

- 2) *Werneckiella (Bovicola) equi* (Denny, 1842)

NM Counties: Otero (1, 2).

Material Deposited: None.

Reference: Kim and others 1986.

Order Primates

Family Hominidae: (Humans)

Genus *Homo*

Host: *Homo sapiens* Linnaeus, 1758 Human.

Siphonaptera:

- 1) *Pulex irritans*

Anoplura:

- 2) *Pediculus humanus* Linnaeus, 1758

- 3) *Phthirus pubis* (Linnaeus, 1758)

NM Counties: Bernalillo (2, 3); Los Alamos (1); Rio Arriba (1); Sandoval (1); Santa Fe (1).

Material Deposited: None.

Reference: MSB Collection.

Order Rodentia

Family Geomyidae: (Pocket Gophers)

Genus *Thomomys*

Host: *Thomomys bottae* (Eydoux and Gervais, 1836) Botta's pocket gopher.

Siphonaptera:

- 1) *Foxella ignotus* Baker, 1895
- 2) *Spicata botticeps* Hubbard, 1943

NM Counties: Sandoval (1); Santa Fe (1, 2).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1956; Morlan 1955.

Host: *Thomomys talpoides* (Richardson, 1828) Northern pocket gopher.

Siphonaptera:

- 1) *Anomiopsyllus nudata* Baker, 1898
- 2) *Ctenophyllus armatus* Wagner, 1901
- 3) *Dactylopsylla neomexicana* Prince, 1945
- 4) *Eumolpianus eumolpi* Rothschild, 1905
- 5) *Foxella ignotus* Baker, 1895
- 6) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Spicata rara* Fox, 1940

NM Counties: San Miguel (3); Sandoval (5, 7); Santa Fe (1, 2, 4, 5, 6).

Material Deposited: None.

Reference: Haas 1973; Haas and others 1973; Holdenried and Morlan 1956; Morlan 1955; Prince 1945.

Family Heteromyidae: (Kangaroo Rats, Pocket Mice)

Genus *Chaetodipus*

Host: *Chaetodipus hispidus* (Baird, 1858) Hispid pocket mouse.

Anoplura:

- Fahrenholzia zacatecae* Ferris, 1922

NM Counties: Statewide.

Material Deposited: None.

Reference: Kim and others 1986.

Host: *Chaetodipus intermedius* Merriam, 1889 Rock pocket mouse.

Anoplura:

- Fahrenholzia pinnata* Kellogg and Ferris, 1915

NM Counties: Bernalillo, Luna, Otero, Roosevelt, Santa Fe, Socorro.

Material Deposited: None.

Reference: Kim and others 1986; Morlan and Hoff 1957; Pfaffenberger and deBruin 1986.

Genus *Dipodomys*

Host: *Dipodomys merriami* Mearns, 1890 Merriam's kangaroo rat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951

- 3) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 4) *Echidnophaga gallinaceus* Westwood, 1875
- 5) *Euhoplopsyllus affinis* Taschenberg, 1880
- 6) *Eumolpianus eumolpi* Rothschild, 1905
- 7) *Meringis altipecten* Traub and Hoff, 1951
- 8) *Meringis arachis* Jordan, 1929
- 9) *Meringis bilsingi* Eads and Menzies, 1949
- 10) *Meringis dipodomys* Kohls, 1938
- 11) *Meringis disparilis* Eads, 1979
- 12) *Meringis nidi* Williams and Hoff, 1951
- 13) *Meringis parkeri* Jordan, 1937
- 14) *Meringis rectus* Morlan, 1953
- 15) *Orchopeas leucopus* Baker, 1904
- 16) *Oropsylla montanus* Baker, 1895
- 17) *Rhadinopsylla fraterna* Baker, 1895
- 18) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 19) *Thrassis campestris* Prince, 1944
- 20) *Thrassis fatus* Jordan, 1925

Anoplura:

- 21) *Fahrenholzia pinnata* Kellogg and Ferris, 1915
- 22) *Haematopinus asini* Linnaeus, 1758

NM Counties: Chaves (2, 4, 5, 9, 10, 12, 14, 17, 18, 19, 20); Colfax (3); Dona Ana (7, 11); Eddy (11, 12); Hidalgo (8, 12); Luna (7, 11, 21); Otero (9, 12, 14, 21, 22); Rio Arriba (1, 13); Santa Fe (15); Sierra (9, 13); Socorro (5, 6, 15, 16); Valencia (2).

Material Deposited: Flea MSB No.: (2) 794; (4) 714; (6) 724; (7) 1060; (8) 940; (9) 992; (10) 1028; (12) 1003; (13) 956; (15) 838; (16) 1011; (19) 875.

Reference: Barnes and others 1977; Eads 1978; Eads and others 1987; Graves and others 1974; Kim and others 1986; Link 1949; Miller and others 1970; Rail and others 1969; Traub and Hoff 1951.

Host: *Dipodomys ordii* Woodhouse, 1853 Ord's kangaroo rat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Echidnophaga gallinaceus* Westwood, 1875
- 4) *Malaraeus sinomus* Jordan, 1925
- 5) *Meringis altipecten* Traub and Hoff, 1951
- 6) *Meringis arachis* Jordan, 1929
- 7) *Meringis bilsingi* Eads and Menzies, 1949
- 8) *Meringis dipodomys* Kohls, 1938
- 9) *Meringis disparilis* Eads, 1979
- 10) *Merinigs facilis* Eads, 1979
- 11) *Meringis nidi* Williams and Hoff, 1951
- 12) *Meringis parkeri* Jordan, 1937
- 13) *Meringis rectus* Morlan, 1953
- 14) *Orchopeas leucopus* Baker, 1904
- 15) *Peromyscopsylla adelpha* Rothschild, 1915
- 16) *Pleochaetis exilis* Jordan, 1937
- 17) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 18) *Thrassis aridis* Prince, 1944

- 19) *Thrassis bacchi consimilis* Stark, 1957
- 20) *Thrassis campestris* Prince, 1944
- 21) *Thrassis fatus* Jordan, 1925
- 22) *Thrassis pansus* Jordan, 1925

Anoplura:

- 23) *Fahrenholzia pinnata* Kellogg and Ferris, 1915
- 24) *Hoplopleura arboricola* Kellogg and Ferris, 1915
- 25) *Hoplopleura ferrisi* Cook and Beer, 1959
- 26) *Hoplopleura hesperomydis* (Osborn, 1891)
- 27) *Hoplopleura hirsuta* Ferris, 1916
- 29) *Neohaematopinus neotomae* Ferris, 1941
- 30) *Polyplax auricularis* Kellogg and Ferris, 1915

Mallophaga:

- 31) *Goniodes squamatus* Emerson, 1950

NM Counties: Bernalillo (7, 31); Catron (12); Chaves (3, 7, 8, 10, 11, 13, 20); Dona Ana (2, 9); Grant (6); Hidalgo (18); Lea (8, 11, 12, 21); Luna (2, 7, 9); Roosevelt (7, 16, 18, 23, 27, 30); Sandoval (8, 12); Santa Fe (1, 11, 12, 13, 14, 15, 16, 17, 20, 22); Sierra (5, 6); Socorro (4); Torrance (13).

Material Deposited: Flea MSB No.: (3) 732; (4) 1027; (5) 957; (11) 1004; (12) 928; (18) 844; (19) 898.

Reference: Barnes and others 1977; Eads 1978; Eads and others 1987; Fagerlund and others 2001; Graves and others 1974; Haas and others 1973; Holdenried and Morlan 1956; Jellison and Senger 1976; Kartman 1960; Kim 1965; Kim and others 1986; Miller and others 1970; Morlan 1955; Morlan and Prince 1954; Pfaffenberger and deBruin 1986; Prince 1944; Rail and others 1969; Williams and Hoff 1951.

Host: *Dipodomys spectabilis* Merriam, 1890 Banner-tailed kangaroo rat.

Siphonaptera:

- 1) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 2) *Echidnophaga gallinaceus* Westwood, 1875
- 3) *Euhoplopsyllus affinis* Taschenberg, 1880
- 4) *Megarhthroglossus bisetis* Jordan and Rothschild, 1915
- 5) *Meringis altipecten* Traub and Hoff, 1951
- 6) *Meringis arachis* Jordan, 1929
- 7) *Meringis bilsingi* Eads and Menzies, 1949
- 8) *Meringis dipodomys* Kohls, 1938
- 9) *Meringis jamesoni* Hubbard, 1943
- 10) *Meringis nidi* Williams and Hoff, 1951
- 11) *Meringis parkeri* Jordan, 1937
- 12) *Meringis rectus* Morlan, 1953
- 13) *Orchopeas sexdentatus* Baker, 1904
- 14) *Pleochaetis exilis* Jordan, 1937
- 15) *Polygenis gwynii* C. Fox, 1914
- 16) *Pulex irritans* Linnaeus, 1758
- 17) *Pulex simulans* Baker, 1895
- 18) *Rhadinopsylla fraterna* Baker, 1895
- 19) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 20) *Thrassis campestris* Prince, 1944
- 21) *Thrassis fatus* Jordan, 1925
- 22) *Thrassis pansus* Jordan, 1925

Anoplura:

- 23) *Fahrenholzia pinnata* Kellogg and Ferris, 1915
- 24) *Hoplopleura acanthopus* (Burmeister, 1839)
- 25) *Hoplopleura arboricola* Kellogg and Ferris, 1915

NM Counties: Bernalillo (10, 12, 25); Chaves (1, 2, 3, 4, 7, 8, 10, 12, 15, 16, 17, 18, 19, 20, 21); Dona Ana (6, 12); Lincoln (12); Luna (5, 6, 23); San Juan (12); Sandoval (12); Santa Fe (3, 6, 9, 10, 11, 12, 13, 19, 20, 22, 23, 24, 25); Sierra (6); Socorro (6); Valencia (12).

Material Deposited: Flea MSB No.: (2) 718; (5) 944; (6) 926; (8) 951; (10) 938.

Reference: Clark and others 1971; Eads and others 1987; Fagerlund and others 2001; Graves and others 1974; Holdenried and Morlan 1955, 1956; Jellison and Senger 1976; Kim and others 1986; Miller and others 1970; Morlan 1955; Morlan and Prince 1954; Rail and others 1969; Traub and Hoff 1951; Williams and Hoff 1951.

Genus *Perognathus*

Host: *Perognathus flavescens* Merriam, 1889 Plains pocket mouse.

Siphonaptera:

- 1) *Meringis arachis* Jordan, 1929
- 2) *Thrassis pansus* Jordan, 1925

NM Counties: Socorro (1, 2).

Material Deposited: Flea MSB No.: (1) 939; (3) 879.

Reference: MSB Collection.

Host: *Perognathus flavus* Baird, 1855 Silky pocket mouse.

Siphonaptera:

- 1) *Anomiopsyllus nudata* Baker, 1898
- 2) *Epitedia stanfordi* Traub, 1944
- 3) *Euhoplopsyllus affinis* Baker, 1904
- 4) *Meringis arachis* Jordan, 1929
- 5) *Meringis dipodomys* Eads, 1979
- 6) *Meringis facilis* Eads, 1979
- 7) *Meringis jamesoni* Hubbard, 1943
- 8) *Meringis nidi* Williams and Hoff, 1951
- 9) *Meringis parkeri* Jordan, 1937
- 10) *Meringis rectus* Morlan, 1953
- 11) *Orchopeas leucopus* Baker, 1904
- 12) *Oropsylla idahoensis* Baker, 1904

Anoplura:

- 13) *Fahrenholzia pinnata* Kellogg and Ferris, 1915

NM Counties: Chaves (5, 6, 10); Santa Fe (1, 2, 3, 7, 8, 9, 10, 11, 12, 13); Socorro (4, 12); Union (7).

Material Deposited: Flea MSB No.: (4) 1000; (8) 931; (12) 1007.

Reference: Eads 1978; Eads and others 1987; Fagerlund and others 2001; Graves and others 1974; Haas and others 1973; Holdenried and Morlan 1956; Kim and others 1986; Morlan 1955; Rail and others 1969.

Family Muridae: Subfamily Arvicolinae (Moles, Meadow Mice, Voles)

Genus *Clethrionomys*

Host: *Clethrionomys gapperi* (Vigor, 1830). Southern red-backed vole.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amaradix euphorbae* Rothschild, 1905
- 3) *Catallagia decipiens* Rothschild, 1915
- 4) *Malaraeus telchinum* Rothschild, 1905
- 5) *Megabothris abantis* Rothschild, 1905
- 6) *Rhadinopsylla fraterna* Baker, 1895

NM Counties: Los Alamos (1, 3, 4); Rio Arriba (1, 3, 4); Sandoval (1, 3, 4); Santa Fe (1, 2, 3, 4, 6); Socorro (5).

Material Deposited: Flea MSB No.: (5) 998.

Reference: Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1956; Morlan 1955; Morlan and Prince 1954.

Genus *Microtus*

Host: *Microtus longicaudus* (Merriam, 1888) Long-tailed vole.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Catallagia decipiens* Rothschild, 1915
- 3) *Delotelis telegoni* Rothschild, 1905
- 4) *Eumolpianus eumolpi americanus* Hubbard, 1950
- 5) *Hystrichopsylla dippiei* Rothschild, 1902
- 6) *Malaraeus telchinum* Rothschild, 1905
- 7) *Megabothris abantis* Rothschild, 1905
- 8) *Megarthroglossus bisetis* Jordan and Rothschild, 1915
- 9) *Oropsylla idahoensis* Baker, 1904
- 10) *Peromyscopsylla adelpha* Rothschild, 1915
- 11) *Peromyscopsylla hamifer vicens* Jordan, 1837
- 12) *Peromyscopsylla selenis* Rothschild, 1906

Anoplura:

- 13) *Hoplopleura acanthopus* (Burmeister, 1839)
- 14) *Hoplopleura hesperomydis* (Osborn, 1891)

NM Counties: Sandoval (1, 2, 5, 6, 7, 8, 9, 10, 11); Santa Fe (1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas 1973; Haas and others 1973; Holdenried and Morlan 1956; Kim and others 1986; Mendez and Haas 1973; Morlan 1955.

Host: *Microtus mexicanus* (Saussure, 1861) Mexican vole.

Siphonaptera:

- 1) *Ctenophthalmus pseudagyrtis* Baker, 1904
- 2) *Hystrichopsylla dippiei* Rothschild, 1902
- 3) *Plusaetis equatorius asetis* Traub, 1950

NM Counties: Socorro (1, 2, 3).

Material Deposited: Flea MSB No.: (1) 743; (2) 1017; (3) 947.

Reference: Fagerlund and others 2001; MSB Collection.

Host: *Microtus montanus* (Peale, 1848) Montane vole.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Catallagia decipiens* Rothschild, 1915

- 3) *Corrodopsylla curvata* Rothschild, 1915
- 4) *Dactylopsylla bluei* Fox, 1909
- 5) *Foxella ignotus* Baker, 1895
- 6) *Hystrichopsylla dippiei* Rothschild, 1902
- 7) *Malaraeus telchinum* Rothschild, 1905
- 8) *Megabothris abantis* Rothschild, 1905
- 9) *Peromyscopsylla hamifer vigens* Jordan, 1937
- 10) *Peromyscopsylla selenis* Rothschild, 1906
- 11) *Spicata rara* Fox, 1940

NM Counties: San Miguel (4); Sandoval (1, 2, 3, 5, 6, 7, 8, 9, 10, 11).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas 1973; Haas and others 1973.

Host: *Microtus pennsylvanicus* (Ord, 1815). Meadow vole.

Siphonaptera:

- 1) *Megabothris megacolpus* Jordan, 1929
- 2) *Peromyscopsylla hamifer vigens* Jordan, 1937
- 3) *Peromyscopsylla selenis* Rothschild, 1906

NM Counties: Colfax (1); San Miguel (2, 3); Sandoval (2, 3).

Material Deposited: None.

Reference: Johnson and Traub 1954.

Host: *Microtus* sp.

Siphonaptera:

- 1) *Catallagia decipiens* Rothschild, 1915
- 2) *Megabothris abantis* Rothschild, 1905
- 3) *Meringis parkeri* Jordan, 1937
- 4) *Eumolpianus eumolpi* Rothschild, 1905

NM Counties: Rio Arriba (1, 2, 3, 4).

Material Deposited: None.

Reference: Link 1949.

Subfamily Murinae: (Old World Rats and Mice)

Genus *Mus*

Host: *Mus musculus* Linnaeus, 1758 House mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904

NM Counties: Sandoval.

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas and others 1973.

Genus *Rattus*

Host: *Rattus norvegicus* (Berkenhout, 1769). Brown rat.

Siphonaptera:

- 1) *Echidnophaga gallinaceus* Westwood, 1875
- 2) *Nosophyllus fasciatus* Bosc, 1800
- 3) *Xenopsylla cheopis* Rothschild, 1903

NM Counties: Bernalillo (1, 2, 3); Chaves (1); Hidalgo (3); Valencia (2).

Material Deposited: None.

Reference: Becker 1947; Prince 1943.

Host: *Rattus rattus* (Linnaeus, 1758) House rat.

Siphonaptera:

Xenopsylla cheopis Rothschild, 1903

NM Counties: Hidalgo.

Material Deposited: None.

Reference: Becker 1947; Prince 1943.

Subfamily Sigmodontinae: (New World Rats and Mice)

Genus *Neotoma*

Host: *Neotoma albigula* Hartley, 1894. White-throated woodrat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus hiemalis* Eads and Menzies, 1948
- 3) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 4) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 5) *Anomiopsyllus nudata* Baker, 1898
- 6) *Atyphloceras echis* Jordan and Rothschild, 1915
- 7) *Echidnophaga gallinaceus* Westwood, 1875
- 8) *Epitedia stanfordi* Traub, 1944
- 9) *Hoplopsyllus anomalus* Baker, 1904
- 10) *Malaraeus sinomus* Jordan, 1925
- 11) *Megarhthroglossus bisetis* Jordan and Rothschild, 1915
- 12) *Megarhthroglossus divisus* Baker, 1898
- 13) *Megarhthroglossus procus* Jordan and Rothschild, 1915
- 14) *Meringis altipecten* Traub and Hoff, 1951
- 15) *Meringis arachis* Jordan, 1929
- 16) *Meringis jamesoni* Hubbard, 1943
- 17) *Meringis nidi* Williams and Hoff, 1951
- 18) *Meringis parkeri* Jordan, 1937
- 19) *Meringis rectus* Morlan, 1953
- 20) *Orchopeas agilis* Rothschild, 1905
- 21) *Orchopeas leucopus* Baker, 1904
- 22) *Orchopeas sexdentatus* Baker, 1904
- 23) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 24) *Oropsylla montanus* Baker, 1895
- 25) *Peromyscopsylla hesperomys* Baker, 1904
- 26) *Phalacropsylla hamata* Tipton and Mendez, 1968
- 27) *Pleochaetis exilis* Jordan, 1937
- 28) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 29) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 30) *Stenistomera alpina* Baker, 1895
- 31) *Stenistomera macrodactyla* Good, 1942
- 32) *Thrassis bacchi consimilis* Stark, 1957
- 33) *Thrassis campestris* Prince, 1944
- 34) *Thrassis pansus* Jordan, 1925

Anoplura:

- 35) *Neohaematopinus neotomae* Ferris, 1941

NM Counties: Bernalillo (3, 4, 11, 12, 22, 25, 26, 30, 35); Catron (3);
Chaves (2); Colfax (3); Dona Ana (4, 14, 17, 20); Eddy (2, 14); Grant
(6); Guadalupe (11); Hidalgo (4, 14, 15); Lea (2, 7, 22); Lincoln (3,
4, 12); Luna (4); McKinley (20); Otero (4, 12); Rio Arriba (1, 4, 7,

22, 23); San Juan (4); Sandoval (11, 13, 29); Santa Fe (1, 3, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17, 18, 19, 21, 22, 23, 24, 28, 30, 31, 33, 34, 35); Sierra (4); Socorro (3, 4, 18, 20, 32); Valencia (4).

Material Deposited: Flea MSB No.: (3) 701; (4) 702; (5) 758; (7) 720; (12) 1008; (13) 1006; (15) 977; (20) 784; (21) 771; (23) 971; (32) 884.

Reference: Barnes and others 1977; Eads and Campos 1982; Eads and others 1987; Fagerlund and others 2001; Good 1942; Haas and others 1973; Holdenried and Morlan 1955, 1956; Kartman 1960; Kim and others 1986; Link 1949; Mendez 1956; Mendez and Haas 1973; Morlan 1955; Morlan and Prince 1954; Tipton and others 1979; Traub and Hoff 1951.

Host: *Neotoma cinerea* (Ord, 1815) Bushy-tailed woodrat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amaradix vonfintelis* Prince, 1959
- 3) *Catallagia decipiens* Rothschild, 1915
- 4) *Hystrichopsylla dippiei* Rothschild, 1902
- 5) *Malaraeus telchinum* Rothschild, 1905
- 6) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Megarhroglossus cavernicolus* Mendez and Haas, 1972
- 8) *Megarhroglossus divisus* Baker, 1898
- 9) *Orchopeas sexdentatus* Baker, 1904
- 10) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 11) *Phalacropsylla allos* Wagner, 1936
- 12) *Rhadinopsylla fraterna* Baker, 1895
- 13) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 14) *Stenistomera alpina* Baker, 1895

NM Counties: Colfax (6, 8); McKinley (6); Rio Arriba (9); Sandoval (1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14); Santa Fe (1, 3, 4, 9, 10, 14).

Material Deposited: Flea MSB No.: (14) 814.

Reference: Eads and others 1987; Haas and others 1973; Holdenried and Morlan 1956; Link 1949; Mendez 1956; Mendez and Haas 1973; Morlan 1955; Tipton and others 1979.

Host: *Neotoma lepida* Thomas, 1893 Desert wood rat.

Siphonaptera:

- 1) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951

NM Counties: Hidalgo.

Material Deposited: None.

Reference: Barnes and others 1977.

Host: *Neotoma mexicana* Baird, 1855 Mexican woodrat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amaradix vonfintelis* Prince, 1959
- 3) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 4) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 5) *Anomiopsyllus nudata* Baker, 1898
- 6) *Catallagia decipiens* Rothschild, 1915
- 7) *Eumolpianus eumolpi* Rothschild, 1905
- 8) *Hystrichopsylla dippiei* Rothschild, 1902

- 9) *Malaraeus sinomus* Jordan, 1925
- 10) *Malaraeus telchinum* Rothschild, 1905
- 11) *Megabothris abantis* Rothschild, 1905
- 12) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 13) *Orchopeas sexdentatus* Baker, 1904
- 14) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 15) *Phalacropsylla allos* Wagner, 1936
- 16) *Pleochaetis exilis* Jordan, 1937
- 17) *Stenistomera alpina* Baker, 1895

Anoplura:

- 18) *Neohaematopinus neotomae* Ferris, 1941

NM Counties: Bernalillo (14, 18); Catron (3); McKinley (12); Rio Arriba (4); Sandoval (1, 2, 6, 8, 10, 11, 12, 13, 14, 15, 17); Santa Fe (5, 7, 9, 13, 14, 16, 17, 18); Taos (3).

Material Deposited: None.

Reference: Barnes and others 1977; Haas and others 1973; Holdenried and Morlan 1956; Kim and others 1986; Link 1949; Mendez and Haas 1973; Morlan 1955; Tipton and others 1979; Traub and Hoff 1951.

Host: *Neotoma micropus* Baird, 1855 Southern plains woodrat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Anomiopsyllus nudata* Baker, 1898
- 4) *Atyphloceras echis* Jordan and Rothschild, 1915
- 5) *Echidnophaga gallinaceus* Westwood, 1875
- 6) *Epitedia stanfordi* Traub, 1944
- 7) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 8) *Megarhroglossus divisus* Baker, 1898
- 9) *Meringis bilsingi* Eads and Menzies, 1949
- 10) *Meringis dipodomys* Kohls, 1938
- 11) *Meringis facilis* Eads, 1979
- 12) *Meringis nidi* Williams and Hoff, 1951
- 13) *Meringis parkeri* Jordan, 1937
- 14) *Meringis rectus* Morlan, 1953
- 15) *Orchopeas leucopus* Baker, 1904
- 16) *Orchopeas sexdentatus* Baker, 1904
- 17) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 18) *Peromyscopsylla draco* Hopkins, 1951
- 19) *Pleochaetis exilis* Jordan, 1937
- 20) *Polygenis gwynii* (C. Fox, 1914)
- 21) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 22) *Thrassis campestris* Prince, 1944
- 23) *Thrassis fatus* Jordan, 1925
- 24) *Thrassis pansus* Jordan, 1925

Anoplura:

- 25) *Neohaematopinus neotomae* Ferris, 1941

NM Counties: Bernalillo (2, 4, 6, 7, 13, 16); Chaves (1, 2, 5, 7, 9, 10, 11, 12, 14, 16, 20, 21, 22, 23); Santa Fe (1, 3, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 24).

Material Deposited: None.

Reference: Graves and others 1974; Holdenried and Morlan 1956; Jellison and Senger 1976; Kim and others 1986; Miller and others 1970; Morlan 1955; Morlan and Prince 1954; Williams and Hoff 1951.

Host: *Neotoma* sp.

Siphonaptera:

- 1) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 2) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 3) *Atyphloceras echis* Jordan and Rothschild, 1915
- 4) *Echidnophaga gallinaceus* Westwood, 1875
- 5) *Euhoplopsyllus affinis* Baker, 1904
- 6) *Malaraeus telchinum* Rothschild, 1905
- 7) *Megarhthroglossus bisetis* Jordan and Rothschild, 1915
- 8) *Meringis bilsingi* Eads and Menzies, 1949
- 9) *Meringis dipodomys* Kohls, 1938
- 10) *Meringis nidi* Williams and Hoff, 1951
- 11) *Meringis rectus* Morlan, 1953
- 12) *Orchopeas leucopus* Baker, 1904
- 13) *Orchopeas sexdentatus* Baker, 1904
- 14) *Polygenis gwynii* C. Fox, 1914
- 15) *Rhadinopsylla fraterna* Baker, 1895
- 16) *Thrassis campestris* Prince, 1944
- 17) *Thrassis fatus* Jordan, 1925

Anoplura:

- 18) *Linognathoides neotomae* Ferris, 1942

NM Counties: Bernalillo (1, 3, 7, 18); Chaves (1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17); Colfax (2); Otero (18); Lea (13); San Miguel (7); Santa Fe (7, 18); Valencia (2).

Material Deposited: None.

Reference: Barnes and others 1977; Jellison and Senger 1976; Jordan and Rothschild 1915; Kartman 1960; Kim and others 1986; Mendez 1956; Morlan 1955; Rail and others 1969.

Genus *Onychomys*

Host: *Onychomys arenicola* Mearns, 1896 Mearns's grasshopper mouse.

Siphonaptera:

- 1) *Meringis altipecten* Traub and Hoff, 1951
- 2) *Orchopeas caedens* Jordan, 1925

NM Counties: Socorro (1, 2).

Material Deposited: Flea MSB No.: (1) 967; (2) 870.

Reference: MSB Collection.

Host: *Onychomys leucogaster* (Wied-Neuwied, 1841) . . . Northern grasshopper mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Echidnophaga gallinaceus* Westwood, 1875
- 4) *Epitedia stanfordi* Traub, 1944
- 5) *Malaraeus sinomus* Jordan, 1925
- 6) *Malaraeus telchinum* Rothschild, 1905
- 7) *Megarhthroglossus bisetis* Jordan and Rothschild, 1915
- 8) *Megarhthroglossus divisus* Baker, 1898

- 9) *Meringis altipecten* Traub and Hoff, 1951
- 10) *Meringis arachis* (Jordan, 1929)
- 11) *Meringis bilsingi* Eads and Menzies, 1949
- 12) *Meringis dipodomys* Kohls, 1938
- 13) *Meringis disparilis* Eads, 1979
- 14) *Meringis facilis* Eads, 1979
- 15) *Meringis jamesoni* Hubbard, 1943
- 16) *Meringis nidi* Williams and Hoff, 1951
- 17) *Meringis parkeri* Jordan, 1937
- 18) *Meringis rectus* Morlan, 1953
- 19) *Orchopeas agilis* Rothschild, 1905
- 20) *Orchopeas leucopus* Baker, 1904
- 21) *Orchopeas sexdentatus* Baker, 1904
- 22) *Peromyscopsylla adelpha* Rothschild, 1915
- 23) *Peromyscopsylla draco* Hopkins, 1951
- 24) *Peromyscopsylla hesperomys* Baker, 1904
- 25) *Pleochaetis exilis* Jordan, 1937
- 26) *Rhadinopsylla multidentatus* Morlan and Prince, 1954
- 27) *Thrassis aridis* Prince, 1944
- 28) *Thrassis bacchi consimilis* Stark, 1957
- 29) *Thrassis campestris* Prince, 1944
- 30) *Thrassis fatus* Jordan, 1925
- 31) *Thrassis pansus* Jordan, 1925

Anoplura:

- 32) *Fahrenholzia pinnata* Kellogg and Ferris, 1915
- 33) *Hoplopleura hesperomydis* (Osborn, 1891)
- 34) *Hoplopleura hirsuta* Ferris, 1916
- 35) *Hoplopleura onychomydis* Cook and Beer, 1959
- 36) *Polyplax auricularis* Kellogg and Ferris, 1915

NM Counties: Bernalillo (3, 14, 17, 31, 35); Chaves (2, 3, 7, 11, 12, 14, 16, 18, 23, 26, 27, 28, 29, 30); Colfax (6, 8, 25); Dona Ana (2, 10, 11, 13); Eddy (30); Hidalgo (10, 27, 31); Lea (11, 21, 30); Luna (3, 9, 10, 13); Roosevelt (11, 20, 24, 25, 27, 30, 32, 33, 34, 36); San Juan (17, 25); Sandoval (11); Santa Fe (1, 4, 5, 15, 16, 17, 18, 19, 20, 21, 25, 26, 27, 28, 31); Socorro (9); Union (1, 5, 22, 23, 25); Valencia (14).

Material Deposited: Flea MSB No.: (5) 1016; (10) 994, 1032; (12) 1024; (20) 887; (25) 889; (28) 881.

Reference: Barnes and others 1977; Eads 1978; Eads and others 1987; Fagerlund and others 2001; Graves and others 1974; Jellison and Senger 1976; Kartman 1960; Kim and others 1986; Morlan 1955; Morlan and Prince 1954; Pfaffenberger and deBruin 1986; Prince 1944; Rail and others 1969; Thomas, 1988; Traub and Hoff 1951; Williams and Hoff 1951.

Genus *Peromyscus*

Host: *Peromyscus boylii* (Baird, 1855) Brush mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Atyphloceras echis* Jordan and Rothschild, 1915
- 4) *Atyphloceras multidentatus* C. Fox, 1909
- 5) *Callistopsyllus terinus* Rothschild, 1905

- 6) *Catallagia charlottensis* Baker, 1898
- 7) *Hoplopsyllus anomalus* Baker, 1904
- 8) *Malaraeus sinomus* Jordan, 1925
- 9) *Malaraeus telchinum* Rothschild, 1905
- 10) *Megarthroglossus bisetis* Jordan and Rothschild, 1915
- 11) *Megarthroglossus divisus* Baker, 1898
- 12) *Meringis altipecten* Traub and Hoff, 1951
- 13) *Orchopeas leucopus* Baker, 1904
- 14) *Peromyscopsylla adelpha* Rothschild, 1915
- 15) *Plusaetis equatorius asetus* Traub, 1950
- 16) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 17) *Stenoponia ponera* Traub and Johnson, 1952

Anoplura:

- 18) *Hoplopleura hesperomydis* (Osborn, 1891)

NM Counties: Bernalillo (8, 11, 18); Grant (17); Lincoln (14); Los Alamos (14); McKinley (11); Rio Arriba (10, 11, 14); Sandoval (1, 5, 9, 14, 16); Santa Fe (1, 3, 4, 6, 7, 8, 13, 14); Sierra (12); Socorro (14, 15); Valencia (2, 14).

Material Deposited: Flea MSB No.: (8) 933; (14) 834; (15) 831.

Reference: Barnes and others 1977; Eads and others 1987; Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1956; Kim 1965; Mendez 1956; Mendez and Haas 1973; Morlan 1955; Tipton and others 1979; Traub and Hoff 1951; Traub and Johnson 1952.

Host: *Peromyscus eremicus* (Baird, 1858) Cactus mouse.

Siphonaptera:

- 1) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 2) *Orchopeas leucopus* Baker, 1904

Anoplura:

- 3) *Hoplopleura ferrisi* Cook and Beer, 1959

NM Counties: Colfax (1); Grant (3); Socorro (2).

Material Deposited: Flea MSB No.: (2) 840.

Reference: Barnes and others 1977; Kim 1965.

Host: *Peromyscus leucopus* (Rafinesque, 1818) White-footed mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Anomiopsyllus nudata* Baker, 1898
- 4) *Echidnophaga gallinaceus* Westwood, 1875
- 5) *Epitedia stanfordi* Traub, 1944
- 6) *Malaraeus sinomus* Jordan, 1925
- 7) *Megarthroglossus bisetis* Jordan and Rothschild, 1915
- 8) *Megarthroglossus divisus* (Baker, 1898)
- 9) *Meringis bilsingi* Eads and Menzies, 1949
- 10) *Meringis nidi* Williams and Hoff, 1951
- 11) *Meringis rectus* Morlan, 1953
- 12) *Orchopeas agilis* Rothschild, 1905
- 13) *Orchopeas caedens* Jordan, 1925
- 14) *Orchopeas leucopus* Baker, 1904
- 15) *Peromyscopsylla adelpha* Rothschild, 1915

- 16) *Peromyscopsylla draco* Hopkins, 1951
- 17) *Peromyscopsylla hesperomys* Baker, 1904
- 18) *Phalacropsylla hamata* Tipton and Mendez, 1968
- 19) *Pleochaetis exilis* Jordan, 1937
- 20) *Rhadinopsylla fraterna* Baker, 1895
- 21) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 22) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 23) *Thrassis campestris* Prince, 1944
- 24) *Thrassis fatus* Jordan, 1925
- 25) *Thrassis pansus* Jordan, 1925

Anoplura:

- 26) *Hoplopleura hesperomydis* (Osborn, 1891)

NM Counties: Bernalillo (6, 7, 17, 18); Chaves (1, 2, 7, 9, 10, 11, 14, 16, 20, 21, 23, 24); Dona Ana (12); Sandoval (1, 5, 6, 12, 15, 22); Santa Fe (1, 3, 4, 5, 6, 8, 14, 15, 16, 19, 21, 23, 25); Socorro (12).

Material Deposited: Flea MSB No.: (4) 765; (6) 960; (12) 857; (13) 785.

Reference: Eads and Campos 1982; Graves and others 1974; Haas and others 1973; Holdenried and Morlan 1955, 1956; Kartman 1960; Kim and others 1986; Morlan 1955; Morlan and Prince 1954; Rail and others 1969; Traub and Hoff 1951.

Host: *Peromyscus maniculatus* (Wagner, 1845). Deer mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amardix euphorbae* Rothschild, 1905
- 3) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 4) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 5) *Atyphloceras echis* Jordan and Rothschild, 1915
- 6) *Callistopsyllus terinus* Rothschild, 1905
- 7) *Catallagia decipiens* Rothschild, 1915
- 8) *Epitedia stanfordi* Traub, 1944
- 9) *Epitedia wnemanni* Rothschild, 1904
- 10) *Eumolpianus eumolpi* Rothschild, 1905
- 11) *Foxella ignotus* Baker, 1895
- 12) *Hystrihopsylla dippiei* Rothschild, 1902
- 13) *Malaraeus sinomus* Jordan, 1925
- 14) *Malaraeus telchinum* Rothschild, 1905
- 15) *Megabothris abantis* Rothschild, 1905
- 16) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 17) *Megarhroglossus divisus* Baker, 1898
- 18) *Meringis altipecten* Traub and Hoff, 1951
- 19) *Meringis arachis* Jordan, 1929
- 20) *Meringis bilsingi* Eads and Menzies, 1949
- 21) *Meringis nidi* Williams and Hoff, 1951
- 22) *Meringis parkeri* Jordan, 1937
- 23) *Meringis rectus* Morlan, 1953
- 24) *Orchopeas leucopus* Baker, 1904
- 25) *Orchopeas sexdentatus* Baker, 1904
- 26) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 27) *Peromyscopsylla adelpha* Rothschild, 1915
- 28) *Peromyscopsylla draco* Hopkins, 1951
- 29) *Peromyscopsylla hamifer vigens* Jordan, 1937

- 30) *Peromyscopsylla hesperomys* Baker, 1904
- 31) *Peromyscopsylla selenis* Rothschild, 1906
- 32) *Phalacropsylla allos* Wagner, 1936
- 33) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 34) *Stenoponia americana* Baker, 1899
- 35) *Thrassis campestris* Prince, 1944
- 36) *Thrassis pansus* Jordan, 1925

Anoplura:

- 37) *Hoplopleura hesperomydis* (Osborn, 1891)
- 38) *Polyplax auricularis* Kellogg and Ferris, 1915

NM Counties: Bernalillo (1, 4, 7, 13, 16, 17, 33, 37, 38); Dona Ana (20); Hidalgo (4, 5, 18, 19); Otero (21, 24); Rio Arriba (1, 7, 9, 10, 14, 15, 24); San Juan (2); Sandoval (1, 7, 8, 11, 12, 13, 14, 15, 16, 22, 24, 26, 27, 29, 30, 31, 32, 33, 34, 37); Santa Fe (2, 3, 6, 7, 8, 10, 13, 14, 17, 21, 22, 23, 24, 25, 27, 28, 33, 35, 36, 37, 38).

Material Deposited: Flea MSB No.: (1) 705; (2) 710; (8) 725; (13) 1001; (14) 987; (15) 982; (26) 852; (28) 854.

Reference: Barnes and others 1977; Eads and others 1987; Good 1942; Haas and others 1973; Holdenried and Morlan 1955, 1956; Kim and others 1986; Link 1949; Mendez 1956; Morlan 1955; Traub and Hoff 1951; Williams and Hoff 1951.

Host: *Peromyscus nasutus* (J.A. Allen, 1891) Northern rock mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Atyphloceras echis* Jordan and Rothschild, 1915
- 3) *Ceratophyllus vison* Baker, 1904
- 4) *Epitedia stanfordi* Traub, 1944
- 5) *Hystrichopsylla dippiei* Rothschild, 1902
- 6) *Malaraeus sinomus* Jordan, 1925
- 7) *Megarhroglossus bisetis* Jordan and Rothschild, 1950
- 8) *Peromyscopsylla adelpha* Rothschild, 1915
- 9) *Peromyscopsylla hesperomys* Baker, 1904
- 10) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 11) *Stenoponia americana* Baker, 1899

Anoplura:

- 12) *Hoplopleura hesperomydis* (Osborn, 1891)
- 13) *Polyplax auricularis* Kellogg and Ferris, 1915

NM Counties: Bernalillo (1, 5, 6, 9, 12); Sandoval (11); Santa Fe (1, 2, 3, 4, 6, 7, 8, 10, 12, 13).

Material Deposited: None.

Reference: Holdenried and Morlan 1956; Kim 1965; Kim and others 1986; Morlan 1955; Traub and Hoff 1951; Williams and Hoff 1951.

Host: *Peromyscus* sp.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 3) *Atyphloceras echis* Jordan and Rothschild, 1915
- 4) *Callistopsyllus terinus* Rothschild, 1905
- 5) *Epitedia wenmanni* Rothschild, 1904
- 6) *Malaraeus sinomus* Jordan, 1925

7) *Megarathroglossus bisetis* Jordan and Rothschild, 1915

8) *Megarathroglossus divisus* Baker, 1898

NM Counties: Bernalillo (1, 3, 6, 7, 8); Rio Arriba (2); San Miguel (1, 2, 4); Torrance (5).

Material Deposited: None.

Reference: Barnes and others 1977; Chapin 1919; Jellison and Senger 1976; Mendez 1956; Mendez and Haas 1973; Traub and Hoff 1951.

Host: *Peromyscus truei* (Shufeldt, 1885) Pinyon mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amaradix euphorbae* Rothschild, 1905
- 3) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 4) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 5) *Anomiopsyllus nudata* Baker, 1898
- 6) *Atyphloceras echis* Jordan and Rothschild, 1915
- 7) *Callistopsyllus terinus* Rothschild, 1905
- 8) *Catallagia decipiens* Rothschild, 1915
- 9) *Echidnophaga gallinaceus* Westwood, 1875
- 10) *Epitedia stanfordi* Traub, 1944
- 11) *Epitedia wenmanni* Rothschild, 1904
- 12) *Euhoplopsyllus affinis* Baker, 1904
- 13) *Hystrichopsylla dippiei* Rothschild, 1902
- 14) *Malaraeus sinomus* Jordan, 1925
- 15) *Malaraeus telchinum* Rothschild, 1905
- 16) *Megabothris abantis* Rothschild, 1905
- 17) *Megarathroglossus bisetis* Jordan and Rothschild, 1915
- 18) *Megarathroglossus divisus* Baker, 1898
- 19) *Meringis nidi* Williams and Hoff, 1951
- 20) *Meringis rectus* Morlan, 1953
- 21) *Opisodasys keeni* Baker, 1896
- 22) *Orchopeas caedens* Jordan, 1925
- 23) *Orchopeas leucopus* Baker, 1904
- 24) *Orchopeas sexdentatus* Baker, 1904
- 25) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 26) *Oropsylla montanus* Baker, 1895
- 27) *Peromyscopsylla adelpha* Rothschild, 1915
- 28) *Peromyscopsylla draco* Hopkins, 1951
- 29) *Peromyscopsylla hesperomys* Baker, 1904
- 30) *Phalacropsylla allos* Wagner, 1936
- 31) *Pleochaetis exilis* (Jordan, 1937)
- 32) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 33) *Stenistomera alpina* Baker, 1895
- 34) *Stenistomera macrodactyla* Good, 1942
- 35) *Thrassis campestris* Prince, 1944

Anoplura:

- 36) *Hoplopleura hesperomydis* (Osborn, 1891)
- 37) *Polyplax auricularis* Kellogg and Ferris, 1915

NM Counties: Bernalillo (4, 10, 14, 29, 33); Catron (3); Los Alamos (17); McKinley (31); Rio Arriba (21); Sandoval (1, 6, 7, 8, 10, 13, 14, 15, 17, 18, 23, 25, 27, 28, 29, 32, 33, 34, 35); Santa Fe (1, 5, 6,

7, 9, 10, 12, 14, 17, 18, 19, 20, 23, 24, 26, 27, 28); Socorro (16); Valencia (4).

Material Deposited: Flea MSB No.: (1) 703; (3) 707; (10) 739; (11) 737; (14) 932; (16) 998; (18) 997; (22) 827; (23) 770; (31) 901.

Reference: Barnes and others 1977; Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1955, 1956; Mendez and Haas 1973; Morlan 1955; Traub and Hoff 1951.

Genus *Reithrodontomys*

Host: *Reithrodontomys megalotis* (Baird, 1858) Western harvest mouse.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Echidnophaga gallinaceus* Westwood, 1875
- 3) *Eptedia stanfordi* Traub, 1944
- 4) *Malaraeus telchinum* Rothschild, 1905
- 5) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 6) *Meringis bilsingi* Eads and Menzies, 1949
- 7) *Meringis nidi* Williams and Hoff, 1951
- 8) *Meringis rectus* Morlan, 1953
- 9) *Orchopeas caedens* Jordan, 1925
- 10) *Orchopeas leucopus* Baker, 1904
- 11) *Oropsylla montanus* Baker, 1895
- 12) *Peromyscopsylla adelpha* Rothschild, 1915
- 13) *Peromyscopsylla draco* Hopkins, 1951
- 14) *Rhadinopsylla sectilis* Jordan and Rothschild, 1923
- 15) *Thrassis fatus* Jordan, 1925
- 16) *Thrassis pansus* Jordan, 1925

Anoplura:

- 17) *Hoplopleura reithrodontomydis* Ferris, 1951

NM Counties: Chaves (1, 5, 6, 8, 10, 13, 15); McKinley (9); Sandoval (1, 3, 4, 10, 12, 14, 16); Santa Fe (1, 2, 7, 8, 10, 11, 12, 13); Socorro (9, 17); Taos (17).

Material Deposited: Flea MSB No.: (9) 858; (12) 893.

Reference: Graves and others 1974; Haas and others 1973; Holdenried and Morlan 1955, 1956; Morlan 1955.

Genus *Sigmodon*

Host: *Sigmodon hispidus* Say and Ord, 1825. Hispid cotton rat.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus novomexicanensis* Williams and Hoff, 1951
- 3) *Eptedia wenmanni* Rothschild, 1904
- 4) *Euhoplopsyllus affinis* Baker, 1904
- 5) *Euhoplopsyllus glacialis* Taschenber, 1880
- 6) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
- 7) *Meringis bilsingi* Eads and Menzies, 1949
- 8) *Meringis nidi* Williams and Hoff, 1951
- 9) *Meringis rectus* Morlan, 1953
- 10) *Orchopeas leucopus* Baker, 1904
- 11) *Orchopeas sexdentatus* Baker, 1904
- 12) *Peromyscopsylla draco* Hopkins, 1951
- 13) *Pleochaetis exilis* Jordan, 1937

- 14) *Polygenis gwyni* (C. Fox, 1914)
- 15) *Rhadinopsylla fraterna* Baker, 1895
- 16) *Rhadinopsylla multidenticulatus* Morlan and Prince, 1954
- 17) *Thrassis aridis* Prince, 1944
- 18) *Thrassis campestris* Prince, 1944
- 19) *Thrassis pansus* Jordan, 1925

Anoplura:

- 20) *Hoplopleura arizonensis* Stojanovich and Pratt, 1961
- 21) *Hoplopleura hirsuta* Ferris, 1916

NM Counties: Chaves (1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18); Roosevelt (5, 10, 13, 17, 21); Socorro (20).

Material Deposited: Flea MSB No.: (19) 864.

Reference: Clark and others 1971; Graves and others 1974; Miller and others 1970; Pfaffenberger and deBruin 1988; Rail and others 1969.

Host: *Sigmodon ochrognathus* Bailey, 1902 Yellow-nosed cotton rat.

Siphonaptera:

Polygenis martinezbaezi Vargas, 1951

NM Counties: Hidalgo.

Material Deposited: None.

Reference: Haas and Wilson 1998.

Family Sciuridae: (Squirrels, Prairie Dogs, and Chipmunks)

Genus *Ammospermophilus*

Host: *Ammospermophilus harrisii* Harris's antelope squirrel.
(Audubon and Bachman, 1854)

Siphonaptera:

- 1) *Thrassis pansus* Jordan, 1925

Anoplura:

- 2) *Enderleinellus suturalis* Osborn, 1891

NM Counties: Bernalillo (2); Santa Fe (2); Socorro (1); Torrance (1).

Material Deposited: Flea MSB No.: (1) 813.

Reference: Jellison and Senger 1976; Kim and others 1986; MSB Collection.

Host: *Ammospermophilus leucurus* (Merriam, 1889) White-tailed antelope squirrel.

Siphonaptera:

Thrassis pansus Jordan, 1925

NM Counties: Socorro.

Material Deposited: Flea MSB No.: 818.

Remarks/Observations: New state host record.

Reference: MSB Collection.

Genus *Cynomys*

Host: *Cynomys gunnisoni* (Baird, 1855) Gunnison's prairie dog.

Siphonaptera:

- 1) *Echidnophaga gallinaceus* Westwood, 1875
- 2) *Hoplopsyllus anomalus* Baker, 1904
- 3) *Meringis rectus* Morlan, 1953
- 4) *Oropsylla hirsutus* Baker, 1895
- 5) *Oropsylla idahoensis* Baker, 1904

- 6) *Oropsylla labis* Jordan and Rothschild, 1922
- 7) *Oropsylla montanus* Baker, 1895
- 8) *Oropsylla tuberculatus cynomuris* Jellison, 1939
- 9) *Thrassi pansus* Jordan, 1925
- 10) *Thrassis stanfordi* Wagner, 1936

Anoplura:

- 11) *Enderleinellus suturalis* Osborn, 1981
- 12) *Linognathoides citellinus* Ferris, 1942
- 13) *Neohaematopinus citellinus* Ferris, 1942

NM Counties: Bernalillo (4, 10); Colfax (5, 6, 8); Rio Arriba (4, 10); Sandoval (4, 5, 7, 8); Santa Fe (1, 2, 4, 8, 9, 11, 12, 13); Taos (4); Torrance (4).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1956; Hopkins and Rothschild 1953; Jellison and Senger 1976; Kim and others 1986; Link 1949; Morlan 1955; Morlan and Hoff 1957; O'Connor and Pfaffenberger 1987.

Host: *Cynomys ludovicianus* (Ord, 1815) Black-tailed prairie dog.

Siphonaptera:

- 1) *Oropsylla hirsutus* Baker, 1895
- 2) *Pulex simulans* Baker, 1895

NM Counties: Chaves (1); Roosevelt (1, 2).

Material Deposited: None.

Reference: Clark and others 1971; Pfaffenberger and others 1984.

Host: *Cynomys* sp.

Siphonaptera:

- 1) *Meringis parkeri* Jordan, 1937
- 2) *Oropsylla hirsutus* Baker, 1895

NM Counties: Catron (1, 2).

Material Deposited: None.

Reference: Jellison and Senger 1976.

Genus *Marmota*

Host: *Marmota flaviventris* (Audubon and Bachman, 1841) Yellow-bellied marmot.

Siphonaptera:

- 1) *Thrassis stanfordi* Wagner, 1936

Anoplura:

- 2) *Linognathoides marmotae* (Ferris, 1923)

NM Counties: Rio Arriba (1); Santa Fe (1, 2).

Material Deposited: None.

Reference: Holdenried and Morlan 1956; Kim and others 1986; Link 1949; Morlan 1955.

Genus *Sciurus*

Host: *Sciurus aberti* Woodhouse, 1853 Abert's squirrel.

Siphonaptera:

- 1) *Anomiopsyllus martini* Holland, 1965
- 2) *Anomiopsyllus nudata* Baker, 1898
- 3) *Ceratophyllus vison* Baker, 1904
- 4) *Eumolpianus eumolpi americanus* Hubbard, 1950

- 5) *Opisodasys robustus* Jordan, 1925
- 6) *Orchopeas caedens* Jordan, 1925
- 7) *Orchopeas sexdentatus neotomae* Auguston, 1943
- 8) *Tarsopsylla coloradensis* Baker, 1895

NM Counties: Catron (1, 3, 5, 6); Sandoval (2, 4, 5, 7, 8); Socorro (5, 6, 7).

Material Deposited: Flea MSB Nos. respectively: (4) 1531; (5) 1534; (7) 1551.

Reference: Barnes 1982; Barnes and others 1977; Haas and others 1973; Jellison 1939; Jordan 1925; Patrick and Wilson 1995.

Host: *Sciurus arizonensis* Coues, 1867 Arizona gray squirrel.

Siphonaptera:

- Orchopeas fulleri* Traub, 1950

NM Counties: Catron.

Material Deposited: None.

Reference: Haas 1973.

Genus *Spermophilus*

Host: *Spermophilus lateralis* (Say, 1823) Golden-mantled ground squirrel.

Siphonaptera:

- 1) *Catallagia decipiens* Rothschild, 1915
- 2) *Eumolpianus eumolpi* Rothschild, 1905
- 3) *Eumolpianus eumolpi americanus* (Hubbard, 1950)
- 4) *Hystrichopsylla dippiei* Rothschild, 1902
- 5) *Malaraeus telchinum* Rothschild, 1905
- 6) *Megabothris abantis* Rothschild, 1905
- 7) *Oropsylla hirsutus* Baker, 1895
- 8) *Oropsylla idahoensis* Baker, 1904
- 9) *Oropsylla montanus* Baker, 1895
- 10) *Oropsylla tuberculatus cynomuris* Jellison, 1939

NM Counties: Rio Arriba (5, 8, 10); Sandoval (1, 3, 4, 6, 7, 8, 9); Santa Fe (2, 8, 9).

Material Deposited: None.

Reference: Haas and others 1973; Holdenried and Morlan 1956; Link 1949; Morlan 1955.

Host: *Spermophilus pilosoma* Bennett, 1833 Spotted ground squirrel.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Echidnophaga gallinaceus* Westwood, 1875
- 3) *Euhoplopsyllus affinis* Baker, 1904
- 4) *Hoplopsyllus anomalus* Baker, 1904
- 5) *Meringis jamesoni* Hubbard, 1943
- 6) *Meringis nidi* Williams and Hoff, 1951
- 7) *Meringis parkeri* Jordan, 1937
- 8) *Meringis rectus* Morlan, 1953
- 9) *Orchopeas leucopus* Baker, 1904
- 10) *Thrassis bacchi consimilis* Stark, 1957
- 11) *Thrassis campestris* Prince, 1944
- 12) *Thrassis fatus* Jordan, 1925
- 13) *Thrassis pansus* Jordan, 1925

Anoplura:

- 14) *Enderleinellus suturalis* Osborn, 1891
- 15) *Linognathoides spilosomae* Stojanovich and Pratt, 1961
- 16) *Neohaematopinus citellinus* Ferris, 1942
- 17) *Neohaematopinus spilosomae* Stojanovich and Pratt, 1961

NM Counties: Bernalillo (2, 8, 13, 14, 15, 16, 17); Chaves (3, 11, 12); Santa Fe (1, 2, 4, 5, 6, 7, 8, 9, 13, 14, 16).

Material Deposited: Flea MSB No.: (2) 1599; (10) 868; (13) 823.

Reference: Graves and others 1974; Holdenried and Morlan 1956; Jellison and Senger 1976; Kim et al, 1986; Rail and others 1969; Williams and Hoff 1951.

Host: *Spermophilus tridecemlineatus* (Mitchill, 1821) . . .Thirteen-lined ground squirrel.

Siphonaptera:

Catallagia neweyi Holland and Loshbaugh, 1958

NM Counties: Colfax.

Material Deposited: None.

Reference: Fagerlund and others 2001.

Host: *Spermophilus variegatus* (Erxleben, 1777) Rock squirrel.

Siphonaptera:

- 1) *Anomiopsyllus hiemalis mexicanus* Holland, 1965
- 2) *Echidnophaga gallinaceus* Westwood, 1875
- 3) *Hoplopsyllus anomalus* Baker, 1904
- 4) *Meringis rectus* Morlan, 1953
- 5) *Orchopeas caedens* Jordan, 1925
- 6) *Orchopeas leucopus* Baker, 1904
- 7) *Oropsylla hirsutus* Baker, 1895
- 8) *Oropsylla idahoensis* Baker, 1904
- 9) *Oropsylla montanus* Baker, 1895
- 10) *Thrassis fatus* Jordan, 1925

Anoplura:

- 11) *Linognathoides laeviusculus* (Grube, 1851)
- 12) *Neohaematopinus citellinus* Ferris, 1842

NM Counties: Bernalillo (2, 3, 7, 11); Catron (1); Otero (5, 9); Rio Arriba (7); Sandoval (2, 3, 8); Santa Fe (2, 3, 4, 7, 10, 11, 12).

Material Deposited: Flea MSB No.: (3) 733; (6) 930.

Reference: Barnes and others 1977; Haas and others 1973; Holdenried and Morlan 1955, 1956; Jellison and Senger 1976; Kim and others 1986; Link 1949; Morlan 1955; Williams and Hoff 1951.

Genus *Tamias*

Host: *Tamias dorsalis* Baird, 1855Cliff chipmunk.

Siphonaptera:

Eumolpianus eumolpi americanus Hubbard, 1950

NM Counties: McKinley.

Material Deposited: Flea MSB No.: 717.

Reference: MSB Collection.

Host: *Tamias minimus* Bachman, 1839 Least chipmunk.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus nudata* Baker, 1898
- 3) *Ceratophyllus vison* Baker, 1904

- 4) *Eumolpianus eumolpi* Rothschild, 1905
- 5) *Eumolpianus eumolpi americanus* (Hubbard, 1950)
- 6) *Hystrichopsylla dippiei* Rothschild, 1902
- 7) *Megarhroglossus wilsoni* Mendez and Haas, 1973
- 8) *Oropsylla idahoensis* Baker, 1905

NM Counties: Colfax (7); Sandoval (1, 2, 3, 5, 6, 8); Santa Fe (4).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1956; Morlan 1955; Tipton and others 1979.

Host: *Tamias quadrivittatus* (Say, 1823) Colorado chipmunk.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Anomiopsyllus nudata* Baker, 1898
- 3) *Catallagia decipiens* Rothschild, 1915
- 4) *Epitedia stanfordi* Traub, 1944
- 5) *Eumolpianus eumolpi* Rothschild, 1905
- 6) *Eumolpianus eumolpi americanus* (Hubbard, 1950)
- 7) *Hystrichopsylla dippiei* Rothschild, 1902
- 8) *Orchopeas leucopus* Baker, 1904
- 9) *Oropsylla idahoensis* Baker, 1904
- 10) *Peromyscopsylla adelpha* Rothschild, 1915
- 11) *Stenistomera alpina* Baker, 1895

Anoplura:

- 12) *Hoplopleura arboricola* Kellogg and Ferris, 1915
- 13) *Neohaemotopinus pacificus* Kellogg and Ferris, 1915

NM Counties: Bernalillo (5, 7, 11, 12); Rio Arriba (5, 8); Sandoval (1, 2, 3, 4, 6, 7); Santa Fe (1, 5, 7, 9, 10, 11, 13); Socorro (12).

Material Deposited: None.

Reference: Fagerlund and others 2001; Haas and others 1973; Holdenried and Morlan 1955, 1956; Kim and others 1986; Link 1949; Morlan 1955; Traub and Hoff 1951.

Host: *Tamias* sp.

Siphonaptera:

- 1) *Eumolpianus eumolpi* Rothschild, 1905
- 2) *Eumolpi eumolpi americanus* Hubbard, 1950

Anoplura:

- 3) *Hoplopleura arboricola* Kellogg and Ferris, 1915
- 4) *Linognathoides pacificus* Kellogg and Ferris, 1915

NM Counties: Bernalillo (3); Otero (1, 2); Santa Fe (4).

Material Deposited: Flea MSB No.: (1) 747.

Reference: Jellison and Senger 1976; Kim and others 1986.

Genus *Tamiasciuris*

Host: *Tamiasciurus hudsonicus* (Erxleben, 1777) Red squirrel.

Siphonaptera:

- 1) *Aetheca wagneri* Baker, 1904
- 2) *Amaradix bitterrootensis* Dunn, 1923
- 3) *Catallagia decipiens* Rothschild, 1915
- 4) *Ceratophyllus vison* Baker, 1904
- 5) *Eumolpianus eumolpi* Rothschild, 1915

- 6) *Eumolpianus eumolpi americanus* (Hubbard, 1950)
 - 7) *Hystrichopsylla dippiei* Rothschild, 1902
 - 8) *Malaraeus telchinum* Rothschild, 1905
 - 9) *Megarhroglossus bisetis* Jordan and Rothschild, 1915
 - 10) *Megarhroglossus divisus* Baker, 1898
 - 11) *Opisodasys robustus* Jordan, 1925
 - 12) *Orchopeas caedens* Jordan, 1925
 - 13) *Orchopeas leucopus* Baker, 1904
 - 14) *Orchopeas sexdentatus* Baker, 1904
 - 15) *Orchopeas sexdentatus neotomae* Auguston, 1943
 - 16) *Oropsylla idahoensis* Baker, 1904
 - 17) *Tarsopsylla coloradensis* Baker, 1895
- NM Counties:** Catron (4, 11, 12, 16); Los Alamos (4); Sandoval (1, 2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15); Santa Fe (4, 5, 12, 17); Taos (4, 11); Valencia (9).
- Material Deposited:** Flea MSB No.: (2) 1529; (3) 1530; (11) 1538; (12) 1543.
- Reference:** Haas 1972; Haas and others 1973; Holdenried and Morlan 1956; Mendez and Haas 1973; Morlan 1955; Patrick and Wilson, 1995.

References

- Barnes, A. M.; Tipton, V. J.; Wilde, J. A. 1977. The subfamily Anomiopsyllinae (Hystrichopsyllidae: Siphonaptera). I. A revision of the genus *Anomiopsyllus* Baker. Great Basin Naturalist. 37(2): 138-206.
- Barnes, A. M. 1982. Surveillance and control of bubonic plague in the United States. Symposia of the Zoological Society of London. 50: 237-270.
- Becker, E. R. 1947. Distribution of the tropical rat flea (*Xenopsylla cheopis*) in the interior of the United States. Iowa Academy of Science. 54: 297-299.
- Bermudez, F. C.; Stuart, J. N.; Frey, J. K.; Valdez, R. 1995. Distribution and status of the Virginia opossum (*Didelphis virginiana*) in New Mexico. Southwestern Naturalist. 40(3): 336-340.
- Brooks, D. R. 1993. Critical Comment: Extending the symbiotype concept to host voucher specimens. Journal of Parasitology. 79: 631-633.
- Brown, T. Undated. A guide to the names of animals known to be infected in New Mexico. Unpublished list. New Mexico Environmental Division, Vector Control. 1 p.
- Busvine, J. R. 1978. Evidence from double infestations for the specific status of human head lice and body lice (Anoplura). Systematic Entomology. 3: 1-8.
- Centers for Disease Control and Prevention. 2003. Imported plague—New York City, 2002. Morbidity and Mortality Weekly Report. 52: 725-728.
- Chapin, E. A. 1919. New species of North American Siphonaptera. Bulletin of the Brooklyn Entomological Society. 14(2): 49-62.
- Clark, P. H.; Cole, M. M.; Forcum, D. L.; Wheeler, J. R.; Wheeler, K.; Miller, B. E. 1971. Preliminary evaluation of three systemic insecticides in baits for control of fleas of wild rats and rabbits. Journal of Economic Entomology. 64: 1190-1193.
- Dryden, M. W.; Broce, A. B. 1993. Development of a trap for collecting newly emerged *Ctenocephalides felis* (Siphonaptera: Pulicidae) in homes. Journal of Medical Entomology. 30: 901-906.
- Eads, R. E. 1978. Two new species of fleas of the genus *Meringis* (Siphonaptera: Hystrichopsyllidae). Great Basin Naturalist. 38(4): 447-455.
- Eads, R. E.; Campos, E. G. 1982. Description of a new *Phalacropsylla* and notes on *P. allos* (Siphonaptera: Hystrichopsyllidae). Great Basin Naturalist. 42(2): 241-245.
- Eads, R. E.; Campos, E. G.; Barnes, A. M. 1979. New records for several flea (Siphonaptera) species in the United States, with observations on species parasitizing carnivores in the Rocky Mountain region. Proceedings of the Entomological Society of Washington. 81(1): 38-42.
- Eads, R. E.; Campos, E. G.; Maupin, G. O. 1987. A review of the genus *Meringis* (Siphonaptera: Hystrichopsyllidae). Journal of Medical Entomology. 24(4): 467-476.
- Fagerlund, R.; Ford, P. L.; Brown, T.; Polechla, P. J., Jr. 2001. New records for fleas (Siphonaptera) from New Mexico with notes on plague-carrying species. Southwestern Naturalist. 46: 94-95.
- Forcum, D. L.; Rael, C. D.; Wheeler, J. R.; Miller, B. E. 1969. Abundance of cottontails and their fleas at Red Bluff Ranch, New Mexico. Journal of Wildlife Management. 33(2): 422-424.
- Frey, J. K.; Yates, T. L. 1996. Mammalian diversity in New Mexico. New Mexico Journal of Science. 36: 4-37.
- Frey, J. K.; Yates, T. L.; Duszynski, D. W.; Gannon, W. L.; Gardner, S. L. 1992. Designation and curatorial management of type host specimens (symbiotypes) for new parasite species. Journal of Parasitology. 78: 930-932.
- Gardner, S. L. 1996. Field parasitology techniques for use with mammals. In: Wilson, D. E., Cole, F. R., Nichols, J. D., Rudran, R., Foster, M. S., eds. Measuring and monitoring biological diversity: standard methods for mammals. Washington, DC: Smithsonian Institution Press. p. 291-298.
- Good, N. E. 1942. Key to the males of the genus *Athyphloceras* with a description of the male of *Athyphloceras echis* (Siphonaptera). Pan-Pacific Entomologist. 28(2): 87-90.
- Graves, G. N.; Bennett, W. C.; Wheeler, J. R.; Miller, B. E.; Forcum, D. L. 1974. Sylvatic plague studies in southeast New Mexico. Journal of Medical Entomology. 11(4): 488-498.
- Haas, G. E. 1972. Partial castration in *Monopsyllus vison* (Baker) (Siphonaptera). Entomological News. 83: 275-278.
- Haas, G. E. 1973. Morphological notes on some Siphonaptera (Leptopsyllidae and Ceratophyllidae) of New Mexico. America Midland Naturalist. 90(1): 246-252.
- Haas, G.; Wilson, N. 1998. *Polygenis martinezbaezi* (Siphonaptera: Rhopalopsyllidae) reared from a rodent nest found in the Peloncillo Mountains of southwestern New Mexico. Journal of Medical Entomology. 35(4): 431-432.
- Haas, G.; Martin, R. P.; Swickard, M.; Miller, B. E. 1973. Siphonaptera-mammal relationships in northcentral New Mexico. Journal of Medical Entomology. 10(3): 281-289.
- Harrison, R. L.; Patrick, M. J.; Schmitt, C. G. 2003. Foxes, fleas, and plague in New Mexico. Southwestern Naturalist. In press.
- Holdenried, R.; Morlan, H. B. 1955. Plague-infected fleas from northern New Mexico wild rodents. Journal of Infectious Diseases. 96: 133-137.
- Holdenried, R.; Morlan, H. B. 1956. A field study of wild mammals and fleas of Santa Fe County, New Mexico. American Midland Naturalist. 55(2): 369-381.
- Hopkins, G. H. E.; Rothschild, M. 1953. An illustrated catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Natural History), Vol. 1 Tungidae and Pulicidae. British Museum of Natural History. 361 p.
- Hubbard, J. P.; Schmitt, C. G. 1984. The black-footed ferret in New Mexico. Final report to the Bureau of Land Management, Santa Fe, NM. 118 p.
- Jellison, W. J. 1939. *Opisodasys* Jordan 1933, a genus of Siphonaptera. Journal of Parasitology. 25: 413-420.
- Jellison, W. J.; Senger, S. M. 1976. Fleas of western North America except Montana in the Rocky Mountain laboratory collection. Western Washington State College, Bellingham, WA. p. 55-136.
- Johnson, P. T.; Traub, R. 1954. Revision of the flea genus *Peromyscopsylla*. Smithsonian Miscellaneous Collections. 123(4): 1-68.

- Jordan, K. 1925. New Siphonaptera. *Novitates Zoologicae*. 32: 96-112.
- Jordan, K.; Rothschild, N. C. 1915. Contribution to our knowledge of American Siphonaptera. *Ectoparasites*. 1: 45-60.
- Kartman, L. 1960. The role of rabbits in sylvatic plague epidemiology, with special attention to human cases in New Mexico and use of the fluorescent antibody technique for detection of *Pasteurella pestis* in field specimens. *Zoonoses Research*. 1: 1-27.
- Kim, K. C. 1965. A review of the *Hoplopleura hesperomydis* complex (Anoplura: Hoplopleuridae). *Journal of Parasitology*. 51(5): 871-887.
- Kim, K. C. 1985. Coevolution of parasitic arthropods and mammals. John Wiley and Sons, New York, NY. 800 p.
- Kim, K. C.; Pratt, H. D.; Stojanovich, C. J. 1986. The sucking lice of North America, an illustrated manual for identification. Pennsylvania State University Press. 241 p.
- Kohls, G. M. 1940. Siphonaptera, a study of the species infesting wild hares and rabbits of North America north of Mexico. United States Public Health Service, National Institutes of Health Bulletin. 175: 1-34.
- Laney, L. H. 1950. Annual report, rodent control, New Mexico District. U.S. District. U.S. Fish and Wildlife Service, and New Mexico College of Agriculture and Mechanical Arts, Extension Service. 10 p.
- Lechleitner, R. R.; Tison, J. V.; Kartman, L. 1962. Die-off of a Gunnison's prairie dog colony in central Colorado. 1. Ecological observations and description of the epizootic. *Zoonoses Research*. 1: 185-199.
- Link, V. B. 1949. Plague among wild rodents in Rio Arriba County, New Mexico. *American Journal of Tropical Medicine*. 29: 493-500.
- Marquardt, W. C.; Demaree, R. S.; Grieve, R. B. 2000. Parasitology and vector biology. San Diego, CA: Harcourt Academic Press. 697 p.
- Mendez, E. 1956. A revision of the genus *Megarathroglossus* Jordan and Rothschild 1915 (Siphonaptera: Hystrichopsyllidae). *University of California Publications in Entomology*. 11: 159-192.
- Mendez, E.; Haas, G. E. 1973. A new flea of the genus *Megarathroglossus* Jordan and Rothschild from New Mexico (Siphonaptera: Hystrichopsyllidae: Anomiopsyllinae). *Journal of Medical Entomology*. 9(4): 285-288.
- Miller, B. E.; Forcum, D. L.; Weeks, K. W.; Wheeler, J. R.; Rail, C. D. 1970. An evaluation of insecticides for flea control on wild mammals. *Journal of Medical Entomology*. 7: 697-702.
- Morlan, H. B. 1955. Mammal fleas of Santa Fe County, New Mexico. *Texas Reports on Biology and Medicine*. 13(1): 93-125.
- Morlan, H. B.; Hoff, C. C. 1957. Notes on some Anoplura from New Mexico and Mexico. *Journal of Parasitology*. 43(3): 347-351.
- Morlan, H. B.; Prince, F. M. 1954. Notes of the subfamily Rhadinopsyllinae Wagner 1930 (Siphonaptera: Hystrichopsyllidae) and description of a new species, *Rhadinopsylla multidenticulatus*. *Texas Reports on Biology and Medicine*. 12: 1037-1046.
- O'Connor, B.; Pfaffenberger, G. S. 1987. Systematics and evolution of the genus *Paraceroglyphus* and related taxa (Acari: Acaridae) associated with fleas (Insecta: Siphonaptera). *Journal of Parasitology*. 73(6): 1189-1197.
- Patrick, M. J.; Harrison, R. L. 1995. Fleas on gray foxes in New Mexico. *Journal of Medical Entomology*. 32: 201-204.
- Patrick, M. J.; Wilson, W. D. 1995. Parasites of Aberts squirrel (*Sciurus aberti*) and red squirrel (*Tamiasciurus hudsonicus*) of New Mexico. *Journal of Parasitology*. 81(2): 321-324.
- Pfaffenberger, G. S.; deBruin, D. 1986. Ectoparasitic overlap between sympatric *Dipodomys ordii* and *Onychomys leucogaster* (Rodentia) in eastern New Mexico, USA. *Journal of Medical Entomology*. 23(2): 201-207.
- Pfaffenberger, G. S.; deBruin, D. 1988. Parasites of the hispid cotton rat, *Sigmodon hispidus* (Cricetinae), and population biology of the cotton rat louse, *Hoplopleura hirsuta* (Hoplopleuridae: Anoplura), in eastern New Mexico, including an annotated host-parasite bibliography. *Texas Journal of Science*. 40(4): 369-399.
- Pfaffenberger, G. S.; Valencia V. B. 1988. Ectoparasites of sympatric cottontails (*Sylvilagus audubonii* Nelson) and jack rabbits (*Lepus californicus* Mearns) from the high plains of eastern New Mexico. *Journal of Parasitology*. 74(5): 842-846.
- Pfaffenberger, G. S.; Wilson, C. 1985. Ectoparasites of vertebrates cohabiting black-tailed prairie dog towns in eastern New Mexico. *Journal of Wildlife Diseases*. 21: 69-72.
- Pfaffenberger, G. S.; Nygren, B.; deBruin, D.; Wilson, C. 1984. Parasites of the black-tailed prairie dog (*Cynomys ludovicianus*) from eastern New Mexico. *Proceedings of the Helminthological Society of Washington*. 51(2): 241-244.
- Prince, F. M. 1943. Species of fleas on rats collected in states west of the 102nd meridian and their relation to the dissemination of plague. *Public Health Reports*. 58: 700-708.
- Prince, F. M. 1944. Descriptions of three new species of *Thrassis* Jordan and the females of *T. bacchi* Rothschild and *T. pansus* Jordan. *Pan-Pacific Entomologist*. 20(1): 13-19.
- Prince, F. M. 1945. Descriptions of three new species of *Dactyopsylla* Jordan and one new subspecies of *Foxella* Wagner, with records of other species in the genera (Siphonaptera). *Canadian Entomologist*. 77: 15-20.
- Rail, C. D.; Forcum, D. L.; Wheeler, J. R.; Miller, B. E. 1969. Wild mammals and fleas of Red Bluff Ranch, New Mexico. *Journal of Medical Entomology*. 6(1): 92-94.
- Roberts, L. S.; Janovy, J., Jr. 2000. Foundations of parasitology (6th ed.). Boston, MA: McGraw-Hill, p. 539-549, 559-569.
- Rodriguez, P. H. 1977. A survey of ectoparasites of hares and rabbits in Grant County, New Mexico. *Texas Journal of Science*. 28: 358.
- Rollag, O. J.; Skeels, M. R.; Nims, L. J.; Thilsted, J. P.; Mann, J. M. 1981. Feline plague in New Mexico: report of five cases. *American Veterinary Medical Association*. 179: 1381-1383.
- Service, M. W. 2000. Medical entomology for students (2nd ed.). Cambridge, UK: Cambridge University Press. p. 167-192.
- Thomas, R. E. 1988. A review of flea collection records from *Onychomys leucogaster* with observations on the role of grasshopper mice in the epizootology of wild rodent plague. *Great Basin Naturalist*. 48: 83-95.
- Thomas, R. E. 1996. Fleas and the agents they transmit. In: Beaty, B. J., Marquardt, W. C., eds. *The biology of disease*

- vectors. Niwot, CO: University Press of Colorado. p. 146-159.
- Tipton, V. J.; Stark, H. E.; Wildie, J. A. 1979. Anomiopsyllinae (Siphonaptera: Hystrichopsyllinae), II. The genera *Callistopsyllus*, *Conorhinopsylla*, *Megarhroglossus*, and *Stenistomera*. Great Basin Naturalist. 39(4): 351-418.
- Traub, R.; Hoff, C. C. 1951. Records and descriptions of fleas from New Mexico (Siphonaptera). American Museum Novitates. 1530: 1-23.
- Traub, R.; Johnson, P. T. 1952. *Kohlsia whartoni* and *Stenoponia ponera*, new species of fleas from North America. Journal of Parasitology. 38: 6-18.
- Whitaker, J. O. 1982. Ectoparasites of mammals of Indiana. Indianapolis, IN: Indiana Academy of Sciences. 240 p.
- Williams, L. A.; Hoff, C. C. 1951. Fleas from the upper sonoran zone near Albuquerque, New Mexico. Proceedings of the United States National Museum. 101(3278): 305-313.
- Zinsser, H. 1934. Rats, lice and history. Boston, MA: Little, Brown and Co. 301 p.

Appendix A. New Mexico Ectoparasites and Their Mammal Hosts

Order Siphonaptera (Fleas)

Family Ceratophyllidae

Aetheca wagneri Baker, 1904

Bassariscus astutus
Clethrionomys gapperi
Dipodomys merriami
D. ordii
Microtus longicaudus
M. montanus
Mus musculus
Neotoma albigula
N. cinerea
N. mexicana
N. micropus
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
P. nasutus
P. truei
Peromyscus sp.
Reithrodontomys megalotis
Sigmodon hispidus
Spermophilus spilosoma
Sylvilagus audubonii
Tamias minimus
T. quadrivittatus
Tamiasciurus hudsonicus

Amaradix bitterrootensis Dunn, 1923

Tamiasciurus hudsonicus

Amaradix euphorbae Rothschild, 1905

Clethrionomys gapperi
Peromyscus maniculatus
P. truei

Amphalius necopinus Jordan, 1925

Ochotona princeps

Ceratophyllus vison Baker, 1904

Peromyscus nasutus
Sciurus aberti
Tamias minimus
Tamiasciurus hudsonicus

Eumolpianus eumolpi Rothschild, 1905

Dipodomys merriami
Microtus sp.
Neotoma mexicana
Peromyscus maniculatus
Spermophilus lateralis
Sylvilagus sp.
Tamias minimus
T. quadrivittatus
Tamiasciurus hudsonicus
Thomomys talpoides

Eumolpianus eumolpi americanus Hubbard, 1950

Microtus longicaudus
Sciurus aberti
Spermophilus lateralis
Tamias dorsalis
T. minimus
T. quadrivittatus
Tamiasciurus hudsonicus

Dactylopsylla bluei Fox, 1909

Microtus montanus

Dactylopsylla neomexicana Prince, 1945

Thomomys talpoides

Foxella apachinus C. Fox, 1914

Vulpes macrotis macrotis

Foxella ignotus Baker, 1895

Lynx rufus
Microtus montanus
Mustela frenata
Peromyscus maniculatus
Thomomys bottae
T. talpoides
Urocyon cinereoargenteus
Vulpes macrotis macrotis

Malaraeus sinomus Jordan, 1925

Bassariscus astutus
Dipodomys ordii
Neotoma albigula
N. mexicana
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
P. nasutus
Peromyscus sp.
P. truei

***Malaraeus telchinum* Rothschild, 1905**

Clethrionomys gaperi
Microtus longicaudus
M. montanus
Neotoma cinerea
N. mexicana
Neotoma sp.
Onychomys leucogaster
Peromyscus boylii
P. maniculatus
P. truei
Reithrodontomys megalotis
Spermophilus lateralis
Tamiasciurus hudsonicus

***Megabothris abantis* Rothschild, 1905**

Clethrionomys gapperi
Microtus longicaudus
M. montanus
Microtus sp.
Mustela frenata
Neotoma mexicana
Ochotona princeps
Peromyscus maniculatus
P. truei
Spermophilus lateralis

***Nosophyllus fasciatus* Bosc, 1800**

Rattus norvegicus

***Opisodasys keeni* Baker, 1896**

Peromyscus truei

***Opisodasys robustus* Jordan, 1925**

Sciurus aberti
Tamiasciurus hudsonicus

***Orchopeas agilis* Rothschild, 1905**

Neotoma albigula
Onychomys leucogaster
Peromyscus leucopus
Sorex preblei
Vulpes macrotis macrotis
V. velox velox

***Orchopeas caedens* Jordan, 1925**

Onychomys arenicola
Peromyscus leucopus
P. truei
Reithrodontomys megalotis
Sciurus aberti
Spermophilus variegatus
Tamiasciurus hudsonicus
Vulpes macrotis
V. velox velox

***Orchopeas fulleri* Traub, 1950**

Sciurus arizonensis

***Orchopeas leucopus* Baker, 1904**

Dipodomys merriami
D. ordii
Neotoma albigula
N. micropus
Neotoma sp.
Onychomys leucogaster
Perognathus flavus
Peromyscus boylii
P. eremicus
P. leucopus
P. maniculatus
P. truei
Reithrodontomys megalotis
Sigmodon hispidus
Spermophilus pilosoma
S. variegatus
Tamias quadrivittatus
Tamiasciurus hudsonicus

***Orchopeas sexdentatus* Baker, 1904**

Dipodomys spectabilis
Neotoma albigula
N. cinerea
N. mexicana
N. micropus
Neotoma sp.
Onychomys leucogaster
Peromyscus maniculatus
P. truei
Sigmodon hispidus
Sylvilagus audubonii
Tamiasciurus hudsonicus

***Orchopeas sexdentatus neotomae* Augustson, 1943**

Bassariscus astutus
Neotoma albigula
N. cinerea
N. mexicana
N. micropus
Peromyscus maniculatus
P. truei
Sciurus aberti
Tamiasciurus hudsonicus

***Oropsylla hirsutus* Baker, 1895**

Cynomys gunnisoni
C. ludovicianus
Cynomys sp.
Spermophilus lateralis
S. variegatus
Sylvilagus audubonii

***Oropsylla idahoensis* Baker, 1904**

Cynomys gunnisoni
Microtus longicaudus

Perognathus flavus
Spermophilus lateralis
S. variegatus
Tamias minimus
T. quadrivittatus
Tamiasciurus hudsonicus

***Oropsylla labis* Jordan and Rothschild, 1922**

Cynomys gunnisoni

***Oropsylla montanus* Baker, 1895**

Bassariscus astutus
Cynomys gunnisoni
Dipodomys merriami
Neotoma albigula
Peromyscus truei
Reithrodontomys megalotis
Spermophilus lateralis
S. variegatus
Spilogale gracilis
Sylvilagus sp.
Vulpes macrotis macrotis

***Pleochaetis exilis* Jordan, 1937**

Dipodomys ordii
D. spectabilis
Lepus californicus
Neotoma albigula
N. mexicana
N. micropus
Onychomys leucogaster
Peromyscus leucopus
P. truei
Sigmodon hispidus
Vulpes macrotis macrotis

***Spicata botticeps* Hubbard, 1943**

Thomomys bottae

***Tarsopsyllus coloradensis* Baker, 1904**

Sciurus aberti
Tamiasciurus hudsonicus

***Thrassis aridis* Prince, 1944**

Bassariscus astutus
Dipodomys ordii
Onychomys leucogaster
Sigmodon hispidus

***Thrassis bacchi consimilis* Stark, 1957**

D. ordii
Neotoma albigula
Onychomys leucogaster
Spermophilus spilosoma

***Thrassis campestris* Prince, 1944**

Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula

N. micropus
Neotoma sp.
Onychomys leucogaster
Peromyscus leucopus
P. maniculatus
P. truei
Sigmodon hispidus
Spermophilus spilosoma
Sylvilagus audubonii

***Thrassis fotus* Jordan, 1925**

Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
N. micropus
Neotoma sp.
Onychomys leucogaster
Reithrodontomys megalotis
Spermophilus spilosoma
S. variegatus
Sylvilagus audubonii

***Thrassis pansus* Jordan, 1925**

Ammospermophilus harrisi
A. leucurus
Dipodomys ordii
D. spectabilis
Mustela frenata
Neotoma albigula
N. micropus
Onychomys leucopus
Perognathus flavescens
Peromyscus leucopus
P. maniculatus
Reithrodontomys megalotis
Sigmodon hispidus
Spermophilus spilosoma

***Thrassis stanfordi* Wagner, 1936**

Cynomys gunisoni
Marmota flaviventris
Mustela frenata

Family Ctenophthalmidae

***Anomiopsyllus hiemalis* Eads and Menzies, 1948**

Neotoma albigula

***Anomiopsyllus martini* Holland, 1965**

Sciurus aberti

***Anomiopsyllus hiemalis mexicanus* Holland, 1965**

Dipodomys merriami
Neotoma albigula
N. mexicana
Neotoma sp.

Peromyscus eremicus
P. maniculatus
P. truei
Spermophilus variegatus
Anomiopsyllus novomexicanus Williams and Hoff, 1951
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
N. mexicana
N. micropus
Neotoma sp.
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
P. truei
Sigmodon hispidus
Sylvilagus audubonii
Sylvilagus sp.
Anomiopsyllus nudata Baker, 1898
Neotoma albigula
N. mexicana
N. micropus
Perognathus flavus
Peromyscus leucopus
P. truei
Sciurus aberti
Spilogale gracilis
Tamias minimus
T. quadrivittatus
Thomomys talpoides
Callistopsyllus terinus Rothschild, 1905
Peromyscus boylii
P. maniculatus
Peromyscus sp.
P. truei
Catallagia charlottensis Baker, 1898
Peromyscus boylii
Catallagia decipiens Rothschild, 1915
Clethrionomys gapperi
Microtus longicaudus
M. montanus
Microtus sp.
Neotoma cinerea
N. mexicana
Peromyscus maniculatus
P. truei
Spermophilus lateralis
Tamias quadrivittatus
Tamiasciurus hudsonicus
Catallagia neweyi Holland and Loshbaugh, 1958
Spermophilus tridecemlineatus
Corrodopsylla curvata Rothschild, 1915
Microtus montanus
Sorex cinereus
Delotelis telegoni Jordan, 1937
Microtus longicaudus
Epitedia stanfordi Traub, 1944
Bassariscus astutus
Neotoma albigula
N. micropus
Onychomys leucogaster
Perognathus flavus
Peromyscus leucopus
P. maniculatus
P. nasutus
P. truei
Reithrodontomys megalotis
Tamias quadrivittatus
Epitedia wenmanni Rothschild, 1904
Peromyscus sp.
P. truei
Sigmodon hispidus
Megarhroglossus bisetis Jordan and Rothschild, 1915
Bassariscus astutus
Dipodomys spectabilis
Microtus longicaudus
Neotoma albigula
N. cinerea
N. mexicana
N. micropus
Neotoma sp.
Ochotona princeps
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
P. nasutus
Peromyscus sp.
P. truei
Reithrodontomys egalotis
Sigmodon hispidus
Sylvilagus audubonii
S. nuttalli
Sylvilagus sp.
Tamiasciurus hudsonicus
Megarhroglossus cavernicolus Mendez and Haas, 1972
Neotoma cinerea
Megarhroglossus divisus Baker, 1898
Neotoma albigula
N. cinerea
N. micropus

Ochotona princeps
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
Peromyscus sp.
P. truei
Tamiasciurus hudsonicus

Megarhroglossu procus Jordan and Rothschild, 1915
Neotoma albigula

Megarhroglossus wilsoni Mendez and Haas, 1973
Tamias minimus

Meringis altipecten Traub and Hoff, 1951
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
Onychomys arenicola
O. leucogaster
Peromyscus boylii
P. maniculatus

Meringis arachis Jordan, 1929
Bassariscus astutus
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
Onychomys leucogaster
Perognathus flavescens
P. flavus
Peromyscus maniculatus

Meringis bilsingi Eads and Menzies, 1949
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma micropus
Neotoma sp.
Onychomys leucogaster
Peromyscus leucopus
P. maniculatus
Reithrodontomys megalotis
Sigmodon hispidus
Sylvilagus audubonii

Meringis dipodomys Kohls, 1938
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma micropus
Neotoma sp.
Onychomys leucogaster
Perognathus flavus
Sylvilagus audubonii

Sylvilagus sp.

Meringis disparilis Eads, 1979
Dipodomys merriami
D. ordii
Onychomys leucogaster

Meringis facilis Eads, 1979
Neotoma micropus
Onychomys leucogaster
Perognathus flavus

Meringis jamesoni Hubbard, 1943
Dipodomys spectabilis
Neotoma albigula
Onychomys leucogaster
Perognathus flavus
Spermophilus spilosoma

Meringis nidi Williams and Hoff, 1951
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
N. micropus
Neotoma sp.
Onychomys leucogaster
Perognathus flavus
Peromyscus leucopus
P. maniculatus
P. truei
Reithrodontomys megalotis
Sigmodon hispidus
Spermophilus spilosoma
Sylvilagus audubonii
Sylvilagus sp.

Meringis parkeri Jordan, 1937
Cynomys sp.
Dipodomys merriami
D. ordii
D. spectabilis
Microtus sp.
Neotoma albigula
N. micropus
Onychomys leucogaster
Perognathus flavus
Peromyscus maniculatus
Spermophilus spilosoma

Meringis rectus Morlan, 1953
Cynomys gunnisoni
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
N. micropus
Neotoma sp.

- Onychomys leucogaster*
Perognathus flavus
Peromyscus leucopus
P. maniculatus
P. truei
Reithrodontomys megalotis
Sigmodon hispidus
Spermophilus spilosoma
S. variegatus
Sylvilagus audubonii
Sylvilagus sp.
- Phalacropsylla allos* Wagner, 1936**
Neotoma cinerea
N. mexicana
Peromyscus maniculatus
P. truei
- Phalacropsylla hamata* Tipton and Mendez, 1968**
Neotoma albigula
Peromyscus leucopus
- Phalacropsylla morlani* Eads and Campos, 1982**
Ochotona princeps
- Rhadinopsylla fraterna* Baker, 1895**
Clethrionomys gapperi
Dipodomys merriami
D. spectabilis
Neotoma cinerea
Neotoma sp.
Peromyscus leucopus
Sigmodon hispidus
Sylvilagus audubonii
Sylvilagus sp.
- Rhadinopsylla goodi* Hubbard, 1941**
Bassariscus astutus
- Rhadinopsylla multidentatus* Morlan and Prince, 1954**
Dipodomys merriami
D. ordii
D. spectabilis
Neotoma albigula
N. micropus
Onychomys leucogaster
Peromyscus leucopus
Sigmodon hispidus
Sylvilagus audubonii
- Rhadinopsylla sectilis* Jordan and Rothschild, 1923**
Neotoma albigula
N. cinerea
Peromyscus boylii
P. leucopus
P. maniculatus
P. nasutus
P. truei
- Reithrodontomys megalotis*
***Stenistomera alpina* Baker, 1895**
Bassariscus astutus
Lynx rufus
Mustela frenata
Neotoma albigula
N. cinerea
N. mexicana
Ochotona princeps
Peromyscus truei
Sylvilagus nuttallii
Tamias quadrivittatus
Vulpes macrotis macrotis
- Stenistomera macrodactyla* Good, 1942**
Neotoma albigula
Peromyscus truei
- Stenoponia americana* Baker, 1899**
Peromyscus maniculatus
P. nasutus
- Stenoponia ponera* Traub and Johnson, 1952**
Peromyscus boylii
- Family Hystrichopsyllidae**
- Atyphloceras echis* Jordan and Rothschild, 1915**
Bassariscus astutus
Neotoma albigula
N. micropus
Neotoma sp.
Peromyscus boylii
P. maniculatus
P. nasutus
Peromyscus sp.
P. truei
- Atyphloceras multidentatus* C. Fox, 1909**
Peromyscus boylii
- Hystrichopsylla dippiei* Rothschild, 1902**
Microtus longicaudus
M. montanus
Neotoma cinerea
N. mexicana
Peromyscus maniculatus
P. nasutus
P. truei
Spermophilus lateralis
Tamias minimus
T. quadrivittatus
Tamiasciurus hudsonicus
- Family Ischnopsyllidae**
- Myodopsylla gentilis* Jordan and Rothschild, 1921**
Myotis yumanensis

***Myodopsylla nordina* Traub and Hoff, 1951**

Myotis thysanodes

***Sternopsylla texanus* Fox, 1914**

Tadarida brasiliensis

Family Leptopsyllidae

***Ctenophyllus armatus* Wagner, 1901**

Ochotona princeps

Thomomys talpoides

***Odontopsyllus dentatus* Baker, 1904**

Sylvilagus audubonii

S. nuttalli

***Peromyscopsylla adelpha* Rothschild, 1915**

Dipodomys ordii

Microtus longicaudus

Onychomys leucogaster

Peromyscus boylii

P. leucopus

P. maniculatus

P. nasutus

P. truei

Reithrodontomys megalotis

Tamias quadrivittatus

***Peromyscopsylla draco* Hopkins, 1951**

Neotoma micropus

Onychomys leucogaster

Peromyscus leucopus

P. maniculatus

Reithrodontomys megalotis

Sigmodon hispidus

***Peromyscopsylla hamifer vicens* Jordan, 1937**

Microtus longicaudus

M. montanus

M. pennsylvanicus

Peromyscus maniculatus

***Peromyscopsylla hesperomys* Baker, 1904**

Neotoma albigula

Onychomys leucogaster

Peromyscus leucopus

P. maniculatus

P. nasutus

P. truei

***Peromyscopsylla selenis* Rothschild, 1906**

Microtus longicaudus

M. montanus

M. pennsylvanicus

Peromyscus maniculatus

Family Pulicidae

***Ctenocephalides felis* Bouche, 1835**

Canis familiaris

Odocoileus hemionus

***Echidnophaga gallinaceus* Westwood, 1875**

Bassariscus astutus

Cynomys gunnisoni

Dipodomys merriami

D. ordii

D. spectabilis

Felis catus

Lepus californicus

Mephitis sp.

Neotoma albigula

N. micropus

Neotoma sp.

Onychomys leucogaster

Peromyscus leucopus

P. truei

Rattus norvegicus

Reithrodontomys megalotis

Spermophilus spilosoma

S. variegatus

Sylvilagus audubonii

Sylvilagus sp.

Urocyon cinereoargenteus

Vulpes velox velox

***Euhoplopsyllus affinis* Baker, 1904**

Dipodomys merriami

D. spectabilis

Lepus californicus

Neotoma sp.

Perognathus flavus

Peromyscus truei

Sigmodon hispidus

Spermophilus spilosoma

Sylvilagus audubonii

S. floridanus

S. nuttalli

Sylvilagus sp.

Urocyon cinereoargenteus

Vulpes macrotis macrotis

V. velox velox

V. vulpes

***Euhoplopsyllus glacialis* Taschenberg, 1880**

Canis familiaris

C. latrans

Felis catus

Lepus californicus

Lynx rufus

Sigmodon hispidus

Sylvilagus audubonii

***Hoplopsyllus anomalus* Baker, 1904**

Cynomys gunnisoni

Lepus californicus

Neotoma albigula
Peromyscus boylii
Spermophilus spilosoma
S. variegatus
Spilogale gracilis
Sylvilagus sp.

***Pulex irritans* Linnaeus, 1758**

Canis familiaris
Dipodomys spectabilis
Felis catus
Homo sapiens
Sylvilagus audubonii
Sylvilagus sp.
Urocyon cinereoargenteus
Vulpes macrotis
V. velox

***Pulex simulans* Baker, 1895**

Bassariscus astutus
Cynomys ludovicianus
Dipodomys spectabilis
Sylvilagus audubonii
Urocyon cinereoargenteus
Vulpes macrotis macrotis
V. velox velox
V. vulpes

***Spilopsyllus inaequalis* Baker, 1895**

Canis familiaris
C. latrans
Felis catus
Lepus californicus
Lynx rufus
Ochotona princeps
Sylvilagus audubonii
S. floridanus
Urocyon cinereoargenteus
Vulpes macrotis macrotis
V. vulpes

***Xenopsylla cheopis* Rothschild, 1903**

Rattus norvegicus
R. rattus

Family Rhopalopsyllidae

***Polygenis gwyni* C. Fox, 1914**

Dipodomys spectabilis
Neotoma micropus
Neotoma sp.
Sigmodon hispidus
Sylvilagus audubonii
Sylvilagus sp.

***Polygenis martinezbaezi* Vargas, 1951**

Sigmodon ochrognathus

Order Anoplura (Sucking Lice)

***Enderleinellus suturalis* Osborn, 1891**

Ammospermophilus harrisii
Cynomys gunnisoni
Spermophilus spilosoma

***Fahrenholzia pinnata* Kellogg and Ferris, 1915**

Chaetodipus intermedius
Dipodomys merriami
D. ordii
D. spectabilis
Onychomys leucogaster
Perognathus flavus

***Fahrenholzia zacatecae* Ferris, 1922**

Chaetodipus hispidus

***Haemodipsus setoni* Ewing, 1924**

Lepus californicus
Sylvilagus audubonii

***Haematopinus asini* Linnaeus, 1758**

Equus asinus
Equus caballus
Dipodomys merriami

***Hoplopleura acanthopus* Burmeister 1839**

Dipodomys spectabilis
Microtus longicaudus

***Hoplopleura arboricola* Kellogg and Ferris, 1915**

Dipodomys ordii
D. spectabilis
Tamias quadrivittatus

***Hoplopleura arizonensis* Stojanovich and Pratt, 1961**

Sigmodon hispidus

***Hoplopleura ferrisi* Cook and Beer, 1959**

Dipodomys ordii
Peromyscus eremicus

***Hoplopleura hesperomydis* Osborn, 1891**

Dipodomys ordii
Microtus longicaudus
Onychomys leucogaster
Peromyscus boylii
P. leucopus
P. maniculatus
P. nasutus
P. truei

***Hoplopleura hirsuta* Ferris, 1916**

Dipodomys ordii
Onychomys leucogaster
Sigmodon hispidus
Sylvilagus audubonii

***Hoplopleura onychomydis* Cook and Beer, 1959**

Onychomys leucogaster

***Hoplopleura reithrodontomydis* Ferris, 1951**

Reithrodontomys megalotis

***Linognathus africanus* Kellogg and Paine, 1911**

Capra hircus

Ovis aries

***Linognathus setosus* von Olfers, 1816**

Canis familiaris

Canis latrans

***Linognathoides citellinus* Ferris, 1942**

Cynomys gunnisoni

***Linognathoides laeviusculus* Grube, 1851**

Spermophilus variegatus

***Linognathoides marmotae* Ferris, 1923**

Marmota flaviventris

***Linognathoides neotomae* Ferris, 1942**

Neotoma sp.

***Linognathoides spilosomae* Stojanovich and Pratt, 1961**

Spermophilus spilosoma

***Neohaematopinus citellinus* Ferris, 1942**

Cynomys gunnisoni

Spermophilus spilosoma

S. variegatus

***Neohaematopinus neotomae* Ferris, 1941**

Dipodomys ordii

Neotoma albigula

N. mexicana

N. micropus

***Neohaematopinus pacificus* Kellogg and Ferris, 1915**

Tamias quadrivittatus

***Neohaematopinus spilosomae* Stojanovich and Pratt, 1961**

Spermophilus spilosoma

***Pediculus humanus* Linnaeus, 1758**

Homo sapiens

***Phthirus pubis* Linnaeus, 1758**

Homo sapiens

***Polyplax auricularis* Kellogg and Ferris, 1915**

Onychomys leucogaster

Peromyscus maniculatus

P. nasutus

P. truei

Order Mallophaga (Chewing Lice)

***Goniodes squamatus* Emerson, 1950**

Dipodomys ordii

***Werneckiella (Bovicola) equi* Denny, 1842**

Equus asinus

E. caballus

Appendix B.

New Mexico County Records of Fleas (Siphonaptera)

Bernalillo

Aetheca wagneri
Anomiopsyllus novomexicanensis
A. hiemalis mexicanus
Atyphloceras echis
Catallagia decipiens
Ctenocephalides felis
Echidnophaga gallinaceus
Epitedia stanfordi
Euhoplopsyllus affinis
Eumolpianus eumolpi
Hoplopsyllus anomalus
Hystrichopsylla dippiei
Foxella ignotus
Malaraeus sinomus
Megarhthroglossis bisetis
M. divisus
M. arachis
M. bilsingi
M. facilis
M. nidi
M. parkeri
M. rectus
Myodopsylla nordina
Nosopsyllus fasciatus
Orchopeas sexdentatus
O. sexdentatus neotomae
Oropsylla hirsutus
O. montanus
Peromyscopsylla hesperomys
Phalacropsylla allos
P. hamata
Pulex irritans
Pulex simulans
Rhadinopsylla goodi
R. sectilis
Spilopsyllus inaequalis
Stenistomera alpina
Thrassis aridis
T. campestris
T. pansus
Thrassis stanfordi
Xenopsyllus cheopis

Catron

Anomiopsyllus hiemalis mexicanus

A. martini
Ceratophyllus vison
Meringis parkeri
Opisodasys robustus
Orchopeas caedens
O. fulleri
Oropsylla hirsutus
O. idahoensis

Chaves

Aetheca wagneri
Anomiopsyllus hiemalis mexicanus
A. novomexicanensis
Atyphloceras echis
Echidnophaga gallinaceus
Epitedia wenmanni
Euhoplopsyllus affinis
E. glacialis
Malaraeus telchinum
Megarhthroglossus bisetis
M. bilsingi
M. dipodomys
M. facilis
M. nidi
M. rectus
Orchopeas agilis
O. caedens
O. leucopus
O. sexdentatus
O. sexdentatus neotomae
Oropsylla hirsutus
Peromyscopsylla draco
Polygenis gwyni
Pulex irritans
P. simulans
Rhadinopsylla fraterna
R. multidenticulatus
Spilopsylla inaequalis
Thrassis aridis
T. bacchi consimilis
T. campestris
T. fotus
T. pansus

Cibola

None recorded.

Colfax

Anomiopsyllus hiemalis mexicanus
Catallagia neweyi
Malaraeus telchinum
Megabothris megacolpus
Megarhroglossus bisetis
M. divisus
M. wilsoni
Oropsylla tuberculatus cynomuris
O. idahoensis
O. labis
Pleochaetis exilis

Curry

Echidnophaga gallinaceus
Euhoplopsyllus affinis
E. glacialis

DeBaca

Pleochaetis exilis
Pulex irritans

Dona Ana

Anomiopsyllus novomexicanensis
Euhoplopsyllus affinis
Meringis altipectin
M. arachis
M. bilsingi
M. disparilis
M. nidi
M. rectus
Orchopeas agilis

Eddy

Anomiopsyllus hiemalis
Echidnophaga gallinaceus
Meringis altipectin
M. disparilis
M. nidi
Orchopeas caedens
Sternopsylla texanus
Thrassis fotus

Grant

Atyphloceras echis
Echidnophaga gallinaceus
Euhoplopsyllus affinis
Meringis arachis
M. dipodomys
Spilopsyllus inaequalis
Stenoponia ponera

Guadalupe

Megarhroglossus bisetis

Harding

None recorded.

Hidalgo

Anomiopsyllus novomexicanensis
Atyphloceras echis
Echidnophaga gallinaceus
Meringis altipectin
M. arachis
M. nidi
Polygenis martinezbaezi
Thrassis aridis
Thrassis pansus
Xenopsylla cheopis

Lea

Anomiopsyllus hiemalis
Echidnophaga gallinaceus
Euhoplopsyllus affinis
E. glacialis
Meringis bilsingi
M. dipodomys
M. nidi
M. parkeri
Orchopeas agilis
O. caedens
O. sexdentatus
Pulex irritans
P. simulans
Thrassis fotus

Lincoln

Anomiopsyllus novomexicanensis
A. hiemalis mexicanus
Megarhroglossus divisus
Meringis rectus
Peromyscopsylla adelpha

Los Alamos

Aetheca wagneri
Catallagia decipiens
Ceratophyllus vison
Malaraeus telchinum
Megarhroglossus bisetis
Peromyscopsylla adelpha
Pulex irritans

Luna

Anomiopsyllus novomexicanensis
Echidnophaga gallinaceus
Meringis altipectin
M. arachis
M. bilsingi
M. disparilis
Pulex irritans

McKinley

Eumolpianus eumolpi americanus
Foxella apachinus
Megarhroglossus bisetis

M. divisus
Orchopeas agilis
O. caedens
Oropsylla montanus
Phalacroscopylla hamata
Pleochaetis exilis
Pulex irritans
Spilopsyllus inaequalis
Stenistomera alpina

Mora

None recorded.

Otero

Anomiopsyllus novomexicanensis
Eumolpianus eumolpi
E. eumolpi americanus
Euhoplopsyllus affinis
Megarhroglossus divisus
Meringis bilsingi
M. nidi
M. rectus
Orchopeas caedens
O. leucopus
Oropsylla montanus

Quay

None recorded.

Rio Arriba

Aetheca wagneri
Anomiopsyllus heimalis mexicanus
A. novomexicanensis
Callistopsyllus terinus
Catallagia decipiens
Echidnophaga gallinaceus
Epitedia wenmanni
Euhoplopsyllus affinis
Eumolpianus eumolpi
E. eumolpi americanus
Foxella ignotus
Malaraeus telchinum
Megabothris abantis
Megarhroglossus bisetis
M. divisus
Meringis parkeri
Opisodasys keeni
Orchopeas leucopus
O. sexdentatus
O. sexdentatus neotomae
Oropsylla hirsutus
O. idahoensis
O. tuberculatus cynomuris
Peromyscopsylla adelpha
Pulex irritans
Spilopsyllus inaequalis

Thrassis pansus

T. stanfordi

Roosevelt

Euhoplopsyllus affinis
E. glacialis
Meringis bilsingi
Orchopeas leucopus
Oropsylla hirsutus
Peromyscopsylla hesperomys
Pleochaetis exilis
Pulex irritans
P. simulans
Thrassis aridis
T. fatus

San Juan

Amaradix euphorbae
Anomiopsyllus novomexicanensis
Meringis parkeri
M. rectus
Pleochaetis exilis
Pulex simulans
Spilopsylla inaequalis

San Miguel

Aetheca wagneri
Atyphloceras echis
Callistopsyllus teinus
Dactylopsylla bluei
D. neomexicana
Megarhroglossus bisetis
Peromyscopsylla hamifer vicens
P. selenis

Sandoval

Aetheca wagneri
Amaradix bitterrootensis
A. vonfintelis
Anomiopsyllus nudata
Atyphloceras echis
Callistopsylla terinus
Catallagia decipiens
Ceratophyllus vison
Corrodopsylla curvata
Echidnophaga gallinaceus
Epitedia stanfordi
Euhoplopsyllus affinis
E. glacialis
Eumolpianus eumolpi americanus
Foxella ignotus
Hoplopsyllus anomalus
Hystrichopsylla dippiei
Malaraeus sinomus
M. telchinum
Megabothris abantis

Megarhroglossus bisetis
M. cavernicolus
M. procus
Meringis bilsingi
M. dipodomys
M. jamesoni
M. parkeri
M. rectus
Odontopsyllus dentatus
Opisodasys robustus
Orchopeas agilis
O. caedens
O. leucopus
O. sexdentatus
O. sexdentatus neotomae
Oropsylla hirsutus
O. idahoensis
O. montanus
O. tuberculatus cynomuris
Peromyscopsylla adelpha
P. draco
P. hamifer vigens
P. hesperomys
P. selenis
Phalacropsylla allos
Pulex irritans
Rhadinopsylla fraterna
R. sectilis
Spicata rara
Spilopsyllus inaequalis
Stenistomera alpina
S. macrodactyla
Stenoponia Americana
Tarsopsylla coloradensis
Thrassis campestris
T. pansus

Santa Fe

Aetheca wagneri
Amaradix euphorbae
Amphalius necopinus
Anomiopsyllus hiemalis mexicanus
A. nudata
Atyphloceras echis
A. multidentatus multidentatus
Callistopsylla terinus
Catallagia decipiens
C. charlottensis
Ceratophyllus vison
Ctenocephalides felis
Ctenophyllus armatus
Delotelis telegoni
Echidnophaga gallinaceus

Epitedia stanfordi
Euhoplopsyllus affinis
Eumolpianus eumolpi americanus
Foxella ignotus
Hoplopsyllus anomalus
Hystrichopsylla dippiei
Malaraeus sinomus
M. telchinum
Megabothris abantis
Megarhroglossus bisetis
M. divisus
Meringis arachis
M. jamesoni
M. nidi
M. parkeri
M. rectus
Myodopsylla gentilis
Odontopsyllus dentatus
Orchopeas agilis
O. caedens
O. leucopus
O. sexdentatus
O. sexdentatus neotomae
Oropsylla hirsutus
O. idahoensis
O. montanus
O. tuberculatus cynomuris
Peromyscopsylla adelpha
P. draco
P. hamifer vigens
P. selenis
Phalacropsylla morlani
Pleochaetis exilis
Pulex irritans
Rhadinopsylla fraterna
R. multidenticulatus
R. sectilis
Spicata bottaceps
Spilopsyllus inaequalis
Stenistomera alpina
S. macrodactyla
Tarsopsylla coloradensis
Thrassis aridis
T. bacchi consimilis
T. campestris
T. fatus
T. pansus
T. stanfordi

Sierra

Anomiopsyllus novomexicanensis
Meringis altipectin
M. arachis

M. bilsingi

M. parkeri

Socorro

Anomiopsyllus hiemalis mexicanus

A. novomexicanensis

Ctenophthalmus pseudagyrtus

Echidnophaga gallinaceus

Euhoplopsyllus affinis

Eumolpianus eumolpi

Foxella ignotus

Hystrichopsylla dippei

Malaraeus sinomus

Megabothris abantis

Meringis altipectin

M. arachis

M. parkeri

Opisodasys robustus

Orchopeas agilis

O. caedens

O. leucopus

O. sexdentatus neotomae

O. montanus

Pleochaetis exilis

Plusaetis equatorius aetus

Pulex irritans

P. simulans

Spilopsyllus inaequalis

Thrassis bacchi consimilis

T. pansus

Taos

Anomiopsylla hiemalis mexicanus

Ceratophyllus vison

Opisodasy robustus

Oropsylla hirsutus

Torrance

Epitedia wenmanni

Euhoplopsyllus affinis

Meringis rectus

Oropsylla hirsutus

Pulex irritans

Thrassi pansus

Union

Aetheca wagneri

Malaraerus sinomus

Peromyscopsylla adelpha

P. draco

Pleochaetis exilis

Pulex irritans

Valencia

Anomiopsyllus hiemalis mexicanus

A. novomexicanensis

Megarhroglossus bisetis

Meringis facilis

M. rectus

Nosopsyllus fasciatus

Peromyscopsylla adelpha

New Mexico County Records of Lice
Order Anoplura and Order Mallophaga (as noted)

Bernalillo

Enderleinellus suturalis
Fahrenheitzia pinnata
F. zacatecae
Goniodes squamatus (O. Mallophaga)
Hoplopleura arboricola
H. onychomydis
H. hesperomydis
Linognathus africanus
L. setosus
Linognathoides laeviusculus
L. neotomae
L. spilosomae
Neohaematopinus citellinus
N. neotomae
N. spilosomae
Pediculus humanus
Phthirus pubis
Polyplax auricularis

Catron

Fahrenheitzia zacatecae

Chaves

Fahrenheitzia zacatecae

Cibola

Fahrenheitzia zacatecae

Colfax

Fahrenheitzia zacatecae

Curry

Fahrenheitzia zacatecae
Haemodipsus setoni

DeBaca

Fahrenheitzia zacatecae

Dona Ana

Fahrenheitzia zacatecae

Eddy

Fahrenheitzia zacatecae

Grant

Fahrenheitzia zacatecae
Hoplopleura ferrisi

Guadalupe

Fahrenheitzia zacatecae

Harding

Fahrenheitzia zacatecae

Hidalgo

Fahrenheitzia zacatecae

Lea

Fahrenheitzia zacatecae

Lincoln

Fahrenheitzia zacatecae

Los Alamos

Fahrenheitzia zacatecae

Luna

Fahrenheitzia zacatecae

McKinley

Fahrenheitzia zacatecae

Mora

Fahrenheitzia zacatecae

Otero

Fahrenheitzia pinnata
Haematopinus asini
Werneckiella (Bovicola) equi (O. Mallophaga)

Quay

Fahrenheitzia zacatecae

Rio Arriba

Fahrenheitzia zacatecae

Roosevelt

Fahrenheitzia pinnata
Fahrenheitzia zacatecae
Hoplopleura hesperomydis
H. hirsuta
Polyplax auricularis

San Juan

Fahrenheitzia zacatecae

San Miguel

Fahrenheitzia zacatecae

Sandoval

Fahrenheitzia zacatecae
Hoplopleura hesperomydis

Santa Fe

Enderleinellus suturalis
Fahrenheitzia zacatecae
Hoplopleura acanthopus
H. arboricola
H. hesperomydis
Linognathoides citellinus
L. laeviusculus
L. marmotae
L. neotomae
L. pacificus
Neohaematopinus citellinus
N. neotomae

N. pacificus
Polyplax auricularis

Sierra

Fahrenheitzia zacatecae

Socorro

Fahrenheitzia zacatecae

Hoplopleura arboricola

H. arizonensis

H. reithrodontomydis

Taos

Fahrenheitzia zacatecae

Hoplopleura reithrodontomydis

Torrance

Fahrenheitzia zacatecae

Union

Fahrenheitzia zacatecae

Valencia

Fahrenheitzia zacatecae



The Rocky Mountain Research Station develops scientific information and technology to improve management, protection, and use of the forests and rangelands. Research is designed to meet the needs of the National Forest managers, Federal and State agencies, public and private organizations, academic institutions, industry, and individuals.

Studies accelerate solutions to problems involving ecosystems, range, forests, water, recreation, fire, resource inventory, land reclamation, community sustainability, forest engineering technology, multiple use economics, wildlife and fish habitat, and forest insects and diseases. Studies are conducted cooperatively, and applications may be found worldwide.

Research Locations

| | |
|-------------------------|--------------------------|
| Flagstaff, Arizona | Reno, Nevada |
| Fort Collins, Colorado* | Albuquerque, New Mexico |
| Boise, Idaho | Rapid City, South Dakota |
| Moscow, Idaho | Logan, Utah |
| Bozeman, Montana | Ogden, Utah |
| Missoula, Montana | Provo, Utah |
| Lincoln, Nebraska | Laramie, Wyoming |

*Station Headquarters, Natural Resources Research Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326 W, Whitten Building, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.