



10-29-2004

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Recommended Citation

Haas, Glenn E.; Wilson, Nixon; and McAllister, Chris T. (2004) "Fleas (Siphonaptera: Ceratophyllidae, Ctenophthalmidae) from rodents in five southwestern states," *Western North American Naturalist*. Vol. 64 : No. 4 , Article 12.

Available at: <https://scholarsarchive.byu.edu/wnan/vol64/iss4/12>

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FLEAS (SIPHONAPTERA: CERATOPHYLLIDAE, CTENOPHTHALMIDAE) FROM RODENTS IN FIVE SOUTHWESTERN STATES

Glenn E. Haas¹, Nixon Wilson², and Chris T. McAllister³

ABSTRACT.—Nine species of fleas were collected incidental to a survey of rodents for molecular studies in Arizona, Colorado, New Mexico, Texas, and Utah, south of latitude 38°N. Three species were parasites of woodrats, *Neotoma* spp.: *Orchopeas neotomae* Augustson was confirmed for Texas, and the distribution patterns of *O. agilis* (Rothschild) and *O. schisintus* (Jordan) were more clearly defined. Four species were parasites of mice, *Peromyscus* spp.: *Aetheca wagneri* (Baker) was a new flea for *P. gratus* Merriam, the distribution of *O. leucopus* (Baker) was extended to far west Texas, *Plusaetis sibynus* (Jordan) was new for Utah and *N. lepida*, and the range of *Stenoponia americana* (Baker) was extended west of the Continental Divide in New Mexico. Other species included *Foxella ignota* (Baker) and *Meringis dipodomys* Kohls.

Key words: fleas, rodents, geographic distribution.

DeWalt et al. (1993) and Planz et al. (1996) trapped rodents for molecular studies in the American Southwest, south of 38°N in Arizona, Colorado, New Mexico, Texas, and Utah, between 1988 and 1991. T.S. DeWalt/T.A. Spradling (TSD/TAS) and J.V. Planz (JVP) also collected 129 fleas of 9 species, from 10 species of rodents. Herein, we report some changes in distribution, 2 new host records, and confirmation for 2 species, 1 each in Texas and Utah.

MATERIALS AND METHODS

Fleas were preserved in 70% ethanol until processed in the laboratory. Specimens were prepared using 10% KOH, graduated alcohols, oil of cloves, and xylene and were then mounted in Canada balsam on microscope slides. Specimens are deposited in the personal collections of Haas and Wilson and in the Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah.

RESULTS AND DISCUSSION

Nine taxa of fleas were identified: 7 are members of the family Ceratophyllidae and 2 of the family Ctenophthalmidae. The list of species is presented below and annotated with distributional and ecological information.

Ceratophyllidae

Aetheca wagneri (Baker)

NEW MEXICO: Catron Co., Luna, 2.4 km N, 1.2 km E, 2195 m: 1 ♀, *Peromyscus gratus* Merriam (TAS 323), 18 Mar. 1990.

This is one of the most common, wide-ranging fleas of mice, especially white-footed/deer mice of the genus *Peromyscus* (Johnson 1961, Haddow et al. 1983, Holland 1985). Distribution maps show that records decrease sharply southward toward the Mexican border, and our collection from the vicinity of Luna is another in the county with the southernmost records in the state (Johnson 1961, Haddow et al. 1983). Osgood's mouse, *P. gratus*, is a new host for *A. wagneri*.

Foxella ignota (Baker)

COLORADO: Conejos Co., Antonito, 1.6 km N, 24.2 km W, 2652 m: 5 ♂♂, 12 ♀♀, *Thomomys talpoides* (Richardson) (JVP 1662), 16 Aug. 1988.

This complex group of fleas is wide ranging and common on pocket gophers, *Thomomys* spp. Haddow et al. (1983) mapped a void in half of Colorado, most of Arizona and New Mexico, and all of Texas. Jordan and Rothschild (1915) and Campos (1971) listed several records for Colorado, all from the western half

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of the state. Our record from the northern pocket gopher, *T. talpoides*, extends the range of this species 2 counties further east along its southern border.

There are 11 named taxa of *E. ignota*, with much confusion in application of the names. No attempt was made to assign our specimens to a possible subspecies.

Orchopeas agilis (Rothschild)

ARIZONA: Mohave Co., Kingman, 9 km S, 30 km W (near Oatman), 914 m: 2♂♂, 4♀♀, *Neotoma albigula* Hartley (JVP 1872), 12 Mar. 1990. **COLORADO:** Archuleta Co., Chromo, 2.4 km S, 3.2 km W, 2286 m: 4♀♀, *Neotoma cinerea* (Ord) (JVP 1668), 22 Aug. 1988; Conejos Co., Antonito, 19.3 km W (Rio Grande National Forest), 2652 m: 11♂♂, 9♀♀, *N. cinerea* (JVP 1659), 16 Aug. 1988; Antonito, 22.5 km W (Rio Grande National Forest): 16♂♂, 28♀♀, *N. cinerea* (JVP 1663, 1664), 16 Aug. 1988. **UTAH:** Washington Co., St. George, 5.1 km N, 2.7 km W (W of Hwy 18 and Halfway Wash), 1128 m: 1♀, *Neotoma lepida* Thomas (JVP 1878), 15 Mar. 1990.

Orchopeas agilis has the widest range of the 7 members of the *Orchopeas sexdentatus* group commonly infesting woodrats, *Neotoma* spp. (Lewis 2000). Records are numerous from the southern Rocky Mountains westward to the Mojave Desert, where *O. agilis* can be classified as the northern homolog of *Orchopeas schisintus* (see account to follow). The bushy-tailed woodrat, *N. cinerea*, and desert woodrat, *N. lepida*, are common hosts of *O. agilis* in the Southwest.

Orchopeas leucopus (Baker)

TEXAS: El Paso Co., El Paso, 13.7 km N, 45.1 km E, 1204 m: 2♂♂, 1♀, *Peromyscus maniculatus blandus* Osgood (JVP 1956), 18 Apr. 1991; El Paso, 40.5 km NE (Hueco Tanks State Park), 960 m: 1♂, 1♀, *Peromyscus difficilis* (J.A. Allen) (TSD 417), 18 Apr. 1991.

This is a common flea of *Peromyscus* spp. in eastern states but collected less frequently in the West (see Benton 1980, Haddow et al. 1983). Eads (1950), Jellison and Senger (1976), and Richerson et al. (1992) each listed 2 collections and McAllister and Wilson (1992) 1 from Texas. Only those of Richerson et al. (1992) were from west Texas.

Orchopeas neotomae Augustson

COLORADO: Archuleta Co., same data as JVP 1668, *O. agilis* above, 1♂. **NEW MEXICO:** Catron Co., Luna: 1♂, 1♀, *Neotoma mexicana* Baird (JVP 1784), 14 May 1989. **TEXAS:** Jeff Davis Co., Kent (in Culberson Co.), 13.2 km S, 12.6 km E (Long X Ranch), 1713 m: 4♂♂, 8♀♀, *N. mexicana* (JVP 1932), 11 Mar. 1991.

This is a parasite of *Neotoma* spp., primarily the Mexican woodrat, *N. mexicana*. It was described from Grand Canyon National Park, Coconino Co., Arizona (Augustson 1943a). Originally its distribution was considered to be centered in the Southwest in the states of Arizona, New Mexico, and Utah (Lewis 1975, Haddow et al. 1983). More recently, however, peripheral records have been reported from northern Colorado (Campos et al. 1985) and central Idaho (Baird and Saunders 1992), but Lewis (2000) questioned the latter record based on a single female. Our records herein include southwestern Colorado and west Texas. Hubbard (1947) had secondary information that *O. neotomae* occurred in west Texas, and Lewis (2000) concurred, but ours is the 1st definitive record with supporting collection data. As emphasized by Stark (1958), this species and *O. sexdentatus* (= *O. agilis*) can be collected from the same host, as was the case with JVP 1668 from Colorado.

Orchopeas schisintus (Jordan)

ARIZONA: Yuma Co., Quartzsite (La Paz Co.), 50 km S, 7 km E: 7♂♂, 6♀♀, *Neotoma devia* Goldman (JVP 1870), 12 Mar. 1990.

Jordan (1929) originally described this arid-land woodrat flea from Cochise Co., Arizona, as a subspecies of *Ceratophyllus sexdentatus* Baker (see Lewis 2000). Distribution records are now known for 6 southern Arizona counties and Mexico. Augustson (1943b) and Hubbard (1947) listed *O. sexdentatus schisintus* from Alvarado Mine, Yavapai Co., and Organ Pipe Cactus National Monument and Tucson, Pima Co., respectively. Stark (1970) reported *O. sexdentatus* (probably *schisintus*) from southern Arizona. Jellison and Senger (1976) listed specimens of *O. sexdentatus* (probably *schisintus*) collected in the 1930s in Pima Co. and the Plomosa Mountains (then Yuma Co., now La Paz Co.). Hall et al. (1989) also recorded *O. sexdentatus* (probably *schisintus*) from the Ajo

Mountains, Organ Pipe Cactus National Monument (Pima Co.). Lewis (2000) cited material from Maricopa and Yuma counties and from Mexico.

Plusaetis sibynus (Jordan)

UTAH: Washington Co.: same data as JVP 1878, *O. agilis* above, 1 ♂.

This is a mouse flea on *Peromyscus* spp., originally described from Paradise in the Chiricahua Mountains, southeastern Arizona (Jordan 1925). Hubbard (1947) collected 1 specimen from a deer mouse, *P. maniculatus* (Wagner), in the Grand Canyon, northwestern Arizona. The U.S. Public Health Service collected 2 specimens from a cactus mouse, *P. eremicus* (Baird), 19.3 km north of Pinos Altos, Grant Co., New Mexico, in 1951 (T.M. Howard correspondence). These 3 localities are the only ones mapped for the United States by Haddow et al. (1983). These authors described the habitat as mixed secondary forest and scrub terrain at 1700 m. Our record near St. George is from the Mohave Desert scrub biome (Turner 1982). Stark (1958) anticipated occurrence of *P. sibynus* in Utah by including it in his checklist and illustrated key to the fleas of the state. Interestingly, our Utah record would appear extralimital as Augustson and Durham (1961) failed to find the species among 35 species (1434 specimens) of fleas from a large survey north of Lake Mead and the Colorado River in northwestern Arizona.

Neotoma lepida is recorded as a host for the 1st time. *Peromyscus* spp. sometimes nest in *Neotoma* stick houses (Hoffmeister 1986, Haas unpublished data), and that ecology may account for this accidental host relationship.

Smit (1983) recognized 2 subspecies of *P. sibynus*, with *P. s. jordani* (Barrera) known only from Mexico. Our specimen from Utah could be either *P. s. sibynus* (Jordan) or an undescribed subspecies. Haddow et al. (1983) stated that other subspecies likely exist between the areas where these two occur.

Ctenophthalmidae

Meringis dipodomys Kohls

UTAH: Washington Co.: same data as JVP 1878, *O. agilis* above, 1 ♂, *Chaetodipus penicillatus* Woodhouse (JVP 1879).

The species is normally a flea of Merriam's kangaroo rat, *Dipodomys merriami* Mearns, and

is prevalent in Washington Co. in the vicinity of St. George and other arid locales (Stark 1958). Elsewhere in its range in Arizona, California, and Nevada, the species occurs on a wide variety of kangaroo rats and associated rodents (Eads et al. 1987).

Stenoponia americana (Baker)

NEW MEXICO: Catron Co.: same data as TAS 323, *A. wagneri* above, 1 ♂.

This is a large flea of murid rodents, particularly *Peromyscus* spp. In New Mexico only a few specimens have been collected, mostly in the north central region, east of the Continental Divide (Williams and Hoff 1951, Stark 1958, Haas et al. 1973). Our new record near Luna is over 42 km west of the Continental Divide and only 8.7 km east of Arizona, which currently lacks records.

ACKNOWLEDGMENTS

We thank J.V. Planz and field assistants for the collection of southwestern fleas, T.A. Spradling for access to her field catalog, R.E. Lewis for identification of some of the *Orchopeas* spp. from woodrats, T.M. Howard for data on specimens of *Plusaetis sibynus* in the Rothschild Collection of Fleas, British Museum (Natural History), and the Arizona Department of Mines and Mineral Resources for location of the Alvarado Mine.

LITERATURE CITED

- AUGUSTSON, G.F. 1943a. A new subspecies of *Orchopeas sexdentatus* (Baker) (Siphonaptera: Dolichopsyllidae). Bulletin of the Southern California Academy of Science 42:49–51.
- . 1943b. Preliminary records and discussion of some species of Siphonaptera from the Pacific Southwest. Bulletin of the Southern California Academy of Science 42:69–89.
- AUGUSTSON, G.F. AND F.E. DURHAM. 1961. Records of fleas (Siphonaptera) from northwestern Arizona. Bulletin of the Southern California Academy of Science 60: 100–105.
- BAIRD, C.R., AND R.C. SAUNDERS. 1992. An annotated checklist of the fleas of Idaho (Siphonaptera). Idaho Agricultural Experiment Station Research Bulletin 148. 34 pp.
- BENTON, A.H. 1980. An atlas of the fleas of the eastern United States. Marginal Media, Fredonia, NY. 157 pp.
- CAMPOS, E.G. 1971. The Siphonaptera of Colorado. Master's thesis, Colorado State University, Fort Collins. 274 pp.
- CAMPOS, E.G., G.O. MAUPIN, A.M. BARNES, AND R.B. EADS. 1985. Seasonal occurrence of fleas (Siphonaptera) on

- rodents in a foothills habitat in Larimer County, Colorado, USA. *Journal of Medical Entomology* 22: 266–270.
- DEWALT, T.S., E.G. ZIMMERMAN, AND J.V. PLANZ. 1993. Mitochondrial-DNA phylogeny of species of the *boyllii* and *truei* groups of the genus *Peromyscus*. *Journal of Mammalogy* 74:352–362.
- EADS, R.B. 1950. The fleas of Texas. Texas State Health Department, Austin. 85 pp.
- EADS, R.B., E.G. CAMPOS, AND G.O. MAUPIN. 1987. A review of the genus *Meringis* (Siphonaptera: Hystrichopsyllidae). *Journal of Medical Entomology* 24: 467–476.
- HAAS, G.E., R.P. MARTIN, M. SWICKARD, AND B.E. MILLER. 1973. Siphonaptera-mammal relationships in north-central New Mexico. *Journal of Medical Entomology* 10:281–289.
- HADDOW, J., R. TRAUB, AND M. ROTHSCHILD. 1983. Distribution of ceratophyllid fleas and notes on their hosts. Pages 42–163 + 151 maps in R. Traub, M. Rothschild, and J.F. Haddow, *The Rothschild collection of fleas. The Ceratophyllidae: key to the genera and host relationships*. Privately published by M. Rothschild and R. Traub (distributed by Academic Press, Inc., London).
- HALL, W.E., C.A. OLSON, AND T.R. VAN DEVENDER. 1989. Late Quaternary and modern arthropods from the Ajo Mountains of southwestern Arizona. *Pan-Pacific Entomologist* 65:322–347.
- HOFFMEISTER, D.F. 1986. *Mammals of Arizona*. University of Arizona Press, Tucson, and Arizona Game and Fish Department. 602 pp.
- HOLLAND, G.P. 1985. The fleas of Canada, Alaska and Greenland (Siphonaptera). *Memoirs of the Entomological Society of Canada* 130. 631 pp.
- HUBBARD, C.A. 1947. *Fleas of western North America*. Iowa State College Press, Ames. 533 pp.
- JELLISON, W.L., AND C.M. SENGER. 1976. Fleas of western North America except Montana in the Rocky Mountain Laboratory collection. Pages 55–136 in H.C. Taylor, Jr., and J. Clark, editors, *Papers in honor of Jerry Flora*. Western Washington State College, Bellingham.
- JOHNSON, P.T. 1961. A revision of the species of *Monopsyllus* Kolenati in North America (Siphonaptera, Ceratophyllidae). USDA Technical Bulletin 1227. 69 pp.
- JORDAN, K. 1925. New Siphonaptera. *Novitates Zoologicae* 32:96–112.
- _____. 1929. Notes on North American fleas. *Novitates Zoologicae* 35:28–39.
- JORDAN, K., AND N.C. ROTHSCHILD. 1915. Contributions to our knowledge of American Siphonaptera. *Ectoparasites* 1:45–60.
- LEWIS, R.E. 1975. Notes on the geographical distribution and host preferences in the order Siphonaptera, part 6. Ceratophyllidae. *Journal of Medical Entomology* 11:658–676.
- _____. 2000 (2001). A taxonomic review of the North American genus *Orchopeas* Jordan, 1933 (Siphonaptera: Ceratophyllidae). *Journal of Vector Ecology* 25:164–189.
- MCCALLISTER, C.T., AND N. WILSON. 1992. Two additions to the flea (Siphonaptera: Hystrichopsyllidae, Leptopsyllidae) fauna of Texas. *Texas Journal of Science* 44:245–247.
- PLANZ, J.V., E.G. ZIMMERMAN, T.A. SPRADLING, AND D.R. AKINS. 1996. Molecular phylogeny of the *Neotoma floridana* species group. *Journal of Mammalogy* 77: 519–535.
- RICHERSON, J.V., J.F. SCUDDAY, AND S.P. TABOR. 1992. An ectoparasite survey of mammals in Brewster County, Texas, 1982–1985. *Southwestern Entomologist* 17: 7–15.
- SMIT, F.G.A.M. 1983. Key to the genera and subgenera of Ceratophyllidae. Pages 1–36 + 205 figs. and 90 plates (by J. Navarro and R. Traub) in R. Traub, M. Rothschild, and J.F. Haddow, *The Rothschild collection of fleas. The Ceratophyllidae: key to the genera and host relationships*. Privately published by M. Rothschild and R. Traub (distributed by Academic Press, Inc., London).
- STARK, H.E. 1958 (1959). *The Siphonaptera of Utah*. U.S. Department of Health, Education, and Welfare, Public Health Service, Atlanta, GA. 239 pp.
- _____. 1970. A revision of the flea genus *Thrassis* Jordan 1933 (Siphonaptera: Ceratophyllidae) with observations on ecology and relationship to plague. *University of California Publications in Entomology* 53. 184 pp.
- TURNER, R.M. 1982. Mohave deserts scrub. Pages 157–168 in D.E. Brown, editor, *Biotic communities of the American Southwest—United States and Mexico*. Desert Plants 4.
- WILLIAMS, L.A., AND C.C. HOFF. 1951. Fleas from the Upper Sonoran Zone near Albuquerque, N. Mex. *Proceedings of the United States National Museum* 101:305–313.

Received 28 May 2003

Accepted 24 November 2003