

SCIENTIFIC NOTE

Range expansion and hosts of *Ctenophthalmus pseudagyrtes* Baker (Siphonaptera: Ctenophthalmidae) in central Alaska

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Traub (1980, 1985) noted that Eocene mammal data account for *Ctenophthalmus* in the western hemisphere. The Nearctic flea *Ct. pseudagyrtes* originated from an African ancestor that accompanied its host rafting in the south Atlantic from Africa to South or Middle America while continents were much closer together in the early Eocene epoch (Traub 1980: pp. 144-145, 161; 1985: pp. 368-406). Traub (1980: p. 119) commented "The host versatility exhibited by *Ctenophthalmus* is exceptional...". He gave examples of "Extra Ordinal fleas within Two or More Orders of Host" including "*Ctenophthalmus* (*C.*) *agyrtes*, etc." on "microtines, murids, soricids, etc." (Traub 1985: Table 8.15). Traub (1980: pp. 142-143) had observed "The range of its main host, *Microtus*, greatly exceeds that of *C. (N.) pseudagyrtes*." Traub (1980: pp. 142-145) was especially puzzled by the anomalous range of the only *Ctenophthalmus* species in North America being limited in the West by the Rocky Mountains and the North by Southern Canada. He and Holland overlooked collections in central Alaska, Arizona, and New Mexico. Only preliminary records for Alaska were published (Haas *et al.* 1989). Five new Alaska *Ct. pseudagyrtes* and two new host *Myodes rutilus* (Pallas) records are given in New Material Examined and Fig. 1 of the present report.

New material examined: USA, Alaska, Galena, 15 km WNW, N bank Yukon River: 1♀ ex *Sorex cinereus*, 21-vii-1988, T. O. Osborne 4520. McGrath vicinity, Kuskokwim River watershed, 1♂ ex *My. rutilus*, 29-vi-1989, J. S. Whitman; 1♂ same data but pool of 8 *My. rutilus*, 7-21-vii-1989. Nowitna NWR, NW bank Little Muddy River, Hades Lake vicinity, Nowitna River watershed, 64°38'N, 154°00'W, 1♂, 1♀ ex *Microtus xanthognathus* (Leach), 9-ix-1995, W. N. Johnson 421; same data but 1♀, 9-ix-1996, WNJ 383.

One interior Alaska watershed with *Ct. pseudagyrtes* reported by Haas *et al.* (1989, Fig. 1) increased to three, i.e. from north bank Yukon River west of Galena to Nowitna River and Kuskokwim River above McGrath. Tributaries of the latter two rivers interdigitate at elevations below 305 m to provide potential for small mammal populations to move between these watersheds.

This topography can account for the range of *Mi. xanthognathus* having a southwest marginal record near the mouth of the Takotna River (Hall 1981, Map 460). That location is directly across from the Kuskokwim River oxbow in which McGrath is located. The ectoparasite study area was within 1.6 km of the city.

The habitat was second-growth deciduous forest interspersed with upland grassy areas. Understory was a heavy grass/forb type. At the Nowitna NWR 1985 burn study areas, *Mi. xanthognathus* habitat was "tall shrub-sapling stage of early successional forest," with some patches of mature conifers, moss and herbs (Paragi *et al.* 1996). Similarities between the two study areas suggest that both provided habitats favored by taiga voles for their post-fire vegetation (Conway and Cook 1999).

Myodes rutilus stands apart from the other hosts by being amphiberingean and without previous *Ct. pseudagyrtes* records. However, the southern-ranging Nearctic congener southern red-backed vole, *My. gapperi* (Vigors) is listed as a major host of *Ct. pseudagyrtes* in Canada by Holland (1949, 1985) with 43 collections. In contrast, the northern red-backed vole ranges from Alaska across Canada to Hudson Bay north of the southern red-backed vole range (Holland 1985, Map 86), without any record of being a host in Canada (Holland 1985, p. 489, Map 34). Updated distribution maps of the two red-backed voles are in MacDonald and Cook (2009: Maps 20, 21).

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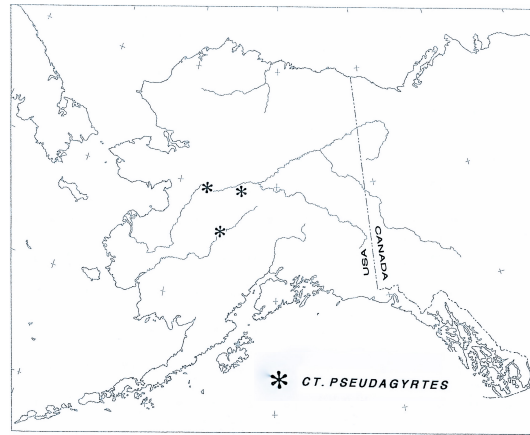


Figure 1. Locations of three study areas in Alaska where *Ctenophthalmus pseudagyrtis* specimens were collected. Upper left symbol marks north bank Yukon River, 15 km WNW of Galena, lower symbol marks McGrath, Kuskokwim River and upper right symbol marks Hades Lakes, Nowitna NWR.

Ctenophthalmus pseudagyrtis had a large literature with many genera and species of small mammal hosts, mainly Nearctic shrews, mice and voles in North America north of Mexico (Benton 1980, Holland 1985, Haas *et al.* 1989, Fagerlund *et al.* 2001, etc.) and in certain biogeographic provinces of Mexico (Morrone *et al.* 2000). *Sorex cinereus* and especially *Microtus pennsylvanicus* are hosts that range widely across the continent. The taiga vole, however, despite ranging from Hudson Bay across much of Alaska (Hall 1981, Map 460; MacDonald and Cook 2009: Map 19) only has *Ct. pseudagyrtis* records in Alaska. Adult specimens of *Ct. pseudagyrtis* were scarce and no larvae were found. Yet 160 of 291 vole nests were positive for 2420

adult fleas (Haas 1982). These were vole fleas of 14 taxa with inclusion of 618 adults of 10 taxa reared from 29 of the nests. Specimens of *Ct. pseudagyrtis* were not found.

New records of three more *Ct. pseudagyrtis* ex two taiga voles in Nowitna NWR remind us of the hypothesis (Haas *et al.* 1989) that fossil records of Zakrzewski (1985) show where taiga voles shifted from northeast and Midwest US states northwest to Alaska and could have carried *Ct. pseudagyrtis* with them. A recent review of *Mi. xanthognathus* fossils in Alaska and a new taiga vole distribution map are presented by MacDonald and Cook (2009: pp. 97-98, Map 19).

REFERENCES

- Benton, A.H. 1980. An atlas of the fleas of the eastern United States. Marginal Media, Fredonia, NY, 177 pp.
- Conroy, C.J. and J.A. Cook. 1999. *Microtus xanthognathus*. Mammalian Species 627: 1-5.
- Fagerlund, R.A., P.L. Ford and P.J. Polechla, Jr. 2001. New records for fleas (Siphonaptera) from New Mexico with notes on plague-carrying species. Southwestern Naturalist 46: 94-96.
- Haas, G.E. 1982. Fleas (Siphonaptera) from vole nests in subarctic Alaska. Canadian Journal of Zoology 60: 2157-2161.
- Haas, G.E., N. Wilson, T.O. Osborne, R.L. Zarnke, L. Johnson and J.O. Wolff. 1989. Mammal fleas (Siphonaptera) of Alaska and Yukon territory. Canadian Journal of Zoology 67: 394-405.
- Hall, E.R. 1981. The mammals of North America. Vol. 2, 2nd edition, John Wiley & Sons, Inc., NY.
- Holland, G.P. 1949. The Siphonaptera of Canada. Canada Department of Agriculture Technical Bulletin 70.
- Holland, G.P. 1985. The fleas of Canada, Alaska and Greenland (Siphonaptera). Memoirs of the Entomological Society of Canada 130.
- MacDonald, S.O. and J.A. Cook. 2009. Recent Mammals of Alaska. University of Alaska Press, Fairbanks. 387 pp.
- Morrone, J.J., R. Acosta and A.L. Gutierrez. 2000. Cladistics, biogeography, and host relationships of the flea subgenus *Ctenophthalmus* (*Alloctenus*), with the description of a new Mexican species (Siphonaptera: Ctenophthalmidae). Journal of the New York Entomological Society 108: 1-12.
- Paragi, T.F., W.N. Johnson, D.D. Katnik and A.J. Magoun. 1996. Marten selection of postfire seres in the Alaskan taiga. Canadian Journal of Zoology 74: 2226-2237.
- Traub, R. 1980. The zoogeography and evolution of some fleas, lice and mammals. Pp. 93-172. In Fleas. Proceedings of the International Conference on Fleas, Ashton Wold, Peterborough, U.K., 21-25 June 1977. R. Traub & H. Starcke (eds.). A.A. Balkema, Rotterdam. 420 pp.
- Traub, R. 1985. Coevolution of fleas and mammals. Pp. 295-437. In K.C. Kim (ed.). Coevolution of Parasitic Arthropods and Mammals. John Wiley & Sons, NY. 800 pp.
- Zakrzewski, R.J. 1985. The fossil record. In Biology of New World *Microtus*. R.H. Tamarin (ed.). Special Publication American Society of Mammalogists No. 8. Pp. 1-51.