

FLEAS (SIPHONAPTERA) FROM NESTS OF WOODPECKERS IN ALASKA

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Abstract.—A total of 955 specimens came from 39 nests in 34 localities west of the Yukon Territory, 1974–1978. Two Holarctic species were *Ornithophaga anomala* Mikulin with 371 specimens from 21 nests (mostly Downy Woodpecker and Three-toed Woodpecker) in 20 localities and *Ceratophyllus zhovtyi* Emel'yanova and Goncharov with 28 specimens from three nests (two Flicker and an unknown species) in three localities. Two Nearctic species were *C. adustus* Jordan with 168 specimens from 15 nests (mostly Three-toed Woodpecker) in 13 localities and *C. rauschi* Holland with 388 specimens from eight nests (seven Flicker) in six localities.

Our survey of ectoparasites in nests of the Tree Swallow (*Trachycineta bicolor* (Vieillot)) and Violet-green Swallow (*Tachycineta thalassina* (Swainson)) yielded data on fleas of swallows (Haas et al., 1981). The swallows sometimes built nests in tree cavities made by woodpeckers. Thus, four species of little-known bird fleas were discovered in old nests of woodpeckers, namely: *Ornithophaga anomala* Mikulin, *Ceratophyllus zhovtyi* Emel'yanova and Goncharov, *C. adustus* Jordan and *C. rauschi* Holland. The first two species were originally described from southcentral USSR and the last two from northwestern Canada not far from the Alaska border. Hopkins and Rothschild (1971) thought that *O. anomala* might be represented in North America by the unique specimen of *O. nearctica* Holland and Loshbaugh from Utah. Therefore, in Alaska, only the finding of *C. zhovtyi* could be considered unexpected.

Some morphological anomalies in *O. anomala* and *C. adustus* were noted and described (Haas, 1983). Our survey of fleas on birds found dead included one record of *C. adustus* from *Picoides tridactylus* (Linnaeus) in southcentral Alaska (Haas et al., 1980). The original description of *C. adustus* from a porcupine (*Erethizon dorsatum* (Linnaeus)) in British Columbia (Jordan, 1932) had obscured its relationship with woodpeckers. The present report concerns records of 955 specimens of four species of fleas from 39 nests of *Picoides* spp. and *Colaptes auratus* (Linnaeus) in 34 localities of Alaska west of the Yukon Territory, 1974–1978.

MATERIALS AND METHODS

In forested regions of Alaska west of the Yukon Territory, especially the interior Copper River lowland and lowlands near upper Cook Inlet, dead stubs of spruce (*Picea glauca* (Moench) Voss), poplar and cottonwood (*Populus* spp.), birch (*Betula papyrifera* Marshall) and other trees were scanned from a distance for woodpecker cavities. Stubs with cavities not being used by nesting birds were cut down or pushed over to collect any nests present (Haas et al., 1981). Stubs that fell intact were cut

open to remove nests with scraper, brush and forceps. The same tools were used for retrieving nests that spilled from cavities when stubs broke open on impact with the ground. Nests of woodpeckers, swallows (Haas et al., 1981), squirrels (Haas and Wilson, 1982) and voles (Haas, 1982) were bagged separately. Nests of *Colaptes auratus* were identified by the large cavity and presence of ant heads and flicker feathers. Nests of *Picoides* spp. that contained small red-tipped feathers were classified as *P. villosus* (Linnaeus) or *P. pubescens* (Linnaeus), not *P. arcticus* (Swainson) or *P. tridactylus*. Nests of *Picoides* that were not of the last two species are indicated by (NT) in the Records.

Five nests were held in plastic bags with moist towels for several weeks to rear immature fleas. All nests of woodpeckers, except old ones that had become compressed into a crust, were picked apart in a light-colored pan, and fleas were transferred with brush or forceps to labelled vials. Specimens selected for permanent mounts in Canada balsam were mostly those found in good condition, but all specimens of *C. zhovtyi* were mounted despite severe structural damage. Specimens of *C. rauschi* were deposited in the Canadian National Collection and collections of the authors; specimens of the other species were retained by Haas.

RESULTS

Specimens totaling 955 (102 reared) of four species of fleas were obtained from 39 nests of woodpeckers (*Colaptes auratus* and *Picoides* spp., mostly *P. pubescens* and *P. tridactylus*) in 34 localities in Alaska west of the Yukon Territory, 1974–1978. Neither fleas nor fragments of them could be found in very old nests, and 14 cavities without nests were negative for these species of fleas.

Ornithophaga anomala Mikulin, 1957

Specimens totaling 371 (15 reared) were obtained from 21 nests of woodpeckers in 20 localities in two regions. All nests were of unidentified *Picoides* spp.; five contained small red-tipped feathers. One nest appeared to be in an abandoned cavity of *C. auratus*. The nests were in cavities an average of 3 m above ground. All cavities were in dead stubs: 11 in birch, six in poplar and four in spruce.

Records. All from nests of *Picoides* spp. Chickaloon (mile 78 Glenn Highway): two males, nine females (eight dead, one gravid), poplar, 8.IV.1976. Eklutna Lake, 3 km SE, 320 m: two males (dead), two females (also *C. adustus*), poplar (NT), 18.X.1974. Glennallen, 53 km W (mile 4.5 Lake Louise Road): three males (dead), two females (dead) (also *C. adustus*), spruce (probable cavity of *C. auratus*), 14.VI.1976. Kasilof, 6.4 km S (Tustumena Lake Road): two females (one dead), under nest of swallow, poplar, 31.VII.1976. Kenai (city): one, sex unknown (left metepimeron only), birch, 23.IV.1976. Kenai Lake, west shore (mile 6 Snug Harbor Road): one male, three females, birch, 29.VII.1976; (mile 7): two females (dead), under squirrel nest, birch, same date. Palmer, 4.5 km NE (Clark–Wolverine Road): 23 males (eight dead), 39 females (21 dead) (also *C. adustus*), poplar, 13.IX.1975; 7 km E (Smith Road): five males (one dead), 10 females (one dead, one gravid), poplar, 13.IX.1975; 7 km N (mile 52.8 Glenn Highway): one female (dead), under squirrel nest and vole nest, poplar (NT), 30.IV.1975; 8 km N (mile 53 Glenn Highway): four males, three females (emerged from cocoons when disturbed), under nest of swallow, birch,

3.VIII.1974; 14 km NW (mile 1.5 Edgerton Park Road): 68 males, 87 females (1 dead), birch (NT), 27.IX.1975; 18.2 km SE (Knik River Road nr. Fox Lake): one male (dead), nine females (dead) (also *C. adustus*), spruce, 28.VII.1974; one female (dead), same spruce, cavities interconnected. Sterling, 7.2 km NW (Sunken Island Lake Road): 29 males, 39 females (one dead) (also *C. adustus*), birch, 30.VII.1976 (two males, six females reared 25.VIII.1976); 22.4 km N (Swanson River Road): one female (dead), under squirrel nest, spruce, 30.VII.1976. Talkeetna, 12.8 km NW (mile 121.6 Parks Highway): one male, seven females (one dead), birch (NT), 13.V.1976 (one male, six females reared 8.VII.1976); 24.1 km W (mile 12.2 Petersville Road): two males, two females, birch, 28.IX.1975. Wasilla, 5 km E (Parks Highway): one male, seven females (one dead), birch, 8.V.1975; 5.5 km E (Parks Highway nr. Black Lake): one female, birch (NT), 6.VIII.1974; 6 km NE (Lakeview Road nr. Kings Lake): one female (dead) (also *C. adustus*), birch, 6.V.1975.

Ceratophyllus zhovtyi Emel'yanova and Goncharov, 1966

Specimens totaling 28 were collected from three nests of woodpeckers in three localities in two regions. Two nests were of *C. auratus* and one was of an unidentified *Picoides* sp. that contained small red-tipped feathers. The nests were in cavities an average of 3 m above ground. All cavities were in dead stubs: two in birch and one in spruce.

Records. Chistochina, 22.5 km SW (mile 222.5 Glenn Highway): 15 males (dead), 11 females (eight dead) (also *C. adustus* and *C. rauschi*), nest of *Picoides* sp. (NT), birch, 9.IV.1976. Circle, 14 km SW (mile 151.3 Steese Highway): one female, nest of *C. auratus*, birch, 1.VII.1976. Nabesna Road, mile 31: one male (dead), nest of *C. auratus*, spruce, 9.VIII.1975.

Ceratophyllus adustus Jordan, 1932

Specimens totaling 168 (30 reared) were obtained from 15 nests of woodpeckers in 13 localities in three regions. One nest was of *C. auratus* and 14 were of unidentified *Picoides* spp. Two of the latter contained small red-tipped feathers. The nests were in cavities an average of 2.5 m above ground. All cavities were in dead stubs: eight in birch, four in spruce and three in poplar.

Records. All from nests of *Picoides* spp., except as indicated. Cantwell, 4.8 km NE (Parks Highway south of Nenana River bridge): 29 males, 31 females, spruce, 3.IX.1974 (one male reared 10.X.1974). Chistochina, 22.5 km SW (mile 222.5 Glenn Highway): seven males (dead), 13 females (dead) (also *C. zhovtyi* and *C. rauschi*), birch (NT), 9.VI.1976. Edgerton Highway, mile 10: one male (dead), poplar, 5.IX.1975. Eklutna Lake, 3 km SE, 320 m: six females (also *O. anomala*), poplar (NT), 18.X.1974. Glennallen, 53 km W (mile 4.5 Lake Louise Road): 11 males (three dead), 17 females (also *O. anomala*), spruce (probable cavity of *C. auratus*), 14.VI.1976. Gunsight Mountain, 3 km SE (mile 119 Glenn Highway): two females, nest of *C. auratus* apparently visited by *Picoides* sp., spruce, 8.VI.1976. Palmer, 4.5 km NE (Clark-Wolverine Road): one male, three females (also *O. anomala*), poplar, 13.IX.1975 (one female reared 21.X.1975); 18.2 km SE (Knik River Road nr. Fox Lake): one male (dead), one female (dead) (also *O. anomala*), spruce, 28.VII.1974. Skilak Lake, north shore: three males (dead), four females (dead), under incomplete nest of swal-

low, birch, 23.V.1978. Sterling, 7.2 km NW (Sunken Island Lake Road): nine males (one dead), 20 females (also *O. anomala*), birch, 30.VII.1976 (eight males, 20 females reared 25.VIII.1976). Talkeetna, 2.9 km SE: one male, birch, 21.IV.75. Wasilla, 4.6 km E (Matanuska Road): one male, three females (one dead), birch, 30.IV.1975; one female, cavity higher in same birch; 6 km NE (Lakeview Road nr. Kings Lake): one male (dead), one female (also *O. anomala*), birch, 6.V.1975; one female (gravid), cavity higher in same birch.

Ceratophyllus rauschi Holland, 1960

Specimens totaling 388 (57 reared) were obtained from eight nests of woodpeckers in six localities in two regions. Seven nests of *C. auratus* harbored 387 of the specimens. These nests were in cavities an average of 4.6 m above ground. All cavities were in dead stubs: four in spruce, two in birch and one in poplar. The last stub was part of a live tree.

Records. All from nests of *C. auratus* except as indicated. Chistochina, 22.5 km SW (mile 222.5 Glenn Highway): one male (dead) (also *C. zhovtyi* and *C. adustus*), nest of *Picoides* sp. (NT), birch, 9.IV.1976. Edgerton Highway, mile 7.5 (nr. Kenny Lake): 58 males, 106 females, poplar, 11.VIII.1974. Fairbanks, 35 km WSW (mile 336 Parks Highway): 15 males (one dead), 30 females (seven dead), birch, 29.VI.1976 (14 males and 23 females reared 9.VII–12.VIII.1976). Glennallen, 51 km W (mile 3 Lake Louise Road): four males, four females, spruce, 8.VI.1976; 47 males, 76 females, spruce, 27.IX.1976 (six males, 14 females reared 6.X–19.X.1976). Nabesna Road, mile 24.5: nine males, 34 females (one dead), spruce, 2.IX.1975; one female, cavity higher in same spruce. Nabesna Road–Glenn Highway Junction, 4.3 km W: three females (dead), under squirrel nest, birch, 16.VIII.1975.

DISCUSSION

The Northern Flicker and the Hairy, Downy, Black-backed and Three-toed Woodpeckers are the five species of the family Picidae that breed in Alaska west of the Yukon Territory (Gabrielson and Lincoln, 1959). The Hairy Woodpecker was considered as not abundant and the Downy and Black-backed Woodpeckers as uncommon, but the Three-toed Woodpecker was referred to as one of the most common yet as one that cannot be called abundant. Gabrielson and Lincoln (1959) could not cite many records of nests of the five species in western Alaska. Recent data of the Anchorage Audubon Society showed the status of the Black-backed Woodpecker as rare and the other four species as uncommon in a well-studied area of the Cook Inlet lowland (Klein et al., 1978). Only one nest of the Northern Flicker was collected in the Cook Inlet region and it was uninfested. In contrast, nests of *Picoides* spp. were easy to find in dead stubs in suitable habitat in the region. But collecting from only dead stubs probably caused the nests of the Black-backed Three-toed and Hairy Woodpeckers to be underrepresented in our data as both also nest in live trees and the latter prefers them (Scott et al., 1977).

Ornithophaga anomala. The history of this Holarctic bird flea was reviewed by Hopkins and Rothschild (1971). The original description was from one female from *P. tridactylus* in Alma Ata Oblast, USSR, and Goncharov et al. (1966) provided

supplementary descriptions that Hopkins and Rothschild (1971) thought were based on two different species. The supplementary specimens consisted of seven males and nine females from the owl *Glaucidium passerinum* Linnaeus from Irkutsk Oblast, USSR, and one male and one female from *Dendrocopos* (= *Picoides*) *leucotos* Bechst from Primor'ye Kray, USSR. Goncharov et al. (1966) thought that the latter two specimens might represent a subspecies of the Alma Ata and Irkutsk species. Hopkins and Rothschild (1971) thought that *O. nearctica* Holland and Loshbaugh from *Dendrocopos* (= *Picoides*) *pubescens leucurus* (Hartlaub) in Utah (Holland and Loshbaugh, 1958) might represent a subspecies of *O. anomala*.

In Alaska, *O. anomala* was especially common in nests of *Picoides* spp. in the upper Cook Inlet region, with 366 specimens infesting 20 nests. The only infested nest (five dead fleas) not from this region was in the Copper River lowland about 53 km west of Glennallen. This flea might be more dependent than *C. adustus* on Hairy or Downy Woodpeckers. The largest population (155 specimens) infested a nest that was probably of the Downy Woodpecker.

Ceratophyllus zhovtyi. This bird flea was originally described from four specimens from the owl *G. passerinum* and seven specimens from two woodpeckers in the Irkutsk Oblast of the Soviet Union (Emel'yanova and Goncharov, 1966). One of the woodpeckers was identified as a large motley-colored woodpecker. We presume it was *Picoides major* (Linnaeus). Neither it nor *G. passerinum* occurs in North America. Two of our specimens were found alone in nests of Northern Flickers, but 26 specimens were present in a mixed population (*C. adustus* and *C. rauschi*) in a nest of a Hairy or Downy Woodpecker. This probably means that breeding can occur in nests of *Picoides* spp. More data are needed on host and nest relationships and geographic distribution.

Ceratophyllus adustus. This northern Nearctic bird flea seemed to have a slight preference for nests of *P. tridactylus*. Only two infested nests (20 and six flea specimens) could be classified as not being of either species of three-toed woodpecker, and the largest population (60 specimens) infested a nest that most likely was of *P. tridactylus*. Six of the 15 nests infested by *C. adustus* were infested by *O. anomala*. The highest proportion of these records, i.e., mixed populations in five of 10 nests, was from the Cook Inlet region.

Ceratophyllus rauschi. This northern Nearctic flea of the Northern Flicker was originally described from the nest of *Colaptes* sp. in the Yukon Territory (Holland, 1960). In Alaska it was found almost exclusively in nests of the Northern Flicker. The only exception was the dead male in a nest of a Hairy or Downy Woodpecker. Thus, all breeding populations were in nests of Northern Flickers. Five localities were in the interior Copper River lowland and one was in the Yukon River watershed (WSW of Fairbanks) about 358 km west of the US-Canada border. The type locality (Stewart Crossing) is about 215 km east of the border on a tributary of the Yukon River. In Alaska, *C. rauschi* probably infests nests of the Northern Flicker to the northern and western limits of breeding by the bird.

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