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## Ectoparasites from Birds in Newfoundland

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During an ongoing survey of the ectoparasites of birds in Canada (Bourgeois and Threlfall, 1981, Proc. Entomol. Soc. Wash. 83: 799-800; Eveleigh and Threlfall, 1974a, Proc. Entomol. Soc. Wash. 76: 270-277; Eveleigh and Threlfall, 1974b, Acarologia 16: 621-635; Eveleigh and Threlfall, 1975, Can. J. Zool. 53: 82-86; Eveleigh and Threlfall, 1976, Can. J. Zool. 54: 1694-1711; Fitzpatrick and Threlfall, 1977, Can. J. Zool. 55: 1205-1209; Threlfall et al., 1979, Proc. Entomol. Soc. Wash. 81: 327-328) we acquired 75 frozen birds, of 46 species, from Newfoundland for examination. Each bird was identified and then examined under a dissecting microscope. Any parasites found were preserved in 70% ethanol and later mounted in Rubin's solution (Rubin, 1951, Stain Technol. 26: 257-260) to facilitate identification. Voucher specimens of biting lice (Mallophaga) were prepared using 5% potassium hydroxide (55 C, 8-12 hr)/10% acetic acid/70/95/100% ethanol/xylene/Canada balsam, while mites (Acarina) were cleared in lactophenol and mounted in Hoyer's medium. One complete set of representative specimens has been deposited in the Canadian National Collection (Accession numbers 1985-39 to 1985-64; Biosystematics Research Institute, Ottawa, Ontario K1A 0C6, Canada). Major taxonomic keys used to identify the parasites included Clay (1969, Bull. Br. Mus. (Nat. Hist.) Entomol. 24: 1-26), Keirans (1967, N.H. Agric. Exp. Sta., Durham,

New Hampshire, 179 pp.) and Krantz (1978, A Manual of Acarology, 2nd Ed., Oregon State Univ. Bookstores, Corvallis, Oregon, 509 pp.). Classification of the Mallophaga follows that of Emerson (1972, Checklist of the Mallophaga of North America (North of Mexico). Part I. Suborder Ischnocera, 200 pp., and Part II. Suborder Amblycera, 118 pp., Desert Test Center, Dugway, Utah), while the nomenclature of the avian hosts follows that of the American Ornithologists' Union (1983, Checklist of North American Birds, 6th Ed., Allen Press Inc., Lawrence, Kansas, 877 pp.). Twenty-seven (36%) birds of 18 species were infested with mallophagans and/or mites (Table 1).

The majority of the birds were window or road kills and many ectoparasites undoubtedly would have been lost upon the death of the host. Consequently, little can be said about the distribution of the ectoparasites on the birds. In the case of the American coot (*Fulica americana*), however, sufficient lice were recovered to speculate on the preferred sites for each species. *Incidifrons transpositus* comprised 72.7% of the lice on the head, but accounted for only 6.6% of the lice on the rest of the body. *Pseudomenopon pilosum* made up 87.7% of the lice on the body and 27.3% of the head lice. The remaining species, *Rallicola advenus* and *Fulicoffula longiphila*, were recovered from the neck and upper back. Clay (1949, Evolution 3: 279-299) noted that the morphology of the species of louse reflects the preferred location on the host's body. Species living on the head and neck are in little danger of being removed by the host's beak during preening and tend to

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TABLE 1. Details of infestation of birds from Newfoundland with ectoparasites (Mallophaga and Acarina).

Parasite	Host(s)	Number (%) birds infested	Number parasites/ infested bird		Status*
			Mean $\pm$ SD	Range	
<b>Mallophaga: Philopteridae</b>					
<i>Brueelia clayae</i> Ansari, 1956	<i>Cyanocitta cristata</i> (blue jay)	1 (100)	30	—	NCR
<i>Brueelia nebulosa</i> (Burmeister, 1838)	<i>Sturnus vulgaris</i> (European starling)	1 (50)	1	—	PR
<i>Brueelia</i> sp.	<i>Tachycineta bicolor</i> (tree swallow)	1 (50)	1	—	PR
	<i>Seturus aurocapillus</i> (ovenbird)	1 (100)	2	—	NHR
<i>Carduiceps</i> sp. (immature)	<i>Calidris pusilla</i> (semipalmated sandpiper)	1 (100)	5	—	PR
<i>Craspedorrhynchus haematopus</i> (Scopoli, 1763)	<i>Accipiter gentilis</i> (northern goshawk)	2 (100)	32 $\pm$ 41	3-61	PR
<i>Fulicoffula longiphila</i> (Kellogg, 1896)	<i>Fulica americana</i> (American coot)	1 (100)	2	—	NCR
<i>Incidifrons transpositus</i> (Kellogg, 1896)	<i>Fulica americana</i> (American coot)	1 (100)	45	—	NCR
<i>Penenirmus jungens</i> (Kellogg, 1896)	<i>Colaptes auratus</i> (northern flicker)	1 (100)	5	—	PR
<i>Philopterus fringillae</i> (Scopoli, 1772)	<i>Pinicola enucleator</i> (pine grosbeak)	3 (50)	1.3 $\pm$ 0.6	1-2	PR
<i>Quadriceps charadrii</i> (Linnaeus, 1758)	<i>Pluvialis apricaria</i> (greater golden plover)	2 (100)	2.0 $\pm$ 1.4	1-3	NCR
<i>Quadriceps<sup>b</sup> ravus</i> (Kellogg, 1896)	<i>Actitis macularia</i> (spotted sandpiper)	1 (100)	3	—	PR
<i>Rallicola advenus</i> (Kellogg, 1896)	<i>Fulica americana</i> (American coot)	1 (100)	10	—	PR
<i>Saemundssonina contica</i> (Denny, 1842)	<i>Pluvialis apricaria</i> (greater golden plover)	1 (50)	3	—	PR
<i>Saemundssonina</i> sp. (immature)	<i>Larus ridibundus</i> (common black-headed gull)	1 (100)	2	—	NCR
<i>Strigiphilus crenulatus</i> (Giebel, 1874)	<i>Surnia ulula</i> (northern hawk-owl)	1 (100)	2	—	PR
<i>Sturnidoecus simplex</i> (Kellogg, 1896)	<i>Turdus migratorius</i> (American robin)	1 (50)	6	—	NCR
<b>Mallophaga: Menoponidae</b>					
<i>Menacanthus aurocapillus</i> Carriker, 1958	<i>Seturus aurocapillus</i> (ovenbird)	1 (100)	14	—	NCR
<i>Pseudomenopon pilosum</i> (Scopoli, 1763)	<i>Fulica americana</i> (American coot)	1 (100)	185	—	NCR
<b>Acarina</b>					
<i>Analges</i> sp. (fam. Analgidae)	<i>Bombycilla cedrorum</i> (cedar waxwing)	1 (100)	12	—	PR
	<i>Dendroica petechia</i> (yellow warbler)	1 (20)	2	—	PR
	<i>Seturus aurocapillus</i> (ovenbird)	1 (100)	5	—	PR
	<i>Pinicola enucleator</i> (pine grosbeak)	2 (33)	10.5 $\pm$ 10.6	3-18	PR
<i>Bychovskiata</i> sp. (fam. Pterolichidae)	<i>Actitis macularia</i> (spotted sandpiper)	1 (100)	1	—	NCR

TABLE 1. Continued.

Parasite	Host(s)	Number (%) birds infested	Number parasites/infested bird		Status <sup>a</sup>
			Mean ± SD	Range	
<i>Mesalgoides</i> sp. (fam. Psoroptoididae)	<i>Zonotrichia albicollis</i> (white-throated sparrow)	1 (50)	99	—	PR
<i>Phyllochaeta</i> sp. (fam. Syringobiidae)	<i>Actitis macularia</i> (spotted sandpiper)	1 (100)	8	—	NCR
<i>Proctophyllodes dendroicae</i> Atyeo and Braasch, 1966 (fam. Proctophyllodidae)	<i>Dendroica striata</i> (blackpoll warbler)	1 (14)	1	—	NHR
<i>Proctophyllodes musicus</i> Vitzthum, 1922	<i>Turdus migratorius</i> (American robin)	1 (50)	4	—	NCR
<i>Proctophyllodes</i> sp.	<i>Pinicola enucleator</i> (pine grosbeak)	2 (33)	9.0 ± 8.5	3–15	PR
<i>Pterodectes</i> sp. (fam. Proctophyllodidae)	<i>Dendroica striata</i> (blackpoll warbler)	3 (43)	43.7 ± 49.0	11–100	PR
<i>Pteronyssoides</i> sp. (fam. Avenzoariidae)	<i>Tachycineta bicolor</i> (tree swallow)	2 (100)	23.5 ± 29.0	3–44	PR

<sup>a</sup> PR = previous records, NCR = new Canadian record, NHR = new host record.

<sup>b</sup> This genus is in need of revision. Many of its species currently are referred to *Cummingstella* Ewing, 1930, including *Q. ravus*.

Specimens of the following avian species were examined and found to be free of ectoparasites: *Butorides striatus*, green-backed heron (1 examined), *Falco sparverius*, American kestrel (1), *Falco columbarius*, merlin (3), *Bonasa umbellus*, ruffed grouse (1), *Rallus limicola*, Virginia rail (1), *Porphyryla martinica*, purple gallinule (1), *Philomachus pugnax*, ruff (1), *Phalaropus lobatus*, red-necked phalarope (1), *Ceryle alcyon*, belted kingfisher (1), *Empidonax flaviventris*, yellow-bellied flycatcher (1), *Empidonax alnorum*, alder flycatcher (1), *Corvus corax*, common raven (1), *Regulus satrapa*, golden-crowned kinglet (1), *Bombycilla garrulus*, Bohemian waxwing (1), *Vireo solitarius*, solitary vireo (1), *Vireo olivaceus*, red-eyed vireo (1), *Dendroica magnolia*, magnolia warbler (1), *Dendroica coronata*, yellow-rumped warbler (3), *Mniotilta varia*, black-and-white warbler (1), *Setophaga ruticilla*, American redstart (1), *Seiurus noveboracensis*, northern waterthrush (2), *Oporornis philadelphia*, mourning warbler (1), *Pheucticus ludovicianus*, rose-breasted grosbeak (1), *Passerculus sandwichensis*, savannah sparrow (1), *Passerella iliaca*, fox sparrow (2), *Melospiza georgiana*, swamp sparrow (2), *Junco hyemalis*, dark-eyed junco (1), *Icterus galbula*, northern oriole (2).

be slow-moving, round-bodied lice with large heads and mandibles (e.g., *I. transpositus*). Slimmer, more elongate lice are free to exploit the remainder of the host's body since they can move easily and rapidly among the feathers to avoid the host's beak.

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