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Authors: Miller, Michael J. R., Ewins, Peter J., and Galloway, Terry D.

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Records of Ectoparasites Collected on Ospreys from Ontario

Michael J. R. Miller,¹ Peter J. Ewins,^{2,4} and Terry D. Galloway,^{3,1} Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, Saskatchewan S7N 5E2, Canada; ² Canadian Wildlife Service, Environment Canada, 4905 Dufferin St., Downsview, Ontario, Ontario M4P 2Z7, Canada; ³ Faculty of Agriculture and Food Sciences, Department of Entomology, University of Manitoba, 214 Animal Science/Entomology Building, Winnipeg, Manitoba R3T 2N2, Canada; ⁴ Present address: Director of Endangered Species Programs, World Wildlife Fund—Canada, 90 Eglinton Ave. E., Suite 504, Toronto, Ontario M4P 2Z7, Canada

ABSTRACT: Ectoparasites were collected from ospreys (*Pandion haliaetus*) in four study areas within the Great Lakes basin of Ontario, Canada. Two parasitic mite (Acari) species, *Bonnetella fusca* and *Analloptes* sp., were collected from nestlings. One chewing louse (Mallophaga) *Kurodaia haliaeeti* was collected from nestlings and adults. Prevalence and intensity of *K. haliaeeti* were greater in the most northern of the four study areas. *Bonnetella* prevalence and intensity did not seem to vary greatly across the study areas. New range and host records are presented for *B. fusca* and *Analloptes* sp., respectively.

Key words: Osprey, *Pandion haliaetus*, ectoparasites, *Kurodaia haliaeeti*, *Bonnetella fusca*, survey.

Raptorial birds (Falconiformes and Strigiformes) often are infected with acari and mallophagan ectoparasites (Keymer, 1972). Reports of elevated parasite intensities are usually documented from immunologically or physiologically compromised birds that have been weakened by other factors such as disease or injury (Ash, 1960; Keymer, 1972). Both mallophagan and acari parasites can reduce host fitness (Møller, 1990; Clayton et al., 1992).

Amblyceran (Mallophaga) feather lice are external parasites that spend their entire life-cycle on the host (Clayton et al., 1992). Species of the Amblycera live on keratin of feathers and skin and, circumstances permitting, occasionally feed on blood, sebum and mucus (Marshall, 1981). Dispersal of feather lice from adult to young birds peaks during the nesting season (Boyd, 1951), and combines with the reduced preening efficiency of nestlings to generate acute infections in young birds. This is in contrast to the often chronic condition found in adult birds (Clayton, 1990).

Feather mites (Acari, Astigmata) are commensals found on or in the remiges and contour feathers, and feed on quill tissue, detritus, and sloughed skin derivatives (Radford, 1953; Terres, 1991). Heavy infections of feather mites are rarely detrimental (W. T. Atyeo, pers. comm.).

We have conducted intensive studies of ospreys (*Pandion haliaetus*) in the North American Great Lakes basin since 1991 to assess their utility as indicators of aquatic ecosystem health (Ewins et al., 1994). Abiotic factors such as environmental contaminants, and biotic factors such as disease and parasite infections can potentially reduce breeding success or lifespan in raptors (Newton, 1979; Poole, 1989). In this study, we attempted to determine possible biotic factors that may potentially contribute to a reduction in osprey productivity. Ancillary to ecotoxicological work, we collected ectoparasites from nestling and live-trapped adult ospreys in an attempt to determine the prevalence and intensity of ectoparasites of ospreys in different regions of the Great Lakes Basin. To our knowledge, this is the first comprehensive examination of a population of ospreys in Canada for ectoparasites.

The study was conducted from 26 May 1992 to 5 August 1992 and involved the collection of a sample of ectoparasites from adult ospreys trapped at the nest using a modified “dome-shaped” noose carpet (Ewins and Miller 1992), and from nestlings (35- to 40-days-old) from four study areas within the Great Lakes basin. The study areas included two inland lake systems: the Ogoki Reservoir (OR) (50°40'N, 88°20'W) and the Kawartha Lakes (KL) (44°30'N, 78°30'W); the

TABLE 1. Prevalence and mean intensity of *Kurodaia haliaeeti* and *Bonnetella fusca* collected from nestling ospreys in Ontario, Canada.

Study area (n) ^a	<i>K. haliaeeti</i>		<i>B. fusca</i>	
	Prevalence	Mean intensity	Prevalence	Mean intensity
Georgian Bay (6)	50	1 (0 to 3) ^b	83	82 (0 to 310)
Kawartha Lakes (7)	14	0.1 (0 to 1)	86	53 (0 to 182)
St. Mary's River (4)	25	0.02 (0 to 2)	100	36 (7 to 83)
Ogoki Reservoir (3)	100	46 (13 to 98)	66	19 (0 to 30)

^a Sample size.^b Mean intensity (range = minimum and maximum number of particular parasite per nestling).

northwestern and eastern shores of Lake Huron: the St. Mary's River (SMR) (46°30'N, 84°10'W) and Georgian Bay (GB) (44°50'N, 79°40'W), respectively. In addition to the collection of ectoparasites from nestlings, a blood smear also was prepared using techniques suggested by Dein (1984), and later examined for hematozoan parasites. One or two nestlings were sampled for ectoparasites from broods of two to four chicks.

Chloroform vapour was used to remove ectoparasites from nestlings (Fowler, 1978). Three cotton balls which had been temporarily soaked in chloroform (Aldrich Chemical Co., Milwaukee, Wisconsin, USA) were placed at the bottom of a large, clear plastic specimen bag. Nestlings were then placed into the bag in sternal recumbency, ensuring that the head and neck remained outside of the bag. The bag opening was held sufficiently closed around the bird's neck to retain chloroform vapours within the bag, while allowing unencumbered breathing. Movements of the nestlings were gently restrained during the procedure to minimize the risk of puncturing the collection bag. Controlled movements of the nestlings were allowed however, as this facilitated aeration of the down and feathers by chloroform vapours (Williamson, 1954). After 10 min, the nestling was removed, and the bag was sealed and labelled. Ectoparasites were removed within 1 wk of collection from the labelled bag under a fume hood, using an aspirator or an alcohol-soaked cotton swab. Ectoparasite samples from adult birds were

scraped with forceps from two to three mid-rachis barbs on the ventral surface of the second primary feather of the right wing. All samples were stored in labelled vials containing 70% ethyl alcohol. No attempts were made to determine parasite territoriality on the host (Pfaffenberger and Rosero, 1984). All parasite specimens were archived in the J. B. Wallis Museum of Entomology (Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada). We used the definitions of Margolis et al. (1982) to express prevalence and mean intensity of infection for nestling ospreys for each study area.

Kurodaia haliaeeti (Mallophaga: Menoponidae) was found on 40% of nestlings examined (8/20) (Table 1). Birds at the OR study site were the most heavily infected, with a mean intensity of 46 lice/nestling (range (*r*) = 13 to 98). The mean lice intensity of the OR birds was comparable to that of other diurnal raptors examined for lice in the southwestern United States (*r* = 10 to 43 lice/bird) (Pfaffenberger and Rosero, 1984). We acknowledge that our counts may under represent the absolute intensity of infection, since no parasites were removed from the neck or head region of the nestlings, where lice may be numerous (Marshall, 1981; Pfaffenberger and Rosero, 1984).

Price and Beer (1963) reported that *K. haliaeeti* was restricted to the Pandionidae, and that it represented the most abundant species of the genus. Previously, *K. haliaeeti* was documented on a juvenile osprey (Stirrett, 1952), and a sora rail *Por-*

zana carolina (Rallidae), (Judd, 1953) collected in southwestern Ontario. *Kurodaia haliaceti* was not collected from adult birds in our study because our sampling method did not involve contour feathers, where these lice are known to occur (Marshall, 1981).

Eighty-five percent of nestlings examined (17/20) had *Bonnetella fusca* (Analgoidea, Avenzoariidae) (Table 1). Comparisons of parasite intensity among adult and juvenile ospreys were not possible because of the aforementioned dissimilar sampling methods. Here, we simply report on the presence of *B. fusca* on all adult ospreys examined ($n = 9$), and quantify parasite intensity and prevalence on nestlings.

To our knowledge, this is the first account of *B. fusca* on ospreys in Ontario (Wheeler and Threlfall, 1989). The only other Canadian record that exists for *B. fusca* on ospreys is from collections made in British Columbia (Spencer, 1941). The genus *Bonnetella* is limited to the osprey (Atyeo and Gaud, 1981).

We collected eight specimens of mites identified as *Analloptes* sp. from chicks in each of three nests in three study areas. The occurrence of *Analloptes* sp. on the ospreys we sampled represents a new host record. *Analloptes* sp. always occur in low numbers on hosts, and could possibly have been simply overlooked in previous investigations like that of Spencer (1941) on feather mites of ospreys (W. T. Ayeo, pers. comm.).

We did not find hematozoa in any of the 30 blood smears examined. There are very few reliable records of blood parasites from ospreys throughout their cosmopolitan range (Danilewsky 1889 as cited in Greiner and Kocan, 1977; Bennett et al. 1982).

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LITERATURE CITED

- ASH, J. S. 1960. A study of the Mallophaga of birds with particular reference to their ecology. *Ibis* 102: 93–107.
- ATYEO, W. T., AND J. GAUD. 1981. The subfamilies of the Avenzoariidae (Acari: Analgoidea). *Journal of Medical Entomology* 18: 341–344.
- BOYD, E. M. 1951. The external parasites of birds: A review. *Wilson Bulletin* 63: 363–369.
- BENNETT, G. F., M. WHITEWAY, AND C. WOODWORTH-LYNAS. 1982. A host-parasite catalogue of avian haematozoa. *Memorial University of Newfoundland Occasional Papers in Biology* 5: 1–243.
- CLAYTON, D. H. 1990. Mate choice in experimentally parasitized rock doves: Lousy males lose. *American Zoologist* 30: 251–262.
- , R. D. GREGORY, AND R. D. PRICE. 1992. Comparative ecology of neotropical bird lice (Insecta: Phthiraptera). *Journal of Animal Ecology* 61: 781–795.
- DEIN, F. J. 1984. Laboratory manual of avian hematology. Association of Avian Veterinarians, East Northport, New York, 38 pp.
- EWINS, P. J., AND M. J. R. MILLER. 1992. Banding adult Ospreys during the breeding season. *Ontario Bird Banding Association Newsletter* 37: 5–6.
- , M. E. BARKER, AND S. POSTUPALSKY. 1994. Birds breeding in or beneath Osprey nests in the Great Lakes basin. *Wilson Bulletin* 106: 743–749.
- FOWLER, M. E. 1978. Restraint and handling of wild and domestic animals. Iowa State University Press, Ames, Iowa, 332 pp.
- GREINER, E. C., AND A. A. KOCAN. 1977. *Leucocytozoon* (Haemosporida; Leucocytozoidae) of the Falconiformes. *Canadian Journal of Zoology* 55: 761–770.
- JUDD, W. W. 1953. A collection of feather lice (Mallophaga) from birds in Ontario. *Transactions of the American Microscopical Society* 72: 349–350.
- KEYMER, I. F. 1972. Diseases of birds of prey. *Veterinary Record* 90: 579–594.
- MARGOLIS, L., G. W. ESCH, J. C. HOLMES, A. M. KURIS, AND G. A. SCHAD. 1982. The use of ecological terms in parasitology (report of an *ad hoc* committee of the American Society of Parasitologists). *The Journal of Parasitology* 68: 131–135.
- MARSHALL, A. G. 1981. The ecology of ectoparasitic insects. Academic Press, London, 459 pp.
- MØLLER, A. P. 1990. Effects of parasitism by a haematophagous mite on reproduction in the Barn Swallow. *Ecology* 71: 2345–2357.

- NEWTON, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, South Dakota, 399 pp.
- PFAFFENBERGER, G. S., AND J. F. ROSERO. 1984. Mallophaga from five raptor species in eastern New Mexico. *Journal of Wildlife Diseases* 20: 65–66.
- POOLE, A. F. 1989. Ospreys: a natural and unnatural history. Cambridge University Press, Cambridge, England, 246 pp.
- PRICE, R. D., AND J. R. BEER. 1963. The genus *Kurodaia* (Mallophaga: Menoponidae) from the Falconiformes, with elevation of the subgenus *Falconenopon* to generic rank. *Annals of the Entomological Society of America* 56: 379–385.
- RADFORD, C. D. 1953. The mites (Acarina: Analgesidae) living on or in the feathers of birds. *Parasitology* 43: 199–230.
- SPENCER, G. J. 1941. Ectoparasites of birds and mammals in British Columbia. VI. A preliminary list of parasitic mites. *Proceedings of the Entomological Society of British Columbia* 37: 14–18.
- STIRRETT, G. M. 1952. Mallophaga collected from birds in Ontario. *Canadian Entomologist* 84: 205–207.
- TERRES, J. K. 1991. The Audubon encyclopedia of North American birds. Wings Books, New York, New York, 1109 pp.
- WHEELER, T. A., AND W. THRELFALL. 1989. Synopsis of the parasites of vertebrates of Canada: ectoparasites of birds. Animal Health Division, Alberta Agriculture, Edmonton, Alberta, Canada, 85 pp.
- WILLIAMSON, K. 1954. The Fair Isle apparatus for collecting bird ecto-parasites. *British Birds* 47: 234–235.

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