

## **ECTOPARASITES OF BIRDS AND MAMMALS OF BRITISH COLUMBIA**

### II. A Preliminary list of the Pupipara, Louse Flies.

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These remarkable and in some cases degenerate flies, are parasitic upon birds and mammals, where most of them move with easy speed through feathers and fur or hair. It is supposed that both sexes suck blood from their hosts, since both have protrusible piercing mouth parts. The bodies are usually flat and leathery and the legs are provided with strong claws; some are always wingless and slow-moving like the sheep-tick, while others, especially those on birds, are winged for flying from host to host. Some shed these wings at a fracture point close to the base soon after finding a host, while the bird parasites retain their wings throughout life. All, except the sheep tick which never has wings, have halteres or balancers on the metathorax.

The reproduction of these insects is unusual, in that the female produces a full-grown larva which has been nourished in a uterus by specially developed accessory glands, and either deposits the larva in the nest of the host, where it pupates very shortly, or extrudes it partially from a pouch, where it pupates almost immediately and the puparium is carried around by the female, often until the young fly emerges. Occasionally, a fly may be found carrying around an empty pupal case from which its offspring has recently emerged; this habit is especially true of our species on deer.

Amongst the Diptera, this viviparous form of reproduction occurs only amongst these louse flies and the tse-tse flies.

The following notes are based upon the collections which I have accumulated at the University and upon observations in the field. Further details of the louse flies upon deer are being published in a separate paper "The Ectoparasites of Deer in British Columbia".

#### **Acknowledgements.**

I am deeply indebted to Dr. Joseph Bequaert, of Harvard School of Tropical Medicine, who identified my preliminary collections and thus enabled me to cope with later collections. I am also greatly indebted to the following collectors in this Province who have supplied me with material: Messrs. E. R. Buckell, I. McTaggart Cowan, K. Racey and especially the late R. A. Cumming who developed a novel technique for collecting these flies. Shortly before his untimely death last sum-

mer, Mr. Cumming gave me permission to publish his methods, which I shall describe very shortly.

The fact that winged louse flies quickly leave their fallen hosts is well known to anybody who has ever collected them, and this brings up some interesting points as to why they do. It is conceivable that if the bird host was shot and left lying, without being disturbed at all, the flies would leave it as soon as it commenced to cool, which would not occur for at least a few minutes. On the other hand, if the host is killed and picked up almost immediately,\* it is possible that something in the unnatural position, or the disturbance of the feathers, might cause the flies to leave. That it is not necessarily due to being alarmed at the sight of a strange object (man) is shown by my experience with a fly on a red-tailed hawk. One evening at dusk I fired with a .22 rifle at a small object which was on the ground, moving amongst dense grass and flowers in an upland meadow, and on going up to see what it was, I was surprised to find a bird (instead of, as I had supposed, a wood chuck) sitting with its wings spread as if ready to take off. Even as I approached and was still a few feet away, I saw a large louse fly come up through the secondaries of the left wing and fly off. Keeping clear of beak and talons, I looked the bird over very carefully for another fly and for **Mallophaga**. Finding nothing, I stood up and the hawk promptly flew away, perched for a few minutes on a stag-headed aspen near by and then flew again, soaring out of sight. There was no trace of injury to the bird, and the fly left before I touched it, so one cannot attribute its alarm to the smell of blood or to any unusual disturbance in the feathers of its host.

Winged and broken-winged flies on deer, however, do not leave their hosts at all, but die among the hairs. I have taken some alive and active eleven days after the deer was shot (in November); most flies from this deer died within a few minutes of being removed from the hide, although a few of both sexes survived for nearly twenty minutes in methanol.

One species of louse fly locally frequents a number of small passerine birds, especially robins which so often become a pest around cherry trees in late summer. Mr. Cumming soon found that the flies leave within a few seconds after their hosts have been shot, so he put out about a score of quart "gem" jars under his cherry trees, shot the birds with a collecting gun, and immediately they fell, pounced on them and shoved them into the nearest jar, which he at once covered with cheese cloth held in place with rubber bands. The flies would leave the birds and, in endeavoring to escape, would work their way through the cheese cloth, thus giving him time to pick them off into a killing jar. He assured me that it was necessary to shoot the birds so that they fell almost directly into the jars—so soon would the flies leave

their dead hosts. All my records from robins were supplied by Mr. Cumming who collected them in this way.

All this means that a collector of these flies must pounce on all birds he shoots, especially birds of prey and game birds, and immediately drop them into a net or bag, if he expects to collect all flies that may be on them.

#### Distribution in British Columbia.

The Order Pupipara contains four families whose members have very restricted habits.

1. The Family **Braulidae** contains only one genus; one species **Braula caeca** Reav. occurs in Europe on the queens and drones of honey bees, and the other, **B. kohli**, occurs on a wild bee in the Belgian Congo. As far as I can determine, it has never been reported in Canada and but rarely in the United States and then probably on bees imported from Europe. The family is uncertainly placed at present, on account of certain conflicting features in the anatomy and habits.

2. The Family **Nycteribiidae** contains 5 genera and some 50 species, of which 8 species occur in North and South America and 3 of the 8 in California. All recorded species are wingless and occur on bats. They are long-legged insects, with the small head doubled back in a groove on the dorsal aspect of the thorax. So far, I have only one record from this Province, **Basilia forcipata** Ferris, (male) taken by the late Kenneth Auden off a bat from near Aspen Grove, in the Nicola region, in 1924. The species of bat is not recorded, but since both **Myotis** and **Eptesicus** occur near Aspen Grove, I presume that the fly must have come from a species of one of these genera.

3. The third Family is the **Streblidae**, of 13 genera but few species. They are both winged and wingless, almost all parasitic upon bats and mostly tropical. Two species of the genus **Strebla** occur in California, but so far, I have only one record from British Columbia, that of a small winged species of **Trichobius** taken from an undetermined bat found in a mine shaft in the Okanagan Valley by Mr. A. A. Dennys and given to me by Mr. E. R. Buckell.

I have examined a fair number of bats in the last ten years but have never found a member of either the **Nycteribiidae** or **Streblidae**.

4. The fourth Family is the **Hippoboscidae**, of some 18 genera and a considerable number of species, distributed all over the world on birds and mammals. My collections consist of 7 genera and 9 species from this Province and many specimens of **Hippobosca longipennis** F. (= *capensis* v. Olf:) from India, off dogs and cattle.

## The British Columbia Species of Hippoboscidae

1. **Melophagus ovinus** (L.). This is the ubiquitous sheep tick, distributed wherever sheep are kept. It is an entirely wingless insect, without halteres, flat and slow-moving. Males are smaller than females, sometimes very small. My experience is that both sexes die within a few minutes of being removed from their hosts.
2. **Lipoptena depressa** (Say) has been taken off the coast deer from several points on Vancouver Island such as Sooke Lake, Comox and Campbell River and from Lasqueti Island in the Gulf. In one collection from a deer shot in November at Campbell River, I took 51 females, of which several were carrying larvae in various stages of development and extrusion, and 30 males. Most of them had broken off their wings when collected. On the same deer was a solitary male of the next species. Only the head and generous scalp of the deer were available so the animal must have been heavily infested, perhaps with both species.
3. **Lipoptena ferrisi** J. Beq. (= **L. subulata** Coq.) (Dr. Bequaert informs me that this is not **subulata**, as Ferris called it, so he has renamed it **ferrisi**.) I have a number of collections from the Mule deer of the Interior and on two occasions, solitary specimens amongst **L. depressa** from Vancouver Island. Of one collection of 7 males and 4 females, taken from a deer at Pemberton Meadows in November, one of the females contained a young larva.

The distribution of these two species is interesting—**depressa** being mostly on the Coast Islands and **ferrisi** in the Interior. When both species occur on the same animal on the coast, **depressa** greatly outnumbered **ferrisi**. One record of both species on a coast deer is from Pemberton, on the mainland, but still in the coastal region.

I have treated of these and other parasites of deer (except ticks) in a separate paper, to be published shortly.

4. **Ornithomyia avicularia** L. I have only one collection of one individual of this world-wide species, taken off Steller's Blue Jay at Tofino, on the west coast of Vancouver Island.

5. **Ornithomyia fringillina** Curtis (= **O. chloropus** Bergroth)

This is the most frequently-occurring species in British Columbia. Its distribution, according to my collections, is summed up in the following table:

Records of *Ornithomyia fringillina* Curtis in British Columbia

Locality	A.O.U.		Month	No. per Host
Chezakut Lake	54	Ring-billed Gull	August	1 fly
Lytton	297	Blue grouse, Juvenile	September	1 fly
Lone Butte	297	Blue grouse (?)	October	1 fly
Wentworth	299	Franklin's grouse	October	1 fly
Salmon Arm	332	Sharp-shinned hawk	August	1 fly
Jesmond		"Hawk" sp. undet.	August	3 flies*
Prob. Vancouver	366	Long-eared owl	February	1 fly, carrying pupa
Pitt River	379	Coast Pygmy owl	September	1 fly
Vancouver	394	Gairdner's Downey Wd-pecker	June	1 fly
Vancouver	413	Red-shafted flicker	November	1 fly
Vancouver	493	Chinese starling	14 August	1 fly
Vancouver	493	Chinese starling	28 August	1 female†
Vancouver	567a.	Oregon Junco	July	1 fly
Vancouver	581	Rusty Song sparrow	June	1 fly
Vancouver	583	Lincoln's sparrow	November	1 fly
Vancouver	596	Black-headed grosbeak	July	1 fly
Vancouver	646	Lutescent warbler	June	1 fly
Vancouver		English sparrow	July	1 fly
Vancouver	758	Russet-backed thrush	June, August, September	1 fly each See <b>Note 3</b>
Vancouver	759	Hermit thrush	October	1 fly
Vancouver	761	Robin and North-west Robin	June, July & August	17 records from Robin <b>Note 4</b>

\* Note 1. † Note 2.

Notes on above Records.

**Note 1.**

The description of the hawk shot at Jesmond, (1937) in the Big Bar country west of Clinton, fitted best the Red Tail, but my informant was not sure. The bird carried three flies; one of these, a female, carried, on the posterior tip of the abdomen, a dense tuft of eggs of the mite *Myialges*. One mite is clearly visible at the edge of the egg mass and there may be another, or several mites, in the middle of the mass.

**Note 2.**

The fly taken off Chinese starling on August 28 (1936) was carrying several specimens of the curious mite *Myialges* and clumps of their eggs, on the dorsum of the abdomen. Dr. Bequaert kindly named the

genus for me when calling my attention to their presence on the fly, but the specimens do not agree closely with Ferris' figures of *M. Caultoon* which they resemble rather than *M. anchora*, except that the four anal bristles and the tarsal bristles are much longer in my specimens and the tips of the legs are provided with suckers rather than with chelate or bifurcate bristles.

#### Note 3.

The fly taken off Russet-backed thrush in June was carrying five specimens of the Mallophagan louse, *Degeeriella interposita* Kellogg. The lice were named for Dr. Bequaert, to whom I sent the fly, by Mr. Harold Peters, recently of Washington, D.C. I am grateful to Mr. Peters for this identification.

#### Note 4.

I have seventeen records of this fly off Robin and Northwest Robin during June, July and August, all taken by Mr. R. A. Cumming in South Vancouver, when he was making a special effort to get lice off robins for the United States National Museum. Of these seventeen birds, twelve had one fly apiece, three had two apiece and two had three flies apiece.

It is interesting to note again the distribution of this fly *O. fringillina* on its various hosts. One is a gull, two are grouse or ground game birds, two are hawks, two are owls, two are birds that nest in holes in trees and there are ten species of perching birds; in all, nineteen species and one variety. Moreover, the one record taken early in the year, the Long-eared owl shot in February, is the only one that has given evidence of the flies breeding, though the puparium being carried round by the fly was empty, showing that breeding had passed, at least in this instance. This forms a contrast to the flies found on deer, which seem to breed, or at least to produce their larvae, in late autumn and early winter.

6. *Ornithoctona erythrocephala* (Leach) taken off a Peregrine falcon in summer, at Osoyoos.
7. *Ornithoica confluenta* (Say) (= *O. promiscua*) taken from Rusty song sparrow in August and from Steller's Jay in September.
8. *Olfersia fumipennis* Sahlb taken from Lincoln's sparrow and from Lutescent warbler in June, at Vancouver. Also from an "unknown host" at Kamloops in September.
9. *Lynchia nigra* Perty, from a Sparrow Hawk (grasshopper hawk) in April at Huntingdon.

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