

Note 1: In McAtee's "Notes on Nearctic Bibionidae" (1921) this species appears as *Bibio hirtus* Lw. Specimens in the Canadian National Museum are so labelled. The specimens in my collection were labelled *Bibio albipennis hirtus* Lw. Whether this is a change in nomenclature and whether they are two distinct species I have not been able to find out. Hardy does not refer to *B. hirtus* at all.

Note 2: The two species *Hesperium brevifrons* Wlk. and *Plecia heteroptera* Say are believed to be present in this province but owing to the difficulty of obtaining certain obscure records they still remain as doubtful records.

Note 3: In a previous paper of mine (1937) this species was placed in the Bibionidae on information received from Dr. C. P. Alexander. Since then Alexander has placed it in the family Pachyneuridae in which *Cramptonomyia* resembles certain genera more closely than genera in the Bibionidae. Another species of this genus has recently been described from Japan.

Note 4: *Bibio inaequalis* and *B. serotinus*. As specimens of these two species were not returned to me after being identified I am unable to give their distributional data.

References

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ECTOPARASITES OF DEER IN BRITISH COLUMBIA

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Acknowledgements

I am very grateful to Dr. J. Bequaert, Harvard School of Tropical Medicine, for checking my tentative naming of the louse flies and to Mr. Harold Peters, Wild Life Survey, Alabama Polytechnic Institute, Auburn, for settling the puzzling question of the identity of the Mallophaga on the deer in this Province.

There are three species of deer in British Columbia whose identity and range is briefly as follows:-

1. The Coast deer or Columbia Black-Tailed deer *Odocoileus*

columbianus columbianus (Richardson) inhabiting the islands off the coast and the mainland eastwards to the summit of the Cascade Range.

2. The Mule deer, **Odocoileus hemionus hemionus** (Rafinesque) occurring in the Dry Belt, from the summit of the Cascades eastwards to the Kootenay country.

3. The White-tailed deer, **Odocoileus virginianus macrourus** (Rafinesque) extending from the Kootenay country, eastwards. An antler of a white-tail was picked up by Dr. R. Bird of Manitoba in 1933, on the south side of Marble Canyon which extends from Hat Creek to Pavilion, so at least a colony of white-tailed deer occurs well to the west of the Dry Belt which is typical Mule deer territory. (The animal may have been a straggler and not one of a colony.)

Hybrids occur between the Coast deer and the Mule deer but they are not common and are usually limited to the boundary line between the territory occupied by these species, as at Pemberton Meadows where several have been taken. I have several times been assured that the white-tail occurs on the coast and on Vancouver Island but the white-tail of the hunter, prospector and surveyor is apparently not the white-tail of the biologist. We may therefore be safe in considering that a deer shot at the coast is a Black-tail, one taken in the Dry Belt is a Mule deer and one taken in the eastern part of the Province, a White-tail.

Of the Black-tails, those on Vancouver Island and most of the Gulf Islands are smaller than those on the mainland and those on islands like Texada and Lasqueti which are some distance from the mainland, have inter-bred until they are such small animals that a man can carry one on his shoulders without much effort; whereas a fat mule deer buck of the Dry Belt will weigh as much as 300 lbs.

For the past few years I have collected parasites of deer whenever opportunity arose and it seems that these small island forms and the sickly ones of other regions, are most infested with parasites whereas large, fat, healthy specimens will be relatively free.

The best time for collecting parasites from all mammals, including deer, seems to be early spring when the severity or inclemency of winter has taxed the strength of the hosts. Later in summer parasites tend to disappear, except on weak animals.

Although most of my collections have been made from male animals owing to hunting regulations, both sexes seem to be equally infested and of the body itself, the back seems to be most attacked, though this varies with the time of the year, when the flank and inside of the thighs may be preferred. It is on the back that lice lay their eggs.

I have taken the following parasites from deer: louse flies, biting lice, a few sucking lice and a few mites; never any fleas. The process of searching for them is a laborious one—the thick, coarse hairs have to be parted systematically a few at a time, with a pair of forceps. Louse flies are readily found but lice are exceedingly difficult to locate, never coming to the surface upon the death of the host, but remaining

close to the skin. Biting lice attach by their mandibles, sucking lice by their claws. When lice are scarce on a deer, it may take one or two hours to go over the hide before locating any.

Concerning HIPPOBOSCIDAE

In order of their occurrence and frequency, the louse flies are easily first. Every deer hide or head I have examined, has contained these flies and many more have been sent in to me from widely scattered points. The vast majority of them are *Lipoptena depressa* (Say) which is freely and generally distributed all over the coast region while in the Interior *Lipoptena ferrisi* Beq. (*subulata* F. & C.) seems to be the commonly-occurring Species. On only two occasions have I found *L. ferrisi* Beq. on the coast and then only four specimens.

Disregarding several small collections of only a few specimens, the following table gives a summary of some collections. The predominance of females, roughly 2.6 times that of males, may be due to the larger size of the former and the greater alacrity of the latter. The distribution of the species, *L. depressa* on the coast and *L. ferrisi* in the Interior, may be either a host relationship or a climatic one—probably the latter.

Some Records of Hippoboscidae From Deer

Columbia Black tailed Deer	<i>L. depressa</i>		<i>L. ferrisi</i>	
North end Vanc. Is. (prob. Alice Arm)				
Sept. 1929. W. R. W. coll.	21	15	2	1
Sooke area. Vanc. Is. 20 Oct. 1929. L. Peden	3	14		
Howe Sound. Vanc. region. G. J. S.		37		
Comox. Vanc. Is. 9 Nov. 1930 I. McT. C.	4	56		
Englishman R. Vanc. Is. 1 Nov. 1931.				
W.R.W. (Three winged)	11	1		
Lasqueti Is. Straits of Georgia. Spring 1932.				
R. Oben	1	1		
Campbell R. Vanc. Is. Nov. 1937. G. J. S.	30	51	1	0
Pemberton Meadows. Coast. Nov. 1937				
G. J. S. From area of Coast deer-Mule deer hybrids			7	4
Mule Deer:				
Kamloops, B. C. Nov. 1933. J. S. Keyes			0	26
	70	175	10	31
	245		41	
Total	286			

So far I have been unable to formulate any rule for the breeding periods of these flies because young flat females may be present at the same time as heavily gravid, large ones. Of the 51 females of *L. depressa* taken from the Scalp (only) of the Campbell River deer in November, 1937, several were in all stages of reproduction. Of the 4 females of *L. ferrisi* from the Pemberton Meadows deer of November

1937, one showed a very young larva with the beginning of a capitulum. From these two records at least, it seems that young flies probably emerge at intervals throughout the spring.

With the exception of only two collections when winged ones were present, all these louse flies had the wings broken off at the humeral suture.

As far as injury to the host is concerned, I have not yet seen a puncture mark on the skin of a deer, even in cases of heavy infestation. This is in marked contrast to the effects of lice and mites on rodents where extensive feeding punctures show on the skins of the hosts. In some cases, even on the thick skins of ground-hogs, severe feeding scars may occur.

Concerning the ANOPLURA, the only species I have is **Solenopotes ferrisi** (Fahrenholz) [**Cervophthirius crassicornis** (Nitzsch)] of which I have only three specimens, one from a deer at Eagle River, east of Revelstoke, and two from a deer at Comox, Vancouver Island. On this latter animal, both biting and sucking lice occurred.

In general, it may be said that sucking lice are rare on deer in this Province, unless my examinations have been made at the wrong season or from the wrong portions of the province, for these insects.

Concerning MALLOPHAGA, however, it is a very different matter. From Osborn's time up to the present, confusion has reigned over species of **Tricholipeurus** (*Trichodectes*) from deer owing, I think, to the very incomplete collections from which the naming has been done. Osborn named **parallelus** from only 3 females which I think were immature although the species is valid and McGregor named **odocoilei** from only three specimens, and McGregor's species is not valid but a synonym of **parallelus** Osb. (Peters, in correspondence).

I forwarded Mr. Harold Peters, (at the time with the Bureau of Entomology) nine collections of 157 specimens and he was able to clear up the uncertainties concerning these lice.

Some Records of Mallophaga From Deer

	Tricholipeurus	
	parallelus	virginianus
Columbia Black Tailed Deer		
Mt. Lehman, near Abbotsford, May 22, 1910.		
S. Hadwen. Specimens loaned by Prof. A. Baker, Guelph	15	
Howe Sound, Vanc. district, Dec. 29, 1929. G.J.S.		6
Campbell R., Vanc. Is. Nov. 19, 1933. G. J. S.....		18
Comox, Vanc. Is. Nov. 9, 1930. I. McT. C.....		5
Mule Deer		
Quesnel, B.C., May 18, 1932. I. McT. C.....	18	
Quesnel, B.C., May 19, 1932. I. McT. C.....	88	
North Fork Eagle R., near Revelstoke, May 22, 1932. E. R. B.	6	2
Vavenby, B.C., North Thompson R. 1934. T.K.M.		10
	127	41
Total	168	

The last record from Vavenby, "in spring", showed all females—both

nymphs and adults, the latter among the largest I have seen being 2.7 m.m. long. Eggs were also present showing that breeding was actively progressing. The lice came from a strip of skin cut from the saddle. I have a later record from Vavenby, of a small piece of hide some 2 inches long, left on the spines of a barbed wire fence that deer had jumped. The hide was covered with fine white hairs showing that it had come from the belly or inside of a thigh and lice were common on it. Several later collections are to hand but have not been analyzed.

The species *Tricholipeurus virginianus* was named by Mr. Peters from the eastern White Tailed deer. In a letter to me he says "It is extremely interesting to me to find my deer louse so widely distributed and so common, especially on deer in eastern United States." In the same letter he sinks the name *T. odocoilei* McGregor as a synonym of *T. parallelus* Osborn.

In conclusion, deer in this Province commonly harbour two species of Louse flies, two species of Biting lice and very rarely, one species of sucking louse, besides ticks and mites which are not considered here.

References

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A PRELIMINARY LIST OF STONEFLIES (PLECOPTERA) FROM THE VICINITY OF CULTUS LAKE, BRITISH COLUMBIA

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Cultus Lake is situated on the southwestern mainland of British Columbia, about 35 miles from salt water, and 4 miles north of the International boundary, in latitude 49° 4' N., longitude 122° 0' W. The level of the lake is only 50 meters above sea-level, but it lies between the two western-most outliers of mountain ranges which in the near vicinity rise to elevations in excess of 2,000 meters. To the north lies a broad valley traversed by the Fraser river, and its tributary the Sumas-Chilliwack system. Specimens of stoneflies recorded in this paper were taken within an area bounded by the Fraser river on the north; the Sumas and Chilliwack rivers, Sweltzer creek, Cultus lake and their tributaries on the west; Tamih creek on the east; and the North Fork of the Nooksack river on the south. The more southerly part of the region outlined lies in the state of Washington.

Within this region collections were made at a variety of locations. The habitats sampled may be grouped as follows: