

OBSERVATIONS ON A BLACK FLY PEST OF CATTLE IN BRITISH COLUMBIA (DIPTERA: SIMULIIDÆ)*

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In Canada, particularly in the northern forested area, black flies are commonly regarded as a pest of man. However, there have been some notable outbreaks in Saskatchewan in which cattle were attacked with heavy losses. Cameron (1918, 1922) reported the loss of 100 head at Duck Lake in 1913, and indefinite losses at other times. Millar and Rempel (1944) described an outbreak at Mac-

species. Matheson (1950) summarized records of infestations affecting domestic and wild animals in the Danube Valley, and a wide range of domestic animals in the lower Mississippi region. Lohmann (1943) described injuries to cattle by black flies in Germany. This paper deals with an infestation of black flies in the Cherryville district of British Columbia in the years 1950-52.

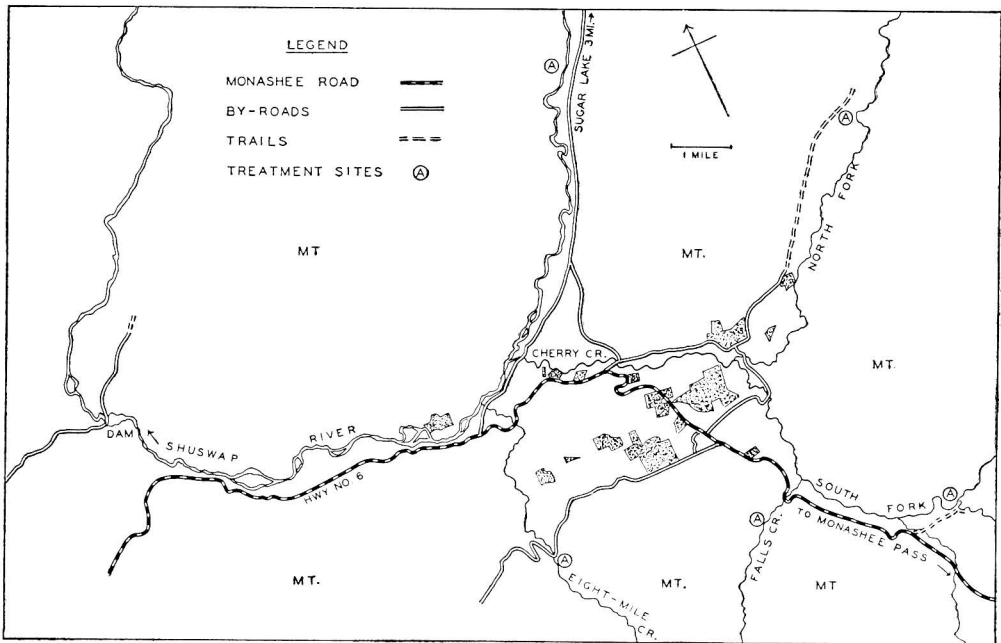


Fig. 1. Map of Cherryville (B.C.) district, prepared from aerial photographs. Stippled areas indicate clearings of home ranches.

dowell, in which the loss was estimated at 132 animals valued at \$20,000. Further outbreaks in 1945 and 1946 were dealt with by Rempel and Arnason (1947). All these attacks are attributed to *Simulium arcticum* Mall., but elsewhere large-scale attacks have been made by other

The Problem

The Cherryville district (Fig. 1) lies in a valley on the western approach to the Monashee Pass in the Monashee Mountains, and is isolated from large centres of population and from other farming districts. The settled area is about 8 miles long and 3 miles wide, and is traversed by the Shuswap River and Cherry Creek.

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The part of the Shuswap involved in the present study originates in Sugar Lake, which it leaves through a storage dam maintained by the British Columbia Power Commission. It flows in a generally southerly direction for a few miles, swings west and north to a power dam at Shuswap Falls, then runs northerly to Mabel Lake through a sparsely settled valley. From Sugar Lake to the power dam is about 12½ miles. The flow in this stretch is regulated at the storage dam and varies from 700 to 3,000 cusecs according to power requirements. Throughout this part of its course, the river is wide and shallow, with a bottom composed of boulders and gravel.

Cherry Creek enters the river about midway between the two dams, and varies in its flow from 45 to about 400 cusecs. In its upper reaches the creek has two main streams — North Fork and South Fork — as well as a number of smaller tributaries, all of which rise in heavily timbered mountain valleys and flow rapidly down to the river. The water of these streams is relatively clear, but since the distances to be covered are not great, the lack of turbidity is not a barrier to effective treatment with DDT (Fredeen *et al.* 1953).

Most of the residents of this district are engaged in logging, but there are several small beef-cattle ranches. Since the available range is confined to the bush on the lower slopes of the surrounding mountains, the number of animals that can be maintained is limited, and the more progressive farmers have in recent years begun to specialize in raising pedigreed stock. Their animals are marketed at various bull sales and fat-stock shows, and prime condition is essential if good prices are to be obtained.

The black fly situation first became known to the staff at Kamloops in the late summer of 1951, when farmers complained that their animals were being attacked by an unknown fly that caused them to leave their wooded pastures for the open roadsides. The flies attacked the

eyelids and the soft underparts, particularly the udders, so that the cows would not tolerate their sucking calves. The ranchers first became aware of this when the normally white-faced calves appeared with faces reddened with their mothers' blood. When questioned, most residents declared that the fly had been unknown until a few years previously, when it appeared in small numbers, later building up to pest proportions; a few even blamed its introduction upon passing migrant farmers and their outfits from the drought-stricken areas of the Prairies in the mid-thirties. However, some natives of the district stated that they had known the fly all their lives. It seems probable that the species is indigenous to the area, but that in earlier times, when ranchers turned out their stock in the spring and did not see them again until fall, they were unaware of the pest and its effect upon their animals. Later, when registered stock were introduced and their condition became a matter of dollars and cents, they were watched more closely and the ravages of the fly became known. There are no records of humans being bitten by this fly.

Although the area affected is small, the losses in weight of cattle attributable to this pest were considerable, and bore upon individual ranchers to such a degree that some doubted their ability to stay in business unless relief was obtained. In 1952 the local cattlemen's association (E. A. Rannie, *in litt.*) calculated a loss of \$24,160 on beef animals alone, in addition to losses on bulls, the prices of which largely depend upon the results of judging in the show ring.

Adult flies taken from the cattle in 1951 were submitted to the Systematic Entomology Unit, Entomology Division, Ottawa, for determination; Mr. G. E. Shewell reported that, although the flies closely resembled *Simulium arcticum* Mall., they were of an apparently undescribed species.

In the spring of 1952 I examined the smaller creeks in the Cherryville district

and found no evidence of breeding. High water in the Shuswap River and Cherry Creek prevented thorough examination of these streams until mid-July, when both yielded pupæ that keyed out to *S. arcticum*. Adults reared from these pupæ were the same as those previously submitted to Ottawa. It is interesting to note that Hearle (1932) reported *S. arcticum* from several localities in British Columbia, including the Okanagan Valley, and Malloch (1914) gave Kaslo, British Columbia, as the type locality for this species. Mr. Shewell (*in litt.*) stated that he examined Hearle's British Columbia specimens and found them to be of *S. arcticum*, but a series taken by Hearle at Ione, Washington, and labelled *S. arcticum* conformed to the Cherryville species.

During 1952 Dr. W. R. Gunn, Provincial Live Stock Commissioner, requested the Provincial Entomologist, Mr. C. L. Neilson, to assist toward the achievement of control of the pest, and agreed to provide necessary materials.

Control

During the winter and spring of 1952-53 frequent visits were made to the area, and on March 1 a few early-instar larvæ were found in the Shuswap River, which then had a temperature of 38° F. None was found in Cherry Creek, which was 2 degrees colder. On March 17 the river was heavily infested, and the creek, which had risen in temperature to 39° F., had a few scattered larvæ in its lower reaches. By April 16 a few pupæ had appeared in the river, and DDT larvicide was applied without delay. Twenty-five per cent emulsifiable concentrate at one part of DDT in 10,000,000 for fifteen minutes (Hocking, Twinn, and McDuffie, 1949) was applied at a point 5½ miles above the mouth of Cherry Creek. In Cherry Creek the larvæ, with few exceptions, were still in the earlier instars. By May 1, pupæ were beginning to appear in the smaller creeks, and DDT at the same dosage was applied to both forks of Cherry Creek, Falls Creek, and Eight

Mile Creek, at points indicated on the map (Fig. 1). These treatments removed practically all larvæ in the creeks, and in the river as far as the power dam at Shuswap Falls.

On June 26 Cherry Creek and the river below its mouth had become heavily reinfested, and the treatment of these waters was repeated. However, by this time the streams were in full freshet, and much larger quantities of larvicide were required than in the spring treatment. Two weeks later large numbers of larvæ were found in Eight Mile Creek, but these were quickly cleared out with DDT, and no more appeared in any waters of the district.

The results of the treatments appeared to be satisfactory. Whereas formerly the cattle were congregated in the day-time along roads and barns, and specimens of the black fly were easily taken from them, they were now scattered through the bush and, in the manner of range animals, unapproachable. Diligent sweeping of the foliage in suitable places produced no black flies. Ranchers interviewed stated that, although they had occasionally seen small numbers of flies on their animals, they were far below the pest level, and they were more than satisfied with the degree of control obtained.

Life-history and Habits

Little is yet known of the life-history of this fly. It overwinters in the egg stage, and hatching has taken place in waters having a temperature of 38° F. The reinfestation after the first treatment indicates that hatching continues over an extended period. Emergence of the adult flies, in the first two years of observation, was completed by mid-July, and the flies are reported by residents to be found from then until the first frosts. In contrast to the Saskatchewan outbreaks, which may occur as far as 100 miles from the breeding-sites (Rempel and Arnason, 1947), the species here discussed has not been reported more than 5 miles from streams in which it breeds.

This may be due to the mountainous and heavily timbered nature of the terrain. As a result of the work done in 1952, it was thought that this species, like *S. arcticum*, confines its breeding to comparatively large streams. However, the infestation of Eight Mile Creek, the maximum flow of which is 20 cusecs, implicates the smaller streams, and suggests that the upper reaches of the larger ones must be treated for satisfactory control.

Acknowledgments

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on the rate of flow of the Shuswap River; and the Provincial Department of Agriculture, which underwrote the cost of control measures.

Summary

A cattle-infesting black fly, closely related to *S. arcticum* Mall., caused serious loss of weight in beef animals in the Cherryville district of British Columbia. It overwinters in the egg stage; the first larvæ appear about March 1 and the pupæ in mid-April; adult emergence is complete by mid-July. Adults are on the wing for the remainder of the summer. A satisfactory degree of control was obtained with DDT, 25 per cent emulsifiable concentrate, applied at one part of DDT in 10,000,000 for fifteen minutes in near-by streams.

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NOTE

Ilybius inversus Shp. (Coleoptera: Dytiscidae). Just too late to get into Hatch's "Adephaga," I took four specimens of the above species in a small lake at Barkerville, B.C. (4400 feet). The species is almost unknown in collections and was described by Sharp in 1882 from a

specimen labelled merely "N.A." The insects are the size of our larger *quadrimaculatus*, strongly convex, somewhat pallid, and distinctly bronzed. Mr. J. B. Wallis verified two of the specimens.—G. Stace Smith.