

OPERATIONAL AND SCIENTIFIC NOTES

BLACK FLY PROBLEM IN ATHABASCA COUNTY AND VICINITY, ALBERTA, CANADA

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Attacks by black flies, primarily *Simulium arcticum* Malloch, have caused losses to cattle operations in Athabasca County and Improvement District No. 18 of Alberta since the earliest days of settlement (Fredeen 1969). An outbreak in 1972 led 224 (of ca. 700 total) livestock producers to petition the provincial government for assistance. This petition indicated that 449 animals were killed and 588 cows unbred, with cash losses totalling \$600,000 (Canadian), as a result of 1972 black fly attacks. A survey of 135 farmers in affected areas later in 1972 revealed 48 cattle deaths and estimated losses of \$73,740 (Stewart, *in litt.*). In recognition of this problem, a research program on control of black flies was carried out from 1974 to 1977 (Haufe and Croome 1980).

As this research project drew to a close, deficiencies were recognized in the assessment of the impact of black flies on livestock. The 2 assessments of 1972 cattle losses were six-fold different when adjusted to equal numbers of producers. These assessments concentrated on complainants and severely affected areas. No surveys were made before or after 1972.

We were contracted to reassess the biting fly problem and its economic cost. The problem was approached through a survey of livestock producers covering the 1977-79 period, and through a literature survey. The producer survey was conducted through illustrated 6-page questionnaires sent to the 701 cattlemen in 11 districts of the study area (Fig. 1), and by personal interviews of 51 cattlemen. Reported animal losses were converted to dollar values (Canadian) through calculations by an Alberta livestock economist (Gould, personal communication) based on figures in the Livestock Market Review (Agriculture Canada 1977-79). Unborn calves were assigned half the market value of newborn calves. Non-conceptions caused by black flies were estimated by taking the non-conception rate of 3 identified non-

problem districts to be the baseline, and attributing non-conception values above baseline to black fly attacks.

Altogether 34.2% of the questionnaires were returned. District 1, a non-problem area, had the lowest return rate of 21.6% of 88 questionnaires. The highest rate, 51.5% of 66 questionnaires, came from district 6, a chronic problem area bordering the Athabasca River.

An impression of cattle production losses caused by black flies can be obtained from Table 1. These data for 1978 indicate that in district 6, 8.41% of cows were unbred, 62 calves killed and another 105 saved by farmer intervention, and 42 older animals lost as a result of black fly attacks. In district 1, 1.55% of cows were unbred, no calf mortality occurred, and 2 older animals were reported killed as a result of black fly attacks. Total 1978 loss in the categories evaluated was \$113,932. From parallel analyses, losses in 1977 were estimated to be \$37,658, and in 1979 were \$131,517. Animal losses, expressed as a percent of herd size, were 0.7% in 1977, 1.14% in 1978, and 0.87% in 1979.

Calves born during fly attack periods were often unable to nurse from fly-bitten udders, and these perished without special handling by farmers. Attacks on bulls resulted in unbred cows, and delayed impregnations. Consequently, calves next year were born during black fly season. From 1977-79, a yearly average of 179 producers reported saving 235 calves being attacked by black flies. This represents 3.1% of the total calf crop. The values of saved animals were \$21,645 in 1977, \$59,226 in 1978, and \$74,496 in 1979. The 3 year total saved was \$155,367. During this same period 100 calves, representing 1.3% of the calf crop, were reported killed annually. A 3 year total of 1,746 cows were reported unbred as a consequence of black fly attacks, which represents 5.7% of those offered for mating.

Total black fly damage reported to us for the 1977-79 period was \$283,107 worth of animals (perished or not conceived), while \$155,367 worth of calves were saved by special handling. These assessments do not include estimates of growth suppression, nor estimates of loss of milk and cream production. Reports of local and government veterinarians (DeNooy, Beck *in litt.*) support claims of fly-caused mortality and chronic losses. There was considerable variation in losses reported within

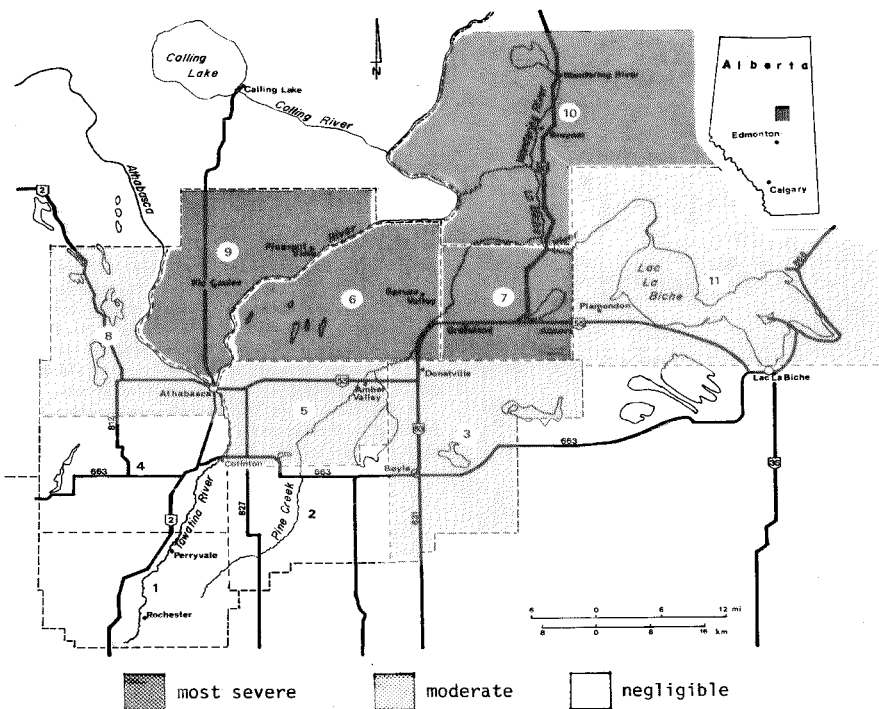


Fig. 1. Sample areas in Athabasca County and Improvement District No. 18. Relative severity of black fly caused losses indicated by shading.

districts, due in large part to variations in cattle management practices. Some producers trucked cattle to outlying areas during black fly season, others provided smoke pots and shelters to reduce attacks, and some made no protective efforts.

Most losses identified in this study were associated with reproduction and calving. Interference with breeding (apparently reduced fertility due to scrotal inflammation) during black fly season resulted in unbred cows and late conceptions. Calves suffered most when born during fly attack periods. Breeding prior to black fly season would cause calves to be born in winter, when temperatures may be -40°C . This practice is utilized by local dairy producers, but would require education of beef producers before it could be instituted.

The Athabasca River was treated with methoxychlor twice in 1979 to control black fly larvae, and not treated during 1977 or 1978. However, 1979 was the year of greatest economic loss. This loss reflects effects of delayed calving due to late breeding in 1978, and higher prices in 1979. It may also indicate that 1979 was an outbreak year, and that this outbreak was reduced by larviciding. Larval populations were extraordinarily high prior to treatment (Murray *in litt.*). Without treatment, we presume that losses would have been greater.

Populations of *Simulium arcticum* are regularly large enough to cause economic losses in the study area. "Outbreaks" have been recognized in the Athabasca area in 1955-56, 1962-63, and 1971-72. Similar outbreaks have

Table 1. Effects of black fly attacks on cattle production in 1978.

	District #											Total
	1	2	3	4	5	6	7	8	9	10	11	
Cows reported	776	554	703	353	794	1789	915	1484	955	600	947	9865
Farmers reporting	14	12	12	10	11	30	19	18	24	11	13	174
Average herd size	55.4	46.2	56.6	35.3	12.3	59.5	48.2	82.4	39.8	54.5	72.8	56.7
Dry cows reported	12	7	32	10	39	150	107	52	105	73	39	626
% cows dry	1.55	1.26	4.55	2.83	4.91	8.41	11.69	3.50	10.99	12.17	4.12	6.35
Non-conceptions	0	0	20	0	25	120	91	26	88	63	23	456
Cash value, \$			900		1125	5400	4095	1170	3960	2835	1035	20520
Calves reported	713	437	520	210	717	1389	543	1068	791	402	692	7482
Farmers reporting	14	10	9	7	12	28	13	15	22	10	11	151
Average calf crop	50.9	43.7	57.8	30.0	56.7	49.6	41.8	71.2	35.9	40.2	62.9	49.5
Calves lost	0	0	5	0	0	62	19	5	16	36	0	143
Cash value, \$			1500			18600	5700	1500	4800	10800		42900
% calf crop lost			0.96			4.46	3.50	0.47	2.02	8.96		1.91
Calves saved by special handling	0	0	15	0	0	105	37	0	51	85	1	294
% of calf crop			2.88			7.56	6.81		6.45	21.4	0.14	3.93
Animals lost excluding calves	2	2	8	0	0	42	9	1	14	32	2	112
Cash value, \$	902	902	3608			18942	4059	451	6314	14432	902	50512
% loss based on herd size	0.26	0.36	1.14			2.35	0.98	0.08	1.47	7.96	0.21	1.14
Total reported cash lost, \$	902	902	6008	0	1125	42942	13854	3121	15074	28067	1937	113932

been identified wherever black flies are acknowledged to be serious pests of livestock, i.e. damage caused by *S. columbaczense* (Fabr.) in northeastern Europe in 1931 and 1934 (Baranov 1935), by *Cnephia pecuarum* (Riley) in the lower Mississippi valley in the early 1930's (Bradley 1935), and by *S. arcticum* in Saskatchewan in the mid 1940's (Rempel and Arnason 1947). Such outbreaks occur abruptly. Temperature, relative humidity, and barometric pressure influence black fly biting behavior (Fallis 1964), so certain weather conditions should precipitate maximum rates of biting. A specific combination of dense fly populations and favorable weather could create an extraordinary crisis in the Athabasca area. Farm management practices currently used to protect livestock may be overwhelmed in such an outbreak, with consequent serious losses.

ACKNOWLEDGMENT. This investigation was funded by Pesticide Chemicals Branch, Alberta Department of the Environment.

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