

STUDIES ON THE INCIDENCE OF GASTROINTESTINAL HELMINTHS
OF CATTLE IN QUEBEC

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INTRODUCTION

A NUMBER OF STUDIES have been done on the incidence and epidemiology of gastrointestinal nematodes of cattle in Canada. These include the studies of Johnston and Macpherson (7) in the Ottawa valley, McGregor and Kingscote (9) in Ontario generally, and Smith (13) and Smith and Archibald (14) in the Maritimes. No information is available for Quebec and the present work represents a limited study to obtain this information.

MATERIAL AND METHODS

Fecal samples were collected during the following periods of the year: spring (March, April, May); summer (June, July, August); fall (September, October, November) and winter (December, January, February).

For each period a hundred or more fecal specimens were collected from each of the following groups of animals: cattle over two years of age (adults); from one to two years of age (yearlings); those under one year and having grazed (calves).

Fecal samples from a total of 1,473 cattle were examined. Samples were obtained from 54 counties representing all geographical areas of the Province (Table I).

Each sample was examined for helminth eggs by a modification of the quantitative McMaster method (4). The original technique was slightly modified by using 28 ml of supersaturated sodium nitrate; so we were able to obtain eggs per gram (e.p.g.) of 50. Since the

McMaster technique will only permit estimate infections in excess of 50 eggs per gram of feces, a simple flotation method using supersaturated sodium nitrate as the flotation solution was also used on each sample to uncover very low levels of infection. All the McMaster positive samples were cultured using the method of Roberts and O'Sullivan (12) and infective larvae were identified with the aid of the identification keys of Hansen and Shivnani (6), Whitlock (17) and Soulsby (16).

RESULTS AND DISCUSSION

In overall incidence, as indicated in Table II, fewer adults than yearlings and fewer yearlings than calves were infected, the percentages for the three groups being respectively, 14%, 25% and 32% on the McMaster test and 50%, 62% and 64.6% on the flotation examination. It will also be seen that the flotation test was more sensitive than the McMaster in detecting positive animals for the reasons previously mentioned.

Analysis of variance of these results showed that the differences between groups were significant ($P < 0.01$). We can, therefore, conclude that "age" is an important factor in the incidence of gastrointestinal nematodes of cattle in this area. Adult cattle were seldom heavily parasitised, 7% of adults having counts between 100 to 1000 e.p.g. and none having counts over 1000 e.p.g. This has been the experience of other workers. Roberts (11) reported in his studies that "it was most unusual to find clinical signs among animals older than about two years" and that "cattle developed a strong resistance to gastrointestinal nematodes during the first 18 months of life." Levine (5) reported that adult dairy and beef cattle in Illinois did not suffer, in general, from serious parasitism; adult animals could, however, serve as a source of infection for calves

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TABLE I
QUEBEC COUNTIES FROM WHICH SAMPLES WERE COLLECTED

Argenteuil	(9)*	Hull	(20)	Papineau	(22)
Abitibi West	(22)	Iberville	(35)	Portneuf	(13)
Abitibi East	(11)	Jacques Cartier	(12)	Québec	(14)
Arthabaska	(39)	Jonquière	(12)	Roberval	(12)
Bagot	(136)	Kenogami	(20)	Richelieu	(63)
Berthier	(19)	Joliette	(16)	Richmond	(58)
Brome	(19)	Kamouraska	(22)	Rimouski	(14)
Beauce	(15)	Lavolette	(16)	Rouville	(40)
Bellechasse	(20)	L'Islet	(13)	Stanstead	(45)
Beauharnois	(17)	Lotbinière	(17)	St-Hyacinthe	(200)
Compton	(16)	L'Assomption	(19)	Shefford	(36)
Chambly	(14)	Lac St-Jean	(16)	Sherbrooke	(25)
Chicoutimi	(12)	Matapédia	(18)	St-Maurice	(14)
Charlevoix	(10)	Montmorency	(12)	Témiscouata	(12)
Champlain	(18)	Missisquoi	(45)	Témiscamingue	(10)
Drummond	(30)	Maskinongé	(27)	Verchères	(21)
Deux Montagnes	(77)	Nicolet	(22)	Wolfe	(27)
Gatineau	(22)	Pontiac	(22)	Yamaska	(27)

*Number of fecal samples collected.

TABLE II
INCIDENCE OF GASTROINTESTINAL PARASITES OF CATTLE, ASSESSED BY FECAL EGGS COUNTS

	Adults	%	Yearlings	%	Calves	%
McMaster positive	68	14	122	25	162	32
Flotation positive	239	50	304	62	326	64.6
<i>Nematodirus</i> spp.	4	.08	7	1	62	12
<i>Bunostomum</i> spp.	3	.06	14	2.8	0	0
Other Strongyles:						
less than 100 e.p.g.	29	6	55	11	72	13
100 to 1000	38	7	72	14	199	19.6
more than 1000	0	0	1	.02	3	.59
<i>Capillaria</i> spp.	1	.02	13	2	6	1
<i>Strongyloides</i> spp.	1	.02	16	3	24	4.7
<i>Moniezia</i> spp.	6	1	4	.8	4	.79
TOTAL SAMPLES	478		490		505	

grazing with them. Herlich (5) concluded that by virtue of age, adult cattle were generally more resistant to nematode parasites than younger animals.

It appears that in Quebec the pattern of infection is similar to that occurring elsewhere. In general, adult animals do not suffer from severe parasitism. However, they can serve as a source of infection for young cattle and from this point of view the infection rate (50%) in this age group is important.

Yearlings which have counts of 100 to 1,000 e.p.g. (14%) might suffer from retarded growth and poor body condition as a result of parasitism. If these were severe enough, treatment might be necessary.

Animals grazing for the first year are the ones which appear most likely to be clinically affected (13). In our study 19.6% had counts of 100 to 1,000 e.p.g. and it is in this category that severe clinical signs and even deaths would be encountered.

Species prevalence

Figure 1 illustrates the seasonal breakdown of strongyle species as determined by fecal cultures on all McMaster positive samples. *Ostertagia* spp. was the most prevalent and was found in 50-69% of the samples; *Cooperia* spp. was next, found in 32.09% of the samples; *Bunostomum* spp. in 11.16% of samples; *Strongyloides papillosus* in 4.18%; *Oesophagostomum* spp. in 1.30% and *Trichostrongylus axei* in 0.46% of the samples.

Both *Ostertagia* spp. and *Cooperia* spp. represent important pathogenic genera; and when present in large numbers, they can cause serious losses (1, 3).

Seasonal variations in worm egg counts

Figure 2 illustrates the mean, monthly, strongyle egg counts. During the months of February, May and July there was a rise in egg count for all animals: adults, yearlings and calves. In August and September, there

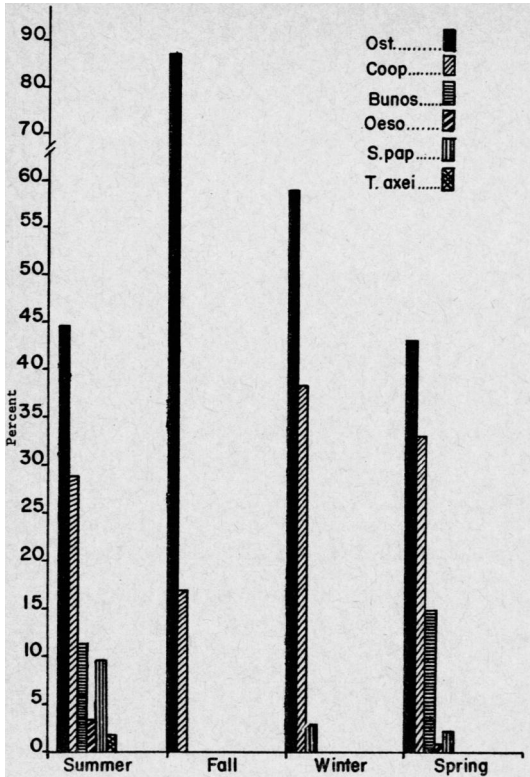


FIGURE 1. Percentage of species as determined by fecal cultures.

was a sharp decrease in the incidence among adults, while in yearlings a sharp decrease was seen later in November and December. The highest peak in calves was seen during the months of August and September. It was of interest to observe the increase in output of eggs from February to April before these animals had had an opportunity to graze. A similar phenomenon, the "spring rise" phenomenon, though of greater magnitude, has been observed in sheep in this area by Procter and Gibbs (10).

Armour *et al* (2) in Scotland have described a type of ostertagiasis as "Type II" in which they have observed an increase in the number of adult worms and eggs in yearling animals in the spring. Such a rise can have important epidemiological implications because it can serve as a source of infection for the calves grazing with yearlings in early summer. The high egg production observed in calves in late summer also results in heavy seeding of pastures with eggs. As a result, these pastures become heavily infected for the succeeding year since both *Cooperia* spp. and *Ostertagia* spp. are known to overwinter successfully (15).

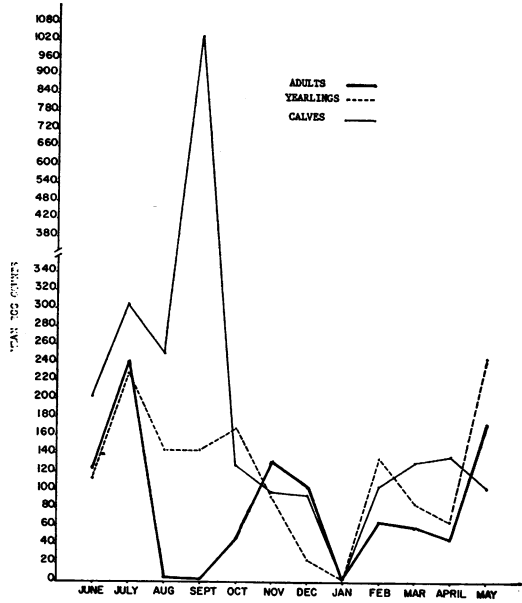


FIGURE 2. Mean egg count fluctuations.

SUMMARY

Studies were undertaken to obtain information on the incidence and seasonal patterns of bovine gastrointestinal helminthiasis in Quebec. Using the flotation technique, McMaster egg counts and fecal culture of infective larvae, 1,473 animals selected from various locations of the province of Quebec were studied. Fifty percent of the adults, 62% of the yearlings and 64.6% of the calves were positive by the flotation technique, but only 14%, 25% and 32% respectively were positive by the McMaster method. Seven percent of adults, 14% of yearlings and 19.6% of calves had ova counts greater than 100.

From the fecal cultures, it appeared that *Ostertagia* spp. was the predominant genus (50%), followed by *Cooperia* spp. (32%) and *Bunostomum* spp. (11%). The incidence of other nematodes, such as *Strongyloides papillosus*, *Nematodirus* spp., *Oesophagostomum* spp., *Trichostrongylus axei* and *Moniezia* spp. was less than 5%.

Calves showed the highest egg counts during September.

These studies indicate a rather high incidence of gastrointestinal parasites in the cattle population of the province of Quebec.

RÉSUMÉ

Des études furent entreprises afin de connaître la fréquence, l'intensité et les variations saisonnières des helminthoses gastrointestinales

chez les bovins du Québec. Des échantillons au nombre de 1473 et provenant des différentes régions de la province ont été analysés en employant les techniques de flottaison, McMaster et la culture des larves infestantes.

La flottaison donna des résultats positifs chez 50% des adultes, 62% des génisses (taures) et 64.6% des veaux. Au McMaster, 14% des adultes, 25% génisses et 32% des veaux étaient positifs. Les coprocultures indiquèrent une prédominance d'*Ostertagia* avec 50% des échantillons, suivi de *Cooperia* 32% et *Bunostomum* 11%, tandis que les autres nématodes, *Strongyloides papillosus*, *Nematodirus*, *Oesophagostomum*, *Trichostrongylus axei* et *Moniezia* furent présents à moins de 5%.

Chez les veaux, le comptage s'avéra le plus élevé durant le mois de septembre, tandis que les adultes et les génisses présentèrent un sommet aux mois de juin et juillet.

Ces études démontrent une fréquence assez élevée des parasites gastrointestinaux chez les génisses et les bovins adultes; mais ordinairement, sans signes cliniques. Ces animaux cependant servent très souvent comme source d'infestation pour les veaux qui eux montrent des signes cliniques de parasitose.

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ABSTRACT

Schneider, R., Dorn, C. R. & Klauber, M. R. (1968). Cancer in households: a human-canine retrospective study. *J. natn. Cancer Inst.* 41, 1285-1292 (Viral & Rickettsial Dis. Lab., State Dep. Public Health, Berkeley, California 94704).

Of 54 cases of human cancer in 427 households with histologically confirmed canine malignancies, 48% were malignant. Of 39 cases of human cancer in 520 control households,

54% were malignant. There was no association of human and canine cancer, even in households containing people aged 60 years and over. Five cutaneous malignant melanomas in dogs were associated with malignancies in the digestive tract in man. Most of the 48 canine malignant melanomas were on the head region, the area most in contact with man.

Reprinted from "The Veterinary Bulletin", Vol. 40, No. 2, February 1970.