

GASTROINTESTINAL NEMATODES IN HORSES IN ONTARIO

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INTRODUCTION

INFORMATION ON THE INCIDENCE and epizootiology of gastrointestinal nematodes in horses in Canada is limited (8, 9, 13, 15). In two areas of Ontario such parasites have produced clinical disease and death in horses (8, 9, 15) but their prevalence has not been assessed. The results of a field survey conducted in Southwestern Ontario in 1970 to determine this are now reported. Information on the incidence of *Strongylus* species collected from the intestine of horses slaughtered in Owen Sound, Ontario, in 1971 is also presented.

MATERIALS AND METHODS

Seven areas in Southwestern Ontario were selected in the vicinity of the following towns: Shelburne, Listowel, Guelph, Stratford, Paris, Ingersoll-Embrow and Fisherville. Fecal samples were collected from two equine farms in each area except Listowel where only one farm was selected. Fecal samples were collected on three occasions: once in early May, once in late June to early July and once in early August. Factors influencing the selection of the areas and farms and the procedures used for collection and analysis of fecal samples have been described (16). The following were modifications to those procedures: a) generally no fewer than eight horses were sampled, and at least 50% of the horses on each farm; b) a 10 g fecal sample was used for the Cornell-McMaster technique; c) square roots of the actual number of eggs counted for each sample (i. e. $\sqrt{\text{eggs per } 0.02 \text{ g of feces}}$) were used for analysis of variance (20); d) infective larvae from fecal cultures were identified as described by Russell (14) and Soulsby (17).

At the Owen Sound slaughter-house during 1971 fecal samples from horses purchased in

Ontario were examined for gastrointestinal nematode or strongyle eggs by a simple flotation technique (15). The large intestine from 48 horses found to contain a large number of these eggs on fecal examination was removed for other studies, and incidentally for the determination of *Strongylus* burdens. The large intestine was opened longitudinally, and the contents and mucosal surface were searched for adult *Strongylus*.

RESULTS

During the May collection of fecal samples the majority of horses were stabled. Some horses were placed on pasture in late May to mid-June depending on the area and weather conditions. The number of fecal samples examined and the percentage of positive samples for each area is in Table I. The percentage of positive samples in May was 87.7%, and in each of June-July and August 87.3%.

The most frequent finding was the oval-shaped, thin-shelled and morulated strongyle egg. This egg type was found in the feces of 83% of the horses in May, 85% in June-July, and 81% in August. The mean strongyle egg counts for the various collection times are in Table II. Examination of the infective larvae from fecal cultures indicated that up to 10% of these eggs came from large strongyles (*Strongylinae*), and more than 90% from small strongyles (*Cyathostominae*). *Parascaris* eggs were found in 16% of the samples in May, 10% in June-July, and 9% in August, and predominantly in yearlings and foals. *Strongyloides* and *Oxyuris* eggs were found in less than 1% of the fecal samples.

The farms were classified according to the nature of the horse enterprise into four groups: A) Thoroughbreds, B) Standardbreds (Trotters, Pacers) and Show horses, C) Pleasure horses, and D) Commercial (Buying and Selling) establishments and Working horses. The

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TABLE I
INCIDENCE OF FECAL SAMPLES POSITIVE FOR
GASTROINTESTINAL NEMATODE EGGS FOR
EACH OF SEVEN SAMPLE AREAS

Area	Number of Examinations	% Positive
Shelburne	59	94.9
Listowel	26	84.6
Guelph	44	79.5
Stratford	42	90.5
Paris	46	80.4
Ingersoll-Embro	40	97.5
Fisherville	54	83.3
All areas	311	87.5

TABLE II
STRONGYLE EGG COUNTS IN EGGS PER GRAM
OF FECES FOR EACH SAMPLING PERIOD

Period	Mean	Range	No. of Samples
May	922.4	0- 5,650	114
June-July	1,327.5	0-11,050	118
August	1,696.2	0-12,300	79

results of a questionnaire directed to the owners of these farms are in Table III. The strongyle egg count fluctuations for the four groups are illustrated in Figure 1. When the egg count data was tested by Analysis of Variance (Table IV) and Duncan's multiple range test (6), groups A and B were found significantly different ($P < 0.01$) from groups C and D in May and June-July. In August all groups were found similar.

The incidence of adult *Strongylus* species collected from 48 horses slaughtered at Owen Sound were as follows: *S. edentatus* was found in 45 horses, *S. vulgaris* in 41, and *S. equinus* in 10. The abundance of adults for the three species were as follows: 1440 *S. edentatus*, 1047 *S. vulgaris* and 131 *S. equinus*.

DISCUSSION

At each sample period in 1970, more than 87% of the horses sampled had gastrointestinal nematode eggs in the feces. Similar findings have been reported previously in Ontario (9, 15). It would appear therefore, that the majority of horses in Ontario are infected with gastrointestinal nematodes. The most frequent egg type was the strongyle egg. More than 90% of these eggs were from small strongyles, and this is similar to reports from the U.S.A. (5) and England (11). *Parascaris* eggs were found mainly in yearlings and foals and in a much lower incidence than reported in the U.S.A. (5) and England (12). *Stron-*

gyloides and *Oxyuris* were found occasionally.

The strongyle fecal egg counts for the Thoroughbreds, Standardbreds and Show horse groups were significantly lower than those for the Pleasure, Commercial and Working horse groups during May and June-July. These results were not surprising since anthelmintics were used in the spring by all farms in the first two groups and in only three of the seven farms in the last two groups. However, the egg counts for all groups were alike in August. The more efficient use of anthelmintics in the first two groups undoubtedly caused low egg counts in May. As the spring and summer progressed, the egg counts rose to a level which resembled the other two groups. Most of the owners of the farms in the first two groups advised that anthelmintics were used again in the fall. From this limited study, it would appear that use of anthelmintics in early July would be a more appropriate time. Treatment at this time would prevent the egg count rise and reduce the contamination on pasture.

The reason for the strongyle egg count increases was not determined. There were no such increases in groups C and D in which minimal amounts of anthelmintic were used.

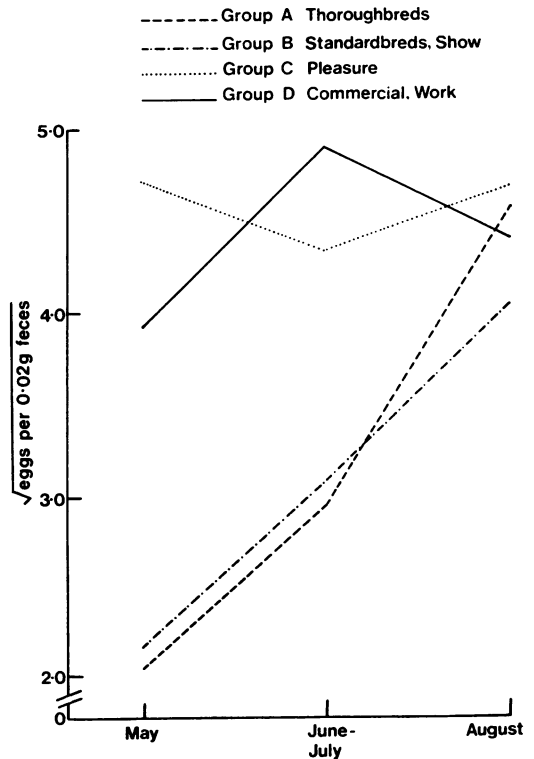


FIGURE 1. Fluctuations in the mean strongyle fecal egg count from four groups of horses.

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TABLE III

HISTORY OF PARASITISM AND MANAGEMENT PRACTICE IN ONTARIO HORSE FARMS: NUMBER OF FARMS FOR EACH OF FOUR TYPES OF ENTERPRISES

	Group A Thoroughbreds	Group B Standardbreds Show	Group C Pleasure	Group D Commercial Work	Total
Group Size (Farms)	2	4	3	4	13
History of Parasitism	1	2	0	1	4
Anthelmintics Used	2	4	2	1	9
Routine Fecal Examination	0	1	0	0	1

TABLE IV

ANALYSIS OF VARIANCE OF THE EGG COUNT DATA

Source	df	MS	F
Groups	3	45.8136	6.6623
Months	2	31.1969	4.5367
Groups × Months	6	14.2143	2.0671
Farms within Groups	9	84.7660	
Months × Farms within Groups	18	24.9477	
Within Cell Error	272	6.8765	
<i>Group × Month Interaction</i>			
Groups within May	3	44.5129	6.4731
Groups within June-July	3	27.7372	4.0336

Increases in strongyle egg counts in the summer have been reported (10, 11). It may be that these increases like the spring-rise phenomenon in sheep (4, 18) and similar fecal egg increases in cattle (3, 16) have epizootiological significance. It provides a source of heavier than normal contamination on pasture at a time when young and susceptible animals are usually grazing and may ensure the perpetuation of the parasite.

Routine analysis of fecal samples is important in the control of gastrointestinal nematodes. Only one farm in thirteen did this. If this practice was carried out in the Thoroughbred and Standardbred group it might have been possible to determine that an administration of anthelmintics in July would have been useful. While there was no history of parasitism in the Pleasure horse group, the high fecal egg counts indicated that clinical parasitism was conceivable with continued heavy contamination of the pasture. In the Commercial horse group one might assume that little attempt at parasite control would be made where the primary concern is on the buying and selling of horses. However these farms can provide a source of infected horses for better managed farms and such horses may be of considerable importance in the spread of nematodes. Moreover, since the prepatent periods for *Strongylus* species are long, six and one-half to eleven months (17),

horses can be affected seriously before their presence can be detected on fecal examination. Since a significant number of horses in Ontario die from the effects of some strongyles (8, 9, 15) and since the equine population in Ontario is increasing (21), routine fecal analysis and other adequate control measures (7) are necessary to minimize the spread and effects of gastrointestinal nematodes.

The horses examined at Owen Sound were unsound for work or pleasure, generally five years or more of age, and were chosen on the basis of high fecal egg counts. Although these horses formed a select group, *Strongylus edentatus* and *S. vulgaris* were found in more than 85% of the horses. This incidence is similar to reports for other parts of the world (1, 2, 5, 12). *Strongylus equinus* was found in 20% of the horses, and this is lower than that in India and the far East (1). In the U.S.A. (19) and England (12) *S. equinus* is a very rare parasite in horses. The most abundant species was *S. edentatus*. The most abundant species reported in Central and North America (2, 19) and in England (12) was *S. vulgaris*.

SUMMARY

On three occasions in 1970 fecal samples were taken from horses on thirteen farms in seven areas of Southwestern Ontario. At each

sample period more than 87% of the horses had gastrointestinal nematode eggs in the feces. The most frequent egg type (more than 80% of samples at each sampling period) was the strongyle egg. Differentiation of infective larvae from fecal cultures showed that more than 90% of these eggs came from the small strongyles. *Parascaris* eggs were found mainly in yearlings and foals and in approximately 10% of the samples. *Strongyloides* and *Oxyuris* eggs were found in less than 1% of the samples.

Strongyle fecal egg counts for farms with Thoroughbreds, Standardbreds (Trotters and Pacers) and Show horses were significantly lower in May and June-July than for Pleasure horses, Commercial (Buying and Selling) establishments and Work horses. In the former groups there was a rise in egg counts which in August was not unlike those for the other group. Anthelmintics were administered principally in the spring and fall but the time for the second administration appeared to be more appropriate in July and this would have prevented the egg count rise. This decision might have been made on the basis of data derived from routine fecal analyses but only one farm in thirteen did this.

Strongylus edentatus and *S. vulgaris* were found in more than 85%, and *S. equinus* in 20% of 48 horses slaughtered at Owen Sound, Ontario. The decreasing order of abundance for the three species was *S. edentatus* 55% of all worms collected, *S. vulgaris* 40%, and *S. equinus* 5%.

RÉSUMÉ

À trois reprises, au cours de l'année 1970, on préleva des échantillons de fèces chez des chevaux, sur 13 fermes situées dans sept régions du sud-ouest de l'Ontario. À chaque période d'échantillonnage, les excréments de plus de 87% de ces chevaux contenaient des oeufs de nématodes gastro-intestinaux. Les oeufs de strongles représentaient la variété rencontrée le plus fréquemment (plus de 80% des échantillons, à chacune des périodes d'échantillonnage). La différenciation des larves infectantes obtenues de croprocultures révéla qu'au delà de 90% de ces oeufs provenaient de petits strongles. On trouva des oeufs de *Parascaris* surtout chez les poulains âgés d'un an ou moins, et dans environ 10% des échantillons. Moins de 1% des échantillons contenaient des oeufs de *Strongyloides* et de *Oxyuris*.

Sur les fermes où on gardait des chevaux Thoroughbred, Standardbred (trotteurs et ambleurs) ou de spectacle, le nombre d'oeufs de strongles s'avéra sensiblement moins élevé

en mai et en juin-juillet que sur celles où il y avait des chevaux d'équitation ou des chevaux pour le commerce (achetés et à vendre), ainsi que des chevaux de trait. Dans les premiers groupes, on constata une augmentation du nombre d'oeufs, laquelle, en août, n'était pas différente de celle des autres groupes. L'administration d'anthelminthiques s'effectuait surtout au printemps et à l'automne; toutefois, le temps le plus propice à un second traitement a semblé être le mois de juillet et on aurait ainsi prévenu l'augmentation du nombre d'oeufs. On aurait pu adopter cette pratique en se basant sur les résultats des examens coprologiques de routine, mais cela ne se fit que sur une seule des 13 fermes.

On décéla *Strongylus edentatus* et *S. vulgaris* chez plus de 85% de 48 chevaux abattus à Owen Sound, Ontario, et *S. equinus* chez 20% de ces bêtes. Par ordre décroissant, l'importance de ces trois espèces était la suivante: *S. edentatus*, 55% de tous les parasites récoltés, *S. vulgaris* 40% et *S. equinus* 5%.

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ANALYSE DE VOLUME

Diseases of Feedlot Cattle. 2e Edition. Rue Jensen et Donald R. Mackey. Publié par The Macmillan Company of Canada Limited, Toronto, Ontario. 1971. 377 pages. Prix \$20.00.

En moins de quatre cents pages, Jensen et Mackey réalisent un traité des maladies des bovins à l'engraissement venant compléter l'ensemble des connaissances nécessaires à l'exercice du vétérinaire praticien.

Dans un esprit pratique, reflet de leur expérience personnelle, les auteurs insistent plus volontiers sur l'aspect économique de la maladie décrite, sur les éléments du diagnostic et de la prévention; en somme, les éléments les plus importants dans ce genre de production.

Ce livre, divisé en neuf (9) chapitres, est présenté d'une façon fort simple mais soignée. Commençant par le préconditionnement des veaux et la période d'adaptation de ces sujets

aux parcs d'engraissement, les chapitres se succèdent, décrivant les différentes maladies (virales, bactériennes, à fungus, parasitaires, de causes diverses ou incertaines) pouvant affecter les bouvillons à différentes périodes de leur engraissement, pour se terminer avec un problème très à la mode de nos jours, celui de la pollution, conséquence possible de l'exploitation d'un parc d'engraissement.

L'ouvrage, très à jour, comporte, pour chaque sujet considéré, la revue de la littérature et la liste des principales références bibliographiques. La lecture est facile et l'attention est attirée par une foule d'illustrations (191) et de tableaux (32) ce qui clarifie grandement la compréhension du texte.

En résumé, "Diseases of Feedlot Cattle" est un bon livre, facile à lire et à comprendre, que tout vétérinaire intéressé aux bovins de boucherie devrait avoir sous la main pour consulter régulièrement. *J. P. Asselin.*