A PERSPECTIVE ON INTERNAL PARASITE CONTROL

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The potential severity of internal parasite problems in deer, particularly lungworm, is well known to veterinarians and to most deer farmers. Drenching of deer is a widespread practice and this would appear to be the main reason for the lower incidence of clinical parasitism on deer farms than there was a few years ago. The 1980 MAF survey showed that farmers considered lung parasitism to be their most "commonly occurring" problem. In the same survey veterinarians reported lungworm to be their second most commonly seen problem on deer farms. Our 1980 survey showed approximately 50% of deer veterinarians had seen clinical lungworm problems on deer farms in the year 1979 Mason and Gladden reported that in 1981, 85% of farms had lungworm larvae and 84% had gut eggs in deer faeces. Clearly the prevalence of gut and lungworm on deer farms is very high.

DRENCHING PRACTICE

Mason and Gladden also reported that 85% of deer farmers had drenched some or all their deer during the previous 12 months. On 20% of these farms, farmers drenched all their deer on each drenching occasion. Some farmers drenched their deer up to 17 times per year. (Small wonder that some had consistently zero egg and larval counts). Weaner deer were drenched more frequently than other stock.

Recommendations for drenching vary. Most practices in our 1980 survey recommended 3-4 weekly drenching, but the start and finish dates varied markedly. Farmer literature has given a blanket recommendation of 3-weekly drenching throughout the year for all young stock.

The cost in terms of drug and labour can be substantial. Table 1 is an actual case, and would be typical of many farms.

Table 1 DRENCHING PRACTICE ON A LARGE RED DEER FARM

Deer	No.	Drenches/year	Approx.man days* labour/year	Drench cost + $	Total++ cost
Weaner female	230	13	7.5	1196	
Weaner male	230	9	5.3	828	
Yearling female	200	2	1	240	
Yearling male	200	2	1	240	
Adult female	800	2	4	960	
Adult male	230	2	1.2	368	
TOTAL	1890		20	$ 3832	$ 5500

* Assuming 1 man can drench 400/day (includes mustering and yarding)

\+ Assuming 40c per weaner, yearling and adult hinds 60c/head, Adult stags 80c/head

++ Assuming in real terms a manager's income of $20,000 p.a. (many are considerably higher)

Obviously, the gross cost on a smaller unit would be correspondingly less, but these figures highlight the financial cost of parasite control. The farmer does not know if he receives a return for this expenditure: is he preventing deaths and/or clinical or subclinical losses, or would he get by with no drenching or a much lesser drenching programme? I suspect most farmers regard parasite control as a cost rather than an investment. I suspect that most farmers and indeed, even veterinarians have little idea about the parasite status of their herds or herds they service. Few veterinarians monitor parasite situations on properties or understanding the real influence of management procedures on parasite burdens.

So what are the bases of current parasite control practices on most deer farms? I believe they fall into two categories:

(i) Drench using a routine to cover all eventualities i.e. multiple drench every deer.

(ii) Gamble i.e. drench a few times and see what happens. If any deer "does not look too good", drench again. If a deer scours or coughs, call it worms, and drench.

It is likely that veterinarians apply both these practices to a varying degree. Is it adequate to approach parasite control in this way?

An alternative is to design a programme with the principle of limited drenching, combined with stringent grazing management and data collection and monitoring to prove that the programme is effective.

WHAT CAN DATA COLLECTION TELL YOU

SITUATION 1

Data presented is from commercial properties of varying sizes and is used to illustrate several points.

(i) The parasite status of each property is different.

(ii) Stocking rate per se is not the major influence on parasite burdens. They are affected by drenching and grazing management.

(iii) Unplanned drenching programmes may not alter the parasite status very much.

(iv) Many factors affect parasite burdens.

(v) Parasitism may occur before weaning.

Table 2 AVERAGE FAECAL EGG AND LARVAE COUNTS OF THREE COMMERCIAL DEER FARMS AT WEANING IN MARCH (WEANERS 3 MONTHS OF AGE)

Property Topography	Year	Total Deer	Stocking rate (Deer/ha)	Counts at weaning			
				Eggs/g		Larvae/g	
				Adult hinds	Weaners	Adult hinds	Weaners
1 Flat	1982	36	14.4	57(17)	92(100)	5.5(92)	8(86)
	1983	52	21.8	60(28)	77(90)	2.3(92)	4.7(100)
	1984	57	22.8	66(33)	50(45)	2.5(20)	30(77)
2 Flat	1983	600	12	-	155(86)	-	141(100)
	1984	800	16	0(0)	140(84)	2.6(70)	253(100)
3 Hill	1984	750	5.3	0(0)	100(15)	0(0)	8.9(47)

NOTE:

1. Figures in parentheses represent the percentage of animals with counts >0.

2. Means are of counts excluding zeros.

3. All counts from weaners are prior to anthelmintic treatment.

Data from Table 2 is from 3 properties for up to 3 years. Property 1 is an intensive unit employing a controlled grazing system i.e. rotational grazing; with a minimum of supplementary feeding. The prevalence of parasites in dams and offspring is high, yet mean counts are low. Thus it appears the likelihood of ingesting parasitic larvae is high, as is expected when pasture utilization is high i.e. deer graze close to old faecal deposits. Adult deer on this unit are not drenched. This suggests that well fed adult deer in rotational grazing systems may not need anthelmintic - they appear to have an inherrent or acquired ability to resist heavy parasite infestations. Egg and larval counts in weaners (early March) on this property also have a high prevalence, but low average. However, figure 1 (discussed later) shows the result if a drench is delayed 6 weeks from weaning.

Property 2 operates under a set stocked:rotational grazing combination. Hinds were given a pre-calving drench before the 1983-84 calving, but not before the 1982-83 calving. Larval counts in weaners are higher when hinds were drenched than they were when hinds were not drenched. Egg and larval counts and prevalences in the hinds were not high, despite the fact that they were grazing up to weaning with their offspring which had very high counts. (Counts were up to 1264 larvae/g). Again, the adult appears capable of resisting the establishment of heavy burdens, despite the 70% prevalence. It is apparent from this data and from property 3 that lungworm burdens generate by cycling through the offspring. It would appear that the adult influences this pattern very little.

Hinds on property 3 were given a precalving drench. Counts are zero. However, weaners did have a parasite burden, albeit small. It is probable that the offspring picked up their burdens from pasture contamination left by the hinds prior to their being drenched in November, since in this case, only deer had been on the property for more than 5 months. No cattle had been grazed on this property and therefore lungworm burdens could not have come from other stock. It is questionable whether it was necessary to drench at weaning in this situation. Three and 6 weeks later, all counts were zero.

Table 3 shows body weights at weaning from these 3 properties in 1984. Weaning dates were within 7 days of one another (7-13 March). Highest

weaning weights were recorded on the most intensive unit. This has been consistent over the past 2 years and is attributable largely to better feed quality under intensive grazing, and rotation of hinds with calves at foot, i.e. before weaning. This is probably a major factor in the lower parasite burdens at weaning in this herd. Property 2 uses some wapiti cross sires and weaning weights would be expected to be higher than on property 1 or 3. However, they were not. After 5 weeks, weight gains on this property were 7.1 and 8.3kg for females and males, respectively, while for property 1, 6.7 and 7.2kg, and property 3, 4.2 and 1.9kg for females and males respectively.

Table 3 AVERAGE BODY WEIGHTS (KG) AT WEANING ON THE THREE PROPERTIES DESCRIBED IN TABLE 1

Property	Adult hinds		Weaner male		Weaner female		Weaning %
	n	kg	n	kg	n	kg	
1	15	92.0	8	44	5	39.8	86.6
2	332	90.0	143	39.5	129	35.6	82
3	413	94.5	165	39.0	199	33.0	88.3

Two factors may be involved in the better performance from weaning on property 2, (i) the wapiti blood may be exerting an influence, (ii) the parasite burden at weaning may have been limiting growth, and the drench may have removed this growth-limiting factor i.e. subclinical parasitism may have been a problem before weaning.

The relatively poor performance of property 3 was largely due to poorer pasture quality, and once this was recognised, the grazing management was altered and the situation rectified by June. It is important that comparing data from different properties or comparison with desirable target weights if these have been established for your situation, can highlight management deficiencies very rapidly.

SITUATION 2

The following is a copy of data collected from a farm with 1900 red and

about 500 fallow, and my report after visiting the property on May 7. The drenching programme used in the past on this property is described in Table 1.

Quoted from the consultancy report ...

"Internal parasite control

Lungworm is the most important to control. A programme aimed at this should automatically control gut worms.

My objective is to drench as little as possible for 3 reasons: labour, cost of drug, the risk of parasite resistance to drench increases with increased usage. My suggested programme is:

(i) Weaners
- drench at weaning (no later than mid-March)
- faecal sample
- drench twice more at 3 week intervals
- place weaners on fresh pasture after each drench. Always give weaners the best pasture available. This has a dual effect: recontamination is less, and a well fed deer is less affected by parasites and most other diseases.
- Faecal sample at 6-8 week intervals until Xmas. In the first year or two it will be an advantage to collect reasonably frequently to establish the normal pattern. In future we will be able to be more selective in our sampling intervals. I can process samples as often as you want to send them. I suggest we choose 6-weekly this year.

(ii) Hinds
- adult and yearling
- faecal sample at weaning - this would best be done 1 week before vaccination is due so drench can be given at vaccination if needed.
- Faecal sample pre-calving.
- Drench if counts suggest the need.

(iii) Stags
- A sample could be sent at the same time as the hinds are sampled.

Sampling

Fresh faeces from the paddock are satisfactory.

Sample number

10 per class of stock e.g. from 2 groups of hinds and 1 group of yearlings this winter, sample 5-6 from each group of adults and 10 from weaners. About 30-40 samples per shipment is about all we can handle.

Choice of drench

"Valbazen", "Systamex"or "Synanthic" are all adequate.

Previous drenching programme

Weaners: weaning and thereafter each 3 weeks until September for males and December for females (i.e. up to 13 drenches).

Yearlings and adults: Pre-rut, pre-calving.

Stags: variable, usually pre-velvet growth.

This year

Weaners were drenched March 18, April 3, and April 26. Hinds were drenched March 18.

Data is shown in Table 4.

Table 4 MEAN FAECAL EGG AND LARVAL COUNTS FROM A 1900 RED DEER HERD

Date	Group	Sample	Faecal eggs		Faecal larvae	
			count/g*	(%prevalence)	count/g*	(%prevalence)
18.3.84	Weaners	20	100	(45)	58	(100)
7.5.84	Weaners	10	62	(40)	6.6	(30)
	Yearlings	8	50	(25)	8	(37)
	Adult hinds	8	0		4.2	(62)
	Adult stags	4	66	(75)	73	(75)

* Mean of counts >zero

Several points arise:

Weaners

- lungworm larvae counts at weaning average 58/g and the prevalence was 100%
- gut worm egg counts are very low
- it appears that no production limiting effects of parasitism would have been encountered, thus commencement of a drenching programme mid-March appears appropriate.

NOTE. In future years when weaning may be earlier if the season is dry and feed runs short, it would be advisable to faecal sample and if counts are low, to delay the commencement to the normal date, rather than to start too early.

- the counts in weaners on 7.5.84 are low, but I find it surprising that only 11 days after a drench that 40% should have larval counts and 33% have egg counts. This suggests that (i) the drench is not destroying some worms, either mature or immature, (ii) the dose calculated or delivered is insufficient. In this regard, a dose rate for a 60kg deer should be given currently, and the DRENCHING GUN MUST BE CHECKED BEFORE EACH SESSION, for both quantity and repeatability. Get an ordinary plastic kitchen measuring cylinder (or large drug syringe barrel) and squirt a number of doses in and check the quantity delivered. (iii) Some worms may be resistant to the drench. This is not likely but future monitoring would uncover this problem if it exists. (iv) Some deer may have been missed with a drench. (v) The drenching technique may not be adequate and some drench may have been spilt from the deer's mouth. WATCH ALL THESE FACTORS CLOSELY.

Yearling and adult hinds

Counts are all low, and only 50% have lungworm.

Stags

These counts are the highest, reflecting the time from last drench. I see no reason to drench at these counts, but it will be interesting to follow changes. It is important that they be rotated around the pastures rather than set stocked, because under the latter, they will be reinfecting themselves at an increasing level."

... end of quote.

NOTE: The farmer collects the samples and sends them in to the clinic for processing.

SITUATION 3

Weekly faecal sample collection from weaners on an intensively grazed unit was undertaken. Data is summarised in Figure 1. In this case the usually advised drench at weaning was withheld for 6 weeks and samples collected. The rapid climb in average lungworm larval counts suggests the likelihood of a clinical problem occurring shortly if drenching was not commenced. The drenching programme of 4 three-weekly

drenches was applied and counts remained low over winter but a small rise was observed in late winter, when deer were forced to graze closer to the ground (and this coincided with a check in their growth rate), and early in spring. Counts were still low when these deer were put to the stag some 4½ months later. Thus once the infestation that threatens to produce clinical disease in the autumn is controlled, the deer appear to develop a natural resistance to the parasite.

It would be interesting to observe the pattern of spring larval counts from deer which had very low counts in the autumn following very early initiation of a drenching programme. It may well be that the apparent resistance of the deer may be an immunity enhanced by exposure to the parasite at an early age. Failure to allow the deer to become infected by the parasite may inhibit the development of such an immunity.

My usual programme of drenching and monitoring is based on the data in Figure 1.

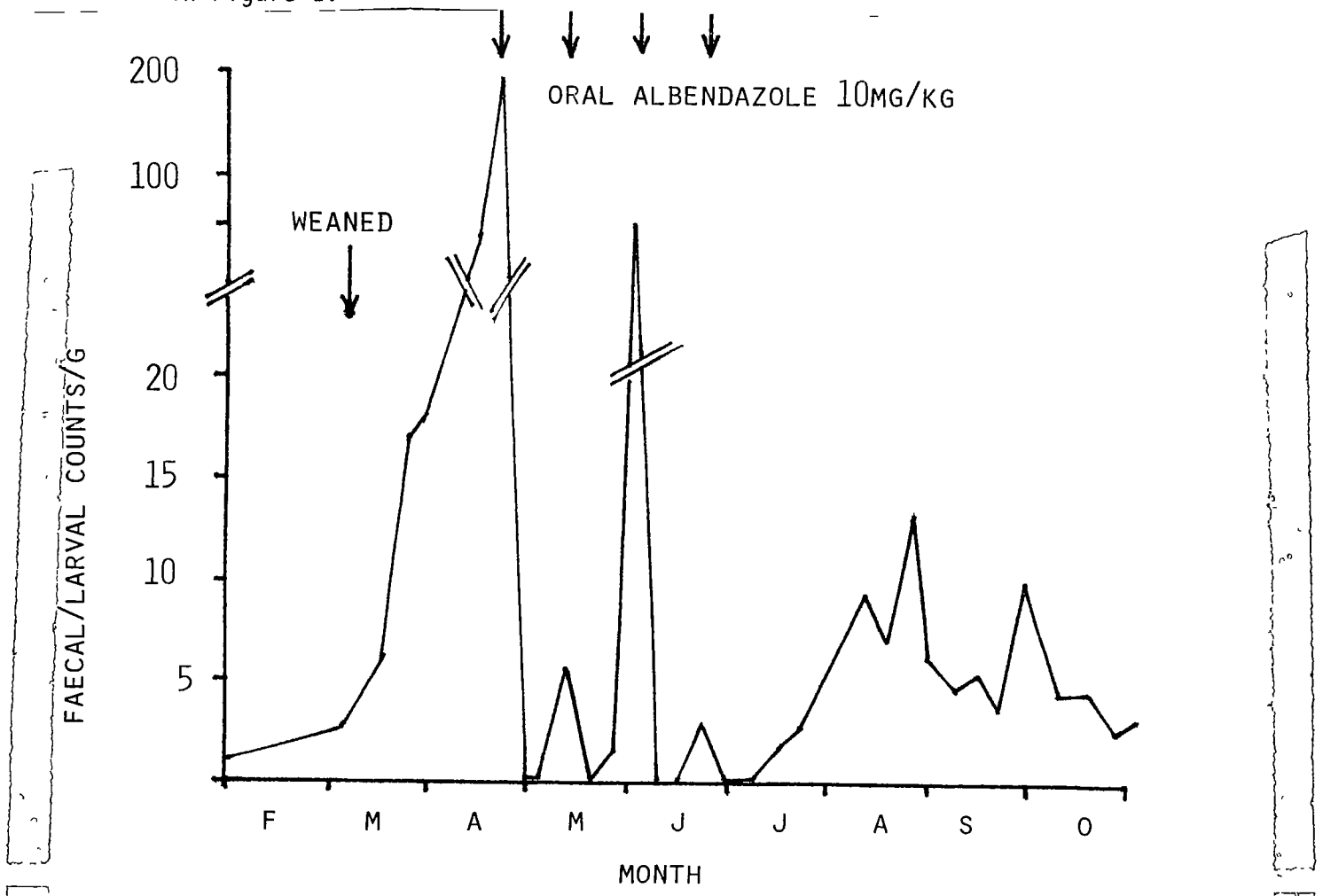

FIG. 1. MEAN FAECAL D. VIVIPARUS LARVAE COUNTS/G FROM ROTATIONALLY GRAZED RED DEER DURING THEIR FIRST YEAR OF LIFE.

CONCLUSIONS

1. Farms have different parasite status.

2. The veterinarian has 3 options when advising on parasite control programmes:
   (i) Drench frequently to cover all eventualities
   (ii) Drench to a programme and hope that it works
   (iii) Drench to a programme and with a joint effort between the farmer (who collects the faeces) and yourself, monitor to ensure the success of the programme.

3. From the data collected, it would seem advisable to start a drenching programme at weaning in March, unless counts indicate otherwise.

4. Yearling and adult stock may not need drenching.

5. Not all properties or farmers are ammenable to the monitoring approach. This approach is best achieved when a whole farm advisory service is offered. It will not be as effective if the veterinarian does not have an intimate knowledge of the property concerned.

6. Any parasite control programme must be integrated with feeding and grazing management as a first consideration.

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