Typical males – do male lambs contribute more to pasture larval contamination?

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An observation from a farming client that in a mob of mixed sex lambs, the ram lambs appeared to be more affected by parasites than the female lambs. He then had the insight to take faecal samples from the ram and ewes lambs to compare the FEC's (faecal egg counts) between them. These results showed a large difference with the ram lambs having a higher FEC. Following these results, I collected more data to see if this result was repeatable – some of the data below was collected by design and some was just incidental as part of standard FEC monitoring. Part of the investigation was to see if ram lambs, cryptorchids and wethers all had higher FECs when compared to ewe lambs. I was also interested in seeing whether age of lamb had any difference on the sex difference in FEC's. My primary curiosity around this was driven by the thought that can we reduce pasture larval contamination by managing male and female lambs differently.

Method

Case 1, 3 and 5 was collected incidentally as part of standard FEC monitoring. Case 2 and 4 was set up to compare FECs of ewes lambs to cryptorchids and wethers respectively. Cases 1, 2, 3 and 4 the male and female lambs had been grazed together so they should have had the same larval challenge. Case 5 the male and female lambs were run together prior to weaning but separated at weaning, with no drenching at weaning. FEC's were all done with the modified McMaster technique. Larval cultures performed at Awanui Veterinary.

Results

Case 1

Date: Feb 2023
Days since last drench: 32
Last drench: Matrix
Stock class: Five-month-old Suffock x Romney lambs
Management: Ewe and ram lambs run together
Resistance status: Significant level of *T.columbriformis* resistance to triple combination anthelmintics

	Ewe lambs		Ram lambs	
	Strongyle	Nematodirus	Strongyle	Nematodirus
	2250	0	15600	0
	1000	0	8250	0
	2250	0	9900	0
	2450	0	4200	0
	1800	0	5600	0
	1650	0	7600	0
	650	0	6300	50
	1600	0	9450	50
	1350	0	7600	0
	4200	0	1650	0
Average FEC epg	1920	0	7615	10

Larval culture				
Haemonchus	0%		0%	
Teladorsagia	2%		1%	
Trichostrongylus	40%		20%	
Cooperia	50%		79%	
Oesoph / Chabertia	8%		0%	

Comment: When this mob of lambs were sex drafted prior to being drenched the farmer noticed that the ram lambs had a higher dag score and were in poorer condition. He decided to take a random 10 faecal samples from the ram and ewe lambs. Fresh samples were collected from the pens that these lambs had been drafted into. While the ram lambs have a much higher FEC than the ewe lambs the majority of this difference was driven by a higher proportion of Cooperia, and as is well known Cooperia in sheep are regarded as non-pathogenic. But doing the calculations on the Trichostrongylus burden showed the ram lambs had 1523epg vs. ewe lambs at 768epg. Given the resistance status it is highly likely that some of the FEC may represent worms that survived the previous drench.

Case 2

Date: June 2024
Days since last drench: 47
Last drench: Startect

Stock class: Nine-month-old terminal x Romney lambs
Management: Ewe and cryptorchid lambs run together since last drench
Resistance status: Moderate level of *T.columbriformis* that are resistant to triple combination anthelmintics

	Ewe lambs		Cryptorchid lambs	
	Strongyle	Nematodirus	Strongyle	Nematodirus
	200	0	650	0
	50	0	250	0
	0	0	650	0
	650	0	1250	0
	50	0	1650	0
	350	0	100	0
	400	0	450	0
	50	0	150	0
	100	0	50	0
	-	-	1600	0
Average FEC epg	205.6	0	650	0

Comment: No culture done but a culture prior to the previous drench was 100% Trichostrongylus so I suspect this burden was predominantly the same. It appears based on this result that post-pubertal cryptorchid lambs have higher FEC compared to ewe lambs although maybe the difference isn't as great as with younger lambs.

Case 3

Date: Jan 2025
Days since last drench: 33
Last drench: Turbo Triple Tape

Stock class: Three-month-old Romney lambs
Management: Lambs given preweaning drench on the 18/12/2024. Weaned and sex drafted on the 5/1/2025. Faecal samples taken on the 20/1/2025
Resistance status: Significant level of *T.colubriformis* that are resistant triple combination anthelmintics

	Ewe lambs		Ram lambs	
	Strongyle	Nematodirus	Strongyle	Nematodirus
	800	0	1550	0
	350	0	1050	50
	650	0	1100	100
	100	0	2000	100
	400	50	1450	0
	250	0	1300	50
	500	0	1900	50
	200	0	550	0
	700	0	750	50
	50	0	650	0
Average FEC epg	400	5	1230	40

Comment: No culture done. Based on this result the young ram lambs appear to have higher FECs compared to ewe lambs. There was also a difference in Nematodirus burdens although at very low burdens. Given the resistance status it is likely that some of the FEC may represent worms that survived the previous drench.

Case 4

Date: March 2025
Days since last drench: 38
Last drench: Boss
Stock class: Six-month-old Headwaterx x Romney lambs
Management: Ewe and wether lambs run together since last drench
Resistance status: No resistance detected to triple combination anthelmintics

	Ewe lambs		Wether lambs	
	Strongyle	Nematodirus	Strongyle	Nematodirus
	50	0	550	50
	100	0	400	50
	0	0	1650	0
	0	0	350	0
	0	0	100	0
	0	0	2400	0
	100	0	850	50
	0	0	2700	50
	350	0	950	0
	150	0	1500	0
Average FEC epg	75	0	1145	20
Larval culture				
Haemonchus	32%		24%	
Teladorsagia	9%		12%	
Trichostrongylus	19%		14%	
Cooperia	40%		45%	
Oesoph/Chabertia	0%		5%	

Comment: An almost unbelievable difference between wether lambs and ewe lambs in this case. And interesting that the culture results from wether and ewe lambs were very similar which may indicate that the mechanism causing the lower FEC's in the ewe lambs may be acting across multiple genera of parasites.

Case 5

Date: February 2024
Days since last drench: n/a
Last drench: n/a

Stock class: Five-month-old halfbred lambs
Management: Lambs not drenched at weaning. Ewe and wether lambs have been running separately since
Resistance status: n/a

	Ewe lambs		Wether lambs	
	Strongyle	Nematodirus	Strongyle	Nematodirus
	100	0	0	300
	0	100	200	0
	500	0	200	400
	300	0	1000	0
	300	0	1200	100
	300	100	600	500
	500	0	700	100
	400	0	2900	400
	300	0	2300	400
	100	0	600	200
Average FEC epg	280	20	970	240

Comment: This case comes from a farm in North Otago and is curtesy of Dave Robinson from Veterinary Centre Oamaru. No culture results. This case also indicates a difference in FECs between wether and ewe lambs and shows a big difference in Nematodirus FEC's. These lambs have not been running together since weaning so could have been subject to different larval challenges.

Analysis

Based on this very limited data set the following has been observed:

1. Male lambs have a higher FEC than female when grazing the same pastures.
2. This difference is seen in entire ram lams, cryptorchids and wethers.
3. This difference is seen from three months of age to nine months of age.
4. The lower FECs seen in ewe lambs maybe across multiple GI nematode genera including Nematodirus.

Discussion

Farmer observations

On discussion of these results with my sheep farming clients none of them are surprised with all having observed male lambs becoming 'wormier' than female lambs on their own farms. Although the compounding issue is that on a lot of farms the male lambs would tend to be grazed on the more intensive 'lamb finishing' part of the farm that it is likely to have a higher pasture larval challenge and hence they would be more likely get a higher level of parasitism.

Does higher FEC's seen in males equal more parasitism?

I didn't do any total worm counts to see if the higher FECs in male lambs were due to a higher GI nematode burden. You would assume this is the case but potentially the ewe lambs had the same burden but were able to suppress adult nematode egg output. In Case 1 there was a farmer observation of more parasitism in the male lambs. There is the potential that higher GA nematode burden in males is having a bigger negative impact on growth rates relative to ewe lambs under the same larval challenge, but that this is likely only seen clinically when lambs are grazing high larval challenge.

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The Carla testing results on ram lambs is usually lower than ewe lambs – with testing both ewe and rams of the same breed on the same farm. Indicating that the ram lambs have a lower ability to respond to larval parasite challenge. This is consistent with the findings that male lambs have higher FECs than ewe lambs.

What does the scientific literature say

Barger (1993) discusses the influence of sex on susceptibility on parasitism. It states this phenomenon is often observed but is rarely documented in domestic ruminants under commercial farming conditions. It has however been more thoroughly investigated in laboratory rodents where the sex difference in susceptibility was studied by manipulation of gonadal steroid hormones. The results suggested that the great susceptibility of males was attributed to testicular hormones decreasing resistance. The mechanism for this difference is thought to be related to a better ability of females to sustain high levels of antibody and that their cell-mediated immune response is more active.

This theory is at odds with the results seen in Case 3 (prepubertal ram and ewe lambs), Case 4 (wether and ewe lambs at around the time of puberty) and Case 5 (prepubertal wether and ewe lambs). Although Adams (1989) found that wethers were more susceptible than ewes of a similar age to *H.contortus* and Copeman and Hutchinson (1979) reported that bulls have higher FEC's than steers, which had a higher FEC than heifers where young bulls, steers and heifers of the same age and breed were run together. These two results would suggest there is more than just testicular hormones involved in the difference in susceptibility to GI nematodes between male and female ruminants. Windon and Dineen (1981) and Windon *et al.* (1984) showed a difference in susceptibility in lambs prior reaching puberty and suggested that this is due to some effect of non-specific components as well as specific components of resistance.

Practical implications

Compared to ewe lambs, male lambs appear to have higher FEC's and therefore will be contributing more to pasture larval contamination. Therefore, treating male and ewe lambs differently could reduce the overall larval challenge in a farm system and also reduce drench input – both could reduce selection for drench resistance. Options to achieve this:

- Get male lambs off pasture as soon as possible after weaning:
  - Kill as low as possible at weaning.
  - Sell male's store.
  - Put onto summer crop.
  - Have on high quality feed to maximise growth rates so they are up to target weight and sold as quick as possible.
  - Those tail end male lambs that are held on pasture for months after weaning are likely to be disproportionally adding the larval challenge. Selling these lambs store or getting them on a crop is a good idea.
  - As a general rule terminal breeds have a lower resistance to GI nematodes – therefore it is likely the terminal cross lambs may have higher FECs than maternal breed male lambs so prioritising them off pasture is probably indicated.
  - The reality is, on the majority of farms male lambs are already prioritised as they have better growth rates and are therefore off farm sooner.
- Avoid stretching drench intervals beyond 28 days with male lambs, except those on crop, unless there is regular FEC monitoring.
- Ewe lambs – stretching drench intervals, alongside planned FEC monitoring, especially from March onwards will likely reduce drench inputs without risking increased pasture larval contamination. The use of programs such as Smartworm in replacement ewe lambs has potential. But care needs to be taken when stretching drench intervals out in the autumn as outbreaks of *Trichostrongylus* related scouring, ill-thrift and deaths in lambs are not uncommon.

References

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