final report

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Controlling Beef Calf Scours

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2006/S06 - Keilira Farm Management Group
Controlling Beef Calf Scours
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BEEF - SOUTHERN

BUDGET $15,000.00

Aim:
Investigate by way of a comparative broad based trial, develop and adopt solutions which:
a) Improve productivity by preventing current calf deaths due to calf scours.
b) Improve profitability by developing methodologies which dramatically reduce the amount of supervision currently required to ensure calves survive the first 12 weeks of life.
c) Reduce the expense and potential health risks of purchasing and administering drugs, and the labour expense of catching calves and administering drugs.
d) Reduce the mental trauma to farmers of seeing calves suffer and die from scours, and then having to sell the resultant dry cow.
e) Improving the sustainability of breeding beef cattle in this region by maximising survive-ability of calves from birth to weaning, and maintaining a larger breeding herd by not having to sell , or carry with no economic gain, the dams of lost calves.

Objectives:
a) Reduce calf deaths due to scours from >4% to less than 0.5%.
b) Reduce the number of calves which contract scours from >25% to less than 2%.
c) Reduce the calved cattle monitoring and supervision time, and costs of drug purchase and administration experienced under the current regimes (as per individual initial reports) by 70%.
d) Develop and adopt a calving management best practice for our group which achieves objectives a), b), and c).

Co-ordinator's Comments

30/08/2009 Alison Gunn's review of the Final Report shows how complicated this problem is and difficult it has been for any producer to understand all the issues and select the best management options and treatments. Alison is restating her view the treatment with antibiotics is not a preferred option. A local meeting is being organized to bring MLA vet Keith Walker and Alison to review the problem and PIRD outcomes with local producers in early December 2009.

7/07/2009	Held phone hookup with Keith, Alison, Jane and myself. Good discussion on the 'so what' where to from here? Alison given task to write up recommendations from the project. Alison agreed a public meeting should be held about late November 2009 to expose the locals to the work and to seek interest in any further work.
23/06/2009	Received their Final Report showing general reduction in calf losses but likely due mostly to dry years? Not reduced the number of calves scouring still around 35%. Did not reduce their labour needs for treating and managing sick calves.
27/04/2009	Rob E. called and is working on the Interim Report and rough budget. Checked with Anna. They have $9k left in budget.
20/04/2009	Jack E requests funds to cover autopsies for very sick calves. Keith's view is that this would only reveal that calves are dying of secondary infections, not the original bacteria. He said to stick with faeces testing only.
15/10/2008	Sent Rob and Jack report from Alison Gunn and letter from Tim and Kieth and myself summarising the workshop meeting and best bet option. Requested report from Rob.
14/10/2008	Good phone hookup with Keith Walker and Tim Wilson today. Draft letter to group and Alison's report discussed. Both will be slightly modified and passed on via me to the group. Suggestions of a followup visit to the site in January 2009.
30/07/2008	Rob has sent extra details of scours/calf history through to Alison. Also received SS of expenses so far nearly spent all first $6,000 and next MS payment due on 1st November 2008 - on track.
23/06/2008	Held good workshop at Keilira CFS shed with Alison Gunn, Tim Wilson and about 14 locals. Toured England's - lots of scours and neighbours no scours? Good discussion but no easy answers. Alison to do report. Received second IR from Rob & Jack. Need to extend project to late 2009.
17/09/2007	Dry has restricted some members ability to run the full monitoring and herd separation. One member had great results and another has had a 25% reduction in scouring calves. Both autumn and spring results to be reviewed soon.
15/01/2007	Been ready to go - waiting on contract process.

2006/S06 - Keilira Farm Management Group
Controlling Beef Calf Scours

FINAL REPORT July 2009

Objective review

Referring to the projects objectives, the Keilira Farm Management Group:

a) **has** reduced calf deaths due to scours from >4% to less than 0.5%. The drier season rather than the management measures introduced are likely to have led to the lower mortality rate.
b) **has not** reduced the number of calves which contract scours from >25% to les than 2%. **35%** of calves aged 3-5 weeks contracted scours in 2009 at Shepherds Hill which is predominantly caused by rotavirus (note – some calves may have been recorded twice as scours can take 3-12 days to clear up).

did not reduce the calved cattle monitoring and supervision time, and costs of drug purchase and administration experienced under the current regimes (as per individual initial reports) by 70% , but mechanisms to achieve this goal are discussed in the following conclusion

Objective:

a) Reduce calf deaths due to scours from >4% to less than 0.5%
b) Reduce the number of calves which contract scours from >25% to les than 2%
c) Reduce the calved cattle monitoring and supervision time, and costs of drug purchase and administration experienced under the current regimes (as per individual initial reports) by 70%
d) Develop and adopt a calving management best practice for our group which achieves objectives a), b), and c).

Methodology:

"Shepherds Hill" – Rob and Jack England – Autumn Calving 2009

Calving mobs:

1. Pregnant cows were broken into four calving rotations being 1st, 2nd, 3rd, and 4th+ calvers.
2. For each rotation pregnant cows were moved into 1 paddock no more than 1 week prior to the onset of calving.
3. Pasture quantity and quality was assessed and budgeted by an agronomist (Jack) and matched to herd size for each calving rotation as best as possible.
4. After 2 weeks of calving pregnant animals yet to calve were drifted to a fresh paddock. Cows with calves at foot remained where they calved. If there was a feed shortage they were moved into another paddock to avoid feeding of hay. In the event of a scours outbreak in the calving mob, the pregnant cows were moved out sooner.
5. Faecal tests were collected from a range of scouring calves from each of the treatments ranging from 3-5 weeks of age and tested for Cryptosporidium, salmonella, coronavirus and rotavirus which were considered the most likely causative agents.

Scours treatment:

1. Calves that were almost too weak to stand were treated with electrolytes as per veterinary advice. Some calves were also given a bolus and/or an oxytetracycline injection.
2. Where 30-50% of calves were afflicted with scours that mob was mustered into the yards and all calves were injected with oxytetracycline.
3. Where 3-10% of calves had scours in a herd, each calf received a streptosulcin tablet that could be caught.
4. Some scouring calves were not given any treatments and were monitored until recovered.

Graham Box, Kingsley Parker – Autumn Calving
Graham and Kingsley have previously experienced calf scours at varying degrees of severity and production losses. Methodology adopted over the past 3 seasons included vaccination with 5in1 or 7in1, drenching, copper, cobalt, and selenium bullets combined with following the MLA Protocol contained in "Tips and Tools Sept 2005".

Charlie and Mark Bruce (summer and spring calving), Keith and Vicki McBride (autumn calving), Angus and Len Vandepeer (spring calving), Jeff and Cameron England
Other KFMG members not experiencing calf scours or mortalities continued to monitor the incidence of scours through their normal management procedures. Notes of treatments administered are itemised in the results and discussion section.

Results and Discussion:

Shepherds Hill – Rob and Jack England – Autumn Calving
The aim was to have 4+ mobs of each calving age group at the end of the 8 week calving season with no more than 2 weeks between the oldest and youngest calf in the mob. Each mob had its own clean paddock. The aims of this were to:

- Limit the exposure of newborn calves to other calving cows;
- Prevent exposure of newborn calves to older calves; and
- Record the age of the calves in each mob so that we can plot exactly how old the calves are when they are affected (to within a 2 week range).

Suspected pathogens are present in low numbers in cow manure, with pathogen populations increasing at the time of calving. The manure of scouring and unaffected calves up to six months of age are known to have pathogens present in higher numbers. Scours pathogens can survive for weeks or months in cool damp conditions so wet and muddy areas or places with manure build up are high risk areas. Calves from heifers and calves with low immunity are most susceptible.

In previous years colostral transfer has been tested in heifers and found to be adequate in most cases.

It is also known that as calves become older and stronger, the pathogen dose required to cause illness increases.

Cows yet to calve were much easier to drift out of the paddock once every two weeks than previous cow and calf drifting to a designated paddock once a week as per MLA tips and tools although strict attention had to be paid not to shift recently calved cows that were not showing suckling.

Figure 1 shows the summary of all calves that contracted scours as a percentage and at what age they contracted the disease. Despite the ranging age groups of the cows there was a strong trend for calves aged between 2 and 5 weeks of age to contract scours over the whole herd. There were still some signs of scours near the tails and on the ground in the calves aged greater than 6 weeks but they mostly seemed to be able to withstand the effects.

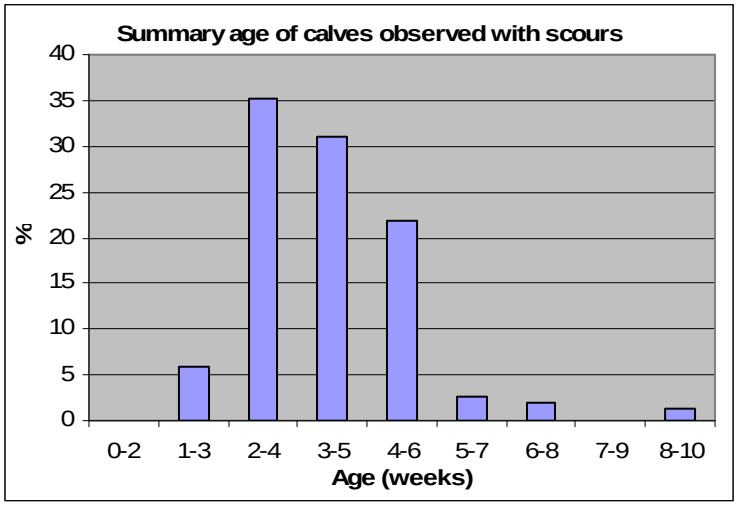

Figure 1. Total calf age distribution percentage when observed with scours.

Scours did not coincide with season breaking rains received on 25 April 09 as seen in the 3rd calvers rotation in figure 11. Plentiful green feed was available by mid May as no frosts occurred throughout calving. Test results indicate that the white scours outbreak was caused by rotavirus.
Of particular interest and concern was the combination of coronavirus and rotavirus which caused the death of one calf, while another large calf died with only the coronavirus present.

Testing in 2006 showed,

- 12 scouring calves tested were confirmed to have rotavirus,
- 3 of the 12 also had coronavirus and cryptosporidia.

Rotavirus usually does not cause severe illness unless complicated with other recognised gastro-intestinal pathogens. The combination of rotavirus and/or coronavirus and cryptosporidia is most likely causing additional stress to calves resulting in severe dehydration and death.

Cryptosporidia is commonly found in watercourses and infects a range of other species including wildlife and humans and these can act as a source of infection to a calf. Calves are mostly affected between 1-4 weeks of age and have diarrhoea for 4-14 days.

Rotavirus also infects other animals and in infected herds many cows will have antibodies in their milk but these decline rapidly after calving and calves can become susceptible to infection at one week of age. Calves are generally 5 days to 2 weeks of age. Disease has also been reported at two to three months of age when calves are first exposed to this virus.

Bovine coronavirus only affects cows and can be transmitted through the respiratory tract as well as ingesting contaminated material. It isn't hardy in the environment and persistently infected cows and older calves are the most likely source of infection in a herd. Calves are commonly infected between 1 week and 1 month of age. It is supposedly not very common in Australia but it has been detected in two calves so far in 2009, and was also present in tests in 2004 and 2006.

E.coli K99 and coccidiosis was also tested this year and in previous years with no positive result.

It is important to note that calf ages are not as accurate in the youngest calf groups at the end of the calving period as some cattle were quite late to calve.

Heifers (1st Calvers)

Birth Date	Number of Calves in mob	Paddock size (ha)	No. scours	No. treated	No. deaths
25Mar - 8Apr	30	78	11	0	0
9Apr - 17Apr	29	69	9	29 Oxytet	0
17Apr - 1May	34	74	15	2 vytrate,4bolus	1

All heifers were drenched prior to calving. Two of the calves in the mob born between 9 – 17 April were confirmed to have been infected with rotavirus by Sydney University. No sample was collected from the calf that died which was 2-4 weeks old in the 17 April – 1 May calving period. It was unable to stand and was surrounded by yellow very watery scours. 3 litres of electrolytes were administered but the calf died overnight despite being wrapped in blankets. 4 other samples were posted to Sydney University from this mob but unfortunately this batch of samples was not refrigerated in time to check for Cryptosporidia. Rotavirus was the only pathogen found but upon discovering a positive test result for corona virus by Gribbles Pathology further tests are now underway using different methodology.

After two weeks of calving, cows yet to calve were moved to another paddock which was the common protocol followed for all calving cow groups aiming to avoid supplementary feeding where possible and eliminate calf camps common on hay residues.

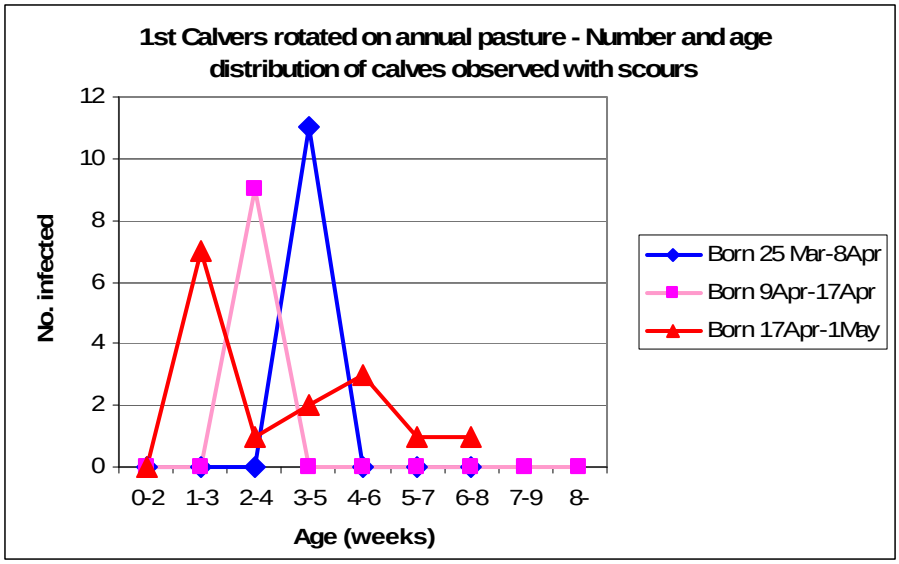

Figure 2. Number and age of calves that developed calf scours.

11 calves out of 30 born between 25 March and 8 April contracted scours at 3-5 weeks of age but did not require treatment after which no more calves were observed with scours (see figures 2 and 3). Cows were not supplemented with hay and after 5 weeks were shifted into a clean paddock.

Of the 29 calves born between 9 and 17 April, 9 calves were observed with severe scours. This herd had been supplemented with high quality hay (ref figure 4) and the resulting calf camp could be the cause for the infection to spread in such a short space of time. Calves were commonly found camping on the hay but there were no available paddocks to shift this mob to. The mob was mustered into the yards and all calves injected with oxytetracycline. No calves were observed with scours again as seen in figure 2 and 3. **It must be noted here that while it appears that you could associate the incidence of scours stopping in this mob with the injection, the older age group (born between 25 March and 8 April) that displayed symptoms were not treated; all the calves recovered on their own, and there were no more incidences of scours in that group.** Rotavirus was the only pathogen found in the limited number of tests conducted.

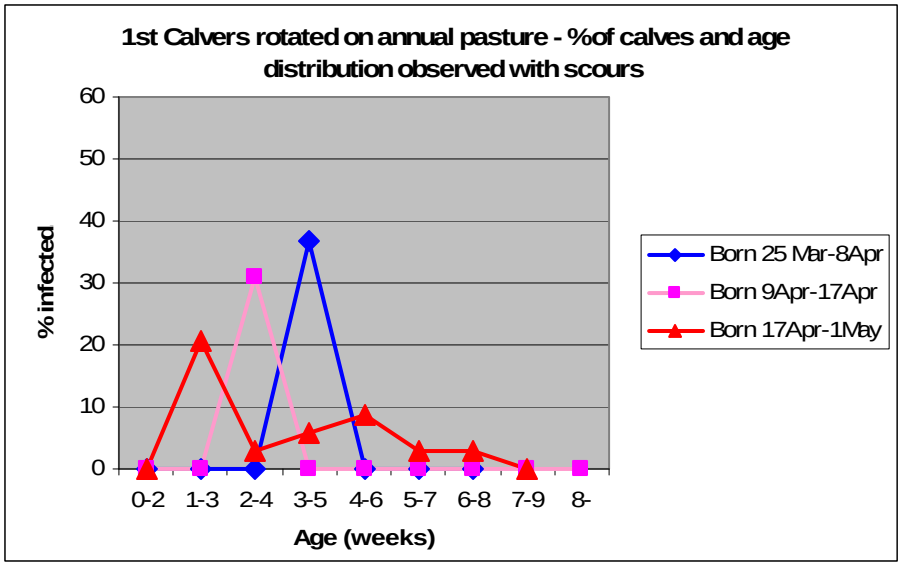

Figure 3. % scouring calves vs healthy calves and age detected in each mob

Figure 4. Supplementary feeding site for cows in 2nd rotation.

The third calving period was longer than the first two due to late calving of a few cows. Ages were calculated from the time they were moved into the paddock which was 17 Apr until 1 May. Unfortunately this had to be a move into the first paddock this whole rotation started in and may have exposed calves to any remaining source of pathogens. Cows calved up until the 10th of May which is why in figures 2 and 3 more scouring calves were calculated as 1-3 weeks old when it is most likely they were 2-4. The death of one calf after vytrate treatment and approaching weekend prompted the manager to treat 4 other scouring calves with streptosulcin tablets as a precaution which would kill any Cryptosporidia bacteria as found in scouring calves in 2004.

Second Calvers

Birth Date	No. Calves	Paddock size (ha)	No. scours	No. treated	No. deaths
25Mar - 8Apr	**31**	**31**	**17**	**5 Bolus,1 Vytrate**	**1**
9Apr - 16Apr	**30**	**56**	**18**	**6 Bolus**	**0**
17Apr - 20May	**30**	**36**	**8**	**1 Bolus, 1 Vytrate**	**0**

This herd calved onto the best pasture both in quantity and quality (comprising lush lucerne, chicory, phalaris, fescue and cocksfoot mix) and required no supplementation (figure 7). The total percentage of scouring vs healthy calves (see figure 10) was much lower than the 1st and 3rd calvers (figures 3 and 14 respectively – all of which are to scale). We had hoped this mob would have the least number of calves affected by scours there were minimal calf camps in large paddocks throughout the calving, and no need for supplementary feeding.

Figure 5. Watery white scour sampled in 9 April – 16 April age group. Rotavirus confirmed.

The most unwelcome surprise was a calf, estimated at 75kg, that eventually died after being set back by severe scours Ref. figure 6. Born in the first two weeks of calving, it was 4-6 weeks old when it could no longer stand up on its own. After being injected with oxytetracycline and treated with electrolytes for 2 days it was returned to its mother and was able to suckle. The faecal sample that was collected (seen in figure 6) returned a **positive test for coronavirus but not rotavirus**. 5 days after being returned to its mother it relapsed, and was again treated with electrolytes only to die 2 days later.

Figure 6. 4-6 week old calf that eventually relapsed and died 1 week post treatment. Coronavirus confirmed.

Figure 7. Example of perennial pasture the 2nd Calvers were grazed on.

The greatest number of scouring calves occurred in the second calving group (dated 9 – 16 April) where 18 of 30 calves scoured. After observing 4 calves with scours with no treatment that recovered on their own, the death of the older calf in the first calving group led to the treatment of 6 calves 3-5 weeks old with streptosulcin tablets in the second calving group. No more scours developed in this group.
The final calving group only had 8 out of 30 calves that scoured. These cows and calves were shifted from their calving paddock at 1-3 weeks of age which could have contributed to the much lower incidence of disease. The calf (2-4 weeks old) seen in figure 8 was treated with a streptosulcin tablet but was subsequently picked up the following day when it struggled to stand on its own. The visiting Coopers Animal Health veterinarian used a litmus test which detected the presence of rotavirus. A faecal sample was collected and sent to Sydney University to test for coronavirus and cryptosporidia in this calf. The calf was returned the next day after treatment with electrolytes.

Figure 8. Very weak calf that was treated with electrolytes. Sample confirmed rotavirus.

Figure 9 shows that of the calves infected, most were 4-6 weeks old, or one to two weeks older than the other calves that were infected while grazing on annual pastures.

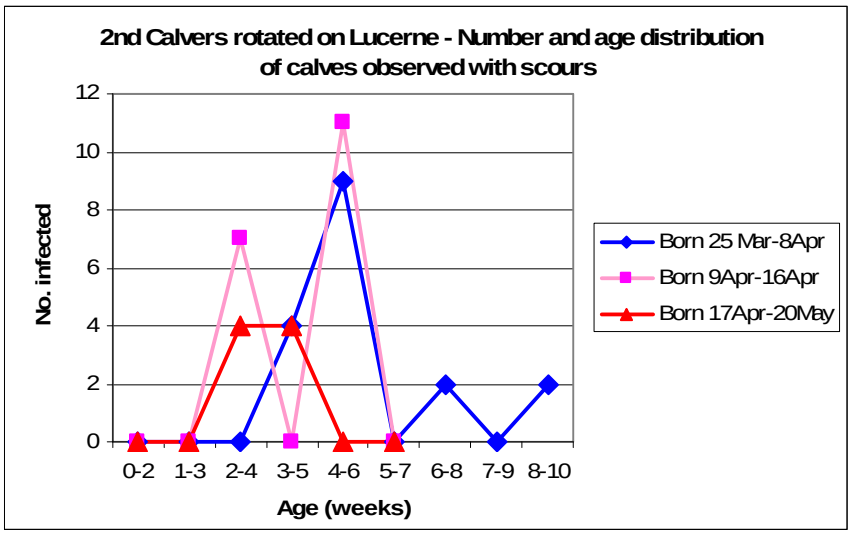

Figure 9. Number and age of calves that developed calf scours.

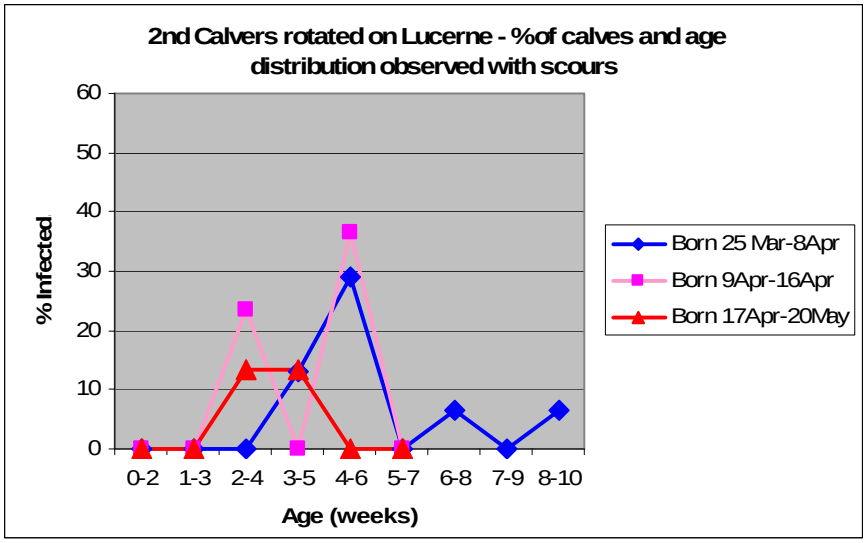

Figure 10. % scouring calves vs healthy calves and age detected in each mob

Third Calvers

Birth Date	No. Calves	Paddock size (ha)	No. scours	No. treated	No. deaths
25Mar - 8Apr	**28**	**57**	**16**	**28 Oxytet**	**1**
9Apr - 16Apr	**47**	**32**	**27**	**47 Oxytet,3 Bolus**	**0**
17Apr - 4May	**40**	**55**	**10**	**8 Bolus,1 Vytrate**	**0**
17Apr - 4May	**26**	**45**	**7**	**2 Bolus**	**0**
4 May-	**5**	**36**	**0**	**0**	**0**

Out of the 28 calves born 25 March – 8 April, 16 developed scours at 2-4 weeks of age which was very high. 5 of these were very weak, bordering on electrolyte treatment. This mob had been supplemented with large quantities of straw and hay prior and post scours outbreak due to the poor season and lack of paddock feed. Four faecal tests were collected from scouring calves with one sample from a weaker calf that was subsequently treated with electrolytes but died 2 weeks later after never recovering full health (see figure 12 to see orange calf which died expressing similar visual symptoms as the large calf from the second calvers). Unfortunately the four faecal tests can not be matched with individual calves as all of the tests were positive for rotavirus with one positive for coronavirus as well. It is more than likely that the sample came from the now deceased calf. All calves were injected with oxytetracycline after which no scours occurred (see figure 13).

Figure 11. Calf with bad scours treated with oxytetracycline. 4 calves were confirmed with rotavirus, and 1 also had coronavirus.

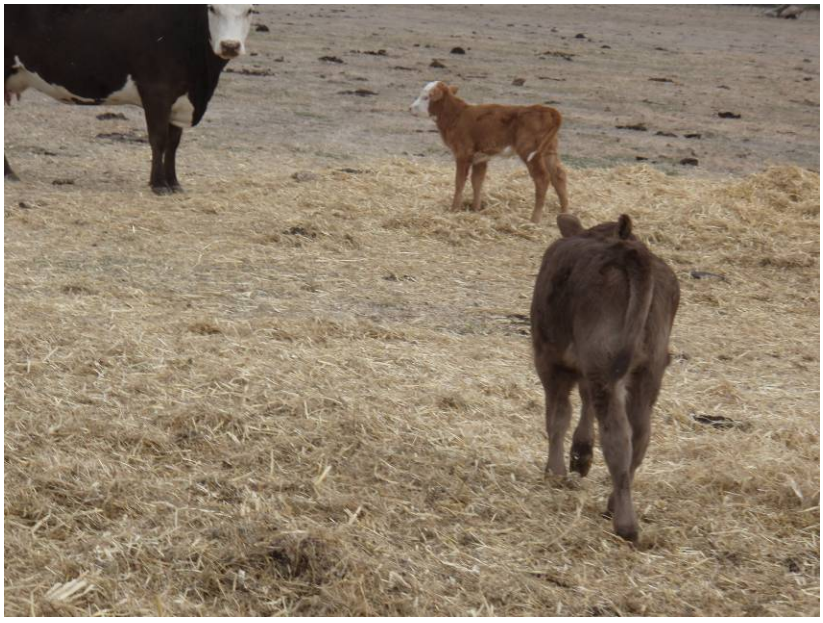

Figure 12. Calves born 25 Mar – 8 Apr post oxytetracycline treatment. Orange calf pictured on hay subsequently died. Confirmed with rotavirus and probably with coronavirus.

It was a similar case for the 47 calves born 9 – 16 April with the exception of no supplementary feeding. However, the increased livestock density in the 32ha paddock combined with calves camping on pre-calving hay feeding sites that could have been responsible for the spread of the scour pathogens as 27 out of 47 calves scoured mostly at 2-4 weeks. All calves were injected with oxytetracycline. However, 3 calves continued to scour for 8 days post treatment which could have been indicative of

coronavirus or rotavirus as it is expected that any cryptosporidia would have been killed.

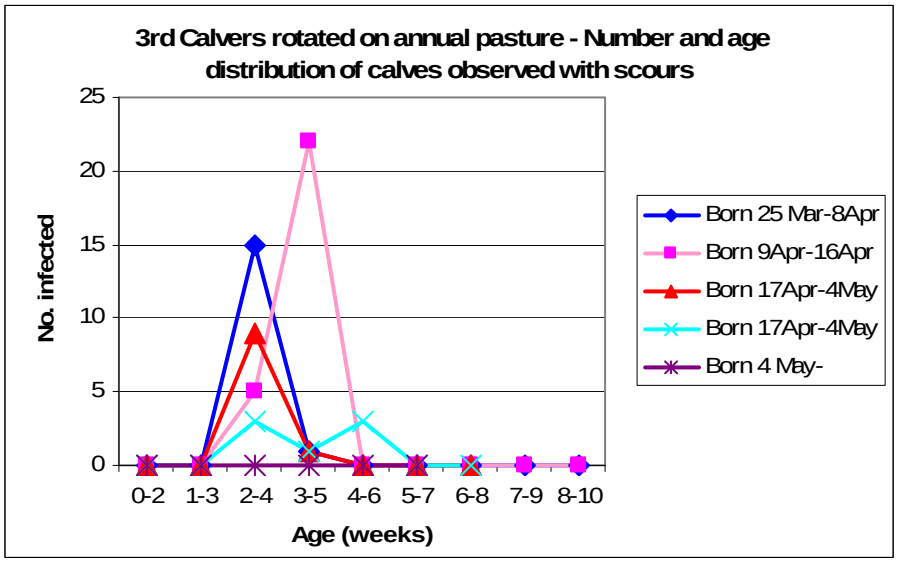

Figure 13. Number and age of calves that developed calf scours.

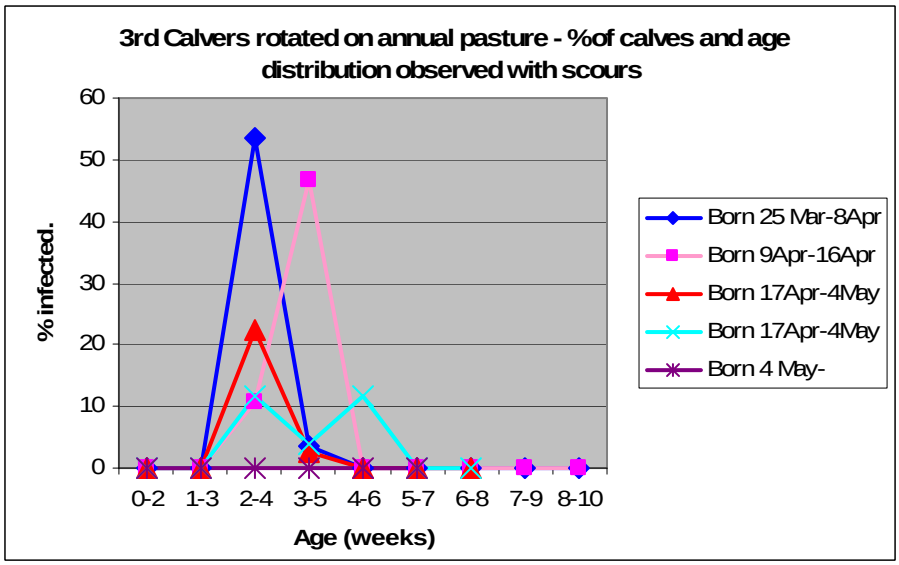

Figure 14. % scouring calves vs healthy calves and age detected in each mob

Fourth to Eighth Calvers

Birth Date	No. Calves	Paddock size (ha)	No. scours	No. treated	No. deaths
25Mar - 8Apr	**8**	**57**	**0**	**0**	**0**
9Apr - 17Apr	**48**	**32**	**4**	**0**	**0**
9Apr - 17Apr	**16**	**55**	**2**	**0**	**0**
17Apr-1May	**40**	**45**	**7**	**1 bolus**	**0**

Only 13 out of 112 calves were infected with scours in the 4th to 8th calvers. No supplementary feeding was required and cows/calves grazed on perennial wheatgrass, balansa clover and annual rye and barley grass pastures as seen in figure 17. While

some scouring did occur, none of the calves became extremely sick. Figure 16 shows the percentage infected vs uninfected calves and compared with the other cow age groups, which uses the same Y axis scale, the incidence of scours was very low. The different round cattle troughs in the paddock may have contributed to the lower infection numbers combined with the low stocking densities of 2.5 cow/calf units to the hectare. Do older cows carry and pass on a higher level of pathogen antigens to their offspring?

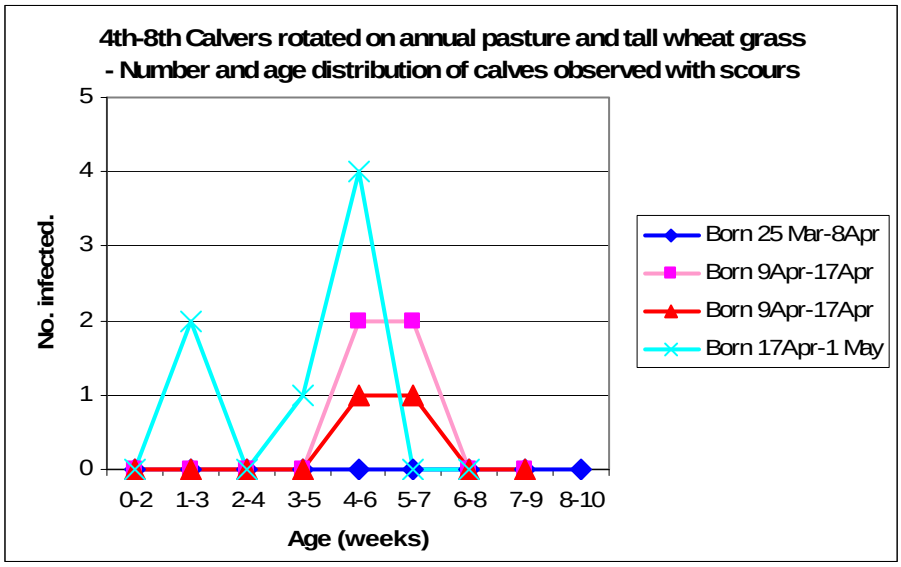

Figure 15. Number and age of calves that developed calf scours.

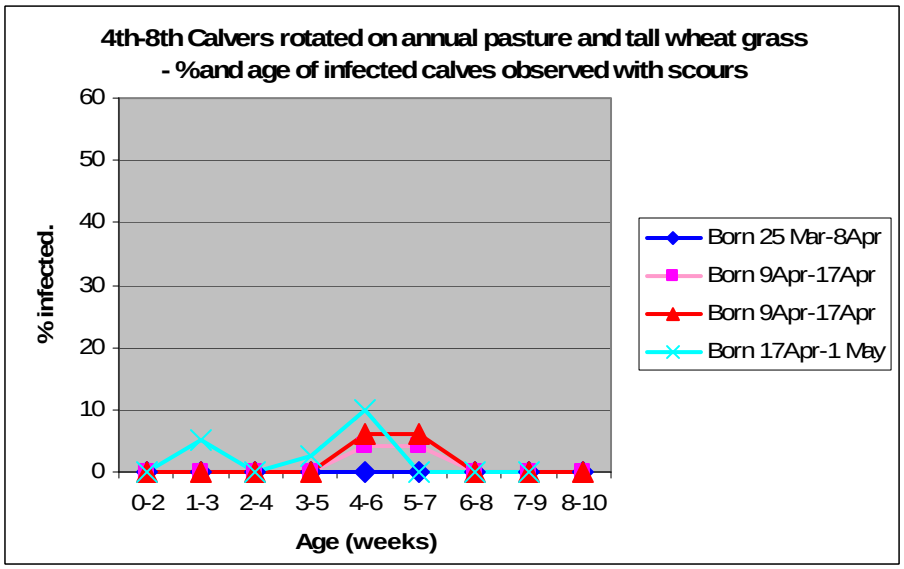

Figure 16. % Scouring calves vs healthy calves and age detected in each mob

Figure 17. Perennial Wheat Grass and annual pasture species.

Some calves greater than 7 weeks of age developed scours, but were strong enough to get over it or were not challenged by an additional scours pathogen.

Graham Box – Autumn Calving

Due to the lack of feed Graham ceased rotational grazing and was supplementary feeding his calving cattle twice a week. Graham observed much fewer calves with scours than previous years which coincided with the season break (which was also the time most calves were 3-6 weeks in age).

Three out of 200 calves were treated with streptosulcin tablets. Two died and were approximately 3-5 weeks old.

During calf marking a significant proportion of calves showed signs of scours. They were treated with 5in1 vaccine, B12 and selenium which Graham believes gave them a lift in condition. It is likely that these calves were being challenged by the more common rotavirus and were in the process of completing their immune response than obtaining a lift from treatments applied during a time of stress. Faecal testing should be conducted to confirm this.

Kingsly Parker – Autumn Calving

Cows commenced calving 5 March 09. 3 mobs were shifted to a clean paddock 1 month later. In mid April 2 calves were observed with scours and were treated with streptosulcin and oxytetracycline. One calf was required to be treated with electrolytes. It would have been useful to obtain a faecal sample from this calf to further test the assumption that more than one scours pathogen is the main causer of death.

Calves were marked and vaccinated with 7in1 and B12 on 18 May 09 and in the following 3 weeks more white scours than any other year were observed in the

paddock but were not turning watery. Cows were not shifted to clean paddocks as much as previous years which may have contributed to the higher incidence of white scours observed. Only 2 were treated with electrolytes, but mainly for peace of mind.

Charlie and Mark Bruce – Summer and Spring Calving
50% of the 360 spring calving herd was observed with white scours at calf marking. 2 were treated with antibiotics at marking and monitored thereafter with no losses recorded or known. All mobs were 50-75 head of mixed age except first and second calvers which were run separately.

Charlie and Mark acknowledge that there is every chance in the future that calf losses will commence but are not sure why scours is not lethal at present.

The dry start to the season may have limited the spread of the scours pathogens. It seems that death in calves is most likely brought on by the spread of bovine coronavirus and/or cryptosporidia which has been detected in previous wetter years. This property has not yet to experience high numbers of calf mortality which gives us reason to speculate that while rotavirus is present, the latter two of the three pathogens are not yet present.

"Lyndal Park" – Jeff and Cameron England – Late winter to early spring calving
Jeff and Cameron hardly had any scour problems before the trial started (approximately 3% and only mild cases that never needed treatments). Calving occurs from 1st July to mid-late Sept. In the first year they did as asked and drifted off calved groups every week & changed the paddock for cows left at end of each month onto clean pasture. Result was approximately the same insignificant level of scours, no treatments necessary and quite a bit of time to drift the cows & calves.
Since then Jeff and Cameron have calved as before in mobs of between 50 and 120 cows for whole of calving in set stocked paddocks unless they had to shift because pasture was too short to sustain them. Last year they had a few more affected (at marking that were approximately 6-8 weeks old) but still less than 10% showing any signs of scouring with none needing any treatments.

Jeff is not sure if time of calving, pasture length, milk volume or whatever is keeping his cows from scouring but hopes their luck continues and feel sorry for those with big problems. Cows are acknowledge as nothing special, all bought in as C&C units or as PTIC and in various size groups and at various ages, so they should have all bugs going around. Perhaps it is because of this mixture allsorts that Jeff's cows (and calves) have some extra immunity?

Keith and Vicki McBride
Again reported no scours that required treatment and will continue with calving cattle to suit their feeding requirements.

PIRD Objective review

Referring to the projects objectives, the Keilira Farm Management Group:

c) **has** reduced calf deaths due to scours from >4% to less than 0.5%. The drier season rather than the management measures introduced are likely to have led to the lower mortality rate.

d) **has not** reduced the number of calves which contract scours from >25% to les than 2%. **35%** of calves aged 3-5 weeks contracted scours in 2009 at Shepherds Hill which is predominantly caused by rotavirus (note – some calves may have been recorded twice as scours can take 3-12 days to clear up).

e) **did not** reduce the calved cattle monitoring and supervision time, and costs of drug purchase and administration experienced under the current regimes (as per individual initial reports) by 70% , but mechanisms to achieve this goal are discussed in the following conclusion.

f) **Has yet to test the new methodology arrived at using this years data** and adopt a calving management best practice for the group which achieves objectives a), b), and c).

Conclusions

- There were no correlations between the onset of scours and the break in season. Calves predominantly became infected at 3-5 weeks of age regardless of birth date. This coincides with increased ingestion of pasture matter and infected material as a result.
- Lower stocking densities generally decreased the incidence of scours except where supplementary feeding is required and/or calf camps are established.
- The KFMG will be tested when a wet season eventuates and pathogen survival and uptake increases with surface water ponding and an increasing reliance on supplementary feeding is necessary.
- Calves that contract rotavirus and/or coronavirus and cryptosporidia are highly likely to need electrolytes or they will die. In the past where streptosulcin tablets have been administered to all scouring calves, it is likely that treatments have prevented deaths and further spread of cryptosporidia. In faecal tests conducted in 2004 and 2006, 31% and 30% respectively would have benefited from antibiotics, based on a total of 24 tests taken at those times. Only 1 out of 12 faecal tests conducted this year returned a positive result for combined rotavirus and coronavirus.
- Bovine coronavirus appears to have killed one 75kg 5-6 week old calf, and possibly one other.
- Cryptosporidia was not found this year in any of the faecal samples.
- Streptosulcin tablets and oxytetracycline administered would not have helped these calves in 2009 based on the limited tests conducted.
- Tests indicate that colostral transfer has been adequate.
- Pestivirus has not been found in 30 samples conducted from 2004-06.

- As Bovine coronavirus is generally spread by persistently affected cows and older calves, all cows that have dead calves due to scours should be isolated from the rest of the mob as they are likely sources of the scours pathogens. Each year cows that have a dead calf are sold.

New planned protocol for the KFMG yet to be tested

Include all or as many of the following steps:

1. Place pregnant cows into age groups or smaller mobs, attempting to reduce cow/calves per hectare densities. Heifers should form another rotation as they are the most vulnerable.
2. Drench, 5in1 vaccine, and trace element supplementation should be completed 3 weeks prior to calving if blood tests or management indicates the need.
3. Each mob should be moved into respective calving paddocks no more than 1 week prior to the onset of calving to avoid pathogen build-up.
4. After 2 weeks of calving, pregnant animals are to be drifted to a fresh paddock. Cows with calves at foot remain where they calved. If there is a feed shortage then move cows into a fresh paddock so as to avoid feeding hay. If hay supplementation can not be avoided by matching calving age groups with pasture quantity and quality then ensure feed is not fed in the same spot and amounts fed are not surplus to stock requirements. (eg in a 56 day joining period, aim to have 4 calving paddocks so calves in each paddock won't vary greater than 2 weeks of age) Calves camping on excess feed or in other paddock locations should be avoided where possible.
5. When calves are 3-5 weeks in age or white scours are first noticed (keep eyes open when checking cows or supplementing magnesium for grass tetany avoidance), calves should be monitored every second day. A calf scours test kit should be used to determine the pathogen type that causes the outbreak. If rotavirus is present, continue to monitor every second day until calves are 4-6 weeks old, or severity of symptoms abate.
6. If a calf can not stand by itself, is very wobbly or dehydrated, isolate the calf and mother immediately and treat with electrolytes. Administer streptosulcin or oxytetracycline as a preventative measure for cryptosporidia if a calf scour testing kit is not available. Faecal tests take time to get results. **If the calf is infected with coronavirus (in which case the mother is the most likely source of infection) or cryptosporidia should we cull this cow?**
7. If pathogen is found to be cryptosporidia in step 6, move mob to a fresh paddock and continue to monitor. If >20% of calves develop scours requiring electrolytes, administer oxytetracycline to all calves in the group immediately and treat as per step 6.
8. Monitor all mobs twice weekly until greater than 5 weeks of age.
9. Once calves are greater than 5 weeks of age and no severe scours requiring electrolytes are noticed, monitoring can be reduced to passing observations during normal stock husbandry checks eg. Grass tetany avoidance.

Further KFMG Questions

- Do cows that appear to calve with more milk pass on less colostrum and therefore less antigens to their calves?

- Is it possible to test cows for pathogens? Should a cow and/or its calf be culled if the calf recovers from bovine coronavirus?

MLA Questions

- Please describe any open days, field days etc and how many attended?
  Meetings have been held each year to collect results, and determine direction for the rest of the PIRD. Two meetings were held this year to discuss results. The season was not conducive to holding a field day. Please identify members practice changes as a result of their trials outcomes.
  All members have adopted some or all of the methodology written at the start of this report.
- How could you have done the project better?
  We could have conducted more faecal tests on the weakest calves that may have died to confirm/test our conclusions re more than one pathogen usually being required for progression of infection to result in death. **This needs to be completed with rigour next year.**
- Is the group interested in doing another project?
  Yes! We need to test the suggested protocol! It would be a pity to get this far towards what appears to be a meaningful and practical solution, and not see it through to completion. The level of monitoring, testing and reporting associated with such a project would be an onerous task to ask of any individual producer, when the results should be for the greater good of the entire beef industry.
- Would you recommend other Groups run their own trials?
  If they have alternative pathogens causing calf scours then possibly different solutions are required after attempting to follow MLA tips and tools, and therefore different procedures adopted. The new protocol described should alleviate most problems in our localised area, and if other groups trialled this protocol the industry could see if this was the scours "silver bullet".

Jack England – 0887675071
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Gribbles VETERINARY

RESULTS

Ph: 1300 307 190

"VETLAB" 33 Flemington St, Glenside SA 5065
2 Leeds St, Rhodes NSW 2138

PATHOLOGY REPORT

Testing performed at: GLENSIDE LABORATORY - SA
Veterinary Pathologist: Dr Mark Williamson

Doctor:	Owner:	Animal:
DR MICHAEL WARNER KINGSTON VETERINARY CLINIC 36 COOKE ST KINGSTON SE 5275	ENGLAND CR MM KEILIRA, SHEPHERDS HILL, PMB KINGSTON SE 5275	

Your Ref: **OwnerID:** SA212222 **Species :** Bovine
Collected: 21/04/09 00:00 **Subm.No:** 00019053 **DOB :** N/A
Date Ref'd: 21/04/09 **Lab No:** 09-5309561 **Printed :** 26/04/09 10:30

All Tests Complete

FAECAL STUDIES

Species: Bovine
Specimen ID: NO ID EAST RYE GLASS

Faecal culture NEGATIVE for Salmonella sp.
Faecal culture NEGATIVE for Yersinia sp.

Rotavirus Antigen	POSITIVE	(by ELISA)
Cryptosporidia Smear	Negative	
Coronavirus Antigen	POSITIVE	(by ELISA)
E.coli K99 Antigen	Negative	(by ELISA)

Brown calf died.

Heavy growth of mixed enteric bacteria isolated from aerobic culture.

Final report.
25 April 09

4778

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Final report.
25 April 09

CC Drs: PIRSA ANIMAL HEALTH.

Print Run: 3636 180
Page: 2 of 2

Email: vets@gribbles.com.au

Comments on Final PIRD Scours report 1/6/09

Alison Gunn BVSc MVS MACVSc

10th Aug 2009

Summary:

☐ The report is well written and contains valuable information

o It should be noted that cryptosporidia are protozoa and cannot be treated with antibiotics effective against bacteria

☐ Scours continues to only significantly affect Shepherds Hill out of study group, with the calves from the younger cows most affected. However mortality is low and antibiotic treatment is not appropriate as there is no evidence of a bacterial cause. I suspect that most calves are suffering from a mild transient disease that probably does not require any treatment. It would be advisable to review the criteria for treatment for the next calving season.

☐ Two of the 3 deaths occurred in calves more than 4 weeks of age and more than 25% of the cases were also in this age group. Whilst I have concerns re unnecessary worry and treatment of scouring calves, disease in this age group continues to be a significant feature on this farm, for which the reason has not been established.

☐ Steps for further investigation of the problem have been recommended including establishing conclusively if colostral transfer is an issue in heifers, establishing the micromineral and pestivirus status of the herd and aiming for diagnostic post-mortems of any calves that may die when older than 5 weeks of age

☐ It is important that the England's establish a good working relationship with their local vet to help with the latter point

Comments on the report

This is a comprehensive and well written report that includes a lot of information, especially on the England's scour problem. It is good to see more data from the other properties in this report. If this is to be a stand alone publication, a paragraph at the beginning of the report giving an overview of the trial and the reasons behind it, would add clarity for those not familiar with the project. Whilst Jack has detailed the spread of scours within each group well, some maps would be useful to demonstrate if the affected groups were in adjacent paddocks or similar areas of the farm when the outbreaks occurred.

There are a couple of significant errors that should be removed before publication: Cryptosporidia are protozoa and not bacteria. They cannot be treated by streptosulcin or oxytetracycline. There is now a product registered for treatment of cryptosporidiosis in Australia, but it has to be given by mouth to calves for 7 days (Halocur by Intervet/Schering-Plough).

I am concerned about publishing information re blanket treatment with antibiotics in any report directed at producers, primarily because mustering will result in closer contact between calves and their dams and may promote increased and more rapid spread of the pathogens involved.

Secondly this should not be promoted due to bacterial resistance and drug residue concerns. It is not clear from the report whether unaffected calves were treated with streptosulcin or only scouring calves. Antibiotics will alter the balance of bacteria in the gut and this can make a calf more susceptible to infection with scours pathogens, so I see no good reason for giving them to unaffected animals on an ad-hoc basis. Similarly I can see no logical reason to stress out calves in a susceptible population by running them down with a motorbike.

Comments on the study

As I have stated previously there is too much diversity between the properties to allow valid comparison of preventive strategies, The MLA “protocol” in the Tips and Tools was designed so that it could be adapted to many properties, consequently it would be useful to detail further the protocols adopted on the farms where this was used.

One important thing that still needs to be established is a standard definition of “scours”? This is important when comparing the number of affected calves between the different properties and also in deciding what should be treated. The colour of the faeces is less important than the consistency.

As a minimum, scouring calves should have runny faeces; more severe cases will show signs of dehydration or infection. Scours kills by causing a significant loss of fluids and electrolytes into the gut. Occasionally in very sudden cases, the massive loss of fluids will cause death before the loose faeces reach the rectum, but in most cases there will be loss of a significant quantity of fluid prior to death. If animals do not have very loose to liquid faeces then they are either only mildly affected or have another disease process occurring. It is not clear from the report if there is much variation in presentation between the properties

Comments on the 2009 calving season at Shepherds Hill

The new approach to managing calved animals has allowed much better collection of data fro Shepherds Hill.

Similarly to last year the most significant problems occurred in the first calf heifers. Increased prevalence in this group may be due to

☐ lack of previous exposure, so colostral and milk antibodies are low

☐ failure of passive transfer in the younger animals due to poorer quality colostrum or calves that are weak after calving

It would be good to know:

1. How many heifers have assisted calvings?
2. The calf mortality rate for the first 48 hours of life?
3. If either mismothering or calves that are slow to suckle are a problem in the heifers?

Jack states that they tested colostral transfer in heifers in previous years: How was this done, how many were tested and what were the results? I have the results from 2006. If these are the results Jack is referring to I have no record to indicate the age of the dam or the age of the calf. For accurate estimate of adequacy of colostral transfer this should be done in calves that are 2-6 days of age and are not scouring. It is specifically the calves from heifers that I am most interested in, mainly because heifers have been shown to have insufficient colostrum in some studies, and also because this is the group with the most scours on the Shepherds Hill property.

Some of the samples we received in Sydney were white but formed and solid. “White scours” is common in calves receiving a lot of milk and may sometimes be associated with a mild infection with scours pathogens. We know that there is a high level of rotavirus in the Shepherds Hill herd, plus some cryptosporidia and coronavirus. Initial protection to these diseases is provided by colostral transfer and local protection in colostrum and milk. However the concentration of antibodies in milk will reduce after a few days or weeks depending on response of the dam, and at this point the calf needs to be exposed to the virus to develop its own infection. Many calves may show mild scours but not significant clinical symptoms.

I have not had the opportunity to visit during a scours outbreak, but although a lot of calves are reported with scours, few died. As stated above some of the samples we received were white but formed and solid. In dairy calves and many beef herds this

type of faeces would not be considered abnormal. I am concerned that many of the calves are not sick and do not need treatment, and the degree of the problem is not as large as the figures indicate. My theory is that in 2004 rotavirus

was either introduced or spread rapidly within the herd due to environmental or management factors. Cryptosporidia and coronavirus was also present increasing severity of disease in some calves. There was little or no herd immunity in the colostrum and in that year 199 calves were affected and 6 died. It is likely that a large number of calves were sick and dehydrated. This may have carried into 2005. Now in 2009 the pathogens are widespread within the herd and in general causing mild disease, but after the 2004 experience Rob and Jack would prefer to do something rather than wait for the calves to get sick. Most cows will now have colostral antibodies to rotavirus and consequently the disease is milder. As I have said to the England's previously, there is no evidence of bacteria being involved in the scours problem, and I see no reason for the use of antibiotics except in a few specific cases. These would be weak and dehydrated calves that are unable to suckle.
I believe that there are calves that do require treatment for scours, but it is possible many calves that have white sticky faeces and no other symptoms are being treated in an attempt to pick up those calves that will progress further. There is no logical reason for antibiotics and it is likely that many of these calves would to recover without treatment. Moreover running down mildly affected calves with a bike is more likely to increase stress and make calves sicker. Jack mentions whilst one mob of heifers' calves was treated with oxytetracycline, an older group were not and recovered uneventfully. I would expect that most calves that are not dehydrated would recover without any treatment**. If dehydration is not routinely observed in the calves before death, then scours may not be the primary cause of mortality in the older calves**.
Whilst I realise that Rob and Jack are reluctant to check the calves more than once every 3 days, I think that it may be more time efficient to check some groups daily and only treat the calves that are obviously dehydrated and easy to catch on foot. The groups that I would target for daily checks are 1) the heifers, as this is the group where the majority of the cases are, 2) any paddock with more than 10% of calves affected and 3) any paddock where calves were treated on the previous day. As we have reiterated, the most effective treatment for sick and scouring calves in electrolyte therapy, and this is much less likely to be effective if the calf has been scouring for the last 2 days without being checked and is significantly dehydrated.
Jack states "*There were still some signs of scours near the tails and on the ground in the calves aged greater than 6 weeks but they mostly seemed to be able to withstand the effects*." This would again support the evidence for a minimal treatment strategy. I found it hard to deduce from report if there any common feature in the groups with calves affected at more than 6 weeks – was the stocking density higher or increased rate of supplement feeding compared with the others. The cost of the outbreak was similar to the last few years, estimated at $5000 using the MLA calf scours calculator. An estimate was made based on treatment costs averaging $7/head and the time to treat each calf estimated at 30 minutes. It was assumed that there was $200 difference between a cull cow and a replacement one.

Recommendations for next year:
The following questions need to be answered conclusively:
1. Is there failure of passive transfer occurring in calves from first and second calvers?
Blood should be collected from 10-20 calves for each cow group at 2-6 days of life. The most economical test is likely to be total protein assuming the calves are not sick. This could be carried out quite inexpensively at a local vet clinic/

2. What is the cause of mortality in older calves
Further work needs to be carried out to investigate the cause of mortality especially in the older calves. A series of post mortems –would be invaluable but it is important to select calves that:

☐ are representative of the problem,

☐ have been sick for no more than 3 days

4

☐ are identified as severely ill and post mortemed within 30 minutes of death, or preferably euthanized when it becomes obvious that the prognosis is extremely poor
It would be necessary to do a minimum of 3 post-mortems and preferably a lot more depending on consistency of results. As Jack has mentioned deaths at less than 4 weeks of age are likely to occur in calves affected by at least 1 of the 3 pathogens identified on the property – and simultaneous infection with multiple pathogens is a significant risk factor for increased severity of disease and mortality. However these pathogens do not generally cause death in older calves, and it is important to try and identify whey these deaths are occurring. Is pestivirus, coccidia or giardia involved, could there be other causes of immunosuppression, or is there really a particularly pathogenic strain of rotavirus or coronavirus present on the property?

3. What is the role of pestivirus?
One potential contributing factor to the scours in older calves is pestivirus. Evidence of this would be seen on post-mortem. In 2006 20 calves were tested to see if they had pestivirus antigens and all were negative. All this tells us is that none of those calves had been exposed to pestivirus during a specific stage of gestation, but does not indicate the status of the herd. It would be good to establish this by bleeding a representative selection of cows prior to calving. (would suggest 20 cows across the whole herd including 4 heifers due to calve in 2010). AGID serology would be most useful as this also gives an indication of the time since exposure.

4. What is the selenium, copper and cobalt status of the herd?
A pooled blood sample from pregnant heifers and adult cows would be a good initial indicator. Pooled samples can only be used reliably on cows that have not received mineral supplements for at least 6 months and longer if they have received boluses.

5. Are giardia or coccidia a contributing factor in the older calves
Giardia is thought to contribute to a scour problem when there is underlying stress or immune suppression such as selenium deficiency or pestivirus. It is generally found in conjunction with cryptosporidia affecting calves older than 4 weeks of age. Most laboratories would need to check faeces within 24 hours of collection to ensure a reliable diagnosis. There was little crypto identified on the property this year, but it would still be good to rule it out. Coccidia can cause disease from 30 days of age and so should also be tested for in the older calves.

☐ It is important that the England's establish a good working relationship with their local vet to help with points 1-5 above.

Other recommendations

1. Aim to refine the current treatment protocol such that only sick dehydrated calves are treated
a) Work with your vet and learn to consistently assess the level of dehydration and mental attitude of sick calves and establish agreed criteria for treatment based on clinical signs
b) Consider routine assessment of severely dehydrated calves by a veterinarian and

administration of intravenous fluids if appropriate.

2. Further refine the management and nutrition of the cows and heifers?
Drifting pregnant cows away from the calved cows appeared to work well this year. The final calving group only had 8 out of 30 calves that scoured. These cows and calves were shifted from their calving paddock at 1-3 weeks of age, which could have contributed to the much lower incidence of disease. Is it possible to replicate this for all heifer mobs and also minimize supplemental feeding (Calf camps) for these animals?
5
3. Assess and record heifer nutrition
It would be good to condition score heifers pre calving and every 2 weeks post calving to assess their nutrition. This information should be recorded in a diary (number of animals scored, range and mean

4. Review electrolyte treatment
It is not clear what volumes of electrolytes were given, but to aid survival large volumes are required. See "Treating Calf Scours" Tips and Tools and table below

Table 1: Daily fluid requirement for ongoing treatment of scouring calvesΩ

Weight of calf (Kg)	**30**	**40**	**50**	**60**	**70**	**80**	**100**
Daily requirement (L)							
Sticky scours	4.0	4.5	5.0	6.0	6.5	7.5	9.0
Liquid scours	5.0	6.0	6.5	7.5	8.0	9.0	10.0
Profuse liquid scours	8.0	9.0	9.5	10.0	11.0	11.5	13.0

Ω Calves that are > 5% dehydrated will need another 2-4 litres additional to this amount and more if they are collapsed
Table from "Treating Calf Scours" Tips and Tools ©MLA 2005

It would be good to have 2 electrolyte solutions available: one for calves that may still be willing to suckle and a stronger (more alkaline) solution (Bovelyte) for calves that are severely sick.

Please contact me for any points of clarification on this report

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