Dairy Research Review™

THE SCIENCE OF HEALTHIER ANIMALS

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In this issue:

Independent Commentary by Hamish Newton.

Hamish Newton graduated from Massey University with a BVSc in 1998 and started working in mixed practice at the Veterinary Centre – Oamaru. **For full bio CLICK HERE.**

Congratulations to Jim Houlton

who won a $500 Visa Prezzy Card by taking part In our recent Subscriptions Update promotion. Jim is a Veterinarian from Animal Health Services in Rotorua.

Welcome to the eighth issue of Dairy Research Review.

This issue features a diverse selection of bovine dairying research papers, including issues of colostrum quality and ketosis, dealing with facial eczema, Johne's disease, and downer cows, and assessments of culling rate trends and water usage.

We hope that you learn something new from the selections in this issue of Dairy Research Review. Please send any feedback or comments that you may have.

Kind regards
Hamish Newton
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Survey of bovine colostrum quality and hygiene on northern Victorian dairy farms

Authors: Phipps AJ et al.

Summary: This Australian study investigated the following colostrum quality issues: 1) farm colostrum storage and handling practices; 2) immunoglobulin level and bacterial composition of colostrum being fed to replacement dairy heifer calves; 3) percentage of colostrum being fed to replacement dairy heifer calves that met industry recommendations; and 4) risk factors for bacterial contamination of colostrum. Two hundred forty colostrum samples were collected (10 samples per farm) from 24 dairy farms and submitted for bacterial level analysis. Each farm harvested and stored first-milking colostrum under normal farm conditions. The analyses indicated that many calves were at risk of receiving poor quality colostrum. In particular, colostrum with high bacterial loads may have interfered with the acquisition of transfer of passive immunity and affected calf health.

Comment: This study of colostrum quality was conducted on 24 commercial dairy farms in Victoria. The Aussies can have bragging rights for the League and we can for the Rugby but we both appear to have problems with colostrum quality. Forty-seven percent of samples had a Brix reading ≥22%, 58% of samples met the criteria for total plate count (TPC) of <100,000 cfu/mL, and 94% of samples met the total coliform count (TCC) of <10,000 cfu/mL, but only 23% of samples met the guidelines for all of the measures. The paper describes colostrum management and storage practices that we in NZ would be very familiar with. Many factors in the collection storage and feeding of colostrum were measured at the farm level but the modelling with available data struggled to give a clear recommendation on what is best. However, the discussion of the data was excellent. What did fall out of the analysis was that refrigeration of excess colostrum within 1 hour of collection will result in lower total bacterial count. If your interest in colostrum management has risen this spring, then this paper is worth reading in full.

Reference: J Dairy Sci. 2016;99(11):8981–8990
Abstract

CLICK HERE to read previous issues of Dairy Research Review

A randomized controlled trial of dexamethasone as an adjunctive therapy to propylene glycol for treatment of hyperketonemia in postpartum dairy cattle

Authors: Tatone EH et al.

Summary: This randomised controlled study, which involved four dairy farms in the US, evaluated the effect of adding a single intramuscular injection of dexamethasone 20mg to oral propylene glycol treatment for hyperketonaemia (defined as blood β-hydroxybutyrate [BHB] ≥1.2 mmol/L). Of the 509 cows (3–16 days in milk) enrolled, 254 were assigned to the placebo group and 255 to the dexamethasone group. Dexamethasone reduced the odds of cows being hyperketonaemic in the second week post-treatment. However, the odds of hyperketonaemia in the first week post-treatment only declined in animals treated at a blood BHB level of 1.2–1.5 mmol/L. For the 8% of cows with blood BHB level >3.2 mmol/L at enrollment, dexamethasone increased the odds of being hyperketonaemic the following week. There was no difference between treatment groups in the odds of post-partum disease or in milk production. Dexamethasone tended to reduce the odds of pregnancy at first insemination in cows with an initial blood BHB level of 1.2–1.5 mmol/L.

Comment: A total of 509 cows 3 to 16 days in milk received propylene glycol daily for four days and either a single shot of dexamethasone 20mg or saline. A cow was enrolled if she had a blood BHB ≥1.2 mmol/L, had no recorded disease events, and no visible disease on the day of enrollment. Cows were blood tested weekly for two weeks following enrollment. Interestingly, the odds of having a blood BHB above 1.2 mmol/L (hyperketonaemia) a week after enrollment went from less than 1 to greater than 1 as the level of BHB at enrollment increased if the cow received dexamethasone. By two weeks' post enrollment, dexamethasone-treated cows were about half as likely to have a BHB ≥1.2 mmol/L irrespective of the level at enrollment. The odds of either metritis, displaced abomasum, or clinical ketosis was not associated with treatment. The odds of being diagnosed with disease, however, was higher if the cow had a blood BHB ≥1.2 mmol/L in the first week of lactation rather than the second and increased with the level of BHB. Treatment with dexamethasone tended to decrease the odds of pregnancy to first service, and had no effect on milk production. In summary, the blood measures seemed to improve with dexamethasone treatment but as there was no change in the incidence of disease or milk yield and a tendency for reduced first service pregnancy rate, I do not think I will start treating hyperketonaemia cows with dexamethasone.

Abstract

Prevalence of cytological endometritis and effect on pregnancy outcomes at the time of insemination in nulliparous dairy heifers
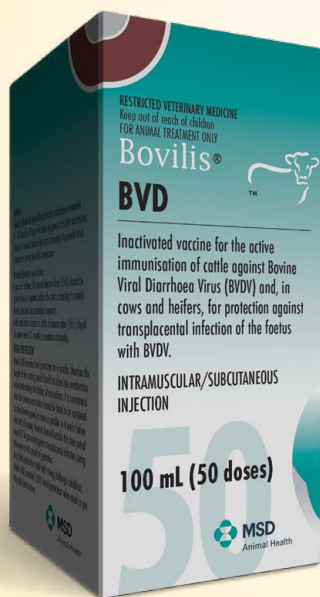
Authors: Bogado Pascottini O et al.

Summary: These researchers assessed the prevalence of cytological endometritis (cyto) at the time of artificial insemination (AI) and its effect on pregnancy outcomes in nulliparous Holstein-Friesian heifers. A total of 512 endometrial cytology samples were taken during AI from 351 animals. The researchers found that the performance of unsuccessful inseminations significantly affected reproductive outcomes in subsequent AI and may lead to cyto in nulliparous dairy heifers.

Comment: Many of you will be well sick of endometritis after a few weeks "metrichecking" and surely there is nothing new anyway? Well, these guys have gone and looked for metritis in maiden heifers at the time of AI using cytotape rolled on an AI pipette then transferred to a slide. Three hundred nucleated cells were then counted. A cut-off point of 1% PMNs was used and deemed cyto-positive. The prevalence of cyto-positive heifers was 7.86% and they had a conception rate of 38.46% compared with 62.8% in cyto-negative heifers. This surprised me as the standard risk factors for endometritis I think of for mixed-age cows (e.g. RFMs, severe negative energy balance, or trauma) are not experienced by heifers. I also think of endometritis as a post-partum disease. The risk factor identified in this study for being cyto-positive was a previous AI event. In fact, 70% of the cyto-positive uteruses had had a previous AI event. The prevalence for a heifer that had never been artificially inseminated was 3.32% but increased to 16.13% for a heifer that had a previous AI event. This paper highlights the importance of clean AI technique and perhaps we need to consider counselling some of our clients on the need to provide the AI techs with improved yarding so that yards are kept cleaner.

Abstract

Facial eczema management protocols used on dairy farms in the North Island of New Zealand and associated concentrations of zinc in serum

Authors: Cuttance EL et al.

Summary: The aim of this study was to describe and evaluate current practices used to manage and prevent facial eczema (FE) in North Island dairy herds and to determine the intra-herd prevalence of elevated activities of gamma glutamyl transferase (GGT) and serum zinc (Zn) levels <18 µmol/L. The study was conducted as regional spore counts for *Pithomyces chartarum* started to rise towards 30,000 spores/g pasture. A total of 1,071 Jersey, Friesian, Holstein-Friesian, Ayrshire, or crossbred cows from 105 farms were weighed and blood-sampled. The study results indicated that facial eczema is generally poorly managed on NZ farms.

Comment: This disease will be at the front of most North Island vet's minds still after the season just gone so this paper is very timely. This study involved blood testing ten cows from each of 105 farms. It showed that 7.3% of cows had a GGT level greater than 300 IU/L and 33% of farms had one or more of the sampled cows with a GGT level above 300 IU/L. Of the cows that were on farms supplementing with Zn, just over 50% of cows had a serum Zn level less than 18 µmol/l, and 74% of supplementing herds had >3 cows with a serum Zn level less than 18 µmol/L. These results suggest that what is happening on farm is not controlling the effects of exposure to facial eczema effectively. This could represent an opportunity for vets to get more involved in the implementation of facial eczema control plans.

Reference: N Z Vet J. 2016;64(6):343–50
Abstract

Using Dairy Research Review for CPD points

Reading relevant veterinary articles such as those in Dairy Research Review is a valuable way to keep current and can become part of your CPD record. Simply record the activity on your activity record and create a reflective record by writing a few sentences about what you learnt and how this impacts your practice as a veterinarian.

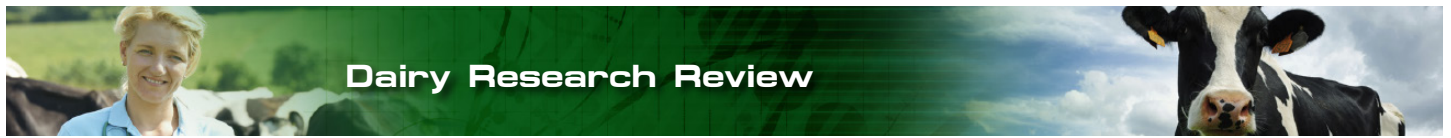*SEE THE VCNZ WEBSITE FOR TEMPLATES TO DOWNLOAD ACTIVITY RECORDS AND REFLECTIVE RECORDS*
http://www.vetcouncil.org.nz/contProfDevel.php

Dairy farmers' perceptions toward the implementation of on-farm Johne's disease prevention and control strategies

Authors: Ritter C et al.

Summary: This study assessed the perceptions of 25 dairy farmers participating in a Johne's disease prevention and control programme toward recommended practices and explored factors that influence whether a farmer adopts risk-reducing measures for *Mycobacterium avium subspecies paratuberculosis* transmission (the cause of Johne's disease). Interviews with the farmers revealed that most did not perceive Johne's disease as a current problem on their farm; however, they differed in their perceptions of the disease importance and their beliefs regarding proposed prevention and control strategies. In general, an unfavourable perception of the disease, rather than a lack of knowledge, inhibited implementation of recommended strategies to improve Johne's disease management.

Comment: Many of you will be using the Johne's herd testing package from LIC on your herds and noticing the reduction in test-positive cows from year to year. This Canadian paper examined the control strategies recommended in Canada and whether farmers implemented them. Farmers perceived Johne's prevention and control as important if they thought it was affecting the economics of the farm or compromising health or welfare. If farmers were struggling with fertility or mastitis issues, Johne's management was regarded as less important. To elicit change in Johne's management, farmers in this study needed to perceive Johne's disease as threat to their farm *and* to believe in any proposed management changes. This paper is interesting not solely from a Johne's perspective as the ideas about why change does or does not take place will be relevant to any disease control programme you may try to implement, e.g. mastitis, lameness, calf-rearing plans, reproductive interventions. Even if you do not read the paper, the authors categorised farmers as proactivists, disillusionists, deniers, or unconcerned. Perhaps tailoring your approach to a farmer with these categories in mind might help understand how to get change to happen.

Reference: J Dairy Sci. 2016;99(11):9114–9125
Abstract

Importance of secondary damage in downer cows

Authors: Poulton PJ et al.

Summary: The aim of this Australian study was to investigate in downer cows the relative importance of the primary cause of recumbency compared with secondary complications. Secondary damage was found in 183/218 cows (84%), with 173/218 cows (79%) having damage considered to be clinically relevant. By day seven, 52 cows (24%) had recovered and 69 (32%) eventually recovered. A total of 149 (68%) cows were euthanased or died, and of these, 23 (15%) were deemed to have been lost due to the primary cause, 107 (72%) due to secondary damage, and 19 (13%) due to a combination of both.

Comment: This paper describes 218 downer cows from Victoria Australia. Most of these cows (80%) had some form of damage secondary to the primary reason that was deemed to be clinically important. What was really frightening was that after seven days only 24% of cows had recovered (able to walk). A cow diagnosed with any type of secondary damage was 6.3-times more likely to be down at 7 days than a cow with no secondary damage. This highlights the importance of looking for musculoskeletal or nerve damage when examining the downer cow. This paper is well worth a read but I would suggest that you also go to the following website, which is from Phil Poulton's studies into downer cows, for practical management tips: http://www.dairyaustralia.com.au/Animal-management/Animal-welfare/Cows/Managing-down-cows.aspx.

Reference: Aust Vet J. 2016;94(5):138–44
Abstract

Accuracy of fetal age estimates using transrectal ultrasonography for predicting calving dates in dairy cows in seasonally calving herds in New Zealand

Authors: Brownlie TS et al.

Summary: This retrospective single-cohort study looked at the accuracy of transrectal ultrasonography for predicting calving dates in dairy cows under typical NZ conditions and assessed potential risk factors for differences between predicted and actual calving dates. In the study population of 83,104 cows, transrectal ultrasonography was used to determine if cows were pregnant and, if so, to estimate foetal age.

Comment: The accuracy of aged pregnancy testing was 90.3% of cows calved within 10 days of the predicted calving date. Accuracy was greatest when the foetus was 12–13 weeks old at diagnosis, the cows had one artificial insemination (AI) event and this was known to the vet, AI did not occur in the last 21 days of the AI period, and the diagnosis was made at the first pregnancy testing visit. These results seem good to me but highlight potential accuracy problems with herds that have poor fertility. In these herds, more cows will conceive in the last 3 weeks of the AI period. These herds will also have more cows conceiving to unrecorded bull matings, younger foetuses at time of diagnosis, and the need for two pregnancy testing visits if mating for an extended period of time.

Reference: N Z Vet J. 2016;64(6):324–9
[Abstract](#)

Prevalence of subclinical ketosis and relationships with postpartum diseases in European dairy cows

Authors: Suthar VS et al.

Summary: This study was conducted on European dairy farms in ten countries to: 1) determine the prevalence of subclinical ketosis (SCK); 2) identify thresholds of β-hydroxybutyrate (BHB); and 3) study their relationships with postpartum metritis, clinical ketosis, displaced abomasum, lameness, and mastitis. The prevalence of SCK (i.e. blood BHB ≥1.2 mmol/L) was 21.8% (11.2–36.6%). Cows with SCK had 1.5-, 9.5-, and 5.0-times greater odds of developing metritis, clinical ketosis, and displaced abomasum, respectively. Cows with blood BHB levels of ≥1.4, ≥1.1, and ≥1.7 mmol/L during 2 to 15 days in milk had 1.7-, 10.5-, and 6.9-times greater odds of developing metritis, clinical ketosis, and displaced abomasum, respectively, compared with cows with lower blood BHB levels. Overall, the prevalence of SCK was high between 2 and 15 days in milk and SCK increased the odds of metritis, clinical ketosis, lameness, and displaced abomasum.

Comment: A total of 5884 cows from across Europe had their BHB levels measured between 2 and 15 days post-partum. SCK was defined as a BHB level ≥1.2 mmol/L and across the study the prevalence of SCK was 21.8%. Optimum BHB levels were determined for predicting a displaced abomasum, mastitis, and other diseases and these optimal levels did indeed differ for the different diseases. Luckily for us, the authors concluded that, except for research purposes, having different specific thresholds for predicting different diseases is not going to be of use clinically. The optimal threshold across all the diseases examined is still ≥1.2 mmol/L.

Reference: J Dairy Sci. 2013;96(5):2925–38
[Abstract](#)

A systematic literature review and meta-analysis of mortality and culling in dairy cattle

Authors: Compton CWR et al.

Summary: This meta-analysis was performed to inform benchmarking for dairy cattle culling and mortality against which dairy industries and farmers can compare themselves as well as to improve understanding of the degree of any change and of any associated factors. It was estimated that, over a period of almost two decades, both the annual incidence risk (IR) and incidence density of mortality of cows had increased from 0.02 to 0.04 per cow and from 2.32 to 3.75 per 100 cow-years, respectively. The annual IR of culling attributed to low production had declined from 0.07 to 0.05 and that the IR of perinatal, but not neonatal, mortality had increased from 0.04 to 0.06 per decade.

Comment: This paper describes the changes in mortality and culling rates of dairy cows between 1986 and 2008 using a meta-analysis of papers from the EU, North America, and Australasia. It seems that the risk of mortality has indeed increased over the decades examined. The authors do point out that this change with time does not imply causality and there could well be social or economic factors driving the change such as an increasing reluctance of farmers to send sick or damaged animals to slaughter or to be culled and they instead get euthanized on farm. The risk of culling for production reasons seemed to decrease over the study period and the risk for culling for reproduction- and udder-related reasons remained unchanged. This paper provides "a line in the sand" for describing death rates of dairy cows in modern farming systems. The authors suggest ways to categorise culls and deaths, which if implemented nationally would give the opportunity to benchmark farms. We are still in the dark about any changes in culling rates or death rates in NZ as only one of the 54 papers included in this paper's analyses was from NZ. However, as both DairyNZ and MBIE financially supported this research they seem to appreciate the reputational risk that mortality and culling might pose, as well as the economic gains of decreasing mortality and culling for reasons other than for production. Unfortunately, before we can manage mortality and culling we do need to be able to measure it. Could, or should, there be a standardised and simple way of recording the reasons of mortality and culling?

Reference: J Dairy Sci. 2016 [Epub ahead of print]
[Abstract](#)

Water use on nonirrigated pasture-based dairy farms: Combining detailed monitoring and modeling to set benchmarks

Authors: Higham CD et al.

Summary: These researchers quantified the seasonal pattern of water use to develop a prediction model of water use for pasture-based NZ dairy farms. Stock drinking, milking parlour, and total water use was measured on 35 pasture-based, seasonal calving dairy farms over a 2-year period. Average stock drinking water was 60 L/cow/day, with peak use occurring in summer. Average corrected stock drinking water (equivalent to voluntary water intake) was 36 L/cow/day, and peak water consumption was 72 L/cow/day in summer. Average milking parlour water use was 58 L/cow/day (September to February).

Comment: This study examined water usage on non-irrigated Waikato Dairy farms. Water usage was attributed to the shed and to stock drinking water (and corrected stock drinking water once leakage was accounted for). As expected, water demand on farms was very seasonal with water usage in the shed increasing during times of peak milk yield and stock drinking water usage increasing during summer and declining during the winter. On half of the farms, leakage of greater than 21% of stock drinking water was identified. The best achieved leakage rate in this data set was 6% so this might be the best that can be achieved. Surprisingly, the authors reported losses for municipal water supplies of between 5 and 58%. This paper will be of use for people designing water reticulation systems and for planners predicting water demand, etc., but for most of us the take home message is that on many farms correcting leaks would result in more efficient use of water and if water is being pumped reduced costs. If the water losses are resulting in reduced water intake, then production could also be affected. If farms are relying on in-line dispensing of trace elements, then correcting leaks might help explain lower than expected results if they occur.

Reference: J Dairy Sci. 2016 [Epub ahead of print]
[Abstract](#)