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REVIEW & PLAN

TECHNOTE 26

Fix areas that make udders dirty

The risk of environmental mastitis is greatly increased when cows are held for long periods in wet, muddy areas. Congregation of cattle in paddocks, on farm tracks and races, on feed pads and other structures can increase exposure to environmental bacteria as well as reduce the health of teat skin.

Strep uberis

Humid conditions, whether hot or cold, particularly following rain, favour environmental mastitis as udders become contaminated with mud and faeces, and conditions are favourable for bacterial multiplication (Blowey and Edmondson, 1995; Lopez-Benavides *et al* 2007).

In a study of bacterial populations around a typical New Zealand dairy farm, there were much greater numbers of *Strep. uberis* present in the cow's environment in winter and early spring, compared to the summer and early autumn. These times coincided with the time when new infections with *Strep. uberis* were most prevalent.

High numbers were found particularly on the farm tracks or races leading to and from the farm dairy (Lopez-Benavides *et al* 2007). Areas of paddocks where cows "camp" or mob such as under trees or near gateways, are also associated with a high pasture contamination with environmental streptococci (Hillerton and Berry 2003).

Mud is always a problem on dairy farms, particularly on cow tracks, around gateways, feed pads and at the entrance to the dairy yard. Conditions are worse when cows are stood on large yards or wait on races before or after milking. Management of cow flow, and sometimes a little extra concrete, can reduce such hazards.

E. coli and other coliform bacteria

Feed pads and other roofed and non-roofed structures are an increasingly common sight on dairy farms in Australasia. Drivers for their use include:

- increasing herd sizes, which require more supplementary feed to maximise cow production (Verkerk and Hemsworth, 2010);
- concerns about effluent management and environmental impact;

- improving animal comfort, health and welfare; and
- protecting pastures (Arnold *et al* 2009).

A survey of 12 NZ veterinarians, covering a client base of around 956 farmers, suggested that about 3% of these farmers were using housing systems (Arnold *et al* 2009). Although low, this number is only likely to increase.

In a NZ study, cows fed a complete, total mixed ration and maintained in zero-grazing environments (loafing paddocks or concrete and free-draining feeding/loafing pad) developed 2-8 fold more cases of clinical mastitis compared to cows maintained solely on pasture (Lacy-Hulbert *et al* 2002). More than 60% of the clinical cases, and up to a third of the subclinical cases, were due to *E. coli* and other coliform-like or Gram-negative environmental bacteria. The presence of 1000-fold more *E. coli* in the faecal matter of these cows compared to cows fed on pasture will have contributed to the environmental challenge.

Farms using feed pads to feed more than 40% of the diet have experienced more infections caused by *E. coli* and other environmental bacteria (Lacy-Hulbert *et al* 2012). Feed pads, stand-off pads and indoor systems require good management and maintenance of the surface materials to ensure that the benefits of such systems are not outweighed by the increased costs of mastitis, and also lameness (Laven and Holmes, 2008).

26.1

Clean and renovate areas around troughs, gates, races and entrance to the dairy area.

Long-term surface drainage and fencing

Tracks and races

Adequate drainage and good lanes reduce problems associated with dirty teats and udders. Cow tracks should be correctly formed with a good sub-base (grass and topsoil removed) and compacted before and after the gravel surface is laid. Gravel needs to be selected carefully (trial a small load first) so that tracks are comfortable for cows to walk on and do not contribute to lameness. The wearing course should be crowned to shed water and drains, and drains should be provided at the sides to direct water away from the general track area. Fencing should be arranged so cows remain on the track and do not have access to drains (Bridges 1984).

For more on the planning and construction of farm tracks to minimise mud and improve cow flow, see the DairyNZ Milksmart website: www.milksmart.co.nz.

Cow tracks or races laid over boggy areas with little foundation can benefit from geotextile materials laid before gravel is installed. Such materials will reduce the tendency for the gravel to sink through the mud (Turner 1998).

Access to water

In accordance with the Dairying and Clean Streams Accord (Anon, 2003), cows need to be fenced away from streams and rivers. The same applies for boggy areas, wetlands or stagnant ponds.

See DairyNZ website for Clean Streams Guides describing clean streams requirements for each region of NZ.

Use of sprinklers on yards in summer to keep cows cool is an acceptable practice but the amount of “dirty” water draining off the flanks and reaching the teats before attaching teat cups needs to be minimised. Erecting shade cloth shelters, or using a combination of sprinklers and fans (Kendall *et al*

For more on minimising heat stress in dairy cows, see www.coolcows.com.au

2007; Schutz *et al* 2011), may be more effective.

Short-term management solutions

Development and maintenance of cow tracks and races tends to be an annual activity. Thoughtful management can reduce the mastitis risk in the interim:

- Muddy areas under trees or in wet areas can be temporarily fenced off.
- Mud around paddock gateways can be reduced by alternating between two or more gateways into the same paddock or by stabilisation of such areas with gravel or lime if the soil type is suitable.
- Mud and slurry on farm races can be removed on a regular basis using a scraper blade.
- Grazing management can be planned so that paddocks that have been spread with farm dairy effluent are not grazed again for at least for 3-4 weeks. Studies have found that *Strep. uberis* remains on the soil for up to 4 weeks after spreading of effluent in winter, but only 1-2 weeks in summer (Lopez-Benavides *et al* 2007).
- Dirty teats can be cleaned before milking. Washing and drying dirty teats before applying teat cups helps minimise environmental mastitis when teats are very dirty.
- Dry cows can be protected with antibiotic dry cow treatment and/or internal teat sealant at drying off if grazing in muddy areas e.g. on crops, is highly likely in the dry period.

If keeping cows in dirty areas is (likely to be) unavoidable, make sure that:

- Teats of lactating cows are washed and dried before attaching cups
- Dry cows are protected by antibiotic dry cow treatment and/or internal teat sealant at dry off.

Technote 5.3 describes pre-milking teat disinfection.

Technote 14 describes treatment strategies for use at dry off.

26.2

Regularly clean and maintain areas where cows are stood off pasture.

Feed pads and stand-off pads

Feed pads must be carefully designed to reduce mud, particularly when the pad is covered for shade or protection from rain, and the drying and sanitising effect of sunlight is lessened. Covered feed pads should be concreted, preferably with 2-4% fall in a longitudinal direction, to facilitate flood washing or at least to improve drainage when they are scraped clean. Scraped, covered feed pads should be orientated North-South so the sun has some opportunity to penetrate under the shade and dry the surface (Davison and Andrews 1997).

See the DairyNZ website for the "Minimising Muck, Maximising Profit" resources for good descriptions of the construction of feed pad systems.

Uncovered feed pads may be gravel provided they are properly formed and compacted similarly to the tracks. However they should always incorporate a 2-5% fall in at least one direction and a drainage system to carry water from the facility. Cows should be excluded from the drainage system. Regular twice-weekly scraping will reduce manure build-up (Davison and Andrews 1997).

Properly constructed stand-off pads, using wood chips as the bedding material, resulted in the longer lying time and less mud, compared to use of a concrete yard or farm track, for prolonged periods of standing off (Fisher *et al* 2003). Achieving adequate lying time is a powerful driver for a dairy cow and this is greatly influenced by the choice of bedding material and

available space per cow (Verkerk *et al* 2006). Lying behaviours affect cleanliness of the udder.

When designing stand-off areas, consider providing a minimum of 5-6 m^2 per cow, which is the typical recommendation for total confinement housing. A proportion of NZ farmers provide 8 m^2 or more for stand-off pads (Tucker *et al* 2005).

Covered Feed pads and Indoor Housing

Effluent management, choice of bedding materials, and size and configuration of cubicle systems all contribute to lying behaviours, which in turn affects cleanliness of the udder and legs. A good review of issues relating to mastitis and housing construction, bedding management and cubicle design in Canada is published by the US-based NMC (Anderson 2006).

Many resources have been published in the US and Canada, about the construction of dairy cattle housing. Further resources are available on-line from construction companies that have been involved with the growth of dairy cattle housing in Australia and New Zealand.

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Key papers

Anderson NG. Cows' houses and udders: Challenges and opportunities. *Proc. of the NMC Regional Meeting,* Charlottetown, Prince Edward Island, Canada. 2006; 38-48.

Anon. Dairying and Clean Streams Accord. Ministry for the Environment 2003 Accessed May 2012 at www.mfe.govt.nz/issues/land/rural/dairying-accord-may03.pdf.

Arnold NA, Verkerk GA, Gregory R, Matthews LR. Identification of potential impacts of New Zealand dairy housing systems on dairy cow welfare. *Proc. NZ Soc. Anim. Prod* 2009; 69: 54-56.

Blowey R, Edmondson P. The environment and mastitis. In: *Mastitis control in dairy herds,* Chapter 8, Farming Press Books, Ipswich, United Kingdom, 1995:103-118.

Bridges DJ. Farm dairy race construction. *Research Publication No. 10,* Massey University Agricultural Research Foundation, New Zealand, 1984.

Davison TM, Andrews RJ. Feed pads downunder. Department of Primary Industry, Mutdapilly. 1997:25-29. Accessed May 2012 at http://www.dairyinfo.biz/images/Content/PDF/feedpads_downunder.pdf.

Fisher A, Stewart M, Verkerk G, Morrow C and Matthews L. The effects of surface type on lying behaviour and stress responses of dairy cows during periodic weather-induced removal from pasture. *App. An. Behav. Sci.* 81: 1-11, 2003.

Hillerton JE, Berry E. 2003 The management and treatment of environmental mastitis. *Vet Clin Food Anim.* 19; 157-169.

Kendall PE, Verkerk GA, Webster JR, Tucker CB. Sprinklers and shade cool cows and reduce insect-avoidance behavior in pasture-based dairy systems. *J Dairy Sci*. 2007; 90: 3671-80.

Lacy-Hulbert SJ, Kolver ES, Williamson JH, Napper AR. Incidence of mastitis among cows of different genotypes in differing nutritional environments. *Proc. NZ Soc. Anim. Prod.* 62, 24-29,

2002.

Lacy-Hulbert SJ, Williamson JH, Kolver E, Doohan JH. Is coliform mastitis an emerging issue? *NZ Milk Quality Conf.* 2012. *In press.*

Laven RA, Holmes CW A review of the potential impact of increased use of housing on the health and welfare of dairy cattle in New Zealand. *NZ Vet. Journal* 2008; 56: 151-157.

Lopez-Benavides MG, Williamson JH, Cursons RT. 2005. Associations between *Streptococcus uberis* populations on farm races and climatic changes during a twelve-month period. *Proc. NZ Soc. Anim. Prod.* 65, 153–156.

Lopez-Benavides MG, Williamson JH, Pullinger GD, Lacy-Hulbert SJ, Cursons RT, Leigh JA. Field observations on the variation of *Streptococcus uberis* populations in a pasture-based dairy farm. *J Dairy Sci*. 2007; 90: 5558-66.

Schütz KE, Rogers AR, Cox NR, Webster JR, Tucker CB. Dairy cattle prefer shade over sprinklers: effects on behavior and physiology. *J Dairy Sci.* 2011; 94: 273-83.

Tucker CB, Verkerk GA, Small BH, Tarbotton IS, Webster JR Animal welfare in large dairy herds: a survey of current practices. *Proc. of the NZ Soc. of Animal Prod*. 2005; 65: 127-131.

Turner LW. Geotextile pad design and use for dairy loafing and feeding areas. In: *Proc of the American Soc of Agric Engineers for the 4th International Dairy Housing Conference,* Michigan, United States, 1998:37-43.

Verkerk GA, Hemsworth PH Managing cow welfare in large dairy herds *Proc. of the 4th Austral. Dairy Sci. Symp*. 2012; 436-443.

Verkerk G, Tucker C, Kendall P, Webster J, Bloomberg M, Rogers A, Stewart M, Davison D, Matthews L Physical environments and dairy cow welfare - lessons from New Zealand research *Proc. of the Soc. of Dairy Cattle Vet. of the NZVA Annual Conf*, 2006; 35-46.