'Partnerships for Success' and being 'Fit for Practice', as discussed at XLVets' recent AGM, took on whole new meanings when later that day 60 XLVets members, joined by teams from Pfizer and Kingshay Farming Trust, set off on the Royal Marine Commandos Endurance Course at Woodbury Common, near Exeter.

XLVets are **'fit for practice'**

The Marines have trained at Woodbury Common since the Second World War and the endurance course is one of four achievements required of recruits and officers alike.

'It was a truly awesome experience,' said David Black, managing director of XLVets. 'I was so impressed by the way everybody threw themselves - literally - into the challenge. It was a wonderful example of how, by working together in teams, we achieved far more than would ever have been possible alone - indeed many looked back at the end of it and said 'Did I do that!?'

The highlight of the course was the infamous 'Sheep Dip' a fully submerged underwater pipe.

'I'd seen this exercise on the TV advert for the Royal Marines but thought they were just joking when they told us we'd be doing it too,' said Rachel Hayton from Southfield Vets. 'I'd never have believed I could do it, but the effect of working together was incredible and our whole team - of all ages and levels of fitness - accomplished the challenge. I just hope we don't all go down with post-dipping lameness!'

The winning team led by vet Charlie Lambert from Lambert, Leonard and May was presented with Royal Marine shirts. Carolyn Hogan technical services veterinarian with Pfizer and Duncan Forbes, managing director of Kingshay Farming Trust were members of the winning team. Duncan commented: 'When XLVets invited me to their AGM to speak about our new membership for vets, I'd no idea I'd spend the afternoon in filthy water in which no self-respecting sheep would ever allow itself to be dipped. However, the challenge was great fun and hasn't put us off from working further with veterinary practices to deliver high quality information and support on farm!'

Prizes were also awarded to a member from each team who had demonstrated outstanding commitment in the eyes of the Marine PTI's leading the challenge. Captain Mark Latham Royal Marines said: 'All competitors worked exceptionally hard throughout the challenge whilst also having a lot of fun. It was great to see the large amount of teamwork and encouragement displayed by all participants.'

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September 2007 Committed to UK Farming

Dairy Event SPECIAL

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Special Feature

ENDOMETRITIS

Risk factors associated with uterine infection and the development of 'whites'

Urine Testing

Using urine analysis in dairy cows...

Ben Yates

High Health

Managed Nutrition Delivers Sustainable Results

Health, contentment and performance are as one for a successful, profitable dairy herd, reasons Ben Yates who manages the 115 Holsteins which form the Wyndford herd owned by W Maddocks Ltd. Based at Chadwell Grange, near Newport, Shropshire, the dairy herd is part of a large mixed farming business along with potatoes and cereals.

Ben has made some significant changes to the way the herd is managed since taking charge just under three years ago - changes which have not only seen the herd average yields increase but also improvements in herd health and profitability. 'When I first started, it was obvious we had to address a number of herd health issues in terms of somatic cell counts, mastitis, fertility, and dry cow related problems' he says.

He jokingly comments that he wished at one point that he could have made up a lorry load of cull cows and made a fresh start with the remainder but, for obvious financial reasons, this was not an option. Instead he sought advice from his new vet & nutritionist - Bill May of Lambert Leonard & May a member of XLVets based near Nantwich, and Keenan's Rumans Nutrition consultant Hefin Richards.

The first task was to limit any new mastitis infections by paying close attention to hygiene both in and out of the parlour and once this had been achieved, the treatment of affected cows started to make sense. 'Over just a few months we managed to improve the cell count situation and we were well on the way to getting dry cow and fertility problems under control,' says Mr Yates.

At about the same time the decision was made to adopt full TMR feeding - up to this point limited parlour feeding had been used in addition to the mixer wagon, but the desire for healthier cows, flatter lactations and the ageing and increasingly inaccurate parlour feeders all prompted this shift. The change caused fewer problems than Ben first envisaged. 'There was a little upset for a few days but the cows soon became used to it and the new heifers that went through the parlour having never known anything else settled very quickly. I honestly think they all milk better for it - parlour feeding was a distraction for the cows and me,' he says.

The milkers are fed a total mixed ration comprising maize and grass silage, whole crop cereals, chopped straw, and a moist feed plus a high quality bespoke blend and minerals mixed in the Keenan 140 mixer wagon. And, according to Ben, they are doing very well on it, with high levels of cud chewing indicating excellent rumen health. But, while such changes have all contributed to the improved performance of the milking herd, he feels that it is the feeding and management of the dry cows which has made the greatest impact over all.

'I am convinced that the way dry cows are managed dictates how they perform during their lactation in terms of both milk yield and health,' he insists. All dry cows are fed a Keenan high-fibre mixed ration - which provides 5kg of straw per head per day plus grass and maize silage and blend balanced with a high specification dry cow mineral which boosts levels of selenium and vitamin E pre calving as well as correcting major mineral balance. Ben's views are shared by Bill May - 'Calving problems such as displaced abomasums, milk fever, failing to cleanse properly and ketosis are very much reduced with this feeding regime,' he says.

'Although it should be noted that the overall management of the herd can also have a bearing on these occurrences.'

Once into their lactation, Ben says he is pleased to see that there is a steady increase in milk yield during the first two or three weeks as cows settle and feed intake rises, rather than an initial rush of milk driven by 'steaming up' or high protein feeding. 'I like to see a much 'flatter' yield curve during the lactation with no dramatic peaks and falls,' he says. 'This way the cow copes better, remains healthier and, at the end of her lactation has probably given more milk in total with less stress.' Plus-points to note at this stage are that annual milk yields are now over 9500 litres/cow at 3.9% butterfat and 3.25% protein. Metabolic problems are minimal, and conception rates run at close to 60% on the first service.

Healthier cows mean less enforced culls and, as a result, reduced requirements for replacement heifers to be introduced into the herd. There are no immediate plans to increase herd size - housing limitations do not allow such expansion - so the aim is to develop the young-stock enterprise and sell a significant number of freshly calved heifers and cows each year to boost total farm income.

This is an additional income which is available as a direct payback from having a healthy herd with a low cull rate.

But now for the subject of contentment - a detail which Ben and his advisors feel is increasingly important and one which can dramatically affect herd production and health. 'Cows are social animals and can become stressed if they are suddenly moved to be in other groups or their routines are disrupted,' points out vet Bill May. 'This is reflected not only in their ability to produce milk but also in the way they eat and perform generally.' For this reason, every effort is made to ensure the cows are kept in a stress-free environment - they are, for example, housed in straw yards, with ample space to eat, drink and lie down. Ventilation is good and nutrition consultant Hefin Richards ensures that the ration is balanced to meet their needs and maintain good rumen health at all times. The milkers are managed in a single group, whilst dry cows move to the dry cow yard for 6-7 weeks - minimising the stress of group changes etc during lactation.

Success in the National Holstein Show and Royal Show in addition to numerous local events has highlighted the quality and potential of the Wyndford herd. Few would deny that herd management is now on par with some of the best in the UK. The attention to detail and stockmanship displayed by Ben Yates and the input of professional health and nutritional advice is helping to create a sound platform to build on for the future.

Ben Yates (right) and his vet Bill May. Mr May points out that the hi-fibre ration fed to the dry cows has resulted in fewer calving problems such as displaced abomasums, milk fever and ketosis.

Whites? A Risky Business

After calving, bacteria contaminate the uterus of most cows. Infection persists in the uterus of many cows for more than three weeks, with approximately 15% dairy cows having clinical endometritis or 'whites'. The cows that develop whites have lower conception rates, take longer to conceive and are more likely to be culled for infertility than uninfected cows. So whites is a costly disease and this article looks at the risk factors involved and the ways to treat whites.

Endometritis & The At Risk Cow

There are several risk factors associated with uterine infection and the development of whites. These factors either affect the balance between bacteria and immunity, cause uterine damage or are metabolic conditions see Table 1.

The presence of bacteria in the uterus and the associated inflammation of the uterus wall prevent the embryo implanting and so these cows do not conceive. Even after successful resolution of the whites, the recovered cows have a lower conception rate. Possible explanations of this are that uterine inflammation may persist after the bacteria have been cleared or there may be chronic scarring of the uterus or adhesions of the oviduct (tubes) that disrupts conception.

Uterine infection also appears to disrupt the normal hormone function and often leads to failure of ovulation, increased cystic ovarian disease and anoestrus. In the UK the direct costs of treatment and reduced milk yield are about £60 per case and the indirect costs of extra AI's, longer calving index & reduced conception rates are about £70 per case.

So What Can Be Done?

Sometimes endometritis can easily be spotted in a cow, as a whitish liquid coming from her vulva as she lies in her bed. However if this is the sole method of diagnosis most cases will be missed! It is important to go looking for it. At the very least, post calving examinations of cows in the high risk group i.e. difficult calvings, retained afterbirths should be performed to check if they have whites or not. When a farm has a higher than average incidence of whites, then it may be best to do a post calving check on EVERY cow to be sure not to miss any cases.

Affected cows can be washed out with Metricure® and then rechecked a week later. Some cows may need prostaglandin treatment but your veterinary surgeon will help you with these cases and advise you on the best course of action. The secret of success is to treat these cases early to resolve the endometritis before serving them.

Here are two case histories of real on farm problems and the approach to them by their vet Luke Knowles (Rutland) and Richard Knights (Westmorland) in Cumbria.

Endometritis can be easily detected and treated on farm, reaping huge benefits in future fertility for affected cows.

Richard Knights - Westmorland Veterinary Group, Cumbria

Table 1: Risk factors for the establishment of clinical endometritis

Balance between bacteria and immunity	Disruption of natural immunity Bacteria in the uterine lumen such as E.coli and A.pyogenes Hygiene of the cows, calving boxes and environment
Uterine damage	Stillbirth, twins, dystocia Retained foetal membranes Delayed uterine involution
Metabolic conditions	Milk fever Ketosis and negative energy balance Mineral deficiencies

Case Study 1: Luke Knowles from Rutland Vets

This case study concerns a 250 cow dairy herd that suffered from problems of whites (endometritis). Up to 85% of calved cows had whites in a one month period.

Background this farm only started grazing in summer 2006, previously they were housed all year round and fed TMR. The farm changed from three times a day milking to twice a day milking at the end of February 2007. IBR had been a problem on the farm before vaccination was carried out.

Other disease issues were high numbers of cleansings (RFM) and metritis cases, which have the potential to cause whites later in lactation and so needed to be dealt with in order to reduce the incidence of whites.

When investigating this problem we had to look into factors causing RFM, metritis and endometritis.

Factors investigated were:

1. Disease leading to more RFM's - milk fever, Leptospirosis, abortion etc.
2. Dry cow diet problems - low Vitamin E and Selenium levels, negative energy balance around the time of calving, body condition scores and feed intakes etc.
3. Disease causing endometritis - unusual bacteria, RFM/metritis, dirty calving protocols, poor calving box hygiene.

Most of our investigations turned up very little; the farm was on an effective DCAB ration to reduce milk fever, swabs of cows with endometritis came back with the normal bacteria, those cows that were affected by RFM's or metritis did not always get endometritis but were at an increased risk of developing it. Calving protocols and hygiene were considered to be adequate.

It was vital to improve the dry cow diet and found that increasing the amounts of Vitamin E and Selenium reduced the numbers of cows with RFM.

We put the following protocols in place on farm:

1. Farmer needed to monitor all at risk cows - those that needed any help at calving, twins, abortion, milk fever, cleansings, mastitis and downer cows.
2. Take temperatures of at risk cows at days 3-5 post calving and treat as necessary (see Treatment Protocols).
3. Post natal check of all cows that have calved within the last month. Allows us to pick up and treat cases of endometritis before they delay fertility.
4. Recheck all cows that have been treated for endometritis at next visit (visits usually carried out every fortnight).

Treatment Protocols

RFM cases - check the cow's temperature, if high (>103F) then treat for metritis (Injectable antibiotic and a non steroidal anti-inflammatory injection). Leave the afterbirth for at least 5 days before attempting to pull by gentle traction. If the RFM does not come away easily then leave it for longer.

Endometritis - check the cow's temperature, if high (>103F) then treat for metritis (Injectable antibiotic and a non steroidal anti-inflammatory injection).

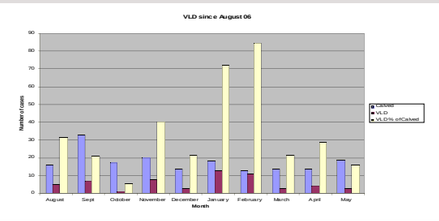
Grade the cow on the type of discharge - putrid (treat), clean (leave)

- if <14 days and low temperature then leave, cow should clear itself
- if >14 days use Metricure®
- if >14 days and CL on ovary use Metricure® and 2ml prostaglandin.

Conclusion

Cure rates after the use of Metricure® were very good. But as can be seen from the first graph, prevention is better than cure and by reducing the number of cows with whites (March onwards) we improved the health of the herd with minimal use of drugs.

Overall this improved herd health, disease costs and fertility.



Case Study 2: Richard Knights from Westmorland Vets

Reporting into the management of endometritis on a dairy farm using Metricure®

100 dairy cows calved from late June 2006 until February 2007, with nearly half calving in July and August. The 8,000kg average yield herd was attended on 2-weekly routine fertility visits. Cows were presented on the basis of action lists generated by InterHerd™. Diagnosis of endometritis was based either on ultrasonographic examination of the uterus or by seeing visible vulval discharge. In all, 27/100 cows were treated for endometritis with Metricure® (34 treatments averaging 1.3 treatments per case) either alone or in combination with prostaglandin injection. Of all cases of endometritis, 11 out of 27 were complicated by another condition, most commonly cystic ovarian disease. 16 out of 27 were treated for endometritis alone. The median time post-partum for diagnosis was 32 days (sd 10.3 days). When compared to the herd mean calving to conception interval for all cows, the calving to conception interval of cows with endometritis was 9 days more (109 vs. 100 days). However, when cows with endometritis were paired to a control cow which calved at a similar time (max +/- 9 days), then the calving to conception intervals were nearly the same (109 vs. 108 days). When conception rate was compared, the herd average was 45%, with the whites group being 37%. The whites control group had a conception rate of 44%. Cows with endometritis will have a milk yield of 221kg more than the herd average. This may be due to a longer lactation. Control cows will have a lactation yield of 199kg less than herd average. The difference in milk yield between endometritis and control cows is 420kg. This difference may not be statistically significant as animals were not paired for parity and there could be a bias towards older cows in the endometritis group.

Conclusions

Prompt diagnosis of endometritis and treatment of dairy cows with Metricure® resulted in a calving-to-conception interval which was similar to the herd average in this case.

As can be seen the case reports above endometritis can be easily detected and treated on farm, reaping huge benefits in future fertility for affected cows. The main point with any fresh calved cow is to minimise disease from the outset through good management, diet and close monitoring of 'at risk' cows. Using a more proactive approach to monitor early lactation dairy cows and getting help when things are starting to go wrong, will reduce overall disease, improving fertility, milk yield and herd health. Metricure® is a valuable tool for improving cattle fertility and is a cost effective treatment.

MOO...

Could a heavy worm burden be reducing your cows' appetites?

Maximising dry matter intake is crucial for high yielding cows and first-calving heifers if they are to realise their full milk yield potential, and avoid a negative energy gap which can contribute to poor fertility.

One of the many factors which can affect feed intakes in cattle, and which is often overlooked, is the gutworm burden. This is because adult cattle rarely show clinical signs of carrying a gutworm burden. In fact, the only reliable way to assess whether a worm burden could be impacting on dairy herd performance is to test the milk for presence of antibodies raised to these parasites.

This is known as the MOO (milk Ostertagia ostertagi) test, and is available through your XLVets practice. It involves sending a bulk milk tank sample for analysis at Bristol University's veterinary laboratory, together with details of the herd's recent grazing history and anthelmintic treatments. The lab test detects the levels of antibodies raised against gutworms and indicates whether there is a high, medium or low gutworm challenge.

Studies involving treating dairy cattle with Eprinex have demonstrated an increase in grazing times, which resulted in higher dry matter intake, and other trials have shown improvements in milk yield of up to 2 litres per day per cow.

XLVets' Paddy Gordon explains: 'If worms are suspected in a herd, then MOO tests are advisable in the first instance, as they give an indication as to the worm burden. If test results show a high gutworm challenge then farmers will need to discuss with their vet their herd's yield objectives and housing programme. The vet can then advise on the most appropriate worming strategy for the farm.'

A worming strategy is one element of dairy farmer Chris May's herd health programme at Shute Farm, near Warminster in Wiltshire. Here, Chris runs a 200-cow dairy herd averaging 10,500 litres/cow, calving all year round, and turned out to grass during the summer months. Chris is careful to maintain both high yields and a healthy herd through attention to detail and considerate stock management. For instance, the calving index is 400 days - this is by choice as cows are not served until three months after calving, allowing them time to regain condition and re-start their oestrus cycle.

Cows are turned out to grass in the summer and not housed all year round as is the case in some high yielding herds. Chris says: 'Not only are cows fantastic converters of grass into milk, we also don't want the extra work of housing them all year. Besides, we have some good soil here and plenty of good grass.'

Chris has been worming the herd with Eprinex for the past few years. He says: 'With these yields, these are valuable animals. So I'll do everything I can to help ensure cattle stay healthy and maintain their body condition. I've never actually used the MOO tests because I've been worming for several years now and see it as simply a matter of good insurance. But I believe there must be a worm challenge to the herd. They just don't show it because they are on such a high plane of nutrition.'

Chris works closely with XLVets' Paddy Gordon of the Shepton Veterinary Group. The worming strategy is to treat all youngstock in the summer when at grass. Cows and heifers are treated at or around calving so that they are fully protected when they rejoin the main herd. The only exceptions for treatment are the older cows which are seeing out their last lactation.

'In the big scheme of things, worming itself is not expensive,' says Chris. 'Eprinex also has the advantage that there's no withholding period so milk can carry on going straight into the tank.' Paddy adds: 'Worm control has been part of a targeted programme on Chris' farm for some time. On other farms, where worming is not routine and herd performance is poor, it's important to always take a holistic approach and consider the whole range of factors that could be responsible.

In the first instance, a MOO test can prove a very useful tool as one of the avenues of investigation into the poor performance. Once the test results are received, an assessment of the risks of not worming versus potential benefits of treatment, can be discussed.

There are several options to choose from. For instance, a worming programme could be used to prevent gut and lungworm infection for all cows out at grass.

Or we could decide to select individual cows and treat them at calving - just the high yielders and heifers. This is because getting enough feed into cows is especially critical post-calving - this is when the energy demands for milk production are at their highest. Insufficient intakes throw the cow into a negative energy balance and this 'energy gap' is one of the factors that depresses fertility as it can delay return to first oestrus, lengthening the herd's calving index.

'Alternatively, on some farms, treating the whole herd at housing will be the preferred option as this would protect them against worm infections through the winter and into turnout, as well as controlling the winter problems of lice and particularly, mange.'

Paddy adds: 'A survey by Bristol University of milk samples from 200 dairy farms, showed evidence of high worm burdens in 68% of cases.'

'Here in the south west, lab tests have also shown that as many as 50% of herds are carrying fluke infestation.'

'So by taking bulk milk samples, farmers can gain information on both gutworm and fluke in their dairy herd and then discuss with their vet the best course of action to get the herd back on form.'

If you are not aware of the level of worm challenge faced by your herd, contact your XLVets' practice to arrange for a **free MOO test** to be carried out.

Article adapted from the Defra Animal Health and Welfare Campaign on Housing the Modern Dairy Cow.
The full article is available at www.defra.gov.uk/animalh/welfare/farmed/advice/adas0506.htm

Housing
Today's Dairy Cow

Dr Brian Pocknee, ADAS Senior Dairy Husbandry Consultant

Nearly all dairy cows are housed for at least part of the year, with increasing numbers housed for 365 days. The purpose of housing is to provide shelter from adverse weather, prevent poaching and increasingly to simplify management of the herd and to ensure optimum nutrition to meet the cows' requirements.

For many units, the cows have outgrown their facilities. Shortcomings become more apparent when cows are housed for extended periods with significant adverse effects on animal health, welfare, production and profitability. Problems are compounded as increased herd size is not matched by an increase in the housing facilities.

Dairy cow housing needs to be designed, adapted or built, and managed to take account of the changing requirements of the dairy cow and the changing climatic conditions.

Requirements for Housing

Regardless of the type of housing, as an absolute minimum, it must provide a comfortable, clean, well drained and dry lying area together with shelter from adverse weather and to allow the animal to move freely around without risk of injury. There are pros and cons with both main types of housing - cubicles and straw yard. However, if designed and maintained correctly neither is better than the other. What is critical is the surface on which the animals lie.

Our main objective is to provide conditions that allow the cow to lay and rise without difficulty, and to lie for around 11 hours per day. In fact close observation of cows shows that they will lie down and get up at least 10 times per day. If the cow spends less time lying down, she is likely to spend more time standing in loafing areas or at the feed stance which can adversely affect foot health.

Maximising lying times should be a clear objective with any cow housing system.

Cow cleanliness is also a very important factor to consider. There is a close association between cow and teat cleanliness and new mastitis infection rates. Digital dermatitis is now a major problem in many UK dairy herds. The disease is often associated with prolonged contact with slurry containing the bacteria Fusiformis nodosus. Therefore passages must be kept clean. Most cattle buildings in the UK are not specifically designed for such stock - and that is the cause of many of our problems, especially with regard to inadequate ventilation. Cattle of all ages do not die from fresh air!

Cattle Housing Rules

Provide plenty of ventilation. You need both inlet and outlet ventilation to change the volume of air ten times per hour. Open ridges must be the aim, with solid walls kept to a minimum - if used at all. However, draughts must be prevented.

As a useful rule of thumb, there should be 5cm of ridge opening for every 3.0m of building width. Spaced roofs become a necessity for multi-span buildings and useful when cows are housed in the summer. Don't forget that air movement in a building is disrupted by other buildings or obstructions (trees or bale stacks).

Mechanical ventilation will usually be the last resort, although may be required to help reduce heat stress in combination with water sprinklers. But site carefully.

Straw yards should be rectangular in shape, with the distance from back wall to feed stance being no more than 10m.

Provide at least 6.5m^2 bedded area per cow plus a further 2.5m^2 of feeding/loafing area. For cows at 700kg liveweight this will need to increase to at least 7.0 m^2 and 3.0 m^2, respectively.

A concrete area for loafing and feeding is essential and helps promote hoof wear and will prevent feet becoming over-grown. It will need to be at least 4.0m wide.

Cows should have access to the bedded area along its entire length. No pokey gateways! They should also only have access to water troughs off the hard standing. No water troughs in the bedded area.

A 0.2-0.3m step should be provided between the feeding/loafing area and the straw beds to help retain the straw and prevent slurry flowing onto the bedded area.

Cubicle dimensions depend on the size of cow and type of division. With the suspended cantilever type then the width will be around 1.125m centres.

For the average 700kg cow the length will need to be at least 2.5m when against a wall and in the region of 2.20m when there is lunging space. A head rail and brisket board are essential to correctly position the cow when standing and lying. Kerb height should be around 0.2m, although the latest evidence would suggest this is too low!

Probably the ideal cubicle base is sand - preferably dredged sand. But it is not suitable for many due to heavy wear on pumps or blocking below ground channels. The alternative is mattresses or mats. Beware they are not all the same in terms of cow comfort or longevity. Also a layer of clean, dry bedding is required to absorb moisture and help keep the cows clean.

Passageways need to be at least 3m wide from cubicle to cubicle, 4m wide at the feed fence and 5m if cows back off from a cubicle on to the feeding passage.

Provide at least 5% more cubicles than cows within a management group. There are good cow reasons for this. Never have dead ends to cubicle passages and provide cross passages every 20 cubicles.

Allow at least 10% of cows to drink at once and always provide clean water. High yielding cows drink in excess of 100 litres per day and this increases by at least 50% in hot weather.

Floors should be designed and maintained so cows have the confidence that they can move around buildings without slipping or falling, particularly when the floor is covered in slurry, and which does not cause damage to hooves.

New concrete should be provided with a hexagon finish, with sides of 46mm length and grooves 10mm wide and 6-10mm deep. Existing sound but smooth concrete should be grooved, with the parallel grooves at the same width and depth as for the hexagon finish, but 40mm between centres. The groove should be at right angles to the main cow flow. Squares and diamonds have been found to provide an increase in the number of pressure points on the cow's feet, without any benefit in slip resistance.

Even with TMR/complete diet feeding you should provide at least 0.7m space per cow in the management group at the feed fence, and even greater with cows over 700kg in weight.

The brisket board of the feed barrier should be around 0.5m above the feed stance with the upper rail about 0.7m above it. The top of the cow's neck should barely touch the rail when she reaches forward to feed, with the rail offset about 0.15m away from the cow. The feed trough should be about 0.1m above the cow standing.

Summary

Don't forget that many existing buildings can be adapted without great cost, often by removing walls at the front of cubicles or increasing inlet and outlet ventilation. Think of the animal first and her needs - which is simply a well ventilated, clean, dry lying area with no risk of injury when she lays down or gets up.

By **Duncan Forbes**

XLVets is pleased to continue its series of articles on partners in the Farming Industry. If you are already a member of Kingshay you will be well familiar with their independent and practical research and advice for dairy farmers. If not then this article will give an insight into just some of what they do to help milk producers farm more profitably.

Kingshay's aim is to help milk producers to respond efficiently and effectively to the ever shifting goal posts of the milk market by providing sound, independent and well researched information and advice.

We are based at Bridge Farm, near Glastonbury in the heart of the south west milk field and work with producers throughout the UK, who between them represent over 25% of UK production. We run many of our trials at the farm but also have a wide range of host farms across the country to ensure our tests are relevant to all growing conditions.

All our trials are conducted by our team of experienced specialists whether it is a field scale forage variety comparison, a feeding trial, a machinery test or a survey.

At Kingshay we believe very strongly that healthy cows are the fundamental requirement for generating healthy profits. And one of the underlying reasons why some herds just don't seem to get there is stress.

Stress is the hidden performance suppressor.

Every dairy herd has stress points - it's a practical reality. So Kingshay is launching a new service at the Dairy Event called How's My Herd™. The service helps producers identify and minimise the causes of stress in their system and release the true potential in their herd.

How's My Herd™ puts one of our experienced consultants on your farm, an expert in 'reading' cows and understanding the key factors for a cow friendly environment. The consultant checks out the milking routine, parlour function and teat scores, as well as cow nutrition, feeding facilities, water availability and walking surfaces. He will also ask how you make use of your vet - do you use him as a reactive fire fighter or do you get fully involved in proactive health planning.

He checks out the cow environment for space per cow, light levels, ventilation and suitability of housing to the type of cows.

Many herds today are housed in ageing buildings and facilities. Cows don't care if your cubicles were installed last year or last century but they do care if they are comfortable or not. Kingshay has its own Cubicle Doctor, Technical Manager Dr. Martin Yeates who runs our cubicle demonstration unit at our farm base. Through careful observations he has identified the key measurements that add up to a comfortable cubicle for today's dairy cow. His work has shown that in many cases it is possible to find low cost solutions to high cost problems. The key is to understand what your cows' behaviour tells you; for example on many farms we find cows standing half in and half out of the cubicles. It is a sure sign there's a problem but it's one which can often be fixed at very little cost.

After the visit the consultant will provide you with a concise report with practical recommendations and a traffic light system that prioritises actions to maximise the wellbeing of your cows. You can opt for follow up visits to monitor progress, address issues in more depth, identify further improvements and maybe access specialist training for your farm team such as locomotion scoring.

How's My Herd™ is designed to complement the work you do with your vet to create healthy profits for you from your healthy herd. Just one example of the very practical services Kingshay provides aimed at taking the stress out of everyday life for both herd and herdsman and putting the cash where it belongs - on the producer's bottom line.

Kingshay members have access to all our services and receive twice monthly technical updates by post and via our award winning website.

If you are not already a member why not join at the Dairy Event or call 01458 851 555 or log on to **www.kingshay.com**.

Kingshay membership could just be the low cost solution you need to high cost problems.

Despite being common practice in other species, urine analysis in cattle is not often part of a veterinary surgeon's diagnostic armoury.

Using URINE ANALYSIS in dairy cows...

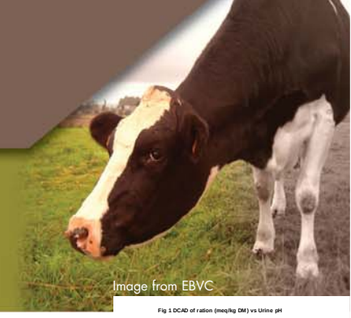


Image from EBVC

However recent advances in interpretation of urinary pH and macro-mineral content now make it an available and interesting investigative tool. James Husband and Richard Vecqueray of EBVC explain how this tool might be useful on farm.

The main indications for urine testing are:

1. Monitoring the acid base balance pre-calving relating to milk fever prevention
2. Monitoring the immediate post calving period
3. Checking the acid base analysis when the cow is in milk

1. Milk fever prevention

The target dietary levels of the major macro-minerals to prevent periparturient hypocalcaemia (milk fever) are reasonably well established (see Box 1). Unfortunately dietary concentrations on paper do not always translate into effective control and a means of monitoring and trouble shooting is desirable.

Box 1 Target dietary macro-mineral concentrations for Milk Fever prevention

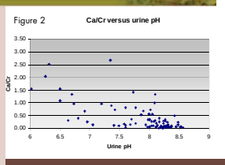
Mg	0.35-0.4%
P	0.30-0.35%
Na	0.12%
S	0.22-0.35%
Ca	0.85-1%?
pH	Depends on the ration

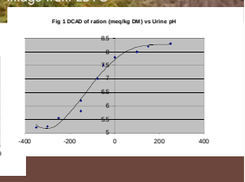
Many studies have identified urine pH as a useful monitoring target to check whether the addition of anionic salts to the transition cow ration is likely to be effective in milk fever prevention. If dietary DCAD (dietary cation anion difference) is reduced to -100 to -150mEq/kg DM, urine pH drops from the usual 8 to 8.5 to approximately 6 to 7. Two recent sets of analysis have identified appetite problems with using anionic salts to achieve dietary DCAD levels of -100 to -150 mEq/kg DM ('the full DCAB system') due to the unpalatability of the salts. There has been a general move away from the full DCAB system towards the 'partial DCAD' system where a smaller quantity of anionic salts is added to the ration and the DCAD is dropped to approximately 0 to 100 mEq/kg DM.

This approach usually achieves effective milk fever prevention and avoids the deleterious metabolic effects of dropping pre-calving feed intakes. However, results in the field tend to be more variable than with a well monitored full DCAB system. It has been observed that a urinary pH value >8.25 in the 48 hours prior to calving accurately predicts that those cows will get clinical milk fever. So whilst there are indicators of what is definitely bad, target values are not well established. Furthermore, because urine pH does not fall in a linear fashion with reducing dietary DCAD (see figure 1) at the DCAB levels commonly used with this method the pH may have hardly changed.

Another area of contention is dietary calcium (Ca). Levels are manipulated upwards with the full DCAB system to 1 to 1.2% DM (usually 120 to 150g) but there is no clear consensus as to what should be done with dietary Ca levels when using partial DCAB. The urine Ca concentration increases with reducing DCAD (metabolic acidification) and is an excellent indicator that Ca is being mobilised (see Figure 2).

Figure 2 Effect of decreasing urine pH on urine Ca excretion.





Creatinine (Cr) is produced at a fixed rate and excreted by the kidney, if urine volume is low, Ca and Cr concentration will be high and hence Ca/Cr will compensate for urine volume effects.

Excessive acidification (dropping the DCAD with an excessively low urinary pH) can cause excessive bone demineralisation, the calcium and phosphorus produced by this demineralisation can be detected.

The serum strong ion difference (SID) is defined as:

SID = Na + K - Cl (all in mEq)

Na = Sodium
K = Potassium
Cl = Chlorine

It is hence very similar to the DCAD equation, giving an indicator of acid base balance. Roche (2003) found that the serum SID changed in parallel with the DCAD showing serum acid base status changing in response to dietary changes. The urinary SID was an even better indicator of the systemic acid base status because it reflects what the kidney is doing to attempt to stabilise the serum acid base status which is subject to strict homeostatic control. Hence, the changes seen in the urine are far greater than those in the blood.

2. The immediate post calving period

Recent work has demonstrated a relationship between sodium (Na), potassium (K), chloride (Cl) and calcium (Ca) in periparturient disease. Low serum sodium and potassium pre and post calving are linked to ketosis and retained placenta. Interestingly, low serum sodium post calving increased the risk of ketosis over 30 times and a low Na:K ratio pre and post calving increased the risk of ketosis too. The true mechanism by which this occurs is not known but is thought to be related to acid-base balance. A failure of Na and K homeostasis may also affect the glucose uptake into cells.

It has been postulated that a ration with a high K content is needed post calving and that Na and Mg are important too for prevention of ketosis.

Summary of urinalysis in immediate post calving period

The acid base balance should be assessed using the same parameters as the pre-calving cows but urine Na and K concentrations are also important, both the absolute values and the ratio between.

Urine pH should return to normal lactating levels (>8) within 3 to 5 days.

Urine Parameter	Use (Pre-calving urine analysis)
Calcium	Demonstrate Ca mobilisation Prevent excessive demineralisation
Phosphorus	Demonstrate mobilisation and hence PTH activity Demonstrate (keto)acidotic ruminal conditions
Magnesium	Vital for milk fever prevention
SID	Acid-base status
pH	Demonstrate precalving metabolic acidification necessary for Ca mobilisation
PCO2	Should correlate with SID and demonstrate degree of acidification

3. The acid base analysis when the cow is in milk

Lactational DCAD has been seen to have effects on dry matter intake (DMI) and yield. An increase in both DMI and yield has been seen as DCAD was increased to 400 and 340mEq/kg DM respectively but declined thereafter. There are situations where sodium bicarbonate is added to rations as a 'just in case' for subacute ruminal acidosis (SARA) which may actually cause a reduction in DMI and yield as well as have deleterious effects on PTH secretion and hence Ca, Mg and P homeostasis if a metabolic alkalosis is induced. Hence, it is useful to know whether SARA is present in the first place. SARA is characterised by production of lactic acid from the rumen to produce systemic acidosis. The origin is different from a change in the acid base balance due to the DCAD effect which is macro-mineral based via intermediary metabolic processes.

The effects of the two forms of acidosis are different and urinalysis can differentiate between them. Both forms of acidosis cause an increased urinary excretion of Cl because the kidney excretes Cl when it is conserving bicarbonate, which it will do to correct acidotic conditions. Ca is excreted under acidosis of a macromineral origin only but P is excreted when the acidosis is of ruminal or macromineral origin.

The reason that P is excreted in both types of acidosis and Ca is not, is that significant amounts of P come from the rumen during acidosis and ketoacidosis as H_2PO_4 which is excreted via the kidney. Hence, the P can come from both the bone and the rumen whereas the Ca only comes from bone and is so its excretion is unaffected by ruminal conditions.

Conclusions

Recent research has highlighted the importance of macro-minerals in milk fever prevention and post calving periparturient disease and energy balance. Urine macro-mineral analysis is a very useful tool to gauge acid base balance and is more accurate than using blood analysis. It has the potential to be a very useful tool for troubleshooting acidosis problems and monitoring.