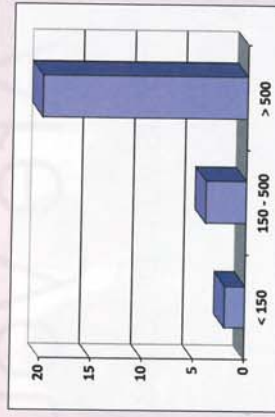




Recycled manure solids normally contain between 20 per cent and 30 per cent dry matter.



Bulk milk samples are a useful way to screen for *Mycoplasma* and *Prototheca*.



Mycoplasma prevalence in relation to herd size in the US.

Update on mastitis from the US

THE annual meeting of global mastitis organisation the National Mastitis Council (NMC) was held in Memphis, Tennessee.

Memphis is famous for a number of reasons, including Elvis Presley's home – Graceland – and the Lorraine Motel, where Martin Luther King was assassinated in 1968. It also has the Civil Rights Museum, which is one of the best museums I have been to. Memphis is also the hub for FedEx. By day, the airport is used for passenger traffic, but at night 10,000 FedEx employees turn up. Five hundred FedEx planes fly in and out and 60 per cent of all global FedEx parcels go through Memphis.

The NMC is an excellent organisation for anyone with an interest in mastitis. Membership is less than £100 and the registration fee for the four-day meeting is £175. Where else can you get CPD value for money like that? In my view, every serious dairy practice should become a member. Go to www.nmonline.org to sign up.

Mastitis is a disease that keeps occurring and as long as there are cows, farmers will always be looking for solutions. As dairy vets, we should be working to help provide the answers.

Mycoplasma mastitis

Mycoplasma is a contagious form of mastitis and is increasing in incidence. The first recorded outbreak causing mastitis occurred in 1962 in a 50-cow herd where 25 per cent of cows had mastitis that came back as culture negative using conventional bacteriology.

Table 1. Prevalence of *Mycoplasma bovis*

Country	Herd prevalence
US	eight per cent to five per cent
Europe	one per cent to 55 per cent to 100 per cent
Mexico, Iraq, Australia	55 per cent to 100 per cent
New Zealand	zero

PETER EDMONDSON
MVB, DipECBIM, CertCHP, FRCVS

reports on what he learned at the 54th annual meeting of the National Mastitis Council – both the latest about the disease and about Memphis

Extended bacteriology testing identified *Mycoplasma bovis*. *M bovis* is the most common strain. It's an emerging problem in many countries where herds are expanding and buying in new animals. In the US, the percentage of herds that tested positive for *Mycoplasma* is clearly associated with herd size (see graph). Prevalence varies greatly between countries. Partly, this relates to how well laboratories look for the organism (Table 1). *Mycoplasma* is likely to be underdiagnosed because it is difficult to grow as it is anaerobic, which means it only grows in the presence of carbon dioxide. It takes about seven to 10 days to grow. The true incidence is probably underestimated as it will not be identified using conventional bacteriology. A PCR test for *Mycoplasma* speeds up diagnosis.

Mycoplasma spreads from cow to cow during milking, but also quarter to quarter through the lymphatic and blood systems just as quickly. Cows can become infected from calves and vice versa. Cows with *Mycoplasma* mastitis must be milked last. They must remain in the hospital pen until either proven cured or they go for culling. Many cows are culled as they go off their milk and dry up. Spontaneous cures do occur and these can only be confirmed following three negative samples. The speed of spontaneous cures can take from one to more than three months. An easy way to screen a herd for *Mycoplasma* is through testing bulk milk. You can pick up one infected cow in a herd of 300 or more from a bulk sample. This should be carried out regularly because if it is present the management of clinical mastitis cases needs to be changed. Cows can be infected and

show no symptoms. About 80 per cent of infected cows develop clinical mastitis. If a tank tests positive, another sample should be taken for confirmation. Infected cows are intermittent shedders, so it can be difficult to detect all infected cows. It is best to test fresh rather than stored or frozen milk as this gives the highest recovery rates. The importance of having a hospital pen cannot be over-emphasised. Cows with *Mycoplasma* mastitis will spread infection to the rest of the herd if they are not kept isolated and milked last. This is why bulk tank screening of milk is important. Staff must know whether the herd is free from this infection.

Some people take a test and slaughter policy, but many herds have been able to manage *Mycoplasma* through good management practices.

Robotic milking

There are now more than 30,000 milking robots in the world, milking more than two million cows. Robots were associated with smaller herds, but this is changing rapidly and herds with between six and 16 robots are common. This trend of robots and larger herds will continue. While robots improve people's quality of life they also impact on wear and tear. People using robots get fewer back, knee, wrist and hand injuries, which is hardly surprising. Robots give consistency and superb performance provided the building and facilities are well designed. One of the great advantages of robotic milking is its consistency. Provided the system is designed around the robot, everything works well. There can be very significant benefits to mastitis and milk quality. More frequent milking

helps reduce cell counts by constantly flushing out bacteria. Quarter milking helps maintain excellent teat health. You get good mastitis detection, but also false positives, although those who understand how the system works can reduce these to low levels. However, there are also limitations, such as poor post-milking teat disinfection. You don't get good cover because robot sprays miss the outer parts of teats. So if you have problem cows in the system these can act as a reservoir to spread infection. More robotic manufacturers are offering steam cleaning for liners between each cow to reduce the transfer of bacteria even further and, provided this works, you should have pasteurised liners going on to the next cow milked.

Robotic milking systems can work extremely well or they can be a disaster from a mastitis and milk quality point of view. This presents superb opportunities for vets to help farmers who have, or are thinking of, investing in this new technology. Bedding materials are decided on a number of factors, including availability, cost, comfort, compatibility with manure handling systems and mastitis control. Availability and compatibility are key factors in decision making. Traditional by-products, such as sawdust and straw, now have significant value as bedding materials. Bedding materials are expensive because there is great competition for all by-products with very few exceptions. Jo Hogan from Ohio State University, and one of the world's experts on environmental mastitis, compared using recycled manure solids to buying used underwear. Its popularity is increasing due to the cost of other bedding materials and also reducing manure disposal costs, but it does not give a very good image to see cows lying on their own faeces. Recycled manure solids contain 100 times more bacteria

than sand bedding and so this carries a risk of mastitis. In areas of high humidity or where management factors are poor in maintaining the beds, the risk of clinical mastitis with recycled manure will be much greater and this has been seen in some herds in south-west Scotland, where there are very high humidity levels and beds can get very wet, especially in poorly ventilated buildings. *Klebsiella* levels can increase to more than one million per gram of bedding in recycled manure solids within 24 hours. *Klebsiella* is shed in cow faeces and problems can occur from contamination splashing up on to teats from alleys and passageways. *Klebsiella* is associated with wood bedding and it is one of the key bacteria responsible for the decaying process in wood. Fifteen per cent of humans also shed *Klebsiella* in their faeces. It is a ubiquitous bacteria.

Some countries compost manure solids for up to five weeks to try to kill off bacteria, but within 24 hours of being put on the beds bacterial numbers increase between 100 and 1,000 fold. We will learn more from UK experiences with recycled manure solids in the future. The pH of bedding materials has been a keen selling point, with various materials having a pH that hinders or stops bacterial growth. The interesting comment from the Ohio group is once these materials are under the cow, the pH changes completely and bacterial growth starts again.

Prototheca is an alga associated with contaminated water supplies. There is no known effective treatment. It is commonly found in the environment and thrives in recycled sand. It is contagious and can be spread from cow to cow via liners. It is also thought to be spread through the lymphatic system from quarter to quarter. It thrives both in the environment and in the udder. *Prototheca* was always considered to be an opportunistic or exotic mastitis organism.

Improved diagnostic techniques have shown its prevalence is significantly higher than thought. It is becoming increasingly common. In 2010, US mastitis testing labs started using *Prototheca* isolation media (PIM) and this increased recovery rates by a factor of 20. This indicates *Prototheca* infections were significantly underdiagnosed before then. It can be picked up through bulk tank screening. You only need one positive cow for the bulk tank to test positive in most herds. There can be a long lag time from infection entering the udder to clinical signs. Unlike most other mastitis organisms, cell counts of infected animals can be low – fewer than 300. Eighty per cent of infected animals do not show signs of clinical mastitis.

There are different *Prototheca* strains, but this is of no relevance from a control point of view. It is essential to identify infected animals and cull them. However, these can be intermittent shedders and, at times, some infected cows are shedding fewer than 100 colonies/ml, which can make diagnosis difficult. *Prototheca* is antibiotic and heat-resistant, but can be killed with disinfectants such as teat dips. Likewise, back flush systems can help to reduce spread between cows. It makes sense to carry out routine bulk tank screening tests for both *Mycoplasma* and *Prototheca*.

● Peter Edmondson and Roger Blowey are running a mastitis and milk quality seminar from November 8 to 10 in Gloucester. Contact rogerblowey@hotmail.co.uk for details.



PETER EDMONDSON is one of 12 dairy vets in the Shepton Molesey Group in Somerset, which looks after 24,000 cows on 150 dairy herds. His main interests are mastitis, milk quality and the interaction of the milking machine and cow. He provides consultancy and tailor-made training for vets, farmers and the pharmaceutical and agri industry.