Johne's disease control: a challenging yet achievable goal

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JOHNE'S disease is an infectious disease of ruminants caused by the bacterium *Mycobacterium avium* subspecies *paratuberculosis* (Map). It is found globally and is undoubtedly one of the most challenging infectious diseases to control in farmed livestock.[1] The challenges stem from its long incubation period, as well as the difficulty in accurately identifying the infection. All tests for Johne's disease have poor sensitivity particularly in the preclinical phase of infection with antibody detection tests having a suboptimal specificity.[2] However, the study by Gavin and others,[3] summarised on p 483 of this week's issue of *Vet Record*, indicates that control and apparent eradication of the infection is achievable, at least at the individual herd level.

While there are numerous potential routes by which infection can enter a herd, overwhelmingly, the most important is through the introduction of infected animals.[4] The report by Gavin and others illustrates this well. In this case, the most likely route that infection was introduced in to the goat herd was through the importation of infected animals, despite all imported animals having tested negative for Johne's disease by either agar gel immunodiffusion (AGID) or ELISA. This highlights the substantial risk of relying on point-of-sale testing for Johne's disease to give purchasers any assurance of the true Johne's disease infection status of individual animals.

The safest way to prevent infection introduction is through operating a closed farm policy where only animals born within the herd are used as replacement stock.[5] To an extent, the risk of disease introduction through animals can be reduced through herd assurance schemes, with animals purchased from certified low-risk herds. Schemes such as those approved by the Cattle Health Certification Standards (CHeCS) (www.checs.co.uk) in the UK have made a significant contribution to this goal. However, given that in most countries most herds are not part of a certification scheme, the paucity of schemes for small ruminants, and the need to align programmes internationally, there remains significant room for improvement. The advice must remain that purchases, whether they are within or between countries, carry with them significant risk of disease introduction – a risk that is of course not just confined to Johne's disease.

There is extensive evidence that on its own a test and cull approach to Johne's disease control is usually inadequate to control infection once it is established in a herd and is typically only one component of most international Johne's disease control programmes.[6] Infection transmission within herds is likely to continue in the absence of additional measures to break the transmission cycle. These largely focus on reducing the likelihood of young animals being exposed to Map. As most

IMPROVING CONTROL OF JOHNE'S DISEASE

- Biosecurity: Reducing the risk of infection introduction
  Avoid animal introductions; if introducing animals, ensure the vendor herd has a high Johne's disease health status; and avoid the introduction of faeces from adults or faecal contaminated materials.
- Biocontainment: Reducing the risk of infection spread within the infected herd
  Identify and remove all 'high risk' animals from maternity and youngstock areas; ensure colostrum/milk from positive animals is not fed to animals that will be retained for breeding purposes; ensure excellent hygiene standards in maternity areas; prevent cross suckling or consumption of colostrum/milk from multiple dams; and as far as possible keep youngstock separate from all adult animals and their faeces.
- Testing:
  Use tests as a management tool to identify higher risk animals; test all adult animals by ELISA (blood or milk), poor sensitivity can, to some extent, be overcome by repeated testing (in general, higher ELISA readings are suggestive of higher risk animals); ELISA test specificity of 98 to 99 per cent will mean that false positive results will occur; cull or manage high risk animals to avoid infection transmission to young livestock; faecal culture or PCR are useful ancillary tests to confirm infection and to identify higher shedding animals. Animals living in an infected environment can ingest Map or Map DNA without becoming infected – this 'pass-through' can be detected in faeces; therefore, care should be exercised in interpreting faecal test results in the absence of ELISA testing.