

# Investigating poor reproductive performance in suckler herds – are we missing a trick?

**Isabelle Truyers DVM DipECBHM, area veterinary manager, Zoetis, discusses the stepwise investigation of poor reproductive performance in suckler herds, bovine venereal campylobacteriosis as a differential diagnosis, and how to optimise success with synchronisation and artificial insemination**



Profitability of beef suckler herds is directly related to the number of calves reared per heifer or cow served annually. The economic consequences of high barren rates can, therefore, be very significant, let alone the costs associated with the diagnosis and management of the problem causing poor fertility.

In recent years, we have eradicated brucellosis, which used to be a major cause of reproductive losses, and many farms now also have disease control strategies in place for bovine viral diarrhoea (BVD), leptospirosis and bovine herpes virus type 1 (BoHV-1).

However, reproductive disease caused either by other infectious, as well as non-infectious, causes are still commonplace. To effectively control reproductive losses, the precise root of the problem must be identified and, since several diseases can cause similar signs, thorough veterinary knowledge and investigation is often required. The first steps in the investigation of a suckler-herd fertility problem are to:

- Review the herd's reproductive history and analyse farm records where available, including the length of the breeding season, bull-to-cow details and pregnancy rates;
- Assess female and male nutritional status, including information regarding body condition scoring, diet formulation and vitamin and mineral supplementation;
- Assess reproductive health, including information from female reproductive tract examination and bull

breeding soundness evaluations where available;

- Conduct a biosecurity audit and assess herd health and vaccination status; and
- Establish the presence or absence of associated clinical signs.

After this, laboratory testing for infectious diseases can be conducted to establish whether or not there is evidence of recent exposure to infections such as BVD, leptospirosis or BoHV-1. However, when the results of these investigations are inconclusive or even eliminate all common differentials, sexually transmitted diseases, particularly bovine venereal campylobacteriosis (BVC), are worthwhile consideration.

## BOVINE VENEREAL CAMPYLOBACTERIOSIS

BVC is caused by *Campylobacter fetus* subspecies *venerealis* (Cfv) and its glycerine tolerant variant *C fetus* subspecies *venerealis biovars intermedius* (Cfvi).<sup>1-3</sup> Infection is transmitted mainly by natural service, but may also be spread during artificial insemination (AI) using semen from infected bulls or through contaminated equipment.<sup>4</sup> Direct transmission between female cattle is unlikely,<sup>5,6</sup> but bull-to-bull spread of infection can occur during mounting behaviour when animals are co-housed.<sup>6</sup> In heifers and cows, the bacteria spread to the uterus and oviducts and pathology is most pronounced eight to 13 weeks after infection. Infection does not affect conception but will typically result in early embryonic death and, so, delayed return to oestrus. Abortions can occur at any time but are

most commonly detected at four to six months of gestation. The disease is generally self-limiting in females and most will recover and conceive within three to six months after infection and immunity persists for several years,<sup>7,8</sup> however, some may remain infected for considerably longer.<sup>7</sup> In contrast, in bulls, the infection is asymptomatic and neither lesions nor protective immunity develop. The bacteria colonise the crypts of the preputial epithelium and, as bulls age, the size and number of these crypts increase allowing persistence of infection (chronic carrier status) and making diagnosis and treatment more difficult.<sup>7,9,10</sup>

**DIAGNOSTICS**

Sensitive and specific diagnostic tests are required in the diagnosis of BVC and to inform and monitor disease control strategies. Current tests include bacterial culture and fluorescent antibody testing (FAT) of vaginal and preputial sheath washings and aborted foetuses and placentas. The use of a transport medium is essential if samples are not processed in the laboratory within the same day of collection. Routine culturing procedures for Cfv and Cvfi appear to have poor sensitivity and for FAT tests the sensitivity and specificity are reported to be 92.6% and 88.9%, respectively.<sup>11</sup> An enzyme linked immunosorbent assay (ELISA) to detect antigen specific secretory IgA antibodies in vaginal mucus is also available. Molecular methods such as polymerase chain reaction (PCR) and sequence analysis can be used for confirmation and discrimination between the subspecies of *C fetus*.<sup>12,13</sup> Considering the difficulties associated with diagnosing BVC, it is advisable to use multiple available tests in parallel to increase the probability of a correct diagnosis and/or to carry out a test in series to increase its sensitivity.<sup>14</sup>

**CONTROL**

There is anecdotal evidence of spontaneous recovery from BVC occurring in young bulls. Successful local and systemic antibiotic therapy has been reported in bulls less than three years old, while culling of older bulls is usually recommended.<sup>7,10</sup> Streptomycin is the most extensively used antibiotic, although streptomycin-resistant strains of

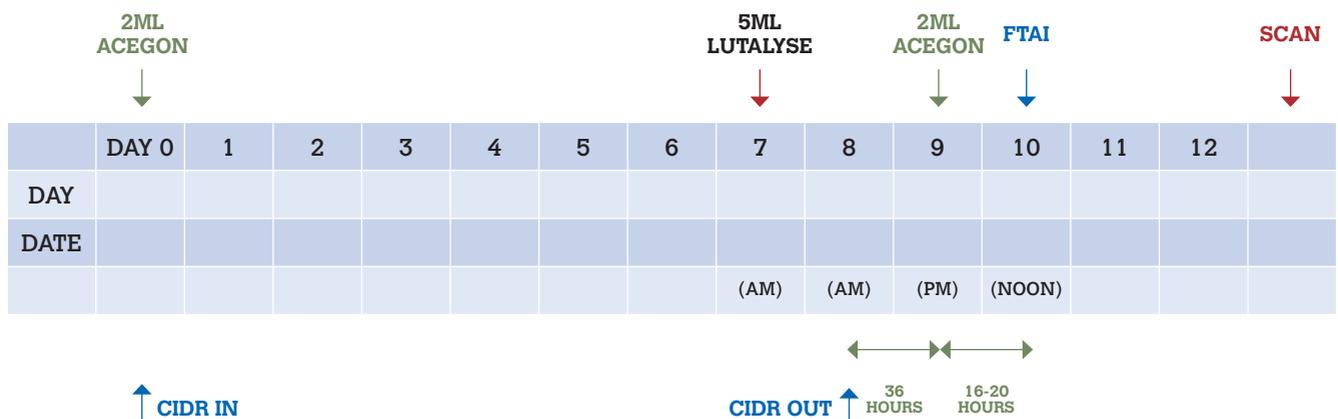
*C fetus* have been reported. Treatment regimes include infusion into the preputial cavity, systemic therapy or a combination of both.<sup>14</sup> Treatment of infected heifers and cows is not recommended because results are poor and most females develop protective immunity enabling them to resist reinfection.<sup>7,8</sup>

Commercial vaccines are unavailable in Ireland, while the efficacy of autogenous vaccines using a bacterial isolate from infected animals on a specific farm is at best unproven. Potentially-infected breeding bulls are frequently culled following the confirmation of BVC, accompanied by a switch from natural mating to artificial insemination (AI). In the EU, all licensed bulls used for AI purposes are tested and free from *C fetus*. Natural mating is ideally not resumed until the last female mated by a potentially infected bull has left the herd to reduce the risk of these animals infecting susceptible bulls at subsequent matings. AI can be used as a simple control method for BVC, but is often considered as impractical for many beef suckler herds, in particular where breeding takes place at pasture. However, synchronisation protocols can be used to facilitate fixed time AI (FTAI) and allow heifers and cows to be bred on an appointed day. This does not only reduce or eliminate the need for oestrus detection but also allows the use of genetically superior bulls and represents an opportunity for genetic improvement of the herd.

**SYNCHRONISATION AND AI**

To optimise success with synchronisation programmes beef heifers should be well grown at 60-65% of the mature cow's body weight. Both heifers and cows should have a moderate body condition score of 2.5-3 at the time of treatment and be on a good plane of nutrition for at least three to four weeks before, during and after synchronisation. Cows should be a minimum of 40 days calved as otherwise they are likely to be in anoestrus and, while progesterone implants will bring many cows out of anoestrus, conception rates at the first induced heat will in this case be reduced. It is also important that other infectious causes of infertility are controlled, that there is a parasite control programme in place and that trace element

**CIDR Synch Synchronisation Programme**



deficiencies are corrected before the start of breeding season. Synchronisation programmes should only be used in herds where facilities are such that animals can be handled safely and on multiple occasions.

It is important to choose a synchronisation programme that best fits an individual herd's situation. Knowledge of farm level factors, reproductive physiology of cattle, properties of hormonal treatments and advantages and disadvantages of different synchronisation programmes is necessary to recommend the most appropriate protocol. Anoestrus is often a major contributor to infertility, because a significant proportion of cows have not initiated cycling before the onset of the breeding season. For synchronisation programmes to be effective, the problem of postpartum anoestrus needs to be addressed and solved.

Synchronisation programmes using gonadotrophin releasing hormone (GnRH), progesterone and prostaglandin F<sub>2</sub> $\alpha$  (PGF<sub>2</sub> $\alpha$ ) can be successfully used in cycling as well as non-cycling heifers and cows and result in earlier conception in seasonal calving herds.<sup>15,16</sup> They are commonly recommended and used for FTAI protocols in suckler herds and maximise herd submission rates as well as the chances of achieving and maintaining a successful pregnancy.<sup>15,16</sup>

### PROGESTERONE

The inclusion of controlled intravaginal drug releasing devices (CIDR) containing progesterone in synchronisation protocols has been shown to positively affect the development of the ovulatory follicle as well as to improve the synchrony of the oestrus cycle. In addition, following ovulation an improved corpus luteum (CL) is formed with higher progesterone levels and normal subsequent luteal phase lengths.<sup>16</sup> Progesterone supplementation as part of FTAI protocols is also associated with more favourable pregnancy outcomes.<sup>15,16</sup>

### GNRH

The inclusion of GnRH at the time of progesterone implant has been shown to increase pregnancy rates by 11-14%.<sup>17</sup> GnRH will ensure that any dominant follicle present at the time of CIDR insertion is ovulated (cycling cows only) and that a fresh follicle develops. GnRH 36 hours after removal of the progesterone implant will synchronise the timing of ovulation for FTAI 16 hours later.

### PGF<sub>2</sub> $\alpha$

Prostaglandin F<sub>2</sub> $\alpha$  and its synthetic analogues will induce the regression of the CL (luteolytic effect) and encourage the ovulation of the dominant follicle in dioestrus cows, thus provoking oestrus.

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