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Bovine Embryo Transfer

It takes four to six months for the eggs in a cow's ovaries to grow to their ovulatory state. Management of the cow during this period is critical in determining their ability to yield transferable embryos that become established pregnancies. Later, it takes another six weeks for the embryo to implant into the dam. So again management during this period is critical. Six months before you plan to start your ET, it is wise to book a half hour session with your vet to talk over your plans

FACTS

Some facts on fertility and bovine embryo transfer (ET):

- About 20% of donors fail to yield any transferable embryos at all

- The average yield of embryos is five per flush - but that can be made up of several ones and twos followed by a 12.

- Perhaps ET results are mirroring normal reproductive performance - conception rates of Holstein cows are reported to be declining at the alarming rate of between 0.5 and 1 per cent every year, although heifer conception rates seem to be holding.

Stress

Poor fertility and reproductive performance can be attributed to stress. This can be caused by a number of factors:

- Genetic stress through inbreeding and continual selection for production improvements
- Production stress associated with higher and higher yields
- Nutritional stress and the early lactation energy gap
- Environmental stress
- Disease stress with mastitis, lameness and infectious disease all having major impacts on fertility

Improving fertility and ET success

Be warned there is no quick fix for improving fertility and ET success rates, but paying detailed attention to all areas of cattle management will minimise those stresses mentioned above.

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Obviously, nutritional management of both the donor and recipients are crucial to the success of ET. A full dietary and mineral analysis for the cattle concerned is recommended, not forgetting to look at the mineral specification of any water supplied from a bore hole.

For six weeks before and after flushing, management needs to be kept steady with no major changes during this period. Ideally, the cow's body condition score should be 2 to 2.5 and rising during this time.

Pre-ET testing for all diseases that might impact on results, plus vaccination if required means that planning must begin a long way in advance. The list of diseases to look for is getting longer and includes BVD, leptospirosis, IBR, Johne's and neosporosis. Again your vet will be ideally placed to help advise on the results.

Remember, both donors and recipients will need testing.

Reproduction and Fertility

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This is normally done three days before the super-ovulatory programme is due to begin. At the same time, the cow's follicular wave is re-programmed by giving her a small shot of gonadotrophin-releasing hormone to make sure there is no dominant follicle present at the time the super-ovulatory injections start.

It is also useful for the number of follicular structures on the ovaries to be counted at this point to predict potential super-ovulatory response.

Usually about 80% of the follicles seen on the ovaries at any time are actually on the way out, but 20% should be capable of joining the super-ovulatory wave.

Flushing the donor cow

Flushing the donor cow should not be done too soon after calving. The cow needs to be away from her period of maximum stress. Observation of a couple of standing heats with a normal inter-heat interval would be a good indication that reproductive capacity is getting back on track.
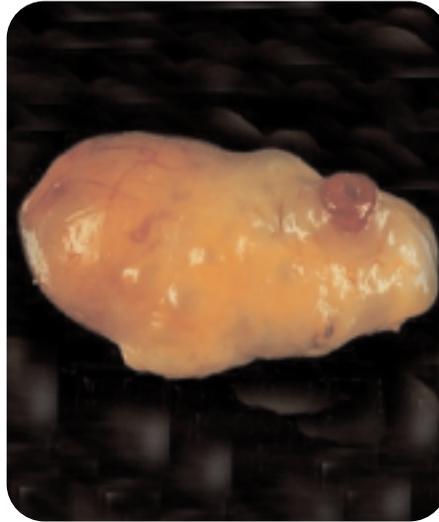
Super-ovulation

Donor cows are normally super-ovulated mid-cycle with a four day series of injections. The vet should examine the donor including a scan of the ovaries a few days before these injections start to check all is well, and a good corpus luteum or yellow body is present on one of the donors' ovaries.

Recipients

When flushing a cow for the first time, bearing in mind the costs involved, it is advisable to prepare three recipients to ensure at least two are capable of receiving an embryo on the day. Often poor quality embryos are flushed and while they could not stand freezing they may have a chance if they are implanted fresh. The better quality embryos can be frozen for implantation on another day.

The next time the cow is flushed then line up as many recipients as there are frozen embryos, so either way you know that all recipients will be implanted.

Cows that flush well once will flush well again, and those that do not will often disappoint again.

Fresh embryos should go into maiden heifers. After this, frozen embryos can be put into recipients seven days after an observed natural heat. This may only be possible if your ET operator is reasonably close. Mature cows are fine but where possible try and use younger ones with good reproductive track records.

ET operators

There is probably little variation in the results of established operators across the country. Much bigger differences will be down to the on-farm factors described above. It is probably best to use the nearest operator, especially if they can offer to put your embryos in after observed heats.

Pregnancy diagnosis

Pregnancy diagnosis should be left later than for normal pregnancies just to avoid the disappointment of late foetal death. The foetus can be sex scanned between days 56 and 65 of pregnancy as by then subsequent losses should be minimal and it can be useful to know whether a bull or a heifer ET calf is expected.

For further information contact your local XLVets practice: