Incorporate hormone-free IVF and recognise the ROI in dairy genetics

Time. The world runs on time. Dairy farmers across the globe are inputting data and waiting for the next round of the results to affect their next breeding decision. Accelerating the right genetics, faster is crucial.

by Dr Bruno Sanches, Vice President of Operations Vytelle Advance, Vytelle. www.vytelle.com

One mating decision can change the outlook of their breeding programme for years to come. If the farmer could speed up time and impact the genetics of their dairy operation sooner, they would, and with in vitro fertilisation (IVF), they can.

Methods of reproduction

Today, approximately 60% of dairy cows undergo artificial insemination. In addition, a once sought-after technology, MOET, otherwise known as conventional embryo production, has been rapidly declining since 2016.

Filling the gap and leading the market is the adoption of IVF technology, the most modern method of reproduction, which aligns with dairy farmers who continuously evaluate their dairy genetics and seek methods of reproduction to match the speed of genetic progress.

Artificial insemination (AI) serves as a constant tool to keep cows bred and in production. Working in harmony with AI is some form of oestrus (heat) detection which is costly and labour intensive.

At multiple intervals throughout the AI programme, the farmer is relying on additional labour, technology, and environmental factors to align for a successful AI pregnancy rate.

Any misstep could result in loss of time – extended calving intervals, slowed genetic progress, and missed breeding opportunities. As with any reproduction programme, management is critical and even more costly with AI.

Hormone-free IVF technology fulfils the same goal of breeding cows to be part of milk production with the added benefit of faster genetic progress. The hormone-free IVF process alleviates the need for any donor preparation.

Oocyte collection is performed without the use of follicle stimulating hormones (FSH), making the process easier on the animals, less labour intensive, and eliminates upfront costs associated with FSH.

Cattle begin follicular development at two weeks old and continually grow and regress follicles on the ovary through their entire lives. Unlike conventional embryo production (MOET), which cannot occur until females reach puberty, hormone-free IVF technology allows ovum pick-up (OPU) from heifers as soon as a veterinarian is able to palpate the ovaries – usually as young as six months old.

A new approach

The hormone-free IVF process centres around the OPU from the chosen donor(s). As part of the OPU process, trained veterinary reproductive specialists can visualise a young heifer's ovaries and follicles with an ultrasound device and use a needle to aspirate the follicles.

Oocytes are then collected, cleaned and fertilised with conventional or pre-sorted semen to the sire (or sires) of choice to create embryos that can be transferred into recipient females.

For farmers looking to make as many embryos as possible in one year, OPU collections should begin as soon as 15 days postpartum, and then continue bi-monthly through 100 days of gestation.

Every 6-10 days a new follicular wave is naturally available for OPU. Donors can be prepared for breeding during their IVF enrolment without needing to take a break from collecting oocytes. Particulars in this setup should be discussed in detail with the OPU veterinarian; that way, they will leave dominant follicular structures on the ovaries that suit synchronisation protocols and the farmer's breeding timeline.

While hormone-free IVF makes it easier on donors, and farmers, no technology is a silver bullet to overcome reproductive management challenges at a dairy.

For effective use of IVF, farmers must first ensure their herd health and nutrition programmes are promoting good conception rates and low embryonic loss within their current reproduction programmes.

Attention to vaccination, proper training of personnel, and donor and recipient

Continued on page 16

Continued from page 15
management are essential. Addressing these basics will enhance the maximum potential of IVF, through embryo production and performance.

Cost of genetic progress

There has never been a better time for accessible and affordable IVF. With one price per embryo, hormone-free IVF can be seamlessly incorporated into any dairy programme.

Some operations question if they can afford implementing IVF but the real question is, can you afford not to? The real value of the embryo lies in the return on investment (ROI). Sexed semen is unarguably cheaper than the cost of an embryo but when comparing genetic progress of AI versus IVF embryos, the results are unparalleled.

Let us use an example to represent the genetic gain difference. According to the Council on Dairy Cattle Breeding (CDCB), the average net merit (NM$) for Holstein females in the USA is $234. For an animal to be designated as 'elite', she will fall into the 99th percentile with a minimum $821 NM. In an AI model, $234 NM donor + $1,100 NM sire = $1,334/2 = $667 NM for the next generation.

In an IVF setting, selecting from the top 5% NM$ in the herd is what creates success. Let us say the next generation results in a $821 NM donor, so $821 NM + $1,200 NM sire = $2,021/2 = $1,010 NM. That is $343 more per animal, skyrocketing the compounding net merit over a larger population of dairy genetics.

The embryo calls for systemic enhancement, eliminating the average or inferior genetics from the gene pool and focusing solely on the best. Rate of genetic gain, thus financial gain, far surpasses what is achieved in an AI programme.

While selecting the most valuable donors for an IVF programme, consider utilising the lower net merit animals as recipient cows for embryo transfer, if they are reproductively sound. Maybe there are only a few qualified donors in the herd, but the need for genetic progress is pressing. In this case, consider buying IVF embryos from another elite herd to diversify and elevate available genetics.

Revamping your breeding programme does not mean starting over. It means rethinking the way you use your existing genetics while replicating your best at a faster rate.

A method for every operation

Whether a farmer is currently using AI or looking to incorporate hormone-free IVF, a comprehensive review of their current reproduction programme and assessment of future goals will aid faster genetic progress.

In order to maximise success through IVF, farmers should ask themselves these questions when designing an embryo programme:

- What are your established goals for genetic improvement?
- How are you currently selecting and measuring for genetic value in your herd?
- What is your cull rate protocol and can you use genetics to identify and select traits to remain in your herd?

Today, cutting-edge, hormone-free IVF technology makes it possible for farmers to confidently and successfully utilise the early-identified, elite-performing genetics sooner, by allowing young dairy females to contribute to the herd's genetic pool earlier, while maintaining their fertility for future breeding opportunities.

Reproduction technology such as IVF tightens the generation interval further by bringing new genetics into a herd from heifers as young as six months or cows up to 100 days pregnant, in just one generation.

As a result, a cow can have several offspring from multiple sires increasing net merit and genetic diversity, in the same amount of time as just one calf produced through natural breeding or AI. ■