

## ***Embryo Transfer***

In the same way that semen collection multiplies a bull's genetics, embryo transfer is regarded as the most economical method to increase and preserve cow genetics. Here is information to help answer most questions, and help the producer decide how to best incorporate embryo transfer into their breeding program.

### **Selecting the donors:**

The selection of donors is very important. Guidelines and benefits for donor selection are:

- \* Use a cow that has proven herself as a good producer. For example the mother of a show champion or a bull that has gone on to be used for AI
- \* A heifer with valuable genetics can be flushed to shorten the generation interval
- \* You are given the ability to choose and increase specific genetic lines
- \* Very expensive or rare semen can be used to achieve more pregnancies.

The quantity of embryos from the donor cows differ greatly according to:

1. Breed
  - a) Crossbreds produce good numbers of embryos
  - b) Most European breeds are also good producers
2. Age
  - a) Heifers produce fewer embryos
  - b) First calves cows are normally under a lot of stress and also produce fewer embryos.
  - c) 3rd up to 7th lactation cows are the best producers of embryos
  - d) Old cows vary tremendously, depending on their genetics and the production stress she has endured in her life.
3. Stage of lactation
  - a) Between 70 and 100 days after giving birth is the best time for flushing embryos. This is after a complete involution of the uterus and just before milk stress starts to play a major role.
  - b) Between 100 and 200 days, milk stress starts to play a major role. Some cows can cope with it, but a smaller quantity of embryos can be expected.
  - c) After 200 days in lactation, milk stress decreases and the cow will start to super-ovulate better again.
  - d) A dry cow is by far the best donor, because less stress.

Because all the donors react differently to hormones, we suggest putting at least 3 cows in the program. If one does not respond, the other two can make up the number of embryos produced. It happened very seldom that all three of the cows will not produce as donors. If only a single donor is flushed and she doesn't produce, all the money and effort would have been wasted. Our advice is to work on a conservative average of 4 to 5 embryos per flush when making your calculations; our average is

probably around 7 embryos over all flushes in time. The more you flush, the closer you should get to the average.

### **Tips for Handling of donor cows for optimum success:**

1. Prior to starting the superovulation process, have the cows examined to make sure their uterus has undergone involution and is clear of infection (pyometria); and that their ovaries are cycling normally.
2. The donors need to be kept calm and free of stress
3. Do not vaccinate the donors within 30 days of starting the process, and do not use pour-on within 7 days and up to the day of flushing.
4. The donor needs to be adapted to her nutrition at least 3 weeks prior to the start of the program, and then should remain constant throughout the process.
5. Injections can be done at home, BUT **the program must be followed diligently and precisely.** Any missed shot can disrupt the process and result in superovulation failure.

### **FAQs - Donor Cows**

**One of the most common questions is how many times and how regularly can the cow be flushed?** A cow can be flushed every 7-8 weeks as long as embryos are produced. The production of the cows in the long run normally differs a great deal. Some cows can be flushed up to 30 times and still produce embryos while other cows stop producing after 3 flushings and then they can only be flushed again after having calved down.

To get a cow pregnant again after being flushed 2 or 3 times is rather easy and no problems should arise from it. If a cow was flushed more than 8 times, you can expect to battle in the case of some cows.

#### **Why do some cows flush poorly?**

When you are looking for reasons why a cow did not flush well, there are 4 main areas that are equally important in order to achieve success, if you have a problem in any of these 4, it will ruin the whole program (“a chain is only as strong as its weakest link” idea)

##### The cow factor

- Some cows (estimated at about 10-15%) do not react to the super ovulation drug. This does not mean that they are infertile, but we’re dealing with a biological system of which every fine detail is not yet understood.
- Some cows produce dead oocytes when super-ovulated.
- Injuries, disease (clinical or subclinical) with a fever may affect the donor.

- Body condition (too thin, or too fat and losing weight)
- Some cow lines within a breed flush well, some do not.
- Some cows only flush well after their calf is removed or being night weaned, especially if she is battling to gain condition during the embryo program.

#### The bull factor

You need really good quality semen for embryo flushing. Semen that may be good enough to use in normal AI programs can give infertilization when used for flushing. The reason for this is that the uterine conditions in a cow that has been super-ovulated is much more demanding on the semen's ability to swim up the uterus, plus the fact that the cow may ovulate over a period of time and the semen must survive long enough to achieve fertilization. It is a good idea to have a straw of the batch you intend to use, checked before the program, or quickly have a vet check the first drop of semen before A.I.'ng with the straw.

#### The human factor

If you made mistakes during the program, like not giving the correct dosages of the correct drug at the correct time, this will influence the result of the flush.

If there is a problem with the management on the farm (unbalanced diet, over robust handling of the animals etc) you cannot expect the animals to react well. Cows need to be in a rising plane of condition and be handled in a minimum stress environment.

If the person doing the AI battles to get through the cervix, or damages the wall of the uterus with resultant edema and blood, this will also cause infertilization. Always use a sanitary sheath when AI'ng to prevent the introduction of infection into the uterus.

The hormone program that we formulate for each cow is a calculated guess, especially if we flush her for the first time. We base this initial estimate on her breed, age, weight, dry or lactating etc. If a cow does not react as one expected, we can change the program to try and get a better response on a subsequent flush.

#### Environmental factors

Cold fronts, unusual rain patterns, heat waves etc can affect donor animals severely. See the discussion on "best time of the year to flush".

Always try and give the animals in the flushing program the pastures with the best grazing, underfoot conditions and protection against the elements, and make sure that they still maintain adequate feed intake during inclement weather.

## **Recipients**

Recipients are one of the most important aspects for success and not enough attention is given to this. It is also one of the most important costs aspects which have to be calculated. Feeding, handling and condition of the recipients are very important areas that are often neglected.

### **Selecting of recipients:**

1. Use fertile animals. Do not use cows or heifers that can not become pregnant by use of A.I. or by a bull.
2. Heifers make good recipients, provided the heifer has reached puberty and are at breeding weight.
3. Thereafter follows 3rd to 6th calvers with a good calving record.
4. The worst recipients are the 1st calvers. One battles to get them pregnant naturally, what chance would you have of getting them pregnant artificially with another cows' embryos. They are much more stressed than other animals.
5. Utilize the animals at your disposal according to their potential. It is cheaper and safer than buying unknown animals.
6. Select the recipients that are big enough to carry the donors' calves.
7. Condition is very important: A condition score from 2.5 to 3 is ideal. Increasing condition is also an advantage. Overweight cows are bad, worse than a cow with a score of 1.5 and in increasing nutritional phase.
8. It is desirable to make use of cyclical animals, animals that are on heat regularly or have been palpated and found to be cycling.
9. Transfer should take place at least 80 days after calving and the required involution of the uterus has taken place in recipients.
10. Do not make use of recipients that has been prepared unsuccessfully twice before. They have proven themselves to be bad recipients.

### **Preparation of recipients:**

1. Follow the program closely.
2. We synchronize with CIDRs. The percentage of cows coming on heat is higher than when synchronizing with prostaglandin (Estrumate or Lutalyse) and the synchronization is closer, making heat observation easier. From the group of cows on heat, a smaller percentage is used, but in total more recipients are able to receive an embryo.
3. About 50-60% of the recipients which have been placed in a program, should be suitable as a recipient.
4. We recommend preparing at least 3 recipients for each cow flushed. Provided there are enough recipients available of course (our biggest problem).

### **Management:**

Where would you find recipients?

1. Purebred Herd:

- In the case where use of commercial cattle as recipients is not available or desired .
- Make use of cattle that you know whose genetic potential would not generate top quality calves.
- Give them the chance to calve from a top cow in the herd.
- After an embryo was transferred and not pregnant, A.I. with good quality semen.
- Lastly she will be served by a bull to produce a calf.
- Suggestion:
  - Use the top 5% from the herd as donors.
  - Use the weakest 72% from the herd as bearers.
  - The middle 20% should first be AI'd and then mated by a bull.

2. Commercial Herd

- The same route is followed if the ranch has purebred and commercial herds available.
- All commercial cattle are used as recipients, provided they are up to standard.
- It is much more valuable to the farmer to have a purebred calf from his top stud cows than to have a commercial calve from his best commercial cow.
- First she gets a chance of being pregnant with an embryo.
- Then A.I.'d by a good bull.
- Lastly a bull serves her.

In both above-mentioned herds the lesser quality cows are used to increase the genetic potential of the top cows.

Embryo transfer is the only way to increase cow genetics and numerous ranchera have seen the potential in a herd from good cow-families or bull-mothers.

## **Management Systems**

Most problems with increased calving intervals can be solved with the correct management in different management systems.

### Having a constant breeding season (ie always start breeding the first of May)

1. Flushing of selected donor cows:

- Donors can be flushed throughout the year and embryos frozen and stored until transfers are done. The donors are then used as producers of embryos and the calving interval for that year ignored.
- Donors can be flushed the day of transfer and the embryos transferred fresh. The donors can be mated 14 days after flushing and very little is lost in terms of the calving interval

2. Transferring into recipients:

- The cows must be mated during the normal breeding season, whether it is purebred or commercial herds.
- Recipients are synchronized at the start of breeding season.

- Those who are unfit for the use of transfers can be injected with Prostaglandin and 72 hours later AI'd. Or they can be synchronised again and AI'd.
- The recipients, who are not pregnant, can be mated by a bull when they come on heat again. (21 days after the previous heat)
- Therefore in 63 days the cows have 3 chances of being bred.
- It is important to do the transfers at the beginning of the breeding season and to make use of the fertile cows, rather than after the breeding season and to make use of all non-pregnant cows.

### **Year-round calving or Spring and Fall Calving seasons:**

Mainly purebred herds make use of this system, but what is of importance here is the selection of fertile animals.

#### 1. Flushing of selected donor cows:

- The same is taken into consideration as with the constant breeding season system. Cows are flushed throughout the year and embryos transferred as recipients are available.

Alternatively a cow is flushed once or twice and then mated. Her embryos are then transferred when recipients are available, or embryos are frozen.

#### 2. Transferring into recipients:

- As the recipients calve, they are prepared to coincide with the flushing of the donors.
- Thereafter the above mentioned applies to breed the cows as soon as possible.
- The recipients can only have one more chance to receive an embryo, but must be bred thereafter.

### **Tips for handling of recipient cows for optimum success:**

1. The cows need to be kept as calmly as possible. Make them familiar with the pen where transfers will take place.
2. Give Vit. A, D and E and minerals 4-6 weeks before the transfers (We recommend use Multimin).
3. The cows must be kept on the same grazing or feeding and receive the same supplements from 6 weeks before transfer until pregnancy is confirmed at 2 months.
4. Do not change feeding shortly hereafter. Gradually change over a period of 3-4 weeks.
5. Pregnancy examinations must be done at 45 days. The transferred embryo develops slower than in the case of natural conception. The fetus is also much more sensitive, and therefore resorption takes place easier.

### **Around Calving**

Most of the recommendations are the same than for normal circumstances. Everything is much more sensitive and the financial importance much bigger. Remember, the calf is worth much more than the recipient.

In most cases the donor is a big cow (that is the one reason why she is flushed) and her calves much bigger than the recipients' natural calves, so calving problems are always a possibility.

1. Do not overfeed the recipient in the last trimester, to prevent the calf from growing too big.
2. Save the calf. If it feels too big or there are any concerns, call us sooner rather than too late.
3. Be sure someone experienced is available when the recipients calve to recognize any problems.

Follow the program closely. Contact us immediately in case of any problem situations or questions. Everybody works for success! Only with good results can embryo transfers be applied economically.