SEXED SEMEN GUIDE (Uses in ET & IVF)

The Power of Sexed Semen

When breeders decide that calves of one gender may be more valuable than the other in relation to their breeding program, they can turn to the technology of sex-sorted semen. Sex-sorted semen became commercially available to the cattle breeding industry in 2003. Since then, this technology has allowed breeders to increase the odds of males or females sired from a number of bulls whose semen has been collected, sorted, and subsequently frozen. Dr. David Faber, President of Trans Ova Genetics indicated that Trans Ova has been providing sexed semen options to their embryo transfer (ET) and in vitro fertilization (IVF) clients since 2005. They also developed a technique in which previously frozen semen, can be sexed after it has been thawed. This technique, which is also called reverse sort, coupled with IVF, has opened the door for breeders to use sexed semen on virtually any bull with high quality frozen semen.

Today, sexed semen is produced in predominately 2 - 3 million sperm straws or 5 million sperm straws which are packaged in ¼ cc straws. They are used for artificial insemination (AI), embryo transfer (ET) and in vitro fertilization (IVF).

Embryo Transfer: Sexed Semen Use in ET

With the appropriate application and understanding, the use of sexed semen in conventional embryo transfer (ET) can be a valuable tool for the beef or dairy producer, as breeders can significantly increase the chances of gender-selected offspring, thus adding predictability and value to their herds.

Cole Wagner, the Sexed Semen Lab Manager at Trans Ova Genetics suggests that when breeding a donor with sexed semen, breeders use 10 to 15 million total sperm or two to three 5 million sperm straws. He also suggests that those donors be bred later than conventional embryo transfer breeding schedules, with one unit at 10 - 12 hours post estrus, 1 unit at 20 hours post estrus and 1 unit at 30 hours post estrus. Donor cows selected for sexed semen use should be younger, fertile donors. If a breeder desires to use sexed semen on older or problem donors he suggests that they do so in an IVF program. Although it is possible to see a slight reduction in the number of total fertilized embryos per flush when using sexed semen, the sex ratio of the resulting embryos will be approximately 90% accurate for the gender chosen.

With embryo transfer, breeders have the ability to obtain multiple calves of the sex they desire from several different sires in a single year. Combining the technologies of sex-sorted semen together with advanced reproductive technologies can help today's breeders multiply the success of their elite genetics.

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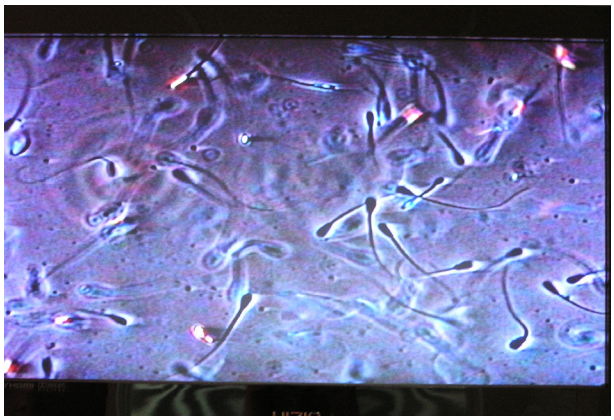
IVF: The Best Place for Expensive or Sexed Semen



While sexed semen use in embryo transfer practice suggests the use of two to three units of sexed semen per superovulated donor, some breeders have opted to take the risk and use only one straw of sexed, or even rare or expensive semen, to inseminate a donor at 12 hours post standing heat (estrus). The down side to taking this risk is the increased chance that some oocytes (unfertile eggs) may be ovulated early, or late, and will result in unfertilized embryos. And in some cases, no embryos are produced or recovered from a donor cow.

A breeder can reduce his risk significantly by utilizing In Vitro Fertilization (IVF) technology which provides an enhanced opportunity for success by maximizing the ability to create embryos from one or two units of sexed semen. IVF generally requires less semen than ET. The amount required will depend on semen quality and oocyte numbers. . If a large number of oocytes are aspirated from one donor cow, the oocytes can be divided into two groups so that semen from two different bulls can be used.

Sorting Semen Prior to Freeze or Sorting Previously Frozen Semen

Sexed semen is prepared and marketed commercially by major bull studs or breeders. This semen is collected, sorted for gender and then frozen. But it is also possible to use frozen semen that is sexed after thaw (reverse sort technology), creating an additional opportunity to produce sexed embryos from a conventional straw of frozen semen on virtually all bulls with high quality frozen semen. This technique, when coupled with the use of IVF technology, creates an incredibly powerful tool for producers by making gender selected offspring a reality from any virtually any bull.

What's the best option for me?

How do breeders determine if the use of sexed semen is a wise choice for their program? Most importantly, breeders must evaluate if there is a significant difference in the value of the male and female offspring from a particular donor cow. If there is not a significant value increase for one sex over another, un-sexed or non-sorted semen will provide the best results at the lowest cost. But if there is a difference in the sales price per gender, sexed semen use in AI, ET or IVF can result in significant value creation for the breeders who are wise enough to utilize the technology in their programs.

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Expectations with Sexed Semen

Whenever a new technology is employed in a breeding program, it is prudent to weigh the advantages and disadvantages and set expectations for success. This is a summary of those expectations for sexed semen use:

	Using Sexed Semen in Embryo Transfer	Using Sexed Semen in In Vitro Fertilization
advantages	• The advantages of using sexed semen outweigh the slight reduction in viable embryos. Even if a breeder produced less total embryos, he/she is still ahead with the total number of gender specific embryos. This generally results in an increase per collection of gender specific calves that have significantly more value per calf for the breeder. • The ability to decrease gestation costs of the unwanted sex may be significant. If a breeder has a limited number of resources or recipients, the opportunity costs of having half of his calves being the unwanted sex can be particularly high. In these situations, the most cost effective means is to decrease the ratio of the unwanted sex at fertilization. • ET embryos freeze well and when coupled with sexed semen may provide additional domestic and export sales opportunities and revenue per embryo.	• Although expenses may be slightly higher in IVF, the number of sexed embryos produced per aspiration procedure may be higher than ET resulting in less expense per viable sexed embryo. One other advantage is that an IVF aspiration can occur every two weeks. • Semen that is sexed prior to freeze, and semen that is sexed after it is frozen (reverse sort), both work very well in an IVF program. Reverse sorted semen should not be used for embryo transfer purposes. • Breeders can expect a 95 percent or higher sex ratio when sorting previously frozen semen for use in IVF. Sorting for females provides a slightly higher accuracy than sorting semen to produce males. • Multiple donors (5+) can be fertilized with one straw of sexed semen. When using Reverse Sorted semen we suggest that the client expect to use approximately 1 unit of semen per donor aspirated. • Almost all bulls with high quality frozen semen can be used to produce sexed semen for use in IVF, making virtually any bull that has frozen semen available for purchase a candidate for reverse sorting. • The ability to create an extremely high percentage of the gender desired, and eliminate the gestation costs of the unwanted gender is significant, particularly when pregnant recipients are purchased. • The additional value created by having more offspring of the desired gender can be financially significant to any breeding program.
dis-advantages	• The fertilization rate with sexed semen can be lower than the rate expected from conventional non-sorted semen. The number of viable embryos produced may be reduced by 10 to 50 percent when compared to unsexed controls. o There are two main reasons for this decrease. • First, the semen has been through the sorting process, which adds additional stress to the sperm cell. • Secondly, low dose inseminations are being utilized. Conventional straws of semen contain approximately 15 to 40 million sperm, while sexed semen straws prepared for embryo transfer contain approximately 5 million sperm.	• When analyzing the use of IVF and sorting previously frozen semen, the results are effectively the same as using unsorted semen so there are few disadvantages to using sexed semen other than cost of semen and slightly higher expenses for IVF procedures. • IVF embryos don't freeze as well as ET embryos, so when producing IVF embryos with sexed semen it is suggested that the resulting embryos be transferred fresh into recipients for the best results. This may result in more purchased recipient expense or off season calves.

For breeders looking to speed up genetic advancement within their herd in order to meet demand and multiply the success of their best genetics, the combination of IVF and sexed semen is a beneficial and logical choice.

Questions?

Contact a Trans Ova Genetics
client service representative:
Iowa: (800) 999-3586
Missouri: (800) 372-3586
Texas: (866) 924-4586
Maryland: (866) 774-3162