

Welcome to the Ice Age: Using Frozen Semen and Embryos in Today's Horse Breeding Operations

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© Iron Horse Equine

The first reported pregnancy with frozen semen was in the 1950's, yet frozen semen is only just now being used world wide in the horse industry. Frozen embryos came to light in the 80's and now frozen embryos from some of the worlds' most elite horses are available for sale on the internet. You now have access to the BEST GENETICS in the world! But is the industry using all of this technology to its full potential? Just how many breeders are using the frozen methods of breeding and what are their success rates?

Frozen Semen

In today's horse industry, there are few breeding operations that utilize frozen semen to its full capacity. Most mare owners feel it is too expensive and too risky to use frozen semen due to the lowered success rates compared to transported semen. But is this really what is happening in the breeding shed?

Frozen semen allows for:

Stallions to continue a performance career

Flexibility in the breeding shed

Allows mare owners to obtain semen anytime, even before their mare cycles (rather than waiting for the 24 hr notice)

If collection problems occur, there is a back up in place to not miss a cycle

Storage of semen after death of stallion

Banking of genetic information from the stallion

Shipment of semen worldwide

The Process:

In general, semen is collected from the stallion using an artificial vagina. The semen is extended with an extender and centrifuged or spun at a speed of 500 x g, which will concentrate the sperm and remove the seminal plasma portion of the ejaculate. The sperm are re-suspended into a freezing extender containing a cryoprotectant, glycerol, and egg yolk. This suspension is then packaged into 0.5 ml straws, shown here, sealed and then cooled down to 5 ° C. From this temperature, the straws are then placed in liquid nitrogen vapour at a temperature of -120 °C, then plunged into the liquid at a temperature of -196 °C. The straws are then stored at this temperature for future use. Sperm stored properly at this temperature will survive indefinitely, making this a secure method of banking the genetic information of the stallion.

Using Frozen Semen:

Frozen semen is becoming more widespread now due to the acceptance of this technology by most breed associations for registration purposes. Shipping of the frozen semen can be done at anytime throughout the year. One does not have to wait until the mare is ready to order the semen. In fact, you can have the semen shipped January to December through the cattle network at a cost of approximately \$15 per dose. Compared to transported semen, which is approximately \$65 within Canada using commercial priority shipping companies, shipping frozen semen can be cost effective. To breed a mare with frozen semen, a veterinarian must ultrasound the mare every 6-8 hours until ovulation. Once ovulation has been determined, the straws are thawed to body temperature as per the recommendations of the facility which carried out the freeze. This is critical, as the thawing stage, if not performed correctly, can induce damage to important membranes required for fertilization. Insemination is slightly different than with fresh semen, and still uses an insemination rod but with a plunger to push the semen through the straw and into the uterus of the mare.

Success of Frozen Semen:

Some vets are not skilled in this type of breeding and as a result, a lower success rate in the industry has been reported. BUT, this technology enables a mare owner to select a stallion from anywhere in the world. Yes, in the world! So why is everyone not jumping at this opportunity? As far as cost is concerned, frozen semen will be approximately the same in costs when comparing to using transported semen. It is based on success. On average, the success with frozen semen, nationwide, all breeds, is approximately 30-75%. Why the variation? Handling of frozen semen and timing of insemination are the largest factors. Anyone interested in using frozen semen should investigate the whole process in order to achieve higher success. Find a qualified individual to help you with the process, as a little research will pay off in the long run.

Thawing and preparing frozen semen for artificial insemination.

By Jos Mottershead

In order for maximum reproductive efficiency to be gained from the use of frozen equine semen, it is essential that the product be frozen, stored and thawed correctly. It is important to note that even if all these facets are carefully covered, reliability of frozen equine semen is still immensely variable from stallion to stallion.

The upper straw is the larger 5 ml straw (with the upper scale on the ruler in inches), the lower the .5 ml straw (lower ruler scale in centimeters)

In North America, the most commonly used packaging systems for frozen stallion semen are the five milliliter "macro" straw and the one-half milliliter straw. There is tremendous dissension among freezing centers as to which size straw yields the best result. The macro straw is possibly easier to handle during the freezing process, which can be carried out completely manually and an entire insemination dose can be frozen in a single straw or two, which is convenient from the inseminators point of view. The one-half ml straw on the other hand, can be used with mechanical processors, which is useful in cases of "mass production" and yields a more equal freeze throughout the straw, as the diameter is considerably less than that of the macro straw. For the sake of this article, we will merely discuss thawing protocols and the differences between the two systems and not attempt to pass judgment. This article will also be limited to the general parameters, and if a different thawing protocol is recommended by the freezing technicians for some semen that you are in possession of, please follow their recommended protocol, as they will have tested various protocols, and again, there is a degree of "stallion variability" in which time and temperature works best.