BREEDING WITH FROZEN SEMEN

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The birth of the first foal conceived using frozen semen occurred almost 50 years ago. Use of frozen semen was approved by the AQHA in 2001 and more recently the rule was adjusted/an amendment was passed to allow for the use of frozen semen from a given stallion even after he has died.

Frozen semen has several distinct advantages over fresh and cooled semen. First and foremost, the genetics of a valuable stallion can be preserved indefinitely by stockpiling doses of frozen semen in the off-season. Frozen semen can be sent to the mare breeding farm as soon as the contract or breeding agreement is signed, eliminating the need for same-day or overnight courier service, as is required with cooled semen. Semen can be thawed 'on demand' for breeding a mare with a history of unpredictable ovulation. Frozen semen also provides a good back-up in case the stallion cannot be collected, there are too many mares to breed on a given day, or if a shipment of cooled semen becomes lost in transit. Export of genetics is another valuable advantage of frozen semen.

The primary disadvantages of frozen semen in an equine breeding program are stallion variability in response to freezing, cost to collect, freeze and store semen, intensified mare management, and slightly lower pregnancy rates per cycle. Spermatozoa from some stallions do not tolerate freezing and thawing. Consequently, post-thaw motility and pregnancy rates can vary greatly between stallions. Performing a 'test freeze' is very valuable in determining if semen from a given stallion can be frozen successfully and what freezing extender is optimal. A minimum of 30% progressive motility should be present post-thaw for a stallion to be considered a 'good freezer'. Proper storage and handling of frozen semen is critical for future success. Straws of semen must be stored in liquid nitrogen at a temperature of -196^{o}C until thawed immediately prior to use.

Directions for thawing semen are usually provided by the person that initially froze the semen. Semen frozen in 0.5-ml straws is typically thawed in a 37^{o}C water bath for 30 seconds, while semen frozen in larger 5.0-ml straws are often thawed at 50^{o}C for 45 seconds. The number of straws required for a breeding dose is dependent on the total number of sperm in the straw and the insemination technique. A breeding dose may consist of anywhere from one to eight straws. While frozen-thawed semen is commonly inseminated into the uterine body, many veterinarians are now depositing the semen near the tip of the uterine horn adjacent to the preovulatory follicle in the hope of increasing pregnancy rates.

The timing of inseminations and the number of inseminations is dependent on the number of breeding doses of frozen semen available for a given estrous cycle. I usually try to inseminate a mare with one dose of frozen semen within 8 to 12 hours *before* she is predicted to ovulate and again within 6 to 8 hours *after* she is confirmed to have ovulated, if two doses are available. If only one breeding dose is available, the mare is examined 3 to 4 times per day as ovulation approaches and the mare is inseminated immediately after ovulation is detected.

Prediction of ovulation and timing of insemination with frozen semen is facilitated by administration of ovulation-inducing agents, such as hCG or deslorelin. Typically, a mare in estrus would be given one of these agents once a follicle larger than 35 mm in diameter is detected. In most instances, ovulation will occur in 36 to 40 hours after hCG or deslorelin administration.

It is important that an ultrasound examination be performed on a mare the day after insemination with frozen-thawed semen. Some mares (especially older maiden mares) may pool fluid in their uterus after being bred with frozen semen. This may be treated with a combination of uterine lavage and oxytocin therapy.

Average pregnancy rates per cycle for mares bred with frozen semen are 30 to 40%. Some stallions may have per cycle pregnancy rates of 50 to 70% using frozen semen, while frozen semen from other stallions will be unsuccessful in getting mares in foal. In general, pregnancy rates per cycle using frozen semen are 5 to 10% lower than with cooled-transported semen. Consequently, more Quarter Horse mares are bred with cooled-transported semen in a year than with frozen semen.

Management of mares for breeding with frozen semen may seem intimidating. However, by following a few simple guidelines, frozen semen can be used very successfully in a breeding program.