

# The Short Straw: Equine Breeding Management Options

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## TO BREED OR NOT TO BREED

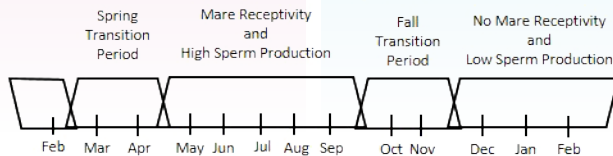
What a great question! Responsible breeding is influenced by many factors, including genetic makeup, conformation, intended use and a thorough understanding of the economics and time commitment required from breeding to training. Considering the plight of the unwanted horse, always consider what will happen to the one you will be making! A realistic outlook and understanding of what is involved can help prevent disappointment and financial surprises.

### Breeding Management

Mares are seasonal breeders, meaning they begin cycling as daylight increases in the spring. Mares may have up to five natural heat cycles per year. Cycles can be manipulated by administering hormones or by keeping mares under artificial lighting for up to 16 hours per day. The optimal breeding age is 4-15 years old, with a decline in fertility from 15 onward.

Key factors for sperm production include the stallion's testicular size, age, ejaculation frequency and libido. Sperm production is also affected by day length and can be manipulated by keeping stallions under lighting. The optimal breeding age is 3-15 years old, with a possible decline in fertility from 15 onward.

#### Seasonality in the Mare and Stallion

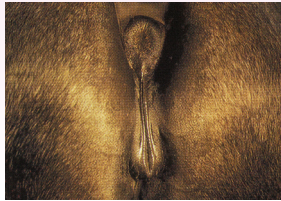


### Breeding Soundness Exam (BSE)

Overall, a BSE evaluates the mare's genetics, conformation, performance quality, age, temperament and health. A BSE should be performed by a veterinarian in late summer or early fall prior to intended breeding. Foaling history, rectal and vaginal exams, ultrasound and uterine pathology should be considered.



Overall, a stallion BSE should evaluate genetics, conformation and performance record. A veterinarian may ultrasound and palpate testes to be sure they are of appropriate size and have descended. Semen should be collected for evaluation one to two times prior to the start of each breeding season. Fertility evaluation includes adequate sperm concentration (30-600 million/ml), semen volume (30-250 ml), morphology (> 60%), and motility (> 60%).



### Nutrition for Breeding Success

Mares at a Body Condition Score (BCS) of 5-7 are more likely to conceive and maintain pregnancy. A pregnant mare's nutritional requirements increase gradually during the first two trimesters. The highest nutritional demands are during the last trimester and the first three months of lactation. Contact your local Extension agent or equine nutritionist to develop a nutrition plan. Quality hay should be provided at approximately 2 percent of body weight. Consuming endophyte-infected tall fescue should be avoided during the last trimester and early lactation to prevent fescue toxicosis, which causes prolonged gestation, dystocia, and reduced or no milk production.

Maintaining a BCS of 5-6 can increase a stallion's reproductive performance. While a poor diet can negatively affect semen quality, owners should also beware of obesity. Joint and back issues and metabolic issues like Equine Metabolic Syndrome can negatively impact performance. Some stallions may see improvements in semen motility with omega-3 fatty acid supplementation. Regular exercise and a maintenance diet are best, as caloric needs only increase 1.25 times when breeding.

### Health Management

Illness can negatively impact fertility. It is recommended to keep pregnant mares away from young horses and horses who travel often. Use separate equipment for cleaning stalls, grooming tools and buckets. Your veterinarian should administer the EHV-1 vaccine at five, seven and nine months of gestation, and the core vaccinations (rabies, tetanus, West Nile virus and Eastern/Western equine encephalitis) again five weeks prior to foaling. Parasite management should also be considered, but avoid dewormers during the last four weeks of gestation. Additional testing and/or vaccinations for sexually transmitted diseases such as Equine Viral Arteritis or Contagious Equine Metritis should be evaluated before re-breeding.

Illness can negatively impact sperm quality. Your veterinarian should administer core vaccinations (rabies, tetanus, West Nile virus and Eastern/Western equine encephalitis) as normal. Any additional vaccination considerations, such as EHV-3, which can cause lesions on the stallion's penis, should also be administered. The veterinarian should also verify the stallion is negative for any sexually transmitted diseases, as proof of negative test results within the previous 30 days is a requirement in most breeding operations. EVA causes fever and inflammation in the external reproductive organs. Testicular tumors and reproductive tract infections can cause problems as well.

## BREEDING METHOD OPTIONS

Aside from natural breeding, assisted reproduction techniques (ARTs) are used to increase the number of offspring, preserve and disseminate bloodlines, decrease disease transmission, combat subfertility, or maintain animals in competition for breeding. This section explores the most popular options.

### LIVE COVER

Despite the advancement of ARTs, live cover remains a popular choice. This is mainly for Thoroughbreds, due to the Jockey Club's registration requirements. Highly sought bloodlines retain their value through fees and sales. There are two types of live cover: pasture and in-hand.

Pasture breeding allows a stallion to breed one or more mares in a natural setting. But it is less frequently used due to greater risk. In-hand breeding allows for greater control and increases the number of mares a single stallion can cover.

Facility design, safety of the horses and handlers, and possible health risks must be considered. Facilities should be designed for safety and comfort. The area should have secure footing, be large enough for all participants to move safely, and be easily sanitized.

Some stallions are hesitant to mount, while others may be aggressive. They may require multiple training sessions before they are ready to breed. It is important to secure the mare, often done with felt boots, hobbles or sedation. Teaser stallions can identify receptive mares and increase the possibility of conception.

Horses can carry sexually transmitted diseases like Equine Viral Arteritis and Contagious Equine Metritis. Health screenings are performed on both mare and stallion 30 days prior to breeding, with cultures often being an additional requirement. Washing both mare and stallion prior to breeding can decrease risk for bacterial uterine infection.

Booking breedings can cause additional stress. Highly sought stallions breed up to three times per day, and if the mare is cycling she may be vying for a spot in the breeding shed with several others. The stallion manager will do their best to accommodate, but the mare may have to wait until her next cycle.



### ARTIFICIAL INSEMINATION (AI)

Now approved by all breed registries (except the Jockey Club), artificial insemination is the most popular and often least costly ART. This strategy allows wider dissemination of genetics on an international scale, improves options for subfertile mares and stallions, decreases physical risk, and minimizes spread of venereal disease.

A stallion can be collected and semen immediately processed, loaded into a straw, and frozen to inseminate the mare.

Frozen semen, diluted and stored at -320 F, means semen can be kept indefinitely. This provides an opportunity to breed horses on different continents and allows for preservation of desired genetics, even after the stallion's death.

Another option is cooled semen, which increases longevity of the sperm for 36-48 hours. Diluted and cooled to 41 F, this option allows shipment of semen to the mare's farm, eliminating additional travel costs. Multiple mares can benefit from one stallion's genetics. This ART also allows for multiple breedings to the same stallion on the mare's natural cycle schedule.

It is important to remember that not all stallions produce the same quality semen, and not all semen may cool or freeze well.



### EMBRYO TRANSFER (ET)

Another widely used ART, ET allows veterinarians to transfer embryos from a donor mare to a recipient. The donor mare is bred, and her uterus flushed seven to eight days postovulation to collect the embryo. The embryo is then inspected and transferred to a recipient mare who will carry the foal to term.

This is ideal for actively competing animals who cannot take time off to reproduce. It is also ideal for subfertile mares, or mares unable to support a foal to term. It also increases the number of foals one mare can produce by allowing multiple embryos to be flushed over a period of time and transferred during a single breeding season.

Embryos can be cooled to 41 F or frozen for shipping to recipient mares in another location. Recipient mares are monitored and synchronized to ensure receptivity when the embryo is ready for transfer. The recipient mare will carry, deliver and care for a foal who lacks any of her genetic makeup.



### OOCYTE TRANSFER (OT)

Oocyte transfer is currently the most effective method to obtain a foal from a single oocyte. Designed to avoid reproductive tract issues including cervix, uterus and/or oviduct abnormalities, OT is ideal for subfertile mares or those unable to support a foal to term.

Similar to embryo transfer, a donor and recipient mare are required. One or more of the donor mare's oocytes are removed using transvaginal follicular aspiration from preovulatory follicles. Follicular fluid and the oocyte are collected into a sterile container, and the oocyte is either placed directly into the recipient's oviduct, or incubated prior to transfer.

Recipient mares can be chosen based on synchronization with the donor mare, or they can be treated with hormonal regimens to induce their cycle. If the recipient is naturally cycling, oocyte removal from her preovulatory follicle is required to ensure the donor mare's oocyte is fertilized.

Surgery is then performed to place the donor's oocyte into the recipient's oviduct for fertilization. Insemination can occur before or after transfer, or both.



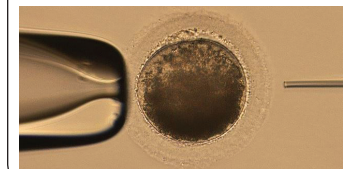
### INTRACYTOPLASMIC SPERM INJECTION (ICSI)

Breeders often seek this ART in more extreme situations for mares who are unable to become pregnant, when the mare has died, or when semen availability is critically limited. It is only recommended for use in mares who are not candidates for other ARTs. Additionally, ICSI is offered by only a few clinics in the United States, making it the more expensive option.

With this technique, a viable individual fresh, cooled or frozen sperm is injected directly into an oocyte aspirated from the donor mare's follicle. Multiple oocytes can be fertilized and transferred to multiple recipients, maximizing the number of foals.

The resulting embryo is then either transferred into a recipient mare or frozen for later use. After fertilization, immediate surgical transfer to the recipient mare is one option. Another is to mature the embryo for one to two days, then surgically transfer it directly into the recipient mare's oviduct. Or, the resulting embryo can be matured for six to nine days, then an ET is performed.

Currently, pregnancy rates are lowest with ICSI than any other ART, mainly due to the novelty of the procedure and lack of available research data.





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