PUSHING THE ENVELOPE WITH EMBRYO TRANSFER

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Even though commercial embryo transfer (ET) services have been offered for over 25 years, not all breed registries have readily adopted this advanced technique. Common concerns over flooding the market with too many offspring prevented certain associations from allowing its use. However, as the years passed more and more organizations felt the demand from their constituents. It has become apparent that the advantages of transferring an embryo from one mare to another far outweigh any disadvantages. To date, over 85% of the breed registries/associations in the United States allow the use of embryo transfer with or without certain conditions.

The largest breed registry in the world is the American Quarter Horse Association (AQHA). For years, AQHA has permitted embryo transfer use but limited it to only registering one embryo transfer foal per mare per year. It was not until 2002 that pressure from its members prompted removal of this restriction thus permitting unlimited numbers of foals to be registered from a given mare. Since this latest change, Quarter Horses have surpassed Warmbloods in being the most prominent breed to utilize the embryo transfer services at Equine Reproduction Concepts (ERC). In the past 4 years, 45% (44/98) of the entries were Quarter Horse mares while Warmbloods represented 25% (24/98) of the ET accounts.

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Although most clients are only looking to obtain 1 or 2 ET foals from their mare, there have been certain breeders who expressed interest in acquiring as many foals as possible. When first approached with such an idea, it's usually with grand plans of having several foals during the same year. Although we make every effort to achieve the client's goals, part of our responsibility also lies in properly educating them on what to expect. Through experience we have learned that expectations can become obtainable only when an inevitable sense of idealism is met with an adequate dose of reality.

To achieve optimal success, it is important to understand those variables that influence embryo recovery and transfer rates. Mare reproductive soundness, semen quality, timing of insemination relative to ovulation, and technical experience are all factors that affect whether or not one is successful in obtaining an embryo. In addition, exposure to situations of prolonged stress (i.e. nutritional deficiencies, extensive exercise, etc.) has been implicated as altering embryo recovery rates. Compromises in any one or more of these areas can have a dramatic effect on the outcome. Generally speaking, if a reproductively sound mare is bred with sufficient amounts of viable semen (250-500 million progressively motile sperm) one should expect a 60-65% embryo recovery rate per cycle. With fresh or cooled semen, insemination should occur 24 before ovulation to 12 hours after. For optimal results with frozen semen, mares should be bred 12 hours before to 6 hours after ovulation. Frozen semen should only be used in an ET program if it has already been proven to obtain pregnancies. Also, expect a slightly lower embryo recovery rate when utilizing frozen semen.

Once an embryo is recovered, it will then be transferred into a recipient mare. Pregnancy

rates following transfer are dependent on embryo quality and size, age of donor mare, estrus synchronization/reproductive status of the recipient, and expertise of practitioner. To minimize the recipient's influence, all mares in ERC's herd have been thoroughly examined for reproductive soundness. In addition, nutritional status and estrus synchronization relative to the donor mare are carefully monitored. If an appropriate recipient is used, one should expect a 65-70% pregnancy rate following transfer of a good quality embryo (Grade 1 or 2, scale: 1-5) collected on Day 6, 7, or 8 post-ovulation. Embryos older than Day 8 tend to be too large and fragile to successfully transfer. Adequate technical expertise should also be emphasized since success rates can markedly be affected.

In 2005: A Quarter Horse foal born at ERC. Genetic Parentage: Sallie B. Badge x Dual Rey. After foaling, this mare has created two foals for the 2006 foaling season (1 ET and 1 she is carrying).

It's been known for years that embryos from aged, subfertile mares have a higher incidence of early embryonic death when compared to younger, reproductively sound individuals. Oocyte degradation seems to be the primary cause for this occurrence. Our ET program is similar to others around the country in that a large portion of the donors are aged mares (>15 yrs old) that have already shown an inability to conceive and/or maintain a pregnancy to term. Trying to get one last foal out of them is why these mares become part of an ET program. Understandably, problems such as poor uterine environment, oviductal blockage, oocyte abnormalities and hormonal imbalances usually result in lower embryo recovery and transfer rates from this population. Regardless, through diligent efforts pregnancies can still be obtained from many of these individuals. This is why embryo transfer services are useful to owners of older mares.

What degree of success should we expect? To answer this question, one needs to evaluate the management circumstances as mentioned previously. When all variables are optimized, embryo recovery should occur approximately 65% of the time. With healthy embryos, over 65% of the embryo transfers should result in a pregnancy. Therefore, when a 65% embryo recovery rate is multiplied by a 65% pregnancy rate after transfer one has achieved a 42% success rate per cycle. In other words, for every cycle a mare is bred there is a 42% chance of obtaining a pregnant recipient at the end of that cycle. Knowing that an embryo transfer procedure is an advanced technique, interested parties should realize that it may take 2 to 3 cycles before success is achieved. Every year we have certain mares of which pregnancies are obtained on the first, second or third cycles. Other mares, particularly those that develop problems, may be in our program for the majority of the season just to obtain one pregnancy. This year, we were fortunate to have fewer problem mares in our program. This resulted in a higher than normal success rate (As of 8/3/05, 72% embryo recovery rate, 75% pregnancy rate after transfer).