



# Newsletter

SUMMER 2005

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## ERC JOINS FORCES WITH THE SMITHSONIAN INSTITUTE

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The Smithsonian Institute's Conservation and Research Center, (CRC), an affiliate of the National Zoological Park in Washington, D.C, is a 3,200 acre facility in Front Royal, Virginia which houses 30-40 endangered species at any given time. Amongst other areas of interest, CRC specializes in reproductive sciences and physiology. By researching these imperiled species they hope to create a captive breeding program that will ultimately provide a means for conserving species that otherwise may not survive in the wild, possibly saving them from extinction entirely.

One of their current studies is of the Przewalski horse. This unique equid is an ancient species of wild horse originating in Mongolia, China and possesses some rather unusual characteristics. Standing 12 to 14 hands high, they are short and stocky in stature, their dun color coat has a dark dorsal stripe which runs along its back. They possess a stiff, spiky mane that has no forelock and completely sheds out every year. Scientifically, it has been discovered that they possess 66 chromosomes while domestic equids have 64. The latest evidence suggests that they have evolved as an entirely different species than our familiar domestic partners.

With a recorded 1,435 in existence, the Przewalski horse remains on the Red List of Endangered Species and is actually classified as extinct in the wild. Their primitive nature does not allow them to be

handled, mounted or harnessed, thus making routine care for them in captivity difficult.

The CRC, along with 3 to 4 other zoological parks, is working to reinitiate research on the Przewalski horse, and in doing so, recently contacted ERC to join forces in learning more about them. Collectively, efforts will be made to evaluate certain reproductive parameters of both the Przewalski stallion and mare.



*The herd of Przewalski mares at the Smithsonian Institute's Conservation and Research Center (CRC), in Front Royal, Virginia.*



For semen collection, these stallions have to be anesthetized. While under the influence of tranquilization, a proven technique of electroejaculation will be used to harvest the semen. By entering the rectal cavity, a probe is properly positioned to come in close contact with the reproductive organs. A small electrical current is then passed through to stimulate ejaculation. This type of collection method has been used successfully in other species, and is apparently also necessary in the Przewalski horse since these stallions aren't tame enough for the more traditional collection techniques of using a phantom mare and artificial vagina. After collection of an ejaculate, seminal characteristics such as volume, concentration, motility, and sperm output will be compared to those collected from those domestic stallions within ERC's clientele base. To date, researchers have not been able to make this direct comparison. ▶

Certain characteristics of the Przewalski mare's reproductive cycle will also be under investigation. Unfortunately, very little has been learned over the years about this female. Because of their wild nature, these mares are also characteristically anesthetized for diagnostic evaluation. The research center is in the process of setting up a special squeeze chute apparatus called a "tamer". This device will allow safe containment of the wild, anesthetized mare as she is being examined. Areas for further study are: 1) follicular growth patterns throughout the estrous cycle; 2) condition of the inner lining (endometrium) of the uterus; and 3) assessing cervical integrity. Interestingly enough, evaluating harvested urine seems to be a viable method of assessing hormonal levels in circulation.

After the collection of data, efforts will be made to get the mares impregnated utilizing artificial insemination techniques and semen from 2 or 3 of the in-house stallions. Unfortunately, in recent years natural service did occur with the herd but no pregnancies ever resulted. Although reasons for this failure are unknown, it is highly speculative that age-related issues have played a role since almost all of the mares are greater than 15 years old.

Our hope at ERC is to establish a mutually rewarding relationship with the CRC. One that will share a common interest in learning more about this particular equine species. It would be wonderful to help with finding ways to preserve this antiquated species. §



*In 2005: A Pony foal born out of a Thoroughbred mare as a result of embryo transfer. Genetic Parentage: Empires Choice x Blue Rain*

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## GROWTH AT ERC RESULTS IN FACILITY EXPANSION

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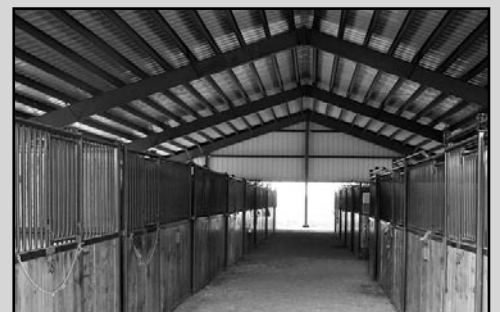
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Every year during the breeding season, ERC becomes a beehive of activity with over 55 stallions and 130 mares visiting the clinic. Well after 8 years of continued growth, it became apparent that it was time to expand the facilities. Aside from an existing 9-stall barn, for years ERC had leased multiple tents and temporary stalls to house the breeding stock coming in during peak season (March through August). This past year however, it was decided to make the investment into a more permanent stabling facility.

Last fall, much time was spent evaluating the size and type of barn desired. After weeks of visiting facilities and talking to various sales representatives, a decision was made to invest in a barn system that contained sturdy, sizeable stalls with optimal

ventilation. The building of choice was a 80' x 120' all steel roofing system which would house 30 self-standing stalls. Since this barn would only be utilized in great quantity during the summer months, no outside walls were in the plans. This, along with the high, open ceiling, would make ventilation ideal.

The new "B-Barn" is to contain 8 stalls measuring 12'W x 16'L x 8'H in size, designed to house stallions or foaling mares. The remaining 22 stalls will be a comfortable 12'W x 12'L x 7'H dimension for mares with or without foals. Most mares due-to-foal will remain in our original 9-stall barn (A-Barn) while visiting stallions may be housed in either building. ▶



*Spring of 2005, establishment of the new 30-stall barn at ERC.*

Moving ahead, the metal building was ordered in October. After 10 weeks of manufacturing, the parts arrived on the back of a single semi-trailer. Amazingly, the company's affiliate work crew began unloading and erecting the very same day. Having the foundation of concrete footers already prepared, it only took 2 1/2 weeks before the structure was fully assembled. It was then up to the staff at ERC to begin erecting the 30 stalls. Although the stalls were made of metal-framework that easily attached to one another, it took almost 2 months to cut, stain and varnish the wood that is slotted within the framework. We were cer-

tainly feeling the pressure of needing the extra stall space. The month of April was spent putting final touches on each stall the day before a horse would occupy it. Not to worry, everything seemed to have come together just in time. Now after 4 months of use, we found it to be a wonderful addition to our facility. One that our clients and staff seemed to appreciate. \$

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## 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.

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

*“Expectations can become obtainable only when an inevitable sense of IDEALISM is met with an adequate dose of REALITY.”*

sperm) one should expect a 60-65% embryo recovery rate per cycle. With fresh or cooled semen, insemination should occur 24 hours 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 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.

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). §



*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).*

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## OVERCOMING THE ODDS!

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To share with you a recent case, in 2003, a 21-year-old Quarter Horse mare was entered into our ET program. In taking advantage of the recent AQHA rule change, the owner wanted to try and get as many embryos from his mare as possible. This particular client was aware of the potential age-related challenges that laid ahead but nonetheless would appreciate any pregnancy that was obtained. Years earlier, a uterine biopsy was performed on this mare identifying some uterine compromise. The owner decided not to breed her for 2 years. Then, in 2001 he decided to enter into an ET program at another facility. This resulted in 1 foal. During the 2002 season, efforts were made to obtain a pregnancy but repeated attempts only resulted in the loss of twin pregnancies. So in March of 2003, the mare arrived at ERC and the agenda began.

The owner made it clear from the beginning that he did not want to breed his mare past July. This left us with approximately 4½ months to obtain 1 or more pregnancies. With the use of short cycling procedures (bring into heat earlier than usual), we felt there was enough time to manage 7 or 8 cycles. Before coming to ERC, it was already confirmed that this mare was cycling so efforts were previously made to breed her. Within 3 days after arriving from Texas, we performed an embryo recovery attempt. Unfortunately, no embryo was obtained. This mare received a prostaglandin shot to hasten the following cycle. As 2 dominant follicles developed, semen was ordered and inseminated shortly before ovulation. To everyone's delight, this cycle did result in the recovery of 1 healthy embryo. Embryo transfer procedures followed and a pregnancy was confirmed 5 days later. Since this mare presumably had some compromise to the uterus, we were carefully monitoring her for any complications following the recovery attempt (i.e. fluid buildup, uterine infection). Nothing of concern appeared so efforts were made to manage her for another cycle. Semen was again ordered once a follicle reached 35 mm in size and prominent endometrial edema was present. Similarly, recovery procedures produced another embryo which subsequently resulted in a successful transfer. The owner was very pleased with the two pregnancies that had transpired in just 2 cycles. His desire to obtain more pregnancies was reiterated but we cautioned him not to expect this fortunate outcome every cycle. At some point, the odds will fall back to normalcy. With the encouragement to carry on, we continued to manage this mare for more pregnancies. To even our amazement, a total of 7 cycles were monitored yielding 9 embryos. There were a few cycles whereby double ovulations helped to increase the numbers of embryos recovered. It has long been known that some mares tend to be more prolific than others in yielding embryos. Aside from the mare's own ability to conceive rather easily, it is our belief that the stallion of choice also played a role in the success. This mare was bred with cooled, transported semen from a Quarter Horse stallion standing in New Jersey. In talking with the stallion owner, it appears this particular horse has a very good first-cycle conception rate. ▶



*Five ET pregnancies were obtained from Zippo's Tammy Te (right, 21-yr-old Quarter Horse).*

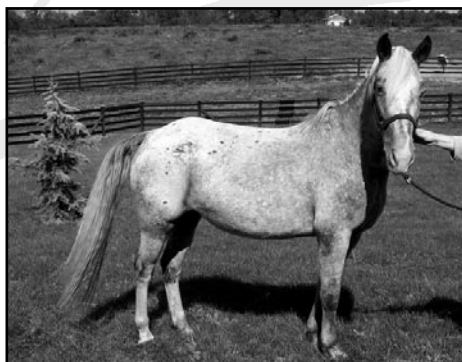
Although we were pleased with the numbers of embryos recovered from this mare, it was not expected that all would result in pregnant recipients. Of the 9 embryos recovered, 6 were classified as excellent to good (Grade 1.0 to 2.0) in quality while 3 were considered fair to poor (Grade 2.5 to 3.5). Since

this mare was older, it was foreseeable that 33% of the embryos were of questionable quality. All embryos were transferred. Five of 6 (84%) good quality embryos resulted in pregnancies while no recipients became pregnant with those of poorer quality.

Eventhough all the embryos did not develop into pregnancies, those 5 survivors broke a single season record at ERC outshining a 21-year-old Thoroughbred mare that, in 2001, yielded 4 pregnancies from just 2 breeding cycles. It is believed that these pregnancies are the first set of 5 ever created in the state of Virginia from a single mare during the same season. For curiosity sake, it would have been interesting to continue breeding this Quarter Horse mare until she stopped cycling in the fall. Maybe 8 or 10 pregnancies could have been achieved? Nevertheless, the owner was very pleased at the arrival of the 5 healthy siblings (3 fillies, 2 colts) last summer. §

## EMBRYO FREEZING— STEPPING IT UP ANOTHER NOTCH!

The day is drawing ever so closer when a person interested in creating their own foal doesn't even need to own a mare or stallion. Embryos can now be made by purchasing semen on demand and leasing breeding cycles from quality mares owned by others. In fact, in the industry today we are starting to see advertisements promoting equine embryos for sale. Has our industry taken it to the next step? The answer is yes. It is now possible to create a genetic cross and then put it into storage until someone is willing to buy it. Once a buyer is found, then the embryo can be transferred into a surrogate or recipient mare for the eventual birth of a foal. A step beyond, one doesn't even have to purchase an already chosen genetic cross. By leasing a mare for a given number of cycles, a person can try to get one or more embryos from any number of stallions. Of course, success is not as simple as that. It is necessary to do homework and really understand the logistical management, expense and success rates when involving oneself with such an endeavor. Effective management and techniques, reproductive soundness of the mare, and semen quality all play a role. Fortunately, within the last few years research has shown us that acceptable pregnancy rates can be achieved with the use of frozen embryos. Lascombes and Pashen (2000) obtained 24 pregnancies from 44 transfers when small, frozen embryos (<200  $\mu$ )



*In 2004: the mare, "Snowflake," is carrying ERC's first frozen embryo pregnancy!*

were used, a 55% success rate. Similarly, work by Maclellan and associates (2002) yielded a 56% (12/17) pregnancy rate when transferring embryos less than 300  $\mu$  in size.

This past fall, ERC underwent a research trial whereby 12 mares were bred with either fresh or cooled semen from stallions of proven fertility. Of the 21 cycles managed, 16 embryos were recovered. Twelve of these embryos were designated to 1 of 2 freezing protocols. The embryos ranged in quality from 1.0 to 2.5. Grade 1.0 embryos showed no morphologic abnormalities while a score of 2.5 indicated some significant abnormalities, but still considered worth continuing with the freezing process. Stage of development varied from loose morula to blastocyst. No embryos were greater than 275  $\mu$  in size (range: 150-275  $\mu$ ).

At ERC, five (5) embryos were frozen in Hams F-10 media using the freezing procedure published by Maclellan et al, 2002. Dulbecco's phosphate buffered saline solution was used as the media for 7 additional embryos that were frozen according to the protocol of Lascombes and Pashen, 2000.

With the anovulatory season fast approaching, time restraints limited our ability to adequately transfer all embryos in storage. Time did allow for 4 embryos (3 morulas and 1 early blastocyst) ▶

to be surgically transferred into 2 recipient mares (2 embryos/mare). Each mare became pregnant with one pregnancy, so 2 of the 4 embryos grew to detected pregnancy (50% success rate). Although the number of embryos transferred at ERC was small, it appears that success rates can be obtained and in higher success than was documented years ago. Published pregnancy rates for frozen embryos are only 10 to 15% lower than that of fresh or cooled embryos. With this recent success, frozen embryos can now be thought of as a wonderful asset to a breeding program.

So how can this new advanced technique be of use to a breeder? A wonderful aspect of this technology is in helping the late-foaling mare. A common problem for many breeders is the fact that once a mare foals, it can take a period of time to get her pregnant again. This may place someone in the situation of having foals born in an undesirable time of the year (late summer/early fall). Horse owners in certain breed registries (i.e. Standardbreds, Quarter Horses) make a point of getting early foals so they are bigger for competition. Well, a possible solution is if a mare isn't pregnant by a certain time, such as July 1<sup>st</sup>, then embryos can be collected from her and frozen. These frozen embryos can be put into storage until early spring. At that time, they are transferred into recipient mares thus guaranteeing early foals every year. Also, this allows for her breeding season to continue into the fall without having the ramifications of late foals.

Embryo freezing can also be advantageous to those breeders wanting to sell offspring from their valuable mares. Instead of waiting for a single foal to be born before selling, it is feasible to obtain 3, 4 or even 5 embryos from a given mare every year and sell them in the frozen state. With proper international

acceptance, this technology would even allow embryos to be bought and sold across country lines. A simple comparison could be made with stallion semen being frozen and sold to interested parties. The major difference with embryos is that you have already chosen the genetic cross. Although each embryo could have a different sire, buyers typically would not have the choice of selecting the genetic cross beforehand. A possibility of getting around that issue is to find someone willing to lease their high-quality mare for only a few cycles. Leasing mares for breeding purposes has been utilized for decades but now with embryo transfer technology, one could simply lease a certain number of cycles so, if desired, one or more embryos could be collected while giving the lessee a choice of selecting parentage.

The largest cost to operating a full-service embryo transfer program is in maintaining a recipient herd. Several mares are necessary to help assure that at least some recipients are at the same stage of the cycle as the mare donating the embryo. Estrus synchronization however would no longer be necessary if frozen embryos were heavily utilized. Since embryos can be stored indefinitely, one could simply wait until a single recipient is at an appropriate stage of the cycle before thawing and transferring. This would minimize the number of recipients needed and subsequently lower the embryo transfers costs to the owner.

With recent advances, frozen embryo usage is becoming more applicable in the industry. To learn more about embryo freezing costs and services, please contact ERC. §

### **Why Freeze an Embryo?**

- **For early foals, breed your mare in the fall and transfer the embryos into recipients in the spring.**
- **Sell equine embryos like selling semen.**
- **Reduce embryo transfer costs (by minimizing recipient herd usage).**
- **Get a foal without owning a mare or stallion (using leased mares).**
- **Potential offspring can be in storage indefinitely.**

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## **OUR LATEST ENDEAVOR— TRANSVAGINAL ASPIRATION!**

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**J**ust this spring, ERC purchased a specialized piece of equipment designed to pass within the vaginal cavity and help visualize the main internal parts of the reproductive tract, most notably the uterus and ovaries. This transvaginal probe is made up of a 5.0 MHz, curvilinear transducer and a long, specially-molded handle with a needle-guide. Similar to rectal ultrasonographic exams, ultrasonic waves are emitted from the end of the probe and used to visualize the structure(s) of interest. Once identified, a 22-inch needle is guided down the handle and through the

vaginal wall for either fluid or tissue aspiration. Transvaginal aspiration (TVA) can help us address so many challenging issues in today's breeding industry

A good example of when to use this equipment is with the older, subfertile mare. Often times, we are faced with trying to get one last foal out of a horse that has significant compromise to her uterine environment. Cysts, fluid accumulation, repeated infections can all be issues within the uterus that prevents either pregnancy maintenance or recovery of a viable

embryo for transfer. A possible solution is to bypass the uterus completely and focus attention on taking the unfertilized egg (oocyte) directly from the follicle of the ovary. By doing this, we can harvest oocytes and transfer them to the oviducts of mares with healthier reproductive tracts. These recipients will have been bred from a stallion of choice just hours before and/or after the oocyte transfer. Any resulting offspring will be genetically linked to the aged donor mare even though she is not carrying the embryo nor allowing fertilization in her reproductive tract. This procedure is called GIFT or *Gamete Intrafallopian Transfer*, and has proven to be a great avenue for some mares that no longer have a proper uterine environment for embryo growth and development.

An alternative use for this piece of equipment is in management of twin pregnancies. In most breeds, there is a 10 to 20 percent occurrence of double ovulations that may result in twin conceptuses. Since it is undesirable to have more than one pregnancy go to term, a common protocol is to manually reduce one by pinching it through rectal manipulation. This usually occurs between 14 and 28 days of gestation. Periodically however, we are faced with cases whereby twin pregnancies are not diagnosed until later in gestation (>35 days) when pinching is no longer possible. A viable option may then be to use the transvaginal probe to either aspirate the fluid from one embryonic vesicle or terminate a fetus through tissue disruption or pharmacologic infusion. There has been some precedence reported for successfully terminating pregnancies between 35 and 170 days and still have the remaining fetus develop to full gestation. This season through transabdominal reduction, we were able to inject the heart of a 150-day twin fetus with 20 ml of procaine penicillin. The heart stopped beating within 5 minutes but unfortunately both fetuses did abort within 30 days following the procedure. Just recently, we successfully aspirated a 26-day vesicle in order to allow an adjacent embryo to continue growth and development. An examination 2 days later showed that the remaining pregnancy was growing and still had a healthy heartbeat.



*Citango, a 3-yr-old Dutch Warmblood stallion created from a breeding with frozen semen at ERC. He is currently training for the 70-day stallion testing in the Netherlands.  
Genetic Parentage: Rita Morka x Contango.*

Reduction of uterine cysts seems to be another avenue by which transvaginal aspiration could be of use. It is not uncommon for multiparous (having multiple pregnancies) or aged mares to have cysts within the endometrium of the uterus. These are fluid-filled structures that develop most notably as a result of lymphatic blockage. Unfortunately, when in large-enough size or number these cysts can be a hindrance for developing pregnancies. If circumstances are warranted, aspiration of certain cysts can be done in an effort to reduce the size and optimize pregnancy maintenance. Recently, a case was referred to ERC whereby a mare was diagnosed with a single, 52 mm uterine cyst at the bifurcation of the two horns. After 2 or 3 cycles of optimum breeding, the mare failed to have a detectable pregnancy by Day 14. Historically, this mare was easy to get in-foal but this cyst had markedly increased in size from the previous year and the referring veterinarian felt it could be the reason for this mare's failure to become pregnant. Therefore, as the mare started coming into heat on her subsequent cycle we aspirated the cyst via transvaginal aspiration. The size of the cyst went from 52 mm at its longest axis down to 25 mm. Although full reduction was the goal, the location of this cyst made it difficult to maintain placement for aspiration. Three days later the mare was bred and subsequently ovulated. Much to everyone's delight, a pregnancy was confirmed on her 14-day pregnancy exam.

**At ERC, we always strive to bring the most advanced reproductive techniques to the industry. It is our belief that "continued success can only come with growth and development."**

## WEBSITE LINKS!

*All clients who actively utilize ERC services are welcome to put their websites on our LINKS webpage.*

**Please contact ERC if you are interested.**

## UPCOMING EVENTS

### August 1 - October 1, 2005:

Embryo Freezing: An introductory offer of \$490 for breeding management and embryo recovery, \$250 for embryo freezing.

### August 15, 2005 - March 30, 2006:

Semen Freezing: a \$100 discount for those entering the program for the first time.

Test Cooling: Now is the time to evaluate your stallion's semen for cooled transport.

### October 26 - 27, 2005:

A 2-day minicourse on "Reproductive Management of the Stallion," held at ERC.

### October 28, 2005 (October 29, spillover date):

A 1-day minicourse on "Techniques of Handling Stallions in the Breeding Situation," held at ERC.

### November 10 - 11, 2005:

A 2-day minicourse on "Reproductive Management of the Mare," held at ERC.

### November 12, 2005:

A 1-day minicourse on "Reproductive Ultrasonography in the Mare," held at ERC.

### November 14, 2005 (November 15, spillover date):

A 1-day minicourse on "Embryo Recovery and Transfer in the Mare," held at ERC.

### January 26, 2006 (January 25, spillover date):

A 1-day minicourse on "Techniques of Handling Stallions in the Breeding Situation," held at ERC.

### January 27 - 28, 2006:

A 2-day minicourse on "Reproductive Management of the Stallion," held at ERC.

### January 30 - 31, 2006:

A 2-day minicourse on "Reproductive Management of the Mare," held at ERC.

### February 15, 2006:

The 2006 embryo transfer program commences.

### February 17, 2006 (February 18, spillover date):

A 1-day minicourse on "Embryo Recovery and Transfer in the Mare," held at ERC.

### February 20, 2006:

A 1-day minicourse on "Reproductive Ultrasonography in the Mare," held at ERC.

### February 21 - 24, 2006:

A 4-day period whereby veterinarians gain experience ultrasounding mares using ERC's recipient herd.

RETURN SERVICE REQUESTED

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