

Breeding Mares — Working Toward Successful Pregnancy

On occasion, a broodmare does not conceive or fails to carry a pregnancy to term, leaving the mare owner wondering why, and whether to try again, and when. The best way to answer these questions is to work with a veterinarian who is experienced in dealing with equine reproduction. He/she can help you sort out the answers to these questions and often help you get the mare safely in foal if she is capable of carrying a foal.

As stated by Dr. Carlos Pinto, MedVet, PhD, Diplomate ACT (North Carolina State University) the first step is to make sure the mare is healthy and in good body condition. She should be on a proper plane of nutrition, with vaccinations, hoof care and deworming kept up to date. You want everything in her favor for reproduction — and she will have the best chance for a successful pregnancy if she's in the peak of good health, with no lameness problems or any other conditions that might cause her discomfort. Good general care and management are very important for a mare you are planning to breed.

"Also make sure the stallion chosen has proven fertility. You don't want to be the first one to find out that the stallion is not fertile. If you know the stallion is fertile, then it comes down to the mare. Is she a young mare, an older mare, one that has foaled before or has she never had a foal?" he asks. The mare's history is important, in determining what your probability of success will be in getting her bred.

You should make sure she is reproductively sound for breeding. "A general reproductive examination performed by an equine veterinarian with expertise in reproduction is imperative, to know if she has the potential to become pregnant. A breeding exam can vary from a simple palpation and ultrasonography of uterus and ovaries and a vaginal exam, to more detailed breeding soundness evaluation (BSE). A lot of people who buy a mare they want to use as a broodmare have this evaluation included

in a pre-purchase examination," he says.

"This involves a thorough reproductive examination: evaluation of the perineal conformation (to see if she has any anatomic defects such as sunken anus), a vaginal exam, making sure she has normal reproductive anatomy (cervix, uterus and ovaries). We also go one step farther and do a culture and a biopsy of the uterus. The culture and cytology of the uterus can indicate whether the mare has an acute endometritis and a biopsy gives us a good indication about any chronic inflam-

a mare that's only 5 or 6 years old, this is very bad — since at that age she should be healthy and in her prime reproductively. But if you have an 18 year old mare that's had 10 foals — almost one each year for the past 12 years — that's almost a normal score, in her case. With age there will be some changes in the uterus, whether or not the mare is having foals," says Pinto.

It is also important to know what type of uterine changes a mare has accumulated over the years. There are currently no proven therapies for mares with signi-



Mare and foal.

mation or scar tissue in the uterus (fibrosis). Those are two good pieces of information that come from the biopsy; we can tell if there is chronic inflammation present and/or the amount of fibrosis (scar tissue in the lining of the uterus)."

The biopsy result is given a score, to give a probability of whether or not the mare can carry a foal to term and deliver a live foal. Many mares will conceive, but not all of them can follow through with a successful pregnancy. "The biopsy evaluation will come back with a score. Most labs in the U.S. use a score with 4 levels: 1, 2a, 2b and 3. Each level refers to a range of probability of foaling a live foal," explains Pinto.

These scores must be interpreted according to the individual mare, however. "For instance, if your veterinarian sends the biopsy to the lab and it comes back 2b, this is the next to worst level for chances of a live foal; her chances are between 10 and 50 percent. But a clinical interpretation is important. If it's

significant amount of fibrosis. But appropriate therapy and breeding management may help mares with acute or chronic inflammation to produce a foal. "Some people get worried; they think that if their 15-year-old mare has a 2a score she is somewhat compromised. But if she is having a foal each year, this tells us she is doing ok; having a foal is the best proof that she's reproductively healthy," he says.

"When a veterinarian checks a mare for the presence of uterine infection, using a uterine culture, we recommend cytology of the uterus be done, too. People learn that they must have a clean culture from a mare but oftentimes a positive culture from the mare results from contamination during the procedure. In this case, a cytology of the uterus will show no signs of inflammation. On the other hand, a negative culture associated with a cytology positive for the presence of inflammatory cells in the uterus would alert the veterinarian to pursue further diagnostics," explains Pinto.

"It's also very important to know when

and how the mare is to be bred. A good teasing program complimented by reproductive examination provides the best chance to ensure the mare will be bred at the right time. Then, our attention turns to the type of breeding management that will be required. Will it be a natural mating, or shipped cooled semen using artificial insemination (collecting the stallion and shipping the semen overnight to another farm), or frozen semen? The way she is to be bred will dictate what level of management is needed. If the mare and stallion are on the same farm, and the stallion has not been booked to many mares, she could be bred every other day if necessary, giving a good chance for conception."

If the mare is in one place and the semen is to be shipped overnight from

another state, you need a much higher level of management (having a veterinarian checking the mare) to find out when would be the best moment to order the semen, and when to use the semen. "If you are using frozen semen, it doesn't live as long, so you need an even higher level of management, which means much more frequent examinations to ensure that the semen is placed in the mare very close to ovulation," says Pinto.

Reproductive management — how the mare is to be bred and how she is checked to make sure the breeding is timed right — plays a big role in the success or failure of the breeding. Breeding with shipped, cooled semen has become very common, so it is important to work with a good reproductive veterinarian to pinpoint the

proper time to order the semen and when to inseminate the mare.

"As long as a mare ovulates within 24 to 48 hours after being bred with fresh or shipped cooled semen, there should be normal fertility. Horse sperm is usually viable longer than that of other species. This changes, however, if you are using frozen semen, because once it's thawed it doesn't live much longer," he says.

There are many horse breeders short courses available, where you can learn more about breeding mares, especially when using cooled or frozen semen. "I would strongly suggest that breeders attend one of these courses. There are many throughout the U.S. Even if you don't plan to do the insemination yourself, it will help you understand all the phases of the process," says Pinto.

Breeding/Shipping Equipment

Many stallions are collected using an artificial vagina, and most semen is shipped by overnight carrier (such as Fed-Ex) to the farm where the mare is located. "Before semen is shipped, an initial examination should include an estimation of the percentage of motile sperm cells, and a sperm count before the semen is processed for shipping," says Pinto.

"Then to keep the semen viable during shipping, we add some nutrients, which we call extenders. There are basically two types — the skim milk base or egg yolk base. Most semen extenders for shipped cooled semen are skim milk based. Semen extenders help control the pH (acidity) and provide nutrients to the sperm cells so they can stay alive. Antibiotics are also commonly added to minimize bacterial growth during the storage period," says Pinto.

The amount of extender added is based on the concentration of sperm cells. "You want a certain amount of sperm cells per ml of fluid. Ejaculates with initial low concentration (few sperm cells and lots of seminal plasma) may result in diluted processed samples that may not contain enough nutrients for the sperm cells. On the other hand, processed semen samples with too many sperm may utilize the nutrients too quickly, thus starving them during overnight shipping. As a rule of thumb, here in the U.S., we pretty much agree that the final concentration (after you add extender) should fall between 25 and 50 million sperm cells per ml. The ratio of extender to semen should be at least 3 parts extender to 1 part semen. As long as the ratio is correct and there are at least 25 to 50 million cells per ml of shipped semen, this gives the best chance for survival of enough sperm for a fertile dose," he says.

"In the U.S. it is also recommended that we use at least 500 million motile sperm cells per AI breeding. Usually we ship about 1 billion motile sperm cells, because we expect some will die overnight during shipping. We want to make sure that the next day the client will be receiving at least 500 million motile sperm. This is why 1 billion motile sperm are typically shipped, in case half of the viability is lost overnight," says Pinto.

"But when we ship them, we don't want the sperm cells to be actively swimming and burning up all the energy. When we ship overnight, we put the semen in special containers with coolant (frozen) cans. Most of these commercially available transport systems for horse semen are designed to bring the temperature down to 5 degrees C. By cooling the semen (not freezing), it decreases the metabolism of the sperm so they don't require as much nutrients. You keep them quiet, without moving so much (wasting energy). Then the next day, when they are put inside the mare, they can then resume their motility and hopefully fertilize the egg. Cooling them puts them on hold for a day or so. There are some containers designed to keep the semen cool for up to 24 hours and some up to 48 or 72 hours," he says.

"Fortunately, in the U.S., it doesn't take more than 24 hours for shipped semen to arrive at its destination. But we recommend people use a good transport system, because every now and then the carrier may make a mistake and misplace the sample. If it's supposed to be here in North Carolina and goes to California instead, it might take another day or additional hours to get where it should be. But overall, it works very well," says Pinto.

"When the semen arrives at the farm where the mare is to be bred, we recommend checking the motility of the sperm. A lot of people don't have a microscope so they don't check it; they just open the container and put the semen into the mare. But if at all possible, it's good to check it, to know how viable it is when it arrives. If you do not have a microscope, a small amount of the sample should be brought to your veterinary clinic. We highly recommend this, because when things go wrong, you want to know if the semen was viable or not at the time the mare was bred. It may have been good semen when it was shipped, but you need to know if it was still good when it arrived."

This can be confirmed with a microscope. Then it can be put into the mare immediately. "It doesn't need further warming or processing. You just warm a drop of it on the glass slide to analyze the motility, but then the entire sample can come out of the container and into the mare without further warming. It warms very quickly once it gets into the mare and the sperm cells begin swimming," he says. Time is crucial; you don't want any delay.

"Once the container is opened, the mare should be bred. We don't recommend warming and cooling the semen very many times. When you are ready to breed the mare, you can open the container, check the motility, and immediately inseminate the mare," he says.

"The most expensive item of equipment would be the microscope to check the semen. However, relatively inexpensive microscopes (new or used) are now available. The other things needed would be disposable, sterile AI rods and syringes, and sterile gloves. Much attention should be paid to keeping everything clean. AI is done by placing the hand and arm into the vagina and into the cervix." The mare's hindquarters should be cleaned up with soap and cotton, and once she is clean, everything you use should be sterile. If you cause contamination when you deliver the semen, and create an infection, this could compromise your success.