

## **Successful Breeding**

As you see below, this article was written in 1992, and was published in a Nova Scotian magazine. Some of the observations made were in keeping with the time and the location. New methods have since become commonplace, and we have amended the article to reflect this by **adding commentary in orange**.

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### **Love me or love me not, but successful breeding takes more than chance**

By Jos Mottershead

Breeding horses should be a simple matter, and if it were left up to herds of them on the open range, or on an island of sand in the middle of the Atlantic, perhaps it would be. But often we are working with small numbers of horses, kept in relative isolation and confinement.

For instance, the mare is apparently one of the most infertile domestic animals. It is estimated that the average conception rate of all mares bred in the USA is only 55% . The rate in Canada is similar.

In fairness to the mare, some of the reasons for these low rates are man made, and so can be eliminated or modified. Too, we now have the techniques to deal with many of the inherent problems.

Man-made problems, except for bad maintenance conditions and the misuse of drugs, tend to stem from the concept that most registries hold - that a horse's birthday is universally January 1 of any year. This is a problem because it encourages early breeding to obtain an early foal with maximum growth potential in any given year.

Nature dictates that it is not desirable for a foal to be born in the middle of winter. Therefore the mare is a seasonal breeder; the time of potential delivery being determined by her coming into regular heat only from about April through to September.

We are sometimes able to manipulate this natural heat period through the use of extended artificial lighting periods and natural or artificial hormones. Although most mares will respond, not all do.

#### **CONDITION IMPORTANT**

One of the most important factors with regards to having a mare conceive is ensuring that she is in good physical condition. This relates to her weight and health. An overly thin or fat mare has less chance of conceiving than does the mare that is just starting to "bloom" or gain a little weight.

The mare should be up-to-date on de-worming and inoculations and last, but far from least, the mare should have had a uterine swab taken and cultured and had the results returned negative. If "positive", then any required treatment should be carried out.

A uterine culture determines whether there are any bacteria present in the mare's uterus that may be creating an unhealthy environment for the foal to grow in. This is one of the most underrated and yet simplest veterinary breeding procedures. A uterine swab does more than ensure a contaminant-free environment for the foal. It provides a guarantee that the mare is not going to contaminate the stallion with an organism that may be passed on from mare to mare in the case of natural breeding. Another requirement should be that a stallion be swabbed and cultured at the beginning of each breeding season, as this provides the same insurance for the mare owner.

**Note:** It is now accepted that a uterine swab culture alone is an inefficient method of ensuring a bacteria free uterine environment. The swab sample should first have a cytology smear prepared and read, to look for the presence of neutrophils. If these are present, it indicates an ongoing inflammatory response in the uterus, and the swab sample should be cultured. If neutrophils are not present it is a reasonable assumption that uterine bacteria are not either. Following this protocol will reduce the possibility of a false negative or positive reading of a culture.

Once it has been established that both stallion and mare are free of infections, the next thing to check is the mare's ability to provide the stallion with an ova to fertilize. (It is being assumed that the stallion is a proven producer and therefore his ability to fertilize is not in question).

## **FOLLICLE CHECK**

The simplest way to find out whether a mare has a viable follicle, and therefore ova, is by means of a rectal palpation. This will establish that the mare, if bred at the right moment, has the potential to conceive. Unfortunately, palpation is a candidate for neglect on "shoestring budget breeding", even though the cost of 2 or 3 palpations and a uterine swab doesn't come anywhere near the cost of keeping a non-pregnant broodmare for a year!

It must be remembered that palpation, by itself, is not 100 percent accurate. A mare may have a "mid cycle" follicle present and yet not be ready to breed or ovulate. Indeed, such a follicle may regress and all but disappear before the mare comes into standing heat.

**Note:** A problem with a single palpation, is that unless one is "following a follicle", there is the possibility of an error being made, and what is believed to be a follicle upon palpation, subsequently proves to be a Corpus Luteum (C.L.), or vice-versa. This situation can be overcome, by means of a progesterone assay of the mare's blood sample. If progesterone is present, it indicates that there is a functional C.L., and is therefore most probably in the diestrus portion of her estrous cycle. This is especially important if a luteinizing hormone is to be used, such as Prostaglandin.

## **HEAT CYCLES**

Many people who own mares claim that they are able to tell at what point a particular mare is in her heat cycle. However, the only way to gain any good idea is through the use of a "teaser" stallion, by rectal palpation, or ultrasound.

The most common method is "conscientious teasing". This process should be carried out by someone who really knows what to look for- the stallion! Or a "teaser gelding" (preferably one that has had testosterone administered to encourage those "stallion habits"). Teasing is not quick experience. It can take up to 15 minutes to encourage a shy mare to show to a stallion, and even then 20% of all mares may not show any signs of estrus at all ("silent heat") and 30% of mares may show signs of estrus during pregnancy. An experienced palpator can take the follicle check a step further by noting whether the mare has ovulated. This too helps determine what stage of her heat cycle the mare has reached.

## **ULTRASOUND**

Ultrasound equipment can also be used to establish the breeding condition of the mare's uterus and ovaries prior to breeding. This is a valuable tool which should be well received when it arrives in your area.

## **THE PROCESS**

From this, we can surmise that the best method of establishing when to breed is a combination (in most cases) of teasing with a stallion and rectal palpation by a veterinarian. Now that we have a healthy stallion, and a healthy time-to-be-bred mare, we can move onto the actual process of breeding.

## **CLEANLINESS A MUST**

Whether A.I. or natural methods are used to inseminate the mare, cleanliness and maximum sterility are essential. The first must is to wash both the mare and the stallion's genital areas. (An exception to this rule is the stallion that is being used regularly, in excess of three times per week. In this case it has been established that the continued use of soap or other cleansing agents may in fact prove detrimental because it removes the natural anti-bacterial flora. With such a well used stallion, washing with clean water has proven to be sufficient).

Many farms do not bother to wash the animals at all, or only the mare. But if the owner of the mare has gone to the trouble of ensuring a bacteria free environment for the foal by having the mare cultured, why introduce excess bacteria at the time of breeding?

One way in which conception rates can be improved is by the knowledgeable use of artificial insemination. By this means, the semen is introduced directly into the mare's uterus, using a liquid nutrient extender which increases the functional life of the sperm.

An added advantage of A.I. is a reduction of the chance of introducing contaminants that may prove harmful to establishing pregnancy. If A.I. is used improperly, or with insufficient knowledge or equipment, the conception rate can drop drastically.

At this point, natural breeding enjoys the reputation of taking less time than A.I. There are a number of reasons for this. For one thing, all A.I. equipment must be sterile, and any surface that will come into contact with sperm must be pre-heated to body temperature (approximately 38C) to prevent shocking the sperm and causing a malfunction of their abilities.

This is where the knowledge and equipment comes in. The Artificial Vagina must be sterilized, or have a sterile sleeve inserted, and must be filled with water heated to the particular stallion's liking. The tightness must similarly be altered by adjusting the amount of water. Some A.V.'s can also have the tightness altered by adding air.

The stallion must be led to the "jump mare", or if so trained to the "phantom mare" and encouraged to mount. Instead of being allowed to breed the jump mare, the stallion's penis is deflected, usually to the left, and inserted into the A.V. so that when he ejaculates, his semen is captured in the collection bottle attached to the A.V.

This semen is taken to the laboratory, which any A.I. breeding facility should have set up. There it is filtered to remove the gel fraction of the ejaculate and any detritus such as smegma, checked under the microscope to establish the sperm's motility and concentration level. Finally, to extend the semen's active life a nutrient liquid called "extender" sometimes containing an antibiotic is added. The actual quantity of extender that should be used will vary depending on what the semen is to be used for, i.e. shipped semen or on-farm A.I., and the desired sperm concentration.

It should be noted that during the processing, semen must have been kept as much as possible at 38 degrees Celsius in an incubator or water bath. Many potential dangers lurk in the lab, including water, sunlight, rubber, lubricants, some antibiotics and spermicidal plastics. Even regular syringes are known to be spermicidal.

During the artificial insemination process, sterility plays no lesser part than before. The extended semen, still warmed to body temperature, must be introduced through the mares cervix into the uterus, and therefore a little closer to the ova to be fertilized.

This is achieved by the inseminator putting his sterile gloved and lubricated arm into the mares vagina. After establishing the position of the mare's cervix, the insemination pipette is introduced. The syringe containing the semen is fixed to the other end of the pipette, so that when the plunger is pressed down, the sperm are sent on their way.

Artificial insemination is an essentially simple practice once a farm is set up to carry it out. If it is done properly, the farm's conception rate should approach the 100% mark.

## **AFTER BREEDING**

Once the mare has been bred, by whatever method, the thing to establish is whether the mare is indeed in foal. The first check is done by teasing the mare from about the eighth day post-last breeding through to about the 18th day. If by the 20th day post-last breeding, she shows no sign of estrus while being teased, the mare has a 90 percent chance of being in foal.

Pregnancy can be confirmed by rectal palpation from about the 21st day post-last breeding onwards. It is indicated at 21 days by a change in uterine tone, and possibly by a slight bulge in one of the horns at the site of implantation.

Another form of pregnancy detection, unfortunately not commonly available in this area, is ultrasonic imaging, better known as ultrasound. This can be carried out as early as 9 days post-last breeding, but is more usually carried out at around day 15.

The use of ultrasound is valuable as it can detect pregnancy prior to the date when a mare would be required to be bred again. If a mare shows a heat cycle at about 14 days post breeding, there is still the possibility that she may nevertheless be in foal. If she is again bred on this heat cycle, which would be the logical thing to do, there is a fair chance that she will reabsorb the foal she already carries. With the use of ultrasound, the mare would be checked for pregnancy prior to rebreeding.

Another major use of ultrasound is in the early detection of twin foals. In the event twins are found, they can be monitored to establish whether the mare is in the process of reabsorbing one. If she is not, then one conceptus can be clearly located by the veterinarian using the ultrasound, and pinched off. The remaining conceptus can then be monitored for survival.

A follow-up rectal pregnancy check is advisable between 100 and 120 days post-breeding. If the mare was bred early enough in the year, and no pregnancy is detected at this point, she may be bred again. In this way an entire breeding season is not wasted.

#### **AND ONE LAST THING.....**

Another item that should be borne in mind for the mother-to-be is regular de-wormings, although not during the first 90 or last 30 days of pregnancy, and never with an organophosphate de-wormer. (Recent clinical evidence has also suggested a link between feed-through fly control which may contain organophosphates and certain mid to late term abortions, neonatal immaturities and associated problems. Caution should therefore be taken if this method of fly control is used.). Suitable immunization is also advisable. One immunization that should be of particular concern for pregnant mares is against Rhino pneumonitis. This is commonly given at 5, 7 and 9 months of pregnancy.

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