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## Equine Pregnancy Losses in Pennsylvania

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The three-year research investigation entitled *Project M.A.R.E.*, funded by the Pennsylvania Department of Agriculture, was completed in June 2001. **Drs. Perry Habecker, Fabio Del Piero, Tanya Lemire** of the Department of Pathobiology at New Bolton Center and Dr. Helen M. Acland of the Bureau of Animal Health and Diagnostic Services, Pennsylvania Veterinary Laboratory in Harrisburg, Pa. were the pathologists representing the Pennsylvania Animal Diagnostic Laboratory System (PADLS) and performing the diagnostic test on specimens. **Dr. Patricia L. Sertich** of the Department of Clinical Studies-New Bolton Center coordinated the project and was assisted by the project research technician **Mr. Steve Kirschner**. **Dr. Raymond C. Boston** performed the data analysis for the project.

At the onset, the study was assigned a name for presentation to the public in order to establish study awareness and memorable project recall. *Project M.A.R.E.*: **M**onitoring **A**bstortions & **R**eproductive **E**fficiency in Pennsylvania would summarize certain aspects of breeding management and determine the causes of late pregnancy loss in mares in Pennsylvania. Horse breeders and equine practitioners in Pennsylvania were solicited for participation in *Project M.A.R.E.* Registration in the study simply required a breeder to complete a survey that inquired about the management of their broodmares. Participation in *Project M.A.R.E.* entitled the breeder to have a diagnostic evaluation and free necropsy of the conceptus of any aborting mare. Participating veterinarians received information regarding the proper submission of samples from any mare that might experience spontaneous abortion. Veterinarians located in remote areas received fetal necropsy kits complete with a directional video, sample vials, and overnight postage. Over 350 breeders and 135 practitioners registered for the project and submitted diagnostic materials from nearly 150 aborting mares. There was a great variation in the number of mares each farm managed (1 to 500 mares) but most breeders had less than 7 pregnant mares. Most (63%) of the farms did not have access to a stallion on their home farm. Greater than 23 breeds were represented in the study with the Thoroughbred (32%), Standardbred (13%) and Quarter Horse (11%) being the most frequent breeds represented in Pennsylvania.

A summary of the many aspects of breeding farm management was made during *Project M.A.R.E.* Breeders seem to be quite successful in getting their mares settled as past pregnancy rates were just over 75%. Although approximately 70% of the farms breed mares by natural cover, around one third of the farms use artificial insemination with fresh semen and slightly more than a third use artificial insemination with transported cooled semen. Only 5% of the farms use frozen semen to breed mares. Over 80% of the mares are examined for pregnancy ultrasonographically and at least 75% of the farms specifically have their mares examined for the presence of twins. If twins are detected an attempt is made to manually reduce them on over 80% of the farms. Some farms allow twins to attempt to regress naturally but as many as 40% of the farms will terminate twin pregnancies with prostaglandin. In the four years preceding *Project M.A.R.E.* the farms participating in the study reported an total average of 29 mares aborting twins each of those four years.

**A**lthough two thirds of the farms surveyed breed mares on their home farm, a little over a third of the farms send mares out of Pennsylvania for breeding. For mares being bred off their home farm, both those being bred in Pennsylvania and out of state, only about one third return to their home farm in less than a week after breeding.

Although only about 6% of the farms never vaccinate their broodmares against infectious diseases, most breeders do not provide their broodmares the best opportunity to produce high quality colostrum. Mares are able to produce higher quality colostrum if they are administered their annual vaccinations at approximately one month before their due date. More than half of the mares are administered vaccinations against rhinopneumonitis repeatedly during pregnancy. Current recom-

mendations are to administer rhinopneumonitis vaccine at 3, 5, 7 and 9 months of gestation because the immune protection achieved from vaccination is short lived and needs to be repeated if mares are to be protected against rhinopneumonitis abortion. Three quarters of the farms use a killed virus vaccine against the herpes virus that causes rhinopneumonitis. Unfortunately some mares do not appear to



have adequate immunity as their serum titers were found to be low when routine titers were evaluated during a pregnancy loss diagnostic work-up. Close to a third of the breeders do not utilize any veterinary service in maintaining a vaccination program and instead purchase their vaccines from a mail order service and have a layperson administer the vaccines. Although most breeders regularly deworm their mares during gestation, few took advantage of the effective safe opportunity to deworm just before breeding when there is no risk to the fetus and in the first few days after parturition. There is evidence that “foal heat diarrhea” can be prevented if mares are administered anthelmintics soon after foaling. This will decrease the parasite contamination a newborn foal is exposed to as they are investigating their early surroundings. Two thirds of the broodmares are administered ivermectin and half of all mares may receive pyrantel pamoate during pregnancy. Almost all breeders were careful not to administer vaccinations or anthelmintics during the first month of gesta-

tion when the early embryo is undergoing important organ development. Slightly less than two thirds of all broodmares have an annual Coggin's test performed. Water is supplied to the broodmares on most breeding farms as groundwater from wells or springs. Only 7% use municipal water exclusively for their broodmares.

**F**ortunately more than 75% of the breeders were able to submit the entire conceptus from mares experiencing a late pregnancy loss. A diagnosis of the cause of pregnancy loss was made two thirds of the time if the entire conceptus was submitted. Unfortunately, if only a necropsy kit was submitted, only half of the time was an etiology determined. Because of this finding, breeders should be encouraged to take the time and make the effort to send the whole fetus and the placenta to the laboratory. When this is not possible though, a necropsy kit submission is still of value. Most mares had no history of problems during their pregnancy and only a quarter of them appeared ill at the time of their pregnancy loss. The presence of premature lactation or early mammary gland development is thought to be an indication of some problem during pregnancy. A third of the mares were noted to have mammary development before spontaneous abortion. Only 11% of the mares had a history of previous pregnancy loss. Just over 10% of the losses were associated with dystocia.

Problems that were associated with the late pregnancy loss are listed in follow table:

Placentitis . . . . .	17%
Other placental abnormalities . .	18%
Bacteria Infection . . . . .	12%
Rhinopneumonitis (herpes) . . .	11%
Developmental abnormality . . .	11%
Dystocia . . . . .	10%
Umbilical cord Abnormalities . .	9%
Twins . . . . .	2.5%
Fescue . . . . .	0%
Nocardia Placentitis . . . . .	0%
Leptospirosis . . . . .	0%
Equine Viral Arteritis (EVA) . . .	0%
Equine infectious anemia (EIA)	0%

**A**lthough vaccination is recommended to help protect mares against abortion due to rhinopneumonitis, the vaccines are not 100% effective. In spite of breeding farms carefully following the veterinary recommendations for frequency of vaccination, vaccine handling and administration some mares still experienced

rhinopneumonitis abortion. It is interesting to note that inadequate plasma titers against rhinopneumonitis were found in some of the vaccinated mares that lost their pregnancy due to some other cause. This information reflects the need to investigate the vaccination protocols that are being used. Prevention of rhinopneumonitis depends not only on vaccination but proper management of the broodmares. Pregnant mares should be isolated from transient horses on the farms and kept in small closed groups. Mares foaling for the first time should be kept separate from pluriparous mares.

Efforts should be made to prevent bacterial infections in mares. Although a diffuse type of placentitis can occur in mares that develop septicemia, the more common type of placentitis



is called ascending placentitis and develops from a local infection of the genital tract. Mares that have poor perineal conformation or lose significant body condition during pregnancy may be prone to developing an infection in the genital tract that slowly moves into the uterus and infects the placenta and may subsequently causes abortion. Changes that occur with placentitis can be detected and monitored by ultrasonographic examination. Keeping the mares in good body condition by providing good quality feedstuffs and moderate exercise can prevent this. An episiotomy or Caslick's Operation can augment the function of the caudal genital tract to prevent contamination and chronic infection of the genital tract. Mares showing signs of placental infection may

be administered antibiotics and agents to help support the pregnancy. These mares need to be carefully monitored at the time of parturition as the inflamed placenta may fail to rupture spontaneously resulting in delayed delivery of the fetus and hypoxia.

Pregnant mares should be examined by palpation and ultrasonography per rectum at least two times before 30 days of gestation to improve the opportunity to detect the presence of twins. Mares found to have twins are best managed by manual reduction of the twins to a singleton prior to 30 days of gestation.

**P**roviding close observation prior to and during delivery can reduce pregnancy losses associated with parturition. Good, frequent communications with the farm's veterinarian will help assure that obstetrical assistance will

be available should a dystocia occur.

Fortunately broodmares in Pennsylvania do not appear to be experiencing significant pregnancy loss due to fescue toxicosis, Nocardia placentitis, Leptospirosis or the Mare Reproductive Loss Syndrome that has been reported in Kentucky this 2001 foaling season. *Project M.A.R.E.* has identified problems associated with pregnancy loss in mares in Pennsylvania. Knowl-

edge of this information can help in the organization of producer educational programs, encourage the use of veterinary services to prevent and treat pregnancy problems, and direct future research projects investigating pregnancy loss. *Project M.A.R.E.* has identified what aspects of broodmare management are being optimally implemented and what areas need to be improved. Veterinarians in Pennsylvania are prepared to provide adequate information and samples to enhance the Pennsylvania Animal Diagnostic Laboratory System's ability to reach a diagnosis. This laboratory and Dr. Sertich encourage continued collaboration with veterinarians and horse breeders in Pennsylvania to **M**onitor **A**bortions & **R**eproductive **E**fficiency in Pennsylvania.