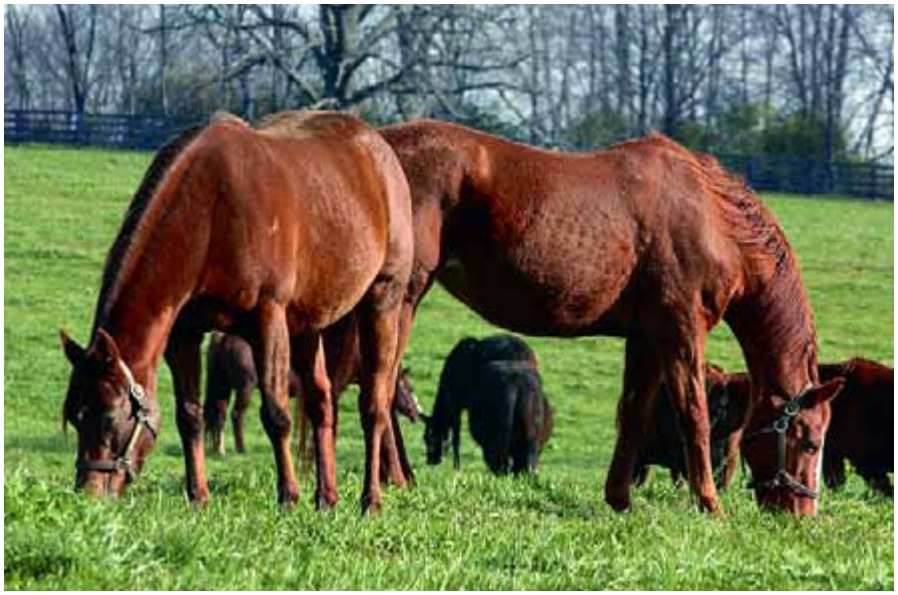
By Heather Smith Thomas
Photos by Anne M. Eberhardt

The Third Trimester



Mares in good body condition will deliver stronger, healthier foals

Each phase of gestation has its risks, and the good news for owners who have pregnant mares in the barn this winter is that most losses will have already happened by now, so they're out of the woods in some respects. Most equine pregnancy loss occurs during the first trimester, particularly during the first 60 days of gestation; after that, the placenta is developing and producing a hormone called progesterone to safeguard the pregnancy. But even though some of the riskier days are behind, it is important that mare owners remain vigilant and monitor the pregnant mare throughout all of gestation, noting any changes in her attitude or demeanor, and any health problems. Important things to look for, especially during the second half of pregnancy, include weight loss or depression, sudden increase in abdominal size, vaginal discharge, periodic mild colic, and sudden udder development or premature lactation.

A mare's gestation is roughly 11 months, which doesn't fall into a neat category of thirds as other species' gestation lengths do (i.e., humans and cattle at nine months). Defining the last trimester as the final third of pregnancy may be a misnomer, because it may entail 3½ to four months in a mare. "In the French literature, a trimester is three months," said Dr. Ahmed Tibary, a theriogenologist and professor in the Department of Veterinary Clinical Sciences at Washington State University's College of Veterinary Medicine. "The last trimester would, therefore, be just the last three months of pregnancy in the mare (the ninth, 10th, and 11th month), rather than the final third," he explained.

All discussions of nomenclature aside, this final trimester is the time the fetus is growing fastest and the mare's abdomen generally becomes larger. Tibary says this is also when a lot of the changes in the mare take place to prepare for the safe arrival of a healthy foal.

EATING FOR TWO

"The two main areas of care during the final trimester are, first, to provide enough nutrients to allow for the growth of placenta and fetus, and secondly, from a health standpoint, to start looking at preparations for the mare to have good colostrum and be prepared for lactation," said Tibary. Feeding adequate levels of balanced nutrients not only to maintain the mare's body, but also support fetal growth, is important during the entire pregnancy. However, you should increase the energy offered, along with certain nutrients needed for fetal growth, during the third trimester. Tibary recommends that mares receive an additional 20-25% more nutrition than they require for their own maintenance during this time.

Dr. Juan Samper, an equine theriogenologist in Langley, British Columbia, says the mare needs to consume more feed to meet the needs of the fetus, but she doesn't have much room for extra feed because the pregnant uterus takes up so much space. Therefore, it's important that you allow her to have continuous access to feed or to offer her small amounts often. It's also important she has adequate body condition throughout the pregnancy.

"I tell my clients that during the last three months they must increase her energy intake," Samper noted. "Otherwise, by the time she foals, she will have lost weight."

A thin mare is not adequately prepared for lactation and might be unable to cycle when it comes time to rebreed her. Weight lost during pregnancy will be more difficult to recover after the mare foals, and she will continue to lose weight; lactation requires even more energy than the growing fetus does.

"The thin mare may also have trouble foaling," said Samper. "She may have poor uterine tone and poor uterine contractions. I tell my clients that by the eighth month they should start increasing her grain intake and she should already be on free-choice hay. By the time she foals, she should be eating double the amount of energy she was consuming at eight months (gestation)," he said.

Tibary explained, "Nutrition in pregnant mares has been an area with very little research. We know that excess nutrition as well as inadequate nutrition may lead to some complications. Some of the problems people worry about are not always verified. Many people think obese mares have difficulty foaling, but this has not been demonstrated. Obesity is not a great concern for the foaling mare, but in my opinion should be avoided, particularly in the maiden mare."

Mares should ideally have a body condition score of 6 (on the scale of 1 to 9) at the time of breeding, and you should not allow them to lose weight during pregnancy. Mares in good body condition (score 6 to 7) will deliver stronger, healthier foals than thin mares, and will lactate better.

"Mares that are stressed nutritionally during pregnancy have a harder time maintaining pregnancy, or may have an abnormally long pregnancy because of fetal growth retardation," said Tibary. "Loss of body condition in the second half of the pregnancy reduces fetal growth and will adversely affect colostrum quality and milk production after foaling. It's usually better for a mare to be a little too fat than too thin."

What an obese mare might experience during gestation, however, is foot problems. "Obesity during pregnancy may lead to pregnancy-induced laminitis as well

as other metabolic diseases," Tibary explained. The obese mare may also "program" her fetus for future metabolic problems after it is born.

"The best thing to do regarding nutrition is to have a plan," he said.

The owner or caretaker should consult the horse's veterinarian and determine the mare's specific nutritional requirements for various stages of her gestation. The ideal program includes testing the forage and knowing what nutrient levels the concentrate portion of the ration supplies. The total diet should contain 12-14% crude protein and should have an ideal calcium to phosphorus ratio. During the last trimester the mare's ration should be between 1.2 and 1.5 parts calcium to 1 part phosphorus, and it should also include proper amounts of the necessary trace minerals, says Tibary. Samper stressed that it's important that the pregnant mare be stabled in the environment in which she will foal. "Then she will develop the immunity she needs for that environment and her colostrum will have protective antibodies for the foal being born into that environment," he explained.

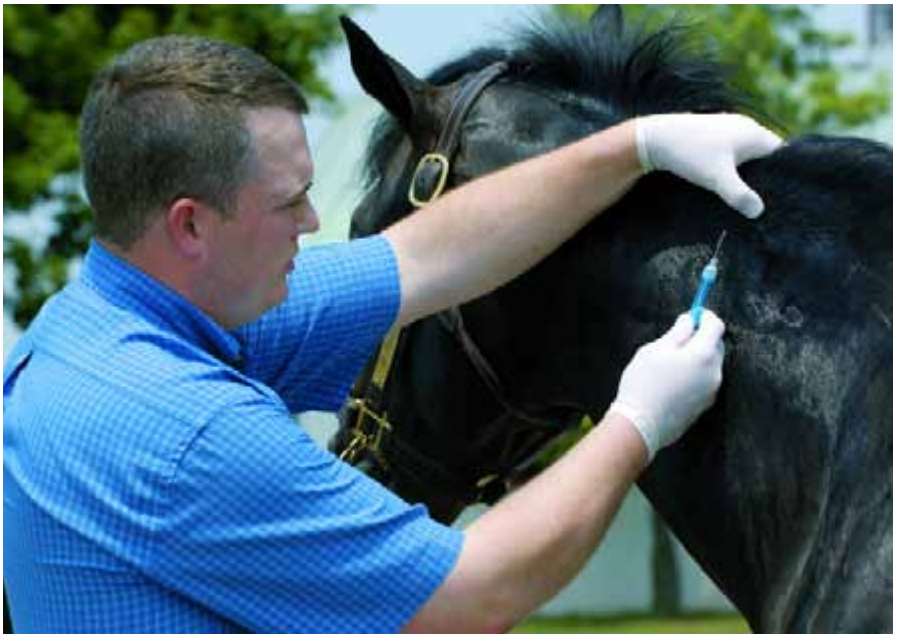
PREVENTIVE CARE

Preventive health measures to ensure disease protection for the foal include vaccination boosters for the mare. These are important, particularly during the last four to six weeks of gestation. "Boosting her vaccinations at this stage will produce a sharp increase in the level of antibodies that will be present in her colostrum," explained Samper. "These maternal antibodies will protect the foal during his first months of life."

Vaccination programs vary from one region to another, depending on the diseases the mare is most likely to encounter. According to Tibary, mares can be vaccinated during pregnancy for influenza, rhinopneumonitis, tetanus, rabies, Eastern and Western encephalomyelitis, West Nile virus, botulism, and rotavirus, for instance.

"In some areas where strangles is a problem, mares are also vaccinated (against) *Streptococcus equi*," he said. "If a new vaccination is contemplated (one that has not been previously included in the mare's annual vaccination schedule), it should start before the third trimester of pregnancy so enough time is provided for both the primary and booster vaccinations."

Some veterinarians prefer not to give more than four vaccines at any one time.



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"Tetanus, rabies, and Eastern/Western encephalomyelitis can be given at least 60 days before foaling, rhinopneumonitis vaccine can be given several times during pregnancy, and influenza and West Nile virus vaccines should be given about 30 days before foaling," said Tibary.

Vaccination against rhinopneumonitis (equine herpesvirus-1) is important for preventing abortion. "The traditional vaccine used for this purpose is a killed vaccine, which should be given every two months, starting at either the third or fifth month of pregnancy," he said. Depending on the region and risks, some people like to start at three months of pregnancy, while others start at five months. The vaccine is usually given at the fifth, seventh, and ninth months of gestation.

"Some veterinarians use the modified-live vaccine for prevention of rhino abortions, without any negative effects, but this vaccine is not labeled for use in pregnant mares," he noted. "The modified-live vaccine seems to protect against both EHV-1 and EHV-4 (another type of EHV)." The American Association of Equine Practitioners has set forth recommendations for broodmare vaccination, but you should check with your own veterinarian regarding the best program for your region, and for your particular mare.

Deworming the pregnant mare is also important, but make sure you choose drugs that are not contraindicated for pregnant mares. "Ideally you should do a fecal analysis (assessing for worm populations) on mares before deciding on treatment for parasites, and also to be able to evaluate the efficacy of treatment," said Tibary. Proper deworming will ensure that she will not pass worm eggs in her manure for the young foal to pick up when he ingests his dam's manure, which foals typically do.

How closely you manage the mare during her last trimester of pregnancy also depends on her individual needs. "Many mares have an easy pregnancy and don't need as much monitoring as mares that are classified as high-risk," said Tibary. "Those mares require a lot more work in monitoring, particularly in that last trimester, than a normal mare who has more chance of carrying a normal pregnancy to term." He recommends having an emergency plan, especially during the final two weeks before the calculated due date. Post emergency numbers and protocol on the door of the mare's stall. You also need to have a plan in case the mare does not have enough milk or colostrum.

COMPLICATIONS THAT CAN ARISE DURING THE LAST TRIMESTER

There are a number of things mare owners should watch for, especially in high-risk pregnancies. Premature udder development and lactation are usually due to impending abortion and might be the result of twins, placentitis (inflammation of the placenta), or other infections.

TRADE ZONE

If the mare is making more udder than she should more than four to six weeks ahead of foaling, or if she's dripping milk more than two weeks ahead of her due date, you should have her checked by your veterinarian.

Samper says imminent signs of foaling might be due to premature contractions of the uterus or premature placental separation. "We need to determine if there's infection present, and, if so, what kind," he explained. "Is it coming from the mare's bloodstream or moving up through the vagina and into the cervix?

"Once we know, there are things we can do if it's not too late. If it's an infection we treat the mare with antibiotics and anti-inflammatory drugs. If it's just a premature placental separation and she's having premature contractions, often we'll just put her on progesterone (such as Regumate) to quiet down the uterus and she'll continue with the pregnancy."

Whenever there's an inflammatory process going on in the uterus, it tends to contract, restricting blood flow to the fetus. Administering hormones and anti-inflammatories decreases uterine contractions.

Dr. Peter Sheerin, an equine theriogenologist at Rood & Riddle Equine Hospital, in Lexington, says treating the mare might be successful in preventing premature foaling. "It will depend on how far along she is in the pregnancy, and how severely affected she is at the time it's discovered," said Sheerin.

"The veterinarian may also use a drug called pentoxyfilline (an anti-inflammatory drug)," he added. "Originally, we thought it helped alter the red cells so they could pass through the placenta more readily, for better circulation to the fetus, but current thinking is that it helps inhibit the inflammatory cytokine cascade."

Some mares with a compromised pregnancy do not show clinical signs of trouble or premature readiness for foaling. The mare may lose her foal before you realize she has a problem. Thus, it is very important to identify these mares early, if possible, and halt the inflammatory process before it gets too far along. Even subtle signs warrant an evaluation. "We would typically do rectal palpation and ultrasound to measure the placental thickness," said Sheerin. There are standards for how thick the placenta should be at various stages of gestation. If it's thicker than it should be at a certain stage, this would raise suspicions of placentitis.

"Abnormal fetal fluids would be another sign," he noted. "A vaginal exam to look at the cervix, and a culture of fluids in the vagina to check for infection can also be helpful. A transrectal ultrasound won't show the whole uterus or placenta, but the

veterinarian can examine the rear part of the uterus near the pelvis to see if the placenta has separated or thickened," said Sheerin. This is the portion most often affected with placentitis because most infections come through the vaginal canal.

"Once we've determined that a mare has placentitis, she should be treated and closely monitored," he said. "We can (ultrasound) scan her transabdominally to monitor fetal heart rate. We pull blood and measure the mare's progesterone, and some veterinarians also look at total estrogen. A fetus that's stressed will produce a spike in the mare's progesterone. Total estrogens will drop, depending on where the mare is in her pregnancy. These levels can be clues the fetus is stressed. The risk for impending abortion is there, so these mares are usually treated to try to prevent abortion."

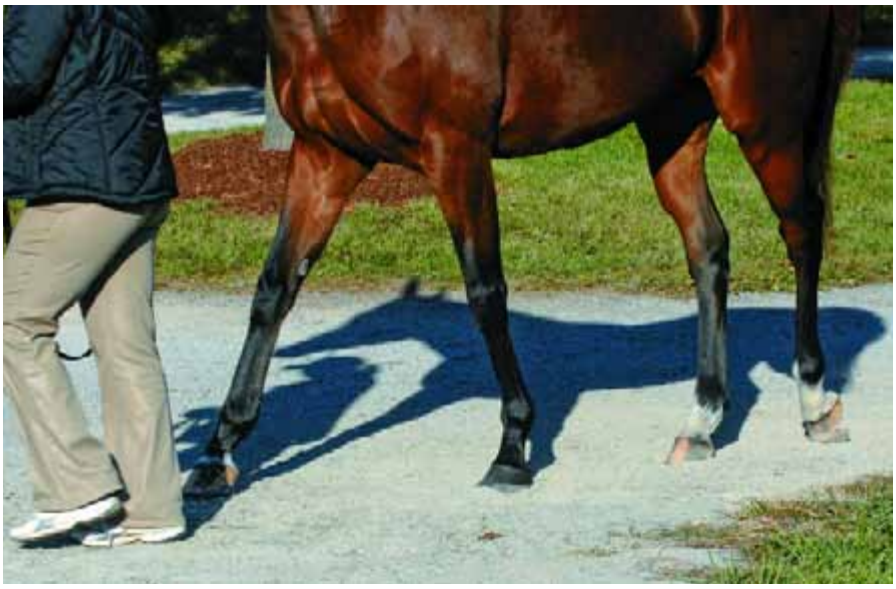
Tibary added, "Udder enlargement with severe ventral edema (fluid swelling along the underside of the belly) is another complication that may occur as the mare nears the end of gestation. You might notice it in some mares as early as three weeks before foaling, and you should watch it closely. "This swelling under her abdomen should not be confused with prepubic tendon rupture," he said. In the latter situation the main support for the abdomen gives way and her belly drops down too far.

Sheerin says this type of rupture doesn't happen very often but can be potentially catastrophic, depending on the severity of the rupture. Even if it's not life-threatening, "if the tendon is completely ruptured, she won't have the abdominal press she needs for pushing the foal out. The drooping abdomen can be supported with a bellyband to take some of the weight.

In these instances a veterinarian might deliver the foal via C-section or might wait to see what the mare can do on her own and help her if needed, ultimately taking her to surgery if it's too difficult to pull the foal.

Rupture of the prepubic tendon may occur because of old age (weakness of the structure), injury such as a fall or kick, or hydrops—too much fluid in the uterus, putting extra weight and pressure on the abdomen. Hydrops is rare in mares, but the veterinarians at Rood & Riddle see about two cases each year, diagnosing cases with palpation and ultrasound.

"The extra fluid puts the foal at risk," said Sheerin. "The outcome depends on whether it's hydrops amnion or hydrops allantois, but in the majority of cases the outcome is not good. If the mare is supposed to be 200 days, and when she's palpated the uterus feels like she's 300 days, you know something is wrong," he explained.



It's important to remain vigilant and monitor the pregnant mare throughout her gestation

Vaginal discharge is another clue that something may be wrong. "The discharge may be bloody due to impending abortion but more commonly may be due to leaking from vaginal varicose veins," explained Tibary.

The vaginal wall/muscles may have become stretched and weakened and, as a result, some of the surface veins hemorrhage. "If these veins break, you'll see a little hemorrhaging or bloody discharge from the vulva," said Samper. This happens most often in older mares and may be related to age and/or many foalings.

Tibary said, "There may also be an effect of the hormonal environment of the pregnancy and the dryness of the vagina, making the veins more susceptible to bleeding." In most cases, bloody discharges are not life-threatening or pregnancy-threatening, but some may be indicative of a serious and dangerous situation. Be alert to any type of discharge. A thick discharge of mucus or pus is often a sign of placentitis. Have your veterinar-

CHECKING THE MARE FOUR TO SIX WEEKS BEFORE FOALING

When Dr. Juan Samper, an equine theriogenologist in Langley, British Columbia, gives mares booster vaccinations at four to six weeks before foaling, he also recommends a rectal and ultrasound examination to determine whether the foal is presenting head first or backward. "If the foal will be coming backward, the birth must be attended, and the foal must be pulled out very quickly or he will die," he explained. "So it's very helpful to know, ahead of time.,.

"Another thing I do when we check the mare before foaling is to see if she's had a Caslick's repair (a veterinarian has sewn up the upper part of the vulva to prevent air from contaminating the mare's reproductive tract). This is the time I will open it up, unless she has such poor vulva conformation that we need to wait until she actually starts labor. Another thing that should be done, especially for maiden mares, is to start touching and cleaning the udder several weeks before foaling. Then when the newborn foal tries to nurse, the mare won't be squealing and kicking because her udder is sensitive. This is also the time to make sure the mare has no vaginal discharges or secretions, no clumping of hairs at the back of the tail which could indicate a discharge." *—Heather Smith Thomas*

ian check the mare.

"Within a reasonable limit, we don't want to see mares all of a sudden increase in girth," Tibary noted.

A too-rapid increase in abdominal girth may be accompanied by respiratory or metabolic complications and can be a clue that the mare is suffering from hydrops or twins.

"Twins may lead to a mid- to late-term abortion," he continued. "The mare is not prepared to dilate properly. The abortion may cause her harm just because of this lack of preparation." She may need assistance to deliver the dead foals.

Colic due to uterine torsion, and on rare occasion, rupture of the uterus can also occur in the last trimester. "Colic toward the end of pregnancy, particularly when it's associated with uterine torsion, is a very serious problem," Tibary said. The torsion must be resolved quickly because it can compromise the flow of blood to the fetus.

Sheerin says mares in late pregnancy may have some gas colics and discomfort, just because the fetus is taking up so much room or sitting on a portion of the digestive tract and putting pressure on it. "Any time a horse colics, you should be concerned," he said. "If a mare only has one mild colic, it's usually not a big deal, but if she continues to colic, there is obviously something wrong. This is the stage of pregnancy when a mare might have a uterine torsion, which could be life-threatening for the fetus," said Sheerin.

The veterinarian can determine whether the uterus has flipped over and is twisted by palpating the rectum. There are two ways to treat this. "The mare can be anesthetized, put on the ground with a wood plank placed on her flank to help hold the uterus in place, and then the mare is quickly rolled over in the opposite direction of the twist—in an attempt to roll her body faster than the heavy uterus," explained Sheerin. If this is successful, it will resolve the torsion. The trick is to figure out the proper direction to roll her.

If rolling the mare doesn't work, the veterinarian must correct the torsion surgically, by making an incision through the flank (this can be done with the mare standing) or through the midline, with the mare on the ground under general anesthesia. The veterinarian reaches in through the incision and turns the uterus over, placing it in the correct position. The crucial factor is how much it has twisted and how long it has been that way. Sheerin explained, "If it has been twisted very long, the blood supply to the uterus has been compromised due to pressure on major blood vessels in the twisted tissues." This could endanger the health and life of the fetus. The common time for a torsion to occur is around nine to 10 months of gestation.

It's also crucial, if there are other broodmares on the farm, to note how the other pregnancies and foalings are going.

"If some mares are going longer than normal, or if the first few mares have foaled and do not have enough milk, for instance, this could be a sign of fescue toxicity if the mares are on fescue hay or pastures," said Tibary. If this happens, remove the remaining mares from the forage that's causing the problems, and your veterinarian might recommend treating mares in the last trimester of pregnancy to improve the chances for a normal foaling and a healthy neonate.

TAKE-HOME MESSAGE

Mare owners should not wait until the last trimester to start watching mares closely. "Any mare that has been flagged as a high risk pregnancy because she's had complications before, or an abortion or premature placental separation in an earlier pregnancy, should be carefully monitored," said Tibary.

In any instance where the general health of the mare is in question, a veterinarian should perform a complete fetal and placental evaluation. "The standard examination for a high-risk pregnancy requires transabdominal and transrectal ultrasonographic evaluation of the fetus and placenta, as well as monitoring of hormonal changes over several days," explained Tibary.