Abstract

Successful management of a band of broodmares whether it is two or two hundred involves more than just getting the mares in foal. The conservation of time that is available to breed the mares is a crucial factor in any program and its judicial management is important to the long term success of any program with a goal to produce a foal every year from each mare. It is important to remember that the mare is not only being bred for this season but also for the following season and many seasons to come. The time of the year she becomes pregnant this season will have an effect on how much time she will have available to be bred next year. As most of the author’s experiences are in the natural covering world of the Thoroughbred that is where the emphasis of this discussion will be. However, it can certainly be adapted to any breeding system that is being used; all of the criteria will still apply.

Keywords: Broodmare, breeding, management

Time management also becomes a useful tool to help the veterinarian and the farm manager to more efficiently use their time, prevent unnecessary examinations, and reduce some of the expenses of the breeding season. The judicial management of time will positively affect all aspects of broodmare management on a farm. It will keep mares producing more regularly, save the farm management time by keeping the management of mares more tightly grouped so that help can be used more efficiently and save the veterinarian time as a larger percentage of the mares will be examined on a single visit.

In order to accomplish the goals established for optimal time management a strategy must be developed by all of the involved parties. The veterinarian, owner, manager and farm help need to understand the goals that need to be achieved and the methods that are being used to achieve them. It is of the upmost importance that the goals are well understood by all parties so that everyone is onboard. If one part of the team is being dragged along, the success of the project will be more difficult to achieve. The first step in this endeavor is to set obtainable and realistic goals. These goals will be determined by the desired end result and the product being produced. Goals will certainly be different for a farm that is selling Thoroughbred yearlings when compared to a farm that is raising Warm Bloods for use as performance horse at five to six years of age. Other farms, for management reasons, may not want foals until March. Any of these management reasons, if planned for, can and should be incorporated in the plan and still allow for better mare management through planning. Once the plan has been worked out and put into place than the implementation becomes the important thing.

The decisions that need to be made before the season starts are; on what date will the first mare be bred, to whom are the mares going to be bred and how are each class of mares going to be managed to obtain optimal results. For the Thoroughbred in North America the traditional start of the season is February fifteenth but some farms may want to wait and start at a later date. As the heart of this system is estrus synchronization, stallion selection should be looked at and mares that are bred to a specific stallion should be spread out a little for easier management. In order for synchronization to work effectively the mares must be cycling, a system of artificial light management must be decided on and started at the appropriate time, so that mares will be ready to cycle at the appropriate time. Once the management systems have been decided on, they need to be put into practice and not deviated from.

The goals of the project are to have a system that will develop a band of mares that produce a foal every year at the most appropriate time to be an economical commodity. Broodmares, even when managed aggressively, will tend to have a drift in the foaling dates which causes a loss of time and a reduction in opportunities for a mare to become pregnant. In a large study of breeding records it was found that the average drift in foaling dates in mares bred in subsequent seasons on well managed farms was 13.4 (±23.2) days.1 This drift can be minimized if mares are bred and become pregnant within 25 days of foaling.1 The control of the drift is important as mares will work their way off the calendar and then must be passed because of foaling dates that are too late.

The achievement of a successful time management program must start well before the start of the breeding season as it is important to have mares ready to be bred when the season begins. Mares should be checked in the fall for pregnancy. All mares should be examined, even the ones that were thought to be barren; every year there are mares found to be pregnant that were reported as barren at the end of the season. The barren mares should be examined and cultured while they are still cycling in the fall. At this time their Caslick suture can be evaluated and repaired if need be, and other problems like possible urine pooling, severe endometrial cysts, torn cervixes and positive uterine infections can be evaluated and treated before the upcoming season. The mare’s hair coat and body condition should be evaluated and her general health evaluated. This can be done quickly with just general
observation, as most mares on a well managed farm will be in good condition, however, sometimes a different set of eyes will see things that are missed by someone who looks at the mare every day. Over- or underweight mares should have their feeding altered to address their individual condition. It is important to have a mare enter the breeding season in the proper body condition and addressing those problems is much easier done before the season starts than trying to correct a problem during the breeding season. Hair coat is frequently a good indicator of general health. An unhealthy or shaggy hair coat can be a sign of conditions such as Cushing’s syndrome and pituitary tumors.

After evaluation, the mares can be divided into groups that, when possible, will be maintained throughout the breeding season. In large farms it is wise to have barren, maiden, and foaling mares separated. In farms with a large number of foaling mares, they should be divided by foaling dates so that they will remain in the same groups throughout the season. Keeping mares in the same social groups will reduce the stress level as they can get the dominance order worked out before the breeding season begins.

In late November or early December the mares that are going under light should be quartered in facilities with proper lighting conditions. There are several systems that work well for artificial lighting the choice will depend on the management style of the farm. Mares can be put in stalls, sheds or paddock confinement with artificial light. The mare should receive a total of 16 hours of light with artificial light added after sunset. It is important that there be a period of darkness, the lights must be on a timer and not left on all night. Traditionally mares have been exposed to at least sixty days of lights from the time they are started until first breeding. In the past several years there have been several alternative methods and treatments for stimulating a mare to pass through the transitional estrus period. These protocols have been well-described and will not be elucidated here. The object of whatever system is used is to have a mare cycling, so that she can be synchronized for breeding at the start of the breeding season. Early foaling mares can also be positively affected by exposure to artificial light. If mares that foal before the fifteenth of April are exposed to artificial light on the same schedule as the open mares it will positively affect their reproductive performance. The exposure to light has been shown to encourage the mares to foal about ten days early and more importantly it reduces the incidence of post-foaling anestrus.

For the purpose of this discussion the start of the breeding season will be February fifteenth. A perfect start to the season would be for all mares that are open, foaling, barren and maiden to be bred on this date. Of course, that is not possible but to think of this as a goal is a good way to set the tone for the season. If mares are put under light on December first, the teasing should begin by mid-January, with the maiden and barren mares. The mares should be examined for follicular activity when they show estrus or at least before they are started on any estrus synchronization program. Mares with no follicular activity should be evaluated before they are entered in the program. Many farm managers will elect to start the mares anyway and often this is the proper decision as these mares will have another twenty days under lights before they will need to ovulate and frequently they will respond well. If they don’t respond, the evaluation will allow the veterinarian to make a proper diagnosis and implement an appropriate treatment without delay.

In the author’s opinion the gold standard for estrus synchronization is the use of progesterone and estradiol in oil as a daily injection. The use of this product has stood the test of time. It has been used for over thirty years and on thousands of mares. It is inexpensive, a little more trouble than other systems but in the experience of the author, the side effects are minimal, limited to sore necks and some mares being difficult to catch, and the results are reliable. The protocol is simple and straightforward. The object of the treatment is to completely shut the mare’s ovaries down so that she is starting with no significant follicular activity and when treatment is stopped she will develop a primary follicle at a normal rate. This process from the start of treatment to ovulation will take between nineteen to twenty-one days with very few mares ovulating outside that period.

The protocol for this procedure is as follows: The mare is palpated on day one to ascertain the degree of follicular activity. She is then given an injection of three ml of progesterone and estradiol that contains 150 mg of progesterone and 10 mg of estradiol in oil. This treatment is continued for ten days and on the tenth day the mare is also given an injection of prostaglandin and palpated. The prostaglandin is given to destroy any luteal tissue that is remaining from an ovulation that may have occurred during the treatment. The reason for the palpation is to determine if there is any follicular structure on the ovary. The presence of a follicle is important to be aware of because its presence will cause the mare to show signs of estrus earlier than mares that do not have a residual follicle. However, the mare will make a second follicle while the original one regresses and this can be very confusing to someone who has not worked with this product in the past. Most mares will come into heat about day seventeen and be ready to breed about day twenty. Ovulating drugs may be given if the mare is to be covered earlier and they have the same effect as they would in a mare that is not being synchronized. If a group of mares are being synchronized it is best to spread them out so that they are not all being bred on the same days. It is common for larger farms to group mares and then leave two or three days between the start of synchronization so that there are
no more than five or six mares in a group and these mares are going to different stallions, with no more than two mares per group going to the same stallion. This grouping may not be as important when artificial insemination is being used, if semen is available to a large number of mares on any given day.

The first group of barren and/or maiden mares should be started nineteen days or so before the optimal breeding date and then any additional groups can be started at two or three day intervals. This will allow the farm to have an opportunity to breed all of the maiden and barren mares in the first two weeks or so of the breeding season. Mares that have foaled before the start of the breeding season may also be synchronized with the same schedule as the maiden and barren mares. The author has done this with excellent results when using mares that have been through their foal heat prior to the time that the maiden and barren mares are ready to be synchronized. It is the author’s opinion that if the foaling mares have not had a foal heat, it is better to let them have that heat and then handle them in a different manner. Foaling mares must be handled aggressively, remembering that this year’s foaling mares will make up the majority of next year’s barren mares in most herds.

Foaling mares that are not synchronized and that have their foal heat after the start of the covering season should be routinely examined for the first time at about seven days after foaling if there is no medical or other reason to examine them before that time. If mares are examined earlier than seven days the mare will not have time to recover from the trauma of foaling and it is difficult to evaluate the severity of any damage that was done during foaling. Mares have an amazing ability to repair after foaling and should be given a chance to do so before any intervention is attempted. Caslick procedures may be replaced before seven days if the mare has sufficiently healed that the Caslick suture line will heal. If the vulvar lips are infected or badly traumatized it is better to wait to replace the Caslick as the suture line will not heal.

At seven days the foaling mares should be examined be with a speculum. This will give the veterinarian an opportunity to visualize the vulvar lips, the vestibule and vagina for lacerations. Cervical lacerations, inflammation, discharge and urine pooling can also be observed. If the examination warrants it an endometrial culture and cytology may also be performed. The uterus and ovaries should then be palpated. The ovaries are evaluated for size, consistency and follicular activity. Granulosa cell tumors can often be formed during pregnancy and are found at this time. The uterus should be evaluated for size, consistency and tone. Post-foaling uterine hemorrhage that was not severe enough for the mare to show clinical signs is often found at this time. After through palpation, the mare’s reproductive tract should be examined by ultrasound and particular attention should be paid to the mare’s uterus. The presence of uterine cysts can be evaluated and recorded along with the presence of fluid in the uterus. The ovaries are evaluated and any abnormalities found during palpation can be examined further. At this time a judgment can usually be made as to whether or not the mare should be considered for foal heat breeding. If the mare is to be considered for breeding, further examinations should be performed very critically. It is the author’s opinion that in order for foal heat breeding to be successful the mare must meet certain criteria. First, she should not be infected or look very inflamed, she should have minimal fluid in her uterus, and lastly should not be bred until she is at least ten days from foaling. If these criteria are adhered to, success at foal heat will be very close to the conception rate at second heat or later heats. If a mare is not bred on foal heat, then it needs to be decided on whether to short cycle her from her foal heat ovulation or to let her return to estrus on her own. Whichever route is decided on, it is important to know when the mare ovulated from her foal heat so that her return to estrus can be anticipated. Foaling mares are frequently difficult to tease, so it is important to keep track of when they are due back in heat. The reason it is important to wait until ten days post-foaling to breed a mare is because the conception rate is so low before ten days that the overall time will be saved for a herd of mares by short cycling these individuals. Mares with uterine infections, severe trauma or other more severe problems should be treated and not rushed into breeding when there is not a good chance for conception. Once a mare is bred the breeding should be respected even if the chance of conception is low, so again time is saved by waiting and breed when the mare is as near “right” as possible.

From the beginning of the breeding season onward the most important procedure on the farm is teasing. In recent years as more modern technologies have been brought into play, teasing has been deemphasized. In the author’s opinion this is a mistake. The author is very lucky in that he has been practicing in an arena where the mare must be covered by the stallion and this has kept teasing alive. A competent teasing person is a great asset to the veterinarian. With the use of a teaser the veterinarian will know how long the mare has been in heat, how well she is showing estrus and whether she is on the way in or out of heat. Follicle size and uterine edema are important but paying attention to the teaser adds valuable information and in many instances will keep everyone out of trouble. It has been suggested by some workers that teasing also improves mare’s uterine health by causing oxytocin release which helps to clear any fluid in the mare’s reproductive tract.

After the mare has been bred and ovulation has been confirmed, regular examinations should be scheduled so that the mare’s performance can be frequently evaluated and if things are not progressing normally the
veternarian can intervene in an attempt to get things back on track. The author likes to examine mares the first time after breeding on the fourteenth day from OVULATION not breeding. This is important as mares have certainly become pregnant that ovulated as long as seven days post-breeding and if these mares were examined on day fourteen from breeding many pregnancies could be missed. If a mare has more than one follicle that ovulates asynchronously it is important to examine them from the day of the last ovulation. The author picks day fourteen because the embryos are not fixed at this stage and if multiple embryos are diagnosed you will have time to deal with them before fixation. If there is any chance of multiple embryos the author will usually examine the mare again at eighteen days to be sure that nothing was missed. If all appears to be normal the next examination should be around twenty-eight days, this will allow the veterinarian to see a heartbeat in the embryo and if the embryo appears abnormal there will still be time to intervene before the formation of endometrial cups. The next examination is usually performed about forty-two days as this is the date when pregnancy is considered diagnostic by insurance companies, sales companies and many breed registries. The mare is examined again at between sixty and seventy days for fetal sexing or just a final pregnancy determination. Later pregnancy examinations are performed when needed for sales, insurance examinations, payment of stud fees or any other management reason when an absolute diagnosis of pregnancy is needed.

We have discussed the methodology for achieving high reproductive performance but how should the outcome be judged? Classically and ultimately the final judgment is the live foal rate. This is in fact a very important measurement but in order for a high live foal rate to be sustained year after year other factors must be taken into consideration. The first measurement that is a significant measure of performance is the conception rate. An even closer look that is frequently used as a measure of performance is the per cycle pregnancy rate and then it can be broken down even farther into breedings per conception. These are the measurements that are all frequently referred to when breeding efficiency is being judged and they are all important. A less frequently used measure of breeding efficiency and, in the author’s view, an important measurement in sustaining all of the other parameters is a measure of days open. Days open refers to the days that a mare is not bred compared to the days that she is eligible to breed. For example if the first day of the breeding season is February fifteenth, then every day after the fifteenth of February would be an additional day open when measuring a maiden or barren mare that has been on the farm under lights. Foaling mares are measured from their foaling date and every day after that is considered to be one day open. This figure is important because as mentioned earlier if the days open interval exceeds twenty five the mare foaling date will start to get later and the mare will eventually work their way off the end of the calendar. The number of years that elapse from the start of this movement is determined by how rapidly it occurs and how early the mare begins her broodmare career. Mares that begin foaling in January will certainly have more time to recover from problems of the foaling season before they have to skip a year because of their foaling dates. High performing farms realize this and work hard to keep mares foaling early. The author has one farm that has a goal of not only a ninety percent plus conception rate but also of having fifty percent of its foals on the ground before the fifteenth of February. The farm certainly doesn’t reach that goal every year but at least it has a goal that can be worked toward. Many broodmare operations may not want foals that early in the year and that is fine but goals should be set so that there is a plan to follow.

In the author’s opinion the broodmare business is production medicine very similar to any other livestock production business. One major difference that hurts the production numbers in the horse industry is the difficulty of culling. For the best production culling needs to be done. This is well-demonstrated when the reproduction records are examined on operations that are producing horses of lower value on a commercial basis. Culling of purebreds often must take other factors into consideration besides just reproductive performance. Even on a commercial farm when sentiment is not a factor, mares with bad production records may be kept because the high value of their offspring will offset the expense of the years of no production. In these instances the management and veterinarian must just do the best they can.

The added expense, if any, of intensively managing a broodmare band is usually more than offset by the increase in value of an older individual to sell or train and better performance from the broodmare band. An added benefit of more intense management is usually more efficient use of the veterinarian’s and farm’s time, and a more condensed breeding season.

References