

Score Behaviors

- 1 Not aggressive toward stallion, but looks away or is not interested.
- 2 Shows interest by facial expression and may approach stallion; slow to show interest. Mare may raise tail or exhibit some winking (eversion of the labia of the vulva). Mare may show these signs at a distance, or in close proximity to stallion.
- 3 More interest in stallion as demonstrated through facial expression, tail raising, flexion of pelvis (posturing), winking and urination.
- 4 Intense interest in stallion as demonstrated by turning hindquarters to him, leaning toward him and exhibiting continuous winking and urination.

MANIPULATION OF THE ESTROUS CYCLE

For a variety of reasons, including earlier foaling dates, spreading of a stallion's book, appointment breeding, and improved reproductive efficiency, some breeders choose to employ more intensive management techniques than simply breeding the mare when she is in estrus. The most commonly used are extended photoperiod and hormonal stimulation.

Currently, the simplest and most effective management protocol for bringing mares into heat prior to the natural breeding season is the use of extended daylength. By imposing an artificially long day on mares beginning in late November or early December, the hormonal mechanisms that control estrous cyclicity are stimulated such that mares will begin to ovulate in mid to late February (rather than March to April). Although different lighting schedules have been studied, a lighting program that supplies 16 hours of light to 8 hours of dark seems to provide a consistent response. The additional light can be provided by placing mares in stalls or paddocks where there is sufficient light in the late afternoon, and then maintaining the light artificially until approximately 11 p.m. The amount of light necessary to elicit photoperiodic stimulation is at least 3-footcandles at the level of the horse's eye. A 200-watt incandescent bulb provides adequate light in the average stall.

It is important for the mare owner to understand that extending the daylength does not provide an immediate response, nor does it eliminate the transitional period between anestrus and the ovulatory season. A behavioral response can be seen 30 to 60 days after the program is initiated, with first ovulation occurring 60 to 90 days after the lighting program begins. It should also be noted that exposure to extended daylength stimulates shedding. Depending on the climate, mares in extended daylength programs may need shelter and/or increased nutrient intake during this period.

Estrous cycles can also be manipulated with the use of exogenous hormone treatments that shorten or prolong diestrus or enhance ovulation. These hormones, when used at the appropriate times, are valuable for improving reproductive efficiency in mares. The most commonly used hormones are prostaglandins, human chorionic gonadotropin, and progesterone. Each will be discussed separately, although they may all be incorporated into a specific regimen for practical use.

The most widely used type of reproductive hormone therapy in mare management is prostaglandin F 2A- and its analogs. Prostaglandin is administered to the mare to cause regression of the corpus luteum (CL) and a subsequent reduction in progesterone during diestrus. This has the secondary effect of allowing the mare to return to estrus earlier than in the normal cycle because without progesterone from the CL, the mare will not remain in diestrus. To do this prostaglandin is given on the fifth or sixth day post-ovulation. The mare will most likely return to estrus within 2 to 5 days and ovulate within 7 to 12 days after treatment. This regimen shortens the mare's cycle by approximately one week, which is advantageous in many situations. The only criteria that must be fulfilled prior to treatment with prostaglandin is that a mature CL be present on the ovary. Therefore, a mare must be cycling (and have ovulated) in order for prostaglandin treatment to be a viable option. In transitional mares in which there is some follicular activity but no previous ovulation (no CL is present), prostaglandin treatment will not be effective.

There are, however, many situations in which prostaglandin treatments are very beneficial in scheduling estrus in mares. One way is to use prostaglandin on post-partum mares that do not meet all the prerequisites for foal heat breeding. Prostaglandin treatment will, in effect, permit a longer post-partum interval without waiting for the normal second post-partum ovulation. Prostaglandin is also useful when a mare arrives at the breeding farm shortly after ovulation. If a mature CL is detected by ultrasonography, administration of prostaglandin can have the mare in estrus and ready to breed within a shorter timeframe than would occur naturally. In any situation in which one would need to shorten the interval from one ovulation to the next, prostaglandin would be the recommended treatment. For example, it can be useful in scheduling groups of mares booked to stallions that are actively performing and have limited days allotted to stud service. Additionally, it may be helpful when scheduling mares that can only be at the breeding farm at a specific time.

Another use of prostaglandin includes aborting early pregnancies that must be terminated (i.e., mismating, elimination of twin pregnancies). Prostaglandin can also be useful for mares in a pseudo-pregnant condition or in other cases in which the mare's CL has not regressed due to the

natural prostaglandin release. If the problem can be rectified by eliminating a dominant corpus luteum, prostaglandin treatment will usually fulfill the objective.

Management of mares during estrus, particularly scheduling breeding or insemination, is sometimes relatively difficult due to their long estrus. In addition, as the season progresses, cycles tend to shorten; therefore, using a previous cycle as a guideline may not be of much benefit. Mares are often mated several times during a single estrus which results in inefficient use of the stallion, as well as increased chances of introducing contaminants into the mare's tract. In an effort to hasten or ensure ovulation, and thereby reduce the number of inseminations during estrus, a hormone with high luteinizing hormone (LH)-like activity is often utilized. The most commonly used of these gonadotropin type hormones is human Chorionic Gonadotropin (hCG). Given to mares intravenously after detection of a large, pre-ovulatory type follicle, hCG usually results in ovulation within 48 hours. Research studies have found no adverse effects on fertility when hCG is used to stimulate ovulation in mares. There has been some concern that the mare might develop antibodies against hCG. This has been shown to occur; however, there has been no significant ovulatory refractoriness (or lack of response) to the hormone or any evidence that these antibodies cross-react and interfere with the mare's own LH. Users should try, however, to be judicious in the use of hCG and limit its use to the most necessary situations.

Progesterone and synthetic progestins are steroid hormones that keep mares out of estrus and help to maintain pregnancy in the early stages. They also have several therapeutic uses, and the product most often prescribed is Regumate® (altrenogest), a synthetic progestin compound that does not interact with the mare's natural progesterone.

One use of Regumate® is the regulation of estrual activity early in the breeding season. Mares in the late transitional state can be put on a 14-day Regumate® protocol followed by administration of prostaglandin the day after Regumate® administration is stopped. The mare should ovulate approximately 12 days post-treatment. This program works fairly well for mares that are transitional and close to entering the physiologic breeding season, but is not successful for mares that are still in deep winter anestrus with no follicular activity. It is a good regimen to use in conjunction with an extended lighting program.

This same progesterone therapy program can be used to "schedule" mares in a live cover breeding situation so that all mares are not ready to be bred on the same day. By varying

the length of the progesterone administration (10 to 16 days), it is possible to have only one or two mares at a specific stage of the cycle at any given time. This can also be used to attempt synchronization of mares when a stallion is available for only a limited time.

The question of progesterone therapy to maintain a pregnancy in mares is still controversial. In the normal situation, the mare's CL produces sufficient amounts of progesterone to maintain pregnancy during early gestation. It is also known that the ovaries (from which progesterone arises) can be removed after 100 days of gestation and pregnancy will continue to be maintained, which suggests that if progesterone therapy is used, it probably is generally not necessary to continue it past 100 days of gestation. The critical period in which quiescence of the uterus and closure of the cervix is important is early in the pregnancy. In cases where the mare is producing less than 2 ng/ml of progesterone, supplementation is likely beneficial. This is usually continued until at least day 35 of pregnancy or longer if necessary.

There are other hormonal treatment regimens which are currently under investigation and should be available for use by the horse breeder in the near future. The three which have been discussed have produced successful results and are recommended for the management of the mare's estrous cycle.

SUMMARY

Accurate detection of estrus and correct utilization of mechanical and hormonal techniques to manipulate the mare's estrous cycle will greatly increase the likelihood of a successful breeding program. Properly managed, mares will demonstrate very high reproductive efficiency rates. In addition to the techniques discussed in this fact sheet, the use of a rectal palpation and reproductive ultrasonography are invaluable tools. Their use is probably prerequisite to the correct timing of hormone administration.

The horse breeder must realize that to have a successful program, all aspects of the horse's health and management must be considered. To concentrate one's efforts in any particular area to the exclusion of other related factors will result in lower reproductive efficiency in the horse.

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