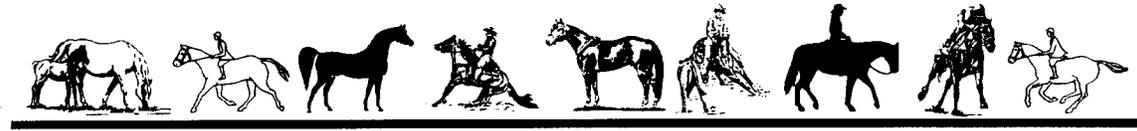


**TEXAS A&M UNIVERSITY
DEPARTMENT OF ANIMAL SCIENCE
EQUINE SCIENCES PROGRAM**



**A Field Study Report: Reproductive Performance of
Mares Kept Primarily on Pasture**

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Success at breeding and raising young race prospects depends a great deal on the reproductive performance of brood mares. Many brood mare owners go to considerable effort in breeding mares so that they will foal at the right time of the year, nurse a properly developing foal and re-breed easily. When problems surface with reproductive performance, the entire production cycle is interrupted in a fashion that affects both economic and professional success in the race horse industry. Without a doubt, today's dedicated mare owners would like to avoid being forced to feed an open mare for eight months, waiting for the next breeding season to come around. Numerous studies have shown that breeding status, age and body condition are some of the factors that can affect a mare's reproductive performance^{2,3,4,7,8}. These and other factors can influence when a mare begins to cycle regularly, the length of her stay at the breeding farm and her ability to become pregnant. The bottom line, however, is foaling rate, because the percentage of foals that hit the ground is the best overall indicator of reproductive efficiency⁶.

In today's industry, some brood mares are managed very intensively, receiving concentrate feeds on a regular basis. However, pasture and hay make-up an important part of many feeding programs, and there are some situations where grazing provides the majority of total feed that mares eat on a yearly basis. Limited information has been available on mares that are maintained predominately on pasture, with only minimal supplementation at certain times of the year. Therefore, a field study was recently completed by the Texas Agricultural Extension Service to evaluate

reproductive performance of pasture-managed mares.

Field Study Design

The field study involved 145 maiden, open or foaling mares on two breeding farms. The mares ranged from 3 to 21 years of age and were bred to four different stallions either by artificial insemination, pasture or hand breeding methods. Mares ranged from maiden status to those having had 15 previous foals. All broodmares were maintained on native grassland grazing or hay until the onset of the breeding season, with grazing consisting primarily of Indiangrass, Switchgrass, Big and Little Bluestem. Beginning in January, mares were supplemented on pasture with either bromegrass or alfalfa hay. In March, or at expected foaling time, the mares were also fed a 14% crude protein concentrate at .5 to .75% of body weight each day. So each mare normally received between 5 and 9 pounds of grain daily. In this study, the pregnant mares were allowed to foal out on pasture and were confined to stalls within 7 days to be re-bred. After breeding, mares were returned to grass pastures with no supplemental roughage or grain.

Records were kept on body condition, reproductive behavior, absence or presence of infections, reproductive tract conformation and past breeding history. The number of cycles required per conception, 45 day pregnancy rates and pregnancy loss data were obtained. Foaling rates were determined as a result of the breeding season during which this study was conducted. Reproductive performance data was tested statistically to determine any differences that

could be attributed to farm, stallion, month of breeding, method of service, number of previous foals, body condition, age and breeding status (i.e. maiden, open, foaling). Discussed hereafter are the results of this field study.

Results

Reproductive performance was not different between the two farms. Across both farms, 74% of the mares were bred during March, April or May, and breeding season ended on July 1. The month of breeding, the method of breeding and stallions to which the mares were bred did not influence reproductive performance of the mares. This narrowed down the list of factors to consider, allowing the study to focus in closely on factors such as age, body condition and breeding status of the mares.

As breeding season approached, the mares had an average body condition score of 4.5, meaning that they could best be described as moderately thin. In this condition, the mares' ribs were barely noticeable but could be very easily felt⁷. Supplemental feeding allowed the open mares in this study to gain one body condition score during the breeding season, compared to .3 for maiden mares and .6 for foaling mares. This difference between the maiden and milking mares was caused by differences in the amount of feed provided. Eight of the 11 mares that lost some body condition were foaling mares, verifying that there is a significant demand for energy to support milk production and re-breeding¹⁰. By the time mares left the breeding barn and returned to pasture, they averaged being in a body condition score of 5.1, meaning that they were in moderate condition⁷. In this condition, the mares' ribs could not be seen, but could be easily felt. Most mares were level down their backbones and their shoulders and necks blended somewhat smoothly into the body.

Number of cycles per conception were computed for those mares that actually foaled (table 1). The 94 mares bred by natural cover or artificial insemination that became pregnant and produced a foal required an average of 1.43 cycles per conception. This was identical to 1.43 reported in other research involving 1032 mares¹³. In the oldest age group of mares (16 years or older), the milking mares required

significantly more cycles per conception in the breeding barn than did the mares that were in open status. Within this group of milking mares, those 16 years or older required more cycles per conception than mares 15 years or younger. In the open mares, age of the mare did not cause any difference in the number of cycles required per conception.

In this study, 107 of the 145 mares were actually diagnosed as either pregnant or open at 45 days. Since it was already so late in the year, the remaining 38 mares were bred until close of the breeding season and simply returned to pasture without pregnancy determination. A total of 104 mares were diagnosed pregnant, indicating a pregnancy rate of 97% (table 2). This was higher than 88% reported in other studies for mares of various breeding status⁸, but identical to the pregnancy rate reported in a study where mares were diagnosed by ultrasound¹³. Of the 104 mares diagnosed pregnant, 8 did not foal, and so the pregnancy loss was 7.7%. This was lower than the 12.5% suggested average for various breeds⁶, but identical to the percentage loss reported in another study where ultrasound determination was used¹³.

The average foaling rate for all mares bred was 80%, which exceeded the expected average of 70% which has been suggested for various breeds of mares⁶. Foaling rate did vary according to the breeding status of mares (Figure 1). Those mares that entered the breeding season in open status had a higher foaling rate than mares that were nursing a foal at time of breeding. The fact that only one mare in this study had been barren for more than one season likely indicated that strict culling pressure had resulted in the six year old and older mares being a reproductively active and fertile group of mares. Overall reproductive efficiency also varied according to mare age. Mares ranging from 6-15 years of age had a significantly higher foaling rate than mares 16 years or older, which was consistent with other studies^{1,5,9,12} comparing various breeds of mares¹¹. In this field study, mare age and breeding status combined to cause some of the differences that were seen in foaling rates (figure 2). The older mares (16 years or older) that were nursing a foal at the time of breeding had an average foaling rate of only 37%, which

was significantly lower than the average foaling rate of the other milking mares that were 15 years old or younger. Among the mares that were open coming into the breeding season, those 5 years or younger had a lower foaling rate than mares 6 years or older. This could possibly be reflective of the fact that culling pressure exercised on the older mares had not yet been applied to the young mares on these farms.

Conclusion

Although 134 of the 145 mares either gained in body condition or maintained their body condition during the breeding season, the mares returned to pasture in marginal condition for acceptable reproductive efficiency. This situation existed, in large part, because the mares lacked the needed condition prior to onset of the breeding season. As a result, they were not able to gain enough condition during the breeding season to let them go back out on pasture in really good shape. In marginal body condition, the open mares turned out to be more reproductively efficient than the milking mares. This finding contradicts the rather commonly accepted belief that lactating mares are always the most fertile and easiest to settle on the farm. In this study, a larger percentage of milking mares tended to skip a breeding season. This strongly suggests that the mares were utilizing available energy for milk production, with reproductive performance having a lower priority. Consequently, the open mares were able to be more reproductively efficient because their marginal body condition was not further compromised by the demands for producing milk. The results indicate that substantial amounts of stored body fat are necessary to adequately support the stresses associated with foaling time and re-breeding. These findings are in agreement with other research that has been done on brood mares. The results show that proper body condition appears to be especially important where older mares are concerned. One step in helping insure that older mares breed back and maintain the pregnancy is to keep them in top shape. Mare owners should bear in mind that some pastures may not provide the energy needed for allowing mares to achieve a fleshy to fat body condition. In many cases, ample grazing will support body condition in pregnant mares, provided the mares have already reached the desired condition.

Acceptable body condition will help promote good reproductive performance, directly impacting the amount of time required to settle a mare. As a result, the ability of a farm to keep pregnancy rates high, and have a respectable foaling rate, will be improved.

Even though this study was not done exclusively with Thoroughbred broodmares, those factors that influence reproductive performance are somewhat common to all breeds of horses. Mares that are in good shape do represent the economic optimum, because they normally spend fewer days at the breeding farm and less time in open status. This also helps the breeding farm have a shorter season, with fewer mares staying around for a long period of time. Now is a good time to take a second look at mares. These last three to four months of pregnancy are extremely important, because this is when the most fetal growth occurs¹⁴. There is still time to improve body condition in questionable mares, long before the demands of foaling, milk production and re-breeding occur. By getting mares in good shape and keeping them that way on a year round basis, owners can better realize both the economic advantages and the enjoyment of seeing the results of their efforts to match the right stallion with the right mare.

Table 1. Cycles per conception in maiden, open and foaling mares of different age.

Age (years)	Cycles per Conception		
	Maiden	Open	Foaling
< or = 5	1.67	1.50	1.20
6-10	*	1.73	1.20
11-15	*	1.38	1.54
> or = 16	*	1.25	2.00

* There were no maiden mares older than 5 years of age in this study.

Table 2. Pregnancy rate and loss in mares of different breeding status.

Breeding Status	Pregnancy Rate (%)	Pregnancy Loss (%)

Maiden	89	6.3
Open	100	2.9
Foaling	98	11.1
Average (all mares)	97	7.7

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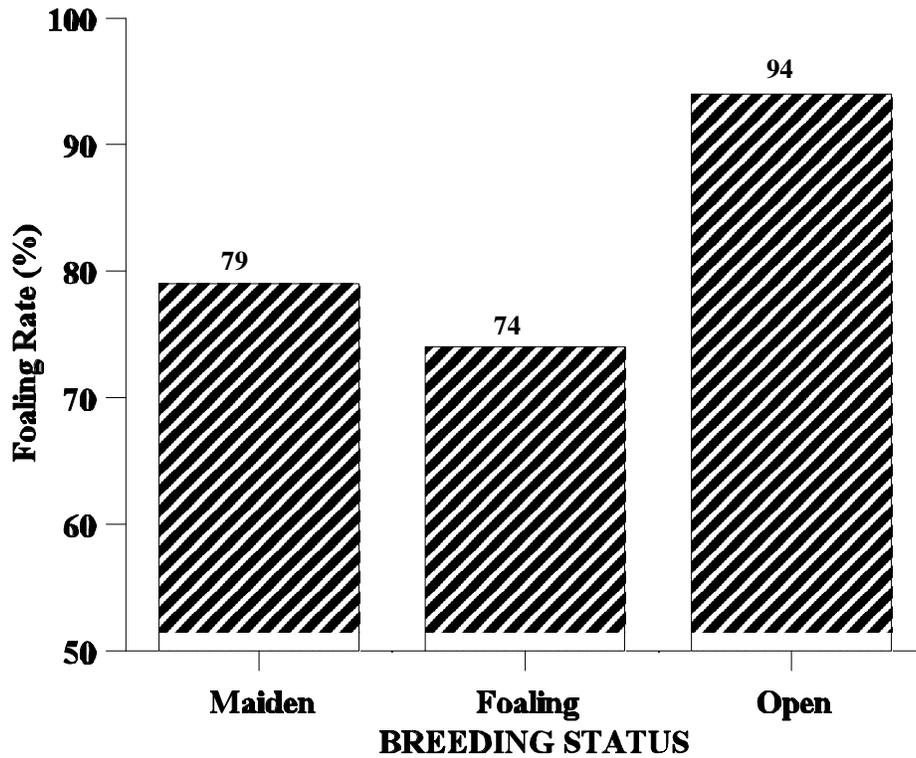


Figure 1. Average foaling rates in mares that entered the breeding season in maiden, foaling, or open status.

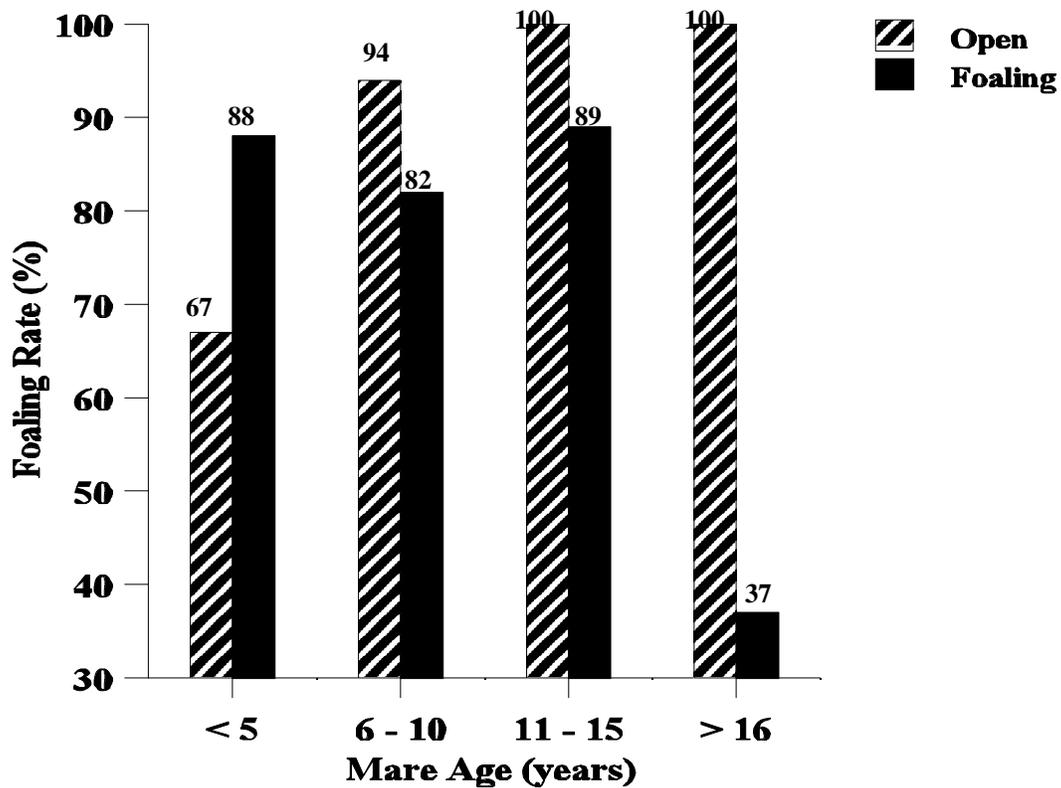


Figure 2. Average foaling rates in mares of different age that entered the breeding season in open or foaling status

