PREGNANCY DIAGNOSIS IN THAI NATIVE GOATS

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ABSTRACT

Pregnancy status was determined in two groups of native Thai goats, mated in either October (n = 116) or March (n = 37), by assay of the progesterone level in four plasma samples taken at 7 day intervals after the completion of mating. The progesterone level (P) in each sample was determined using facilities in a local hospital, and a commercial assay kit with human serum-based standards was used. The distribution of $\log_{10}$P yielded a discriminatory value of 2 ng/ml; any value below this level was assumed to indicate a follicular phase. Pregnancy diagnoses based on this criterion were 96.2% accurate. Diagnoses based on returns to service were not accurate, as 36.5% of pregnant does were recorded as returning. Real-time ultrasonic imaging of the March mated group was 100% accurate for pregnancies, but detection of twins was poor.

The progesterone technique described here is useful in field studies where mating dates are not known, and where there is no access to an animal assay laboratory.

Key words: pregnancy diagnosis, goats, progesterone, Thailand

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INTRODUCTION

Thimonier et al. (1) have described an accurate method for diagnosing pregnancy in goats based, on the circulating levels of progesterone; however their method requires precise knowledge of mating dates in order to be accurate. A modification of this strategy, suitable for field studies in sheep, has been described by Tyrrell et al. (2). Their method can be used in a flock where mating dates are not known since the procedure relies on detecting a low or zero progesterone level (i.e. an estrus level) in one of three samples obtained at intervals of 6 d after completion of a mating program. The method has a reported accuracy rate higher than 95%.

This paper describes an adaptation of the method of Tyrrell et al. (2) as used in native Thai goats.

MATERIALS AND METHODS

The observations were carried out on native Thai goats held at the goat research facility of the Faculty of Natural Resources, Prince of Songkla University, Hatyai, Southern Thailand. The facilities, climate, husbandry and pasture management practices at the center have been described earlier by Milton et al. (3).

Two series of observations were carried out as follows: In Series 1, 116 native does were mated in October 1985 for a period of 50 d. At completion of mating, four serum samples were obtained from each of 69 does at intervals of 7 d. Vasectomized bucks with raddle harnesses were run with the does after mating to detect returns to service. In Series 2, 37 does were mated in March 1986 for a period of 10 d. Serum samples were obtained as for Series 1. In addition, the does were examined by Real-time ultrasonic imaging (RTUI) between 55 and 65 d post coitum, using a Hitachi EUB-25M model scanner with 3.5 and 5.0 MHz transducers.

Progesterone levels were obtained in all serum samples by solid phase radioimmunoassay using a commercial assay kit (Coat-A-Count, Diagnostics Products Corporation, Los Angeles, CA, USA) with human serum-based standards.

The progesterone values obtained were examined as suggested by Tyrrell et al. (2), and a discriminatory value was chosen after examination of the values of $Log_{10}P$. The nadir of the distribution yielded a discriminatory value of 2ng/ml in the data for each series; animals with any one value below 2 ng/ml were classified as nonpregnant, while those with values above 2 ng/ml in all four samples were classified as pregnant.

All does kidded under close supervision, permitting an accurate recording of a kidding date.

RESULTS

The apparent progesterone levels varied from 0 to 15.1 ng/ml. The results of the pregnancy diagnoses and the subsequent kidding data are given in Table 1. Using the formulae given by Thimonier et al. (1), overall pregnancy status accuracy for the two series combined was 96.2%.

The diagnostic errors included two does diagnosed as pregnant which did not kid (false positive diagnoses) and two does diagnosed as not pregnant which did kid (false negative diagnoses).

During mating in 1985, 27 does (36.5% of pregnant does) were raddled 46 times after they had conceived, the conception date having been estimated from the gestation interval. Most of the raddle marks were light but would normally be classified as true returns to service.

Table 1. Accuracy of pregnancy diagnoses in native Thai goats using peripheral progesterone concentration. Two series of observations from different matings are shown.

Attribute	Series 1	Series 2
No. of does	68	37
No. diagnosed pregnant	34	21
No. kidding	32	21
Accuracy %	94.1	100
No. diagnosed nonpregnant	34	16
No. not kidding	33	15
Accuracy %	97.1	93.8
No. of diagnoses	68	37
No. of correct diagnoses	65	36
Overall accuracy %	95.6	97.3

The number of fetuses detected by RTUI in the 37 does examined in March 1986 is shown in Table 2. Scanning was 100% accurate in detecting pregnancies and nonpregnancies, but detection of twins was poor, with only one of four sets identified.

DISCUSSION

There are obvious management and other advantages in determining the pregnancy status of does shortly after mating, but the methods involving precise knowledge of the time of mating (1), or the detection of a return to service, may not be appropriate in field studies or in instances where anestrus may occur after mating. The method described here appears to give an acceptable level of accuracy but progesterone assay facilities need to be available. In our study, the goat serum samples were assayed using the routine procedures for human plasma samples in a local hospital, and the results, while not accurately reflecting true caprine progesterone levels, provided data suitable for the discrimination of pregnancy status. Such facilities may be used in field studies remote from an animal assay laboratory.

The method for diagnosing pregnancy is based on taking a sufficient number of blood samples at appropriate intervals after mating to detect the follicular (no progesterone) phase of the estrus cycle in nonpregnant does. In this study the diagnoses were available, on average, in the 8th week of pregnancy, 30d after the end of mating. This allowed ample time for appropriate modifications to be made to the management of the pregnant and nonpregnant does. With shorter mating periods than used here, diagnoses would be available earlier in pregnancy.

Table 2. Number of fetuses detected in native Thai goats by Real-time ultrasonic imagery and number of kids born.

	No. of kids born			
No. of fetuses detected	0	1	2	Total
0	15	0	0	15
1	0	18	3	21
2	0	0	1	1
Total	15	18	4	37

The data of Thorburn and Schneider (4) suggests that four samples collected at 7-d intervals would allow the detection of a follicular phase of a goat cycle. The use of nongoat progesterone standards in the

hormone assay was not a disadvantage, as the discriminatory value was obtained from an examination of the distribution of values, as suggested by Tyrrell et al. (2). This procedure overcomes any perturbation that may be introduced by diurnal or daily variation in progesterone level, or differences between assays. However, differences also occur due to breed and age structure, and discriminatory values should be determined on a within-flock basis, provided there are sufficient numbers of pregnant and nonpregnant goats.

The use of return to service data would appear to be unreliable in detecting pregnancy in Thai goats, as 36.5% of pregnant does came into estrus, as evidenced by raddle marks on the rump, during early pregnancy. Similar percentages have been observed in Australian goats (Restall unpublished observations), and it leads to serious errors. The detection of pregnancy was highly accurate using RTUI at 55 to 60 days of gestation, but identification of twin bearing does was poor. This may have been due to operator inexperience, as twin detection accuracy is high with experienced operators (5).

It is suggested that the progesterone technique described here is suitable for the diagnosis of pregnancy in field studies of native Thai goats, as well as in situations where experimental hormone assay facilities for animals are not available but routine hospital laboratory facilities are.

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