

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

South Dakota Sheep Field Day Proceedings and
Research Reports, 1979

Animal Science Reports

1979

Pregnancy Diagnosis in the Ewe

M. J. Trapp
South Dakota State University

A. L. Slyter

Follow this and additional works at: http://openprairie.sdstate.edu/sd_sheepday_1979

Recommended Citation

Trapp, M. J. and Slyter, A. L., "Pregnancy Diagnosis in the Ewe" (1979). *South Dakota Sheep Field Day Proceedings and Research Reports, 1979*. Paper 3.
http://openprairie.sdstate.edu/sd_sheepday_1979/3

This Report is brought to you for free and open access by the Animal Science Reports at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in South Dakota Sheep Field Day Proceedings and Research Reports, 1979 by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.



PREGNANCY DIAGNOSIS IN THE EWE

M. J. Trapp and A. L. Slyter

Department of Animal Science
Experiment Station

South Dakota State University
A.S. Series 79-11

Summary

A total of 378 ewe lambs were evaluated for signs of pregnancy by five operators using five methods of detection. The methods used were breeding mark, rectal-abdominal palpation, an intrarectal Doppler instrument¹ and two ultrasonic devices, the Scanoprobe^R and ScanopregTM (Model 738) for sheep².

Accuracies of pregnancy diagnosis by grease mark were 65.7% in 1976 and 75.5% in 1977 ($P < .05$) based on lambing results. Accuracy of diagnosis for ewe lambs called pregnant or nonpregnant using the rectal-abdominal palpation technique was 62.7%. The overall accuracy on the same ewes using the intrarectal Doppler device was 72.7%. The ewes were examined when they were from 60 to 96 days of gestation using the two rectal probes. Seven ewes died from peritonitis and six aborted following pregnancy detection using the rectal instruments.

Accuracy using the Scanoprobe device was 89.1% for ewe lambs which ranged from 69 to 103 days pregnant. The accuracy achieved when the same ewes were evaluated at 78 to 112 days of gestation using the Scanopreg device was 94.8%. No injuries occurred following pregnancy detection using the two ultrasonic devices. Ewes called open with the Scanopreg were retested the following day with a 98.8% accuracy rate.

Introduction

The ability to diagnose pregnancy in the ewe before the last 6 weeks of gestation would enable the producer to reduce feed costs on open ewes, increase percent lamb crop and select for fertility.

Many methods of pregnancy detection have been tried in the ewe. Hulet (1972) has developed a rectal-abdominal palpation technique for pregnancy testing. Accuracy of 90% and better has been reported when ewes 60 to 96 days pregnant were tested with this method. Lindahl (1971) has described an intrarectal Doppler instrument for use in detecting

Prepared for Sheep Day, June 8, 1979.

¹ Doptone "Mark 1" manufactured by Smith-Kline Company.

² Scanoprobe^R and ScanopregTM (for sheep) manufactured by Ithaco,

Inc.

pregnancy. Several workers have reported accuracy rates of 85% and better when ewes 60 to 90 days pregnant were evaluated using this instrument (Lindhahl, 1971; Hulet, 1972). Although these techniques are fairly accurate, abortions and deaths following use of these rectal probes have been reported by several researchers (Lindhahl, 1971; Morcan, 1973; Turner and Hindson, 1975).

Ultrasonic scanning devices originally developed and used to measure depth of backfat and longissimus muscle have been used to diagnose pregnancy in the ewe (Stouffer et al., 1969a,b). Two newTM ultrasonic scanning instruments, the Scanoprobe^R and the ScanopregTM, for sheep have been used to detect pregnancy in the ewe. Preliminary evaluation of the Scanopreg device has shown it to be safe and over 90% accurate when evaluating ewes 60 to 120 days pregnant (R. Thompson, personal communication).

This research was performed to evaluate the four methods of pregnancy detection previously mentioned for both accuracy and safety.

Experimental Procedure

Breeding Procedure. One hundred sixty-six Targhee, Finnsheep x Targhee and Suffolk x Targhee ewe lambs were exposed to three Suffolk rams from September 30 to November 4, 1976. The following year 212 ewe lambs of the same three breeds were exposed to four Suffolk rams from September 30 to November 3, 1977. The ewes were exposed daily in drylot from early evening until the following morning when the ewes were returned to pasture. Each day the rams' briskets were painted with a combination of axle grease and lanolin-based paint. The color of the paint was changed every 2 weeks and the ewes examined once daily for signs of servicing by the ram.

Pregnancy Testing Procedure (1977). The 166 ewe lambs were pregnancy tested by three operators using two techniques when the animals were 60 to 96 days pregnant. One method of pregnancy diagnosis used was rectal-abdominal palpation developed by Hulet (1972) using a plastic rod. The second method used was an ultrasonic fetal pulse detector, Doptone Mark 1, described by Lindahl (1971).

All ewes were fasted overnight prior to diagnosis. The ewes were placed on their backs with their legs extended and secured upward in a laparotomy cradle. After the animal was given an 80 ml enema of soapy water, a lubricated plastic rod 50 cm long and 1.5 cm in diameter was inserted in the rectum. The rod was initially directed toward the backbone and gently pushed forward until it had reached the abdominal cavity. The free hand was used to palpate the rod through the abdominal wall over the entire width of the abdomen. If the fetus was palpated directly or felt rolling over the rod, the ewe was diagnosed as pregnant. If no fetus was felt after examining the entire abdominal cavity, the ewe was called nonpregnant. All three operators made their diagnoses while the rod was in place. The probe was cleaned, dipped in disinfectant solution and relubricated after each examination.

The same ewes were examined using the intrarectal Doppler instrument. Determination of pregnancy was done by inserting the probe (lubricated with water soluble gel) in the rectum of the cradled ewe. Any arterial pulse heard in the posterior abdominal region, fetal heart beat or movement were taken as positive criteria of pregnancy. Each operator made his own evaluation of the sounds obtained while the intrarectal Doppler was in place.

Pregnancy Testing Procedure (1978). Three operators used two ultrasonic scanning instruments, the Scanoprobe and Scanopreg (Model 738), to evaluate 212 ewe lambs for pregnancy. The ewes ranged from 69 to 112 days pregnant when tested.

Both of these devices make use of high frequency sound waves and the principle of wave reflection to determine tissue composition and depth. The instruments contain a transducer which produces sound waves and listens for the returning echoes. The Scanoprobe translates any echoes which are produced when the sound waves strike an area where tissue density changes into light signals. These lights are contained on the instrument's display panel which is graduated in both tenths of inches and millimeters. The Scanopreg is programmed to analyze for pregnancy signals and indicate if the animal is pregnant or open.

All ewes were tested in a natural standing position. A small amount of lightweight oil was applied to the transducer immediately prior to testing. The oil served to insure good transmission of the ultrasonic waves. To detect the uterus using the Scanoprobe, the transducer was placed on the animal's right flank just anterior to the udder and directed 30° forward and 45° upward. A negative pregnancy diagnosis was indicated by a row of intermittently illuminated lights 2 to 6 cm long. A 2- to 4-cm gap of no lights surrounded by 2 to 4 cm of illuminated lights was taken as positive criteria of pregnancy. The ewes were tested only once using the Scanoprobe.

Positioning of the animal and transducer using the Scanopreg device was the same as described using the Scanoprobe. Illumination of the green-colored light and sound of the horn for at least 2 sec were taken as positive criteria of pregnancy. Illumination of the red light was basis for a nonpregnancy diagnosis. No tone accompanied an open diagnosis. Intermittent or short tone bursts from the horn and flashing green lights were not interpreted as positive diagnosis of pregnancy. All ewes called open were retested the following day.

Results and Discussion

Accuracy by Breeding Mark. The accuracy of pregnancy diagnosis by breeding (grease) mark is recorded in table 1. The accuracies of ewes called pregnant (positive), nonpregnant (negative) and the combination of these two diagnoses in 1976 were 62.2%, 80.6% and 65.7%, respectively. In 1977, the percentages of diagnoses correct using grease mark were 71.8%, 96.8% and 75.5% for positive, negative and combined diagnosis, respectively. The nonpregnant and overall accuracy

was higher ($P < .05$) in 1977. The higher success rates recorded in 1977 could be due to several things. Ewe identification tags and paint brands were clearer to read in 1977. In the second year of the study, the ewes were checked for signs of mating while eating at a fence-line feed bunk, whereas in 1976 the ewes were checked for breeding marks when crowded in a large group. This made identification of marked ewes much easier. In addition, the operators were more experienced and the fertility of the ewe lambs was about 5% greater in 1977.

Accuracy of Detection Using Rectal-Abdominal Palpation. Accuracies of diagnosis using rectal-abdominal palpation are recorded in table 2. The total pregnant, nonpregnant and combined accuracies of the three operators were 66.0%, 58.9% and 62.7%, respectively. The ewes ranged from 60 to 96 days pregnant when evaluated and the success rates of the individual operators were not different ($P > .05$). Length of gestation when tested had no effect on accuracy of diagnosis ($P > .05$). Ewes bearing singles had a higher accuracy of detection than those bearing twins ($P < .05$). Approximately 40 ewes per hr were evaluated by rectal-abdominal palpation. Considerable manual labor was required to prepare each ewe for testing.

Accuracy of Detection Using the Intrarectal Doppler. Accuracies using the intrarectal Doppler are shown in table 2. Total pregnant, nonpregnant and combined accuracies were 68.3%, 84.8% and 72.7%, respectively. The ewes ranged from 60 to 96 days pregnant when tested and individual operator accuracies did not differ ($P > .05$). About 30 ewes per hr were examined using the intrarectal Doppler device. This method like the rectal-abdominal palpation technique required a lot of manual labor to prepare the ewes for evaluation.

Seven ewes died and at least six aborted from peritonitis subsequent to the rectal-abdominal palpation and intrarectal Doppler testing. Abrasion of the rectal wall by the probe may have caused subclinical infection to occur. Multiple operators, multiple methods of detection and operator inexperience, no doubt, increased rectal wall abrasion. Blood was observed on both rectal probes several times upon withdrawal from the rectum. The tear-shaped end of the Doppler might have caused more damage to the rectal wall than the bullet-shaped tip of the palpation rod. However, it is impossible to determine which probe caused more damage.

Accuracy of Detection Using the Scanoprobe. Total pregnant, nonpregnant and combined accuracies were 85.5%, 98.3% and 89.1%, respectively (see table 2). The ewes ranged from 69 to 103 days pregnant when tested. Length of gestation and type of lambing did not affect accuracy of diagnosis ($P > .05$). Operator differences were significant ($P < .02$) with the inexperienced operator having a higher accuracy.

About 35 ewes per hr were examined using the Scanoprobe. Although this was not much different than the time required using the rectal probes, there were fewer assistants and much less labor required to prepare the ewes for evaluation using the Scanoprobe.

Accuracy of Detection Using the Scanopreg. Total pregnant, non-pregnant and combined accuracies using the Scanopreg were 98.9%, 91.7% and 94.8%, respectively (table 2). The ewes were 78 to 112 days pregnant when evaluated. No operator difference was recorded ($P > .05$). In addition, length of gestation when tested and type of lambing did not affect accuracy of detection. Thirty-five ewes were examined per hr using the Scanopreg. Less labor was required to prepare the ewes for evaluation with the Scanopreg than when using the rectal probe methods.

The number of ewes correctly identified pregnant with the Scanopreg was higher ($P < .05$) than with the Scanoprobe. However, six more ewes were incorrectly identified as being nonpregnant using the Scanopreg. These results agree with the Texas workers (P. Thompson, personal communication) who stated that pregnant diagnoses were accurate, while about 8% of the nonpregnant diagnoses were incorrect.

The 84 ewes initially called open using the Scanopreg were retested the following day. Eight of these 84 ewes were called pregnant and seven of these ewes lambed (table 2). Since no retests were made using the other devices, these results were not used when comparing accuracy by method and operator.

Conclusions

Of the five methods investigated, evaluation of pregnancy using breeding marks can be done the earliest time, immediately following exposure to the ram. One must remember it is only indicative of servicing and not pregnancy. However, assuming good records are obtained, nonmarked ewes can be safely called open and managed accordingly.

The ultrasonic devices, Scanoprobe and Scanopreg, were much easier to use and more accurate than the techniques using rectal probes. Use of the ultrasonic devices also involved less animal handling and less stress for both animal and operator. The higher labor requirement, necessity of overnight fasting, incidence of abortion and/or mortality and lower accuracy make the techniques using rectal probes less desirable for producer application.

Based on the results reported, retesting the following day of ewes initially called open with the Scanopreg gave the best overall accuracy. Retesting such ewes would be recommended for maximum accuracy.

Literature Cited

- Hulet, C. V. 1972. A rectal-abdominal palpation technique for diagnosing pregnancy in the ewe. J. Anim. Sci. 35:814.
- Lindhahl, I. L. 1971. Pregnancy diagnosis in the ewe by intrarectal Doppler. J. Anim. Sci. 32:922.
- Morcan, L. 1973. Pregnancy detection in ewes: a new technique. New Zealand J. Agr. 126:15.
- Turner, C. B. and J. C. Hindson. 1975. An assessment of a method of manual pregnancy diagnosis in the ewe. Vet. Rec. 96:56.
- Stouffer, J. R., I. L. Lindahl, D. E. Hogue and W. R. C. White. 1969a. Ewe pregnancy check with ultrasonic scanner and Doppler. J. Anim. Sci. 29:103. (Abstr.).
- Stouffer, J. R., W. R. C. White, D. E. Hogue and G. L. Hunt. 1969b. Ultrasonic scanner for detection of single and multiple pregnancy in sheep. J. Anim. Sci. 29:104. (Abstr.).

Table 1. Accuracy of Diagnosis by Grease Mark^a

Year	Number of ewes exposed	Percent accurate diagnosis ^b		
		Pregnant	Nonpregnant	Combined
1976	166	$\frac{84}{135} = 62.2$	$\frac{25}{31} = 80.6$	$\frac{109}{166} = 65.7$
1977	212	$\frac{130}{181} = 71.8$	$\frac{30}{31} = 96.8$	$\frac{160}{212} = 75.5$

^a Ram briskets were painted with colored grease and ewes checked for signs of mating once daily.

^b $\frac{\text{Total pregnant or open}}{\text{Total called pregnant or open}} \times 100 = \text{percent accuracy.}$

Table 2. Accuracy of Diagnosis

Method	Number of ewes tested	Stage of gestation when tested (days)	Percent accurate diagnosis ^a		
			Pregnant	Nonpregnant	Combined
Rectal-abdominal palpation ^b	498	60- 96	$\frac{173}{262} = 66.0$	$\frac{139}{236} = 58.9$	$\frac{312}{498} = 62.7$
Intrarectal Doppler device ^c	498	60- 96	$\frac{250}{366} = 68.3$	$\frac{112}{132} = 84.8$	$\frac{362}{498} = 72.7$
Scanoprobe ^d	212	69-103	$\frac{130}{152} = 85.5$	$\frac{59}{60} = 98.3$	$\frac{189}{212} = 89.1$
Scanopreg ^e	212	78-112	$\frac{124}{128} = 98.9$	$\frac{77}{84} = 91.7$	$\frac{201}{212} = 94.8$
Scanopreg (retest) ^f	84	79-113	$\frac{7}{8} = 87.5$	$\frac{76}{76} = 100.0$	$\frac{83}{84} = 98.8$

^a $\frac{\text{Total pregnant or open}}{\text{Total called pregnant or open}} \times 100 = \text{percent accurate diagnosis.}$

^b Rectal-abdominal palpation as described by Hulet (J. Anim. Sci. 35:814).

^c Doptone Mark 1 manufactured by Smith-Kline Instrument Company.

^d Scanoprobe manufactured by Ithaco Inc., Ithaca, New York.

^e Scanopreg (Model 738) manufactured by Ithaco Inc., Ithaca, New York.

^f Ewes diagnosed open initially were retested the following day.