# ULTRASONOGRAPHIC STUDIES ON FOETAL DEVELOPMENTAL IN SHEEP

**By**

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**2000**

**DEDICATED**
**to my**
**Reverend parents**
**Sh. Surat Singh Nain**
**&**
**Smt. Mainkur Devi**

# CERTIFICATE I

This is to certify that this dissertation entitled, "ULTRA-SONOGRAPHIC STUDIES ON FOETAL DEVELOPMENT IN SHEEP", submitted for the degree of Master of Veterinary Science, in the subject of Veterinary Gynaecology and Obstetrics of Chaudhary Charan Singh Haryana Agricultural University, is a bonafide research work carried out by **Dr. Ramphal** under my supervision and that no part of this thesis has been submitted for any other degree.

The assistance and help received during the course of investigation have been fully acknowledged.

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# CERTIFICATE II

This is to certify that this dissertation entitled, "ULTRASONOGRAPHIC STUDIES ON FOETAL DEVELOPMENT IN SHEEP", submitted by Dr. Ramphal to Chaudhary Charan Singh Haryana Agricultural University in partial fulfilment of the requirement for the degree of Master of Veterinary Science in the subject of Veterinary Gynaecology and Obstetrics, has been approved by the Student's Advisory Committee after an oral examination on the same.

**HEAD OF THE DEPARTMENT** **MAJOR ADVISOR**

**DEAN, POST-GRADUATE STUDIES**

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Since the fetal parts were not differentiated because the obseivation from Day 18 to Day 39 are referred as the value of conceptus. The conceptus length is increased from Day 18 to Day 39 or almost linearly. The values at Day 18 were less than 0.8 cm while it reached up to close to 1.6 cm by Day 39.

27. **Conceptus width**

The conceptus width also shows linear pattern of growth, the values reached close to 1.2 cm by Day 39.

28. **Fetal Trunk Diameter**

The trunk diameter shows significant increase between Day 46 and Day 53, and between Day 60 and Day 66. The trunk diameter could not be measured after Day 73 due to large size of fetus and limitations of transducer.

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The head diameter shows a typical linear pattern of growth. The values at Day 39 are close to 1 cm and reached around 5 cm by Day 90.

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The crown rump length could be measured only between Day 39 and 53 because of the full fetus was seen during these days. There was significant increase in crown rump length between Day 39 and 46 and again significant increase between Day 46 and 53.

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The heart beat ranged between 172 to 155 beats per minute and there were variations among values. However these were not significant different (P>0.05). It appeared the values were higher around Day 25 and Day 32.

32. **Cranial Cavity Diameter**

A very good image of cranial cavity containing brain lobes was obtained between Days 46 to 73. The cranial cavity also shows almost linear pattern of growth between Day 46 and Day 73.

33. **Internal Uterus Diameter**

The internal uterus diameter was measured between Day 18 to Day 39 and later on it became difficult to obtain the full view of the uterus. The values on Day 18 were close to 1.5 cm that reached up to over 2.25 cm by Day 39

34. **Placentomes Diameter**

The good pictures of placentomes were obtained and diameter were measured on a cross section view. The values were close to 1 cm on Day 39 and that reached to over 2.5 cm by Day 73 and 2.75 cm by Day 90. There was no significant change between Day 73 and Day 90

35. **Umbilicus Diameter**

The umbilicus diameter was measured between Day 39 and Day 90. It shows almost linear pattern of increase. However there was significant change between Day 80 and Day 90.

# Chapter -I

# Introduction

Sheep industry plays an important role with its multipurpose utility of meat, wool, leather products and enriched manure thereby contributing a great deal towards our national economy. The accurate prediction of pregnancy in ewes would greatly increase efficiency of sheep farming.

The profitability of sheep farming could be improved if a simple and a reliable technique is available for the detection of pregnancy. This would enable prompt remating or culling of non-pregnant ewes, more economical use of supplementary feeding in late gestation and more accurate planning of production.

For the last many years, various techniques have been used to diagnose the early pregnancy in sheep such as recto-abdominal rods, vasectomized rams, abdominal ballotment, serum steroid assays and radiography. Most of these techniques have been unsatisfactory due to factors such as expenses, low accuracy rates, impracticability, ewe and human safety considerations and long delay in availability of results.

The use of ultrasound system has improved both the reliability and practicality of pregnancy diagnosis in the field. A mode (Amplitude mode) ultrasound applied to the flank region has proven to be reasonably reliable from 50 to 120 days of gestation (Watt *et al.*, 1984).

Doppler systems have been used rectally from 25 days but require animal restraint and operator training (Deas, 1977). Recent improvements in ultrasound technology now enable instantaneous and continuous images of internal anatomy (real time) (Kossoff, 1979; Simpson *et al.*, 1982).

Recently portable real-time B-mode (Brightness mode) ultrasound systems have been used for pregnancy testing in ewes.

In the non-pregnant ewe or in the pregnant ewe during the first 25 days of pregnancy the uterus is situated within the pelvic cavity. The urinary bladder is taken as a landmark to take the image of uterus with ultrasound.

Pregnancy is diagnosed by imaging fluid in the uterine lumen, evidence of conceptus with heart beat and by the presence of placentomes or by the identification of fetuses.

Lindahl (1971) was the first who reported the use of B-mode real-time ultrasonography with a 5 MHz rectal probe. In view of this reported improvement in accuracy, it was decided to examine further the rectal probe method of early pregnancy diagnosis.

Fowler and Wilkins (1980) used ultrasonic scanning in ewes and found accurate rapid, safe and practicable means of diagnosis of pregnancy.

They reported real-time ultrasound system transabdominal in sheep as reliable to determine pregnancy and fetal numbers from day 50 post-breeding. The rectal use of a 7.5 or 5 MHz probe in the ewe could yield better results, because the early pregnant uterus is in the pelvic canal.

Fredrikson and Swertsson (1986) reported that ultrasonography technique enable to detect the dead fetus or fetal abnormalities in addition to pregnancy diagnosis.

With the advent of B-mode real time ultrasonography it is now possible to obtain images of reproductive organs and developing fetus in small ruminants such as sheep (Buckrell, 1988; Gearhart *et al.*, 1988; Aiumlamai *et al.*, 1992 and Garcia *et al.*, 1993).

It is the noninvasive method and considered superior to non-imaging techniques because it is more accurate and enables to veterinarian to detect viability of conceptus and its dimensions (Logue *et al.*, 1987 and Buckrell, 1988).

An additional advantage of the ultrasound system is the prediction of foetal sex by identifying and locating the genital tubercle (Coubrough and Castell, 1998).

In our country investigation about the use of ultrasonography in general and diagnosis of early pregnancy in sheep in particular are lacking. Keeping in consideration of this fact the present experiment was conducted in Corriedale sheep with the following objectives :-

1. To obtain images of uterus on day 18th of mating to differentiate pregnant and non-pregnant uterus.

2. To study fetal development through weekly recording of images of developing fetus.

3. To assess change in fetal heart beat up to 90 days of gestation.

# Chapter -II

# Review of Literature

In intensive sheep farming, sonographic examination for pregnancy detection and determination of fetal numbers is applied routinely (Fowler and Wilkins, 1984; White *et al.*, 1984 and Davey, 1986). Generally the findings on non-pregnant uterus as well as the uterus and conceptus during pregnancy are similar in sheep and goats (Tainturier *et al.*, 1983a, b).

Rowson and Moor (1966) conducted the study of development of sheep conceptus during the first fourteen days and found that by Day 13 to 14 the embryonic vesicle lied as a 10 cm long tube in the uterine horn ipsilateral to the corpus luteum of pregnancy. By Day 16 to 18 it extended into the contralateral horn. Eckstein and Kelly (1977) reported that during early pregnancy in ewes, the trophoblast rapidly elongated to occupy both horns and body of uterus by Day 20. King et al (1982) found that on Day 11 trophoblast vesicle began to elongate, by Day 13$^{th}$ vesicle entered the contralateral horn, by Day 18 both horns were occupied in ewes.