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**THE EFFECT OF MANIPULATION OF
FEED INTAKE DURING PREGNANCY
ON LAMB BIRTH WEIGHT**

T A R S O N O

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The Effect of Manipulation of Feed Intake during Pregnancy on Lamb Birth Weight

A thesis presented in partial fulfilment
of the requirements for the degree of
Master of Applied Science in Animal Science
at Massey University
Palmerston North
New Zealand

T A R S O N O

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ABSTRACT

Tarsono, 2000. The effect of manipulation of feed intake during pregnancy on lamb birth weight. M. Appl. Sc. Thesis, Massey University, Palmerston North, New Zealand. 86pp.

This study tested the hypothesis that increased maternal nutrition during early and mid-pregnancy could affect placental and fetal development at mid-gestation and fetal weight at term.

Mixed-aged Romney ewes ($n=136$) were mated at a synchronised oestrus and then randomly allocated to a M ("maintenance", average live weight 54.5 ± 1.5 kg) or H ("high", equal to 1.5M, average live weight 55.3 ± 1.5 kg) feeding level from day 19 of pregnancy (P19). At P47, the M group was divided into two groups and each group was allocated to either a M or H feeding level until P102. Thirty ewes (10 per group) were slaughtered at P102-104. The remaining ewes from each group were further subdivided into either a M or H feeding level from P102 to P136. These ewes were slaughtered at P136-140. Maintenance requirements for a 55 kg ewe were assumed to be 11 MJ ME/day at an energy concentration of 10 MJ ME/kg DM.

Over the period from P19 to P102, mean herbage dry matter (DM) intake ranged from 0.98 to 1.24 kg ewe⁻¹ day⁻¹ resulting in ewe live weight changes of 3.1, 4.8 and 5.9 kg for the MM, MH and HH groups ($P<0.05$) respectively. From P102 to P131, mean herbage DM intake ranged from 0.97 to 1.66 kg ewe⁻¹ day⁻¹ resulting in ewe live weight changes of 5.2, 9.0, 8.4, 14.0, 9.2 and 14.8 kg for the MMM, MMH, MHM, MHH, HHM and HHH groups ($P<0.05$) respectively. Feeding level had no significant effect on placental and fetal weights at either of the two slaughter periods (P102-104 and P136-140). Placental weights at P102-104 were 658.0 ± 49.5 , 612.1 ± 49.5 and 676.7 ± 50.6 g, and fetal weights were 1281.7 ± 50.4 , 1296.0 ± 50.8 and 1258.2 ± 53.4 g for

the MM, MH, and HH groups, respectively. At P136-140 placental weights were 583.2 ± 81.9 , 545.8 ± 72.8 , 602.3 ± 77.4 , 551.5 ± 72.8 , 622.5 ± 84.6 and 547.3 ± 86.7 g, and fetal weights were 4535.9 ± 175.4 , 4640.5 ± 162.7 , 4836.6 ± 166.3 , 4651.5 ± 159.3 , 4408.5 ± 186.1 and 4389.2 ± 189.1 g for the MMM, MMH, MHM, MHH, HHM and HHH groups, respectively.

Pelt weights were significantly ($P < 0.05$) affected by pregnancy rank at P102 but final ewe live weights and carcass weights were not. Other components (*i.e.*, total placentome and total cotyledon) were significantly ($P < 0.05$) heavier in twins than in singles but were not affected by feeding level. Ewes carrying twin fetuses had significantly ($P < 0.05$) more placentomes and tended to have more caruncles than single-bearing ewes. Caruncle occupancy was significantly ($P < 0.05$) higher in twins than in singles (87% vs 80%, respectively).

Pre-partum nutritional treatments from P102 to P136 affected final ewe live weights, carcass weights and pelts weights ($P < 0.05$). Pregnancy rank had no effects on final ewe live weights or pelt weights but did affect carcass weights at P136. Carcasses of ewes carrying a single fetus were heavier than those of ewes carrying twins. Single-bearing ewes had lower weights of mammary glands, uterus, myoendometrium, fetal membranes, total placentomes, and total cotyledons, and had lower placentome numbers compared to ewes carrying twins ($P < 0.05$) at P136. Weights of gravid uterus, total caruncle weights and total caruncle numbers were not affected pregnancy rank at day 136 of gestation.

Based on the comparison of these results with earlier studies, it can be concluded that quite severe nutritional treatments are required to influence placental and fetal weights at P102-104 and P136-140.

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TABLE OF CONTENTS

	Page
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
LIST OF ABBREVIATIONS.....	ix
CHAPTER ONE: LITERATURE REVIEW.....	1
1.1. INTRODUCTION.....	1
1.2. LAMB BIRTH WEIGHT AND NEWBORN LAMB SURVIVAL.....	3
1.2.1. Causes of Perinatal Lamb Mortality and the Association with High and Low Birthweight.....	4
1.2.2. Efforts to Improve Lamb Survival by Using Manipulation of Birthweight.....	6
1.3. FACTORS AFFECTING PASTURE INTAKE OF GRAZING SHEEP.....	12
1.3.1. Plant Factors.....	12
1.3.2. Animal Factors.....	15
1.3.3. Regulation of Feed Intake during Pregnancy.....	15
1.3.4. Possible Causes of Declining Intake in Late Pregnant Ewes.....	18
1.4. PLACENTAL AND FETAL DEVELOPMENT.....	25
1.4.1. Placental Development.....	25
1.4.2. Factors Affecting Placental Development.....	27
1.4.3. Fetal Growth and Development.....	29
1.4.4. Factors Affecting Fetal Growth.....	30

1.5.	MATERNAL NUTRITION AND FETAL GROWTH.....	34
1.6.	PURPOSE AND SCOPE OF THE STUDY.....	36
CHAPTER TWO: THE EFFECT OF MANIPULATION OF FEED INTAKE DURING PREGNANCY ON LAMB BIRTHWEIGHT.....		38
2.1.	INTRODUCTION.....	38
2.2.	MATERIALS AND METHODS.....	39
	2.2.1. Experimental Design and Animals.....	39
	2.2.2. Pasture Preparation.....	41
	2.2.3. Animal Measurements.....	42
	2.2.4. Slaughter Procedure.....	42
	2.2.5. Statistical Analysis.....	44
2.3.	RESULTS.....	44
	2.3.1. Ewe Intake during Early and Mid-Pregnancy.....	44
	2.3.2. Ewe Intake during Late Pregnancy.....	45
	2.3.3. Ewe Live Weight Changes, and Placental and Fetal Development during Early and Mid-Pregnancy.....	47
	2.3.4. Ewe Live Weight Changes, and Placental and Fetal Development during Late Pregnancy.....	52
2.4.	DISCUSSION AND CONCLUSIONS.....	58
	APPENDIX.....	70
	REFERENCES.....	71

LIST OF TABLES

		Page
Table 1.	The effect of pre-partum nutrition (from P47-102) and pregnancy rank on intake of dry (DM) and digestible organic matter (DOM) by ewes at two periods during pregnancy.....	45
Table 2.	The effect of pre-partum nutrition (from P102-136) and pregnancy rank on intake of dry and digestible organic matters by ewes at two periods during pregnancy	46
Table 3.	The effect of pre-partum nutrition on ewe live weights (kg) at different stages of pregnancy	47
Table 4.	The effect of pregnancy rank on ewe live weights (kg) at different stages of pregnancy	48
Table 5.	The effect of pre-partum nutrition and pregnancy rank on: final ewe live weights; weights of carcass, pelt and placental components; and placentome and caruncle numbers at day 102-104 of pregnancy.....	50
Table 6.	The effect of pre-partum nutrition on fetal weight, crown rump length, girth, volume and organ weights at days 102-104 of pregnancy	51
Table 7.	The effect of pre-partum nutrition on ewe live weights (kg) at different stages of pregnancy.....	53
Table 8.	The effect of pregnancy rank on ewe live weights (kg) at different stages of pregnancy.....	54
Table 9.	The effect of pre-partum nutrition and pregnancy rank on final ewe live weights and weights of carcass, pelt and placental components, and placentome and caruncle numbers at day 136-140 of pregnancy	56
Table 10.	The effect of pre-partum nutrition on fetal weight, crown rump length, girth, and fetal volume, and organ weights at day 136-140 of pregnancy.....	57

LIST OF FIGURES

	Page
Figure 1. A model of animal factors affecting feed intake (From Lynch <i>et al.</i> , 1992).....	16
Figure 2. Diagram of target ewe live weights for each of the treatments	40
Figure 3. The comparison between target and actual live weights from day 19 to day 102 of gestation for three nutritional treatments	60
Figure 4. The comparison between target and actual live weights from day 19 to day 140 of gestation for six nutritional treatments	61

LIST OF ABBREVIATIONS

°C	degrees celcius
%	percentage
µg	microgram
cm	centimetre
C	control (group)
CIDR	controlled internal drug releaser
Cr	chromium
Cr ₂ O ₃	chromic oxide
CCK	cholecystokinin
CRC	controlled release capsules
CRL	crown rump length
d	day
D	digestibility
day ⁻¹	per day
DM	dry matter
DMI	dry matter intake
DOM	digestible organic matter
DOMI	digestible organic matter intake
EPM	Ellinbank Pasture Meter
FO	faecal output
g	gram
h	hour
H	high (group)
ha	hectare
HFRO	Hill Farming Research Organisation
IL-1	interleukin-1
kg	kilogram
kg ⁻¹	per kilogram
M	maintenance (group)

ME	metabolisable energy
MJ	megajoule
mm	millimetre
OF	oesophageal fistulated
OM	organic matter
P	day of pregnancy
VFI	voluntary feed intake
vs	versus

Statistical:

n	number of experimental units
<i>P</i>	cut of value of significancy
s.e.m.	standard error of the mean