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

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ABSTRACT

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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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^{O}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
P	cut of value of significancy
s.e.m.	standard error of the mean