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VENISON PRODUCTION
FROM WEANER RED DEER (*Cervus elaphus*)

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the Degree of Master of Agricultural Science
in the Department of Animal Science,
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to my wife Ratna, my parents and my family

*"And livestock He (Allah) has created for you (human beings):
from them you derive warmth, And numerous benefits,
And of their (meat) you eat". (Qur'an Surah Al- Nahl (16): 5)*

*"Allah! There is no god But He - the Living, The Self-subsisting, Eternal.
No slumber can seize Him Nor sleep. His are all things in the heavens and on earth.
Who is there can intercede In His presence except As He permitteth?
He knoweth What (appareth to His creatures as) Before or After Or Behind them.
Nor shall they compass Aught of His knowledge Except as He willeth.
His throne doth extend Over the heavens And the earth, and He feeleth No fatigue
in guarding And preserving them For He is the Most High, The supreme (in glory)"
(Qur'an Surah Al-Baqarah (2): 255)*

ABSTRACT

Forty four weaner red deer (*Cervus elaphus*) fawns (26 stags; 18 hinds) were used to investigate the effects of grazing pure red clover (*Trifolium pratense*) or perennial ryegrass (*Lolium perenne*)/white clover (*Trifolium repens*) pastures and immunisation against melatonin upon growth and venison production, with the objective of the stags attaining a minimum target slaughter liveweight (92 kg LW; >50 kg carcass) by 12 month of age. The experiment was conducted at the Deer Unit Massey University, NZ, during 1991.

The animals were randomly allocated into eight treatment groups (starting on 13 March 1991), with the combination of pasture types ((pure red clover (RC) or perennial ryegrass/white clover (PRG/WC)), sex (male or female) and immunisation (against melatonin or placebo only). The deer were rotationally grazed on either RC or PRG/WC pasture (feed allowances 6, 7 kg DM/h/day, respectively) during autumn and spring. During winter, all animals were combined and grazed together on PRG/WC pasture (6 kg DM/h/day feed allowance), at a pasture residual DM of 1100 kg DM/ha. The subcutaneous anti-melatonin injections were administered to the immunisation groups at birth and at weaning.

Pre-grazing herbage mass for RC or PRG/WC were respectively 3568, 3706 kg DM/ha in autumn; 2726, 2150 kg DM/ha in spring; 1736 kg DM/ha in winter. Post-grazing herbage mass for RC or PRG/WC averaged at 1822, 1882, in autumn; 1705, 1334, in spring; and 1170 kg DM/ha in winter, respectively. Total nitrogen (N) and organic matter digestibility (OMD) concentration of both feed on offer (FO) and diet selected (DS) were higher in RC than PRG/WC (FO total N: 3.4 vs 3.4% DM in autumn, 4.1 vs 2.6% DM in spring; FO OMD: 77.3 vs 78.6% OM in autumn, 84.5 vs 80.3% OM in spring; DS total N: 4.2 vs 3.9 % DM in autumn, 4.7 vs 3.3% DM in spring; DS OMD: 84.2 vs 83.2% OM in autumn, 87.7 vs 82.4% OM in spring).

Liveweight gain (LWG) of RC stags and hinds was significantly higher than PRG/WC animals in autumn (237 vs 207; 197 vs 159 g/d; $P<0.01$) and in spring (346 vs 281; and 260 vs 188 g/d; $P<0.001$), but not in winter (94 vs 95; 38 vs 40 g/d;

$P > 0.05$). Weaner stags and hinds grazing RC forage had significantly higher voluntary feed intake (VFI) than the comparable animals grazing PRG/WC pasture in either autumn ($P < 0.05$) or spring ($P < 0.001$). By 12-month of age, stags grazing RC were 6 kg heavier and hinds 7 kg heavier than animals grazing PRG/WC forage. All (100%) RC stags attained the minimum target slaughter LW (> 92 kg LW; 50 kg carcass) by 12-month of age at the end of November, compared to 90% of PRG/WC stags. Carcass weights (kg) and dressing percentage (%) of RC stags were significantly higher than PRG/WC stags (58.9 vs 53.3 kg, $P < 0.01$; 56.2 vs 52.4%, $P < 0.001$), but the carcass GR was not different ($P > 0.05$) either after or before being adjusted to equal carcass weight.

The immunisation treatment did not provide any significant responses ($P > 0.05$) in LWG and did not affect plasma prolactin concentrations. The immunisation against melatonin treatment did not give any significant effects ($P > 0.05$) on all measurements of carcass production.

In conclusion, these studies show that early venison production from grazed PRG/WC pastures is possible, and that this can be further improved by inputs of RC. Weaner red deer grazing red clover forage during autumn and spring grew and produced venison better than animals grazing conventional PRG/WC pastures. The immunisation against melatonin did not provide any significant effects on growth and venison production from weaner red deer grazing either RC or PRG/WC forages. RC offers very good potential as a special purpose forage for venison production.

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GLOSSARY OF TERMS

DM	Dry matter
VFI	Voluntary feed intake
DMI	Dry matter intake
OM	Organic matter
FO	Faecal output
OMD	Organic matter digestibility
FO	Feed on offer
DS	Diet selected
LW	Liveweight
LWG	Liveweight gain
FOR	Rumen fractional outflow rate (% of rumen pool leaving to flow into abomasum/h)
Cr-EDTA	Chromium ethylene diamine tetra acetate
Ru-p	Ru- phenanthroline (particulate phase marker)
ME	Metabolisable Energy
MJ	Mega Joule
CT	Condensed Tannin
CP	Crude protein
MRT	Mean retention time
RC	Red clover
PRG	Perennial ryegrass
WC	White clover

MCF	Malignant Catarrhal Fever
RPM	Revolutions per minute
HSA	Human serum albumin
FCA	Freunds complete adjuvant
FIA	Freunds incomplete adjuvant
PRL	Prolactin
GLM	General Linear Model Procedure
LSM	Least Square Means
CRD	Intra ruminal chromium-slow-release capsule (sheep-size)
GR (carcass)	Soft tissue depth over the 12th rib 16 cm from the mid line (mm) (indirect measure of carcass fatness)
NZ	New Zealand
MAF	Ministry of Agriculture and Fisheries
GIB	Game Industry Board
NZDFA	New Zealand Deer Farmers Association
NZGCL	New Zealand Game Company Limited (now Cervena Company)
DSP	Deer slaughtering premises
GPH	Game packing houses
QA	Quality assurance