GROWTH AND VENISON PRODUCTION OF FARMED DEER 46

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The three major species of deer farmed in NZ; red, wapiti and fallow; originate from temperate northern hemisphere regions. All have similar growth and feeding patterns that are adaptations for efficient exploitation of natural forest/pasture environments. These patterns generally prevail under pastoral farm conditions and are necessary considerations for efficient deer production. During this talk we will mainly concentrate on a venison production system, but firstly outline the salient points about the liveweight and feed intake cycle of breeding and velvet deer (ie. adults).

(1) Mature Stags/Bucks

- Liveweight loss during rut well known to deer farmers (up to 25% of peak weight).
- Feed intakes over rut drop; coincidental with a rise in activity.
- Feed intakes modest over winter but little gain in liveweight.
- Rapid weight gains over spring and summer represent deposition of depot/subcutaneous fat in preparation for next rut.

(2) Mature Hinds/Does

- Annual liveweight patterns largely reflect reproductive state.
- Maintenance over early-mid gestation (winter).
- Foetus significantly contributes to hind weight from early September until parturition.
- Liveweight loss (15%) at calving (December).
- High feed requirement over lactation (December-March).
- If feed supply poor over lactation this hind and calf weights will be affected.
- Some recovery of lost weight in late autumn, early winter (April-June) if feed is adequate.

(3) Young Hinds/Does

- Puberty weights at 15 months are 65 kg for red hinds and 30 kg for fallow does; however aim for averages considerably higher than this (eg. 80 kg for red, 38 kg for fallow).
- Feed well throughout the growing period up to 15 months of age in order to achieve target weights.

(4) Young Stags/Bucks

- The venison producers.

Over the last 3-4 years there has been a move toward specialisation in venison production. For this weaner stags, bucks are usually purchased in March and slaughtered at ages between 14 and 27 months.

For profitable venison production a number of factors need to be known such as the net returns for different carcass weights and grades. But also required is information on growth patterns and growth rates. Red and fallow show similar trends apart from absolute size; we consider red deer stags from here on.

GROWTH PATTERNS OF RED STAGS

Seasonal patterns of liveweight change with pasture fed deer up to 2 years of age in the Waikato region are shown in Fig.1.

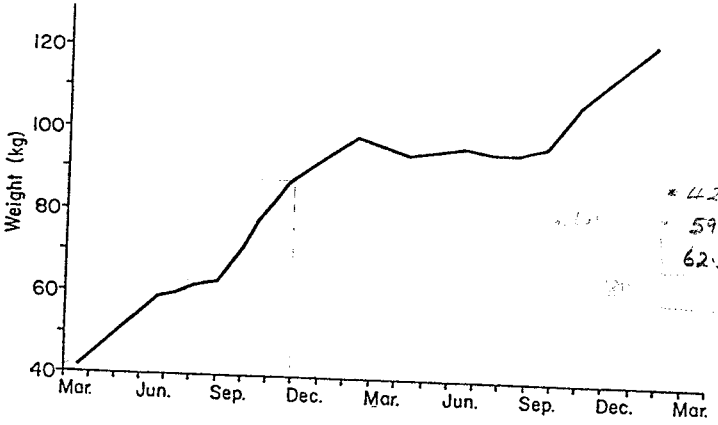

Fig. 1. General pattern of liveweight for red stags

Following weaning in March young stag calves can show moderately high weight gains over the autumn but these decrease to a low weight gain over the winter months from late June till August. In cooler regions, zero winter growth has been observed. During the spring-summer periods weight gains are rapid in stags almost irrespective of age. However, it is over the autumn-winter period following 15 months that age exerts an important effect. In contrast to the modest weight gains made by rising yearling stags over this period, rising 2 year old stags only maintain their liveweight.

Within the season patterns of liveweight change actual liveweight gains have been shown to vary markedly between farms in the northern region. Seasons in which this is most apparent are autumn, after weaning in mid March, and again in the summer months December to March with 12 to 15 month old animals. However, where stags are slaughtered around 2 years of age the long autumn-winter period with no liveweight gains should be noted.

Finally, annual liveweight gain/loss cycles become pronounced with stags over 2.5 years. This, with the ability of these older stags to accumulate body fat, may minimise their role in venison production systems.

GROWTH RATES OF RED STAGS

Profitability of venison production depends largely on liveweight gains, which in turn reflect feed intakes, feed quality and stocking rate.

At Ruakura farmlets were set up to measure feed intakes and liveweight gains of stags between weaning (3 months) and slaughter at 24 and 26 months of age. Stags were initially stocked at the rates of 15, 20 and 24 per ha, with two farmlets at each stocking rate. Each farmlet was divided into 10 paddocks with electrified hot tape and rotationally grazed.

Management up to 14 months was similar for all stocking rates, excepting that during spring the area conserved decreased as stocking rate increased. Together with seasonal differences in grass growth this resulted in rotation lengths varying between 11 and 50 days. From 15 months of age supplementary feeding was periodically required until August for all stocking rates.

Overall liveweight changes for stags up to 26 months of age at all stocking rates are shown in Fig.2, and are similar to the general growth pattern outlined in Fig.1.

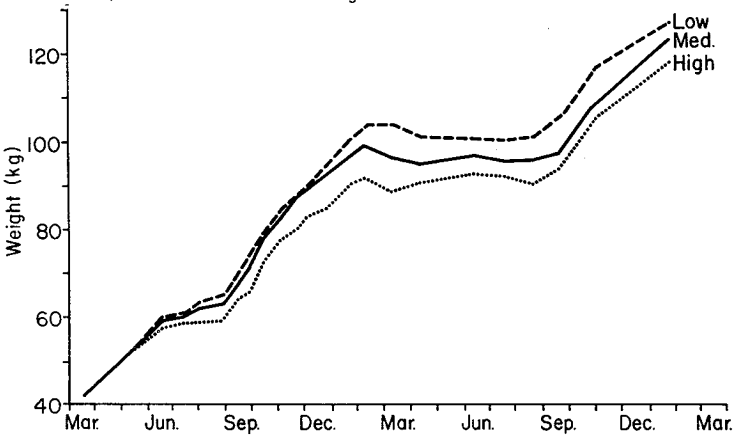

Fig. 2. Effect of stocking rate on the liveweight of red stags

But at any given month stags on the lowest stocking rate were the heaviest and those on the highest stocking rate were the lightest.

Due to the delayed completion of the farmlets all weaner stags were grazed as a mob for 2 months from weaning (11 March 1982). During this period they averaged 184 g/day. This over a full 100 day autumn would have represented a liveweight increase of 18.4 kg/stag.

After allocation to their respective farmlets on the 15 May differences in weight gains between stocking rate averaged 178 g/day while those on the highest stocking rate averaged only 112 g/day.. Again if these gains applied over a 100 day autumn stags on the lowest stocking rate would have been 6.6 kg (17.8-11.2) heavier than those on the highest stocking rate. Over winter stags at the lowest stocking rate further increased their liveweight advantage over more highly stocked animals. For the two winter months total weight gains varied from 1.25 to 5.25 kg per stag (20 to 80 g/day) for high and low stocked groups respectively.

From the start of the 100 day spring (29 August) the rising yearling stags averaged close to 260 g/day or 26 kg per stag regardless of stocking rate. As pasture growth exceeded intake by stags the surplus was conserved. The amounts conserved, expressed as bales of hay for convenience, were 7.1, 3.5, and 1.5 bales per stag per ha for the low, medium and high stocking rate farmlets respectively.

The summer period, from December to mid March, saw a dramatic fall in stag weight gains down to 168 g/day for the lowest stocking rate and to 53 g/day for the highest stocking rate. Maximum liveweights for all stocking rates occurred in February at 14 months (Table 1).

Table 1. Effect of stocking rate on red stag liveweights (kg) at selected dates.

Age (mths)	3	6	14	20	24
Date	11 Mar	25 Jun	17 Feb	23 Aug	16 Dec
Stocking rate					
L	40.8	60.4	103.7	101.3	121.7
M	41.4	59.6	98.4	95.5	113.4
H	41.7	58.0	91.5^{-1}	90.9^{-2}	109.9^{-3}

Stocking rate L = 15 stags/ha; M = 20 stags/ha; H = 24 stags/ha less number shown.

With 15 to 20 month old stags over the autumn-winter period supplementary feed as hay, with limited amounts of whole maize, was offered at all stocking rates to keep total daily dry matter intakes above 2.1 kg/head/day. Over this period individual stags consumed 30 kg of maize plus 7 bales of hay or 11 bales for the lowest and highest stocked stags respectively. No liveweight gains were made between February and late August (14 to 20 months).

From the start of spring in late August stag growth increased to around 200 g/day but fell back to around 110 g/day in late spring. After cutting velvet from the 2 year olds stocking rates were halved to 8, 10 and 12 stags per ha from 16 December. Growth rates immediately increased to an average of 224 g/day across all stocking rates. Final average liveweights are given in Table 1.

VENISON PRODUCTION

Stags were slaughtered in December at 24 months and also in February at 26 months of age. A further group, from another trial, were slaughtered in February at 14 months. Using this information for dressed cold carcass yield and assuming a 23 kg carcass for each 42 kg weaner, net production estimates were derived.

Assuming a 14 month venison farming system with slaughter in February average cold carcass weights decreased with increasing stocking rate (Table 2).

Table 2. Effect of stocking rate on average cold carcass (CCW) weight per stag and net cold carcass gain per hectare.

Slaughter age (mths)	14		24		24 and 26	
	Av CCW (kg)	Net CCW gain (kg/ha)	Av CCW (kg)	Net CCW gain (kg/ha)	Av CCW (kg)	Net CCW gain (kg/ha)
Stocking rate						
L	59.7	560	70.1	716	73.1	751
M	56.7	678	65.3	850	68.7	914
H	52.7	662[-1](715)	63.3	780[-3](970)	66.6	846[-3](1040)

Stocking rate: see footnote on Table 1.

But net cold carcass weight production increased from 560 kg to 662 kg per ha as stocking rate increased. The figure of 662 kg could have been as high as 715 kg/ha but for one stag being electrocuted in late November while in velvet. The net venison production per ha at all stocking rates was less than that of 740 kg obtained at Invermay with a spring-summer stocking rate of 31.4 rising yearling stags per ha.

A second alternative involved venison production with 2 year old stags. Where all stags are slaughtered at 24 months (Dec), the effects of increasing stocking rate on average cold carcass weight and net cold carcass weight gain per ha were similar to those for February although absolute weights were higher (Table 2). However, by killing half in December (24 months) and half in February (26 months) net venison production increased still further (Table 2). But whereas only 5% of stags were downgraded for fatness at 24 months (Dec) this figure increased to over 25% by 26 months (Feb).

CONCLUSIONS

The results show that increases in per hectare production were achieved at the expense of individual stag performance. Thus with stags killed at 14 months (Feb) net carcass weight gains increased from 560 kg/ha up to 715 kg/ha. At the same time average stag carcass weight decreased from 59.7 kg down to 52.7 kg.

Where stags were killed at 24 to 26 months, versus 14 months, the absence of growth over autumn-winter contributed to a comparatively small increase in average cold carcass weights. Actual net gains of between 716 and 1040 kg/ha, estimated over 2 years, were therefore less on an annual basis than those under a 14 month venison system. In addition the application of present grading standards indicated a marked increase in carcass fatness between 24 months (Dec) and 26 months (Feb) particularly at the heavier weights.

Collectively these results point to a 14 month venison production system. This would also avoid the costly autumn-winter period with no growth from rising 2 year old stags. However, this would depend upon financial signals from the market place through the GPH's particularly in respect of desired stag carcass weights.

For a 14 month venison production system the autumn and summer can be critical periods for the growth of stags.