



Central Regions PROJECTS

Passion 2 Profit

Feeding grain based supplements to velvet stags from button drop to velveting did not give economic return.

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Summary

Fifty stags were divided into two treatment groups at antler casting. Both groups had access to good quality pasture made up of plantain, clover and ryegrass. One group was fed a concentrate feed in the form of pellets “Deer Velvet Nuts” which was offered at up to 1.5kg/head/day and a total of 60kg/stag while the other group was kept on pasture alone. The total cost of the concentrate feed was \$42 per stag. Antlers were harvested from all deer at the optimum harvest length according to the most recent velvet grading guidelines. Velvet antler weights were compared along with the increase in antler weight compared to the previous year. There were no statistically significant differences between groups in antler weight. Paddocks in which the stags fed meal had grazed had greater pasture covers at the end of the trial. The cost of feeding the stags was \$51 per head. The value of the extra pasture was between \$0 and \$20 per head depending on how it is utilised. If the difference in mean antler weight was significant it would have valued approximately \$25 per head. One stag in the “meal” group died and this may have been due to acidosis.

There was no financial benefit to feeding grain based supplement to velvet stags on good quality pasture during antler growth. There is a potential risk to the health of the stags. The results may have been different if the pasture had been of poorer quality or quantity.

Aim

To determine whether there is a cost benefit to feeding supplementary grain to velvet stags during velvet growth when stags have access to good pasture.

Introduction

Velvet antler is a valuable product harvested each year from male deer. The price paid to the farmer depends on the weight and grade of the antler. A relatively small increase in velvet antler weight can result in a significantly greater financial return to the farmer, especially if this is associated with improvement in antler grade. Velvet producers aim to maximise velvet antler weight through selective breeding and nutritional management of stags.

Little is published about the optimum feeding of velvet stags to maximise velvet antler weight and grade. Only a few experiments on small numbers of stags have been published and these have shown variable results. Fennessy and Suttie (1985) reported some results from unpublished work by

Fennessy and Corson incorporating three feeding trials. Stags fed a high protein diet had heavier antler weights as two-year-olds compared to those fed a low protein diet. This was not the case for three-year-old antler weight. In the third experiment, stags fed a restricted diet (80% of *ad-lib*) for 65 days of antler growth did not have significantly lighter three-year-old antler weight than those fed *ad-libitum*. In a study involving 17 Iberian red deer (Gaspar-Lopez et al, 2010), there was no correlation between the amount of weight lost during the rut and subsequent antler weight, however there was a positive relationship between the rate of increase in weight in the spring and antler weight. Muir et al (1987) did not find any effect of altering calcium and protein in the diet of red deer during antler growth. However in that study only six deer were used in each treatment group and these were all harvested at a different time after casting of the previous antler.

Information of the Deer Industry New Zealand website states that “Any restriction in feeding over this period [post rut to October/November] has a significant negative effect on antler growth”. However the data either does not support this statement or does not exist.

There have been several Chinese studies looking at energy, protein and calcium requirements of Sika deer. The details and experimental design for these studies are difficult to access in English and therefore we are reliant of the summaries of these findings by other authors (Gao et al, 2003). Some of the trials have been done on small numbers of deer while others may not be applicable to the New Zealand systems of farming red and wapiti deer. One key difference identified by Gao et al (2003) is that Chinese deer are fed on a base diet of concentrates with supplementary roughage, whereas New Zealand deer are fed on a forage based diet with supplementary concentrates. A summary of the Chinese findings found that in New Zealand equivalent units, mature adult stags (100-140kg) required 28.7MJ ME/day and 11% crude protein in the winter and 31.6 MJME and 17% crude protein during the antler growing period. Using regression analysis, Asleson et al (1996) estimated that adult white-tailed deer required crude protein levels of approximately 10% during antler growth.

This study aimed to investigate the effect of feeding a grain based specialty nut to stags during velvet antler growth and the weight and financial value of the antlers.

Materials and Methods

This experiment was conducted on Ken Norman’s farm, Dougherty’s road, Pahiatua

50 velvet stags that cast their buttons early in the season were used. These were divided into two groups, supplement fed (Meal) and non-supplement fed (Control). The stags were alternately assigned to each group based on casting date.

In addition, there were 59 stags of a similar age group that were run according to normal farm practice on grass only. The data from these animals were also collected for comparison.

Both group were allocated a similar area of pasture that was of similar length and pasture quality. The total area for each group of 25 stags was 4.2ha. Each group had two paddocks that they were rotated between.

Herbage tests were done at the start of the study although the results were not available until after the start of the trial.

The concentrate group was fed up to 1.5 kg of deer velvet nuts. These were made from barley, maize, soya meal, copra, peas, bran, pollard, molasses, dicalcium phosphate, sale, lime, vitamins and minerals. The typical analysis based on dry matter was: Crude Protein min 20%, Crude fibre max

9%, Fat max 6%, Salt max 2%, 12.5 MJME/kg, NDF 23%.

Pasture heights were measured periodically using a rising plate meter.

When pasture cover got too low, baleage was offered to the stags.

Velveting was carried out at the normal time for each stag, being the time for optimum harvest and grading.

Velvet weights were compared to the last season weights and weight for age averages for the whole herd.

Results

One stag in the concentrate group died of suspected acidosis

The non-concentrate group had to be offered an additional paddock due to grass grub damage in their area.

FEED ANALYSIS

Pasture analysis was performed on 20th August 2014 and 4th September 2014 by Analytical Research Laboratories, Waitangi road, Awatoto, Napier on behalf of Keinzley Agvet Carterton. Feed analysis of meal was provided by the manufacturer. Table 1 shows feed analysis results.

Table 1: Pasture and Deer Nuts feed analysis results in paddocks grazed by velvet stags during spring, showing two paddocks in each of the treatment groups "Meal" and "Control".

	Pine tree	Gelvin	Mailbox	Rushes	Normal range	Meal
Area	2.17	1.9	2.43	1.96		
Treat type	Meal	Meal	Control	Control		
	ryegrass mix	plantain mix	ryegrass mix	Plantain mix		
Date	4/9/14	20/8/14	4/9/14	20/8/14		
ADF %w/w of DM	23.9	20	20.9	22.3	15-25	
Ash % w/w/ of DM	9.7	9.1	10.8 H	7.4	5-10	
Crude protein w/w% of DM	18.8	27.9 H	23.9	25.4 H	10-25	20
DM %	23.5	15.5	22.5	18	9-35	
Lipid % w/w of DM	3.9	3.9	4.6	3.6	3-5	6
ME MJME/kgDM	12.3 H	>12.7 H	>12.7 H	> 12.7 H	10-11	12.5
NDF % w/w of DM	46	33.8 L	39 L	37.1 L	45-55	23
OMD %w/w of DM	83.9 H	>85 H	> 85 H	>85 H	65-75	

SSS%w/w of DM	17.8 H	16.4 H	19.7 H	20.6 H	4-12	
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PASTURE GROWTH

Pasture growth estimates were based on reports from a nearby monitor farm and changes in pasture height in the ungrazed paddocks. These are shown in Table 2.

Estimated pasture growth varied between paddocks and could not be measured in all paddocks on each occasion.

Table 2: Estimated pasture growth rates in paddocks used in velvet stag feeding trial. Monitor = nearby dairy farm, Gelvin and Pine tree had deer that stags that were also fed meal whereas mailbox and rushes had deer that were not fed meal.

Period	Monitor	Gelvin	Pine tree	Mail	Rushes
13-19 August	8				
20-26 August	12				
27 Aug - 2 September	15				
3-9 Sept	18	10			40
10-16					
17-23	45			20	
24 Sept - 1 Oct	25	45			67
2-8 Oct	28	55		20	
5/10 to 1/11		72			80

PASTURE HEIGHT MEASUREMENTS

Pasture height was measured using a rising plate meter. These measurements were used to estimate grass growth rates and also to determine the difference in total herbage available at the end of the study in each treatment group.

Group	Control		Meal	
Number of days	50		50	
Paddock	Mail	Rushes	Pine tree	Gelvin
Area	2.43	1.96	2.17	1.9

Start cover 3/9	1400	1350	2100	1150
End cover 22/10	1850	1940	1900	4000
Total increase in pasture mass (kg DM)	513		1,224	
estimated pasture growth kgDM/ha/day	33		33	
Estimated animal requirement (kgDM/ha/day)	23		24	
kg meal eaten/kg DM/ha/day	0		7	
Predicted surplus kgDM/ha/day	10		16	
Total surplus kgDM/ha/day (measured)	10		24	

Velvet growth

Average velvet weights for deer in the control and meal fed groups for 2012, 2013 and 2014 and the difference between the 2014 weights and previous years. Meal was only fed in 2014.

	2012	2013	2014	mean diff 2014-2013	diff 2014-2012
CON	4.06	4.70	5.30	0.54	1.24
MEAL	4.18	4.80	5.64	0.75	1.46
OTHER	4.07	4.55	5.32		

There were no statistically significant differences between the meal and control groups.

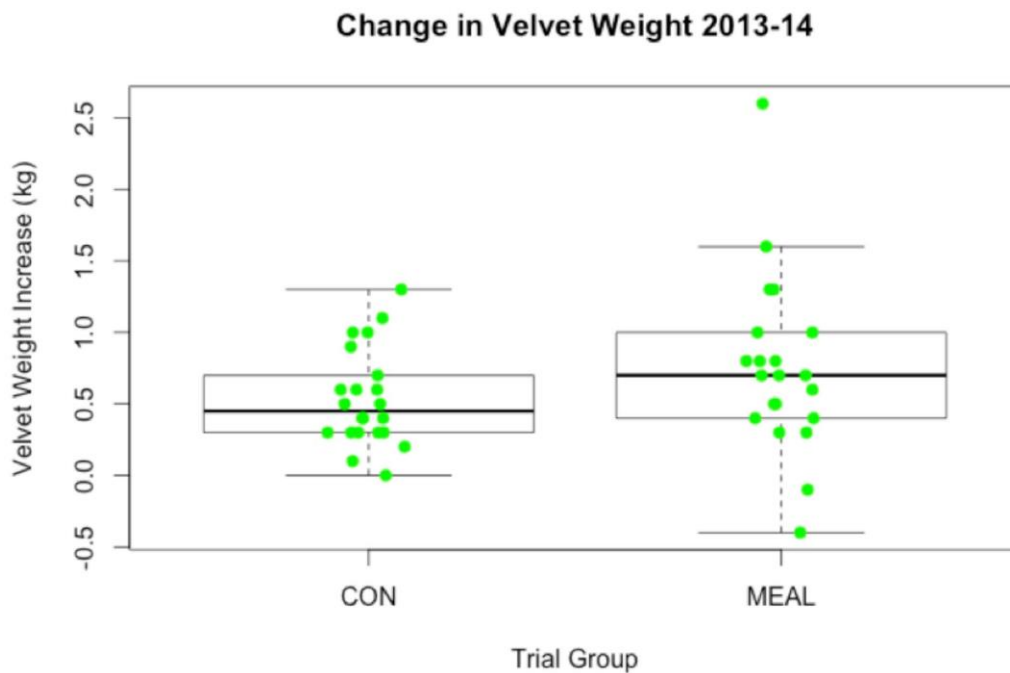


Figure 1: Graph showing difference between 2014 and 2013 velvet weights in stags that were fed meal in 2014 (meal) and stags that were not fed meal (Con)

Cost benefit analysis

As there was no significant difference between the group that was fed meal and the group that was not fed meal, there is a cost deficit. The cost of feeding meal was \$51 per head. The value of the additional pasture was \$7 to \$20 per head depending on how this pasture is utilised. The value of the mean difference in velvet weight was approximately \$20.

Discussion

The selection of concentrate was made prior to pasture analysis results and was based on a relatively high estimated requirement for protein and calcium. In hind-sight the pasture analysis had a high protein level, high soluble sugars and low fibre content. It may have been preferable to choose a different concentrate type with a lower protein and higher fibre content.

One stag died of suspected acidosis in the concentrate group. This is a risk when stags are fed meal as they will compete for the feed and some will inevitably eat more than others. This was also evidenced by the fact that some stags were not really interested in the nuts and ate very little of them. The loss of a good velvetling stags would be a greater cost than the added benefit of extra velvet production in the remaining mob. A contributing factor to the death may have been the high soluble sugar content of the pasture. There are safer options for feeding concentrates. For example, acidosis has not been reported when stags were fed up to 2kg of palm kernel per day (Craig Hocken, concurrent trial).

There was a significant ($p < 0.01$) increase in velvet weight in both groups between 2013 and 2014 and also between 2012 and 2014. The most likely reasons for these increases are improved nutrition and increasing age and yield potential of the stags.

The average age of the stags in 2014 was 6.6 (control) and 6.8 (meal) years. In 2013 the average age would be one year younger. An increase in velvet weight may well be expected when a stag goes from an average of 5.5 years to 6.5 years.

Across all years and stags velveted from 2003 to 2013, the weight from age increases on this farm have been as listed in the table below

Age increase	Average increase in velvet weight	Standard Deviation
from 2 to 3 years	0.8kg	0.6kg
from 3 to 4 years	0.7 kg	0.7kg
from 4 to 5 years	0.5kg	0.5kg
from 5 to 6 years	0.4kg	0.4kg
from 6 to 7 years	0.3 kg	0.4kg
from 7 to 8 years	0.3kg	0.8kg

There were less than 10 animals kept over 8 years of age

The table above indicates that the expected increase in weight for age in this group of stags would be around 0.4kg. The standard deviation in weight for age increase is large and as the stags in this study were chosen for their relatively high genetic merit for velvet growth, the increase in weight for age in this particular cohort may be greater than the whole farm average. Nevertheless, it seems unlikely that this would explain all of the increase in antler weight in the “meal” group between 2013 and 2014.

Part of the increase from one year to the next may also be explained by better nutrition. It is not possible to assess the effect retrospectively. There may also be seasonal variation dependent on the weather, warmth and daylight hours and again these factors can not be accounted for in this study.

Although the average velvet weight in the meal group increased more than the control group, there was large variation in the data meaning that the groups could not be separated statistically. The variation was greater in the meal group and this may have been due to differences in intake of the meal. It may also simply reflect that variability of the data indicating that very large numbers of stags are required if a statically significant difference of around 0.5kg is to be detected. A power analysis estimates that the required number of stags per treatment would be 67 animals given the variability in the data.

Meal fed stags were fed an additional 60kg per head. This was at a cost of \$51/head. The additional velvet would not cover the cost of feeding the meal if extra grass growth is not utilised. In this study, over 50 days, the paddocks with the “meal” group had a total surplus growth of 4981kgDM compared to 2250kg DM in the control paddocks. Taking into account animal requirements and total area of each paddock, this equated to an average surplus (growth - animal intake) of 24kg DM/ha/day in the “meal” group and 10kg DM/ha/day in the “control” group. A difference between the groups of 14kg DM/ha/day. Based on an average feed requirement of 3.5kgDM/ha/day, this would be enough to run an additional 4 velvet stags over this 50 day period. The difference in pasture growth surplus between the treatment groups was greater than the kg of meal fed to the “meal” group, which averaged 7kgDM/ha/day. This indicated that there is not a direct substitution on a dry matter basis and that the

stags fed nuts tended to eat less grass. An alternative explanation for this difference is that the growth rate in the Gelvin paddock was much greater than the growth rate in other paddocks. This is likely because the stags spent very little time in Gelvin which would have minimised pasture disturbance. One paddock in the control group was also affected by porina and a small area “triangle” had to be offered to the stags in the control group while the paddock recovered. Because of these variables, it is difficult to draw any sound conclusions, although it does appear that stags significantly reduce the intake of grass when offered meal. The value of this additional pasture would depend on whether it can be utilised at this time of the year either by feeding other classes of stock or harvesting for supplementary feeding at a later date. If not utilised, pasture deterioration may result in decreased growth and quality.

One of the reasons that the farmer wanted to do this trial was because he believed that early cut velvet tended to be lighter or less dense than later cut velvet. The results showed that there was no difference between the trial deer and the other deer on the property in the same age group. The trial deer were selected because they were the first to cast their antler buttons and therefore would be the first stags that were ready to harvest. In this study button cast date and velvet harvest date did not have a significant effect on antler weight.

The trial was an attempt to answer one question concerning the effect of nutrition on velvet antler growth. Further research is required to determine the critical time for feeding velvet stags and the ideal make up of the feed offered. There are a large number of variables to take into consideration and any further studies will need to include at least 60 to 70 stags per treatment to give confidence in the results.

Conclusion

There was no significant increase in antler weight in deer fed special “Deer Velvet Nuts” compared to those on high quality spring pasture.

There was no economic benefit to feeding “Deer Velvet Nuts” to stags from button drop until velveting.

Stags fed meal ate less pasture and this could be utilised for other purposes.

References

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