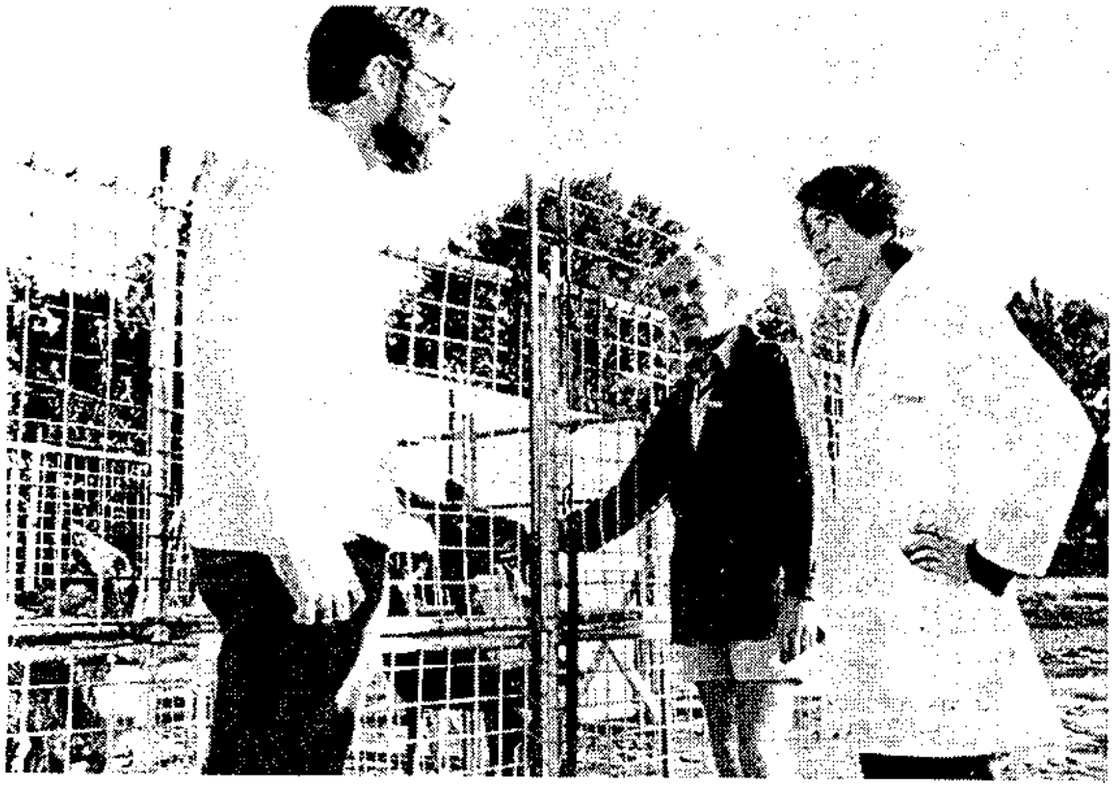


Terry Reid, Dr Mike Adam, and Geoff Asher at the Ruakura Field Day.

10

The Mid-Northern Regions – reproduction and growth 1980/81

This article by Geoff Asher of the Ruakura Animal Research Station combines information from two sources; firstly, on-farm monitoring of Red and Fallow deer during the birth season 1980/81 and, secondly, a postal survey to deer farms in the Waikato, Bay of Plenty and South Auckland areas (March 1981).*

IN 1980 33 per cent of all deer farmed in New Zealand were north of Taupo in the Waikato, Bay of Plenty and Auckland region; including 28 per cent of all Red deer and 65 per cent of all Fallow deer. This proportion of farmed deer justifies at least an initial investigation into factors affecting productivity in these regions.

With this in mind, on-farm monitoring of reproduction and growth of deer was instigated from Ruakura in

* *J.L. Adam, M. Langridge, Ruakura Animal Research Station.*

Table 1

Regional comparison of Red deer calving performance

	Farms	Hinds	Minimum calving rate %	Weaning rate %	Minimum mortality %
Waikato	61	1946	88.5	80.7	8.8
Bay of Plenty	27	894	85.9	80.9	5.9
South Auckland	9	379	88.7	79.7	10.1
TOTAL	79	3219	87.8	80.6	8.2

Table 2

Calving performance of Red deer by farm size
(data for Waikato/Bay of Plenty/South Auckland combined)

Size of hind group	Farms	Hinds	Minimum calving rate %	Weaning rate %	Minimum mortality %
1–20	49	504	92.7	83.7	9.6
21–40	28	786	93.0	84.1	9.6
41+	20	1929	84.4	78.4	7.1
TOTAL	97	3219	87.8	80.6	8.2

January 1980. Up until the start of 1981 initial effort was concentrated on 5-6 Red deer farms in the Waikato region, but this has since expanded into the Taupo, Bay of Plenty, Auckland and Northland regions. On-farm work now encompasses 23 Red deer and 6 Fallow deer farms.

Table 3

Comparison of Red deer calving and Fallow deer fawning performance
(data for Waikato/Bay of Plenty/South Auckland combined)

	Farms	Hinds/Does	Minimum birth rate %	Weaning rate %	Minimum mortality %
Red	97	3219	87.8	80.6	8.2
Fallow	21	473	79.9	66.4	16.9

A new-born fallow fawn tagged at birth. Non-standard, small-mesh fences on one farm monitored, eliminated fence deaths.

Reproductive performance

With the high price of female breeding stock, productivity levels are determined by the numbers of surviving offspring produced each year. It is, therefore necessary to obtain a measure of female productivity in terms of calving/fawning rates, weaning percentages and pre-weaning mortality. This was our objective in the 1980-81 calving/fawning season. It provided some insight into those problems affecting overall reproductive productivity.

For the sake of clarity between species, "calving" refers to Red deer and "fawning" to Fallow deer.

From Figure 1 it can be seen that the seasonal spread of birth differed for the two species. Fallow births (Bay of Plenty region) were confined within about two months (93 per cent born in December), while Red deer births (Auckland and Waikato regions) were spread over four months (97 per cent born between November and January).

The medium date of birth for both species was about 13 December 1980.

Back-dating all birth dates the appropriate number of days of gestation provided information on the spread of conception (Figure 1). This put the peak mating period towards the end of April for both species.

The wide calving spread for Red deer presented several management problems in terms of stock movement, pasture quality and allocation. The practice of set-stocking hinds over the long calving period was often in conflict with the need to maintain good young leafy pasture over summer, traditionally a drier period in the northern regions.

Several options may be seen to be effective, singularly or cumulatively: 1) maintaining a lush and vegetative pasture in calving paddocks from spring onwards by utilising excess pasture available in spring and preventing it from growing rank prior to set-stocking with hinds in summer; 2) rotationally graze hinds, making sure no calves remain behind in old paddocks (this may not be easy, but does facilitate pasture spraying in bad facial eczema periods); 3) making available to the hinds adjacent paddocks at regular intervals, simply by opening a gate; 4) restricting the spread of the calving season. The latter option requires further investigation but, clearly, removal of stags from June onwards will prevent later conceptions. At this stage the economics of doing so are questionable.

The calving/fawning performance is

Table 4

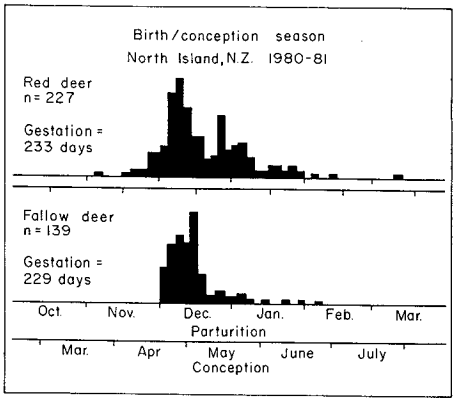
Diagnoses of Fallow fawn deaths

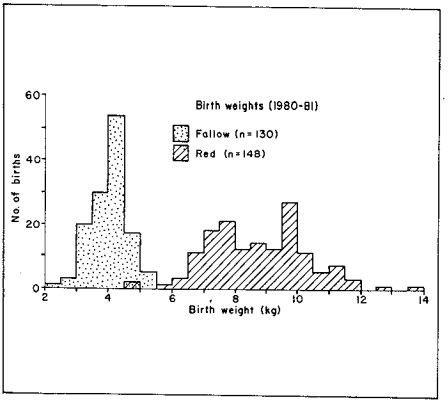
	Number of deaths	% of deaths
Misadventure	10	37
Birth problems	6	22
Infectious agent	5	18
Mis-mothering	5	18
Unexplained	1	4
TOTAL	27	100

Table 5

Average birth weights for Red and Fallow deer (kg)

	Red deer	Fallow deer
Male	9.4	4.3
Female	8.8	3.9





represented in two ways: 1) the number of animals born relative to the number of dams previously mated. This is a "*minimum* birth rate" because some mortalities may have been overlooked; 2) the number of young weaned (or counted in March) relative to the number of dams intended to calve/fawn ("weaning percentage").

In addition, the number of pre-weaning deaths relative to the number of animals born is presented as the "*minimum* percentage mortality".

For questionnaire and daily monitoring data combined, there was little difference in the Red deer calving rate, weaning percentage and minimum percentage mortality between the Waikato, Bay of Plenty and South Auckland regions (Table 1). Fallow farms were too few for regional comparisons.

Overall mortality of Red calves prior to weaning of about 8 per cent was comparable to that seen in other New Zealand regions (K. Drew, pers. comm.).

There was some suggestion that smaller Red deer farms (up to 40 hinds) had 6 to 7 per cent better calving performance, but similar mortalities, than larger (40-300 hinds) farms (Table 2).

This may be related to differences in management between farms of different sizes. Small numbers of hinds often receive preferential management not practical with larger numbers.

Overall productivity was lower for Fallow deer than for Red deer (Table 3). The minimum fawning rate was about eight per cent lower and the pre-weaning fawn mortality was about twice that of Red deer. This combined to give a weaning rate about 15 per cent lower.

Daily monitoring of Fallow deer during the fawning period also involved laboratory diagnoses of fawn deaths. Unfortunately, this was not attempted with Red deer. Of the 139 Fallow fawns identified at birth, 27 (19.4 per cent) died prior to weaning in March.

Mortality diagnoses for Fallow fawns (Table 4) show that the largest proportion of deaths were due to misadventure (caught in fences) and birth problems (undersized fawns and parturition hazards). Mis-mothering due to handling at birth was believed to have been the causal factor behind only two deaths (1.5 per cent of all fawns handled).

No major disease episodes were implicated in fawn deaths. Infections (mainly pneumonia) occured in isolated cases.

A large proportion of Fallow fawn deaths can be overcome by reducing the hazard presented by standard mesh fences (eg. reducing mesh size with extra wires or chicken mesh). One farm monitored had non-standard small mesh fences. Fawns were not capable of crawling through the wire and consequently, no fence deaths were recorded.

In total 148 Red calves and 130 Fallow fawns were weighed at birth. Average birth weights are presented in Table 5. For both species, males were 8 to 10 per cent heavier than females at birth.

Greater variation in birth weights was evident with Red than Fallow deer (Figure 2). However, the Red deer sample included a few individuals with some degree of Wapiti parentage which may have exaggerated the observed variation towards the upper limit of birth weights.

It was observed that the survival rate of Fallow fawns below 3.0 kg birth weight was as low as 29 per cent compared to 82 per cent for those above 3.0 kg birth weight.

Pre-weaning calf/fawn growth (Table 6) was calculated as the difference between the March weight and birth weight, divided by the interval between.

Later born calves and fawns were proportionally lighter in March. Due to the large number of late born Red calves in the sample tagged at birth, the March weights were quite low compared to other data for March weaning weights.

Calves/fawns born later than January have proven to be a problem if pre-rut weaning is desired. These individuals were too small to wean and had to remain with their dams.

Growth

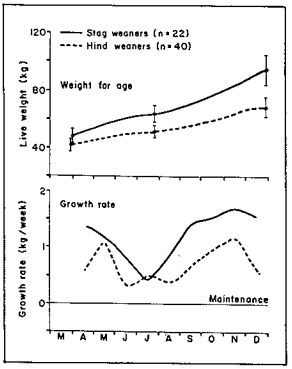
This section examines the effects of age and season on the growth of Waikato Red deer. Information is also presented on the effects of mating weight at 16 months of age on the proportion of first calvers to successfully rear calves to weaning.

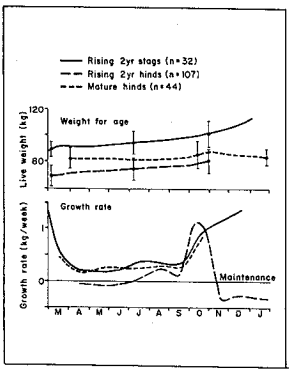
Deer were weighed at six to eight week intervals and data are pooled for up to three farms. In general, the samples represent highly selected populations mainly on the basis of liveweight. As such they are not intended to reflect the performance of the whole range of individuals born, but rather the productivity of some typical Waikato Red deer farms. Stocking rates throughout the year were about 10 to 15 deer/ha.

Weight for age and growth rate of weaners through their first year are important as levels of performance set in that year may be reflected in growth and reproductive performance in later years.

Increases in liveweight were continuous from weaning in March through to December for both sexes (Figure 3). However, stag calves were always heavier than hinds. While growth rate curves were similar for both stags and hinds they illustrate that liveweight gain (kg/week) was not constant over the period from March weaning to December.

Using stag calves as the example, high growth rates of up to 1.5 kg/week declined sharply to trough in late June/July at about 0.5 kg/week. However, this was soon followed by a marked growth increase starting in late





July/August and peaking between September and November at 1.5 to 1.7 kg/week liveweight gain. There is an indication that growth rates also declined a little from December.

There is no data to relate these growth characteristics to seasonal feed availability but the following factors may have influenced declining growth rates:

1) higher energy requirements relative to voluntary or mandatory feed intake in June/July;

2) depression in feed quality and/or quantity in late summer.

Corresponding data for rising two year stags and hinds again shows absolute sex differences of weight for age but similar growth rate curves (Figure 4). However, these individuals declined in growth rate to near maintenance from April till September. Although there was no weight loss, liveweight gain was small (0.2 kg/week). The growth rate increase from September onwards was quite marked (up to 1.5 kg/week).

Growth rate differences between rising one years olds (calves – Figure 3) and rising two year olds (Figure 4) may be a reflection of inherent growth characteristics of different aged individuals and preferential feed allocation to weaners.

The seasonal liveweight of mature hinds was also monitored and the growth rate curve shows that they did not gain in weight until July/August (Figure 4). A very marked increase in growth rate was evident from mid-September, which peaked in October, perhaps related to foetus growth, and thereafter declined after calving.

Insufficient data were obtained on mature stags for comparable analyses.

The calving performance in relation to liveweight at mating (16 months) of yearling hinds in the Waikato is shown in Figure 5.

Yearling hinds at or below 65 kg at

Table 6

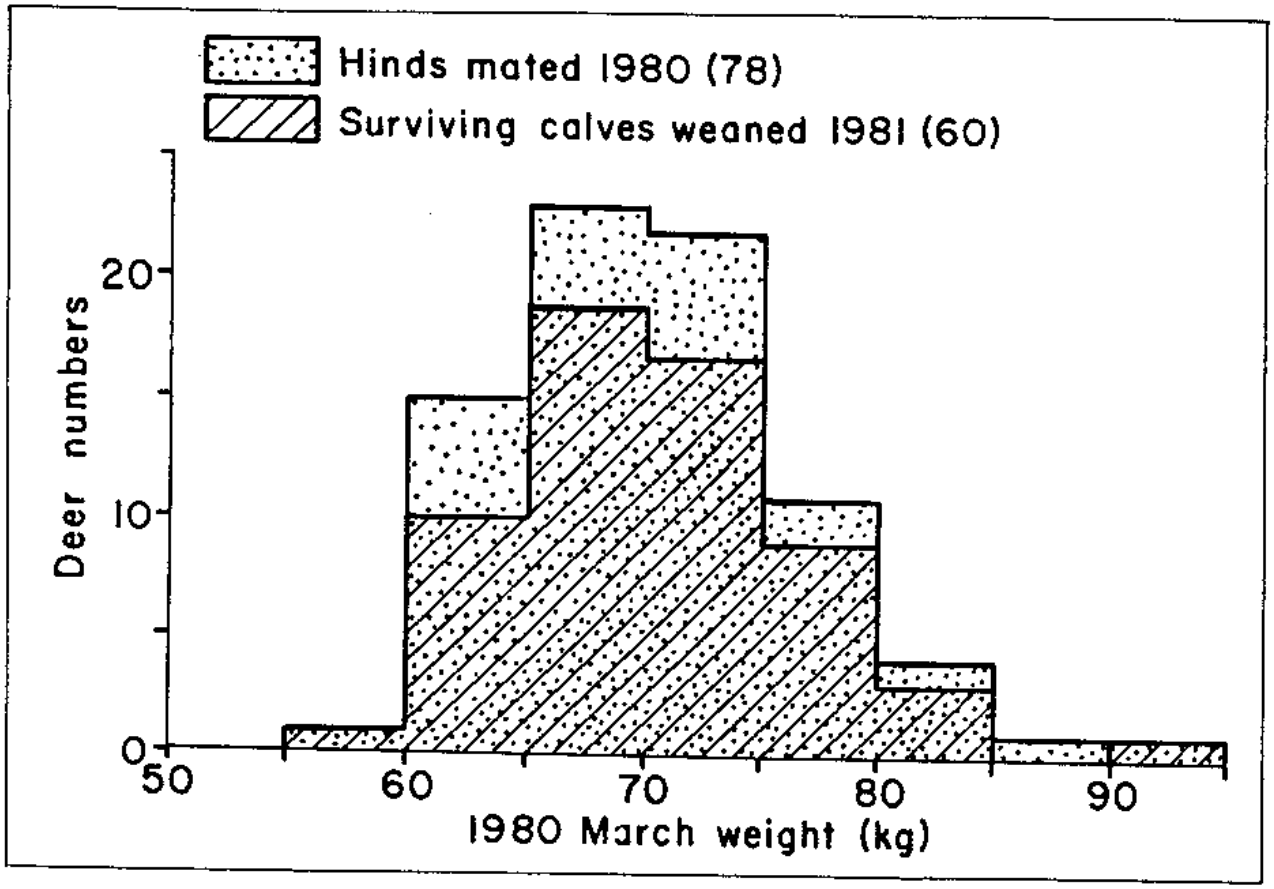
Pre-weaning growth rates and March weights for Red calves and Fallow fawns tagged at birth

	Red deer		Fallow deer	
	Growth (kg/week)	March weight (kg)	Growth (kg/week)	March weight (kg)
Males	2.6	34.7	1.3	20.1
Females	2.4	32.5	1.1	18.0

Table 7

Red deer calving performance (1980/81) relative to the proportion of first calvers in the population
(data for Waikato/Bay of Plenty/South Auckland combined)

% yearlings in hind group	Farms	Hinds	Minimum Calving %	Weaning %	Minimum mortality %
1) 0– 20%	56	2131	87.3	80.1	8.2
2) 21– 60%	25	813	88.9	82.9	6.8
3) 51–100%	16	275	88.4	77.8	**11.9**
TOTAL	97	3219	87.8	80.6	8.2



mating (14 per cent of those weighed) had a *weaning* rate of 69 per cent as compared to 79 per cent for yearling hinds above 65 kg. This does not take into account the actual calving rate, which would, undoubtedly be higher for both groups. The number of surviving calves produced by the lighter hinds was higher than expected as 65 kg liveweight has been previously estimated as approximating puberty weight in yearling hinds.

The effect of the proportion of first calvers (two year old hinds) in the population upon calving performance of Red deer was established using information from the questionnaire on reproductive performance (Table 7).

From that survey it appears that yearling hinds had a similar level of reproduction to that of mature hinds, with, perhaps, a slightly higher pre-weaning calf mortality.

Summary

Reproduction: (Red and Fallow deer)

- A wide spread of calf births for Red deer presented difficulties in stock movement and pasture allocation as well as poor performing late calves.
- Overall productivity of Fallow deer was low. This was a function of a poor fawning rate and high pre-weaning fawn mortality.
- A large proportion of Fallow fawn deaths were accidental and can be prevented by reducing fence mesh diameter.
- Handling and tagging of calves/fawns at birth provided useful data and was accomplished with little difficulty or mortality.

Growth: (Red deer)

- Although sex differences were observed for absolute weight for age, growth rate curves were similar for both sexes in the first and second years. But growth rates differed between rising one year old and rising two year old deer. This may have been due to characteristics of age groups and preferential feeding of weaners.
- For weaners, there were depressions in growth rate in June/July and December.
- In contrast, for rising two year olds, growth was largely suppressed between April and September.
- Seasonal liveweight of mature hinds was influenced by reproductive state.
- Calving performance of yearling hinds was better than expected, especially for individuals below 65 kg at first mating.

Acknowledgements

The authors wish to thank all those farmers who have willingly co-operated by returning questionnaires and allowing deer to be weighed at regular intervals. A special thanks to those farmers allowing calves and fawns to be tagged and weighed at birth.