Hind reproduction and growth data update: Richmond Wrightson Deer Performance Project

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The background to the Richmond-Wrightson Deer Performance Project (RWDPP) was summarised and some interim reproductive data was presented previously (Walker et al. 1999a,b).

This paper will highlight further data from the scanning of hinds within the project, and how this information relates to lactational growth and yearling growth rates One farmer's performance will then be summarised in detail to highlight the key points.

1. Hind Scanning Details

The principal technology used to characterise reproductive patterns was ultrasound scanning for pregnancy and foetal ageing using the technique of Revol and Wilson (1991) Numbers of hinds scanned are presented in Table 1

Table 1 **Number of hinds in project**

	1999	1998
Total Number of MA Hinds	2789	2845
No of MA Hinds Scanned	2194	2180
No of R2 Hinds Scanned	932	616

The number of mixed age (MA) hinds is the total from eleven properties. For the first two years of the project numbers have been static, although in the current year some properties are increasing numbers. The big increase in the number of rising two-year-old (R2) hinds is mainly related to a change in mating management of yearling hinds to that of using spikers for mating rather than individual sires. Selection for replacements occurs after pregnancies have been confirmed and aged

Data for the RWDPP farms and other farms in the district, included for comparison, are presented in Table 2.

Table 2 **Pregnancy rates of deer scanned by Vet Services (HB) Limited between 1995-1999, compared with those in the RWDPP in 1998 and 1999**

YEAR	MA HINDS		R2 HINDS	
	No. Scanned	% hinds not diagnosed pregnant	No. Scanned	% hinds not diagnosed pregnant
1995	3562	10 7	1430	26 0
1996	2711	6 86	1693	19 5
1997	2618	5.04	2191	16 7
1998	5954	17.65	2327	38 8
1999	6229	9.34	3309	26 26
RWDPP 1998	2180	7 75	616	18 8
RWDPP 1999	2194	2 7	932	17.81

There was a big difference between years for pregnancy rates in both MA and R2 hinds. It is worth noting that in 1998 there was a serious drought in the Hawke's Bay area

Within the RWDPP, the recommendations given for mating management of MA hinds is resulting in pregnancy rates ahead of the rest of the region and an improvement over the two years of data It is notable that the greatest difference was during the 1998 drought, suggesting that farmer skill, focus and motivation is particularly important in managing to achieve high performance in the face of adverse conditions This coincides with the need to prevent poor performance, in order to maintain financial viability, so makes good sense.

The R2 hind numbers mated has increased because of spiker mating, increasing herd size or maintaining flexibility for selling of unwanted R2 hinds

2. Pregnancy Profiles

The concept of pregnancy profiling and its application to characterising reproductive performance is described elsewhere (Campbell, 1998; Walker *et al.* 199b; Wilson *et al.* 2000) Hinds were categorised as conceiving early, mid, and late.

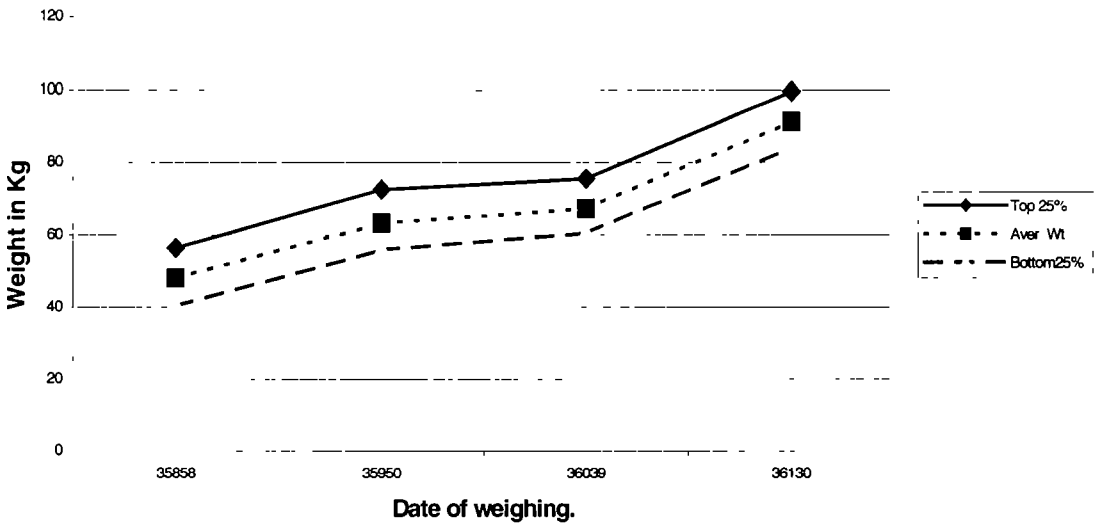
Table 3. Comparison of pregnancy profile for MA hinds for 1998 and 1999

	1999		1998	
	%	*No mated*	%	*No mated*
Hinds mated before 1st April (Early)	57 02	1194*	13 21	236
Hinds mated 2nd -20th April (Medium)	36 4	782	69 17	1236
% Hinds mated after 20th April (Late)	4 06	85	9 85	176
% Hinds not diagnosed pregnant	2 72	57	7.78	154

There was an improvement in the number of early mated hinds in 1999 compared with 1998. This has advanced the mean mating date from 10th April in 1998 to 30th March in 1999. Among the reasons for this are the adoptions of MA hind mating recommendations used in the project (Walker *et al.* 1999b), including decisions on weaning date. It is also encouraging to see a reduction in the number of hinds not diagnosed pregnant

This data is presented graphically in Figure 1 to provide visual illustration of the pattern

Figure 3. Growth Curve for Weaner Stags from weaning to 12mths.



Data in Table 4 shows pregnancy profiles for R2 hinds

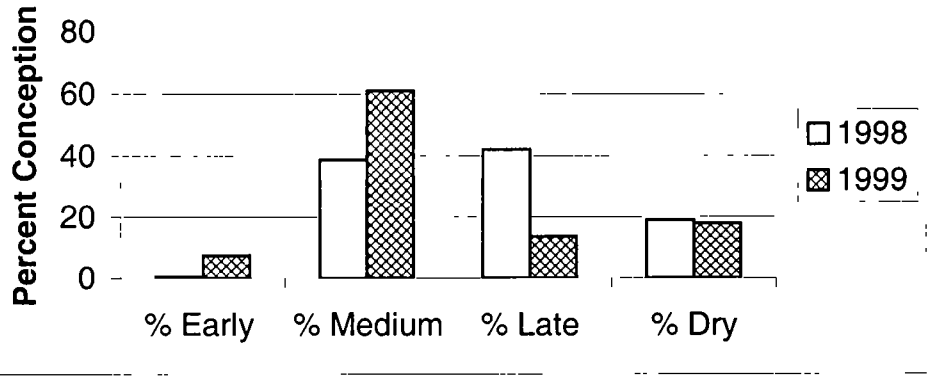
Table 4 Comparison of Conception Profile for R2 Hinds for 1998 and 1999

	1999		1998	
	%	*No mated*	%	*No mated*
Hinds mated before 1st April	7 4	69	0.32	2
Hinds mated 2nd –20th April	60 84	567	38 8	239
Hinds mated after 20th April	13.95	130	42 05	259
Hinds not diagnosed pregnant	17.81	166	18.83	116

There was a difference in the pregnancy profile of R2 hinds from 1998 to 1999 This represents a shift in mean mating date from 21st April in 1998 to 12th April in 1999. There has been a major change in mating management with nearly all properties using spikers to some degree for mating yearling hinds (Walker *et al.* 1999b) The liveweight of yearlings has also improved. It is notable that the percentage of R2 hinds conceiving is still low, and was similar in both years. Further investigation of the cause of failure to reach potential reproductive performance in this age group is warranted

This data is presented graphically in Figure 2 to provide visual illustration of the pattern.

Figure 2. Comparison of R2 Hind Scanning Profile for 1998 & 1999 (All herds combined)



3. Significance of Reproductive Data

One of the prime objectives of this project was to improve farm productivity and profitability.(Walker et al 1999a) Obviously market trends over the last 6 months in the deer industry have had a huge impact on profitability However, there are other indicators to ensure this does occur. The number of fawns weaned and weight of fawns weaned contribute to efficiency. Application of technology by the RWDPP farms has resulted in improvements as follows

- There has been a decrease in wastage from herds in terms of fewer dry hinds.
- This improved efficiency of the hind herd was at no extra capital cost financially The timing of critical management decisions and the implementation of them has been crucial eg mating date, timing of joining, selection of stag for mating The movement of the mean mating date forward is the key factor
- This improvement in productivity will impact on any deer farming system where there are breeding hinds regardless of whether the revenue stream is from selling weaners or finishing weaners bred on property.

4. Growth Profiles from Weaning

Liveweights have been taken from several farms for all hind or stag fawns born to MA and R2 hinds These have been grouped into the top and bottom 25% at weaning time, and their liveweights tracked through to 12 months of age to test whether there is compensation growth in lightweight weaners during this period. These liveweight trends have been monitored in 3 herds

The following data is from one farm, and is used to demonstrate the trend that has occurred over all the RWDPP farms

Table 5 **Mean liveweights (kg) and liveweight gain (LWG, g/d) of stag fawns from MA hinds born 1997. Data from one participating farm.**

	Mean live weight of fawns		Mean LWG	
Weigh Date	*top 25%*	*bottom 25%*	*top 25%*	*bottom 25%*
4 Mar	56 4	40.5		
4 Jun	72 5	55 9	175	167
1 Sept	75.5	60 5	35	51
29 Nov	99 6	84 0	270	264

The difference in average liveweight between the top and bottom group stayed approximately the same throughout the year – ie. between 15 0 and 16 5 kg.

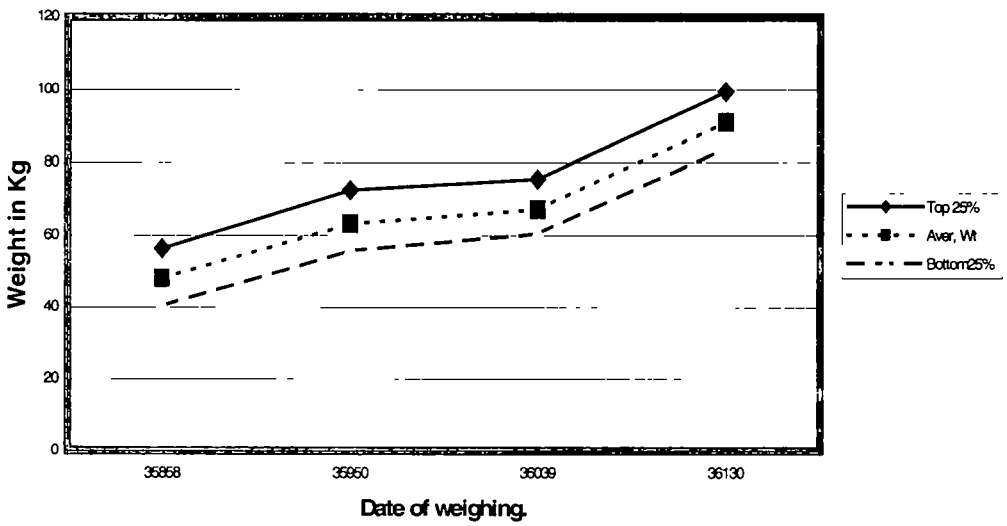
The top 25% of fawns at weaning were still in the top 37% at 12 months of age.

Conversely, the bottom 25% of fawns at weaning were still in the bottom 38% at 12 months of age. The liveweights have been tracked through to 21 months of age and the differences still occur.

It appears from this data that the liveweight ranking of an individual at one year of age is largely determined by the weight at weaning, and then seasonal influences on the growth rates

The mean growth curves for all weaner stags, and those of the top and bottom 25 percentiles, are presented in Figure 3

Figure 3. Growth Curve for Weaner Stags from weaning to 12mths.



5. Fawn Growth Profiles from Birth to 12 months

The following data describes the growth patterns of stag progeny during lactation through to 12 months of age, from MA and R2 hinds from all RWDPP herds.

Weaning dates have been standardised to allow appropriate comparisons.

Table 6 Average weight (kg) and growth rate (g/d) profiles for stag progeny from MA (above) and R2 hinds (below) from pooled data from the RWDPP farms. (Figures in brackets represent range in individual farm means).

		MA HINDS		
		1999	1998	1997
Mean bodyweight (kg)	Mid Lactn – 15 Jan	35.4	32.7	31.8
	Weaning	49.7 (45-54)	50.1 (46-54.5)	46 3
	1 June		61 1 (52-66)	57.7
	1 Sept		71.2 (64-78)	71 8
	1 Dec		92 9 (87-109)	95
Mean growth rates (g/d)	Early Lactn	458	494	454
	Late Lactn	318	344	246
	Birth to weaning	399	393	386
	Autumn		108	128
	Winter		111	138
	Spring		232	260

		R2 HINDS		
		1999	1998	1997
Mean Bodyweight (kg)	Mid Lactn – 15 Jan	28 8	26 7	23.0
	Weaning	43.1 (39-47)	42 5 (38-52)	37 8
	1 June		53 9(48-64)	53.5
	1 Sept		66 1 (57-71)	66 1
	1 Dec		88.7 (85-94)	88 3
Mean Growth Rates(g/d)	Early Lactn	461	526	451
	Late Lactn	341	377	331
	Birth to weaning	392	412	374
	Autumn		120	155
	Winter		136	140
	Spring		250	248

The greatest potential gains that can be made on fawn weaning weights are in the first part of lactation when the LWG is highest

Thus, if the mean calving date was advanced by 8 days, there would be about a 4.0 kg liveweight improvement at weaning

Also, a gain of 4 kg at weaning, could mean a gain of about 14 days in average killing time in the spring It is also of interest that the growth rate of fawns from R2 and MA hinds is similar· Thus the difference in liveweight of fawns from MA and R2 hinds at weaning is mainly a function of birth dates

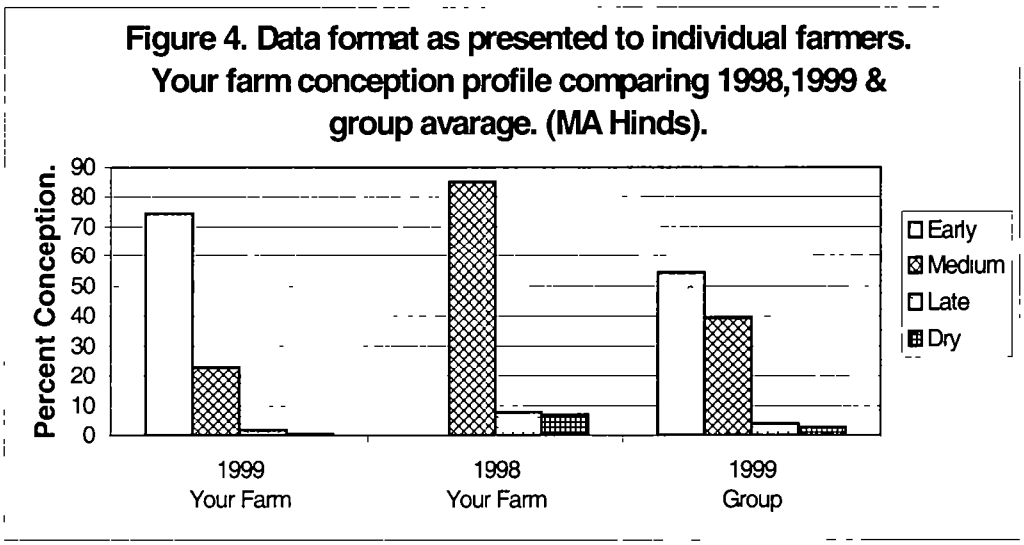
6. Production Data from Farm

The following is a summary of data from one farm in the project. This is included to demonstrate the gains that can be made by adoption of technology

Table 7 Pregnancy profile for herd with changed weaning date and actual weaning weights.

Weaning Date	Year		
	2000	1999	1998
	Mar 7	Mar 3	Mar 20
Stag Introduction	Mar 8	Mar 4	Mar 23
Weaning Weight (kg)	56 9	53 6	49.4
Mean Mating Date	Mar 24	Mar 30	April 12
Pregnancy Profile			
% Early	92 0	74 52	0
% Medium	7 5	22 93	85 04
% Late	0 6	1 91	7 87
% Dry	-	0.64	7 09

Figure 4 is a sample of one format in which data is provided for the individual RWDPP participating farmer In this case, data is that for the farm presented in Table 7, with the group average pattern (all RWDPP farms combined) for comparison



The farmer elected to wean earlier based on our recommendations, and data from the project The mean weaning date was advanced by 13 days It is estimated that the March 20 weight in 2000 would have been approximately 60 kg, about 11 kg higher than achieved in 1998, or an increase in value of more than $40/head

The preliminary scanning date for this year indicates that the mean mating date has advanced another 6 days

7. Conclusions

Progress in terms of hind pregnancy rates can be compared between years for participants in the RWDPP, and can also be compared to a larger number of deer farmers throughout the Hawke's Bay Region RWDPP farms were about 10 and 7% higher for MA hinds, and about 20 and 8% higher for R2 hinds in 1998 and 1999, respectively.

Pregnancy profiles have an important role in defining the mean mating date and the subsequent fawning date. This varies considerably between MA hinds and R2 hinds, and various management procedures have been introduced by participating farmers to influence these pregnancy profiles.

The fawning date is an important determinant of the weaning weight – the earlier the fawning, generally the better the weaning weight However, there are many other factors affecting weaning weight The better the weaning weight, the better the 12 month weight will be.

8. Acknowledgements.

All farmer members are acknowledged for their time and effort towards this project Also the sponsorship of FORST, AGMARDT, RICHMONDS, WRIGHTSONS, ALLFLEX, CYANAMID, AGVAX DEVELOPMENTS, NZDFA, NZGIB and members of Hawkes Bay branch of NZDFA.

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Trace elements