THE RELATIVE PERFORMANCE OF CANADIAN WAPITI AND THEIR HYBRIDS

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P.F. FENNESSY and A.J. PEARSE

MAFTech, Invermay Agricultural Centre
Mosgiel
New Zealand

INTRODUCTION

Since 1981, a number of wapiti (Cervus elaphus ssp, C.e.nelsoni, C.e.rooseveltii, C.e.manitobensis) have been imported from Canada. While "purebred" herds are being maintained, the males are also being used in the "upgrading" of New Zealand wapiti-type deer and in hybridisation with NZ red deer (mainly of C.e.scoticus origin). The NZ wapiti-type deer has its origin in the Fiordland National Park and is a hybrid of mixed background between C.e.nelsoni and red deer, and consequently the relative proportions of each species is unknown. The interest in the upgraded wapiti and the wapiti X red hybrids centres around their use in venison production systems (eg, as a terminal sire over red deer) and for velvet antler production. This paper presents some comparative data on weight for age and velvet antler production for Canadian wapiti and their hybrids with NZ red deer and wapiti-type deer.

COMPARATIVE LIVE WEIGHTS

Table 1 presents a summary of typical live weights for NZ red deer (NZR), Canadian wapiti (CW) and the CW X NZR hybrid at Invermay although the data for CW (C.e.manitobensis) are limited due to the small size of the herd (<20). The data have not been collected in experimental situations with all animals run together; rather the data represent a summary of the performance information available. The birth weights for the hybrid are about intermediate between the two parental strains, but at the 3m (weaning), 1.3y (yearling) and 2 year old stages, the hybrids are clearly superior to that expected for an intermediate animal. However by the time they are 3 to 4 years old, the female hybrids are at an intermediate weight but this is not the case with the males.

There are two possibilities to explain this apparent relative superiority of the hybrids particularly at the young ages, namely hybrid vigour and/or a relatively poor performance of the purebred CW. Also included in Table 1 are calculations of the expected live weights for the CW in the Invermay environment calculated from the weight of the red deer and CW X NZR hybrid assuming either no hybrid vigour or 10% hybrid vigour for live weight in the CW X NZR progeny.

TABLE 2 Typical velvet antler yields (kg; and days of growth) NZR, CW, X NZR hybrids, and CW at Invermay and the expected velvet antler weight for CW[1] assuming no hybrid vigour and the ratio of actual to expected velvet antler weight for CW

	Actual velvet antler weights			Expected velvet antler weight	Actual/expected velvet weight
	NZR	CW X NZR	CW	of CW[1]	of CW
2y	1.01 (55)	2.05 (64)	1.99 (68)	3.09	0.64
3y	1.60 (58)	2.63 (64)	2.50 (71)	3.66	0.68

[1] Expected velvet antler weight of CW = 2(CW X NZR) - NZR

As both 2 and 3 year olds, the CW X NZR hybrid actually outperforms the purebred CW. The antler data, therefore also provide support for the concept that the purebred CW have a relatively poor performance in the Invermay environment. However problems of underperformance may be more widespread. For example there is evidence, albeit based on very limited data, that the CW X New Zealand wapiti-type (NZW) hybrids at Orokonui, a Landcorp property, also outperform the purebred CW in terms of weight for age (M.T. Johnston and A.J. Pearse, unpublished data). In this respect, Table 3 presents live weight data for NZW and the CW X NZW hybrids at weaning (about 3 months) and yearling (1.3y) stages at Orokonui. Using the same method as in Table 1, the expected liveweights of CW in the absence of hybrid vigour were calculated. The expected weights are very similar to those derived from the Invermay data, with expected yearling weights for CW males and females of around 200 and 175 kg respectively.

TABLE 3 Mean live weights (kg) at weaning (c 3 months) and 1.3 years for New Zealand wapiti-type deer (NZW, C.e.nelsoni X C.e.scoticus interbred hybrid) and Canadian wapiti (CW, C.e.manitobensis) X NZW hybrids at Orokonui with the expected live weights1 for CW assuming no hybrid vigour in the CW X NZW progeny

Age	Actual live weights (kg) NZW	CW X NZW	Expected live weight of CW[1]
Males			
3m	71	82	93
1.3y	153	176	199
Females			
3m	60	74	88
1.3y	118	146	174

[1] Expected live weight of CW = 2(CW X NZW) - NZW

Table 1 Typical live weights (kg)[1] by age for New Zealand red deer (NZR, Cervus elaphus scoticus), Canadian wapiti (CW, C.e.manitobensis) X NZR hybrids and CW at Invermay with the expected live weights[2] for CW (assuming A- no hybrid vigour and B-10% hybrid vigour in CW X NZR progeny) and the ratio of actual to expected live weights for CW

	Actual live weights			Expected live weight of CW[2]		Actual/expected live weights ofCW	
Age	NZR	CW X NZR	CW	A	B	A	B
Males							
Birth	9.6	14.1	18.1	18.6	16.0	0.97	1.13
3m	48	74	73	100	86	0.73	0.85
1.3y	110	155	155	200	172	0.78	0.90
2.2y	150	210	210	270	232	0.78	0.91
3.2y	188	264	265	340	292	0.78	0.91
4.2y	210	(295)[3]	305	380	326	0.80	0.94
5.2y	220	(310)[3]	330	400	344	0.83	0.96
Females							
Birth	8.8	13.3	17.2	17.8	15.3	0.97	1.12
3m	43	71	70	99	85	0.71	0.82
1.3y	85	129	140	173	149	0.81	0.94
2.3y	96	158	180	220	189	0.82	0.95
3.2y	105	167	215	229	197	0.94	1.09
4.2y	110	170	240	230	198	1.04	1.21

[1] Moore 1982, 1983, 1984; Moore et al. 1988a, b; Moore and Littlejohn 1989; Pearse unpublished data.
[2] Expected live weight of CW:A = 2(CW X NZR) - NZR and B = 2(0.909(CW X NZR)) - NZR
[3] Actual live weights for (CW X NZR) males at 4.2 and 5.2 y are based on limited data.

Assuming an absence of hybrid vigour, it is apparent that only at birth do the male CW apparently attain their appropriate weight for age although the females are about their expected weights by 3 to 4 years of age. The calculations on the basis of 10% hybrid vigour in the progeny would suggest that the Canadian wapiti females exceed their expected live weights at birth, but then fall behind to catch up again by the time they are 3 years old. However, the males never reach their expected live weights except at birth. Overall, extrapolating from other species, some hybrid vigour could be expected so that the real situation would give an expected live weight somewhere between the two calculated extremes presented in Table 1. Data for velvet antler production are presented in Table 2.

The comparative live weight and velvet antler weight data strongly support the concept that the CW are performing poorly compared with their genetic potential in the Invermay environment. The poor performance may be at least in part due to health problems, including ryegrass staggers, copper deficiency, internal parasitism, an apparent mycotoxicosis of unknown origin and a generalised wasting syndrome probably of mixed etiology (Mackintosh et al. 1982, 1986; Orr and Mackintosh 1985; Pearse 1988; C.G. Mackintosh and P.F. Fennessy unpublished data). All of these problems are much more severe in CW than in either the CW X NZR hybrid or the NZR. Internal parasites are particularly difficult to control and it appears that adult CW may not develop immunity to the parasites at the level found in the NZR deer (C.G. Mackintosh pers.comm).

THE HYBRID

While the production of the CW X NZR hybrid is a specialist operation, principally due to the difference in size of the parental strains, there is considerable potential for the use of the hybrid, particularly as a sire over NZR hinds. In this respect Fennessy and Thompson (1989), using a computer model of food intake and growth in deer suggested that the use of such a hybrid system would be expected to increase efficiency of meat production by about 11% compared with a straight-bred NZR system. The use of a CW X NZR hybrid as a sire would also enable a greater proportion of rising yearling males to attain a carcass weight of 55 kg by September-October, the time of the year when there is a high demand for venison to meet export requirements.

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