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Growth, reproduction and fibre production of alpacas imported from Chile

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ABSTRACT

The importation of 100 alpacas from Chile in 1989 has enabled some preliminary observations to be made on the performance of these animals under farming conditions in Otago. After one year the adult female liveweights (70.8-72.8 kg) exceeded that of alpacas farmed in South America. Cria showed high growth rates (176 gm/day) to weaning at 5 months of age. Sixty two cria were born and their survival to 7 months of age was high (92%). Only 22% of females had cria following spring mating but a more successful autumn mating resulted in 61% pregnant. Adult females clipped 1.7 kg and males 2.8 kg of fibre. The fibre diameter from females averaged 28.8 microns and from males 30.6 microns. Nine month old cria clipped 1.7 kg of fibre with a mean diameter of 23.4 microns. These preliminary data indicate that alpacas are adapting well to this new environment, but as in South America, there are problems of low fertility.

Keywords Alpaca, growth, reproduction, fibre production, animal production.

INTRODUCTION

A research flock of one hundred 2-4 year old alpacas imported from Chile was established in September 1989 by MAF Technology in Otago. The aim of the programme is to evaluate alpacas as fibre producers in the South Island high country environment where climatic conditions are somewhat similar to those in the alpaca's native South American altiplano. This paper details the liveweight, reproductive and fibre data collected from the flock during the first 15 months after quarantine.

FLOCK MANAGEMENT

Seventy five imported alpacas (66 females and 9 males) were located at the Tara Hills High Country Research Station near Omarama and the other 25 (21 females and 4 males) at a private property near Lowburn. At each location the alpacas were run on an irrigated farmlet from which all other livestock were excluded. The males and females were kept apart except during mating in November and February/March.

The alpacas rotationally grazed the pastures which were predominantly perennial ryegrass and white clover. During winter a supplement of lucerne hay

(0.37 kg), crushed barley (0.12 kg) and a pelleted concentrate (0.12 kg) was also fed. At Tara Hills the perimeter fence was constructed to exclude possums, but otherwise the alpacas were confined by conventional sheep netting fences with an electrified wire on top. Sheepyards were modified by increasing the height to 1.3 m.

Liveweights were recorded monthly. All adults were shorn in October 1989 and again in October 1990. Fleeces were weighed and yield and fibre diameter measured. No useful comparisons could be made between fleeces grown in Chile and those in NZ because when the alpacas were imported the fleeces represented from 5 months to a year's growth and there were no details of the precise shearing date of individuals.

Mating was carried out in pens in November 1989 (spring mating) and in pens and paddocks in February/March 1990 (autumn mating). Full details of the mating system have been described by Pollard *et al.* (1991). Pregnant females were identified by ultrasonic scanning in July 1990.

RESULTS AND DISCUSSION

Only two deaths occurred in the imported animals. A female died at Tara Hills in October 1989 from a

chronic kidney disease and another died at Lowburn in October 1990 from lymphosarcoma. A few alpacas at both locations were affected by ryegrass staggers. The affected animals were removed from the pasture but the slow recovery took about four months. Ryegrass staggers has seldom been experienced in sheep or cattle at either property which may indicate that alpacas are more susceptible to this disease.

Liveweight

TABLE 1 Mean (\pm SEM) alpaca liveweights (kg)

	Pregnant	Non-pregnant	Male
Tara Hills			
Number	48	17	9
November 1989	66.7 \pm 1.3	61.6 \pm 1.7	59.3 \pm 2.5
November 1990	70.8 \pm 1.5	72.8 \pm 2.1	69.2 \pm 1.8
L.W. change	+4.1	+11.2	+9.9
Lowburn			
Number	13	7	4
December 1989	65.2 \pm 3.0	55.5 \pm 3.0	56.2 \pm 3.3
December 1990	72.3 \pm 3.7	72.7 \pm 5.2	67.5 \pm 3.9
L.W. change	+6.9	+17.2	+11.3

Liveweights of the adult alpacas are shown in Table 1. Females classified as non-pregnant failed to have a cria during the 1989/1990 year.

When the alpacas entered quarantine in Chile they were in poor condition because of a prolonged drought on the altiplano. Their liveweights were about 45 kg which is the average weight of alpacas farmed by peasant communities in Peru (Bryant *et al.*, 1989). Adult liveweights of alpacas farmed in South America are commonly in the range 55-65 kg (Franklin, 1982), but Table 1. shows that liveweights increased at both locations and by November/December 1990 the weight of all female groups exceeded 70 kg.

Liveweight data from the cria are shown in Table 2. In Chile the males and females had been run together continuously and this resulted in cria being born in NZ over an extended period from 19 September 1989 to 11 June 1990. The mean birth date of cria born at Tara Hills was 44 days earlier than those born at Lowburn. The cria at Tara Hills were heavier at birth

and also had higher growth rates to 16 weeks of age than cria at Lowburn. There was no difference between male and female cria for birth weight or subsequent liveweight gain at either location. The mean liveweights at four months of age (28.4 kg and 24.5 kg) were close to the 30-31 kg quoted as the average for nine month old cria in Peru (Calle-Escobar, 1984) which indicates a much higher level of nutrition at Tara Hills and Lowburn.

Thirteen replacement stock selected according to colour and age were retained at Tara Hills and their growth is shown in Table 3. These cria averaged 35.3 kg at weaning at five months of age. Growth rate to weaning was 176 gm/day but in the five months after weaning it slowed to 79 gm/day. In November at 10 months of age they averaged 47.8 kg. These weight gains together with those of the adults show that in this initial year at Tara Hills and Lowburn the alpacas are achieving much higher liveweights than is normal in South America.

Reproduction

TABLE 2 Mean (\pm SEM) liveweight and daily gain of cria from birth to 16 weeks (kg)

	Tara Hills	Lowburn
Number of cria	45	12
Birth date	1/2/90	17/3/90
Birthweight	8.4 \pm 0.1	7.7 \pm 0.3
Liveweight (16 wks)	28.4 \pm 0.6	24.5 \pm 1.5
Daily gain (birth-16 wks)	0.18 \pm 0.01	0.15 \pm 0.01

Overall 75% of the imported females were pregnant. At Tara Hills 48 of the 62 females (77%) were pregnant (4 which had cria in quarantine excluded) in September 1989 and at Lowburn 14 of the 21 females (67%) were pregnant. These pregnancy rates exceed the averages of 53 - 62% reported for alpacas in Peru (Bryant *et al.*, 1989).

Pregnancy rates following spring mating in November 1989 were low. Only 22% (5/23) of the non pregnant females mated in November were pregnant at scanning in July. Autumn mating in February/March 1990 was more successful with 61% (38/62) pregnant in July. In South America most alpacas give birth in the

TABLE 4 Mean (\pm SEM) liveweight, fleece weight, yield and fibre diameter of alpacas shorn in October 1990 (kg)

	N	Liveweight (kg)	Fleeceweight (kg)	Yield (%)	Diameter (micron)
Tara Hills					
Adult female	65	68.2 \pm 1.1.	1.75 \pm 0.06	78.29 \pm 0.21	28.8 \pm 0.2
Adult male	9	68.2 \pm 1.5	2.82 \pm 0.14	74.21 \pm 0.87	30.6 \pm 0.6
Cria	13	40.8 \pm 2.7	1.74 \pm 0.07	78.31 \pm 0.42	23.4 \pm 0.4
Lowburn					
Adult female	21	66.4 \pm 2.5	1.69 \pm 0.10	80.08 \pm 0.39	28.9 \pm 0.4
Adult male	4	68.2 \pm 2.9	2.80 \pm 0.16	78.26 \pm 0.48	30.5 \pm 0.8

rainy season from December to March but according to Calle-Escobar (1984) when the sexes have been kept separate they demonstrate sexual activity throughout the year. If there is a seasonal component to alpaca reproduction it may be more pronounced at Tara Hills and Lowburn as they are located at approximately latitude 45° south.

The first-born female cria weighed 43 kg when it was mated once on 5 March 1990 at 167 days of age, and it was pregnant when scanned in July. Alpacas are normally first mated at 2 years of age but may be mated at 12-14 months if they weigh over 40 kg (Calle-Escobar, 1984). (She subsequently gave birth to a healthy cria on 30 January 1991 when aged 1 year and 19 weeks. Her weight 2 weeks before parturition was 90 kg.)

Forty five cria (94%) at Tara Hills survived to seven months of age and 12 (86%) at Lowburn. Two cria were stillborn, two small cria (2.8 kg and 4.0 kg) never suckled and the fifth cria was found dead in the paddock at one month of age. Cria survival in alpacas farmed in Peru averages 82 - 88% (Bryant *et al.*, 1989).

In the altiplano almost all cria are born in daylight, usually in the morning, and seldom in bad weather (Reiner & Bryant, 1983). On the Peruvian altiplano Sumar (1983) observed that no births occurred between 7 pm and 4 am, and 93.5% were between 7 am and 1 pm. At Tara Hills 67% of births occurred between 7 am and 1 pm. The remainder were in the afternoon before 5 pm. The two females which had cria on the one day when there was heavy rain gave birth at 2.30 pm and 4.30 pm respectively, after the rain had ceased.

TABLE 3 Mean (\pm SEM) preweaning and postweaning growth of replacement stock (kg)

Number of cria	13
Birthweight (January)	8.7 \pm 0.3
Weaning weight (June)	35.3 \pm 2.1
Age at weaning (days)	152
Preweaning gain (kg/day)	0.176 \pm 0.005
Liveweight (November)	47.8 \pm 3.2
Postweaning period (days)	159
Postweaning gain (kg/day)	0.079 \pm 0.011

Fibre Production

Fibre production and characteristics are shown in Table 4. The only significant difference between locations was for yield which was 1.79 percentage units higher for adult females at Lowburn ($P < 0.01$) and 4.05 percentage units higher for adult males at Lowburn ($P < 0.01$). At both locations adult males clipped heavier fleeces than adult females ($P < 0.01$) but had lower yields ($P < 0.01$). Males at both locations had courser fleeces than females but the difference was only significant at Tara Hills ($P < 0.01$).

The fleece weights of the adults are similar to the South American averages of 1.72 kg for females and 2.58 kg for males (Calle-Escobar, 1984). The adult fleeces were 1.3-3.1 microns courser than alpacas of comparable age in South America (Bustinza, 1979).

The range of adult fleece weights (female: 0.91-3.02 kg; male: 2.33-3.72 kg) and fibre diameters (female:

20.3-36.6 microns; male: 24.4-34.8 microns) indicate that there is considerable scope for selection for fibre production within the herd.

The mean cria fleece weight (1.74 kg) was considerably higher than the 1.15 kg cited by Bustinza (1979) for cria of the same age (9 months). The fibre diameter of the cria fleeces was 6.0 microns coarser than that reported by Bustinza (1979), but 2.5 microns coarser than the value cited by Calle-Escobar (1984). The higher fleece weights and coarser fibre diameters from the cria at Tara Hills are consistent with the effects of higher nutrition demonstrated in Peru, where it was shown that cria fed on lucerne produced an extra 0.79 kg of fleece and the diameter increased by 6.8 microns (A.J. Marshall *pers. comm.*)

The production from alpacas at both locations during this initial year indicates that they are adapting well to new management systems in a new environment, but fertility levels remain low.

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