

Changes in body weight and condition of female llamas and alpacas throughout the year

Summary

The yearly time course of body weight and body condition was evaluated in female llamas and alpacas. One hundred and twenty lactating females, 60 llamas, and 60 alpacas maintained grazing natural pastures were assessed monthly for body weight and body condition. Body weight was registered using a scale to the nearest 1 kg. Body condition was evaluated behind the shoulder, and dorsal protrusion of the thoracic vertebrae was detected. Body weight was analyzed using analysis of variance and body condition using the Chi-square test. Body weight, kg, was different ($P \leq 0.05$) by species and breeds, 97.6 and 56.2 for llama and alpaca, respectively. Chaku llamas, 94.3; Kcara llamas, 100.9, Huacaya alpacas 56.3, and Suri alpacas 55.9 kg. Body condition varied significantly ($P \leq 0.05$) between llamas and alpacas. Twelve percent of animals presented good body condition compared to 46% of regular and 42% with poor body condition. More llamas and alpacas were in good body condition, and 82 animals, during the rainy season, December, were also pregnant, more than 15 females with poor body condition and nonpregnant during the same period. Body weight and body condition improved during the rainy than the dry season.

Keywords: Body weight, body condition, year, llama, alpaca

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Introduction

Most llamas and alpacas are maintained grazing natural pastures from the Peruvian highlands with a clear separation of plenty of green grass during the rainy season and dried grass during the dry season. The rainy season lasts four months, from December through March; the dry season lasts eight months, from April through November. This pasture availability defines an increase and decrease in body weight. For llamas, a body weight of 100 kg was reported during the summer months and 50 to 60 kilograms of the alpaca during the same period.¹ One way to assess the health of animals is by measuring and registering body weight.² This encompasses the use of a scale and people to handle animals.

On the other hand, assessing body condition is also a valuable technique. It determines the filling on the sides of the vertebral spinous process at the shoulder or lumbar areas. In this sense, a scale of 1 to 5 has been used in alpacas.³ This method does not need a scale but requires the operator's training. The use of body weight has been reported on specific periods, parturition of llamas,⁴ growing llamas,^{5,6} at the time of shearing alpacas,⁷ weaning,⁸ but not on females, which constitute a significant population of animals in any given herd. Besides, females are subjected to parturition and breeding during the summer and lactation during the summer and dry seasons.

This study aimed to evaluate the body weight and body condition of adult female llamas and alpacas throughout the year on animals maintained on natural pastures.

Materials and methods

This study was conducted at the La Raya research center at 15 °S latitude, 70 °W longitude, and 4200 m sea level. One hundred and twenty adult lactating females were separated randomly from the herd of females. Sixty female llamas, of which 30 were Chaku breed, and

30 were Kcara breed. In addition, 60 female alpacas, from which 30 were Huacaya breed and 30 were Suri breed. At the time of initiation of the study, all of them were late pregnant or had offspring by their side. They were maintained on native pastures from the Peruvian highlands.

Procedure: At the end of each month, starting in February and through January of the following year, all females were weighed using a scale to the nearest 1 kg. In addition, body condition was assessed behind the shoulder, considering 1, skinny to 5, and obese classification.³ For practical aspects, three body conditions were considered: 1, thin; 3, regular; and 4, good. The pregnancy of alpacas was determined by ballottement at the time of shearing in October.

Body weight was analyzed using the repeated measures model of the analysis of variance, and body condition was analyzed using the Chi-square test. All the statistical analysis procedures were done using the number-crunching statistical software NCSS (Layton, UT, USA). A P value of 0.05 was considered significant.

Results

Body weight: Llama weight differed from alpaca ($P \leq 0.05$), (Figure 1). Kcara llamas weighed more than Chaku llamas. There was no difference (Figure 2) between Huacaya and Suri alpacas ($P \geq 0.05$). The changes in body weight concerning pregnancy (Figure 3) in llamas and alpacas were also different during the last months of pregnancy ($P \leq 0.05$).

Body condition: There were more llamas in good and regular condition than alpacas in the same condition ($P \leq 0.05$). Conversely, there were more alpacas in poor condition than llamas (Figure 4). The three body conditions were present in pregnant and open females. Half of the females in every body condition were pregnant (Figure 5). The variation of body condition in the four breeds of llamas and alpacas is presented in Figure 6.

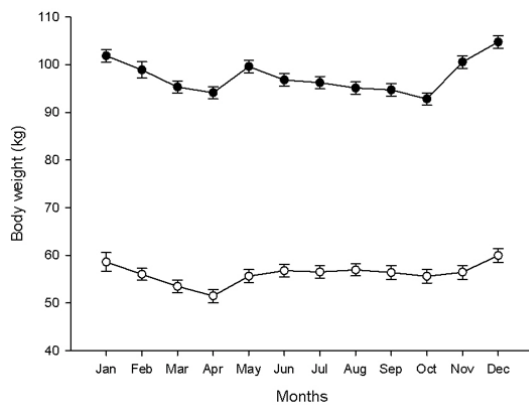


Figure 1 Mean and standard error of the mean on body weight between llama (closed circles) and alpaca (open circles) females throughout the year and maintained grazing on natural pastures in the Peruvian highlands.

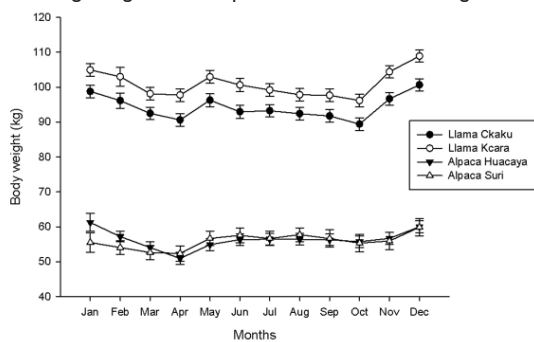


Figure 2 Mean and standard error of the mean for the body weight of two llamas (Chaku and Kcara) and two alpaca breeds, Huacaya and Suri females, throughout the year on animals maintained grazing natural pastures on the Peruvian highlands.

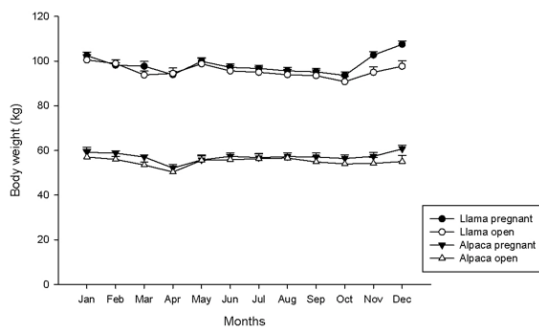


Figure 3 Changes in body weight of female llamas and alpacas during the year between pregnant and open animals.

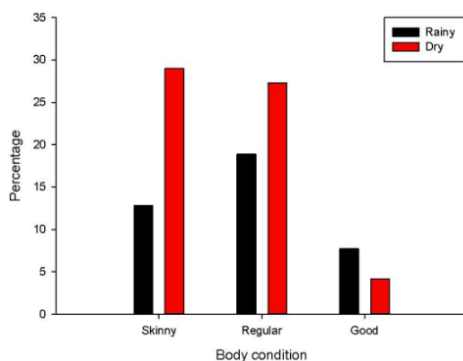


Figure 4 The percentage of female llamas and alpacas are skinny, regular, and in good body condition according to the year's season.

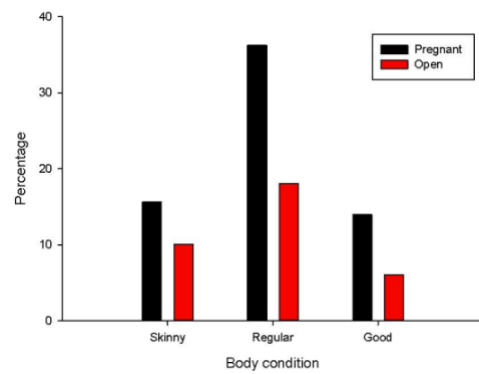


Figure 5 Body condition of pregnant and open female llamas and alpacas-maintained grazing in natural pastures on the Peruvian highlands.

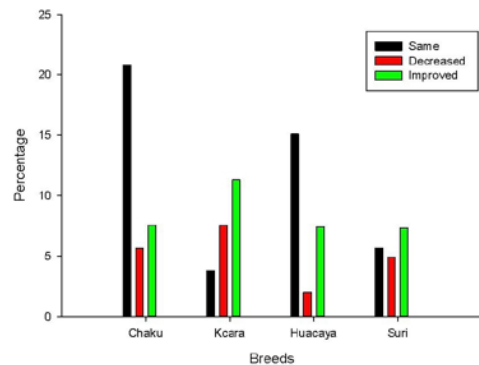


Figure 6 Changes in body condition on the same animals from the beginning to the end of the 12 months of evaluation.

Discussion

The change in body weight and condition was assessed regularly and throughout the year on an essential group of llamas and alpacas, females. Llamas were definitively heavier than alpacas, and even though there were minor differences between Kcara and Chaku llamas, the same feature is observed in Huacaya and Suri alpacas. Although the size of llamas appears to be the same and Chaku llamas appear bulky due to the presence of fiber, it was not enough to make a difference in body weight. In this aspect, Kcara llamas are used for meat production, and Chaku llamas are used for fiber and meat production. On the alpaca side, Huacaya alpacas appear to be bigger than Suri alpacas due to fiber disposition perpendicular to the body side in Huacaya alpaca, and Suri alpacas seem to be skinny because of their fiber disposition parallel to the body side. Thus, fiber disposition plays a minor role in body weight.

The effect of the season on body weight was also noticeable. Llamas and alpacas gained body weight during the rainy season and lost weight during the dry season. There is plenty of succulent green grass during the spring and summer rather than dried grass during the dry season. A similar trend was also observed in alpacas,⁹ and the alpaca registered during the present study was like those reported by Quispe et al.¹⁰ A similar trend of loss and gain in body weight has been reported in sheep^{11,12} and beef cows.¹³ It is difficult to contrast the results of the present study with others in llamas and alpacas. Reports on body weight are only considered at specific times of the year. For instance, alpacas were weighed in May and June,¹⁴ and llamas in April¹⁵ and November through March;¹⁶ however, results from this study are comparable with previous results, and this is valid for those specific times. The current study was done throughout the year and on adult lactating females.

The effect of pregnancy on body weight was more significant by the end of the 11 months, specifically during the last two months of pregnancy. Llamas and alpacas gained more weight than open females. The late increase in body weight could be attributed to the accelerated growth of the fetus inside the uterus of the pregnant female.^{17, 18} In addition, pregnant sheep gained more weight than open sheep,¹⁹ and sheep during the lambing season weighed more than at other times.²⁰ In addition, the body weight of domesticated female South American camelids is subjected to parturition, lactation, breeding, and a newly established pregnancy in the summer months, and this study considered only the state of pregnancy. The impact of the reproductive stages remains to be elucidated.

The year's season has also affected the body condition of female llamas and alpacas. Even though there were more females with good and regular conditions than females in poor conditions, a significant group of females was in poor condition. Altogether, 42% of females were in poor condition, and alpacas suffered the most. This reflected the availability and quality of pastures. During the dry season, female alpacas grazed areas of the research center with fewer pastures and naturally dried. In addition, they were at more altitudes as mandated by the management established over the years. Pregnancy, especially during the last two months, affects the body's condition. More females of good and regular body condition were pregnant, suggesting a positive relationship. A similar trend was observed in pregnant and non-pregnant Merino ewes²⁰ and beef cows.¹³ This is remarkable considering the length of time that llamas and alpacas are pregnant, i.e., 11.5 months. Animal species living together on the same herd, sheep, have a pregnancy length of 5 months, which is entirely different from llamas and alpacas. At the first months of lactation, females may be already pregnant to secure a cria every year; they were lactating for 6-7 months, have a skin coat of fiber, and must maintain themselves.

A detailed determination of body condition resulted in three categories: Females maintaining their shape, females losing body condition, and females gaining body condition throughout the year. This monthly assessment is practical and constitutes a valuable tool for the animal owners, people caring for the animals, and managers of the whole herd. There is a significant group of females who are losing weight and pregnant. This group should be considered to have a better pasture and, if pregnant, avoid losing the fetus.

Conclusion

Body weight and condition varied between llamas and alpacas, and pregnancy affected both characteristics in the last two months. Most llamas and alpacas are in excellent or regular body condition, and a significant percentage of alpacas (40%) are in poor condition.

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Conflicts of interest

The authors do not have any conflict of interest.

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