

Successful Alpaca Breeding in the Unites States and Peru
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Although there are many differences between breeding alpacas in the United States and Peru there are also many similarities and farmers in both locations can certainly learn from each other. This paper describes the breeding of alpacas in Peru and illustrates the common goals and methods which can contribute to success in both locations.



Background

Nunoa district is in the southern Peruvian highlands, approximately 2 hours north of the border with Bolivia. 7,000 people live in the countryside on farms. Nunoa is known as the Suri capital of the world and that is included on their district flag. A large Suri statue is present at the entrance to town in addition to smaller Huacaya statues. However, the general breakdown of alpacas in the area is 15% Suris and 85% Huacayas similar to the US population. The local economy is based on farming, in particular farming of alpacas. Alpaca wool is the main crop in the area with a lower percentage of animals used for meat. The same applies for llamas and sheep there. Most of the alpaca farming occurs in a community structure with members sharing in both animal and crop work. Most communities have a communal herd with individual farmers owning some of their own animals. The daily temperature range is 25 to 65°F each day year round, with lower temperatures and higher winds in May - October during the *dry season*. Birthing and breeding season is November - April during *rainy season*. This takes advantage of the best pasture for late pregnancy, lactation, and early cria growth. All animals are kept on pasture only with no hay or grain feeding and no barn housing. It occasionally snows but there is rarely any significant accumulation. Large snow storms are devastating to people and animals because the pastures are covered and there is therefore no food for the livestock. The roofs of most farmers' houses are grass and heavy snow accumulations result in cave-ins or water leakage as the snow melts. Streams and springs are the water sources in the pastures. Animals are usually corralled at night except during birthing season for protection from predators (pumas/ Andean fox/ dogs). Dogs live with the alpacas to offer protection

from predators as well. Coral containment also allows farmers to collect manure for use as cooking fuel and fertilizer for plant crops.

All species cohabitate on the farm, with alpacas, llamas, sheep, Brown Swiss cattle, horses, and donkeys living in the same areas. In the rainy season animals are kept in the higher pastures for breeding and birthing, and in dry season in the lower pastures (if available) after the breeding season is over and stream levels have receded. Pasture is generally plentiful in communities but individual farmers may have not have this option. The area in general suffers from not enough available fencing to properly subdivide animals and thus control breeding properly. Animals are shorn with hand clippers usually between October and December. Wool prices vary from year to year with current prices approximately \$3 to \$5 per pound for raw clip. Currently in Nunoa they do not separate the blanket from leg and neck fleece at shearing time. Farmers hope to get 5 to 6 lbs. of wool per year from good animals. The meat price at the town slaughterhouse is approximately \$40 per adult animal. Relatively few animals are used for meet as this takes them out of wool production. The choice is usually made to keep all animals in wool production unless they have some severe health issue in which case they are sold for meat. Not much camelid meat is consumed locally. At the current time a relatively small quantity of alpaca, llama, and sheep meat is transported to nearby cities for public consumption. Hides and internal organs are also used. Field crops if planted are potatoes and quinoa only as nothing else will grow in the climate there at the 13,000 ft. plus elevation.

Alpaca Breeding Plan for One Well Managed Farm in Nunoa Peru

This particular farm has adequate fencing and financial support from outside of the area. All animals are pasture bred for 3 months during the rainy season, November/December through February/March. Female to male breeding ratios are 1 male to 35 to 40 females and males are rested for 7 to 14 days after 4 to 7 days of work. Other males are then turned out with females and thereafter are separated for a comparable period of time. Females are first bred at 2 years of age if they have good fleece and body condition. Superior males are started into breeding at 3 years of age. Females have three seasons to get pregnant and deliver a cria. If this does not happen they are removed from the breeding program for use in wool or meat production. If females do not get pregnant in three years and have inferior fleece they are sold at the slaughterhouse.



Male and female production records are maintained and all animals have ear tags so that individual animal production can be evaluated each year. Herdsmen track pregnancy success of males by observing behavior of females during the breeding season. There is no specific behavior testing plan since animals are pasture bred.

Males or females which produce crias with congenital defects are immediately removed from future breeding. Birthing rates of 80 to 90% are possible, much higher than the 30 to 50% birthing rate reported on most farms in the area. Careful selection of males and continued monitoring of birthing success is critical to this high success rate.

Breeding males are selected on the basis of superior fiber and conformation. The best are started into breeding at 3 years of age. The herd is evaluated each year and replacement breeding males and females are selected from within. New genetics are introduced by purchasing superior animals from other top farms in the area. Outside money allows for purchase of new quality animals. This farm has approximately 1,000 alpacas and llamas and only 25 people care for and are supported by the herds. There are some Brown Swiss cows for meat production and also llamas and sheep for meat and wool production. There are no plant crops due to the high elevation of the land.

Alpaca Breeding Plan for Most Nunoa Peru Area Farms

The typical farming community has approximately 100-120 members which tend the animals and plant crops and depend on them for their livelihood. Poor fleece quality and quantity is seen in many of the animals contrary to what might be expected. Use of poor quality and low numbers of males for breeding results in low birthing rates and poor wool production. Production of females is also not evaluated as farmers do not have ear identification tags or breeding and birthing records. Some animals are not able to be shorn every year because of short fleece length. Inbreeding and poor breeding management are resulting in severe economic hardship in these communities. There is no money to purchase outside males or females to improve production. This is commonplace in the region. Very few farms can implement the management plan or have the cash flow necessary for reproductive success. On many farms male and female Huacayas and Suris are pastured together along with llamas. The lack of money for fencing results in mixing of the species despite the best efforts of the herders who live with the animals. This results in production of cross bred animals with poor quality wool. There are very few animals with ear tags and few or no animal production records are being used. Males and females are frequently pastured together year round. Farmers divide their time between plant crops and animal production. Most plowing and planting is done by hand without the use of animal power.

People want to improve their herds but frequently cannot get it accomplished. The farmers' lives in Nunoa are very difficult with harsh living conditions, poor food, marginal shelter, and inadequate medicine and medical care for treatment of family illnesses. The lack of money and education are detriments to alpaca herd improvement for many Nunoa farmers. Despite these hardships the people are friendly and happy being farmers. They are very much connected to the land and to their animals. I have never seen a Peruvian farmer treat any animal with anything but respect. They appreciate very much farmers and animal professionals from other countries and are very willing to share their expertise after mutual trust is established.

Nunoa Project Alpaca Breeding Improvement Program

In order to help local farmers to increase cria, wool, and meat production, initially three Nunoa communities were each loaned two new superior males purchased by the Nunoa Project to start improving their herds in January 2012. There are approximately 145,000 alpacas in Nunoa district. This project with 300 alpacas was started as pilot project to show farmers what is possible with careful attention to breeding management. The three communities receiving animals were selected by the mayor on a need basis. All three of the communities were very limited financially and their herds needed significant improvement. Offspring produced from controlled breedings were to be used as future breeding stock for the communities. One male was selected to be kept with 20 to 25 females in a separate breeding group during the period January to March 2012. Male selection criteria included: age \geq 3 years; excellent wool quality and quantity; excellent conformation- legs, teeth, balance, size; lack of evidence of infectious disease; normal testicular size, number,

location, and palpation; and normal semen evaluation if available. \$1,000 was paid for each male from funds donated by US alpaca farmers and veterinarians. As expected there were problems in implementing the breeding plans in these communities. The lack of fencing for separation of the project animals was the biggest problem noted. Some animals also were not given identification tags as was planned. This was not for lack of effort on anyone's part. Farming and life in general is very difficult in the Peruvian altiplano. One farm was able to achieve a 94% pregnancy rate when using a controlled breeding program, verified by Nunoa Project workers using ultrasound in July of 2012. The reported birthing rate for the entire community's 300 alpacas was only 30% the previous year.



Nunoa Project Breeding Plan for 2013 and Beyond

After the July 2012 findings were discussed with the municipality it was decided that more support from municipality workers was critical to improving the success of the breeding project. It was also decided that individual farmers rather than whole communities would be selected for future projects to minimize the number of people involved in carrying out the necessary steps. In January of 2013 an additional 10 males were selected, purchased, and ear tagged by a Nunoa Project veterinary team. All farmers participating in the project were supplied with ear tags which were put in place by a team of Nunoa Project workers and the farmers. One Nunoa Project male was to be allowed access to a maximum of 25 females during the breeding season extending from January through April. Females were not to be exposed to any other males during the breeding season. Crias produced from the project breedings will be tagged yearly at weaning time (4 to 6 months of age) starting in 2014. They will be evaluated for use as breeding animals (females at 2; males at 3). Females which have not produced a cria after two breeding seasons will be removed from the select herd and replaced by other qualified females. This select herd and its offspring will be used to increase wool quality and quantity and thus farmer income. This allows them to purchase more food, plant more crops, and have more meat animals for sale, leading to a better quality of life for the farm families.

Two American and two Peruvian students sponsored by Nunoa Project worked with the farmers and municipality workers in Nunoa from January through April 2013 and are working there now. The municipality formed an alpaca herd improvement team of its own to aid local farmers in 2013. The focus of the work was to help farmers with improving cria production and demonstrate the benefits of improving genetics and herd management. Nunoa Project conducts seminars for all area farmers during each semiannual visit to Nunoa. The students also collect data on cria mortality and identification of the infectious agents involved in pneumonia and enteritis cases, birthing rates, cria weight gains, gastrointestinal parasitism, semen analysis in actively breeding males, and male and female herd reproductive behavior. The Nunoa Project males are collected at the end of the breeding season. In July of 2013 a Nunoa Project veterinary team pregnancy tested all project females using ultrasound to evaluate the success of the breeding project with each individual farmer and offer

suggestions for improvement. The average pregnancy rate was 80% with some farms at the 90% level. The cooperation of the farmers and ability to keep a small, elite breeding herd is being evaluated. Males were assigned for the 2014 breeding season, along with implementing necessary procedural changes. A Peruvian veterinarian with extensive field experience working with farmers was hired by Nunoa Project to assist the students, farmers, and local agricultural workers.

Findings for Nunoa Project Work in 2013

Results are continually evaluated to determine what can be improved. It was noted that a few farmers were not able to separate the elite herds from rest of the alpaca and llama population. This was a fencing issue which may be avoided if there is enough physical separation between groups during the breeding season. Thus non program males and/or females sometimes mixed with the program herds. If outside males breed the program females then obviously the crias produced would not have the quality to be used to improve the herd. If outside females were bred by program males and they were not identified with ear tags there would be no way to track production as in the past, and the potential for overuse of the males leading to low pregnancy rates would exist. It was noted that when two males were kept together and put in a small corral to breed, they sometimes concentrated more on fighting than on breeding. Males sometimes breed the same receptive female repeatedly in one day when confined in a corral. Semen evaluations performed over two days (six breedings) with one male in use with program females revealed no sperm in any post breeding vaginal samples collected from the females. If he had continued to breed females even when his sperm reserves were exhausted most would ovulate. When there were no more receptive females he would hopefully get the sexual rest needed to replenish his sperm for new breedings. This was successful over the three month breeding season but those particular breedings were obviously not useful to achieve pregnancies. Four days of sexual rest corrected the short term problem with this particular male as his sperm production resumed. One male with continual low fertility alone with a female group could be ineffective at achieving pregnancies if it was not discovered by semen evaluations or careful attention to pregnancy/rebreeding status. What farmers in Peru could observe without semen evaluations is that the male would continually be breeding females throughout the entire season since no females would become pregnant. Some males were observed to be more aggressive towards breeding females when moved to a small corral than they were on pasture. Breeding was observed to occur after dark in addition to during the day in some situations.

Keys to Improving Reproductive Management in Nunoa Peru

Use of identification tags and evaluation of production records is critical to improving reproductive success and is not currently practiced on most area farms. Hopefully financial support from the municipality and continued education and fencing improvements will correct this. It is expected that when farmers see the increased birthing rates and increased cria quality they will be convinced to do what they can to make improvements. Low fertility animals need to be identified and to be confined to fiber herds or sold for meat, and they should not be used for breeding. The current philosophy which cannot be argued with given the financial constraints of most farmers is that even poor wool is better than no wool at all. The female:male breeding ratio should be decreased to 30:1 maximum to increase pregnancy rates. Performance of semen evaluations would make sure males are effective at breeding and this may be feasible in the area as the technique is not difficult to perform. Improved reproduction management will result in increased cria production and will allow for more low producing animals to be sold for meat. Better wool and more meat means more income for farm families, better food, medicine for the sick, and more money for seeds for crops.



Keys to Improving Reproductive Management Anywhere

These simple rules are applicable to alpaca farming anywhere. I have been privileged to work with alpaca farmers in both Peru and North America and have identified some common best practices.

- Alpacas demonstrate high fertility if properly managed.
- Animal identification and evaluation of production records are critical to alpaca breeding success.
- Superior males and females should be used to improve the herd production
- New males and females should be introduced based on fertility and cria production results.
- Low fertility males and females should not be bred; they lower herd production and may pass on this bad characteristic to offspring.
- If animals are not getting pregnant or growing their crias properly they should be removed from the breeding herd.
- Medical intervention to assist animals to become or stay pregnant is contrary to building a strong production herd.
- Males and females with low disease resistance should not be used as breeding animals.
- Overcrowding leads to increased disease, increased mortality, and low production in a herd.





Comparison between Alpaca Farming in North America and Nunoa Peru:

Alpaca Health Issues	North America	Nunoa Peru
Shelter	Barns, run in sheds, covered areas	No shelter- pasture only
Weather	Variable heat, humidity, and winter cold depending on location	Similar year round- 25 to 60 °F. Dry season April to October; Rainy season November to March; animals are not kept where there are prolonged periods of snow or cold weather
Elevation of farms	Sea level to <4,000 ft. primarily	All at 13,000 feet plus
Feed	Hay, pasture, grain, vitamin-mineral supplements	Pasture only
Feed adequacy	Problems due to overcrowding	Usually adequate pasture
Vitamin-mineral deficiency or excess	Occasionally	Not identified to date
Water	Usually water tubs or buckets	Streams and rivers, small ponds
Gastrointestinal parasites	Tapeworms, strongyles including barber pole worm (<i>Haemonchus contortus</i>), <i>Nematodirus</i> , whipworms, liver flukes in some locations	Similar species to US, although no problems with barber pole worm (<i>Haemonchus contortus</i>) to date
Clinical disease from GI parasites	Yes if overcrowded	Not usually except for liver flukes in wet areas and <i>Eimeria macusaniensis</i> in young crias complicating enterotoxemia
Drug resistant GI parasites	Yes	Not documented yet since drugs are not often used

Parasitic skin disease (mange)	Primarily Chorioptic mange	Sarcoptic mange
Mange resistant to treatment with ivermectin	Yes	Yes
Farmer income	High	Very low
Animal records	Yes	Usually not
Breeding stock selection criteria	Fiber, color, fertility	Very little selection occurring
Breeding plan in use	Primarily hand breeding	Pasture breeding
Female/male breeding ratios	20:1 max per year	35 to 100:1
Pregnancy rates	90% often	30% to 50% usually; 80% easily achieved
New genetics introduced	Often	Rarely

If you would like to help support this important project working directly with alpaca farmers in Peru, please contact us or make a tax deductible contribution through our website at www.nunoaproject.org. The farmers in Peru need your help now.

