

Nunoo Project Update: July 2013

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The Nunoo Project is a non-profit organization with alpaca teaching and research programs in the US and Peru. Both the North American and South American projects are funded solely by private donations from US alpaca farmers. In the US we provide courses for undergraduate students in Camelid Management and Alpaca and Donkey Reproduction. We maintain a teaching and research herd of 20 alpacas and 6 donkeys. Students are also able to gain experience in laboratory and field investigation techniques and problem solving while being involved in practical research programs in reproduction and infectious diseases. Many students take advantage of these programs during their undergraduate years before veterinary school. They become the camelid veterinarians and researchers for US alpaca farmers. In addition the North American Camelid Studies Program provides intensive camelid practice courses for veterinarians and veterinary students at multiple times during the year in the US. Nunoo Project veterinarians and students also work in Peru in July and during the breeding season from January through April to help improve alpaca production in the Nunoo district in the southern Peruvian altiplano.



Nunoo farmers herd animals into a corral for ultrasound examination for pregnancy in July 2013.

There are approximately 145,000 alpacas in Nunoo District in the southern Peruvian highlands. Most of the farmers are living under extreme economic hardship with alpaca fiber and meat as their only cash crop. It is our hope that the project we have started will spread throughout the district as farmers see the positive results in animal production. It is based on improved breeding management including record keeping, critical evaluation of breeding animals, and on introduction of superior genetics into breeding herds. These are the same goals of farmers everywhere. Economic hardship has prevented this from happening in most herds in Nunoo in the past.

The Nunoa Project veterinary team spent 2 weeks working in Peru in July 2013. The people involved included 3 veterinary students (Jett Eder and Kimberly Hoefert from Kansas State University and Yvette Chretien from Ohio State University [also a former student in the North American Camelid Studies Program]). Nunoa Project prevet student Christina Baker who spent 4 months working with alpaca farmers in the beginning of 2013 also returned to see firsthand the results of her work with improving pregnancy rates in local herds. The team was led by Nunoa Project veterinarians Steve Purdy from the US and Gisela Marcoppido from Argentina who take part in each work trip in Nunoa. The **Nunoa Project Alpaca Herd Improvement Project** is a collaboration with local veterinarians and technicians from the Proyecto Alpacas Nunoa (PAN). Together we held two seminars while in Nunoa: one on alpaca health and breeding with the local farmers which attracted 60 attendees, and another with the PAN workers on alpaca semen evaluation. The farmers and local workers are always interested in learning more to help improve production as they depend on alpaca fiber and meat production for their livelihood. We distributed our partner CONOPA's (www.conopa.org) alpaca adult and cria health manuals to all attendees.



Three generations of a Nunoa Alpaca herding family working with Dr. Steve Purdy and Dr. Gisela Marcoppido from the Nunoa Project.

In the 2013 breeding season 10 groups of farmers and 200 females used 10 of our Nunoa Project breeding males. For the 2014 breeding season (January through March) one more farmer has been added and 290 females will be involved in the program with all 14 superior males. We performed pregnancy ultrasound examinations in July on all of the herd improvement project females. The positive results of the program were obvious as pregnancy rates in these females were increased from the typical 30 to 50% in Peruvian herds to 65 to 90% (average of 79.5%). Extending the male exposure to a full 90 days in all groups in 2014 should increase those percentages even more. The crias produced from these breedings to superior males become the breeding stock for the farmers. Females are usually started into breeding at 2 years of age and males at 3 years of age. The cria group born in 2013 from the first Nunoa Project males introduced in 2012 was excellent. These animals exhibit uniform distribution of superior fiber throughout the blanket which will result in increased quality and quantity of fiber, and thus more income for the farm families. Female production is also

being monitored and those animals which are unable to produce a cria after two breeding seasons will be removed from the select breeding herd. We implemented programs in reproduction management and record keeping with these farmers as none existed at the start of the project. This is not because of a lack desire to improve but more due to a lack of money to upgrade the herd genetics by introducing new males and to purchase identification tags. Most farmers in the area and all of those involved in our project do not keep track of breeding success with males or females. Everyday life there is very difficult for farmers and their families with marginal nutrition, medicine and shelter for the people, and they do not have the resources or incentive like farmers in some other parts of the world.

Nunoo Project Macho Number	Macho Age (years)	Number of Days Exposed to Hembras	Number of Hembras in Group	Pregnancy Rate (%)
5	2-3	60	24	67
12	4	90	20	65
13	2.5	77	20	70
8	2-3	64	19	79
11	4	78	20	80
9	2-3	62	19	84
3 and 4	6 and 6	90	40	85
10 and 14	4 and 4	90	40	90
1	6	Not used in 2013		
2	6	Not used in 2013		
6	2-3	Not used in 2013		
7	2-3	Not used in 2013		

Pregnancy data for 2013 breedings with Nunoo Project males.

In 2014 we will have a Peruvian veterinarian supervising the team of US and Peruvian students working in Nunoo during the breeding season. Our collaborators from CONOPA in Peru select the Peruvian members of the team. We will continue to work with the local PAN team and identification tags for all 2014 crias will be provided to participating farmers. Some farmers are interested in a workshop on post breeding semen evaluation and it will be held in January 2014 with actively breeding males and females. The techniques we use in Peru are those we developed in the US in our North American Camelid Studies Program. Post breeding samples are collected from the vagina of the females immediately after the male dismounts. The samples are evaluated for semen color and viscosity, and sperm concentration, activity, percentage live, and morphology. This is done in the field just as we do in our teaching and research herd and in local breeding herd studies in the US. It will also be introduced in Argentina by Dr. Marcoppido in 2014. This allows farmers to quickly determine if their males are producing adequate sperm during the breeding season to maximize pregnancy rates. Males may need to be rested to allow for sperm reserves to be replenished before resuming breeding. If males are overloaded with too many females in too short a time period (some farmers in Nunoo were using 1 male to 80 to 100 females for only 2 months), then low pregnancy rates and low cria production are the result.



US veterinary students Kimberly Hoefert and Yvette Chretien examine one of the Nunoa Project's breeding males.

Some observations from our work in the US and Peru which have applicability to the rest of the world as well:

1. When 2 males are put in a small corral with 40 females to breed they concentrate on fighting instead of breeding.
2. If they are on pasture with the same number of females with more breeding space this decreases.
3. If males have large numbers of females to breed then there is less fighting.
4. Males will breed the same female repeatedly in one day in a corral.
5. Semen evaluations performed over 2 days (6 breedings) with one male with 20 females revealed no sperm in any post breeding samples. This might have worked out over the 3 months breeding season since when all of the receptive females are bred the male gets a forced rest to enable sperm reserves to replenish. 4 days of sexual rest corrected the problem as sperm were found from the first and second breedings after that time period.
6. Some males are more aggressive towards breeding females when moved to a small corral than they are on pasture.
7. Breeding occurs both during the day and after dark if males and females are housed together.
8. To improve reproductive management:
 - a. Use animal identification tags and evaluate production records.
 - b. Cull or remove low fertility animals to fiber or meat herds.
 - c. Sell poor wool animals for meat.
 - d. Decrease female/male ratio to 30:1 maximum to increase pregnancy rates.
 - e. Perform semen evaluations/watch for repeat breeding/perform pregnancy ultrasounds to make sure males are effective.
9. Superior males >> improve herd production; new males should be introduced based on fertility and cria production results.
10. Low fertility males and females should not be bred; they lower herd production and may pass on this bad characteristic in their offspring.
11. Males and females with low disease resistance should not be used as breeding animals.
12. Overcrowding leads to increased disease, increased mortality, and low production in a herd.
13. Overuse of drugs quickly leads to emergence of drug resistant GI and skin parasites.
14. Management of parasites is the best practice, not attempts to eliminate them which will only serve to worsen the problem.



Nunoa Project veterinarians and municipality workers with alpaca farmers check females at 5,000 meters altitude.

Economic support for our work in Peru and the US comes from a few US alpaca farmers. We need to expand our financial support to be able to continue these important programs which benefit students and farmers in both countries. Many US veterinary students and prevet students have been positively affected by education programs and working in both the US and Peru. Our expansion into working with Peruvian veterinarians and students started in 2013 will continue in 2014. We are in need of increased funding to continue this important work. We are getting ready for another academic semester of courses and are continuing research in the US and are in need to funding for the US teaching herd and academic and research programs and for the 2014 work in Peru. Please see our website at www.nunoaproject.org and consider making a tax deductible contribution now. You may contact the Nunoa Project at any time through Dr. Steve Purdy at srpurdy@nunoaproject.org.



Future herd sire: one of the outstanding male crias produced in 2013 from breeding with Nunoa Project males in 2012.