

NUÑO A PROJECT PERU:

January 2020 VETERINARY WORK TRIP

Leaders: Heather Jenkins and Jhoana Jimenez



INTRODUCTION

Nunoa Project Perú worked with alpaca farmers in the Anansaya Puna region of Peru, 40 minutes away from the town of Nuñoa from January 3rd to January 16th 2020.

We have been working with this association of farmers since June 2018, with cooperation of the Vet in charge, Dr. Efrain Ccoyto, of the research station Tambo Anansaya Puna at 4320 meters above sea level.

The aim for this trip was to evaluate genetic, reproductive, and nutritional status of the herds of the participating farmers. The team also identified the farmers' animal health concerns and formed a plan for solutions.

January 3rd 2020

Four North American Studies Program students from Massachusetts, one vet student from UC Davis, one vet student from the University of Penn, one veterinarian team co-leader from the US met up with our Peruvian team leader veterinarian at the Cusco airport. They travelled from Cusco to the Urubamba to spend the night at a hostel.



The Nuñoa Project veterinary team: Shelby, Jill, Shayla, Nicole, Dr. Jenkins, Dr. Jimenez; and Carissa and Connor at the bottom.

January 4th 2020

The group spent the day acclimating to the altitude at Ollantaytambo, Moray and the salt mines. We had a good day sightseeing, getting to know each other and acclimating to the altitude.

January 5th 2020

We left in the morning for the 5 hour ride from the Urubamba area to the town of Nuñoa. In town they ate lunch and gathered supplies at the Sunday market for their 10 days at the Tambo Anansaya Puna research station. They spent the evening cleaning, organizing and settling into the station.

January 6th 2020

Farmers and team members discussed the plans for the work in the morning. The volunteers were introduced to the farmers. Farmers gave their reservations about the age of our loaner males (older than they usually use but still producing good offspring and having good pregnancy results), and working in the afternoon. Many of the farmers were concerned about the thunderstorms in the afternoon, as there had been recent reports of electrocution of some herders.



The team at the entrance to Nuñoa.

Even though The Nunoa Project team would like to work all day a lot of the farmers and herders were reluctant. A final schedule was created that would be subject to change over the next 10 days. After lunch they departed the research station in a small pickup truck. Some of the students were in the cab of the truck and the rest were in the bed. Despite the threat of an afternoon thunderstorm they felt it was important to drive to the farm that was holding our superior loaner breeding males. They got close to the farm but was unable to cross the river due to high level and swift running water.

The results of examinations for each farmer's animals are noted in the summary table at the end of this document.



Dr Efrain, Dr. Heather and Dr. Jhoana coordinating visits with all farmers.



Top row: Efrain, Heather, Francisco, Benedicto, Nestor, Shayla.

Middle row: Quintina, Silveria, Felipe, Jose's Wife.

Bottom row: Jhoana, Shelby, Connor, Carissa, Nicole, Jill

January 7th 2020

★ Farmer #1

The team drove for roughly 20 minutes to the farm. Then farmer wanted to borrow two males from the Nunoa Project. He has roughly 800 animals. He has 200 males, but only uses 7 for breeding. He has approximately 350 open females, 250 pregnant females, 150 yearlings (tuis), and the number of crias is unknown. The birthing season was in progress. He said he had a pregnancy rate of 60% (low). He believes his abortion rate is 10% with most occurring in the colder dry season. His breeding strategy is to put 2 males with 200 females between 5 pm and 7 am for 1 week then change to 2 different males the following week.

The team evaluated 30 females that the farmer and his shepherd chose. They placed 30 ear tags, aged the females, assessed the body condition score (BCS), and ultrasounded for pregnancy. While looking at his herd we noticed one or two possible traumatic eye injuries. We didn't see any skin lesions. All vulvas and mammary glands were in good condition.

After returning to the research station Dr. Jenkins gave a lecture on alpaca basics, vaccines, intestinal parasites and meningeal worm disease to the team.



Farmer #1's herd in the examination corral.

January 8th 2020

★ **Farmer #2**

He has approximately 360 animals: 250 females, 50 males, and 60 yearlings (tuis). He has a pregnancy rate of 50% (low) and an abortion rate of 20% (high). He breeds 2 females with 1 male in a corral from 5 pm to 6 am. The female herd was on their way out to eat when the team arrived. Farmer #2 wanted then team to evaluate his breeding males. He was interested in partnering with The Nunoa Project in loaning males to other farmers.

The team evaluated 12 males. Not all males had eartags. They checked at color, type of alpaca, age, BCS, size and firmness of testicles, characteristics of fiber and for obvious diseases. The males were a mix of Huacayas and Suris. He had white, dark brown, and brown colored animals. They found one cryptorchid male, and some males with small and soft testicles. They felt like the stature of the 12 males was on the small side but the farmer did not agree in all cases. They chose 2 males that may be suitable loaners if needed, Both are older white Huacayas.



The team walking to see Farmer #2 .

★ **Farmer #3**

He had approximately 30 plus animals. He states that he has 30 females, 1 male, and 8 yearlings. He has an estimated pregnancy rate of 50% (low). He stated there were 5 abortions last year (high). He breeds his alpacas by putting one male into the entire herd

during breeding season. His male has access to crias, females, and yearlings. He does complain about cases of diarrhea, enterotoxemia, or pneumonia. The team found two alpacas with fibromas on the upper lip. This is the most common skin tumor of alpacas, but it is rare. He doesn't experience much mange. He treats the herd with Ivermectin before and after the rainy season.

The team evaluated 20 alpacas in the herd. The pregnancy rate was 65% diagnosed by ultrasound and ballottement. The average age is 4.3 years. They checked a newborn cria that had been born prior to their arrival. The baby seemed to have a neck issue, but they could not find any identifiable problems on physical exam. The baby seemed healthy and the mom had a good udder.



Shayla and Dr. Jhoana holding an alpaca to examine it. Farmers are nearby

★ Farmer #4

He has approximately 200 animals. He states he has 100 females, 4 intact males and roughly 20 castrated males, and 30 yearlings. He claims he has a pregnancy rate of 30% (very low) with a 15% abortion rate (high). During breeding season his 2 Huacaya males and 2 Suri males are put in with the females, crias and yearlings in the morning. There is no attempt to separate Suris from Huacayas. He stated that he struggles with

Enterotoxemia in crias in January and February. He occasionally experiences problems with dystocia. The team recommended that he attend the Nunoa Project birthing lecture on the 10th. He experiences pneumonias in August when it can be very cold. He does see coccidiosis in newborns during breeding season (January to April). There are two animals with mandibular osteomyelitis. He treats the pregnant females with Ivermectin for sarcoptic mange in October.

The team evaluated and ear tagged 7 females. They had a pregnancy rate of 30% (very low) and an average age of 2.7 years. They did not see any obvious signs of disease or illness in the 7 they examined. One of the pregnant females had good mammary development. The other pregnant female did not, but this can change even up to birthing time.



Farmer holding the alpaca. Dr. Jhoana and Shelby performing ballottement to check for late pregnancy.

★ Farmer #5

This farmer has approximately 220 animals. He states he has 20 males, 200 females and 80 yearlings. He claims he has a pregnancy rate of 40% (low) and an abortion rate of 10% (high normal). He breeds his animals by putting the males in with the females in the morning between 6am and 8pm. He breeds from January to March 15th. He struggles with sarcoptic mange despite treating all animals in the herd. He sees lice, tape worms and nematodes. He sees cria enterotoxemia cases in February. He sees pneumonia during the rainy season. He has conjunctivitis cases, otitis cases and osteomyelitis cases. He does have diarrhea cases. He does see alpaca fevers occasionally. We did see a weanling age cria with a splint on his/her left rear leg. Overcrowding and malnutrition are suspected with this amount of disease. It can also be associated with poor genetics from an immune system standpoint.

We evaluated and ear tagged 11 females. The shepherds picked the 11 to be evaluated. They refused to evaluate any that had white spots in their iris regardless of how small. The average age was 2.8 years. The average pregnancy rate of the 11 was 72% (8 pregnant or with cria/ 3 not pregnant).



Dr. Jhoana, Dr Efrain and Mr. Cerapio talking with the farmer about her herd.

January 9th 2020

★ Farmer #6

The owner of this group is a veterinarian, but he was not present for the visit. The farm had recently purchased a male from Rural Alianza, a large corporate farm in the area. They wanted the team to evaluate 30 females and to borrow a male from NP. The shepherd states that he has approximately 350 animals. There are 20 males, 343 females, and 70 yearlings. He has a 50% pregnancy rate (low) with a 10% abortion rate (high normal). He breeds from December to April and put the males in 8 days prior to the evaluation. He uses 3 Suri and 4 Huacaya males with 50 females of both types daily for 1 month, and changes to a different 30 females the following month.

He experiences enterotoxemia in crias and pneumonia during the rainy season. He has seen coccidiosis, tapeworms and diarrhea. He has lice and sarcoptic mange. He treats with Ivermectin in June and December. He will sometimes see otitis cases. We did see cases of uterine infections diagnosed by a discharge coming from the vulva and evidence on the tail.

The team evaluated and ear tagged 30 potential females to breed to a NP male. They checked all females for uterine infections, vulvar conformation and mammary gland characteristics. The average age was 4 years. Some may already pregnant with the recent male exposure.

The ride home was an adventure. The team had to ride in the back of the truck with a sheep headed to town to be slaughtered. They got stuck in a large mud puddle on the way back to the road. They worked really hard for 3 hours trying to get the truck out. They were unsuccessful and caught a ride back with another farmer just before the rain started.



The team working with the farmer's herd. Dr. Jenkins is examining teeth while another group is ultrasounding for pregnancy.

January 10th 2020

At Tambo Anansaya Puno

This was farmer conference day. The conference started at 11:30 am with 15 farmers in attendance. Jhoana lectured on the diseases and problems that could affect crias in the first year. Heather lectured on dystocia, the first 24 hours after the cria is born, and feeding the orphan cria. The meeting finished with more discussion about the NP males and more schedule changes.



Dr. Jenkins explaining about the normal birthing process and how to correct dystocias while Dr. Jhoana translated.

Examination of Nunoa Project Superior Breeding Males

After the conference the team travelled to examine the NP males which are loaned to area farmers. This time they were able to safely navigate two rivers to arrive at the farm, roughly an hour commute from the research station. There are 8 males on the property. The team was able to examine 7 of them but unable to catch the 8th. The males were scattered in three different paddocks. They had to form a human corral and catch each male while holding the others in close proximity. There were 3 who were very thin with a BCS of 1. There were 3 with significant mange. This seems to be associated with stress including malnutrition. It was determined that the males should be moved to another farm for care and distribution. Five males had firm testicles and good measurements. Number 13 with a BCS of 1 and severe mange passed away a few days after moving to a new farm after we had left the country. As of 1/10/2020 the NP had 3 males that were ready to loan. 2 males had mange that needed treatment and one was not examined by the team.



Dr. Jhoana holding one of our males while Shelby is examining testes. Jill, Connor and Corissa are making a human corral to keep all males together.

January 11th 2020

The team woke up to snow on the ground and a very wet and cold day. They waited for the scheduled farmers to arrive to take them to their farms. They ultimately canceled. In the afternoon Dr. Jenkins lectured to the students about external parasites, geriatric alpacas, dental care and breeding soundness exams. The farmers that were scheduled for the day were never seen by the team during the visit.



Snowy morning at the Tambo.



One farmer came to apologize for canceling the visit due to the bad weather. He brought a box full of just baked homemade bread with cheese for the team.

January 12th 2020

This was a Sunday and the weekly market day. No one works on market day. The team drove into town in a taxi to buy food, to get some lunch out and to look around. Everyone had a great day exploring local produce and food options. They were able to see a market that catered to the locals' needs and not to tourists.



Different stands of products in the local market.

January 13th 2020

★ Farmers #7 and #8

Then husband is a taxi driver and the couple own a store in the town of Nunoa. They do not have enough shepherds to help with their 270 animals. They are interested in borrowing a NP Suri male. They have 190 females and 10 males. They use three for breeding. They have 70 yearlings. They have a pregnancy rate of 50% (low). Over the past year they had 15 abortions (normal since < 10%). They have two breeding groups. One group has all open females in with 3 males, 2 Huacayas and 1 Suri. The second group is the pregnant females with 2 Huacaya males.

They do have some problems with mange in the older animals. They treat for mange twice a year in May and November. Their crias have diarrhea during the birthing season. They see enterotoxemia in crias in April and May. They may have a few cases of pneumonia during the rainy season. They treat for liver flukes in June. They have found liver flukes at slaughter. The team saw some jaw infections and corneal/eye damage.

The males were placed in with the females 28 days ago. This gave the team a chance to use the transrectal ultrasound probe to find some early pregnancies. The team was to pick 30 Suri females that were not pregnant to breed to a NP Suri male. They chose the females and placed ear tags in all females. All females appeared to be healthy with good conformation. The average age was 4.2 years. After observing their herd and land, the team leaders negotiated with them to care for and pasture the NP males.



Dr. Jhoana and Connor talking to a farmer about his herd.



His partner's herd in corrals where they usually spend nights.

★ Farmer #9

This farmer works at the research station. He enjoys taking his animals to competitions and wins with both Huacayas and Suris. He has approximately 100 animals. He has 80 females, 10 males, and 20 yearlings. He uses 4 males (2 Suris and 2 Huacayas) for mating. He divides his herd into his high-quality show animals in one group and all the animals in the second group and has a 60% pregnancy rate (low). He had two abortions in November 2019 (normal). He has similar problems as the other farmers in the area. He treats his animals for mange twice a year before and after the rainy season. He experiences enterotoxemia in February and March. He sees diarrheas cases starting in November and during the rainy season. He does have trouble with standing water in pastures during the rainy season and this may be a contributing factor. The animals also experience pneumonia during the rainy season. He admits that predators are a huge problem for him. He has lost 3 yearlings and 5 crias in 2019 to foxes.

Felipe brought 14 animals for evaluation, but 4 turned back and ran home when he was close to the exam location. The team evaluated at all 10, but we only recorded data on 9. The owner decided the 10th animal wasn't good enough. The team tagged 8 females and one male with NP ear tags. They did not ultrasound any of the females at the request of the farmer. He informed them that NP 2020 108 was pregnant and that the rest were open. All animals looked to be in good health and good conformation. He had several of the animals coated to protect the fiber. The average age is 4.3 years.

The team waited at the farm for another farmer to arrive, but he did not show.

At the end of the day then team gathered to start discussing what they had seen over the past 7 days. They diagnosed and discussed problems that were observed then discussed practical solutions to offer the farmers they visited. Jhoana had been working on creating a record system for each farmer, a problem list and solution plan, and pictograms to help farmers understand what the team is recommending.



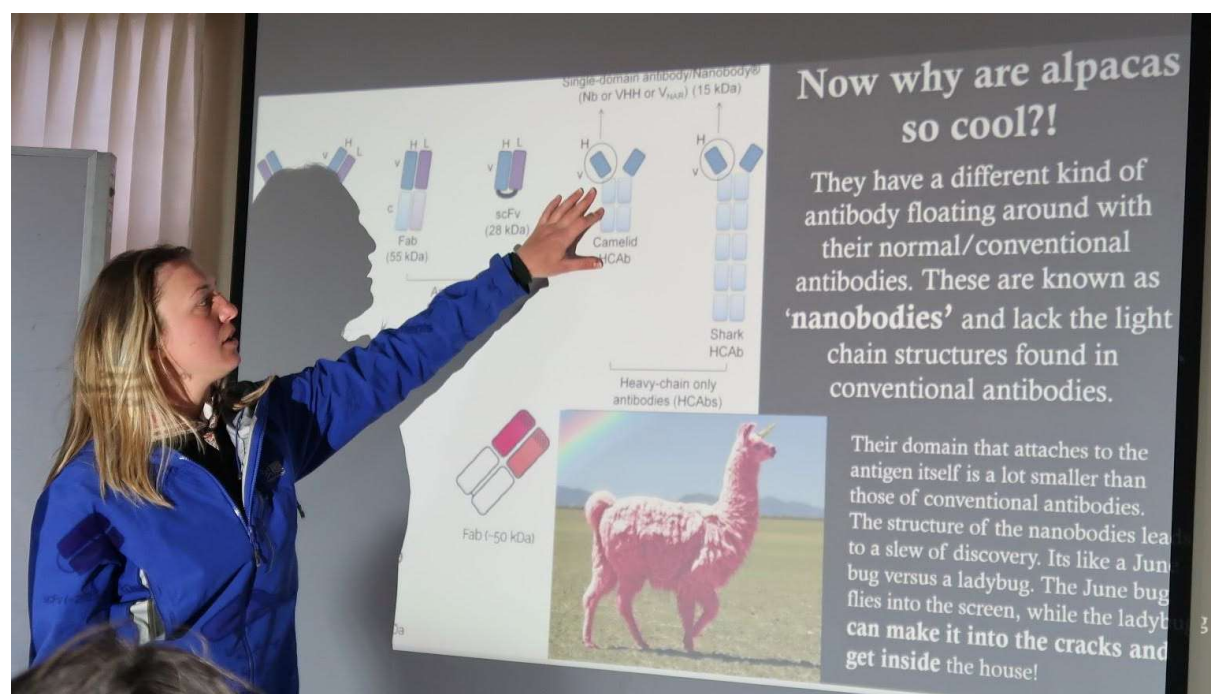
Team working with the farmer's herd. Most of the animals are covered to keep their fiber clean for competitions



*Left: One of the farmer's best Huacaya alpacas.
Right: Fiber from one of the best Suri alpacas he has.*

January 14th 2020

All farmers canceled for that day. Dr. Jenkins lectured to the team on dystocia in camelids, sheep, goats and cows. Shelby lectured on research concerning camelid antibodies/nanobodies which opened up a great conversation amongst the team.



Shelby talking about nanobodies from alpacas.

January 15th 2020

★ Farmer #10

The farmer brought his herd to the Tambo at 6 am. He has approximately 65 animals. There are 47 females. He is borrowing males. He has 3, 2-year olds and 15 yearlings. He believes he has a 74% pregnancy rate (normal). He had 6 abortions in the past year (normal). He breeds his animals by putting in a male with the whole herd. He does not wean crias and animals do now have access to corrals or shelters. This is common for the altiplano herds. He actually will bring the crias into the house on really cold and rainy nights, which is uncommon. He makes cria coats out of fabric and plastic dog food bags. He experiences enterotoxemia and diarrhea in February and March. He sees pneumonia during the rainy season. He periodically sees lice in his crias and treats accordingly. He also treats mange with ivermectin.

The team evaluated and ear tagged 13 females and 2 males. The average age is 3.6 years old. He had a 70% pregnancy rate in the 13 females evaluated (low normal).



NP team examining an alpaca, looking for pregnancy with transabdominal ultrasound. Then poncho proves shade to be able to visualize the equipment screen.



The farmer tries to protect crias from bad weather by covering them with a blanket under a plastic bag coat.

★ Farmer #11

This farmer brought her 68 animals (llamas and alpacas) to Al Tambo for the team to evaluate and to help her with a breeding male. She has 24 females, 12 castrated adult males, no intact adult males, 18 yearlings and several crias. She had 11 females of her pregnant 16 give birth. Eight crias were aborted in August and September 2019 (high). She does not have any corrals or shelters. She is unable to wean her crias. She does not keep any herd records. She keeps all her males, females and young animals together. There is evidence of many mixed breeds and congenital abnormalities such as polydactyly (extra digits) animals and cryptorchid males (retained testicles). Prior to NP's arrival she castrated all her adult males so NP would loan her a good male to help her herd.

She loses crias to enterotoxemia, diarrhea and pneumonia during the rainy season. She does not have many problems with lice and sarcoptic mange. She does treat all animals in November with Ivermectin.

The team evaluated 6 animals, 5 Huacayas and 1 Suri. There are 2 males and 4 females, all are less than 2 years old that had the best characteristics of the species. None of the females were pregnant. The team chose two young males < 2 yrs. of age as future herd sires. It appears that she cares for these animals on her own. She is in desperate need of help. It is obvious that she loves her animals and tries hard to protect her babies as demonstrated in the photos below.



The farmer and her beloved cria.



This farmer used a scarf to cover the cria's umbilicus to avoid contamination at birthing.



Polydactyly, evidence of inbreeding problems in a herd.

January 16th 2020

The team left Al Tambo in the morning and headed back to Ollantytambo. Dr. Jhoana printed all the farmers records, recommendations and pictograms for Efrain to distribute. We stopped by Brigida's store in Nunoa and negotiated the movement and placement of the NP males to her farm. She agreed to house those needing treatment an extra good in a paddock behind her house. Once they are healthy, they can join the herd. The rest of the males can be moved to Brigida's farm after breeding season is over.



Last meal of the NP team in Ollantytambo.

SUMMARY TABLE OF FARMERS

Farmer	Breeding Females	Breeding Males	Yearlings	Estimated Herd Pregnancy Rate (%)	Estimated Abortion Rate (%)	BCS < 3(%) 1 or 2 of 5	No. of Breeding Females Examined	Females Determined Pregnant (%)	Herd Problems
1	350 open 250 bred	7	150	60	10	77	30	90	female to male ratio too high; 2 males with 200 females and change males each week, low BCS, low preg rate
2	250	50	60	50	20	10	none 12 machos only	NA	some small breeding males; 1 cryptorchid; low preg rate; high abortion rate
3	30	1	8	50	16	85	20	65	low BCS; low preg rate; high abortion rate
4	100	4	30	30	15	71	7	30	enterotoxemia, dystocia, mange; low preg rate; high abortion rate
5	200	20	80	40	10	27	11	72	mange, needs cria shelters; low preg rate
6	343	20	70	50	10	40	30	0	enteroxemia pneumonia; low preg rate
7 and 8	190	10 3 breed	70	50	<10	47	30 suris	0	100 females to 1 male; dirty and wet corrals (overcrowding); liver flukes; low preg rate
9	80	10 4 breed	20	60	<10	11	9	none checked	low preg rate; predation by foxes
10	47	borrows them	15	75	15	62	13	69	one group- uses cria coats; brings them inside when cold weather; high abortion rate
11	24	0	18	70	33	50	6	0	needs a macho, polydactyly, cria diarrhea and pneumonia; high abortion rate
Total				< 70 is low	> 10 is high	> 50 is high	160	< 70 is low	

SUGGESTIONS/ LESSONS LEARNED FROM THE 2020 TRIP PERÚ

The January 2020 trip was a very good experience for the team and the farmers. Dr. Jhoana also created records and written pictogram/information sheets to help educate farmers. In subsequent visits we can increase the number of animals ear tagged and increase the number of animals evaluated. By placing ear tags, we can encourage record keeping. An additional regional alpaca association has contacted us to arrange for farmer assistance starting in June 2020.

The NP volunteers can continue to develop practical solutions to help farmers in the Puno region. All farmers are presented with a written problem and solutions document along with updated records at the end of each visit.

Another long-term goal is providing consistent water sources for the animals in the Puno region. The NP is exploring the opportunity to partner with other NGO's to help provide consistent watering sources for the Puno farmers. No one has been identified to date.

Teaching BCS evaluation is critical to helping farmers identify when their animals need more food and/or water. Malnutrition is a common problem in the altiplano, and it is tied closely with incidence of infectious diseases along with unclean pastures and corrals.

Causes of low pregnancy and high abortion rates need to be identified and practically solved if possible, to improve herd production. Continual evaluation of breeding males and herd reproductive performance are critical. From past years' diagnostic evaluations in Puno we believe that malnutrition is the cause of most abortions and deaths in the dry (cold) season.

Cria disease and death can be reduced by improving sanitation in birthing and turnout areas.

Respectfully submitted:

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22 February 2020